

Jason Michelson Project Manager Chevron Environmental Management Company 1400 Smith Street, #07084 Houston, Texas 77002 Work: 713-372-0289 Cell: 281-660-8564 jmichelson@chevron.com

July 25, 2018

Olivia Yu Environmental Specialist New Mexico Oil Conservation Division, District 1 1625 N. French Drive Hobbs, NM 88240

### Re: Chevron Lovington Paddock Unit 59 2017 Soil Assessment Report Case No. 1RP-915 Lea County, New Mexico

**APPROVED** By Olivia Yu at 8:54 am, Sep 17, 2018

NMOCD approves of the proposed monitoring well to complete site assessment for 1RP-915.

Dear Ms. Yu,

Please find enclosed for your files copies of the following report:

 Lovington Paddock Unit 59 – 2017 Soil Assessment Report, Unit G, Section 1, Township 17 South, Range 36 East; Lea County New Mexico.

The report was prepared by GHD Services (GHD) on behalf of Chevron Environmental Management Company (CEMC) to document on-going assessment activities throughout 2017 at the Site.

Please do not hesitate to call Scott Foord with GHD at 713-734-3090 or myself at 713-372-0289, should you have any questions.

Sincerely,

Jan Mil

Jason Michelson

Encl. Lovington Paddock Unit 59 – 2017 Soil Assessment Report

C.C. Amy Barnhill, Chevron/MCBU



# **Site Assessment Report**

Lovington Paddock Unit 59 1RP-915 Produced Water Release Lea County, New Mexico

Chevron Environmental Management Company





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# 1. Introduction

On behalf of Chevron Environmental Management Company (CEMC), GHD Services Inc. (GHD) prepared this report summarizing site assessment activities conducted at the Lovington Paddock Unit (LPU) 59 site (hereafter referred to as the "Site"). The Site is located in Unit G, Section 1, Township 17 South, Range 36 East, approximately 5 miles southeast of the City of Lovington (COL) in Lea County, New Mexico. The land surface is owned by the COL and the minerals are managed by the State of New Mexico. The location of the Site is identified on the vicinity map of Figure 1 and the aerial map of Figure 2.

# 2. Background

According to historical records provided to GHD, an estimated 40 barrels (10 barrels recovered) of produced water were released from a pipe in a valve box at this location on June 4, 2006. The approximate affected area was estimated at 200 feet x 200 feet.

Shallow soil samples were collected from the impacted area in July 2010 from six hand augered sample locations (AH-1 through AH-6) at sampling intervals of 0 to 0.5 feet below ground surface (bgs), and in August 2010 from six locations in a sample trench (T-1 through T-6) at sample intervals of 0 to 1 feet bgs. Sample analyses included total petroleum hydrocarbons (TPH); benzene, toluene, ethylbenzene, and xylenes (BTEX); and chloride from the July 2010 sampling event, and chloride only during the August 2010 sampling event. TPH and BTEX concentrations were below laboratory detection limits in the upper sample intervals from the hand augered locations (0 to 0.5 feet), and therefore these analyses were not performed for the deeper intervals collected from the trench samples. Chloride results from both intervals collected at locations AH-2, AH-4, T-2, T-3, T-4, T-5, and T-6 exceeded the Recommended Remedial Action Level (RRAL) of 250 milligrams per kilogram (mg/kg) for chloride.

In May 2011, GHD subcontractor Harrison Cooper, Inc. (HCI) advanced five soil borings (SB-1 through SB-5) utilizing an air-rotary drilling rig to depths ranging from 20 to 40 feet bgs, and soil samples were collected at five-foot intervals within each of the five soil borings. Samples were submitted to ALS Environmental laboratory in Houston, Texas for analysis of chlorides by EPA Method 300.

Laboratory analytical results indicated that the vertical extent of chloride impact was not yet defined in borings SB-2 and SB-3. On June 27, 2012, GHD and CEMC met at the New Mexico Oil Conservation Division (NMOCD) District 1 Hobbs office to discuss the path forward for the Site. The NMOCD requested that additional assessment be completed to further evaluate the vertical extent of chloride impacts.

In December 2012, under the supervision of GHD, HCI advanced two additional borings (SB-2b and SB-3b) utilizing an air-rotary drilling rig to depths of 70 feet bgs. Soil samples were collected from 40 to 70 feet bgs at 10-foot intervals in an effort to delineate the vertical extent of chloride impacts to soil. Samples were placed in laboratory-supplied sample containers on ice, labeled, and submitted to Lancaster Labs in Lancaster, Pennsylvania for analysis of chlorides by EPA Method 300.



Groundwater was not encountered in either boring. Following completion of activities, the borings were backfilled with hydrated bentonite pellets to the ground surface.

Monitoring well MW-1 was installed in October 2016 to assess potential groundwater impact in follow-up to soil analytical results collected and reported during previous assessments conducted in 2010 through 2012 that indicated chloride concentrations extending vertically to a depth of at least 70 feet bgs. No soil samples were collected during MW-1 installation activities. The depth to groundwater was confirmed at the Site at 101 feet bgs. BTEX and TPH constituents were non-detect in the groundwater sample, and chloride concentrations reported for the groundwater sample collected from MW-1 in October 2016 were below the New Mexico Water Quality Control Commission (NMWQCC) standard of 250 mg/L.

Analytical results associated with assessment activities conducted from 2010 through 2016 indicate that the horizontal and vertical extent of chloride impact in soil had not been fully delineated. MW-1 was re-sampled in May 2017, and six additional soil borings (SB-6 through SB-11) were advanced and analytical analyses performed in October 2017 in an attempt to fully delineate the horizontal and vertical extents of chloride impact to soil. Soil boring and monitoring well locations are depicted on Figure 3. Soil analytical results are summarized on Table 1. Results from the 2017 assessment activities are summarized below.

# 3. Remediation Standards

### Soil

Information available from various sources including the Petroleum Recovery Research Center (PRRC) Mapping Portal, GHD currently managed groundwater site(s) data, and the United States Geological Survey (USGS) Current Water Database for the Nation, concludes:

- The depth to groundwater from the deepest impacted soil at the Site is less than 50-feet bgs.
- The nearest private domestic water source is greater than 200-feet from the release site.
- The nearest public/municipal water source is greater than 1,000-feet from the release site.
- The release site lies more than 1,000 horizontal feet from the nearest surface water body.

The NMOCD provides guidance for remediation of contaminants of oil field wastes or products in Guidelines for Remediation of Leaks, Spills, and Releases (August 13, 1993). Consequently, the NMOCD total ranking criteria score is twenty (20) for the Site. The site-specific RRALs applied to this location by the NMOCD are 10 milligrams per kilogram (mg/kg) for benzene; 50 mg/kg for total benzene, toluene, ethylbenzene, and xylenes (BTEX); 100 mg/kg for total petroleum hydrocarbons (TPH); and an NMOCD accepted 600 mg/kg for horizontal and 250 mg/kg for vertical delineation of chlorides.

In an August 28, 2017 telephone conversation between Bernard Bockisch (GHD) and Jim Griswold (NMOCD Environmental Bureau Chief), GHD was informed that the NMOCD is accepting chloride concentrations of 600 mg/kg for the horizontal delineation assessment clean up levels.



### Groundwater

The NMOCD provides guidance for remediation of contaminants of oil field wastes or products in Guidelines for Remediation of Leaks, Spills, and Releases (August 13, 1993). The guidance requires remediation of groundwater to the human health standards of the NMWQCC set forth in New Mexico Administrative Code 20.6.2.3103. Standards for BTEX and chloride are listed below.

Analyte	NMWQCC Groundwater Standard (mg/L)
Benzene	0.01
Toluene	0.75
Ethylbenzene	0.75
Total Xylenes	0.62
Chloride	250

NMWQCC groundwater standards do not include TPH.

# 4. Geophysical Survey – EM31 and ER

In June and August 2017, GHD completed a two-phase geophysical investigation at the Site. The purpose of the investigation was to delineate areas of elevated conductivity in order to map the extent of suspected chloride impacts to soil at the Site. The first phase of the investigation consisted of an electromagnetic (EM) survey to delineate the footprint of the suspected impacts. Based on the EM survey results, an electrical resistivity (ER) survey was completed to determine the vertical distribution of the suspected impacts. Survey coverage data are presented on attached Figures 4 (EM Survey Results) and 5 (ER Survey Results and Historical Soil Analytical Data).

The EM survey was completed with an EM31 terrain conductivity meter. Prior to conducting the EM31 survey, a grid consisting of parallel lines was established over the proposed area of investigation indicated on Figure 4. Measurements of EM31 data were collected along 30-foot spaced grid lines over the area of investigation, with station spacings of approximately 4 feet on all grid lines. The ER survey line location was chosen based on the EM31 survey results, and transected the EM31 conductivity anomaly. The configuration of the electrodes (also called an array) and the electrode spacings were optimized to achieve an approximate depth of investigation of approximately 70 feet bgs, and the electrode spacing on all grid lines was on the order of 6.6 feet (i.e. 2 meters).

## 4.1 EM31 Survey Methodology

The EM31 survey was completed to determine the horizontal extent or limits of chloride impacts in the shallow subsurface soils at the Site. The EM31 consists of transmitter and receiver coils located at opposite ends of a rigid boom. The coil separation for the EM31 is approximately 13 feet, which yields an approximate depth of penetration of 18 feet bgs in vertical dipole mode. Measurements of terrain conductivity from the EM31 were used to assess the extent of chloride impacts at the Site. The data for the EM31 survey were then processed as a colored contour plot. The plot was superimposed on an aerial image of the Site plan, and was used to locate elevated conductivity responses indicative of chloride-impacted areas relative to the Site features. Figure 4 depicts the EM31 survey results.



### 4.2 EM31 Survey Results

The colored contour conductivity plot presented on Figure 4 reveals that the highest intensity conductivity responses are colored red to purple, while areas of low response are colored blue. All remaining intermediate responses correspond to the color scale presented on the figure. Results from non-impacted areas within the survey coverage indicate that background conductivity responses were approximately 20 milliSiemens/meter (mS/m). Anomalous responses relative to background were generally 3 to 10 times higher, and ranged from approximately 60 to 200 mS/m. The EM31 survey results delineated one main area of suspected brine-impacted soils approximately 75 feet south of MW-1 (adjacent to the access road). Multiple smaller conductive zones were also detected, with several located along the pipelines that intercept the Site. Some of the higher responses are believed associated with conductive metallic piping.

### 4.3 ER Survey Methodology

The ER survey profile was completed in August 2017 to determine the vertical extent of chlorideimpact in soil on one selected survey line located diagonally across the northwest to southeast section of the Site. This area exhibited the highest responses during the EM31 survey (see Figure 4). The ER survey was conducted with a dual-function resistivity meter, which operates simultaneously as a transmitter and receiver. The survey utilized two multi-electrode cables yielding a total spread of 72 electrodes. The receiver was programmed to automatically "switch" between measured quadripoles, yielding a pseudosection of apparent resistivity. The apparent resistivity data were then imported into an inversion software program, and processed to yield a modeled profile section of resistivity.

### 4.4 ER Survey Results

The electrical resistivity results for the survey line are presented on Figure 5. These results are based on the measured apparent resistivity values for various depths along the survey line. Calculations of measured apparent resistivity values include the type of ER array (Wenner), the electrode spacing, and raw field data (i.e., applied current and measured voltage for each data point).

The measured apparent resistivity data were processed with the inversion program RES2DINV, to yield the modeled resistivity section presented on Figure 5. The modeled section represents the resistance of earth materials in the shallow subsurface, and thus provides an interpretation of the overburden sequences and areas of suspected brine impacts along the survey line. The highest resistivity values are colored dark blue, while areas of low resistivity (or conversely, high conductivity) are colored yellow to red. All remaining intermediate responses correspond to the color scale presented on the bottom of each section.

The colored plot reveals that the contour intervals ranged from 2.25 to 1,000 Ohm.meters (Ohm.m). The intermediate contour intervals were determined by applying a normalized distribution curve to the data such that the entire range of responses could be identified by discrete colors. The interpreted colored contoured plot suggests that suspected brine-impacted soils can be likely characterized by modeled responses of approximately 2.25 to 60 Ohm.m.



## 4.5 Geophysical Survey Correlations/Conclusions

- The EM31 survey delineated one main area and several smaller areas of suspected brineimpacted soils at the Site. High responses were recorded east and southwest of the Site (LPU-59 wellhead area) and will be investigated further at a later date.
- In general, the ER survey results indicate the zone of suspected brine impact is affecting soils from the surface down to at least 70 feet bgs.

# 5. Soil Assessment

In order to further define the horizontal and vertical extent of chloride impact, six additional soils borings (SB-6 though SB-11) were installed using an air rotary drilling rig. Prior to mobilizing drilling equipment to the Site, the boring locations were marked and an initial New Mexico One Call utility locate ticket was submitted on October 11, 2017. GHD's contracted service provider, HCI, a New Mexico-licensed water well driller, and GHD mobilized to the Site to begin drilling activities on October 19, 2017. Each boring location was cleared for underground utilities with the use of an air knife to a depth of 5.0 feet bgs or refusal. The six borings were advanced to 90 feet bgs. Site details and boring locations are shown on Figure 3.

Chloride screening was accomplished in the field by mixing soil samples with distilled water, then testing the rinsate using Hach chloride test strips. The soil types observed during drilling of SB-6 through SB-11 consisted primarily of silty sands. The soils were logged in accordance with the Unified Soil Classification System, and soil boring logs are provided in Appendix A.

Soil samples were collected at 0.5-1 feet bgs, 4-5 feet bgs, and then ten-foot intervals starting at 9-10 feet bgs within each of the six soil borings. Soil samples were placed in laboratory-supplied sample containers on ice, labeled, and submitted to Xenco Laboratories in Midland, Texas for analysis of chlorides by EPA Method 300. Groundwater was not encountered in any of the soil borings. Following completion of activities, the soil cuttings were returned to their respective boreholes and backfilled with hydrated bentonite pellets from 10 feet bgs to the ground surface.

## 5.1 Soil Analytical Results

Analytical results associated with the soil boring activities of October 2017 are discussed in the following section. Based on analytical results from the shallow soil samples, some deeper soil samples were not analyzed at the direction of GHD. Analytical results are presented in Table 1 and the laboratory reports are provided in Appendix B. These analytical results are summarized below and shown on Figure 6.

- Soil samples collected from SB-6, SB-8, SB-9, and SB-11 demonstrated chloride concentrations below the site specific RRAL of 250 mg/kg for chloride throughout the sample intervals of the boreholes (0-90 feet bgs).
- SB-7 exhibited chloride concentrations exceeding the RRAL in one sample interval (19-20 feet bgs at 286 mg/kg).



• SB-10 exhibited chloride concentrations exceeding the RRAL in four sample intervals (9-10 feet bgs at 645 mg/kg, 19-20 feet bgs at 1400 mg/kg, 29-30 feet bgs at 564 mg/kg, and 39-40 feet bgs at 423 mg/kg). The deepest sample analyzed (60 feet bgs) reported chloride at 28.9 mg/kg.

# 6. Groundwater Assessment

Groundwater sample results from existing monitoring well MW-1 collected in October 2016 reported chloride concentrations below the NMWQCC standard of 250 mg/L. MW-1 was re-sampled in May 2017, and the details are described below.

## 6.1 Groundwater Sampling

Depth to groundwater was measured in MW-1 to the nearest hundredth of a foot (105.51 feet bgs) from the top of casing using an electronic water level meter on May 7, 2017. The conductivity profile of the water column was determined by recording conductivity at five-foot intervals from the top of the water column to the total depth of the well (230 feet bgs). Field equipment was decontaminated with an Alconox <sup>™</sup> wash and distilled water rinse before beginning field activities. The results of the conductivity profile are summarized on Table 2.

MW-1 was sampled using a Hydrasleeve sampler. The groundwater sample was collected after the Hydrasleeve was lowered to the depth of the highest conductivity measurement (i.e., 230 feet below the top of casing). The sampler was removed from the well and the sample was placed in laboratory-supplied containers and chilled on ice in an insulated cooler. The sample was delivered under chain-of-custody documentation to Xenco Laboratories of Midland, Texas for analysis of chloride by EPA method 300 and total dissolved solids (TDS) by method SM 2540C.

## 6.2 Groundwater Analytical Results

Chloride was detected at a concentration of 144 milligrams per liter (mg/L) from MW-1, which is below the 250 mg/L standard. TDS was reported at a concentration of 530 mg/L from the sample collected from MW-1, which is below the 1,000 mg/L standard.

Groundwater analytical results for chloride and TDS are summarized in Table 3 in reference to NMWQCC standards. The laboratory analytical report is provided in Appendix B.

# 7. Conclusions

Analytical results associated with assessment activities conducted in 2011, 2012, 2016, and 2017 indicated the horizontal extents of the chloride impact in soil have not been fully delineated. Recent groundwater confirmation sampling of MW-1 confirms groundwater is not impacted in that location.



# 8. 2018 Assessment Activities

On February 13, 2018, GHD and Chevron representatives met with NMOCD to discuss further assessment activities addressing the presence of chloride in soil and the potential presence of chloride in groundwater at the Site. Additional assessment activities based on those discussions are summarized in the Work Plan included in Appendix C of this report.

Submitted by:

GHD

N

Scott Foord, P.G., Project Manager

Ray U. PaliO

Raaj Patel, Program Manager

# Figures



CAD File: I:\CAD\Files\07----\073819-CEMC-LPU #59\073819-00\073819-00(006)\073819-00(006)GN-DL001.dwg



Source: Microsoft Product Screen shot(s) Reprinted with permission from Microsoft Corporation

Lat/Long: 32.8657° North, 103.3060° West





CEMC LEA COUNTY, NEW MEXICO LOVINGTON PADDOCK UNIT #59

## 073819-00 Feb 6, 2018

**FIGURE 2** 

## SITE LOCATION MAP

CAD File: I:\CAD\Files\07----\073819-CEMC-LPU #59\073819-00\073819-00(006)\073819-00(006)GN-DL001.dwg



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# SOIL BORING AND MONITOR WELL LOCATION MAP

# FIGURE 3



Imagery Source: Microsoft and Affiliated Data Providers





CEMC LEA COUNTY, NEW MEXICO LPU 59

EM31 GEOPHYSICAL INVESTIGATION

CAD File: P:\drawings\73000s\73819\73819-REPORTS\73819-2017(006)\73819-2017(006)GN\73819

73819-2017 Apr 11, 2018





LPU 59 - LINE 1 INVERSE MODEL RESISTIVITY SECTION DISTANCE (ft)





CEMC LEA COUNTY, NEW MEXICO LPU 59 ELECTRICAL RESISTIVITY SURVEY RESULTS AND HISTORICAL SOIL ANALYTICAL DATA

NORTH



73819-2017 Apr 11, 2018

# FIGURE 5



CAD File: I:\CAD\Files\07----\073819-CEMC-LPU #59\073819-00\073819-00(006)\073819-00(006)GN-DL001.dwg

Coordinate System: NAD 1983 (2011) StatePlane

New Mexico East (US Feet)

606 -

—Sample Result (mg/kg)

Chloride

CHLORIDE ANALYTICAL RESULTS MAP

# FIGURE 6

# **Tables**

### TABLE 1 SUMMARY OF SOIL ANALYTICAL RESULTS CHEVRON ENVIRONMENTAL MANAGEMENT COMPANY LOVINGTON PADDOCK UNIT 59 LEA COUNTY, NEW MEXICO

					Ethyl-	Total	Total		ТРН		
Sample	Depth (feet)	Date	Benzene	Toluene	benzene	Xylenes	BTEX	DRO	GRO	GRO/DRO	Chlorides
ID			mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
		NMC					Ranking Score		iiig/kg	ingrig	iiig/kg
			10				50			100	250
AH-1	0-0.5	7/6/10	<0.0200	<0.0200	<0.0200	<0.0200	<0.0200	<50.0	<2.00	<50.0	<200
T-1	0.5-1	8/18/10									448.00
AH-2	0-0.5	7/6/10	<0.0200	<0.0200	<0.0200	<0.0200	<0.0200	<50.0	<2.00	<50.0	2910.00
T-2	0.5-1	8/18/10									1620.00
AH-3	0-0.5	7/6/10	<0.0200	<0.0200	<0.0200	<0.0200	<0.0200	<50.0	<2.00	<50.0	<400
T-3	0.5-1	8/18/10									7140.00
AH-4	0-0.5	7/6/10	<0.0200	<0.0200	<0.0200	<0.0200	<0.0200	<50.0	<2.00	<50.0	2720.00
T-4	0.5-1	8/18/10									1650.00
AH-5	0-0.5	7/6/10	<0.0200	<0.0200	<0.0200	<0.0200	<0.0200	<50.0	<2.00	<50.0	<400
T-5	0.5-1	8/18/10									515.00
AH-6	0-0.5	7/6/10	<0.0200	<0.0200	<0.0200	<0.0200	<0.0200	<50.0	<2.00	<50.0	<200
T-6	0.5-1	8/18/10									534.00
SB-1	4-5	5/26/11									4.75
	9-10	5/26/11									54.10
	14-15	5/26/11									104.00
	19-20	5/26/11									111.00
SB-2	4-5	5/26/11									102.00
	9-10	5/26/11									312.00
	14-15	5/26/11									706.00
	19-20	5/26/11									1260.00
	24-25	5/26/11									1174.00
	29-30	5/26/11									1180.00
	34-35	5/26/11									1140.00
	39-40	5/26/11									622.00
SB-2B	49-50	12/18/12									606.00
	59-60	12/18/12									618.00
	69-70	12/18/12									176.00
SB-3	4-5	5/26/11									148.00
	9-10	5/26/11									436.00
	14-15	5/26/11									390.00
	19-20	5/26/11									338.00
SB-3b	49-50	12/18/12									2210.00
00 00	59-60	12/18/12									1750.00
	69-70	12/18/12									1690.00
SB-4	4-5	5/26/11								-	70.60
00-4	9-10	5/26/11									12.00
	9-10 14-15	5/26/11									12.00
	14-13	5/26/11									12.00
SB-5	4-5	5/26/11									4.96
5-3-3	4-5 9-10										4.96 75.20
		5/26/11									
	14-15	5/26/11									22.40
SP C	19-20	5/26/11									49.20
SB-6	0.5-1	10/19/17									5.19
	4-5	10/19/17									6.24
	9-10	10/19/17									11.80
	19-20	10/19/17									19.70
_	29-30	10/19/17									225.00
Dup.	29-30	10/19/17									222.00

### TABLE 1 SUMMARY OF SOIL ANALYTICAL RESULTS CHEVRON ENVIRONMENTAL MANAGEMENT COMPANY LOVINGTON PADDOCK UNIT 59 LEA COUNTY, NEW MEXICO

			_		Ethyl-	Total	Total		TPH		
Sample	Depth (feet)	Date	Benzene	Toluene	benzene	Xylenes	BTEX	DRO	GRO	GRO/DRO	Chlorides
ID			mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
		NMC			iation Action L						
			10			<u> </u>	50			100	250
SB-7	0.5-1	10/19/17									7.71
	4-5	10/19/17									<4.95
	9-10	10/19/17									17.50
	19-20	10/19/17									286.00
	29-30	10/19/17									
	39-40	10/19/17									
	49-50	10/19/17									
	59-60	10/19/17									
	69-70	10/19/17									52.00
	79-80	10/19/17									53.40
	89-90	10/19/17									78.10
SB-8	0.5-1	10/19/17									<4.94
	4-5	10/19/17									6.74
	9-10	10/19/17									<4.92
	19-20	10/19/17									84.40
SB-9	0.5-1	10/19/17									11.20
	4-5	10/19/17									17.70
	9-10	10/19/17									5.31
	19-20	10/19/17									58.20
SB-10	0.5-1	10/19/17									<4.93
	4-5	10/19/17									191.00
	9-10	10/19/17									645.00
	19-20	10/19/17									1400.00
	29-30	10/19/17									564.00
	39-40	10/19/17									423.00
	49-50	10/19/17									64.70
	59-60	10/19/17									28.90
SB-11	0.5-1	10/19/17									<24.6
	4-5	10/19/17									9.97
	9-10	10/19/17									<4.94
	19-20	10/19/17									<4.95
	29-30	10/19/17									
	39-40	10/19/17									
	49-50	10/19/17									
	59-60	10/19/17									
	69-70	10/19/17									12.30
	79-80	10/19/17									9.83
	89-90	10/19/17									13.80

Notes:

Bold concentrations are above lab reporting limits.
Highlighted cells indicated concentrations exceeding regulatory limits

- "--" indicates not analyzed or not applicable

- BTEX analyses by EPA Method 8021B.

- TPH analyzed by EPA Method SW8015B Mod.

- Chlorides analyzed by EPA Method 300.

### TABLE 2 SUMMARY OF MW-1 ELECTRICAL CONDUCTIVITY PROFILE CHEVRON ENVIRONMENTAL MANAGMETN COMPANY LOVINGTON PADDOCK UNIT 59 LEA COUNTY, NEW MEXICO

MW-1

Date:	5/26/2017	
Depth	Conductivity	Temperature
105.51		
105	928	19.0
110	927	19.0
115	926	19.0
120	927	19.0
125	930	18.9
130	946	18.7
135	946	18.9
140	926	19.0
145	907	19.0
150	918	19.0
155	927	19.0
160	931	19.0
165	944	19.1
170	988	19.1
175	989	19.2
180	991	19.9
185	995	19.9
190	996	19.9
195	996	19.4
200	998	19.3
205	1002	19.4
210	1003	19.6
215	1002	19.7
220	1002	19.7
225	1034	19.7
230	1046	19.7
232.73		

### NOTES:

Well:

Depth - feet below top of casing Conductivity - microseimens per centimeter Temperature - degrees Celsius

### TABLE 3 SUMMARY OF GROUNDWATER ANALYTICAL RESULTS CHEVRON ENVIRONMENTAL MANAGEMENT COMPANY LOVINGTON PADDOCK UNIT 59 LEA COUNTY, NEW MEXICO

Well ID	Date	Benzene	Toluene	Ethylbenz ene	Total Xylenes	TPH GRO	TPH DRO	Chloride	Total Dissolved Solids
	Standards	0.01	0.75	0.75	0.62	-	-	250	1000
		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
MW-1	10/19/17	<0.002	<0.002	<0.002	<0.002	<1.50	<1.50	117	
MW-1	5/26/17							144	530

### NOTES:

NMWQCC - New Mexico Water Quality Control Commission

'mg/L' indicates milligrams per liter

-- indicates analyte not analyzed

- BTEX analysis by EPA Method 8021B.

- TPH analysis by Method SW8015B.

- Chlorides analyzed by EPA Method 300.1



GHD | Chevron Environmental Management Company - Site Assessment Report | 073819 (6)

# Appendix A SB-6 though SB-11 Boring Logs



Page 1 of 1

PROJECT NAME: Lovington Paddock Unit 59 PROJECT NUMBER: 73819 CLIENT: Chevron Environmental Management Company

LOCATION: Lea County, New Mexico

HOLE DESIGNATION: SB-6 DATE COMPLETED: 19 October 2017 DRILLING METHOD: Air Rotary

FIELD PERSONNEL: Rebecca Jones

DEPTH	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH			SAM	PLE	1/ka)
ft BGS		ft BGS	DEPTH (ft)	INTERVAL	REC (%)	PP (tsf)	CHLORIDE (ma/ka)
	TOP SOIL	<u>1.00</u>	+	-	-		Щ. Н
	CALICHE; light brown						
- 5			4-5	$\geq$	1		<2
	SILTY SAND (SM); light brown, contains caliche	7.50					-0
- 10			9-10	$\geq$			<2
15							
					<b>_</b> .		
20			19-20	$\geq$	1		<2
- 25	SILTY SAND (SM); reddish brown	25.00					
- 30			29-30	$\geq$	1		66
- 35 -	SILTY SAND (SM); light brown, contains caliche	35.00					
					<b>_</b> .		40
- 40			39-40	$\geq$	1		46
45	SILTY SAND (SM); light reddish brown	45.00					
					<b>_</b> .		
- 50			49-50	$\geq$	1		52
		영상 : 1 영상 : 1					
- 55		영상) 신청(					
			50.00				74
- 60			59-00	$\geq$	1		74
- 65							
			00 70				00
- 70			69-70	$\geq$	<b>–</b> 1		90
- 75							
			79-80	$\geq$			74
- 80			13-00	$ \frown $	<b>,</b>		74
- 85							
			89-90	$\geq$	<b>1</b>		99
- 90 -	END OF BOREHOLE @ 90.0ft BGS	90.00	03-30	$ \frown $	<b>_</b>		95
- 95							
<u>1</u>	NOTES:	I		1	-		
	LABORATORY ANALYSIS						



Page 1 of 1

PROJECT NAME: Lovington Paddock Unit 59 PROJECT NUMBER: 73819

CLIENT: Chevron Environmental Management Company LOCATION: Lea County, New Mexico

HOLE DESIGNATION: SB-7 DATE COMPLETED: 19 October 2017

DRILLING METHOD: Air Rotary

FIELD PERSONNEL: Rebecca Jones

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH ft BGS	_	-	SAM		c
			DEPTH (ft)	INTERVAL	REC (%)	PP (tsf)	CHI ORIDE (ma/ka)
		- 1.00		_			— <u>H</u>
	CALICHE; light brown				L.		
5			4-5	$\geq$	1		<2
_	SILTY SAND (SM); light brown, contains caliche	7.50					-0
10			9-10	$\geq$			<2
15	SILTY SAND (SM); reddish brown	15.00					
			19-20	$\sim$	<b>1</b>		90
20			19-20		<b>"</b>		90
25							
			29-30	$\sim$	1		14
30			2000		T.		
25		25.00					
35	SILTY SAND (SM); light brown	35.00					
40			39-40	$\sim$	1		52
40			$\sim$		Т		
45							
45							
50			49-50	$\sim$	1		34
50			$\square$				
55							
55							
60			59-60	$\sim$	1		28
00			$\square$				
65							
70			69-70	$\geq$	1		<2
75							
80			79-80	>	1		<2
85							
90 -	END OF BOREHOLE @ 90.0ft BGS	90.00	89-90	>>	1		<2
95							
N	IOTES:						
<u>.</u>							
	LABORATORY ANALYSIS						



Page 1 of 1

PROJECT NAME: Lovington Paddock Unit 59 PROJECT NUMBER: 73819 CLIENT: Chevron Environmental Management Company

LOCATION: Lea County, New Mexico

HOLE DESIGNATION: SB-8 DATE COMPLETED: 19 October 2017 DRILLING METHOD: Air Rotary

FIELD PERSONNEL: Rebecca Jones

TOP SOIL         CALICHE; light brown           5         CALICHE; light brown, contains caliche         7.50           10         SILTY SAND (SM); light brown         15.00           20         33.0         15.00           25         SILTY SAND (SM); light brown         25.00           30         35.00         33.0           35         SILTY SAND (SM); light brown         35.00           40         35.00         34.0           45         56         56           60         665         665           70         68.0         1           75         88.0         1           88         1         1           90         END OF BOREHOLE @ 90.0ft BGS         90.00         88.0         1	Ъ S	STRATIGRAPHIC DESCRIPTION & REMARKS		DEPTH ft BGS	$\vdash$	1	SAMF	~LE
TOP SOIL         1.00           CALICHE; light brown         7.50           SILTY SAND (SM); light brown         7.50           SILTY SAND (SM); light brown         15.00           SILTY SAND (SM); light brown         15.00           SILTY SAND (SM); light brown         15.00           SILTY SAND (SM); light brown         25.00           SILTY SAND (SM); reddish brown         25.00           SILTY SAND (SM); reddish brown         35.00           SILTY SAND (SM); light brown         35.00           SILTY SAND (SM); light brown         36.00           660         667           70         78.00           75         78.00           800         78.00           90         END OF BOREHOLE @ 90.0ft BGS					EPTH (ff)	TERVAL	REC (%)	PP (tsf)
CALICHE; light brown       40         10       SILTY SAND (SM); light brown         15       SILTY SAND (SM); light brown         20       15.00         21       SILTY SAND (SM); light brown         22       SILTY SAND (SM); light brown         30       25.00         31       SILTY SAND (SM); light brown         32       SILTY SAND (SM); light brown         33       SILTY SAND (SM); light brown         40       48.0         45       48.0         50       51.0         53       66.0         64       67.0         75       78.0         60       79.00         61       79.00         62       79.00         63       79.00         64       79.00         65       79.00         66       79.00         67.0       79.00         68.0       79.00         69.0       79.00         79.00       88.0         70.00       79.00         70.01       79.00         70.02       79.00         70.03       79.00         70.04       79.00<				1 00	ä	Z		
5			[_	1.00				
10       SIL TY SAND (SM); light brown       15.00         15       SIL TY SAND (SM); light brown       15.00         20       83       1         21       SIL TY SAND (SM); reddish brown       25.00         30       35.00       83         31       SIL TY SAND (SM); reddish brown       25.00         32       SIL TY SAND (SM); light brown       25.00         33       SIL TY SAND (SM); light brown       35.00         40       663       663         55       60       69.00         65       60       70.0         75       60.0       70.0         85       90.00       80.0         90.00       END OF BOREHOLE @ 90.01 BGS       90.00		oo,g o. o		-	4-5	$\geq$	1	
10       NUTY SAND (SM); light brown         15       SILTY SAND (SM); reddish brown         20       25.00         30       25.00         31       35.00         32       SILTY SAND (SM); reddish brown         33       35.00         340       35.00         340       35.00         35       SILTY SAND (SM); light brown         40       35.00         45       36.00         46       56.0         56       56.0         66       56.0         67       56.0         68       70         77       78         880       90.00         END OF BOREHOLE @ 90.011 BGS       90.00		SILTY SAND (SM): light brown contains caliche		7.50				
SILTY SAND (SM); light brown       25.00         30       25.00         31       35.00         32       35.00         33       35.00         340       35.00         35       SILTY SAND (SM); light brown         40       35.00         41       35.00         42       36.00         43       36.00         445       36.00         45       36.00         46       980         47       36.00         485       900         END OF BOREHOLE @ 90.0ft BGS       90.00				l) A	9-10	$\geq$	1	
SILTY SAND (SM); light brown       25.00         30       25.00         31       35.00         32       35.00         33       35.00         340       35.00         35       SILTY SAND (SM); light brown         40       35.00         41       35.00         42       36.00         43       36.00         445       36.00         45       36.00         46       980         47       36.00         485       900         END OF BOREHOLE @ 90.0ft BGS       90.00								
20       SILTY SAND (SM); reddish brown       25.00       33.0		SILTY SAND (SM): light brown	·····································	15.00				
20       SILTY SAND (SM); reddish brown       25.00       23.30       33.00         30       SILTY SAND (SM); light brown       35.00       34.0       34.0       34.0       34.0       34.0       34.0       35.00         40       SILTY SAND (SM); light brown       35.00       36.00       36.00       36.00       34.0       36.00       34.0       36.00       37.00       36.00       37.00       36.00       37.00       36.00       37.00       36.00       37.00       36.00       37.00       36.00       37.00       37.00       37.00       37.00       37.00       37.00       37.00       37.00       37.00       37.00       37.00       37.00       37.00       37.00       37.00       37.00								
30       35.00         35       SILTY SAND (SM); light brown         40       35.00         45       44         50       49.00         55       49.00         65       90.00         65       70         75       780         80       783         90       END OF BOREHOLE @ 90.0ft BGS					19-20	$\geq$	1	
30       35.00         35       SILTY SAND (SM); light brown         40       35.00         41       35.00         42       45         50       49.50         55       49.50         66       98.60         77       68.70         80       78.80         90       END OF BOREHOLE @ 90.0ft BGS								
30     33.00       35     SILTY SAND (SM); light brown       40     35.00       43     443       44     443       55     443       56     980       66     980       775     980       80     780       85     980		SILTY SAND (SM): reddish brown	·····································	25.00				
35       SILTY SAND (SM); light brown       35.00         40       340       340         45       445       445         50       4950       4950         55       60       90.00       90.00         65       70       71.00       10.00         75       70       71.00       10.00         85       90.00       890       10.00         90       END OF BOREHOLE @ 90.0ft BGS       90.00       890       1								
38.1 1 Y SAND (SM), light blown         40         45         46         50         55         60         65         70         75         80         90         END OF BOREHOLE @ 90.0ft BGS					29-30	$\geq$	1	
38.1 1 Y SAND (SM), light blown         40         45         46         50         55         60         65         70         75         80         90         END OF BOREHOLE @ 90.0ft BGS								
40 45 50 55 60 60 65 70 75 80 90 END OF BOREHOLE @ 90.0ft BGS 90.00 85 90.00 80 80.00		SILTY SAND (SM); light brown	<u></u>	35.00				
40 45 50 55 60 65 70 75 80 85 90 END OF BOREHOLE @ 90.0ft BGS 90.00 890 10 10 10 10 10 10 10 10 10 1						L		
50       49.30       49					39-40		1	
50       49.30       49								
50 55 60 65 70 75 80 85 90 END OF BOREHOLE @ 90.0ft BGS 90.00 89.90 90.00 80.90 80.90								
50 55 60 65 70 75 80 85 90 END OF BOREHOLE @ 90.0ft BGS 90.00 89.90 90.00 80.90 80.90								
60       5960       1         65       900       6970       1         770       7380       1         80       7380       1         85       90.00       8940       1					49-50		1	
-60     5960       -65     90.00       -70     90.00       -75     90.00       -85     90.00       -80     90.00								
-65								
-65								
70       90       90.00					59-60		1	
70       90       90.00								
70     70       -75     79.80       -80     79.80       -85     90.00       END OF BOREHOLE @ 90.0ft BGS     90.00								
70     70       -75     79.80       -80     79.80       -85     90.00       END OF BOREHOLE @ 90.0ft BGS     90.00					00 70			
-80 -85 -90 END OF BOREHOLE @ 90.0ft BGS					69-70	$\sim$	<b>1</b>	
-80 -85 -90 END OF BOREHOLE @ 90.0ft BGS								
-85         90         END OF BOREHOLE @ 90.0ft BGS         90.00         89.90         1								
-85         90         END OF BOREHOLE @ 90.0ft BGS         90.00         89.90         1					70.00	$\vdash$		
- 90 END OF BOREHOLE @ 90.0ft BGS					19-00	$ \frown $		
-90 END OF BOREHOLE @ 90.0ft BGS								
END OF BOREHOLE @ 90.0ft BGS								
END OF BOREHOLE @ 90.0ft BGS					80.00	$\vdash$		
95		END OF BOREHOLE @ 90.0ft BGS		90.00	03-30	$\square$		
- 95								
NOTES:	NOTES			1	1	1	1	· · · · ·
		_						



Page 1 of 1

PROJECT NAME: Lovington Paddock Unit 59 PROJECT NUMBER: 73819

CLIENT: Chevron Environmental Management Company LOCATION: Lea County, New Mexico

HOLE DESIGNATION: SB-9 DATE COMPLETED: 19 October 2017 DRILLING METHOD: Air Rotary

FIELD PERSONNEL: Rebecca Jones

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH ft BGS			SAMF		kc
			DEPTH (ft)	INTERVAL	REC (%)	PP (tsf)	CHLORIDE (ma/ka)
	TOP SOIL	<u>1.00</u>		4	-		
	CALICHE; light brown						
5			4-5	$\times$	<b>1</b>		<28
	SILTY SAND (SM); light brown, contains caliche	7.50					-04
10			9-10	X	1		<28
15	SILTY SAND (SM); reddish brown	15.00					
20			19-20	$\times$	<b>1</b>		<28
20							
25							
30			29-30	$\times$	∎ 1		52
35 -	SILTY SAND (SM); light brown	35.00					
			20.40	X	- 1		166
40			39-40				100
45							
45							
50			49-50	$\times$	∎ 1		14
55							
60			59-60	$\times$	<b>1</b>		52
65							
			69.70	$\times$	■ 1		<28
70			00-10				-20
75							
10							
80			79-80	$\times$	<b>1</b>		<28
85							
90	END OF BOREHOLE @ 90.0ft BGS	90.00	89-90	>	∎ 1		<28
95							
NC	<u>DTES:</u>	1					



Page 1 of 1

PROJECT NAME: Lovington Paddock Unit 59 PROJECT NUMBER: 73819 CLIENT: Chevron Environmental Management Company

LOCATION: Lea County, New Mexico

HOLE DESIGNATION: SB-10 DATE COMPLETED: 19 October 2017 DRILLING METHOD: Air Rotary

FIELD PERSONNEL: Rebecca Jones

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH ft BGS		SAM	
			DEPTH (ft)	INTERVAL REC (%)	PP (tsf)
		- 32 - 100	DE	IN N	<b>_ _ _</b>
	CALICHE; light brown				
5	CALICHE; light brown		4-5	1	
<b>U</b>		7.50			
	SILTY SAND (SM); light brown, contains caliche	7.50	9-10	<b>1</b>	
10				·	
15 –	SILTY SAND (SM); light brown	15.00			
20			19-20	<b></b> 1	
25		25.00			
	SILTY SAND (SM); reddish brown				
- 30			29-30		
30				T	
35 –	SILTY SAND (SM); light brown	35.00			
40			39-40	1	
45		유럽 학생님 전쟁 학생님			
50			49-50	1	
00					
- 55					
			59-60	<del>\</del> 1	
60			59-60		
65					
-70			69-70		
-					
75					
15					
			79-80	<b>1</b>	
- 80			15-00		
- 85					
90 -		90.00	89-90	1	
	END OF BOREHOLE @ 90.0ft BGS				
95					
N	OTES:	1	I		
_					
	LABORATORY ANALYSIS				



Page 1 of 1

PROJECT NAME: Lovington Paddock Unit 59 PROJECT NUMBER: 73819 CLIENT: Chevron Environmental Management Company

LOCATION: Lea County, New Mexico

HOLE DESIGNATION: SB-11 DATE COMPLETED: 19 October 2017

DRILLING METHOD: Air Rotary

FIELD PERSONNEL: Rebecca Jones

EPTH t BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPT ft BG	<u> </u>	SAMPLE				
			DEPTH (ft)	INTERVAL	REC (%)	PP (tsf)		
	TOP SOIL	1.00		=				
	CALICHE; light brown				L.			
- 5			4-5	$\geq$	1		<	
-	SILTY SAND (SM); light brown, contains caliche	7.50			L.			
10			9-10	$\geq$	1		<	
15	SILTY SAND (SM); light brown	15.00						
			40.00				<	
- 20			19-20	$\geq$	<b>–</b> 1		<.	
- 25 -	SILTY SAND (SM); reddish brown	25.00						
			00.00					
- 30			29-30	$\geq$	<b>1</b>		<	
- 35 -	SILTY SAND (SM); light brown	35.00						
			39-40				<	
- 40			39-40	$\geq$	<b>–</b> 1		<.	
- 45								
			10.50					
- 50			49-50	$\geq$			<	
- 55								
- 60			59-60		<b>1</b>		<	
- 65								
- 70			69-70	$\geq$	<b>1</b>		<	
- 75								
			70.00					
- 80			79-80	$\geq$	<b>1</b>		<	
- 85								
- 90	END OF BOREHOLE @ 90.0ft BGS	90.00	89-90	$\geq$	1		<	
	-							
- 95								
I N	OTES:	1		1	-			
	LABORATORY ANALYSIS							

# Appendix B Analytical Laboratory Reports



Project Id:073819Contact:William FoordProject Location:Lovington NM

# Certificate of Analysis Summary 554082

GHD Services, INC- Midland, Midland, TX



Project Name: CEMCLPU-59

Date Received in Lab: Fri May-26-17 01:35 pm Report Date: 02-JUN-17 Project Manager: Kelsey Brooks

	Lab Id:	554082-0	01				
Analysis Requested	Field Id:	LPU-59-W-17	70526				
Analysis Kequesieu	Depth:						
	Matrix:	GROUND W.	ATER				
	Sampled:	May-26-17 0	9:30				
Chloride by EPA 300	Extracted:	May-26-17 1	6:06	ŕ		ſ	
	Analyzed:	May-27-17 (	00:35				
	Units/RL:	mg/L	RL				
Chloride		144	2.50				
TDS by SM2540C	Extracted:						
	Analyzed:	May-30-17 (	09:00				
	Units/RL:	mg/L	RL				
Total Dissolved Solids	530	5.00					

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

Houston - Dallas - San Antonio - Atlanta - Tampa - Boca Raton - Latin America - Odessa - Corpus Christi

Huns Roah

Kelsey Brooks Project Manager

# Analytical Report 554082

for GHD Services, INC- Midland

**Project Manager: William Foord** 

CEMCLPU-59

### 073819

02-JUN-17

Collected By: Client





### 1211 W. Florida Ave, Midland TX 79701

Xenco-Houston (EPA Lab code: TX00122): Texas (T104704215), Arizona (AZ0765), Florida (E871002), Louisiana (03054) Oklahoma (9218)

Xenco-Dallas (EPA Lab code: TX01468): Texas (T104704295) Xenco-Odessa (EPA Lab code: TX00158): Texas (T104704400) Xenco-San Antonio: Texas (T104704534) Xenco Phoenix (EPA Lab Code: AZ00901): Arizona(AZ0757) Xenco-Phoenix Mobile (EPA Lab code: AZ00901): Arizona (AZM757)



02-JUN-17



Project Manager: **William Foord GHD Services, INC- Midland** 2135 S Loop 250 W Midland, TX 79703

Reference: XENCO Report No(s): **554082** CEMCLPU-59 Project Address: Lovington NM

### William Foord:

We are reporting to you the results of the analyses performed on the samples received under the project name referenced above and identified with the XENCO Report Number(s) 554082. All results being reported under this Report Number apply to the samples analyzed and properly identified with a Laboratory ID number. Subcontracted analyses are identified in this report with either the NELAC certification number of the subcontract lab in the analyst ID field, or the complete subcontracted report attached to this report.

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

The validity and integrity of this report will remain intact as long as it is accompanied by this letter and reproduced in full, unless written approval is granted by XENCO Laboratories. This report will be filed for at least 5 years in our archives after which time it will be destroyed without further notice, unless otherwise arranged with you. The samples received, and described as recorded in Report No. 554082 will be filed for 60 days, and after that time they will be properly disposed without further notice, unless otherwise arranged with you. We reserve the right to return to you any unused samples, extracts or solutions related to them if we consider so necessary (e.g., samples identified as hazardous waste, sample sizes exceeding analytical standard practices, controlled substances under regulated protocols, etc).

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

Respectfully,

Huns hoah

Kelsey Brooks Project Manager

Recipient of the Prestigious Small Business Administration Award of Excellence in 1994. Certified and approved by numerous States and Agencies. A Small Business and Minority Status Company that delivers SERVICE and QUALITY

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



# Sample Cross Reference 554082



# GHD Services, INC- Midland, Midland, TX

CEMCLPU-59

Sample Id	Matrix	Date Collected	Sample Depth	Lab Sample Id
LPU-59-W-170526	W	05-26-17 09:30		554082-001


#### CASE NARRATIVE

Client Name: GHD Services, INC- Midland Project Name: CEMCLPU-59

Project ID: 073819 Work Order Number(s): 554082 
 Report Date:
 02-JUN-17

 Date Received:
 05/26/2017

#### Sample receipt non conformances and comments:

Sample receipt non conformances and comments per sample:

None





# GHD Services, INC- Midland, Midland, TX

CEMCLPU-59

Sample Id: LPU	-59-W-170526	Matrix:	Ground Water	]	Date Received:05.2	26.17 13.3	5
Lab Sample Id: 5540	82-001	Date Collec	cted: 05.26.17 09.30				
Analytical Method:	Chloride by EPA 300			]	Prep Method: E30	)0P	
Tech: MGO					% Moisture:		
Analyst: MGO		Date Prep:	05.26.17 16.06				
Seq Number: 30184	07						
Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride	16887-00-6	144	2.50	mg/L	05.27.17 00.35		5
Analytical Method: Tech: MAN	-				% Moisture:		
Analyst: MAN							
Seq Number: 30185	598						
Parameter	Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Total Dissolved Solids	TDS	530	5.00	mg/L	05.30.17 09.00		1



# **Flagging Criteria**



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

MDL Method Detection Limit	SDL Sample Detection Limit	LOD Limit of Detection
PQL Practical Quantitation Limit	MQL Method Quantitation Limit	LOQ Limit of Quantitation

- **DL** Method Detection Limit
- NC Non-Calculable
- + NELAC certification not offered for this compound.
- \* (Next to analyte name or method description) = Outside XENCO's scope of NELAC accreditation

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4147 Greenbriar Dr, Stafford, TX 77477	(281) 240-4200	(281) 240-4280
9701 Harry Hines Blvd , Dallas, TX 75220	(214) 902 0300	(214) 351-9139
5332 Blackberry Drive, San Antonio TX 78238	(210) 509-3334	(210) 509-3335
1211 W Florida Ave, Midland, TX 79701	(432) 563-1800	(432) 563-1713
2525 W. Huntington Dr Suite 102, Tempe AZ 85282	(602) 437-0330	



# QC Summary 554082

#### **GHD Services, INC- Midland** CEMCLPU-59

Analytical Method: Seq Number: MB Sample Id: Parameter	Chloride by EPA 3 3018407 725283-1-BLK MB Result	00 Spike Amount		Matrix: nple Id: LCS %Rec	Water 725283-1- LCSD Result	-BKS LCSD %Rec	Limits		ep Metho Date Pre D Sample RPD Limit	ep: 05.2	0P 26.17 283-1-BSD Analysis Date	Flag
Chloride	< 0.500	25.0	26.5	106	26.4	106	90-110	0	20	mg/L	05.27.17 00:20	
<b>Analytical Method:</b> Seq Number: Parent Sample Id: <b>Parameter</b> Chloride	<b>Chloride by EPA 3</b> 3018407 554082-001 <b>Parent</b> <b>Result</b> 144	00 Spike Amount 125			Ground W 554082-00 MSD Result 277		<b>Limits</b> 90-110		ep Metho Date Pre D Sample <b>RPD</b> Limit 20	ep: 05.2	0P 26.17 082-001 SD <b>Analysis</b> <b>Date</b> 05.27.17 00:43	Flag
<b>Analytical Method:</b> Seq Number: MB Sample Id: <b>Parameter</b> Total Dissolved Solids	<b>TDS by SM2540C</b> 3018598 3018598-1-BLK <b>MB</b> <b>Result</b> <5.00	Spike Amount 1000		Matrix: nple Id: <b>LCS</b> %Rec 98	Water 3018598-	1-BKS	<b>Limits</b> 80-120			<b>Units</b> mg/L	<b>Analysis</b> <b>Date</b> 05.30.17 09:00	Flag
<b>Analytical Method:</b> Seq Number: Parent Sample Id: <b>Parameter</b> Total Dissolved Solids	<b>TDS by SM2540C</b> 3018598 554084-001 <b>Parent</b> <b>Result</b> 3370				Ground W 554084-00			<b>%RPD</b> 2	<b>RPD</b> Limit 10	<b>Units</b> mg/L	Analysis Date 05.30.17 09:00	Flag
<b>Analytical Method:</b> Seq Number: Parent Sample Id: <b>Parameter</b> Total Dissolved Solids	<b>TDS by SM2540C</b> 3018598 554084-011 <b>Parent</b> <b>Result</b> 892				Ground W 554084-0			<b>%RPD</b> 6	<b>RPD</b> Limit 10	<b>Units</b> mg/L	<b>Analysis</b> <b>Date</b> 05.30.17 09:00	Flag

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Company Name / Branch: GHD-Midland Notice: Signature of this document and relinquishment of samples constitutes a valid purchase order from client company to XENCO Laboratories No. Email: 2135 S Loop 250 W, Midland, TX 79703 9 8 Company Address: 10 Z 6 cn amplers's Name 4 ω N oject Contact: Scott Foord Relinquished by: 3 Day EMERGENCY 2 Day EMERGENCY Next Day EMERGENCY Same Day TAT Relinquished by: Relinquished by Sampler: Service Center - San Antonio, Texas (210-509-3334) Dallas Texas (214-902-0300) Stafford, Texas (281-240-4200) william.foord@ghd.com TAT Starts Day received by Lab, if received by 5:00 pm **Client / Reporting Information** Lun-Sol-m-Furnaround Time (Business days) Field ID / Point of Collection 1JUSTA NXu 70526 Contract TAT 7 Day TAT X 5 Day TAT Phone No: 713-734-3090 SAMPLE CUSTODY MUST BE DOCUMENTED BELOW EACH TIME SAMPLES CHANGE POSSESSION, INCLUDING COURIER DELIVERY Date Time: 5-76-17 Date Time: Date Time Sample Depth 5-26-1 PO Number: CEMCLPU-59/073819 Project Location: Project Name/Number: Invoice To: Collection ovington, NM 1330 Date Received By; 730 **Received By:** Received By: Time Project Information Level III Std QC+ Forms **TRRP Checklist** Level 3 (CLP Forms) Level II Std QC Se Matrix Data Deliverable Information www.xenco.com # of bottles HCI NaOH/Zn Number of preserved bottles Acetate -INO3 Relinquished By: Relinquished By: Custody Seal # 12504 UST / RG -411 TRRP Level IV Level IV (Full Data Pkg /raw data) NaOH NaHSO4 MEOH NONE Odessa, Texas (432-563-1800) Xenco Quote # Norcross, Georgia (770-449-8800) BTEX Preserved where applicable TPH-GRO Date Time: Date Time: TPH-DRO Analytical Information 1 FED-EX / UPS: Tracking # Chloride Notes: Moisture Temp: J.J CF:(0-6: -0.2°C ) Xenco Job # Received By: **Received By:** Corrected Temp: (6-23: +0.2°C) Onlige 2004002 Lakeland, Florida (863-646-8526) Tampa, Florida (813-620-2000) Cooler Temp. 0.0 IR ID:R-8 Field Comments S = Soil/Sed/Solid GW =Ground Water DW = Drinking Water P = Product WW= Waste Water W = Wipe OW =Ocean/Sea Water SL = Sludge SW = Surface water Thermo. Corr. Factor A = Air 0 = 01 Matrix Codes

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previously negiotiated under a fully executed client contract.

Final 1.000



#### **XENCO** Laboratories Prelogin/Nonconformance Report- Sample Log-In



Client: GHD Services, INC- Midland Acceptable Temperature Range: 0 - 6 degC Air and Metal samples Acceptable Range: Ambient Date/ Time Received: 05/26/2017 01:35:00 PM Temperature Measuring device used : R8 Work Order #: 554082 Comments Sample Receipt Checklist 2 #1 \*Temperature of cooler(s)? #2 \*Shipping container in good condition? Yes #3 \*Samples received on ice? Yes #4 \*Custody Seal present on shipping container/ cooler? N/A #5 \*Custody Seals intact on shipping container/ cooler? N/A #6 Custody Seals intact on sample bottles? N/A #7 \*Custody Seals Signed and dated? N/A #8 \*Chain of Custody present? Yes #9 Sample instructions complete on Chain of Custody? Yes #10 Any missing/extra samples? No #11 Chain of Custody signed when relinguished/ received? Yes #12 Chain of Custody agrees with sample label(s)? Yes #13 Container label(s) legible and intact? Yes #14 Sample matrix/ properties agree with Chain of Custody? Yes #15 Samples in proper container/ bottle? Yes #16 Samples properly preserved? Yes #17 Sample container(s) intact? Yes #18 Sufficient sample amount for indicated test(s)? Yes #19 All samples received within hold time? Yes #20 Subcontract of sample(s)? N/A #21 VOC samples have zero headspace? N/A

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

Analyst: JKR

PH Device/Lot#: 213315

Date: 05/26/2017

Checklist completed by: Jessica Kramer Checklist reviewed by: Kelsey Brooks

Date: 05/26/2017



## Certificate of Analysis Summary 566199

GHD Services, INC- Midland, Midland, TX Project Name: LPU #59



Date Received in Lab:Fri Oct-20-17 04:20 pmReport Date:08-DEC-17Project Manager:Kelsey Brooks

	Lab Id:	566199-0	01	566199-0	02	566199-0	03	566199-0	004	566199-0	005	566199-0	012
Analysis Requested	Field Id:	SB-6-S-0.5-1-	171019	SB-6-S-4-5-1	71019	SB-6-S-9-10-1	71019	SB-6-S-19-20-	171019	SB-6-S-29-30-	171019	SB-7-S-0.5-11	171019
Anaiysis Kequesieu	Depth:	0.5-1		4-5		9-10		19-20		29-30		0.5-1	
	Matrix:	SOIL			SOIL		SOIL			SOIL		SOIL	
	Sampled:	Oct-19-17 (	)9:45	Oct-19-17 (	9:50	Oct-19-17 0	9:55	Oct-19-17 1	10:00	Oct-19-17	10:05	Oct-19-17 1	10:45
Chloride by EPA 300	Extracted:	Oct-31-17 (	)9:00	Oct-31-17 0	9:00	Oct-31-17 0	9:00	Oct-31-17 (	)9:00	Oct-31-17 (	)9:00	Oct-31-17 0	09:00
	Analyzed:	Oct-31-17	11:48	Oct-31-17 11:54		Oct-31-17 12:01		Oct-31-17 1	2:20	Oct-31-17 12:26		Oct-31-17 12:32	
	Units/RL:	mg/kg	RL	mg/kg	RL	mg/kg	RL	mg/kg	RL	mg/kg	RL	mg/kg	RL
Chloride		5.19	4.95	6.24	4.91	11.8	4.90	19.7	4.96	225	4.97	7.71	4.95
Percent Moisture	Extracted:												
	Analyzed:	Oct-25-17 (	)9:50	Oct-25-17 0	9:50	Oct-25-17 0	9:50	Oct-25-17 0	9:50	Oct-25-17 (	)9:50	Oct-25-17 0	9:50
	Units/RL:	%	RL	%	RL	%	RL	%	RL	%	RL	%	RL
Percent Moisture		9.80	1.00	10.8	1.00	10.5	1.00	5.96	1.00	6.20	1.00	10.9	1.00

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Mike Kimmel Client Services Manager



## Certificate of Analysis Summary 566199

GHD Services, INC- Midland, Midland, TX Project Name: LPU #59



Date Received in Lab:Fri Oct-20-17 04:20 pmReport Date:08-DEC-17Project Manager:Kelsey Brooks

	Lab Id:	566199-0	13	566199-0	14	566199-0	15	566199-0	020	566199-0	21	566199-0	22
Analysis Requested	Field Id:	SB-7-S-4-5-1	71019	SB-7-S-9-10-1	171019	SB-7-S-19-20-	171019	SB-7-S-69-70-	171019	SB-7-S-79-80-	171019	SB-7-S-89-90-	171019
Analysis Kequestea	Depth:	4-5		9-10		19-20		69-70		79-80		89-90	
	Matrix:	SOIL		SOIL	SOIL		SOIL			SOIL		SOIL	
	Sampled:	Oct-19-17	0:50	Oct-19-17 1	0:55	Oct-19-17 1	1:00	Oct-19-17	11:25	Oct-19-17 1	1:30	Oct-19-17 1	1:35
Chloride by EPA 300	Extracted:	Oct-31-17 (	)9:00	Oct-31-17 0	9:00	Oct-31-17 0	9:00	Dec-07-17	16:30	Dec-07-17 1	2:30	Dec-07-17 1	2:30
	Analyzed:	Oct-31-17	2:39	Oct-31-17 12:45		Oct-31-17 12:52		Dec-07-17	22:25	Dec-07-17 14:01		Dec-07-17 14:54	
	Units/RL:	mg/kg	RL	mg/kg	RL	mg/kg	RL	mg/kg	RL	mg/kg	RL	mg/kg	RL
Chloride		<4.95	4.95	17.5	4.97	286	4.95	52.0	4.96	53.4	4.96	78.1	4.96
Percent Moisture	Extracted:												
	Analyzed:	Oct-25-17 (	09:50	Oct-25-17 0	9:50	Oct-25-17 0	9:50	Dec-08-17	08:30	Dec-07-17 (	9:15	Dec-07-17 0	9:15
	Units/RL:	%	RL	%	RL	%	RL	%	RL	%	RL	%	RL
Percent Moisture		7.65	1.00	5.49	1.00	7.08	1.00	6.21	1.00	6.27 K	1.00	7.16 K	1.00

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Mike Kimmel Client Services Manager



## Certificate of Analysis Summary 566199

GHD Services, INC- Midland, Midland, TX Project Name: LPU #59



Date Received in Lab:Fri Oct-20-17 04:20 pmReport Date:08-DEC-17Project Manager:Kelsey Brooks

	Lab Id:	566199-0	)23	566199-0	24	566199-0	25	566199-0	26	566199-0	34	566199-0	)35
Analysis Requested	Field Id:	SB-9-S-0.5-1-	171019	SB-9-S-4-5-1	71019	SB-9-S-9-10-1	71019	SB-9-S-19-20-	171019	SB-8-S-0.5-1-	71019	SB-8-S-4-5-1	71019
Analysis Kequeslea	Depth:	0.5-1		4-5		9-10		19-20		0.5-1		4-5	
	Matrix:	SOIL	SOIL		SOIL		SOIL			SOIL		SOIL	
	Sampled:	Oct-19-17	11:45	Oct-19-17 1	1:50	Oct-19-17 1	1:55	Oct-19-17	2:00	Oct-19-17 1	2:40	Oct-19-17 1	12:45
Chloride by EPA 300	Extracted:	Oct-31-17	09:00	Oct-31-17 0	9:00	Oct-31-17 0	9:00	Oct-31-17 (	09:00	Oct-31-17 0	9:00	Oct-31-17 0	09:00
	Analyzed:	Oct-31-17	13:11	Oct-31-17 13:17		Oct-31-17 1	3:36	Oct-31-17 1	3:43	Oct-31-17 1	3:49	Oct-31-17 1	13:55
	Units/RL:	mg/kg	RL	mg/kg	RL	mg/kg	RL	mg/kg	RL	mg/kg	RL	mg/kg	RL
Chloride		11.2	4.91	17.7	5.00	5.31	4.94	58.2	4.90	<4.94	4.94	6.74	4.90
Percent Moisture	Extracted:												
	Analyzed:	Oct-25-17	09:50	Oct-25-17 0	9:50	Oct-25-17 0	9:50	Oct-25-17 (	9:50	Oct-25-17 0	9:50	Oct-25-17 0	)9:50
	Units/RL:	%	RL	%	RL	%	RL	%	RL	%	RL	%	RL
Percent Moisture		6.45	1.00	8.32	1.00	12.2	1.00	7.43	1.00	25.0	1.00	11.7	1.00

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Mike Kimmel Client Services Manager

Final 1.002



## Certificate of Analysis Summary 566199

GHD Services, INC- Midland, Midland, TX Project Name: LPU #59



Date Received in Lab:Fri Oct-20-17 04:20 pmReport Date:08-DEC-17Project Manager:Kelsey Brooks

	Lab Id:	566199-0	36	566199-0	37	566199-04	45	566199-0	46	566199-0	47	566199-0	48
Analysis Requested	Field Id:	SB-8-S-9-10-	171019	SB-8-S-19-20-	171019	SB-11-S-0.5-1-	171019	SB-11-S-4-5-	171019	SB-11-S-9-10-	171019	SB-11-S-19-20-	-171019
Analysis Kequestea	Depth:	9-10		19-20		0.5-1		4-5		9-10		19-20	
	Matrix:	SOIL		SOIL		SOIL		SOIL		SOIL		SOIL	
	Sampled:	Oct-19-17 1	2:50	Oct-19-17 1	2:55	Oct-19-17 1	3:45	Oct-19-17	13:50	Oct-19-17 1	3:55	Oct-19-17 1	4:00
Chloride by EPA 300	Extracted:	Oct-31-17 (	)9:00	Oct-31-17 0	9:00	Oct-31-17 0	9:00	Oct-31-17 1	2:30	Oct-31-17 1	2:30	Oct-31-17 1	2:30
	Analyzed:	Oct-31-17	14:02	Oct-31-17 14:08		Oct-31-17 1	4:14	Oct-31-17 1	5:44	Oct-31-17 16:03		Oct-31-17 1	6:09
	Units/RL:	mg/kg	RL	mg/kg	RL	mg/kg	RL	mg/kg	RL	mg/kg	RL	mg/kg	RL
Chloride		<4.92	4.92	84.4	4.97	<24.6	24.6	9.97	4.97	<4.94	4.94	<4.95	4.95
Percent Moisture	Extracted:												
	Analyzed:	Oct-25-17 (	09:50	Oct-25-17 0	9:50	Oct-25-17 0	9:50	Oct-25-17 (	9:50	Oct-25-17 0	9:50	Oct-25-17 0	9:50
	Units/RL:	%	RL	%	RL	%	RL	%	RL	%	RL	%	RL
Percent Moisture		12.6	1.00	7.34	1.00	19.3	1.00	8.05	1.00	13.1	1.00	7.73	1.00

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Mike Kimmel Client Services Manager



## Certificate of Analysis Summary 566199

GHD Services, INC- Midland, Midland, TX Project Name: LPU #59



Date Received in Lab:Fri Oct-20-17 04:20 pmReport Date:08-DEC-17Project Manager:Kelsey Brooks

	Lab Id:	566199-0	53	566199-0	54	566199-03	55	566199-0	56	566199-0	57	566199-0	58
Analysis Requested	Field Id:	SB-11-S-69-70	-171019	SB-11-S-79-80-	171019	SB-11-S-89-90-	171019	SB-10-S-0.5-1-	171019	SB-10-S-4-5-	171019	SB-10-S-9-10-	171019
Analysis Kequesieu	Depth:	69-70		79-80		89-90		0.5-1		4-5		9-10	
	Matrix:	SOIL	SOIL		SOIL		SOIL			SOIL		SOIL	
	Sampled:	Oct-19-17	4:25	Oct-19-17 1	4:30	Oct-19-17 1	4:35	Oct-19-17 1	4:45	Oct-19-17 1	4:48	Oct-19-17 1	4:51
Chloride by EPA 300	Extracted:	Dec-07-17	12:30	Dec-07-17 1	2:30	Dec-07-17 1	2:30	Oct-31-17 1	2:30	Oct-31-17 1	2:30	Oct-31-17 1	2:30
	Analyzed:	Dec-07-17	15:00	Dec-07-17 15:06		Dec-07-17 15:12		Oct-31-17 1	6:16	Oct-31-17 16:22		Oct-31-17 16:41	
	Units/RL:	mg/kg	RL	mg/kg	RL	mg/kg	RL	mg/kg	RL	mg/kg	RL	mg/kg	RL
Chloride		12.3	4.98	9.83	4.93	13.8	4.92	<4.93	4.93	191	4.98	645	4.91
Percent Moisture	Extracted:												
	Analyzed:	Dec-07-17	09:15	Dec-07-17 0	9:15	Dec-07-17 0	9:15	Oct-25-17 0	9:50	Oct-25-17 0	9:50	Oct-25-17 0	9:50
	Units/RL:	%	RL	%	RL	%	RL	%	RL	%	RL	%	RL
Percent Moisture		6.73 K	1.00	6.12 K	1.00	7.34 K	1.00	8.89	1.00	3.92	1.00	4.65	1.00

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Mike Kimmel Client Services Manager



## Certificate of Analysis Summary 566199

GHD Services, INC- Midland, Midland, TX Project Name: LPU #59



Date Received in Lab:Fri Oct-20-17 04:20 pmReport Date:08-DEC-17Project Manager:Kelsey Brooks

	Lab Id:	566199-0	)59	566199-0	60	566199-0	61	566199-0	62	566199-0	)63	566199-0	)67
Analysis Requested	Field Id:	SB-10-S-19-20	-171019	SB-10-S-29-30-	-171019	SB-10-S-39-40-	171019	SB-10-S-49-50	-171019	SB-10-S-59-60	-171019	Dup-1-171	019
Analysis Kequestea	Depth:	19-20		29-30		39-40		49-50		59-60			
	Matrix:	SOIL	SOIL			SOIL		SOIL		SOIL		SOIL	
	Sampled:	Oct-19-17	14:54	Oct-19-17 1	4:57	Oct-19-17 1	5:00	Oct-19-17	15:03	Oct-19-17	15:06	Oct-19-17 (	00:00
Chloride by EPA 300	Extracted:	Oct-31-17	12:30	Oct-31-17 1	2:30	Oct-31-17 1	2:30	Nov-06-17	10:00	Nov-06-17	10:00	Oct-31-17 1	12:30
	Analyzed:	Oct-31-17	16:47	Oct-31-17 16:54		Oct-31-17 1	7:00	Nov-06-17	18:43	Nov-06-17	19:02	Oct-31-17 1	17:07
	Units/RL:	mg/kg	RL	mg/kg	RL	mg/kg	RL	mg/kg	RL	mg/kg	RL	mg/kg	RL
Chloride		1400	25.0	564	4.92	423	4.92	64.7	4.99	28.9	4.99	222	5.00
Percent Moisture	Extracted:												
	Analyzed:	Oct-25-17 (	09:50	Oct-25-17 0	9:50	Oct-25-17 0	9:50	Nov-02-17	09:45	Nov-02-17	09:45	Oct-25-17 0	)9:50
	Units/RL:	%	RL	%	RL	%	RL	%	RL	%	RL	%	RL
Percent Moisture		5.56	1.00	4.60	1.00	6.01	1.00	5.73	1.00	6.17	1.00	6.27	1.00

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Mike Kimmel Client Services Manager

# **Analytical Report 566199**

for GHD Services, INC- Midland

**Project Manager: Scott Foord** 

LPU #59

073819

08-DEC-17

Collected By: Client





1211 W. Florida Ave, Midland TX 79701

Xenco-Houston (EPA Lab code: TX00122): Texas (T104704215-17-23), Arizona (AZ0765), Florida (E871002-24), Louisiana (03054) Oklahoma (2017-142)

> Xenco-Dallas (EPA Lab code: TX01468): Texas (T104704295-17-15), Arizona (AZ0809), Arkansas (17-063-0)

Xenco-El Paso (EPA Lab code: TX00127): Texas (T104704221-17-12) Xenco-Lubbock (EPA Lab code: TX00139): Texas (T104704219-17-16) Xenco-Odessa (EPA Lab code: TX00158): Texas (T104704400-17-13) Xenco-San Antonio (EPA Lab Code: TNI02385): Texas (T104704534-17-3) Xenco Phoenix (EPA Lab Code: AZ00901): Arizona(AZ0757) Xenco-Phoenix Mobile (EPA Lab code: AZ00901): Arizona (AZM757)



08-DEC-17



Project Manager: **Scott Foord GHD Services, INC- Midland** 2135 S Loop 250 W Midland, TX 79703

Reference: XENCO Report No(s): **566199** LPU #**59** Project Address: Lea County, NM

#### Scott Foord:

We are reporting to you the results of the analyses performed on the samples received under the project name referenced above and identified with the XENCO Report Number(s) 566199. All results being reported under this Report Number apply to the samples analyzed and properly identified with a Laboratory ID number. Subcontracted analyses are identified in this report with either the NELAC certification number of the subcontract lab in the analyst ID field, or the complete subcontracted report attached to this report.

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

The validity and integrity of this report will remain intact as long as it is accompanied by this letter and reproduced in full, unless written approval is granted by XENCO Laboratories. This report will be filed for at least 5 years in our archives after which time it will be destroyed without further notice, unless otherwise arranged with you. The samples received, and described as recorded in Report No. 566199 will be filed for 45 days, and after that time they will be properly disposed without further notice, unless otherwise arranged with you. We reserve the right to return to you any unused samples, extracts or solutions related to them if we consider so necessary (e.g., samples identified as hazardous waste, sample sizes exceeding analytical standard practices, controlled substances under regulated protocols, etc).

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

Respectfully,

le p

Mike Kimmel Client Services Manager

Recipient of the Prestigious Small Business Administration Award of Excellence in 1994. Certified and approved by numerous States and Agencies. A Small Business and Minority Status Company that delivers SERVICE and QUALITY

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



# Sample Cross Reference 566199



#### GHD Services, INC- Midland, Midland, TX

LPU #59

Sample Id	Matrix	Date Collected	Sample Depth	Lab Sample Id
SB-6-S-0.5-1-171019	S	10-19-17 09:45	0.5 - 1	566199-001
SB-6-S-4-5-171019	S	10-19-17 09:50	4 - 5	566199-002
SB-6-S-9-10-171019	S	10-19-17 09:55	9 - 10	566199-003
SB-6-S-19-20-171019	S	10-19-17 10:00	19 - 20	566199-004
SB-6-S-29-30-171019	S	10-19-17 10:05	29 - 30	566199-005
SB-7-S-0.5-1171019	S	10-19-17 10:45	0.5 - 1	566199-012
SB-7-S-4-5-171019	S	10-19-17 10:50	4 - 5	566199-013
SB-7-S-9-10-171019	S	10-19-17 10:55	9 - 10	566199-014
SB-7-S-19-20-171019	S	10-19-17 11:00	19 - 20	566199-015
SB-7-S-69-70-171019	S	10-19-17 11:25	69 - 70	566199-020
SB-7-S-79-80-171019	S	10-19-17 11:30	79 - 80	566199-021
SB-7-S-89-90-171019	S	10-19-17 11:35	89 - 90	566199-022
SB-9-S-0.5-1-171019	S	10-19-17 11:45	0.5 - 1	566199-023
SB-9-S-4-5-171019	S	10-19-17 11:50	4 - 5	566199-024
SB-9-S-9-10-171019	S	10-19-17 11:55	9 - 10	566199-025
SB-9-S-19-20-171019	S	10-19-17 12:00	19 - 20	566199-026
SB-8-S-0.5-1-171019	S	10-19-17 12:40	0.5 - 1	566199-034
SB-8-S-4-5-171019	S	10-19-17 12:45	4 - 5	566199-035
SB-8-S-9-10-171019	S	10-19-17 12:50	9 - 10	566199-036
SB-8-S-19-20-171019	S	10-19-17 12:55	19 - 20	566199-037
SB-11-S-0.5-1-171019	S	10-19-17 13:45	0.5 - 1	566199-045
SB-11-S-4-5-171019	S	10-19-17 13:50	4 - 5	566199-046
SB-11-S-9-10-171019	S	10-19-17 13:55	9 - 10	566199-047
SB-11-S-19-20-171019	S	10-19-17 14:00	19 - 20	566199-048
SB-11-S-69-70-171019	S	10-19-17 14:25	69 - 70	566199-053
SB-11-S-79-80-171019	S	10-19-17 14:30	79 - 80	566199-054
SB-11-S-89-90-171019	S	10-19-17 14:35	89 - 90	566199-055
SB-10-S-0.5-1-171019	S	10-19-17 14:45	0.5 - 1	566199-056
SB-10-S-4-5-171019	S	10-19-17 14:48	4 - 5	566199-057
SB-10-S-9-10-171019	S	10-19-17 14:51	9 - 10	566199-058
SB-10-S-19-20-171019	S	10-19-17 14:54	19 - 20	566199-059
SB-10-S-29-30-171019	S	10-19-17 14:57	29 - 30	566199-060
SB-10-S-39-40-171019	S	10-19-17 15:00	39 - 40	566199-061
SB-10-S-49-50-171019	S	10-19-17 15:03	49 - 50	566199-062
SB-10-S-59-60-171019	S	10-19-17 15:06	59 - 60	566199-063
Dup-1-171019	S	10-19-17 00:00		566199-067
SB-6-S-39-40-171019	S	10-19-17 10:10	39 - 40	Not Analyzed
SB-6-S-49-50-171019	S	10-19-17 10:15	49 - 50	Not Analyzed
SB-6-S-59-60-171019	S	10-19-17 10:20	59 - 60	Not Analyzed
SB-6-S-69-70-171019	S	10-19-17 10:25	69 - 70	Not Analyzed
SB-6-S-79-80-171019	S	10-19-17 10:30	79 - 80	Not Analyzed
SB-6-S-89-90-171019	S	10-19-17 10:35	89 - 90	Not Analyzed
SB-7-S-29-30-171019	S	10-19-17 11:05	29 - 30	Not Analyzed





## GHD Services, INC- Midland, Midland, TX

LPU #59

S	10-19-17 11:10	39 - 40	Not Analyzed
S	10-19-17 11:15	49 - 50	Not Analyzed
S	10-19-17 11:20	59 - 60	Not Analyzed
S	10-19-17 12:05	29 - 30	Not Analyzed
S	10-19-17 12:10	39 - 40	Not Analyzed
S	10-19-17 12:15	49 - 50	Not Analyzed
S	10-19-17 12:20	59 - 60	Not Analyzed
S	10-19-17 12:25	69 - 70	Not Analyzed
S	10-19-17 12:30	79 - 80	Not Analyzed
S	10-19-17 12:35	89 - 90	Not Analyzed
S	10-19-17 13:00	29 - 30	Not Analyzed
S	10-19-17 13:10	39 - 40	Not Analyzed
S	10-19-17 13:15	49 - 50	Not Analyzed
S	10-19-17 13:20	59 - 60	Not Analyzed
S	10-19-17 13:25	69 - 70	Not Analyzed
S	10-19-17 13:30	79 - 80	Not Analyzed
S	10-19-17 13:35	89 - 90	Not Analyzed
S	10-19-17 14:05	29 - 30	Not Analyzed
S	10-19-17 14:10	39 - 40	Not Analyzed
S	10-19-17 14:15	49 - 50	Not Analyzed
S	10-19-17 14:20	59 - 60	Not Analyzed
S	10-19-17 15:09	69 - 70	Not Analyzed
S	10-19-17 15:12	79 - 80	Not Analyzed
S	10-19-17 15:15	89 - 90	Not Analyzed

SB-7-S-39-40-171019
SB-7-S-49-50-171019
SB-7-S-59-60-171019
SB-9-S-29-30-171019
SB-9-S-39-40-171019
SB-9-S-49-50-171019
SB-9-S-59-60-171019
SB-9-S-69-70-171019
SB-9-S-79-80-171019
SB-9-S-89-90-171019
SB-8-S-29-30-171019
SB-8-S-39-40-171019
SB-8-S-49-50-171019
SB-8-S-59-60-171019
SB-8-S-69-70-171019
SB-8-S-79-80-171019
SB-8-S-89-90-171019
SB-11-S-29-30-171019
SB-11-S-39-40-171019
SB-11-S-49-50-171019
SB-11-S-59-60-171019
SB-10-S-69-70-171019
SB-10-S-79-80-171019
SB-10-S-89-90-171019



#### CASE NARRATIVE

Client Name: GHD Services, INC- Midland Project Name: LPU #59

Project ID:073819Work Order Number(s):566199

 Report Date:
 08-DEC-17

 Date Received:
 10/20/2017

#### Sample receipt non conformances and comments:

566199-062, -063 removed from hold per Scott Foord e-mail 11/02/17-- KB 11/07/17: Revised report for added samples. 12/07/17: Run SB-7-(69-70),(79-80),(89-90) SB-11(69-70),(79-80),(89-90) For Chloride

Sample receipt non conformances and comments per sample:

None





#### GHD Services, INC- Midland, Midland, TX

LPU #59

Sample Id: Lab Sample Id	<b>SB-6-S-0.5-1-171019</b> d: 566199-001		Matrix: Date Collect	Soil ed: 10.19.17 09.45		Date Received Sample Depth:		0
Tech:	ethod: Chloride by EPA 3 MNV	300				Prep Method: % Moisture:		
Analyst: Seq Number:	MNV 3032032		Date Prep:	10.31.17 09.00		Basis:	Wet Weight	
Parameter		Cas Number	Result	RL	Units	Analysis Da	te Flag	Dil

16887-00-6 **5.19** 

4.95

10.31.17 11.48

mg/kg





#### GHD Services, INC- Midland, Midland, TX

LPU #59

Sample Id: Lab Sample Id	<b>SB-6-S-4-5-171019</b> d: 566199-002		Matrix: Date Collect	Soil ed: 10.19.17 09.50		Date Received Sample Depth		20
Analytical Me Tech: Analyst:	ethod: Chloride by EPA 3 MNV MNV	300	Data Pranu	10.31.17 09.00		Prep Method: % Moisture: Basis:	E300P Wet Weight	
Seq Number:			Date Prep:	10.31.17 09.00		Dasis.	wet weight	
Parameter		Cas Number	Result	RL	Units	Analysis Da	ate Flag	Dil

16887-00-6 **6.24** 

4.91

10.31.17 11.54

mg/kg





#### GHD Services, INC- Midland, Midland, TX

LPU #59

Sample Id:         SB-6-S-9-10-171019           Lab Sample Id:         566199-003			Matrix: Date Collect	Soil ed: 10.19.17 09.55	Date Received:10.20.17 16.20 Sample Depth: 9 - 10				1
Analytical Me Tech: Analyst:	ethod: Chloride by EPA 3 MNV MNV	300	Date Prep:	10.31.17 09.00		Prep Method: % Moisture: Basis:		)P Weight	
Seq Number:	3032032								
Parameter		Cas Number	Result	RL	Units	Analysis D	ate	Flag	Dil

16887-00-6 **11.8** 

4.90

10.31.17 12.01

mg/kg

1

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#### GHD Services, INC- Midland, Midland, TX

LPU #59

Sample Id: Lab Sample Id	<b>SB-6-S-19-20-171019</b> d: 566199-004		Matrix: Date Collect	Soil ed: 10.19.17 10.00		Date Received: Sample Depth:		0
Tech:	ethod: Chloride by EPA 3 MNV	300				Prep Method: % Moisture:		
Analyst: Seq Number:	MNV 3032032		Date Prep:	10.31.17 09.00		Basis:	Wet Weight	
Parameter		Cas Number	Result	RL	Units	Analysis Da	te Flag	Dil

16887-00-6 **19.7** 

4.96

mg/kg

10.31.17 12.20





#### GHD Services, INC- Midland, Midland, TX

LPU #59

Sample Id: Lab Sample Id	<b>SB-6-S-29-30-171019</b> d: 566199-005		Matrix: Soil Date Collected: 10.19.17 10.05		Date Received:10.20.17 16.20 Sample Depth: 29 - 30			6.20
Tech:	ethod: Chloride by EPA 3 MNV	300				Prep Method: % Moisture:		
Analyst: Seq Number:	MNV 3032032		Date Prep:	10.31.17 09.00		Basis:	Wet Weigh	ıt
Parameter		Cas Number	Result	RL	Units	Analysis Da	ate Flag	Dil

16887-00-6 225

4.97

10.31.17 12.26

mg/kg





#### GHD Services, INC- Midland, Midland, TX

LPU #59

Seq Number: 3032032			
Analyst: MNV	Date Prep: 10.	31.17 09.00 Basis:	Wet Weight
Tech: MNV		% Moisture:	
Analytical Method: Chloride by EPA 300		Prep Method:	E300P
Sample Id:         SB-7-S-0.5-1171019           Lab Sample Id:         566199-012	Matrix: Soi Date Collected: 10.		1:10.20.17 16.20 : 0.5 - 1

16887-00-6 **7.71** 

4.95

10.31.17 12.32

mg/kg





U

1

#### GHD Services, INC- Midland, Midland, TX

LPU #59

Sample Id:         SB-7-S-4-5-171019           Lab Sample Id:         566199-013			Matrix: Soil Date Collected: 10.19.17 10.50		Date Received:10.20.17 16.20 Sample Depth: 4 - 5				
Tech: M Analyst: M	od: Chloride by EPA 3( INV INV 032032	00	Date Prep:	10.31.17 09.00		Prep Method: % Moisture: Basis:		P Weight	
Parameter		Cas Number	<b>Result</b>	RL	Units	Analysis D	ate	Flag	Dil

<4.95

16887-00-6

4.95

10.31.17 12.39

mg/kg





#### GHD Services, INC- Midland, Midland, TX

LPU #59

Parameter		Cas Number	Result I	RL	Units	Analysis D	ate 1	Flag	Dil
Seq Number:	3032032								
Analyst:	MNV		Date Prep:	10.31.17 09.00		Basis:	Wet W	/eight	
Tech:	MNV					% Moisture:			
Analytical Me	ethod: Chloride by EPA 3	600				Prep Method:	E300P	)	
Sample Id: Lab Sample Id	<b>SB-7-S-9-10-171019</b> d: 566199-014		Matrix: Date Collecte	Soil ed: 10.19.17 10.55	Date Received:10.20.17 Sample Depth:9 - 10			17 16.20	
a 1 7 1			34.1	a .:.		D . D	1 1 0 0 0	1 - 1 < 00	

Chloride

17.5

16887-00-6

4.97

10.31.17 12.45

mg/kg





#### GHD Services, INC- Midland, Midland, TX

LPU #59

Sample Id:         SB-7-S-19-20-171019           Lab Sample Id:         566199-015			Matrix: Date Collect	Soil ed: 10.19.17 11.00	Date Received:10.20.17 16.20 Sample Depth: 19 - 20			
Analytical Me Tech: Analyst:	ethod: Chloride by EPA 3 MNV MNV	300	Date Prep:	10.31.17 09.00	(	Prep Method: % Moisture: Basis:	E300P Wet Weight	
Seq Number:	3032032							
Parameter		Cas Number	Result	RL	Units	Analysis Da	ate Flag	Dil

286

16887-00-6

4.95

mg/kg 10.31.17 12.52





#### GHD Services, INC- Midland, Midland, TX

LPU #59

Parameter		Cas Number	Result	RL	Units	Analysis Da	nte Flag	g Dil
Seq Number:	3035317							
Analyst:	MNV		Date Prep:	12.07.17 16.30		Basis:	Wet Weig	ght
Tech:	MNV					% Moisture:		
Analytical Me	ethod: Chloride by EPA	300				Prep Method:	E300P	
Lab Sample Io	d: 566199-020		Date Collec	ted: 10.19.17 11.25		Sample Depth:	:69 - 70	
Sample Id:	SB-7-S-69-70-171019		Matrix:	Soil		Date Received	:10.20.17	16.20

16887-00-6 **52.0** 

4.96

12.07.17 22.25

mg/kg





#### GHD Services, INC- Midland, Midland, TX

LPU #59

Sample Id: Lab Sample Ic	<b>SB-7-S-79-80-171019</b> l: 566199-021		Matrix: Date Collect	Soil ed: 10.19.17 11.30		1:10.20.17 16. 1:79 - 80	20	
Analytical Me Tech:	thod: Chloride by EPA 3 MNV	00				Prep Method: % Moisture:	E300P	
Analyst:	MNV		Date Prep:	12.07.17 12.30		Basis:	Wet Weight	
Seq Number:	3035238							
Parameter		Cas Number	Result	RL	Units	Analysis D	ate Flag	Dil

16887-00-6 53.4

4.96

12.07.17 14.01

mg/kg





#### GHD Services, INC- Midland, Midland, TX

LPU #59

Sample Id: Lab Sample Id	<b>SB-7-S-89-90-171019</b> l: 566199-022		Matrix: Date Collecte	Soil ed: 10.19.17 11.35		Date Received Sample Depth		16.20
Analytical Me Tech: Analyst:	thod: Chloride by EPA 3 MNV MNV	00	Date Prep:	12.07.17 12.30		Prep Method: % Moisture: Basis:	E300P Wet Weig	ht
Seq Number:	3035238		Date Trep.	12.07.17 12.30			n et n eig	
Parameter		Cas Number	Result I	8L	Units	Analysis D	ate Flag	g Dil

16887-00-6 **78.1** 

4.96

mg/kg

12.07.17 14.54





#### GHD Services, INC- Midland, Midland, TX

LPU #59

Sample Id: Lab Sample Id	<b>SB-9-S-0.5-1-171019</b> d: 566199-023		Matrix: Date Collecte	Soil ed: 10.19.17 11.45	Date Received:10.20.17 16.2 Sample Depth: 0.5 - 1			
Analytical Me Tech:	ethod: Chloride by EPA 3 MNV	800				Prep Method: % Moisture:	E300P	
Analyst:	MNV		Date Prep:	10.31.17 09.00		Basis:	Wet Weight	
Seq Number:	3032032							
Parameter		Cas Number	Result	RL	Units	Analysis D	ate Flag	Dil

Chloride

11.2

16887-00-6

4.91

10.31.17 13.11

mg/kg





#### GHD Services, INC- Midland, Midland, TX

LPU #59

Sample Id: Lab Sample Id	<b>SB-9-S-4-5-171019</b> d: 566199-024		Matrix: Date Collect	Date Received:10.20.17 16.20 Sample Depth: 4 - 5				
Analytical Me Tech:	ethod: Chloride by EPA 3 MNV	800				Prep Method: % Moisture:	E300P	
Analyst:	MNV		Date Prep:	10.31.17 09.00		Basis:	Wet Weight	
Seq Number:	3032032							
Parameter		Cas Number	Result	RL	Units	Analysis D	ate Flag	Dil

16887-00-6 17.7

5.00

10.31.17 13.17

mg/kg





#### GHD Services, INC- Midland, Midland, TX

LPU #59

Sample Id: Lab Sample Ic	<b>SB-9-S-9-10-171019</b> d: 566199-025		Matrix: Date Collect	Soil ed: 10.19.17 11.55	Date Received:10.20.17 16.20 Sample Depth:9 - 10			
Analytical Me Tech: Analyst:	thod: Chloride by EPA 3 MNV MNV	300	Date Prep:	10.31.17 09.00		Prep Method: % Moisture: Basis:	E300P Wet Weight	
Seq Number:	3032032							
Parameter		Cas Number	Result	RL	Units	Analysis D	ate Flag	Dil

16887-00-6 **5.31** 

4.94

10.31.17 13.36

mg/kg





#### GHD Services, INC- Midland, Midland, TX

LPU #59

Sample Id: Lab Sample Id	<b>SB-9-S-19-20-171019</b> d: 566199-026		Matrix: Date Collecte	Soil ed: 10.19.17 12.00	Date Received:10.20.17 16.20 Sample Depth: 19 - 20			
Analytical Me Tech: Analyst:	ethod: Chloride by EPA 3 MNV MNV	300	Date Prep:	10.31.17 09.00		Prep Method: % Moisture: Basis:	E300P Wet Weight	
Seq Number:	3032032		I					
Parameter		Cas Number	Result F	RL	Units	Analysis D	ate Flag	Dil

16887-00-6 58.2

4.90

10.31.17 13.43

mg/kg





#### GHD Services, INC- Midland, Midland, TX

LPU #59

Sample Id:         SB-8-S-0.5-1-171019           Lab Sample Id:         566199-034			Matrix: Soil Date Collected: 10.19.17 12.40			Date Received:10.20.17 16.20 Sample Depth: 0.5 - 1			
Tech:	thod: Chloride by EPA 3 MNV MNV	00		10 21 17 00 00		Prep Method: % Moisture: Basis:			
Analyst: Seq Number:	3032032		Date Prep:	10.31.17 09.00		Basis:	wetv	Weight	
Parameter		Cas Number	Result	RL	Units	Analysis D	ate	Flag	Dil

16887-00-6

<4.94 4.94

mg/kg

10.31.17 13.49

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#### GHD Services, INC- Midland, Midland, TX

LPU #59

Sample Id: Lab Sample Id	<b>SB-8-S-4-5-171019</b> d: 566199-035		Matrix: Date Collect	Soil ed: 10.19.17 12.45		Date Received:10.20.17 16.20 Sample Depth: 4 - 5		
Analytical Me Tech: Analyst:	ethod: Chloride by EPA 3 MNV MNV	300	Date Prep:	10.31.17 09.00		Prep Method: E3 % Moisture: Basis: W	300P Tet Weight	
Seq Number:	3032032							
Parameter		Cas Number	Result ]	RL	Units	Analysis Date	Flag	Dil

16887-00-6 **6.74** 

4.90

mg/kg

10.31.17 13.55





#### GHD Services, INC- Midland, Midland, TX

LPU #59

Sample Id: S Lab Sample Id: 5	<b>SB-8-S-9-10-171019</b> 566199-036		Matrix: Date Collect	Soil ed: 10.19.17 12.50		Date Received:10.20.17 16.20 Sample Depth: 9 - 10			
Tech: M	od: Chloride by EPA 30 INV INV	00	Date Prep:	10.31.17 09.00		Prep Method: % Moisture: Basis:		)P Weight	
Seq Number: 30	032032								
Parameter		Cas Number	Result	RL	Units	Analysis D	ate	Flag	Dil

<4.92

16887-00-6

4.92

10.31.17 14.02

mg/kg

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### GHD Services, INC- Midland, Midland, TX

LPU #59

Sample Id: Lab Sample Id	<b>SB-8-S-19-20-171019</b> d: 566199-037		Matrix: Date Collect	Soil ed: 10.19.17 12.55		Date Received Sample Depth:		0
Tech:	ethod: Chloride by EPA 3 MNV MNV	300		10 21 17 00 00		Prep Method: % Moisture: Basis:	E300P Wet Weight	
Analyst: Seq Number:			Date Prep:	10.31.17 09.00		Dasis:	wet weight	
Parameter		Cas Number	Result ]	RL	Units	Analysis Da	te Flag	Dil

16887-00-6 **84.4** 

4.97

mg/kg 10.31.17 14.08





### GHD Services, INC- Midland, Midland, TX

LPU #59

Sample Id:         SB-11-S-0.5-1-171019           Lab Sample Id:         566199-045			Matrix: Date Collect	Date Received:10.20.17 16.20 Sample Depth: 0.5 - 1					
Tech: Analyst:	thod: Chloride by EPA 3 MNV MNV	00	Date Prep:	10.31.17 09.00		Prep Method: % Moisture: Basis:		)P Weight	
Seq Number: Parameter	3032032	Cas Number	Result	RL	Units	Analysis D	ate	Flag	Dil

16887-00-6

<24.6 24.6

mg/kg 10.31.17

10.31.17 14.14

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### GHD Services, INC- Midland, Midland, TX

LPU #59

Sample Id: Lab Sample Id	<b>SB-11-S-4-5-171019</b> d: 566199-046		Matrix: Date Collect	Soil ed: 10.19.17 13.50		Date Received:10.20.17 Sample Depth: 4 - 5			)
Analytical Me Tech:	ethod: Chloride by EPA 3 MNV	800				Prep Method: % Moisture:	E30	0P	
Analyst: Seq Number:	MNV		Date Prep:	10.31.17 12.30		Basis:	Wet	Weight	
Parameter	JUJ2U <del>1</del> 2	Cas Number	Result	RL	Units	Analysis D	ate	Flag	Dil

16887-00-6 **9.97** 

4.97

mg/kg 10.31.17 15.44





### GHD Services, INC- Midland, Midland, TX

LPU #59

Sample Id:         SB-11-S-9-10-171019           Lab Sample Id:         566199-047			Matrix: Soil Date Collected: 10.19.17 13.55		Date Received:10.20.17 16.20 Sample Depth:9 - 10				
Analytical Me Tech: Analyst:	thod: Chloride by EPA 3 MNV MNV	00	Date Prep:	10.31.17 12.30		Prep Method: % Moisture: Basis:	E300P Wet W		
Seq Number:	3032042								
Parameter		Cas Number	Result	RL	Units	Analysis D	ate	Flag	Dil

16887-00-6

<4.94 4.94 mg/kg

10.31.17 16.03

U





U

1

### GHD Services, INC- Midland, Midland, TX

LPU #59

Sample Id:         SB-11-S-19-20-17           Lab Sample Id:         566199-048	Matrix: Date Collecte	Matrix: Soil Date Collected: 10.19.17 14.00			Date Received:10.20.17 16.20 Sample Depth: 19 - 20			
Analytical Method: Chloride by E Tech: MNV Analyst: MNV	EPA 300		10 21 17 12 20		Prep Method: % Moisture:			
Analyst: MNV Seq Number: 3032042		Date Prep:	10.31.17 12.30		Basis:	Wet Weight		
Parameter	Cas Number	Result F	RL	Units	Analysis Da	ite Flag	Dil	

<4.95

16887-00-6

4.95

10.31.17 16.09

mg/kg





### GHD Services, INC- Midland, Midland, TX

LPU #59

Sample Id:         SB-11-S-69-70-171019           Lab Sample Id:         566199-053			Matrix: Date Collect	Date Received:10.20.17 16.20 Sample Depth: 69 - 70				
Analytical Me Tech:	ethod: Chloride by EPA 3 MNV	00				Prep Method: % Moisture:	E300P	
Analyst:	MNV		Date Prep:	12.07.17 12.30		Basis:	Wet Weight	
Seq Number:	3035238							
Parameter		Cas Number	Result ]	RL	Units	Analysis Da	ate Flag	Dil

16887-00-6 **12.3** 

4.98

mg/kg 12.07.17 15.00

1

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### GHD Services, INC- Midland, Midland, TX

LPU #59

Parameter		Cas Number	Result I	RL	Units	Analysis Da	ate Flag	Dil
Seq Number:	3035238							
Analyst:	MNV		Date Prep:	12.07.17 12.30	1	Basis:	Wet Weight	
Tech:	MNV				Ģ	% Moisture:		
Analytical Me	ethod: Chloride by EPA 3	600			I	Prep Method:	E300P	
Sample Id: Lab Sample Id	<b>SB-11-S-79-80-171019</b> d: 566199-054		Matrix: Date Collecte	Soil ed: 10.19.17 14.30	Date Received:10.20.17 16.20 Sample Depth: 79 - 80			
a 1 11				a :1			1 1 0 0 0 1 7 1 4 4	

16887-00-6 **9.83** 

4.93

mg/kg 12.07.17 15.06





### GHD Services, INC- Midland, Midland, TX

LPU #59

Sample Id:         SB-11-S-89-90-171019           Lab Sample Id:         566199-055			Matrix: Soil Date Collected: 10.19.17 14.35		Date Received:10.20.17 16.2 Sample Depth: 89 - 90			.20
Analytical Me Tech:	ethod: Chloride by EPA 3 MNV	00				Prep Method: % Moisture:	E300P	
Analyst:	MNV		Date Prep:	12.07.17 12.30		Basis:	Wet Weight	:
Seq Number:	3035238							
Parameter		Cas Number	Result I	RL.	Units	Analysis D	ate Flag	Dil

Chloride

13.8

16887-00-6

4.92

 Analysis Date

 12.07.17
 15.12

mg/kg





### GHD Services, INC- Midland, Midland, TX

LPU #59

Sample Id: Lab Sample Id	<b>SB-10-S-0.5-1-171019</b> : 566199-056		Matrix: Date Collect	Soil ed: 10.19.17 14.45		Date Received Sample Depth		.20
Analytical Me Tech:	thod: Chloride by EPA 3 MNV	00				Prep Method: % Moisture:	E300P	
Analyst:	MNV		Date Prep:	10.31.17 12.30		Basis:	Wet Weight	
Seq Number:	3032042							
Parameter		Cas Number	Result	RL	Units	Analysis D	ate Flag	Dil

<4.93

16887-00-6

4.93

mg/kg

10.31.17 16.16

U





### GHD Services, INC- Midland, Midland, TX

LPU #59

Sample Id: Lab Sample I	<b>SB-10-S-4-5-171019</b> d: 566199-057		Matrix: Date Colle	Soil cted: 10.19.17 14.48	-	Date Received:10.20.17 16.20 Sample Depth: 4 - 5			
Analytical M	ethod: Chloride by EPA	300			I	Prep Method: E30	0P		
Tech:	MNV				ç	% Moisture:			
Analyst:	MNV		Date Prep:	10.31.17 12.30	I	Basis: Wet	t Weight		
Seq Number:	3032042								
Parameter		Cas Number	Result	RL	Units	Analysis Date	Flag	Dil	
Chloride		16887-00-6	191	4.98	mg/kg	10.31.17 16.22		1	





### GHD Services, INC- Midland, Midland, TX

LPU #59

Sample Id: <b>SB-10-S-9-1</b> Lab Sample Id: 566199-058	0-171019	Matrix: Date Collec	Soil ted: 10.19.17 14.51		Date Received: Sample Depth: 9		)
Analytical Method: Chloride	e by EPA 300	Date Conce			Prep Method: 1		
Tech: MNV					% Moisture:		
Analyst: MNV		Date Prep:	10.31.17 12.30	]	Basis:	Wet Weight	
Seq Number: 3032042							
Parameter	Cas Number	Result	RL	Units	Analysis Dat	e Flag	Dil
Chloride	16887-00-6	645	4.91	mg/kg	10.31.17 16.4	1	1





### GHD Services, INC- Midland, Midland, TX

LPU #59

Sample Id: Lab Sample I	<b>SB-10-S-19-20-17101</b> d: 566199-059	9	Matrix: Date Colle	Soil cted: 10.19.17 14.54	-	Date Received:10.20.17 16.20 Sample Depth: 19 - 20			
•	ethod: Chloride by EPA MNV	300				Prep Method: E30 % Moisture:	00P		
Tech: Analyst:	MNV		Date Prep:	10.31.17 12.30	,		t Weight		
Seq Number:	3032042								
Parameter		Cas Number	Result	RL	Units	Analysis Date	Flag	Dil	
Chloride		16887-00-6	1400	25.0	mg/kg	10.31.17 16.47		5	





### GHD Services, INC- Midland, Midland, TX

LPU #59

Sample Id: Lab Sample I	<b>SB-10-S-29-30-17101</b> d: 566199-060	9	Matrix: Date Colle	Soil cted: 10.19.17 14.57	-	Date Received:10.2 Sample Depth: 29 -		0
Analytical M	ethod: Chloride by EPA	300			I	Prep Method: E30	00P	
Tech:	MNV				Ģ	% Moisture:		
Analyst:	MNV		Date Prep:	10.31.17 12.30	1	Basis: Wet	t Weight	
Seq Number:	3032042							
Parameter		Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride		16887-00-6	564	4.92	mg/kg	10.31.17 16.54		1





### GHD Services, INC- Midland, Midland, TX

LPU #59

Analytical Me	d: 566199-061 ethod: Chloride by EPA 3	800			]	Sample Depth: Prep Method:		
Tech: Analyst:	MNV MNV		Date Prep:	10.31.17 12.30		% Moisture: Basis:	Wet Weight	
Seq Number:	3032042							
Parameter		Cas Number	Result	RL	Units	Analysis Da	te Flag	Dil

16887-00-6 423

4.92

mg/kg 10.31.17 17.00

1

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### GHD Services, INC- Midland, Midland, TX

LPU #59

Parameter		Cas Number	Result I	RL	Units	Analysis D	ate Flag	Dil
Seq Number:	3032548							
Analyst:	MNV		Date Prep:	11.06.17 10.00		Basis:	Wet Weight	
Tech:	MNV					% Moisture:		
Analytical Me	ethod: Chloride by EPA 3	600				Prep Method:	E300P	
Sample Id: Lab Sample Id	<b>SB-10-S-49-50-171019</b> d: 566199-062		Matrix: Date Collecte	Soil ed: 10.19.17 15.03		20		

16887-00-6 **64.7** 

4.99

11.06.17 18.43

mg/kg





### GHD Services, INC- Midland, Midland, TX

LPU #59

Sample Id: Lab Sample Id	<b>SB-10-S-59-60-171019</b> d: 566199-063		Matrix: Date Collect	Soil ed: 10.19.17 15.06		Date Received:10.20.17 16 Sample Depth: 59 - 60				
Analytical Me Tech: Analyst:	ethod: Chloride by EPA 3 MNV MNV	300	Date Prep:	11.06.17 10.00		Prep Method: E % Moisture: Basis: V	E300P Wet Weight			
Seq Number:	3032548		Duie Hep.				6			
Parameter		Cas Number	Result	RL	Units	Analysis Date	e Flag	Dil		

16887-00-6 **28.9** 

4.99

11.06.17 19.02

mg/kg





### GHD Services, INC- Midland, Midland, TX

LPU #59

Sample Id: Lab Sample I	<b>Dup-1-171019</b> d: 566199-067		Matrix: Date Colle	Soil cted: 10.19.17 00.00		Date Received:10.	20.17 16.2	0
Analytical Mo	ethod: Chloride by EPA	300				Prep Method: E3	90P	
Tech:	MNV					% Moisture:		
Analyst:	MNV		Date Prep:	10.31.17 12.30		Basis: We	t Weight	
Seq Number:	3032042							
Parameter		Cas Number	Result	RL	Units	Analysis Date	Flag	Dil
Chloride		16887-00-6	222	5.00	mg/kg	10.31.17 17.07		1



## **Flagging Criteria**



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

MDL Method Detection Limit	SDL Sample Detection Limit	LOD Limit of Detection
PQL Practical Quantitation Limit	MQL Method Quantitation Limit	LOQ Limit of Quantitation

- **DL** Method Detection Limit
- NC Non-Calculable
- + NELAC certification not offered for this compound.
- \* (Next to analyte name or method description) = Outside XENCO's scope of NELAC accreditation

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5332 Blackberry Drive, San Antonio TX 78238	(210) 509-3334	(210) 509-3335
1211 W Florida Ave, Midland, TX 79701	(432) 563-1800	(432) 563-1713
2525 W. Huntington Dr Suite 102, Tempe AZ 85282	(602) 437-0330	



## GHD Services, INC- Midland

LPU #59

Analytical Method:	Chloride by EPA 3	00						Pı	ep Metho	od: E30	)P	
Seq Number:	3032032			Matrix:	Solid				Date Pre	ep: 10.3	1.17	
MB Sample Id:	7633532-1-BLK		LCS Sar	nple Id:	7633532-	1-BKS		LCS	D Sample	d: 7633	3532-1-BSD	
Parameter	MB Result	Spike Amount	LCS Result	LCS %Rec	LCSD Result	LCSD %Rec	Limits	%RPD	RPD Limi	it Units	Analysis Date	Flag
Chloride	< 5.00	250	246	98	245	98	90-110	0	20	mg/kg	10.31.17 09:33	

Analytical Method:	Chloride by EPA 30	)0						Pr	ep Metho	d: E30	0P	
Seq Number:	3032042			Matrix:	Solid				Date Pre	ep: 10.3	1.17	
MB Sample Id:	7633545-1-BLK		LCS Sar	nple Id:	7633545-	1-BKS		LCSI	O Sample	Id: 763	3545-1-BSD	
Parameter	MB Result	Spike Amount	LCS Result	LCS %Rec	LCSD Result	LCSD %Rec	Limits	%RPD 1	RPD Limi	t Units	Analysis Date	Flag
Chloride	<5.00	250	239	96	238	95	90-110	0	20	mg/kg	10.31.17 15:31	

Analytical Method:	Chloride by EPA 30	00						P	rep Metho	od: E30	OP 90	
Seq Number:	3032548			Matrix:	Solid				Date Pr	ep: 11.0	6.17	
MB Sample Id:	7633896-1-BLK		LCS Sar	nple Id:	7633896-	I-BKS		LCS	D Sample	e Id: 7633	3896-1-BSD	
Parameter	MB Result	Spike Amount	LCS Result	LCS %Rec	LCSD Result	LCSD %Rec	Limits	%RPD	RPD Lim	it Units	Analysis Date	Flag
Chloride	< 5.00	250	261	104	263	105	90-110	1	20	mg/kg	11.06.17 16:36	

Analytical Method:	Chloride by EPA 30	)0						Pı	ep Meth	od: E300	)P	
Seq Number:	3035238			Matrix:	Solid				Date Pr	ep: 12.0	7.17	
MB Sample Id:	7635585-1-BLK		LCS Sar	nple Id:	7635585-	1-BKS		LCS	D Sample	e Id: 7635	585-1-BSD	
Parameter	MB Result	Spike Amount	LCS Result	LCS %Rec	LCSD Result	LCSD %Rec	Limits	%RPD	RPD Lim	it Units	Analysis Date	Flag
Chloride	< 5.00	250	255	102	258	103	90-110	1	20	mg/kg	12.07.17 09:29	

Analytical Method:	Chloride by EPA 3	00						P	rep Metho	od: E30	0P	
Seq Number:	3035317			Matrix:	Solid				Date Pr	ep: 12.0	7.17	
MB Sample Id:	7635619-1-BLK		LCS Sar	nple Id:	7635619-	1-BKS		LCS	D Sample	e Id: 763	5619-1-BSD	
Parameter	MB Result	Spike Amount	LCS Result	LCS %Rec	LCSD Result	LCSD %Rec	Limits	%RPD	RPD Lim	it Units	Analysis Date	Flag
	Kesuit	Amount	Result	/OKCC	Result	70Kec					Dutt	

MS/MSD Percent Recovery Relative Percent Difference LCS/LCSD Recovery LCS = Laboratory Control Sample A = Parent Result C = MS/LCS Result E = MSD/LCSD Result



#### **GHD Services, INC- Midland** LPU #59

<b>Analytical Method:</b> Seq Number: Parent Sample Id:	<b>Chloride by EPA 3</b> 3032032 566199-015	00		Matrix: nple Id:	Soil 566199-01	15 S			ep Meth Date Pr D Sampl	rep: 10.3		
Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RPD	RPD Lim	uit Units	Analysis Date	Flag
Chloride	286	248	521	95	518	94	90-110	1	20	mg/kg	10.31.17 12:58	
Seq Number:	Chloride by EPA 3 3032042	00		Matrix:	Soil 566199-04	16 5			ep Meth Date Pr	rep: 10.3		
Parent Sample Id: Parameter	566199-046 Parent Result	Spike Amount	MS Sar MS Result	MS %Rec	MSD Result	MSD %Rec	Limits		-	uit Units	Analysis Date	Flag
Chloride	9.97	249	250	96	252	97	90-110	1	20	mg/kg	10.31.17 15:50	
<b>Analytical Method:</b> Seq Number: Parent Sample Id:	<b>Chloride by EPA 3</b> 3032042 566200-001	00		Matrix: nple Id:	Soil 566200-00	)1 S			rep Meth Date Pr D Sampl	rep: 10.3		
- -	Parent	Spike	MS	MS	MSD	MOD	T :!4-	%RPD	RPD Lin	it Units	Analysis	Flag
Parameter	Result	Amount	Result	%Rec	Result	MSD %Rec	Limits				Date	riag
Parameter Chloride		-					90-110	0	20	mg/kg	•	riag
Chloride	Result	Amount 250	Result 454	%Rec 98 Matrix:	Result 453	%Rec 97		0 Pr	20 Tep Meth Date Pr	mg/kg od: E300 rep: 11.0	Date 10.31.17 17:19 0P	гіад
Chloride Analytical Method: Seq Number:	Result 210 Chloride by EPA 3 3032548	Amount 250	Result 454	%Rec 98 Matrix:	Result 453 Soil	%Rec 97		0 Pi MS	20 Tep Meth Date Pr	mg/kg od: E300 rep: 11.0 e Id: 5668	Date 10.31.17 17:19 0P 6.17	Flag
Chloride Analytical Method: Seq Number: Parent Sample Id:	<b>Result</b> 210 <b>Chloride by EPA 3</b> 3032548 566877-023 <b>Parent</b>	Amount 250 00 Spike	Result 454 MS Sar MS	%Rec 98 Matrix: nple Id: MS	Result 453 Soil 566877-02 MSD	%Rec 97 23 S MSD	90-110	0 Pi MS	20 Tep Meth Date Pr D Sample	mg/kg od: E300 rep: 11.0 e Id: 5668	Date 10.31.17 17:19 0P 6.17 877-023 SD Analysis	-

Analytical Method:	Chloride by EPA 3	)0						Prep 1	Method:	E300I	P	
Seq Number:	3032548			Matrix:	Soil			Da	te Prep:	11.06	.17	
Parent Sample Id:	566877-033		MS San	nple Id:	566877-03	33 S		MSD Sa	ample Id	56687	7-033 SD	
Parameter	Parent	Spike	MS	MS	MSD	MSD	Limits	%RPD RPI	) I imit I	Inite	Analysis	
i ui uiiicici	Result	Amount	Result	%Rec	Result	%Rec	Linits	/0KID KIL		Jints	Date	Flag

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

 $LCS = Laboratory \ Control \ Sample$ A = Parent ResultC = MS/LCS ResultE = MSD/LCSD Result



#### **GHD Services, INC- Midland** LPU #59

<b>Analytical Method:</b> Seq Number: Parent Sample Id:	Chloride b 3035238 566199-021	•	DO		Matrix: nple Id:	Soil 566199-02	21 S			rep Metho Date Pro D Sample	ep: 12.0		
Parameter		Parent Result	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RPD	RPD Lim	it Units	Analysis Date	Flag
Chloride		53.4	248	307	102	303	101	90-110	1	20	mg/kg	12.07.17 14:07	
Analytical Method:	Chloride b	y EPA 30	DO						Р	rep Metho	od: E30	0P	
Seq Number:	3035238	-			Matrix:	Soil				Date Pr	ep: 12.0	7.17	
Parent Sample Id:	569852-001	l		MS Sar	nple Id:	569852-00	01 S		MS	D Sample	e Id: 5698	352-001 SD	
Parameter		Parent Result	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RPD	RPD Lim	it Units	Analysis Date	Flag
Chloride		484	250	730	98	722	95	90-110	1	20	mg/kg	12.07.17 12:44	

Analytical Method:	Chloride by EPA 30	00						P	rep Meth	od: E30	OP 90	
Seq Number:	3035317			Matrix:	Soil				Date Pr	ep: 12.0	7.17	
Parent Sample Id:	566199-020		MS Sar	nple Id:	566199-02	20 S		MS	D Sample	e Id: 566	199-020 SD	
Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RPD	RPD Lim	it Units	Analysis Date	Flag
Chloride	52.0	248	301	100	305	102	90-110	1	20	mg/kg	12.07.17 22:31	

Analytical Method:	Chloride by EPA 30	00						Pı	rep Meth	od: E30	0P	
Seq Number:	3035317			Matrix:	Soil				Date Pr	ep: 12.0	7.17	
Parent Sample Id:	570208-010		MS Sar	nple Id:	570208-01	10 S		MS	D Sample	e Id: 5702	208-010 SD	
Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RPD	RPD Lim	it Units	Analysis Date	Flag
Chloride	223	245	464	98	470	101	90-110	1	20	mg/kg	12.07.17 23:54	

Analytical Method: Seq Number:	3031329 Matrix	: Solid : 3031329-1-BLK			
Parameter	MB Result		Units	Analysis Date	Flag
Percent Moisture	<1.00		%	10.25.17 09:50	

MS/MSD Percent Recovery Relative Percent Difference LCS/LCSD Recovery LCS = Laboratory Control SampleA = Parent Result C = MS/LCS Result E = MSD/LCSD Result



#### **GHD Services, INC- Midland** LPU #59

Analytical Method: Seq Number:	<b>Percent Moisture</b> 3031375	Matrix: MB Sample Id:	Solid 3031375-1-BLK					
Parameter		MB Result				Units	Analysis Date	Flag
Percent Moisture		<1.00				%	10.25.17 09:50	
Analytical Method: Seq Number:	<b>Percent Moisture</b> 3032135	Matrix: MB Sample Id:	Solid 3032135-1-BLK					
Parameter		MB Result				Units	Analysis Date	Flag
Percent Moisture		<1.00				%	11.02.17 09:45	
<b>Analytical Method:</b> Seq Number: <b>Parameter</b> Percent Moisture	<b>Percent Moisture</b> 3035219	Matrix: MB Sample Id: MB Result <1.00	Solid 3035219-1-BLK			Units %	<b>Analysis</b> <b>Date</b> 12.07.17 09:15	Flag
Analytical Method:	Percent Moisture							
Seq Number:	3035329	Matrix: MB Sample Id:	Solid 3035329-1-BLK					
Parameter		MB Result	5666929 T BLK			Units	Analysis Date	Flag
Percent Moisture		<1.00				%	12.08.17 08:30	
<b>Analytical Method:</b> Seq Number: Parent Sample Id:	<b>Percent Moisture</b> 3031329 566199-015	Matrix: MD Sample Id:						
Parameter	Parent Result	MD Result		%RPD RP	D Limit	Units	Analysis Date	Flag
Percent Moisture	7.08	7.04		1	20	%	10.25.17 09:50	

LCS = Laboratory Control SampleA = Parent ResultC = MS/LCS ResultE = MSD/LCSD Result



#### **GHD Services, INC- Midland** LPU #59

<b>Analytical Method:</b> Seq Number: Parent Sample Id: <b>Parameter</b> Percent Moisture	<b>Percent Moisture</b> 3031329 566199-045 <b>Parent</b> <b>Result</b> 19.3	Matrix: MD Sample Id: MD Result 18.1	<b>%RPD</b> 6	<b>RPD Limit</b> 20	Units %	<b>Analysis</b> <b>Date</b> 10.25.17 09:50	Flag
<b>Analytical Method:</b> Seq Number: Parent Sample Id: <b>Parameter</b> Percent Moisture	<b>Percent Moisture</b> 3031375 566199-067 <b>Parent</b> <b>Result</b> 6.27	Matrix: MD Sample Id: MD Result 6.39	<b>%RPD</b> 2	<b>RPD Limit</b> 20	Units %	<b>Analysis</b> <b>Date</b> 10.25.17 09:50	Flag
<b>Analytical Method:</b> Seq Number: Parent Sample Id: <b>Parameter</b> Percent Moisture	Percent Moisture 3032135 566199-062 Parent Result 5.73	Matrix: MD Sample Id: MD Result 5.46	<b>%RPD</b> 5	<b>RPD Limit</b> 20	Units %	<b>Analysis</b> <b>Date</b> 11.02.17 09:45	Flag
<b>Analytical Method:</b> Seq Number: Parent Sample Id: <b>Parameter</b> Percent Moisture	Percent Moisture 3035219 566199-055 Parent Result 7.34	Matrix: MD Sample Id: <b>MD</b> Result 7.39	<b>%RPD</b> 1	<b>RPD Limit</b> 20	Units %	Analysis Date 12.07.17 09:15	Flag
<b>Analytical Method:</b> Seq Number: Parent Sample Id: <b>Parameter</b> Percent Moisture	<b>Percent Moisture</b> 3035329 566199-020 <b>Parent</b> <b>Result</b> 6.21	Matrix: MD Sample Id: <b>MD</b> Result 5.90	<b>%RPD</b> 5	<b>RPD Limit</b> 20	Units %	<b>Analysis</b> <b>Date</b> 12.08.17 08:30	Flag

MS/MSD Percent Recovery Relative Percent Difference LCS/LCSD Recovery LCS = Laboratory Control SampleA = Parent Result C = MS/LCS Result E = MSD/LCSD Result



Stafford.Texas (281-240-4200)

2 Day EMERGENCY

3 Day EMERGENCY

Relinguished by:

Relinquished by:

3

Contract TAT

Date Time

Date Time:

Date

TAT Starts Day received by Lab, if received by 5:00 pm

will be enforced unless previously negotiated under a fully executed client contract.

## CHAIN OF CUSTODY

Page Of 7

San Antonio, Texas (210-509-3334)

Level 3 (CLP Forms)

SAMPLE CUSTODY MUST BE DOCUMENTED BELOW EACH TIME SAMPLES CHANGE POSSESSION, INCLUDING COURIER DELIVERY

**TRRP** Checklist

Received By

Received By:

Phoenix, Arizona (480-355-0900)

FED-EX / UPS: Tracking #

ived By

On Ice

Temp 5. 8 IR ID:R-8 CF·(0-6: -0.2°C) (6-23: +0.2°C) Corrected Temp: 5. (6

Cooler Temp.

Thermo, Corr, Factor

1670

Date Time:

Date Time:

Preserved where applicable

D	allas Texas (214-902-0300)		Midland, T	exas (432										Xenc	o Quote			Xenco Job	. 5	Total	29	
					-		vww.xe	1100.00	2111		-						Analutia	al Informat			nerel	Matrix Codes
	Client / Reporting Information	1			Pro	ject Infor	mation	-				-		-	1	T	Analyuc			TT	T	matrix codes
Comp	any Name / Branch: GHD / Houston	1		Project Name	/Number:	our mor	mation								1							W = Water
Comp	any Address:			LPU #59 / Project Loca							-	-	-	-	1							S = Soil/Sed/Solid GW =Ground Water
6320 1	Rothway St. #100, Houston TX 77040			Lea County,	NM																	DW = Drinking Water P = Product
Email Chris	: s.Knight@ghd.com	Phone No: 512-506-8803		Invoice To:											1							SW = Surface water SL = Sludge OW =Ocean/Sea Wat
Projec	ct Contact: tt.Foord@ghd.com												_									WI = Wipe
	lers's Name Rebecca Jones			PO Number:																		O = Oil WW= Waste Water
				Collection			111		Numb	per of p	rese	rved t	bottl	es		0						A = Air
No.	Field ID / Point of Col	lection	Sample Depth	Date	Time	Matrix	# of bottles	Ţ	NaOH/Zn Acetate	1NO3	12SO4	HOH	VaHSO4	NEOH	Chloride	Moisture					-	Field Comments
1	SB-6-S-0.5-1-171019		0.5-1	10/19/17	945	S	1							1		N						
2	SB-6-S-4-5-171019		4-5	10/19/17	950	S	1							1		N						
3	SB-6-S-9-10-171019		9-10	10/19/17	955	S	1							1		N	100					
4	SB-6-S-19-20-171019		19-20	10/19/17	1000	s	1							1		N						
5	SB-6-S-29-30-171019		29-30	10/19/17	1005	S	1		-					1		N						
6	SB-6-S-39-40-171019		39-40	10/19/17	1010	S	1							1		N	1.19 - 1				Hol	d
7	SB-6-S-49-50-171019		49-50	10/19/17	1015	s	1							1		N					Hoi	d
8	SB-6-S-59-60-171019		59-60	10/19/17	1020	S	1		4.1					1		N					Hol	d
9	SB-6-S-69-70-171019		69-70	10/19/17	1025	S	1						1	1		N					HOL	ł
10	SB-6-S-79-80-171019		79-80	10/19/17	1030	S	1							1		N					Hold	
15.00	Turnaround Time ( Business days)	1-2-2					Data Deli	iverable	e Inform	ation			-					Note	s:		- porte	
	Same Day TAT	5 Day TAT			Le	evel II Sto	QC				Leve	el IV (F	Full I	Data Pkg	g /raw	data)						
Г	Next Day EMERGENCY	7 Day TAT				evel III St	d OC+ F	Forms			TRR	P Lev	el IV					1				

UST / RG -411

Relinquished By

**Relinquished By** 

Custody Seal #

Notice: Notice: Signature of this document and relinquishment of samples constitutes a valid purchase order from client company to Xenco, its affiliates and subcontractors, it assigns standard terms and conditions of service. Xenco will be liable only for the cost of samples and shall not assume any responsibility for any losses or expenses incurred by the Client if such loses are due to circumstances beyond the control of Xenco. A minimum charge of \$75 will be applied to each project. Xenco's liability will be limited to the cost of samples. Any samples received by Xenco but not analyzed will be involced at \$5 per sample. These terms



## CHAIN OF CUSTODY

Page of Of 7

Setting the Standard since 1990 Stafford, Texas (281-240-4200)

Dallas Texas (214-902-0300)

#### Phoenix, Arizona (480-355-0900)

San Antonio, Texas (210-509-3334) Midland, Texas (432-704-5251)

Dallas Texas (214-902-0300)			Midland, I	CA03 (452		vww.xer	100.00	m					P	Kenco Quot	e #		Xenco Jo	ab# 5	100	9
			_			-									A	nalytical Inform	nation	+		Matrix Codes
Client / Reporting Information	11			Proj	ect Infor	mation														
Company Name / Branch: GHD / Houston			Project Name LPU #59 /																	W = Water S = Soil/Sed/Solid
Company Address:		1	Project Loca	tion:										911						GW =Ground Water
6320 Rothway St. #100, Houston TX 77040			Lea County,	NM									-							DW = Drinking Water P = Product
Email: Chris.Knight@ghd.com	Phone No: 512-506-8803		Invoice To:																	SW = Surface water SL = Sludge OW =Ocean/Sea Water
Project Contact: Scott.Foord@ghd.com			PO Number:		_					_			_							WI = Wipe O = Oil
Samplers's Name Rebecca Jones			PO Number.																	WW= Waste Water
		1	Collection	5				Num	ber of	prese	rved b	ottles	-	0 0						A = Air
No. Field ID / Point of Coll	lection	Sample Depth	Date	Time	Matrix	# of bottles	Ţ	NaOH/Zn Acetate	4NO3	12SO4	VaHSO4	MEOH	NONE	Chloride Moisture						Field Comments
1 SB-6-S-89-90-171019		89-90	10/19/17	1035	S	1	-	24		-			1						Ho	
2 SB-7-S-0.5-1-171019		0.5-1	10/19/17	1045	S	1						1	1	1					- 110	10
3 SB-7-S-4-5-171019		4-5	10/19/17	1050	s	1		-				1	1	1						
4 SB-7-S-9-10-171019		9-10	10/19/17	1055	S	1							1	1	Ì					
5 SB-7-S-19-20-171019		19-20	10/19/17	1100	S	1							1		1					
6 SB-7-S-29-30-171019		29-30	10/19/17	1105	S	1							1		1				Hold	d
7 SB-7-S-39-40-171019		39-40	10/19/17	1110	S	1							1		J				Hold	
8 SB-7-S-49-50-171019		49-50	10/19/17	1115	S	1						11	1		J				Hol	4
9 SB-7-S-59-60-171019	1	59-60	10/19/17	1120	S	1							1						Hol	d
10 SB-7-S-69-70-171019		69-70	10/19/17	1125	S	1							1		J				Hol	9
Turnaround Time ( Business days)	2				1	Data Deli	verable	Inform	ation	1		_				N	otes:		1000	1
Same Day TAT	5 Day TAT			Le	vel II Sto	I QC				Leve	H IV (F	ull Data	a Pkg /	/raw data)						
Next Day EMERGENCY	7 Day TAT			Le	vel III St	d QC+ F	orms	21		TRR	P Leve	VI I								
2 Day EMERGENCY	Contract TAT			Le	vel 3 (Cl	P Form	s)			UST	/ RG -	411								
3 Day EMERGENCY	.,		1	TF	RP Che	cklist											0	1		0
TAT Starts Day received by Lal	b, if received by 5:0	0 pm	-		_	-	_	-			-					FED-E	X / UPS: Tra	king #		11
Relincaished by Standar	SAMPLE CUSTOD	Y MUST BE	DOCUMENT	Received		E SAMPI	ES CH	IANGE			, INCLU quishe		OURIE	R DELIVER		e Time: 1/	Radal	ed By		the la
Relinquished by Sampler:		OAD	7:0800	1	an	00				2		Der.	1	1.		2/20/17	20 2/1	ADU	inle	nuth
Relinquished by:		Date Tim	e:	Received	By:					Relin	quishè	d By:				e Timé:	Receiv	ed By:	_	
3 Relinguished by:		Date Tim	e:	3 Received	By:				-	4 Custo	ody Se	al #	_	Pre	served	d where applic	able	do M	Cooler T	emp. Thermo, Corr, Factor
5				5														N		

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Temp: 5 F IR ID:R-8 CF:(0-6: -0.2°C) (6-23: +0.2°C) Corrected Temp: 5 (6

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CHAIN OF CUSTODY Page 3 of 7

Phoenix, Arizona (480-355-0900)

Stafford, Texas (281-240-4200)

San Anto	nio, Texas (210-509-3334)
Midland,	Texas (432-704-5251)

Dallas Texas (214-902-0300)		Midland, T	CA03 (452		ww.xe	nco.ca	om						Xen	co Quote	#		Xenco J	lob# 5	100	199
			-							-					Analy	ical Inform	ation	~	neur	Matrix Codes
Client / Reporting Information			Proj	ect Infor	mation															
ompany Name / Branch: GHD / Houston		Project Name LPU #59 / 1																		W = Water S = Soil/Sed/Solid
ompany Address:		Project Local											1				11			GW =Ground Water
320 Rothway St. #100, Houston TX 77040		Lea County,	NM																	DW = Drinking Wate P = Product
imall: Phone No: Chris.Knight@ghd.com 512-506-8803		Invoice To:																		SW = Surface water SL = Sludge OW =Ocean/Sea Wat
Project Contact: Scott.Foord@ghd.com		DO North		_								_								WI = Wipe
amplers's Name Rebecca Jones		PO Number:																		O = Oil WW= Waste Water
		Collection	1		-		Numt	berof	prese	erved	bottles	5					1.1	11		A = Air
No. Field ID / Point of Collection	Sample Depth	Date	Time	Matrix	# of bottles	Ę	NaOH/Zn Acetate	HNO3	H2SO4	NaOH	NaHSO4	NONE	Chloride	Moisture						Field Comments
1 SB-7-S-79-80-171019	79-80	10/19/17	1130	S	1							1		N						Hold
2 SB-7-S-89-90-171019	89-90	10/19/17	1135	S	1		- 1					1		X						blot
3 SB-9-S-0.5-1-171019	0.5-1	10/19/17	1145	S	1							1		N						
4 SB-9-S-4-5-171019	4-5	10/19/17	1150	s	1							1		N						
5 SB-9-S-9-10-171019	9-10	10/19/17	1155	S	1							1		1						
6 SB-9-S-19-20-171019	19-20	10/19/17	1200	S	1							1		N						
7 SB-9-S-29-30-171019	29-30	10/19/17	1205	S	1							1		1					H	told
8 SB-9-S-39-40-171019	39-40	10/19/17	1210	S	1							1		N					Ě	fold
9 SB-9-S-49-50-171019	49-50	10/19/17	1215	S	1							1		5					H	Flot
10 SB-9-S-59-60-171019	59-60	10/19/17	1220	S	1							1		5			1 1	1 1	V	told
Turnaround Time ( Business days)	-		-		Data Deli	verabl	e Inform	ation	1.1				-				Tem	/	10	,
Same Day TAT 5 Day TAT			Le	vel II Std	QC				Leve	el IV (	Full Da	ata Pky	g /rav	v data)			CEV	p: <	2.0	IR ID:R-8
Next Day EMERGENCY 7 Day TAT			Le	vel III Ste	d QC+ F	orms			TRR	RP Le	vel IV					1200	01.(	6.22.	0.000	<b>N</b>
2 Day EMERGENCY	1		Le	vel 3 (CL	P Form	is)			UST	r/RG	-411						Corr	ected 1	Fomn	5.6
3 Day EMERGENCY	a.			RP Che	klist												oom		remp.	Ο. φ
TAT Starts Day received by Lab, if received by 5					-											FED-EX	UPS: T	acking #		0
SAMPLE CUSTO	Date Time		ED BELOW E		E SAMP	LES CI	ANGE	POSSE			UDING		IER D	ELIVERY	Date Tim	. 17	Bachi	ved By;		11 11
Refinquished by Sampler	10/20/1"	7:0800	1	X	no	0	_	_	2	1	an	1	1	1.	10/-	20/17	2	VM	me	Chith
Relinquished by:	Date Tim	<b>b</b> :	Received	By:					Relin	quis	ned By				Daté Tin	le:	Recei	ved By:		
Relinquished by:	Date Time	e:	Received	By:	_				Cust	ody S	eal #	47	-	Pres	erved wh	ere applica	ble	On lo		ooler Temp. Thermo, Corr. Factor

5 Notice: Signature of this document and relinquishment of samples constitutes a valid purchase order from client company to Xenco, its affiliates and subcontractors. It assigns standard terms and conditions of service. Xenco will be liable only for the cost of samples and shall not assume any responsibility for any valid purchase previously negotiated under a fully executed client contract.



## **CHAIN OF CUSTODY** Page 4 Of 7

Phoenix, Arizona (480-355-0900)

Stafford, Texas	(281-240-4200)
Dallas Texas (2	14-902-0300)

San Antonio, Texas (210-509-3334)
Midland, Texas (432-704-5251)

Dallas Texas (214-502-5550)		majana, i			www.xei	100.00	m						Xenco	Quote #	2			Xenco J	ob#	5	001	99		
			-	-									( I		Ana	lytical In	formati	ion					Matrix Co	odes
Client / Reporting Information		Project Name		ect Infor	mation	_				_	_		97			Í				1			W = Water	
		LPU #59 /	0073819	-	_																		S = Soil/Se	d/Solid
Company Address: 6320 Rothway St. #100, Houston TX 77040		Project Loca Lea County,																					GW =Grou DW = Drin	king Water
Email: Phone No: Chris.Knight@ghd.com 512-506-8803		Invoice To:																					P = Produc SW = Surfa SL = Sludg OW = Ocea	ace water
Project Contact: Scott_Foord@ghd.com		PO Number:		_	_				_	_													WI = Wipe O = Oil	
Samplers's Name Rebecca Jones	-	PO Number.										$\sim$											WW= Was	te Water
		Collection	1		Num	ber of	prese	erved	bottles										-	-	A = Air			
No. Field ID / Point of Collection	Sample Depth	Date	Time	Matrix	# of bottles	Ţ	NaOH/Zn Acetate	HNO3	H2SO4	NaOH	MEOH	NONE	Chloride	Moisture								Fie	ld Commen	ts
1 SB-9-S-69-70-171019	69-70	10/19/17	1225	S	1							1									Ho	Id		
2 SB-9-S-79-80-171019	79-80	10/19/17	1230	S	1							1									Ho	12		
3 SB-9-S-89-90-171019	89-90	10/19/17	1235	S	1							1		N							the	17		
4 SB-8-S-0.5-1-171019	0.5-1	10/19/17	1245	S	1							1		N								de la		
5 SB-8-S-4-5-171019	4-5	10/19/17	1250	s	1							1	1	N										
6 SB-8-S-9-10-171019	9-10	10/19/17	1255	S	1							1	1	N										
7 SB-8-S-19-20-171019	19-20	10/19/17	1300	s	1							1		N										
8 SB-8-S-29-30-171019	29-30	10/19/17	1305	S	1							1		N							Ho	ld		
9 SB-8-S-39-40-171019	39-40	10/19/17	1310	S	1							1		N							Ho	d		_
10 SB-8-S-49-50-171019	49-50	10/19/17	1315	S	1		-					1		N							Ho	d		
Turnaround Time ( Business days)				2.12	Data Deli	verable	e Inform	nation	201		-	-		100	1		N	-		-	0			
Same Day TAT 5 Day TAT		1.3.5	Le	vel II Sta	d QC				Leve	el IV (	Full Da	ta Pkg	/raw c	lata)				lem	ip:	2	X	IRI		
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2 Day EMERGENCY	AT		Le	vel 3 (Cl	LP Form	is)	11		] UST	r/RG	-411							Corre	6-23	+0.	2°C)	-	D:R-8	1.17
3 Day EMERGENCY			TF	RP Che	cklist	1											-	OUTE	ected	ller	mp:	5	6	
TAT Starts Day received by Lab, if received by																FE		UPS: T					-	
Refinquished by Sampler	Date Tim	DOCUMENTE 1-080		By:	ICO	LES CI	HANGE	POSSE			LUDING ned By:		ER DEL		Date 1	Time:	1620	Recei	ed By:	au	ne	h	AL	
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Relinquished by:	Date Tim	e:	Received	d By:			-		Custo	ody S	ieal #	-	- 6	Prese	rved v	where ap	plicabl	e	P	p Ice	Cooler	Temp.	Thermo, C	orr, Factor
5			15												-	1			A					

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Final 1.002

XENCO
LABORATORIES
Setting the Standard since 1990
Stafford, Texas (281-240-4200)

CHAIN OF CUSTODY Page 5 Of 7

San Antonio, Texas (210-509-3334)

Phoenix, Arizona (480-355-0900)

	-	
Dallas	lexas	(214-902-0300)

D	allas Texas (214-902-0300)			Midland, T	exas (432										IV.	enco Qu	inte il			Yanc	# doL d	~1	1.100	
_			_	-		Y	ww.xei	100.00	om	_	_			_		enco qu			_	- Autor	1	20	aller	
		1	-		-	-		-	-						1.0	-		Analytic	al Inform	ation	-		Matrix	Codes
	Client / Reporting Information					ect Infor	mation	-		_		_		_	_	- 1							W = Wat	
Comp	pany Name / Branch: GHD / Houston			Project Name LPU #59 / 0																			S = Soil/	Sed/Solid
	pany Address: Rothway St. #100, Houston TX 77040			Project Location: Lea County, NM																	ound Water Inking Water			
		<b>N</b>		Invoice To:											_								P = Prod	
Email Chris	l: s.Knight@ghd.com	Phone No: 512-506-8803		invoice ro:																			SL = Slu OW =Oc	dge ean/Sea Water
Sco	ct Contact: tt.Foord@ghd.com olers's Name Rebecca Jones			PO Number:		-	-				_			_	-								WI = Wip O = Oil WW = Wi	e este Water
Jamp	Aers s Manie Rebecca Jones		-	Collection				10.00	Num	ber of	ores	erved	bottle	25									A = Air	iste mater
No.	Field ID / Point of Colle	ection	Sample Depth	Date	Time	Matrix	# of bottles	Ţ	VaOH/Zn Acetate	HN03	12SO4	HOH	A		NONE	Chloride	Moisture						Field Comme	ents
1	SB-8-S-59-60-171019		59-60	10/19/17	1320	S	1	-	24		-	2	2	-	1			1		-			Hold	
	SB-8-S-69-70-171019		69-70	10/19/17	1325	s	1							+	1	1	1						Hold	
3	SB-8-S-79-80-171019		79-80	10/19/17	1330	s	1		1					1	1	1	1						Hold	
4			89-90	10/19/17	1335	S	1							1	1	1	1						Hold	
	SB-11-S-0.5-1-171019		0.5-1	10/19/17	1345	s	1								1	1	1			-			THURS.	
			4-5	10/19/17	1350	s	1								1		1							
7	SB-11-S-9-10-171019		9-10	10/19/17	1355	S	1								1	1	V							
8	SB-11-S-19-20-171019		19-20	10/19/17	1400	S	1								1	V								
9			29-30	10/19/17	1405	S	1								1	V		111				1.1	Hold	
10	SB-11-S-39-40-171019		39-40	10/19/17	1410	S	1		-				17		1	V							Hold	
1	Turnaround Time (Business days)				3	1000	Data Deli	verabl	e Inform	nation		1			-	1				ites:			and the second second	
E	Same Day TAT	5 Day TAT			Le	vel II Std	QC				Lev	vel IV	(Full C	Data F	Pkg /r	raw dat	a)			Tem		8		
E	Next Day EMERGENCY	7 Day TAT			Le	vel III Sto	d QC+ F	orms			TR	RP Le	vel IV	9 - T						CF:(0	-6: -0	).2°C)	1110.0-0	
E	2 Day EMERGENCY	Contract TAT			Le	vel 3 (CL	P Form	is)			] us	T/R	5 -411							(6	6-23:	+0.2°C	IR ID:R-8	
E	3 Day EMERGENCY					RP Che	cklist												T I	Corre	cted	Temp:	50	
	TAT Starts Day received by Lab	, if received by 5:	00 pm	1						_				_					FL		0		+	
	kellagufished by Samalar	SAMPLE CUSTO					E SAMP	LES C	HANGE	POSSE			hed B		URIER	RDELIVI		ate Time			erverby		A	1.
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F	Relinquished by:		Date Time	e:	Received	By?					Reli	inquis	hed B	y:			1	até Time		Red	eived By	r:		
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5			1		5																1	X	and the second se	

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Final 1.002

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XENCO
LABORATORIES
Setting the Standard since 1990

## CHAIN OF CUSTODY

Page () Of 7

Setting the Standard since 199 Stafford, Texas (281-240-4200)

Dallas Texas (214-902-0300)

#### Phoenix, Arizona (480-355-0900)

San Antonio, Texas (210-509-3334) Midland, Texas (432-704-5251)

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Notice: Notice: Signature of this document and relinquishment of samples constitutes a valid purchase order from client company to Xenco, its affiliates and subcontractors. It assigns standard terms and conditions of service, Xenco will be liable only for the cost of samples and shall not assume any responsibility for any losses or expenses incurred by the Client If such hoses are due to circumstances beyond the control of Xenco. A minimum charge of \$75 will be applied to each project. Xenco's liability will be limited to the cost of samples, Any samples received by Xenco but not analyzed will be invoiced at \$5 per sample. These terms will be enforced unless previously negotiated under a fully executed edicient contract.

Final 1.002



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Setting the Standard since 1990 Stafford, Texas (281-240-4200)

Dallas Texas (214-902-0300)

#### San Antonio, Texas (210-509-3334)

Phoenix, Arizona (480-355-0900)

Midland, Texas (432-704-5251)

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### **XENCO** Laboratories Prelogin/Nonconformance Report- Sample Log-In



Client: GHD Services, INC- Midland Acceptable Temperature Range: 0 - 6 degC Air and Metal samples Acceptable Range: Ambient Date/ Time Received: 10/20/2017 04:20:00 PM Temperature Measuring device used : R8 Work Order #: 566199 Comments Sample Receipt Checklist 5.6 #1 \*Temperature of cooler(s)? #2 \*Shipping container in good condition? Yes #3 \*Samples received on ice? Yes #4 \*Custody Seals intact on shipping container/ cooler? N/A #5 Custody Seals intact on sample bottles? N/A #6\*Custody Seals Signed and dated? N/A #7 \*Chain of Custody present? Yes #8 Any missing/extra samples? No #9 Chain of Custody signed when relinquished/ received? Yes #10 Chain of Custody agrees with sample labels/matrix? Yes #11 Container label(s) legible and intact? Yes #12 Samples in proper container/ bottle? Yes #13 Samples properly preserved? Yes #14 Sample container(s) intact? Yes #15 Sufficient sample amount for indicated test(s)? Yes #16 All samples received within hold time? Yes #17 Subcontract of sample(s)? No

#18 Water VOC samples have zero headspace?

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

Analyst:

PH Device/Lot#:

Date: 10/24/2017

N/A

Checklist completed by: Connie Hernandez Checklist reviewed by: Kelsey Brooks

Date: 10/24/2017

# Appendix C 2018 Work Plan

Reference No. 073819



July 13, 2018

Ms. Olivia Yu Environmental Specialist New Mexico Oil Conservation Division – District 1 1625 N. French Drive Hobbs, New Mexico 88240

#### Re: 2018 Work Plan Lovington Paddock Unit 59 – Produced Water Release (1RP-915) Lea County, New Mexico

Dear Ms. Yu,

### 1. Project Information

The Site is located approximately 5 miles southeast of Lovington in Lea County, New Mexico in Unit G, Section 1, Township 17 South, Range 36 East. The land surface is owned by the City of Lovington (COL) and the minerals are managed by the State of New Mexico. According to historical records provided to GHD, an estimated 40 barrels (10 barrels recovered) of water were released from a pipe in a valve box at this location on June 4, 2006. The approximate affected area was estimated at 200 feet x 200 feet.

#### Soil

Information available from various sources including the Petroleum Recovery Research Center (PRRC) Mapping Portal, GHD currently managed groundwater site(s) data, and the United States Geological Survey (USGS) Current Water Database for the Nation, concludes:

- a) The depth to groundwater from the deepest impacted soil at the Site is less than 50-feet bgs.
- b) The nearest private domestic water source is greater than 200-feet from the release site.
- c) The nearest public/municipal water source is greater than 1,000-feet from the release site.
- d) The release site lies more than 1,000 horizontal feet from the nearest surface water body.

The NMOCD provides guidance for remediation of contaminants of oil field wastes or products in Guidelines for Remediation of Leaks, Spills, and Releases (August 13, 1993). Consequently, the NMOCD total ranking criteria score is twenty (20) for the Site. The site-specific Recommended Remedial Action Levels (RRALs) applied to this location by the NMOCD are 10 milligrams per kilogram (mg/kg) for benzene; 50 mg/kg for total benzene, toluene, ethylbenzene, and xylenes (BTEX); 100 mg/kg for total petroleum hydrocarbons (TPH); and an NMOCD accepted 600 mg/kg for horizontal and 250 mg/kg for vertical delineation of chlorides.



In an August 28, 2017 telephone conversation between Bernard Bockisch (GHD) and Jim Griswold (NMOCD Environmental Bureau Chief), GHD was informed that the NMOCD is accepting chloride concentrations of 600 mg/kg for the horizontal delineation assessment clean up levels.

#### Groundwater

The NMOCD provides guidance for remediation of contaminants of oil field wastes or products in Guidelines for Remediation of Leaks, Spills, and Releases (August 13, 1993). The guidance requires remediation of groundwater to the human health standards of the NMWQCC set forth in New Mexico Administrative Code 20.6.2.3103. Standards for chloride and total dissolved solids (TDS) are listed below.

Analyte	NMWQCC Standard for Groundwater (mg/L)
Chloride	250
TDS	1,000

Soil assessment activities were performed in July 2010, May 2011, and December 2012 at the Site. One monitoring well (MW-1) was installed in October 2016 to assess potential groundwater impact. Delineation activities were continued in 2017 and included the advancement of six additional soil borings (SB-6 through SB-11) to 90 feet bgs. Analytical data obtained from the assessment performed in 2017 indicates that vertical and horizontal extent of chloride impacts in soil are delineated and no impact to groundwater has been confirmed.

### 2. 2018 Scope of Work

On February 13, 2017, representatives from Chevron, GHD, NMOCD, and the New Mexico State Land Office (NMSLO) met to discuss the path to closure for the Site. NMOCD recommended installation of one additional monitoring well southeast (downgradient) of the impacted area to confirm chloride concentrations in soil and groundwater at the Site.

#### 2.1 Task I - Monitoring Well Installation Activities

GHD is proposing the installation of one 4-inch diameter monitoring well (MW-2) to the southeast (downgradient) of the impacted area to further screen groundwater for chloride impact (see Figure 1).

Prior to mobilizing drilling equipment to the Site, a utility notification will be made at least 48-hours prior to mobilization. In addition to the utility locate, a geophysical survey will be completed for each of the proposed boring locations.

A hydroexcavator or similar borehole clearance equipment will be used to clear the boring location with a diameter at least 2 inches greater than the size of the largest drilling tool. The boring will be cleared to 5-feet bgs or refusal. Initially, the boring will be drilled with air-rotary and switched to mud-rotary toward the bottom portion of the boring (if necessary). The rig will be operated by a New Mexico licensed water well driller.



One soil boring will be installed approximately 20 to 25 feet into the Ogallala Formation (i.e., approximately 125 feet bgs) and completed as the proposed 4 inch monitoring well. A GHD geologist will record the subsurface lithology and any sample data on the well construction diagram/soil boring logs.

Soil samples will be collected at 10 foot intervals. Soil samples will be field screened for chloride concentrations using Hach Chloride Titration strips and evaluated by the field geologist during the sampling event. Selected soil samples will be submitted for laboratory analysis of chloride by EPA Method 300. The nature of any sampling of soils will be based on results of the chloride field screening and the professional judgment of the GHD geologist with the intent to establish the depth at which soil concentrations are below the Site RRAL's. Soil sampling will be completed in accordance with our standard Quality Assurance/ Quality Control (QA/QC) procedures designed to minimize cross-contamination between samples and to provide reliable laboratory results.

Following monitoring well installation activities, the newly installed well will be developed by the driller. Roll off/mud boxes will be located proximate to the proposed well location and drilling and formation fluids, along with drill cuttings, will be containerized. Following waste characterization (estimated at one month), drill cuttings (non-hazardous) will be removed and transported to CEMC-approved Sundance Services, Inc. for disposal.

#### 2.2 Task II – 2018 Groundwater Monitoring Activities

Following installation and development of MW-2, the two monitoring wells (MW-1 and MW-2) will be gauged prior to sample collection. Prior to purging the wells, static fluid levels will be measured with an electric interface probe to the nearest hundredth of a foot. After recording fluid levels, monitoring wells will be profiled using a conductivity meter. Subsequent to well gauging, the monitoring wells will be purged using EPA-approved low-flow methodology.

Groundwater samples will be placed on ice in insulated coolers and chilled to a temperature of approximately 4°C (40°F). The coolers will then be sealed for shipment and proper chain-of-custody documentation will accompany the samples to the laboratory for analysis of chloride by EPA Method 300 and TDS by Method 2540C.

#### 2.3 Task III– Reporting

Following completion of the field activities detailed above, a report summarizing the results of the additional assessment will be prepared for submittal to NMOCD. The report will include a Site description, project history, description of field events, a discussion of results, and recommendations (if any). Soil and groundwater analytical results collected will be tabulated in data tables and presented graphically using concentration maps. A boring log and monitor well construction log for the Site will also be completed.



If you have any questions, please contact me at 713-734-3090.

Sincerely,

2

Scott Foord, P.G. Project Manager

SF/sh/1

Encl.

Attachment: Figure 1 – Proposed Monitoring Well Location



CAD File: I:\CAD\Files\07----\073819-CEMC-LPU #59\Proposed\073819-00(Proposed-02)GN-DL001.dwg

Coordinate System: NAD 1983 (2011) StatePlane

New Mexico East (US Feet)

PROPOSED MONITORING WELL LOCATION MAP

## FIGURE 1