Received by OCD: 11/15/2019 12:26:14 PM



Jason Michelson Project Manager Chevron Environmental Management Company 1500 Louisiana Street, #38116 Houston, Texas 77002 Work: 832-854-5601 Cell: 281-660-8564 jmichelson@chevron.com

November 15, 2019

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

Re: VGSAU 148 Soil Assessment Report Case No. 1RP-3688 Lea County, New Mexico

Dear whom it concerns,

Please find enclosed for your files, a copy of the following report:

• Vacuum Grayburg-San Andres Unit (VGSAU) 148 – Soil Assessment Report (dated July 31, 2019), Unit S; Section 1; Township 18 South; Range 34 East; Lea County; New Mexico.

The submittal was prepared by GHD Services, Inc. (GHD) on behalf of Chevron Environmental Management Company (CEMC).

Please do not hesitate to call Scott Foord with Arcadis at 713-953-4853 or myself at 832-854-5601, should you have any questions.

Sincerely,

In Jason Michelson

Encl. VGSAU 148 - Soil Assessment Report

C.C. Amy Barnhill, Chevron/MCBU



Soil Assessment Report

VGSAU 148 (1RP-3688) Produced Water Release Lea County, New Mexico

Chevron Environmental Management Company







Table of Contents

1.	Introduction	1
2.	NMOCD Closure Requirement Criteria for Soils	1
3.	Project Information and Background	2
4.	2018 Drilling and Sampling	3
	4.1 Soil Sampling Analytical Results	4
5.	Summary of Findings	4
	5.1 2019 Remediation Activities	4

Figure Index

Figure 1	Site Location Map
Figure 2	Site Aerial Map
Figure 3	Site Details Map
Figure 4	Site Details and Analytical Results Map

Table Index

 Table 1
 Soil Analytical Results Summary

Appendix Index

Appendix A	Soil Boring Logs
Appendix B	Soil Laboratory Analytical Report – 2018
Appendix C	2019 Remediation Work Plan

.



1. Introduction

GHD is pleased to present this Site Assessment Report to Chevron Environmental Management Company (CEMC) for the Vacuum Grayburg-San Andres Unit (VGSAU) 148 produced water release location (hereafter referred to as the "Site"). The Site is located in Unit S, Section 1, Township 18 South, Range 34 East, approximately one-half mile south of the Chevron Buckeye Field Management Team office in Lea County, New Mexico. The Site is located within the VGSAU oil field (Refer to Figures 1 and 2).

2. NMOCD Closure Requirement Criteria for Soils

Historical subsurface investigation activities were completed in accordance with the Guidelines for Remediation of Leaks, Spills, and Releases Rule 19.15.29 New Mexico Administrative Code (NMAC) from the New Mexico Oil Conservation Division (NMOCD) dated August 13, 1993. The former site-specific Recommended Remediation Action Levels (RRALs) previously applied to this location by the NMOCD were 10 milligrams per kilogram (mg/kg) for benzene, 50 mg/kg for total BTEX, 100 mg/kg for total TPH, and 600 mg/kg for chloride.

Rule 19.15.29 was revised and reissued on August 14, 2018. The following criteria from Table 1 (below) within NMAC 19.15.29.12 was utilized to determine site-specific screening limits.

Minimum depth below any point within the horizontal bou of the release to ground water less than	Constituent	Limit*
>100 feet	Chloride**	20,000 mg/kg
	TPH (GRO+DRO+MRO)	2,500 mg/kg
	GRO+DRO	1,000 mg/kg
	BTEX	50 mg/kg
	Benzene	10 mg/kg

* Numerical limits or natural background level, whichever is greater.

** This applies to release of produced water or other fluids which may contain chloride.

Localized depth to groundwater was confirmed to be approximately 130 feet below ground surface (bgs) in 2018 based on the information from monitoring well MW-12 associated with the Buckeye Compressor Station facility and VGSAU 58 (AP-104) located approximately 0.80 miles northeast of VGSAU 148 (both sites monitored by GHD). The boring log for MW-12 is included in Appendix A. Additionally, SB-16 was advanced at the Site in September 2018 to 101 feet bgs and groundwater was not encountered, confirming Site groundwater extends deeper than 100 feet bgs. Information also available from various sources including the New Mexico Office of the State Engineer (NMOSE) Point of Diversion (POD) mapping portal, Petroleum Recovery Research Center (PRRC) Mapping Portal, FEMA Flood Map Service, New Mexico OSE POD Locator, currently managed groundwater site(s) data by GHD, and the United States Geological Survey (USGS) Current Water Database for the Nation, concludes:



- a) the depth to groundwater at the Site is greater than 100-feet bgs;
- b) the site is not within 300 feet of any continuously flowing watercourse;
- c) the site is not within 200 feet of any lakebed, sinkhole or playa lake;
- d) the site is not within 300 feet of an occupied permanent residence, school, etc.;
- e) the site is not within 500 feet of a spring or private, domestic fresh water well;
- f) the site is not within 1,000 feet of any fresh water well or spring;
- g) the site is not within incorporated municipal boundaries or within a defined municipal fresh water well field;
- h) the site is not within 300 feet of a wetland;
- i) the site is not within an area overlying a subsurface mine;
- j) the site is not within an unstable area; and
- k) the site is not within a 100-year floodplain.

Consequently, the anticipated site-specific screening limits to be applied to this location by the NMOCD based on the revised Rule are <u>10 mg/kg for benzene</u>, <u>50 mg/kg for total BTEX</u>, <u>2,500 mg/kg for total TPH</u>, and <u>20,000 mg/kg for chloride</u>.

Per 19.15.29.13, Restoration, Reclamation, and Re-vegetation, the impacted area must be remediated a minimum of 4-feet bgs with non-waste containing, uncontaminated, earthen material with chloride concentrations less than 600 mg/kg. Soil cover must consist of topsoil at a thickness comparable to background topsoil thicknesses, or one foot of suitable earthen material capable of establishing and maintaining vegetation at the site. Reclamation is considered complete when all disturbed areas have established vegetative cover with a life-form ratio of plus or minus 50 percent of pre-remedial levels, and plant cover of a minimum of 70 percent of previous levels, excluding noxious weeds.

3. Project Information and Background

The release site is situated proximate to multiple produced water and oil gathering lines that converge at a surface manifold location. According to the NMOCD Release Notification and Corrective Action Form C-141 submitted to the agency by Chevron, the release occurred on June 22, 2015 and was immediately reported to Ms. Kellie Jones, Hobbs District 1 NMOCD office. The volume of the spill was reported as 153.55 barrels of produced water of which 30 barrels were recovered. A failure of a fiberglass water line was listed as the cause of the release.

In June 2016, Chevron contracted GHD to perform a soil assessment at the Site by implementing a soil boring installation and sampling program. On June 13 and 14, 2016, GHD subcontractor Harrison Cooper, Inc. (HCI) advanced five soil borings (SB-1 through SB-5) utilizing an air-rotary drilling rig to depths of approximately 50 feet bgs. A subsequent soil assessment was conducted on August 22 and 23, 2016. HCI advanced four additional soil borings (SB-6 through SB-9) to 50 feet bgs.



All soil samples collected during the June mobilization (SB-1 through SB-5) were below the historical NMOCD Site-specific RRALs for TPH (1,000 mg/kg) and total BTEX (50 mg/kg). Chloride concentrations in samples collected from SB-2, SB-3, SB-4, and SB-5 exceeded the historical NMOCD Site-specific RRAL of 250 mg/kg for vertical delineation of chloride. The chloride exceedances ranged from 285 mg/kg to 4,210 mg/kg at depths ranging from 5 to 10 feet bgs. The samples collected from the deeper intervals (up to 50 ft bgs) within SB-2, SB-3, SB-4, and SB-5 were below the historical RRAL for chloride.

Samples collected for chloride analysis during the August mobilization (SB-6 through SB-9) were below the historical NMOCD RRAL in all but three samples. Chloride exceeded the RRAL in SB-7 at 15 feet bgs (352 mg/kg) and 20 feet bgs (954 mg/kg), and in SB-9 at 5 feet bgs (6,540 mg/kg). Analytical results associated with assessment activities conducted in June and August 2016 indicated the horizontal extent of chloride impacts in soil had not been fully delineated.

In 2017, a two-phase geophysical investigation was completed at the Site and six additional soil borings were subsequently installed (SB-10 through SB-15) and sampled in an attempt to fully delineate the horizontal extents of the chloride impact. The electromagnetic (EM)-31 survey delineated two areas of suspected brine-impacted soils within the Site boundaries. In general, the electrical resistivity (ER) survey results indicate the zone of suspected brine impact is a surficial zone, affecting soils at surface down to approximately 30-40 feet bgs. Analytical results associated with assessment activities conducted in 2016 and 2017 indicated the horizontal extents of the chloride impact in soil had not been fully delineated. The vertical extent of chloride impact appeared delineated and confined to shallow soils less than 40 feet bgs, therefore the risk of impact to groundwater is believed minimal.

To further delineate the horizontal extent of chloride impact, additional soil borings were advanced and sampled at the Site in 2018. The results of the soil borings investigation is provided herein. Figure 3 depicts the soil boring locations installed between 2014 through 2018.

4. 2018 Drilling and Sampling

Sixteen soil borings (SB-16 through SB-31) were advanced at the Site to further assess and delineate the release area. Prior to mobilizing drilling equipment to the Site, the soil boring locations were pre marked and a New Mexico 811 One-Call utility locate was completed at least 48 hours prior to start of work. A confirmation utility check was completed that included Ground Penetrating Radar (GPR) services by High Mesa of Albuquerque, New Mexico.

On September 14, 2018, GHD and GHD subcontractor HCI, a New Mexico licensed drilling company, mobilized to the Site to begin soil boring installation activities for SB-16 through SB-31. The soil borings were pre-cleared with a hydro-vac to a depth of 8 feet bgs or until refusal. SB-16 was advanced to 101 feet bgs using an air rotary drilling methods. The remainder of the borings were advanced using an air rotary drill rig to 10 feet bgs. Soil cuttings were spread on-site and the borings were plugged with hydrated 3/8 inch bentonite hole plug. During drilling, a GHD geologist observed, visually inspected, and logged soil cuttings at 4 feet bgs and then 10-foot intervals. Subsurface lithology was recorded in accordance with the Unified Soil Classification System in field books. Boring logs prepared from the field information can be found in Appendix A.



The soil types observed in soil samples collected during the drilling program consisted of caliche followed by silty sand. Chloride screening was accomplished in the field by mixing soil samples with distilled water, then testing the rinsate using Hach chloride test strips. Total depths of the borings and collection of soil samples for laboratory analysis were determined based on chloride field test results.

Soils samples were collected from SB-16 at 4 feet bgs, 10 feet bgs, and then at 10-foot intervals down to 90 feet bgs. Soil samples were collected for laboratory analysis from SB-17 through SB-31 at 4 and 10 feet bgs. Soil samples were packed into laboratory prepared jars and stored in a cooler with ice. The soil samples were sent to Xenco Laboratories (Xenco) in Midland, Texas for chloride analysis by EPA Method 300.

4.1 Soil Sampling Analytical Results

A soil analytical summary of results from 2016 through 2018 is presented in Table 1. A Site Details and Analytical Results Map for Soils (2016 – 2018) is presented as Figure 4.

- Chloride concentrations above the revised Rule 19.15.29 screening limit of 20,000 mg/kg were
 not reported in any of the soil borings installed at the site, including the new soil borings installed
 in September 2018 (SB-16 through SB-31).
- Chloride concentrations above the revised Rule restoration limit of 600 mg/kg within the top 4 feet bgs of the soil column were reported in historical borings SB-2, SB-3, SB-5, SB-9, SB-15, and newly installed borings SB-21, SB-23, SB-24, SB-25, SB-26, SB-28, SB-29, and SB-30.

The 2018 soil laboratory analytical report is included in Appendix B.

5. Summary of Findings

Evaluation of the analytical data obtained from soil assessment and delineation activities performed from 2016 through 2018 indicate horizontal and vertical delineation of chloride impacts has been achieved at the Site to support remediation activities (excavation and lining of the area). The advancement of SB-16 to 101 feet bgs confirms that depth to groundwater at the Site is greater than 100 feet bgs.

5.1 2019 Remediation Activities

Lateral and horizontal delineation have been completed at the Site. Soil remediation activities (excavation) per NMAC 19.15.29.13 will be conducted at the Site following NMOCD approval of the 2019 Remediation Work Plan attached as Appendix C of this report.



All of Which is Respectfully Submitted, GHD

parige A. Acel

Paige Hall Project Manager

Raaj Patel, P. G. Senior Project Manager

•

Figures

•

GHD | Chevron Environmental Management Company - Soil Assessment Report | 11121241 (3)



CAD File: I:\CAD\Files\Eight Digit Job Numbers\1112----\11121241-CEMC-Buckeye_VGSAU 148\11121241-00(003)\11121241-00(003)GN-DL001.dwg



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

Lat/Long: 32.777256° North, -103.521904° West





11121241-00 CEMC LEA COUNTY, NEW MEXICO Dec 14, 2018 VGSAU 148 PRODUCED WATER RELEASE ASSESSMENT

SITE AERIAL MAP

FIGURE 2

CAD File: I:\CAD\Files\Eight Digit Job Numbers\1112----\11121241-CEMC-Buckeye_VGSAU 148\11121241-00(003)11121241-00(003)GN-DL001.dwg



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





CEMC LEA COUNTY, NEW MEXICO VGSAU 148 PRODUCED WATER RELEASE ASSESSMENT

SITE DETAILS MAP

CAD File: I:\CAD\Files\Eight Digit Job Numbers\1112----\11121241-CEMC-Buckeye_VGSAU 148\11121241-00(003)\11121241-00(003)GN-DL001.dwg

Lat/Long: 32.777256° North, -103.521904° West

11121241-00 Mar 19, 2019

FIGURE 3





LEA COUNTY, NEW MEXICO VGSAU 148 PRODUCED WATER RELEASE ASSESSMENT

SITE DETAILS AND ANALYTICAL RESULTS MAP

```
CAD File: I:\CAD\Files\Eight Digit Job Numbers\1112----\11121241-CEMC-Buckeye_VGSAU 148\11121241-00(003)\11121241-00(003)GN-DL001.dwg
```

Mar 19, 2019

FIGURE 4

Tables

•

GHD | Chevron Environmental Management Company - Soil Assessment Report 11121241 (3)

Table 1

Soil Analytical Results Summary Chevron Environmental Management Company VGSAU 148 Lea County, New Mexico

Sample ID Full Sample Name Depth (feet)			Date	Chlorides mg/kg
	NMOCD Scre	ening Standard	20,000	
	Restoration Requirement	ts within the Top 4 feet ba	5	600*
SB-1	SB-1-10-161306	10 ft BGS	6/13/2016	80.3
SB-1	SB-1-15-161306	15 ft BGS	6/13/2016	102
SB-1	SB-1-30-161306	30 ft BGS	6/13/2016	29.2
SB-1	SB-1-50-161306	61306 50 ft BGS 6/13/2016		<11.5
SB-2	SB-2-5-161306	5 ft BGS	6/13/2016	4210
SB-2	SB-2-10-161306	10 ft BGS	6/13/2016	813
SB-2	SB-2-20-161306	20 ft BGS	6/13/2016	49.2
SB-2	SB-2-50-161306	50 ft BGS	6/13/2016	11.9
SB-3	SB-3-5-161306	5 ft BGS	6/13/2016	1680
SB-3	SB-3-10-161306	10 ft BGS	6/13/2016	184
SB-3	SB-3-20-161306	20 ft BGS	6/13/2016	28
SB-3	SB-3-50-161306	50 ft BGS	6/13/2016	21
SB-4	SB-4-5-161306	5 ft BGS	6/14/2016	290
SB-4	SB-4-10-161306	10 ft BGS	6/14/2016	285
SB-4	SB-4-30-161306	30 ft BGS	6/14/2016	<10.5
SB-4	SB-4-50-161306	50 ft BGS	6/14/2016	<10.4
SB-5	SB-5-5-161306	5 ft BGS	6/14/2016	2660
SB-5	SB-5-10-161306	10 ft BGS	6/14/2016	1010
SB-5	SB-5-20-161306	20 ft BGS	6/14/2016	43.2
SB-5	SB-5-50-161306	50 ft BGS	6/14/2016	29.8
SB-6	SB-6-082216-5	5 ft BGS	8/22/2016	20.2
SB-6	SB-6-082216-10	10 ft BGS	8/22/2016	14.5
SB-6	SB-6-082216-20	20 ft BGS	8/22/2016	<10.0
SB-6	SB-6-082216-50	50 ft BGS	8/22/2016	<10.0
SB-7	SB-7-082216-5	5 ft BGS	8/22/2016	14.2
SB-7	SB-7-082216-15	15 ft BGS	8/22/2016	352
SB-7	SB-7-082216-20	20 ft BGS	8/22/2016	954
SB-7	SB-7-082216-30	30 ft BGS	8/22/2016	30.6
SB-7	SB-7-082216-50	50 ft BGS	8/22/2016	11.7
05.0		E (1 E O O	0/00/00/0	
SB-8	SB-8-082316-5	5 ft BGS	8/23/2016	<10.0
SB-8	SB-8-082316-10	10 ft BGS	8/23/2016	<10.0
SB-8	SB-8-082316-20	20 ft BGS	8/23/2016	<10.0
SB-8	SB-8-082316-30	30 ft BGS	8/23/2016	<10.0
SB-8	SB-8-082316-50	50 ft BGS	8/23/2016	<10.0

Table 1

Soil Analytical Results Summary Chevron Environmental Management Company VGSAU 148 Lea County, New Mexico

Sample ID	Full Sample Name	Depth (feet)	Date	Chlorides mg/kg
	NMOCD Scre	ening Standard		20,000
	Restoration Requirement	ts within the Top 4 feet bg	S	600*
SB-9	SB-9-082316-5	5 ft BGS	8/23/2016	6540
SB-9	SB-9-082316-10	10 ft BGS	8/23/2016	86.4
SB-9	SB-9-082316-15	15 ft BGS	8/23/2016	46.8
SB-9	SB-9-082316-20	20 ft BGS	8/23/2016	21.1
SB-9	SB-9-082316-50	50 ft BGS	8/23/2016	41.6
SB-10	SB-10-S-0.5-1-171017	0.5-1 ft BGS	10/17/2017	15.1
SB-10	SB-10-S-4-5-171017	4-5 ft BGS	10/17/2017	91.6
SB-10	SB-10-S-9-10-171017	9-10 ft BGS	10/17/2017	175
SB-10	SB-10-S-19-20-171017	19-20 ft BGS	10/17/2017	40.5
SB-10	SB-10-S-29-30-171017	29-30 ft BGS	10/17/2017	12
SB-11	SB-11-S-0.5-1-171017	0.5-1 ft BGS	10/17/2017	41.3
SB-11	SB-11-S-4-5-171017	4-5 ft BGS	10/17/2017	2310
SB-11	SB-11-S-9-10-171017	9-10 ft BGS	10/17/2017	1030
SB-11	SB-11-S-19-20-171017	19-20 ft BGS	10/17/2017	2260
SB-11	SB-11-S-29-30-171017	29-30 ft BGS	10/17/2017	923
SB-11	SB-11-S-39-40-171017	39-40 ft BGS	10/17/2017	332
SB-11	SB-11-S-49-50-171017	49-50 ft BGS	10/17/2017	86.1
SB-12	SB-12-S-0.5-1-171017	0.5-1 ft BGS	10/17/2017	<5.14
SB-12	SB-12-S-4-5-171017	4-5 ft BGS	10/17/2017	13.5
SB-12	SB-12-S-9-10-171017	9-10 ft BGS	10/17/2017	135
SB-12	SB-12-S-19-20-171017	19-20 ft BGS	10/17/2017	<5.15
SB-12	SB-12-S-29-30-171017	29-30 ft BGS	10/17/2017	<5.28
SB-13	SB-13-S-0.5-1-171017	0.5-1 ft BGS	10/17/2017	136
SB-13	SB-13-S-4-5-171017	4-5 ft BGS	10/17/2017	1610
SB-13	SB-13-S-9-10-171017	9-10 ft BGS	10/17/2017	1160
SB-13	SB-13-S-19-20-171017	19-20 ft BGS	10/17/2017	205
SB-13	SB-13-S-29-30-171017	29-30 ft BGS	10/17/2017	1450
SB-13	SB-13-S-39-40-171017	39-40 ft BGS	10/17/2017	255
SB-13	SB-13-S-49-50-171017	49-50 ft BGS	10/17/2017	87
SB-14	SB-14-S-0.5-1-171017	0.5-1 ft BGS	10/17/2017	<5.06
SB-14	SB-14-S-4-5-171017	4-5 ft BGS	10/17/2017	16.8
SB-14	SB-14-S-9-10-171017	9-10 ft BGS	10/17/2017	12.6
SB-14	SB-14-S-19-20-171017	19-20 ft BGS	10/17/2017	25.4
SB-14	SB-14-S-29-30-171017	29-30 ft BGS	10/17/2017	21.9

Table 1

Soil Analytical Results Summary Chevron Environmental Management Company VGSAU 148 Lea County, New Mexico

Sample ID	Full Sample Name	Date	Chlorides mg/kg	
	NMOCD Scre	ening Standard		20,000
	Restoration Requirement	ts within the Top 4 feet bg	S	600*
SB-15	SB-15-S-0.5-1-171017	0.5-1 ft BGS	10/17/2017	707
SB-15	SB-15-S-4-5-171017	4-5 ft BGS	10/17/2017	601
SB-15	SB-15-S-9-10-171017 9-10 ft BGS 10/17/2017			573
SB-15	SB-15-S-19-20-171017	19-20 ft BGS	10/17/2017	15
SB-15	SB-15-S-29-30-171017	29-30 ft BGS	10/17/2017	5.74
SB-15	SB-15-S-39-40-171017	39-40 ft BGS	10/17/2017	5.52
SB-16	SB-16-4-140918	4 ft BGS	9/14/18	258
SB-16	SB-16-10-140918	10 ft BGS	9/14/18	610
SB-16	SB-16-20-140918	20 ft BGS	9/14/18	367
SB-16	SB-16-30-140918	30 ft BGS	9/14/18	25.5
SB-16	SB-16-40-140918	40 ft BGS	9/14/18	20.4
SB-16	SB-16-50-140918	50 ft BGS	9/14/18	22.5
SB-16	SB-16-60-140918	60 ft BGS	9/14/18	24.9
SB-16	SB-16-70-140918	70 ft BGS	9/14/18	19.8
SB-16	SB-16-80-140918	80 ft BGS	9/14/18	20.9
SB-16	SB-16-90-140918	SB-16-90-140918 90 ft BGS 9/14/18		23.2
SB-17	SB-17-4-140918	4 ft BGS	9/14/18	223
SB-17	SB-17-10-140918	10 ft BGS	9/14/18	488
SB-18	SB-18-4-140918	4 ft BGS	9/14/18	200
SB-18	SB-18-10-140918	10 ft BGS	9/14/18	671
SB-19	SB-19-4-140918	4 ft BGS	9/14/18	26.8
SB-19	SB-19-10-140918	10 ft BGS	9/14/18	35.5
SB-20	SB-20-4-140918	4 ft BGS	9/14/18	21.0
SB-20	SB-20-10-140918	10 ft BGS	9/14/18	29.1
SB-21	SB-21-4-140918	4 ft BGS	9/14/18	4,190
SB-21	SB-21-10-140918	10 ft BGS	9/14/18	617
SB-22	SB-22-4-140918	4 ft BGS	9/14/18	432
SB-22	SB-22-10-140918	10 ft BGS	9/14/18	257
SB-23	SB-23-4-140918	4 ft BGS	9/14/18	1,860
SB-23	SB-23-10-140918	10 ft BGS	9/14/18	127
			_ /	
SB-24	SB-24-4-140918	4 ft BGS	9/14/18	1,560
SB-24	SB-24-10-140918	10 ft BGS	9/14/18	311

Table 1

Soil Analytical Results Summary Chevron Environmental Management Company VGSAU 148 Lea County, New Mexico

Sample ID	Full Sample Name	Depth (feet)	Date	Chlorides mg/kg				
	NMOCD Scre	ening Standard		20,000				
Restoration Requirements within the Top 4 feet bgs								
SB-25	SB-25-4-140918	4 ft BGS	9/14/18	2,770				
SB-25	SB-25-10-140918	10 ft BGS	9/14/18	927				
SB-26	SB-26-4-140918	4 ft BGS	9/14/18	1,680				
SB-26	SB-26-10-140918	10 ft BGS	9/14/18	454				
SB-27	SB-27-4-140918	4 ft BGS	9/14/18	435				
SB-27	SB-27-10-140918	10 ft BGS	9/14/18	40.2				
SB-28	SB-28-4-140918	4 ft BGS	9/14/18	1,650				
SB-28	SB-28-10-140918	10 ft BGS	9/14/18	371				
SB-29	SB-29-4-140918	4 ft BGS	9/14/18	1,200				
SB-29	SB-29-10-140918	10 ft BGS	9/14/18	1,580				
SB-30	SB-30-4-140918	4 ft BGS	9/14/18	1,390				
SB-30	SB-30-10-140918	10 ft BGS	9/14/18	143				
SB-31	SB-31-4-140918	4 ft BGS	9/14/18	34.5				
SB-31	SB-31-10-140918	10 ft BGS	9/14/18	108				

Notes:

1. "--" indicates not analyzed or not applicable.

2. Chloride analyzed by EPA Method 300.

3. Highlighted values indicate exceedance of NMOCD guidance limits.

4. * Revised screening limit and restoration criteria per Rule 19.15.29 effective August 14, 2018.

Appendices

•

GHD | Chevron Environmental Management Company - Soil Assessment Report | 11121241 (3)

Appendix A Soil Boring Logs

Client: Texaco

Project: Buckeye Plant

Project No: 2-0102

Location: SW/4, SE/4, Sec. 36, T17S, R34E, Lea Co., NM

Loa:	MW-12

Geologist: Cindy K. Crain

Page: 1 of 1

SUBSURFACE PROFILE			SAMPLE PID Measu		PID Measurement		Natas		
Depth	Symbol	Description	Elev.	Number	Type	Recovery	(PPM) 	Well Detail	Well Secured with Locking Above-Grade Cover
5 10 15		Caliche 7.5 YR 7/3, pink quartz sand and quartzite, very fine grained, very poorly sorted, very indurated.					0.4 0.2 0.0		Casing Stickup: 3.01'
20 25 30 35		Silty Sand 7.5 YR 7/4. pink quartz sand.	3961		.H.H.		0.1		1.0 to 121.0': Cement-Bentonite Grout
40 45 50		very fine grained, well sorted, loose.			11		0.0 0.0		0.0 to 124.87': 2" Sch. 40 PVC Riser (Threaded)
55 60 65 70 75 80 85 90 95 100 105 110 115 120 125 130 135 140		Sand 7.5 YR 5/6, strong brown quartz sand, very fine grained, well sorted, loose.	3933				p.0		121.0 to 123.0': Bentonite Pellets W. L. 129.77' (10/8/02) 124.87 to 144.49': 2" Sch. 40 Screen, 0.02" Slot (Threaded) 123.0 to 145.0': 8-16
145 150		TD: 145'	3645						Graded Silica Sand Sch. 40 PVC Cap (Threaded)
	vrilling vate Di Vell Si	Method: Rotary (water at 60') illed: 8/29/02 ze: 2"	507	Larso ' Nort Mic	n and h Ma dlanc (915	d Ass rienfe I, Tex 5) 687	ociates, Inc. eld St., Ste. 202 as 79701 -0901	TO Che Dri	C Elevation: 3989.62 ecked by: CKC lled by: Scarborough Drilling

.

		MAJOR DI	VISIONS			TYPICAL NAMES		
			CLEAN GRAVELS	GW		WELL-GRADED GRAVELS WITH OR WITHOUT SAND		
) SIEVE	GRAVELS MORE THAN HALF	WITH LESS THAN 15% FINES	GP		POORLY-GRADED GRAVELS WITH OR WITHOUT SAND		
	DILS AN NO. 200	COARSE FRACTION IS LARGER THAN NO. 4 SIEVE	GRAVELS WITH 15% OR MORE	GM		SILTY GRAVELS WITH OR WITHOUT SAND		
	AINED SC RSER THA		FINES	GC		CLAYEY GRAVELS WITH OR WITHOUT SAND		
	DARSE-GF LF IS COA		CLEAN SANDS WITH LESS THAN	SW		WELL-GRADED SANDS WITH OR WITHOUT GRAVEL		
	HAN HA	SANDS MORE THAN HALF	15% FINES	SP		POORLY-GRADED SANDS WITH OR WITHOUT GRAVEL		
	MORE 1	COARSE FRACTION IS FINER THAN NO. 4 SIEVE SIZE	SANDS WITH 15%	SM		SILTY SANDS WITH OR WITHOUT GRAVEL		
			OR MORE FINES	SC		CLAYEY SANDS WITH OR WITHOUT GRAVEL		
	SIEVE		ML			INORGANIC SILTS OF LOW TO MEDIUM PLASTICITY WITH OR WITHOUT SAND OR GRAVEL		
	LS NO. 200	SILTS AN	D CLAYS 50% OR LESS	CL		INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY WITH OR WITHOUT SAND OR GRAVEL		
	INED SOI			OL		ORGANIC SILTS OR CLAYS OF LOW TO MEDIUM PLASTICITY WITH OR WITHOUT SAND OR GRAVEL		
	FINE-GRA		МН			INORGANIC SILTS OF HIGH PLASTICITY WITH OR WITHOUT SAND OR GRAVEL		
	E THAN H	SILTS AND CLAYS LIQUID LIMIT GREATER THAN 50%		СН		INORGANIC CLAYS OF HIGH PLASTICITY WITH OR WITHOUT SAND OR GRAVEL		
	MOR			ОН		ORGANIC SILTS OR CLAYS OF HIGH PLASTICITY WITH OR WITHOUT SAND OR GRAVEL		
		HIGHLY ORGANI	C SOILS	PT		PEAT AND OTHER HIGHLY ORGANIC SOILS		
SAMPLE TYPES		SYMBOLS KE	WELL SYMBOLS			ABBREVIATION KEY		
AK Air Knife Air Knife Auger Cuttings Composite Rock Core HV Hydro-Vac HA Hand Auger Large Bore Rock Core Macro-Core Rock Core	Mod Split Digg Shel Shel Shel Shel Undi Core	fied Spoon Hole er by Tube c Core Spoon sturbed	Grout Grout Blank Casing Bentonite Pellets First Encountered Groundv Static Groundwater Filter Pack Groundwater Screened Casing	vater	CA - CD - CN - CU - DS - PP - (3.0) - RV - SA -	CHEMICAL ANALYSIS (CORROSIVITY) CONSOLIDATED DRAINED TRIAXIAL(200) -(WITH % PASSING NO. 200 SIEVECONSOLIDATIONSW-SWELL TESTCONSOLIDATED UNDRAINED TRIAXIALTC-CYCLIC TRIAXIALDIRECT SHEARTV-TORVANE SHEARPOCKET PENETROMETER (TSF)UC-UNCONFINED COMPRESSION(WITH SHEAR STRENGTH IN KSF) SIEVE ANALYSIS: % PASSING(1.5)-(WITH SHEAR STRENGTH IN KSF)SIEVE ANALYSIS: % PASSING #200 SIEVEUU-UNCONSOLIDATED UNDRAINED TRIAXIAL WA-WA-WASH ANALYSIS (200%)(WITH % PASSING NO. 200 SIEVE)		
GHD	Key to Boring Log							

GHI									
					Page 1 of 1				
PROJE	CT NAME: VGSAU #148	HOLE DESIGNATION:	SB-10	010					
			l4 September 2	:010 20 Air	· Pota	24			
			Soon Parry	JII, AII	Rola	у			
	NG COMPANY: HCI	TIEED TERSONNEL.	Seann any						
DEPTH		DEPTH	DEPTH SA			.E			
ft BGS	STRATIGRAPHIC DESCRIPTION &	REMARKS	ft BGS	(ft)	'AL	(f)	g (j		
				РТН	-ERV	EC (hlorid mg/k		
				DE	Ξ	~	0~		
	CALICHE: light grey-brown, dry								
-				4	G	1.0	258		
10				10		1.0	610		
-10	SILTY SAND (SM): yellow orange, dry		10.00		- G	1.0	610		
-									
-20	CALICHE: light grey, dry		20.00	20	G	1 .0	367		
- 30	SILTY SAND (SM): vellow orange dry contains larger	clasts/nebbles	30.00	30	G	1 .0	25.5		
-									
-40	- light brown, dry			40	G	1.0	20.4		
-									
-									
50							00 F		
- 50				50	G	1.0	22.5		
-									
- 60	- yellowish orange, dry, contains larger clasts/pebbles			60	G	1 .0	24.9		
)/18									
2 - 70	- light brown, moist			70	G	1 .0	19.8		
GDT									
ORP 1									
₹ <u>80</u>				80	G	1.0	20.9		
L L									
148.0									
SAU						- 10	22.2		
× 90				90		1.0	23.2		
1 C									
11212									
÷⊢100			101.00						
BURC	<u>NOTES:</u> Stratigraphic descriptions are based on drill cutting	js.							
DVER									
	\smile								

GHD	STRATIC						Dage 1 of 1
	(OVE	ROURDEN)					Page 1 of 1
PROJEC	CT NAME: VGSAU #148	HOLE DESIGNATION:	SB-17				
PROJEC	CT NUMBER: 11121241	DATE COMPLETED: 1	4 September 2	2018			
CLIENT:	Chevron Environmental Management Company	DRILLING METHOD: F	lydro Excavati	on, Aiı	⁻ Rota	ry	
	DN: Lea County, New Mexico	FIELD PERSONNEL: S	Sean Parry				
DRILLIN	G COMPANY: HCI		DEDTU			SAMP	IF
ft BGS	STRATIGRAPHIC DESCRIPTION &	REMARKS	ft BGS	£	۲		*
				ΤΗ	RV	C (H	oride g/kg
				DEP	INTE	8	Ч СЧ
	CALICHE: very light grey, dry	-	1				
_		-		4	G	1 .0	223
		-					
- 10	SILTY SAND: light yellowish orange		9.50 10.00	10)	1.0	488
	END OF BOREHOLE @ 10.0ft BGS						
-20							
-							
20							
- 30							
-							
-40							
- 50							
-							
- 60							
-							
10/18							
⊉⊢70							
0. 							
COR							
80 <u>-</u> 80							
GPJ							
148							
90 - 90							
1241 (
1112							
	NOTES: Stratigraphic descriptions are based on drill cutting	IS.					
3	LABORATORY ANALYSIS						

•

GHD	STRATIG (OVER	RAPHIC LOG BURDEN)					Page 1 of 1
PROJECT	NAME: VGSAU #148	HOLE DESIGNATION:	SB-18				
PROJECT	NUMBER: 11121241	DATE COMPLETED: 14	September 2	2018			
CLIENT:	Chevron Environmental Management Company	DRILLING METHOD: Hy	dro Excavati	on, Ai	r Rota	ry	
LOCATIO	N: Lea County, New Mexico	FIELD PERSONNEL: Se	ean Parry				
DRILLING	COMPANY: HCI						
DEPTH	STRATIGRAPHIC DESCRIPTION & R	EMARKS	DEPTH			SAMPL	E
11 003			11 003	H (#	NAL	(ŧ	ide (kg)
				EPT	TER	SEC	Chloi (mg/
_	SILTY SAND (SM): light grey, doy, contains caliche		8818		≧		0
	SILTT SAND (SM). IIght grey, dry, contains calche					1.0	200
				4		1.0	200
10			10.00	10		10	671
	END OF BOREHOLE @ 10.0ft BGS		10.00			1.0	0/1
- 20							
- 30							
10							
-40							
- 50							
- 60							
-70							
- 80							
- 90							
- 100							
<u></u>	OTES: Stratigraphic descriptions are based on drill cuttings						

.

GHD	STRATIGR (OVERE	APHIC LOG BURDEN)					Page 1 of 1
PROJEC PROJEC CLIENT: LOCATIC	T NAME: VGSAU #148 T NUMBER: 11121241 Chevron Environmental Management Company DN: Lea County, New Mexico	HOLE DESIGNATION: S DATE COMPLETED: 14 S DRILLING METHOD: Hydr FIELD PERSONNEL: Sear	SB-19 eptember 2 o Excavation Parry	2018 on, Air	⁻ Rota	ry	
DEPTH ft BGS	EPTH STRATIGRAPHIC DESCRIPTION & REMARKS DEPTH t BGS						LE
				DEPTH (INTERV/	REC (ft	Chlorid (mg/kg
_	CALICHE: light grey, dry			4	G	1 .0	26.8
- 10 =	SILTY SAND (SM): light yellowish orange, dry END OF BOREHOLE @ 10.0ft BGS		9.50 10.00	10	G	1.0	35.5
- 20							
30							
- 50							
- 60							
70							
- 80							
- 90							
- 100							
<u> </u>	NOTES: Stratigraphic descriptions are based on drill cuttings.			-			
L							

GHD	STRATIG (OVFF	GRAPHIC LOG RBURDEN)					Page 1 of 1
			20 20				Fage 1011
	I NAME: VGSAU #148	HOLE DESIGNATION:	DD-20	2010			
		DRILLING METHOD: Hvdr	o Excavati	2010 οπ Δir	. Rota	N	
	N: Lea County New Mexico	EIELD PERSONNEL: Sea		on, An	Ttota	y	
DRILLING	G COMPANY: HCI		i i any				
DEPTH		DEPTH					ĽΕ
ft BGS	STRATIGRAPHIC DESCRIPTION & F	REMARKS	ft BGS	(#)	'AL	ft)	g)
				DTH	ERV	EC (I	ng/k
				DE	IN	R	55
	CALICHE: very light grey, dry						
-				4	G	1.0	21.0
- 10	SILT (ML): very light grey, dry		9.50) G	1.0	29.1
	END OF BOREHOLE @ 10.0ft BGS						
- 20							
- 30							
-							
10							
- 40							
-							
- 50							
-60							
,							
80							
§—90							
100							
	IOTES: Stratigraphic descriptions are based on drill cuttings	S.					
۲ <u>ــــــــــــــــــــــــــــــــــــ</u>							

.

GHD	STRATIGR (OVERB	APHIC LOG URDEN)					Page 1 of 1
PROJEC	CT NAME: VGSAU #148	HOLE DESIGNATION:	SB-21				
PROJEC	CT NUMBER: 11121241	DATE COMPLETED: 14 Se	eptember 2	2018			
CLIENT	: Chevron Environmental Management Company	DRILLING METHOD: Hydro	o Excavati	on, Aiı	⁻ Rotai	y	
LOCATI	ON: Lea County, New Mexico	FIELD PERSONNEL: Sean	Parry				
DRILLIN	IG COMPANY: HCI						
DEPTH	STRATIGRAPHIC DESCRIPTION & REN	MARKS	DEPTH			SAMP	LE
ft BGS			ft BGS	(II)	/AL	(£	de (g)
				L L L	LER'	U U U	hlori mg/k
		P. P. J		B	Ľ	~	00
-	SANDY SILT (MLS): yellowish orange, dry			4	G	1 .0	4190
- 10	- light grey, dry, contains larger clasts/pebbles		10.00	10		1.0	617
	END OF BOREHOLE @ 10.0ft BGS	/		\square		「	
-							
-20							
_							
— 30							
-							
_10							
40							
-							
- 50							
-60							
70							
<u></u> 80							
5							
§ 90							
	NOTES: Stratigraphic descriptions are based on drill cuttings.						

•

GHD	STRATIGRA (OVERBI	APHIC LOG URDEN)					Page 1 of 1
PROJECT	۲ NAME: VGSAU #148	HOLE DESIGNATION:	SB-22				
PROJECT	ΓNUMBER: 11121241	DATE COMPLETED: 14 S	eptember 2	2018			
CLIENT:	Chevron Environmental Management Company	DRILLING METHOD: Hydr	o Excavati	on, Ai	r Rotar	'y	
LOCATIO	N: Lea County, New Mexico	FIELD PERSONNEL: Sea	n Parry				
DRILLING	G COMPANY: HCI						
DEPTH		ADKS	DEPTH			SAMP	LE
ft BGS		AINO	ft BGS	(£	/AL	(Ĵ	g) de
				PTH	ER	Ц Ш Ш	hlori mg/k
		p p		В	Ξ	2	00
-	SANDY SILTY (MLS): light grey, dry, contains caliche			4	G	1 .0	432
- 10 -	- light grey, dry		10.00	10)	1.0	257
	END OF BOREHOLE @ 10.0ft BGS						
-							
- 30							
-40							
-							
- 50							
-							
- 60							
_							
70							
80							
90							
100							
<u>N</u>	OTES: Stratigraphic descriptions are based on drill cuttings.			L			
L							

.

GHI	GHD STRATIGRAPHIC LOG										
	(OVER	BURDEN)					Page 1 of 1				
PROJE	CT NAME: VGSAU #148	HOLE DESIGNATION:	SB-23								
PROJE	CT NUMBER: 11121241	DATE COMPLETED: 14 S	eptember 2	2018							
CLIENT	: Chevron Environmental Management Company	DRILLING METHOD: Hydi	o Excavati	on, Air	Rota	ŷ					
	ION: Lea County, New Mexico	FIELD PERSONNEL: Sea	n Parry								
			DEDTH			SAMF	чЕ				
ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS										
				HL	ERV	≣C (f	ng/kg				
				DE	I	R	55				
	SILT (ML): light brownish grey, dry, contains caliche										
-				4	G	1.0	1860				
10			10.00	10		10	127				
- 10	END OF BOREHOLE @ 10.0ft BGS		10.00			1.0	121				
_											
-20											
+											
- 30											
_											
40											
_											
- 50											
-											
60											
8											
/01/z1 											
GDT											
ORP.(
0 80											
148.G											
Deseau											
×											
241 C											
111212											
5 – 100 90											
	NOTES: Stratigraphic descriptions are based on drill outtings										
ERBUR											
Хо О	LABORATORY ANALYSIS										

GHD	STRATIG						
	OVER	BURDEN)					Page 1 of 1
PROJEC	CT NAME: VGSAU #148	HOLE DESIGNATION:	SB-24				
PROJEC	CT NUMBER: 11121241	DATE COMPLETED: 14 Se	eptember 2	2018	. .		
CLIENT	Chevron Environmental Management Company	DRILLING METHOD: Hydro	> Excavati	on, All	Rota	У	
		FIELD PERSONNEL: Sean	Parry				
			ПЕРТЦ			SAMP	LE
ft BGS	STRATIGRAPHIC DESCRIPTION & R	EMARKS	ft BGS	£	AL	a	e 🚍
				TH	ERV	C (Ħ	llorid Ig/kg
				DEF	I	R	5 E
	SILTY SAND (SM): yellowish orange, dry, contains larger	clasts/pebbles					
_				4	G	1.0	1560
- 10	SANDY SILT (MLS): yellowish orange, dry		9.50 10.00		- G	1.0	311
	END OF BOREHOLE @ 10.0ft BGS						
-20							
-							
_ 30							
50							
-							
- 40							
50							
-							
- 60							
-							
⊴⊢70							
5							
80 ₩							
GPJ							
148							
90 - 90							
241(
	NUIES: Stratigraphic descriptions are based on drill cuttings.						
~ L	\smile						

•

GHD	STRATIC (OVE)	GRAPHIC LOG RBURDEN)					I	Page 1 of 1
PROJECT	NAME: VGSAU #148	HOLE DESIGNATION	ON: S	B-25				
PROJECT	NUMBER: 11121241	DATE COMPLETE	D: 14 Se	ptember 2	2018			
CLIENT:	Chevron Environmental Management Company	DRILLING METHO	D: Hydro	Excavati	on, Air	Rota	Ŷ	
LOCATIO	N: Lea County, New Mexico	FIELD PERSONNE	L: Sean	Parry			-	
DRILLING	COMPANY: HCI							
DEPTH				DEPTH			SAMPL	E
ft BGS	STRATIGRAPHIC DESCRIPTION &	REMARKS		ft BGS	(ft)	AL	£	e 🖨
					H	ERV	C (f	lorid Jg/kç
					DEF	E Z	8	유민
	LIMESTONE: light grey, dry							
				5.00	4	G	1.0	2770
	SANDY SILT (MLS): light brownish grey, dry			5.00				
- 10				10.00	10	G	1.0	927
-	END OF BOREHOLE @ 10.0ft BGS				\square			
-20								
- 30								
-40								
- 50								
50								
- 60								
- 70								
- 80								
- 90								
30								
- 100								
N	DTES: Stratigraphic descriptions are based on drill cutting	gs.						

PROJECT NAME: VOSAU #148 PROJECT NAME: VOSAU #148 PROJECT NAME: VOSAU #148 PROJECT NAMERE: 11121241 CUENT: Chevron Environmental Management Company UDATIC: Chevron Environmental Management Company DRILLING CMPARY: HCI PPTH RGS STRATICRAPHIC DESCRIPTION & REMARKS PEID PERSONNEL: Sean Pary PROJECT MARK: S PROJECT SAMD (SM): Bight grey, dry, contains larger dasts/pebbles CALICHE: light grey, dry, contains their pabbles NO OF BORE HOLE @ 10.01 BGS	GHD	GHD STRATIGRAPHIC LOG (OVERBURDEN) Page 1 of 1								
PROJECT NAME: VSAND F149 Induct DESIGNATION: 55-26 PROJECT NAME: VSAND F145 DEFINI PROJECT NAME: Standard Stand								Tage Tor T		
PROJECT NUMBER: IT 12/41 DATE COMPLETED. In September 2010 CLENT: Cheven Environmental Management Company DETUNING METHOD: Hydro Exactandor, All Rolary LOCATION: Les County, New Mexico PELD PERSONNEL: Sean Pary DRILLING COMPANY: HCI Exact Second Se	PROJEC	I NAME: VGSAU #148	HOLE DESIGNATION: S	B-20	2040					
CLEICH : Clerich Enderstrated and management company DALLICH State Proc. Prod. Exceeded of An Acady DRILING COMPANY: HCI FIELD PERSONNEL: Sean Pary DEPTH STRATIGRAPHIC DESCRIPTION & REMARKS FEED PERSONNEL: Sean Pary DRILING COMPANY: HCI State of the state		Chowen Environmental Management Company	DATE COMPLETED: 14 Se	eptember 2	2018 on Air	Doto	- /			
COUNT Des Journary Teol Count Des Journary Teol DEPTH STRATIGRAPHIC DESCRIPTION & REMARKS DEPTH 1 DEST TESS SILTY SAND (SM): light grey, dry, contains larger classifyebbles 0 -10 CALICHE: light grey, dry, contains thet pebbles 0 -20 CALICHE: light grey, dry, contains thet pebbles 0 -20 0 0 -30 - -40 - -50 - -50 - -60 - -70 -				Borny	on, Ai	Rola	у			
Direction Cost Mith. 160 STRATIGRAPHIC DESCRIPTION & REMARKS DEPTH IN BOS SAMPLE BILTY SAND (SM): light grey, dry, contains larger clasts/pebbles Image: strategraphic descriptions are based on drill cuttings. 10 CALICHE: light grey, dry, contains then pebbles Image: strategraphic descriptions are based on drill cuttings. -20 - - - 10 CALICHE: light grey, dry, contains then pebbles 10 0			FIELD FERSONNEL. Sean	Fairy						
NEGS STRATIGRAPHIC DESCRIPTION & REMARKS NEGS E </td <td>DEPTH</td> <td></td> <td></td> <td>ПЕРТН</td> <td></td> <td></td> <td>SAMP</td> <td>LE</td>	DEPTH			ПЕРТН			SAMP	LE		
SILTY SAND (SM): light grey, dry, contains larger clasts/pebbles 9.50<	ft BGS	STRATIGRAPHIC DESCRIPTION & F	REMARKS	ft BGS	(#)	AL	£	e 🕞		
SILTY SAND (SM): light grey, dry, contains larger clasts/pebbles Image: stats/pebbles Ima					크	ERV	C (f	llorid 1g/kg		
SILTY SAND (SM): light gray, dry, contains larger diastspebbles 9.50					DEF	INT	8	55		
CALICHE: Tight grey, dry, contains chert pebbles 9.50 0 1.0 454 20 0 0 0 454 20 0 0 0 454 20 0 0 0 454 20 0 0 0 454 20 0 0 0 454 20 0 0 0 454 20 0 0 0 454 40 0 0 0 0 40 0 0 0 0 0 50 0 0 0 0 0 0 60 0 0 0 0 0 0 0 90 0 0 0 0 0 0 0 0 100 NOTES: Stratigraphic descriptions are based on drill cuttings. 0 0 0 0 0 0 0 100 NOTES: Stratigraphic descriptions are based on drill cuttings. 0 0 0		SILTY SAND (SM): light grey, dry, contains larger clasts	/pebbles							
10 CALICHE: light grey, dry, contains chert pebbles 9.50 0 10 454 20 END OF BOREHOLE @ 10.0h BCS 10 10 10 454 -20 -30 -30 10 10 10 454 -30 <td< td=""><td>-</td><td></td><td></td><td></td><td>4</td><td>G</td><td>1.0</td><td>1680</td></td<>	-				4	G	1.0	1680		
10 CALICHE: light grey, day, contains chert pebbles 10 454 20 END OF BOREHOLE @ 10.01 BGS 10 454 -20 - - - - -30 - - - - -30 - - - - -30 - - - - -40 - - - - -50 - - - - -60 - - - - -70 - - - - -90 - - - - -100 NOTES: Stratigraphic descriptions are based on drill cutings. -										
END OF BOREHOLE @ 10.0ft BGS	10	CALICHE: light grey, dry, contains chert pebbles		9.50 10.00	10	- G	1.0	454		
-20 -30 -40 -40 -50 -50 -60 -70 -80 -100		END OF BOREHOLE @ 10.0ft BGS								
-20 -30 -30 -30 -40 -30 -40 -30 -50 -30 -50 -30 -50 -30 -60 -30 -70 -30 -80 -30 -90 -30 -100 -30 NOTES: Stratigraphic descriptions are based on drill cuttings.										
	-20									
-30 -30 -40 -40 -50 -50 -60 -70 -70 -80 -90 -100 NOTES: Stratigraphic descriptions are based on drill cuttings.	F									
	30									
	00									
-40 -40 -50 -50 -60 -60 -70 -70 -80 -70 -90 -70 -100 -70 NOTES: Stratigraphic descriptions are based on drill cuttings. LABORATORY ANALYSIS -70	-									
-40 -50 -50 -60 -70 -70 -80 -90 -100 NOTES: Stratigraphic descriptions are based on drill cuttings. LABORATORY ANALYSIS										
	-40									
-50 -60 -70 -70 -80 - -90 - -100 NOTES: Stratigraphic descriptions are based on drill cuttings.										
- 60 - 70 - 70 - 80 - 90 - 100 NOTES: Stratigraphic descriptions are based on drill cuttings.	- 50									
- 60 - 70 - 70 - 80 - 90 - 100 NOTES: Stratigraphic descriptions are based on drill cuttings.										
- 60 - 70 - 70 - 80 - 90 - 90 - 100 NOTES: Stratigraphic descriptions are based on drill cuttings. LABORATORY ANALYSIS	-									
	- 60									
- 70 - 70 - 80 - 90 - 100 NOTES: Stratigraphic descriptions are based on drill cuttings.										
- 70 - 80 - 90 - 100 NOTES: Stratigraphic descriptions are based on drill cuttings.	-									
- 70 - 80 - 90 - 100 NOTES: Stratigraphic descriptions are based on drill cuttings.										
- 80 - 90 - 100 NOTES: Stratigraphic descriptions are based on drill cuttings.	-70									
- 80 - 90 - 100 NOTES: Stratigraphic descriptions are based on drill cuttings. LABORATORY ANALYSIS	-									
- 80 - 90 - 100 NOTES: Stratigraphic descriptions are based on drill cuttings. LABORATORY ANALYSIS										
- 90 - 100 NOTES: Stratigraphic descriptions are based on drill cuttings. LABORATORY ANALYSIS	80									
- 90 - 100 NOTES: Stratigraphic descriptions are based on drill cuttings. LABORATORY ANALYSIS										
- 90 - 100 NOTES: Stratigraphic descriptions are based on drill cuttings. LABORATORY ANALYSIS										
- 100 NOTES: Stratigraphic descriptions are based on drill cuttings. LABORATORY ANALYSIS	90									
- 100 NOTES: Stratigraphic descriptions are based on drill cuttings. LABORATORY ANALYSIS										
NOTES: Stratigraphic descriptions are based on drill cuttings. LABORATORY ANALYSIS										
NOTES: Stratigraphic descriptions are based on drill cuttings.										
		Stratigraphic descriptions are based on drill cuttings	j.							

•

GHD	STRATIGR (OVERB	APHIC LOG BURDEN)					Page 1 of 1
PROJEC [®] PROJEC [®] CLIENT:	Γ NAME: VGSAU #148 Γ NUMBER: 11121241 Chevron Environmental Management Company	HOLE DESIGNATION: S DATE COMPLETED: 14 S DRILLING METHOD: Hydr	SB-27 eptember 2 ro Excavati	2018 on, Aiı	Rotai	Ŷ	
	N: Lea County, New Mexico	FIELD PERSONNEL: Sea	n Parry				
DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REP	MARKS	DEPTH ft BGS	(ft)	AL	SAMPI	E a) (c)
		For a		DEPTH	INTERV	REC (f	Chloric (mg/k
_	SANDY SILT (MLS): very light grey, dry		•	4	G	1.0	435
- 10 -	END OF BOREHOLE @ 10.0ft BGS	<u>[3</u>]1	. 10.00	10		1.0	40.2
- 20							
- 30							
_							
- 50							
— 60							
- 70							
80							
- 90							
- 100							
<u> </u>	OTES: Stratigraphic descriptions are based on drill cuttings.						
	LABORATORY ANALYSIS						

GHD	STRATIC						
	(OVE	RBURDEN)					Page 1 of 1
PROJEC [®]	T NAME: VGSAU #148	HOLE DESIGNATION:	SB-28				
PROJEC	T NUMBER: 11121241	DATE COMPLETED: 14 Se	eptember 2	2018			
CLIENT:	Chevron Environmental Management Company	DRILLING METHOD: Hydro	o Excavati	on, Aiı	Rotar	ſУ	
LOCATIC	DN: Lea County, New Mexico	FIELD PERSONNEL: Sear	Parry				
DRILLING	G COMPANY: HCI					C A A 4	
DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION &	REMARKS	DEPTH ft BGS	-			'LE
				E E	RVA	(ff)	oride 3/kg)
				DEP	NTE	RE(Chlc
					_		
	SILTY SAND (SM): vollowish arange, day	18/18/1	4	4	G	1.0	1650
	SILTY SAND (SM). yellowish brange, dry						
- 10 =	SANDY SILT (MLS): very light grev, dry		9.50	10		1.0	371
	END OF BOREHOLE @ 10.0ft BGS	/	10.00				
F							
- 20							
-							
- 30							
-40							
-							
- 50							
-							
- 60							
00							
-							
10/18							
à⊢70							
P.GD							
COR							
80 - SR							
GPJ							
148. T							
00 – 00							
2410							
11121							
0							
	Stratigraphic descriptions are based on drill cutting	js.					
OVEF	LABORATORY ANALYSIS						
-							

.

GHD	STRATIO							
	(OVE)	RBURDEN)					Page 1 of 1	
PROJECT	PROJECT NAME: VGSAU #148 HOLE DESIGNATION:							
PROJECT	PROJECT NUMBER: 11121241 DATE COMPLETED: 14 Set			2018				
CLIENT:	CLIENT: Chevron Environmental Management Company DRILLING METHOD: Hydr					У		
LOCATIO	N: Lea County, New Mexico	FIELD PERSONNEL: Sea	n Parry					
DRILLING	GOMPANY: HCI		DEDTU			SAMP	IF	
ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS		ft BGS	(F)	a) e Li (ft)			
				TH (ERV/	C (#	loride 1g/kg	
				DEF	IL	R	Ϋ́́	
	CALICHE: very light grey, dry							
-				4	G	1 .0	1200	
			-					
- 10	SANDY SILT (MLS): very light yellow orange, dry		□ 9.50 10.00	10) 	1.0	1580	
	END OF BOREHOLE @ 10.0ft BGS							
-20								
- 30								
- 10								
- 40								
-								
50								
- 60								
8								
⁰ / ₂ −70								
DI								
ORP.(
ŭ ≰80								
48.G								
SAU 1								
ő⊢90 ≳								
20								
12124								
N LO								
NOTES: Stratigraphic descriptions are based on drill cuttings.								
0								
.

GHD	STRATIG						
	OVER	(DURDEN)		Page 1 of 1			
PROJEC	T NAME: VGSAU #148	HOLE DESIGNATION:	SB-30	2040			
	I NUMBER: 11121241	DATE COMPLETED: 14	September : Iro Excavati	2018 ion Air	Potar	v	
			an Parry	ion, Ai	Notal	у	
DRILLIN	G COMPANY: HCI	TIEED TEROONNEE. OC					
DEPTH		PEMADKS	DEPTH			SAMP	LE
ft BGS			ft BGS	(III)	VAL	(#)	(g)
				EPT	ITER	REC	Chlor (mg/l
	SILTY SAND (SM); vellow orange, dry, contains larger cl	lasts/pebbles			≤	_	
			사이 사이 사이	4	G	1.0	1390
- 10	- yellow orange, dry		10.00	10	_	1.0	143
	END OF BOREHOLE @ 10.0ft BGS						
-20							
F							
- 30							
-							
-40							
-							
50							
-							
- 60							
<u>∞</u>							
701/2							
SDT							
ORP.(
0 ∦80							
148.6							
00 - 00							
1241 (
N RDEN	IOTES: Stratigraphic descriptions are based on drill cuttings						
ERBU							
8	LABORATORY ANALYSIS						

This log should not be used separately from the original report.

•

GHD	STRATIGF (OVERE	RAPHIC LOG BURDEN)					Page 1 of 1
PROJECT PROJECT CLIENT:	۲ NAME: VGSAU #148 ۲ NUMBER: 11121241 Chevron Environmental Management Company	HOLE DESIGNATION: S DATE COMPLETED: 14 S DRILLING METHOD: Hydr	SB-31 eptember 2 o Excavatio	2018 on, Ai	r Rota	ry	
	N: Lea County, New Mexico	FIELD PERSONNEL: Sear	n Parry				
DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & RE	MARKS	DEPTH ft BGS	(j)	L L	SAMPI	LE
				DEPTH (INTERV#	REC (ft	Chloride (mg/kg
-	CALICHE: very light grey, dry			4) G	1 .0	34.5
- 10 -	END OF BOREHOLE @ 10.0ft BGS		10.00	10		1.0	108
- 30							
- 60							
- 70							
- 80							
- 90							
- 100							
N	OTES: Stratigraphic descriptions are based on drill cuttings.		1		I		

This log should not be used separately from the original report.

Appendix B Soil Laboratory Analytical Report

GHD | Chevron Environmental Management Company - Soil Assessment Report | 11121241 (3)



Project Id: Contact: Scott Foord

Project Location:

11121241

Certificate of Analysis Summary 599287

GHD Services, INC- Midland, Midland, TX

Project Name: CEMC VGSAU 148



Date Received in Lab: Mon Sep-17-18 01:19 pm Report Date: 25-SEP-18 Project Manager: Debbie Simmons

	Lab Id:	599287-0	001	599287-0	02	599287-0	03	599287-0	004	599287-0	05	599287-0	006
Analysis Paguastad	Field Id:	SB16-4-14	0918	SB16-10-14	SB16-10-140918		SB16-20-140918		0918	SB16-40-140918		SB16-50-140918	
Anuiysis Kequesieu	Depth:	4-		10-		20-		30-		40-		50-	
	Matrix:	SOIL		SOIL		SOIL	SOIL			SOIL		SOIL	
	Sampled:	Sep-14-18 (14-18 08:25 Sep-		08:30	Sep-14-18 0	8:35	Sep-14-18 08:40		Sep-14-18 08:45		Sep-14-18	08:50
Chloride by EPA 300	Extracted:	Sep-21-18	p-21-18 10:30 Sep		10:30	Sep-21-18 1	0:30	Sep-21-18 10:30		Sep-21-18 10:30		Sep-21-18 10:30	
	Analyzed:	Sep-21-18	12:16	Sep-21-18 12:26		Sep-21-18 12:37		Sep-21-18 13:08		Sep-21-18 13:18		Sep-21-18 13:29	
	Units/RL:	mg/kg	RL	mg/kg	RL	mg/kg	RL	mg/kg	RL	mg/kg	RL	mg/kg	RL
Chloride		258	5.21	610	5.44	367	5.30	25.5	5.25	20.4	5.26	22.5	5.44
Percent Moisture	Extracted:												
	Analyzed:	Sep-18-18	p-18-18 13:45 Sep		3:45	Sep-18-18 1	3:45	Sep-18-18 1	3:45	Sep-18-18 1	3:45	Sep-18-18	13:45
	Units/RL:	%	% RL		RL	%	RL	%	RL	%	RL	%	RL
Percent Moisture		5.07		8.45		5.66		5.09		5.08		8.09	

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

Debbie Semmons

Debbie Simmons Project Manager



Project Id: Contact: Scott Foord

Project Location:

11121241

Certificate of Analysis Summary 599287

GHD Services, INC- Midland, Midland, TX

Project Name: CEMC VGSAU 148



Date Received in Lab: Mon Sep-17-18 01:19 pm Report Date: 25-SEP-18 Project Manager: Debbie Simmons

	Lab Id:	599287-0	007	599287-0	008	599287-0	09	599287-0	010	599287-0	11	599287-0	012
Analysis Requested	Field Id:	SB16-60-14	40918	SB16-70-14	SB16-70-140918		SB16-80-140918		0918	SB17-4-140918		SB17-10-140918	
Anulysis Kequesieu	Depth:	60-		70-		80-		90-		4-		10-	
	Matrix:	SOIL		SOIL		SOIL	SOIL			SOIL		SOIL	
	Sampled:	Sep-14-18	14-18 08:55 Sep-1		09:00	Sep-14-18 0	9:05	Sep-14-18 09:10		Sep-14-18 ()9:48	Sep-14-18	09:50
Chloride by EPA 300	Extracted:	Sep-21-18	-21-18 10:30 Sep-2		10:30	Sep-21-18 1	0:30	Sep-21-18 10:30		Sep-21-18 1	0:30	Sep-21-18 10:30	
	Analyzed:	Sep-21-18	13:39	Sep-21-18 13:49		Sep-21-18 14:00		Sep-21-18 14:31		Sep-21-18 14:41		Sep-21-18 15:12	
	Units/RL:	mg/kg	RL	mg/kg	RL	mg/kg	RL	mg/kg	RL	mg/kg	RL	mg/kg	RL
Chloride		24.9	5.32	19.8	5.18	20.9	5.23	23.2	5.44	223	5.07	488	5.33
Percent Moisture	Extracted:												
	Analyzed:	Sep-18-18	-18-18 13:45 Sep-		13:45	Sep-18-18 1	3:45	Sep-18-18	13:45	Sep-18-18 1	3:45	Sep-18-18	13:45
	Units/RL:	%	% RL		RL	%	RL	%	RL	%	RL	%	RL
Percent Moisture		5.83	5.83		4.08		4.28		7.71		2.11		

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

Debbie Semmons

Debbie Simmons Project Manager



Project Id: Contact:

Project Location:

11121241

Scott Foord

Certificate of Analysis Summary 599287

GHD Services, INC- Midland, Midland, TX

Project Name: CEMC VGSAU 148



Date Received in Lab: Mon Sep-17-18 01:19 pm Report Date: 25-SEP-18 Project Manager: Debbie Simmons

	Lab Id:	599287-(013	599287-0	599287-014		599287-015		016	599287-0)17	599287-	018
Analysis Paguested	Field Id:	SB18-4-14	0918	SB18-10-14	SB18-10-140918		SB19-4-140918		40918	SB20-4-14	0918	SB20-10-140918	
Anulysis Kequesieu	Depth:	4-		10-		4-		10-		4-		10-	
	Matrix:	SOIL		SOIL		SOIL		SOIL		SOIL		SOIL	_
	Sampled:	Sep-14-18	-14-18 09:55 Sep-		09:57	Sep-14-18 10:03		Sep-14-18 10:05		Sep-14-18 10:10		Sep-14-18	10:12
Chloride by EPA 300	Extracted:	Sep-21-18	ep-21-18 10:30 Sep		10:30	Sep-21-18 1	0:30	Sep-21-18 10:30		Sep-21-18 10:30		Sep-21-18 10:30	
	Analyzed:	Sep-21-18	15:22	Sep-21-18	Sep-21-18 15:33		Sep-21-18 15:43		15:53	Sep-21-18 1	16:04	Sep-21-18 16:14	
	Units/RL:	mg/kg	RL	mg/kg	RL	mg/kg	RL	mg/kg	RL	mg/kg	RL	mg/kg	RL
Chloride		200	5.22	671	5.45	26.8	5.05	35.5	5.17	21.0	5.22	29.1	5.19
Percent Moisture	Extracted:												
	Analyzed:	Sep-18-18	ep-18-18 13:45 Sep-		13:45	Sep-18-18 1	3:45	Sep-18-18	13:45	Sep-18-18 1	13:45	Sep-18-18	13:45
	Units/RL:	%	% RL		RL	%	RL	%	RL	%	RL	%	RL
Percent Moisture	3.35		7.87		1.99		3.53		4.18		3.51		

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

Debbie Semmons

Debbie Simmons Project Manager



Project Id: Contact: Scott Foord

11121241

Project Location:

Certificate of Analysis Summary 599287

GHD Services, INC- Midland, Midland, TX

Project Name: CEMC VGSAU 148



Date Received in Lab: Mon Sep-17-18 01:19 pm Report Date: 25-SEP-18 Project Manager: Debbie Simmons

	Lab Id:	599287-0)19	599287-0	020	599287-0	21	599287-0	022	599287-0	23	599287-0	024
Analysis Paguested	Field Id:	SB21-4-14	0918	SB21-10-14	SB21-10-140918		0918	SB22-10-140918		SB23-4-140918		SB23-10-140918	
Anulysis Kequesieu	Depth:	4-		10-		4-		10-		4-		10-	
	Matrix:	SOIL		SOIL		SOIL		SOIL		SOIL		SOIL	
	Sampled:	Sep-14-18	-14-18 10:22 Sep		10:24	Sep-14-18 1	0:30	Sep-14-18 10:32		Sep-14-18 10:35		Sep-14-18	10:37
Chloride by EPA 300	Extracted:	Sep-21-18	p-21-18 11:15 Sep		11:15	Sep-21-18 1	1:15	Sep-21-18	1:15	Sep-21-18 11:15		Sep-21-18	11:15
	Analyzed:	Sep-21-18	17:47	Sep-21-18	Sep-21-18 17:16		Sep-21-18 17:58		8:08	Sep-21-18 18:18		Sep-21-18 18:49	
	Units/RL:	mg/kg	RL	mg/kg	RL	mg/kg	RL	mg/kg	RL	mg/kg	RL	mg/kg	RL
Chloride		4190	28.1	617	5.61	432	26.4	257	5.36	1860	26.2	127	5.14
Percent Moisture	Extracted:												
	Analyzed:	Sep-18-18	ep-18-18 13:45 Sep		13:45	Sep-18-18 1	3:45	Sep-18-18 13:45		Sep-18-18 1	3:45	Sep-18-18	13:45
	Units/RL:	%	% RL		RL	%	RL	%	RL	%	RL	%	RL
Percent Moisture		11.1	11.1		11.1		6.13		6.33		5.52		

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

Debbie Semmons

Debbie Simmons Project Manager



Project Id: Contact:

Project Location:

11121241

Scott Foord

Certificate of Analysis Summary 599287

GHD Services, INC- Midland, Midland, TX

Project Name: CEMC VGSAU 148



Date Received in Lab: Mon Sep-17-18 01:19 pm Report Date: 25-SEP-18 Project Manager: Debbie Simmons

	Lab Id:	599287-0)25	599287-0	599287-026		599287-027		28	599287-0	29	599287-0	030
Analysis Paguastad	Field Id:	SB24-4-14	0918	SB24-10-14	SB24-10-140918		SB25-4-140918		0918	SB26-4-140)918	SB26-10-140918	
Analysis Kequestea	Depth:	4-		10-		4-		10-		4-		10-	
	Matrix:	SOIL		SOIL		SOIL		SOIL		SOIL		SOIL	,
	Sampled:	Sep-14-18	-14-18 10:42 Sep-		10:44	Sep-14-18 10:47		Sep-14-18 10:49		Sep-14-18 10:52		Sep-14-18 10:54	
Chloride by EPA 300	Extracted:	Sep-21-18	p-21-18 11:15 Sep-		11:15	Sep-21-18 1	1:15	Sep-21-18 11:15		Sep-21-18 11:15		Sep-21-18	11:15
	Analyzed:	Sep-21-18	19:00	Sep-21-18 19:10		Sep-21-18 19:20		Sep-21-18 19:31		Sep-21-18 20:12		Sep-21-18 19:41	
	Units/RL:	mg/kg	RL	mg/kg	RL	mg/kg	RL	mg/kg	RL	mg/kg	RL	mg/kg	RL
Chloride		1560	26.8	311	5.27	2770	26.2	927	5.14	1680	26.4	454	5.18
Percent Moisture	Extracted:												
	Analyzed:	Sep-18-18	ep-18-18 13:45 Sep-		13:45	Sep-18-18 1	3:45	Sep-18-18	3:45	Sep-18-18 1	3:45	5 Sep-18-18 13	
	Units/RL:	%	% RL		RL	%	RL	%	RL	%	RL	%	RL
Percent Moisture		6.29	6.29		5.99		5.49		3.52		5.08		

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

Debbie Semmons

Debbie Simmons Project Manager



Project Id: Contact: Scott Foord

11121241

Project Location:

Certificate of Analysis Summary 599287

GHD Services, INC- Midland, Midland, TX

Project Name: CEMC VGSAU 148



Date Received in Lab: Mon Sep-17-18 01:19 pm Report Date: 25-SEP-18 Project Manager: Debbie Simmons

	Lab Id:	599287-0	031	599287-0	599287-032		599287-033		034	599287-035		599287-036	
Analysis Paguested	Field Id:	SB27-4-14	0918	SB27-10-14	40918	SB28-4-140918		SB28-10-140918		SB29-4-140918		SB29-10-140918	
Anulysis Kequesieu	Depth:	4-		10-		4-		10-		4-		10-	
	Matrix:	SOIL		SOIL		SOIL	SOIL			SOIL		SOIL	
	Sampled:	Sep-14-18	-14-18 11:00 Sep-		11:02	Sep-14-18 11:07		Sep-14-18 11:09		Sep-14-18 11:19		Sep-14-18	11:23
Chloride by EPA 300	Extracted:	Sep-21-18	p-21-18 11:15 Sep-		11:15	Sep-21-18 1	1:15	Sep-21-18 11:15		Sep-21-18 11:15		Sep-21-18 11:15	
	Analyzed:	Sep-21-18	20:22	Sep-21-18 2	Sep-21-18 20:53		Sep-21-18 21:04		21:14	Sep-21-18 2	21:24	Sep-21-18 21:35	
	Units/RL:	mg/kg	RL	mg/kg	RL	mg/kg	RL	mg/kg	RL	mg/kg	RL	mg/kg	RL
Chloride		435	5.31	40.2	5.08	1650	26.6	371	5.40	1200	26.0	1580	27.3
Percent Moisture	Extracted:												
	Analyzed:	Sep-18-18	ep-18-18 13:45 Sep-		13:45	Sep-18-18 1	3:45	Sep-18-18	13:45	Sep-18-18 1	13:45	Sep-18-18	13:45
	Units/RL:	%	% RL		RL	%	RL	%	RL	%	RL	%	RL
Percent Moisture 5.67			2.61		5.53		6.90		4.76		9.21		

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

Debbie Semmons

Debbie Simmons Project Manager



Project Id: Contact: Scott Foord

Project Location:

11121241

Certificate of Analysis Summary 599287

GHD Services, INC- Midland, Midland, TX

Project Name: CEMC VGSAU 148



Date Received in Lab: Mon Sep-17-18 01:19 pm Report Date: 25-SEP-18 Project Manager: Debbie Simmons

	Lab Id:	599287-0)37	599287-0	38	599287-0	39	599287-0	040	
Analysis Requested	Field Id:	SB30-4-14	0918	SB30-10-14	0918	SB31-4-140)918	SB31-10-14	40918	
Analysis Kequestea	Depth:	4-		10-		4-		10-		
	Matrix:	SOIL		SOIL		SOIL		SOIL		
	Sampled:	Sep-14-18	p-14-18 11:23 So		11:25	Sep-14-18 1	Sep-14-18 11:29		11:31	
Chloride by EPA 300	Extracted:	Sep-21-18	Sep-21-18 11:15		1:15	Sep-21-18 1	2:45	Sep-21-18 12:45		
	Analyzed:	Sep-21-18	Sep-21-18 21:45		Sep-21-18 21:55		9:27	Sep-21-18	19:44	
	Units/RL:	mg/kg	RL	mg/kg	RL	mg/kg	RL	mg/kg	RL	
Chloride		1390	27.3	143	5.48	34.5	5.11	108	5.05	
Percent Moisture	Extracted:									
	Analyzed:	Sep-18-18	13:45	Sep-18-18 1	3:45	Sep-18-18 1	3:45	Sep-18-18	13:45	
	Units/RL:	%	RL	%	RL	%	RL	%	RL	
Percent Moisture		7.67		8.57	8.57		1.89			

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

Debbie Semmons

Debbie Simmons Project Manager

Analytical Report 599287

for GHD Services, INC- Midland

Project Manager: Scott Foord

CEMC VGSAU 148

11121241

25-SEP-18

Collected By: Client





1211 W. Florida Ave, Midland TX 79701

Xenco-Houston (EPA Lab Code: TX00122): Texas (T104704215-18-27), Arizona (AZ0765), Florida (E871002-24), Louisiana (03054) Oklahoma (2017-142)

> Xenco-Dallas (EPA Lab Code: TX01468): Texas (T104704295-18-17), Arizona (AZ0809), Arkansas (17-063-0)

Xenco-El Paso (EPA Lab Code: TX00127): Texas (T104704221-18-13) Xenco-Lubbock (EPA Lab Code: TX00139): Texas (T104704219-18-17) Xenco-Midland (EPA Lab Code: TX00158): Texas (T104704400-18-16) Xenco-San Antonio (EPA Lab Code: TNI02385): Texas (T104704534-18-4) Xenco Phoenix (EPA Lab Code: AZ00901): Arizona (AZ0757) Xenco-Phoenix Mobile (EPA Lab Code: AZ00901): Arizona (AZM757) Xenco-Atlanta (LELAP Lab ID #04176) Xenco-Tampa: Florida (E87429) Xenco-Lakeland: Florida (E84098)



25-SEP-18

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

Reference: XENCO Report No(s): **599287** CEMC VGSAU 148 Project Address:

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) 599287. 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. 599287 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,

Debbie Sems

 Debbie Simmons

 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 Id

Sample Cross Reference 599287



GHD Services, INC- Midland, Midland, TX

CEMC VGSAU 148

Matrix	Date Collected	Sample Depth	Lab Sample Id
S	09-14-18 08:25	4	599287-001
S	09-14-18 08:30	10	599287-002
S	09-14-18 08:35	20	599287-003
S	09-14-18 08:40	30	599287-004
S	09-14-18 08:45	40	599287-005
S	09-14-18 08:50	50	599287-006
S	09-14-18 08:55	60	599287-007
S	09-14-18 09:00	70	599287-008
S	09-14-18 09:05	80	599287-009
S	09-14-18 09:10	90	599287-010
S	09-14-18 09:48	4	599287-011
S	09-14-18 09:50	10	599287-012
S	09-14-18 09:55	4	599287-013
S	09-14-18 09:57	10	599287-014
S	09-14-18 10:03	4	599287-015
S	09-14-18 10:05	10	599287-016
S	09-14-18 10:10	4	599287-017
S	09-14-18 10:12	10	599287-018
S	09-14-18 10:22	4	599287-019
S	09-14-18 10:24	10	599287-020
S	09-14-18 10:30	4	599287-021
S	09-14-18 10:32	10	599287-022
S	09-14-18 10:35	4	599287-023
S	09-14-18 10:37	10	599287-024
S	09-14-18 10:42	4	599287-025
S	09-14-18 10:44	10	599287-026
S	09-14-18 10:47	4	599287-027
S	09-14-18 10:49	10	599287-028
S	09-14-18 10:52	4	599287-029
S	09-14-18 10:54	10	599287-030
S	09-14-18 11:00	4	599287-031
S	09-14-18 11:02	10	599287-032
S	09-14-18 11:07	4	599287-033
S	09-14-18 11:09	10	599287-034
S	09-14-18 11:19	4	599287-035
S	09-14-18 11:23	10	599287-036
S	09-14-18 11:23	4	599287-037
S	09-14-18 11:25	10	599287-038
S	09-14-18 11:29	4	599287-039
S	09-14-18 11:31	10	599287-040

.



CASE NARRATIVE

Client Name: GHD Services, INC- Midland Project Name: CEMC VGSAU 148

Project ID: 11121241 Work Order Number(s): 599287 Report Date:25-SEP-18Date Received:09/17/2018

Sample receipt non conformances and comments:

None

Sample receipt non conformances and comments per sample:

None



Certificate of Analytical Results 599287



GHD Services, INC- Midland, Midland, TX

Sample Id:	SB16-4-140918		Matrix:	Soil		Date Received	l:09.17.	.18 13.19	
Lab Sample Id	: 599287-001		Date Collec	ted: 09.14.18 08.25		Sample Depth	:4		
Analytical Met	thod: Chloride by EPA 3	00				Prep Method:	E300F	þ	
Tech:	SCM					% Moisture:	5.07		
Analyst:	SCM		Date Prep:	09.21.18 10.30		Basis:	Dry W	/eight	
Seq Number:	3064136								
Parameter		Cas Number	Result	RL	Units	Analysis Da	ate	Flag	Dil
Chloride		16887-00-6	258	5.21	mg/kg	09.21.18 12.	16		1







GHD Services, INC- Midland, Midland, TX

Sample Id:	SB16-10-140918		Matrix:	Soil		Date Received	1:09.17.1	18 13.19	
Lab Sample Id	: 599287-002		Date Collec	ted: 09.14.18 08.30		Sample Depth	:10		
Analytical Met	hod: Chloride by EPA 3	00				Prep Method:	E300P		
Tech:	SCM					% Moisture:	8.45		
Analyst:	SCM		Date Prep:	09.21.18 10.30		Basis:	Dry W	eight	
Seq Number:	3064136								
Parameter		Cas Number	Result	RL	Units	Analysis Da	ate I	Flag	Dil
Chloride		16887-00-6	610	5.44	mg/kg	09.21.18 12.	26		1







GHD Services, INC- Midland, Midland, TX

Sample Id:	SB16-20-140918		Matrix:	Soil		Date Received	:09.17.18	3 13.19	
Lab Sample Id	: 599287-003		Date Collec	cted: 09.14.18 08.35		Sample Depth	:20		
Analytical Me	thod: Chloride by EPA 3	00				Prep Method:	E300P		
Tech:	SCM					% Moisture:	5.66		
Analyst:	SCM		Date Prep:	09.21.18 10.30		Basis:	Dry Wei	ght	
Seq Number:	3064136								
Parameter		Cas Number	Result	RL	Units	Analysis Da	ate Fl	ag	Dil
Chloride		16887-00-6	367	5.30	mg/kg	09.21.18 12.	37		1







9287

GHD Services, INC- Midland, Midland, TX

Sample Id:	SB16-30-140918		Matrix:	Soil		Date Received	:09.17	.18 13.19)
Lab Sample Id	: 599287-004		Date Collec	cted: 09.14.18 08.40		Sample Depth	:30		
Analytical Me	thod: Chloride by EPA	300				Prep Method:	E300I	Р	
Tech:	SCM					% Moisture:	5.09		
Analyst:	SCM		Date Prep:	09.21.18 10.30		Basis:	Dry W	Veight	
Seq Number:	3064136								
Parameter		Cas Number	Result	RL	Units	Analysis Da	ate	Flag	Dil
Chloride		16887-00-6	25.5	5.25	mg/kg	09.21.18 13.	08		1





Certificate of Analytical Results 599287



GHD Services, INC- Midland, Midland, TX

Sample Id:	SB16-40-140918		Matrix:	Soil		Date Received	1:09.17	.18 13.19	
Lab Sample Io	1: 599287-005		Date Collec	cted: 09.14.18 08.45		Sample Depth	:40		
Analytical Me	ethod: Chloride by EPA	300				Prep Method:	E300	Р	
Tech:	SCM					% Moisture:	5.08		
Analyst:	SCM		Date Prep:	09.21.18 10.30		Basis:	Dry V	Veight	
Seq Number:	3064136								
Parameter		Cas Number	Result	RL	Units	Analysis D	ate	Flag	Dil
Chloride		16887-00-6	20.4	5.26	mg/kg	09.21.18 13	.18		1



Certificate of Analytical Results 599287



SUP ACCREDING

GHD Services, INC- Midland, Midland, TX

Sample Id:	SB16-50-140918		Matrix:	Soil		Date Received	1:09.17.18	13.19
Lab Sample Io	1: 599287-006		Date Collec	cted: 09.14.18 08.50		Sample Depth	:50	
Analytical Me	ethod: Chloride by EPA	300				Prep Method:	E300P	
Tech:	SCM					% Moisture:	8.09	
Analyst:	SCM		Date Prep:	09.21.18 10.30		Basis:	Dry Weig	ht
Seq Number:	3064136							
Parameter		Cas Number	Result	RL	Units	Analysis Da	ate Flag	g Dil
Chloride		16887-00-6	22.5	5.44	mg/kg	09.21.18 13.	29	1



Certificate of Analytical Results 599287



GHD Services, INC- Midland, Midland, TX

Sample Id:	SB16-60-140918		Matrix:	Soil		Date Received	:09.17.	.18 13.19	
Lab Sample Id	: 599287-007		Date Collec	ted: 09.14.18 08.55		Sample Depth	:60		
Analytical Me	thod: Chloride by EPA	300				Prep Method:	E300F	þ	
Tech:	SCM					% Moisture:	5.83		
Analyst:	SCM		Date Prep:	09.21.18 10.30		Basis:	Dry W	Veight	
Seq Number:	3064136								
Parameter		Cas Number	Result	RL	Units	Analysis Da	ate	Flag	Dil
Chloride		16887-00-6	24.9	5.32	mg/kg	09.21.18 13.	39		1



Certificate of Analytical Results 599287



GHD Services, INC- Midland, Midland, TX

Sample Id:	SB16-70-140918		Matrix:	Soil		Date Received	1:09.17.18	13.19
Lab Sample Id	: 599287-008		Date Collec	eted: 09.14.18 09.00		Sample Depth	:70	
Analytical Me	thod: Chloride by EPA 3	00				Prep Method:	E300P	
Tech:	SCM					% Moisture:	4.08	
Analyst:	SCM		Date Prep:	09.21.18 10.30		Basis:	Dry Weig	ght
Seq Number:	3064136							
Parameter		Cas Number	Result	RL	Units	Analysis Da	ate Fla	ig Dil
Chloride		16887-00-6	19.8	5.18	mg/kg	09.21.18 13.	49	1



Certificate of Analytical Results 599287



GHD Services, INC- Midland, Midland, TX

Sample Id:	SB16-80-140918		Matrix:	Soil		Date Received	:09.17.18	13.19
Lab Sample Id	: 599287-009		Date Collec	ted: 09.14.18 09.05		Sample Depth:	80	
Analytical Me	thod: Chloride by EPA 3	800				Prep Method:	E300P	
Tech:	SCM					% Moisture:	4.28	
Analyst:	SCM		Date Prep:	09.21.18 10.30		Basis:	Dry Wei	ght
Seq Number:	3064136							
Parameter		Cas Number	Result	RL	Units	Analysis Da	ite Fla	ag Dil
Chloride		16887-00-6	20.9	5.23	mg/kg	09.21.18 14.	00	1



Certificate of Analytical Results 599287



SAP ACCREDIES

GHD Services, INC- Midland, Midland, TX

Sample Id:	SB16-90-140918		Matrix:	Soil		Date Received	l:09.17.	18 13.19	
Lab Sample Ic	1: 599287-010		Date Collec	cted: 09.14.18 09.10		Sample Depth	:90		
Analytical Me	ethod: Chloride by EPA	300				Prep Method:	E300P)	
Tech:	SCM					% Moisture:	7.71		
Analyst:	SCM		Date Prep:	09.21.18 10.30		Basis:	Dry W	eight	
Seq Number:	3064136								
Parameter		Cas Number	Result	RL	Units	Analysis Da	ate	Flag	Dil
Chloride		16887-00-6	23.2	5.44	mg/kg	09.21.18 14.	31		1



Certificate of Analytical Results 599287



GHD Services, INC- Midland, Midland, TX

Sample Id:	SB17-4-140918		Matrix:	Soil		Date Received	1:09.17.1	8 13.19	
Lab Sample Id	: 599287-011		Date Collec	eted: 09.14.18 09.48		Sample Depth	:4		
Analytical Me	thod: Chloride by EPA 3	00				Prep Method:	E300P		
Tech:	SCM					% Moisture:	2.11		
Analyst:	SCM		Date Prep:	09.21.18 10.30		Basis:	Dry We	eight	
Seq Number:	3064136								
Parameter		Cas Number	Result	RL	Units	Analysis Da	ate F	lag	Dil
Chloride		16887-00-6	223	5.07	mg/kg	09.21.18 14.	.41		1







GHD Services, INC- Midland, Midland, TX

Sample Id:	SB17-10-140918		Matrix:	Soil		Date Received	:09.17.1	18 13.19	
Lab Sample Id	: 599287-012		Date Collec	ted: 09.14.18 09.50		Sample Depth:	:10		
Analytical Met	hod: Chloride by EPA 3	00				Prep Method:	E300P		
Tech:	SCM					% Moisture:	5.43		
Analyst:	SCM		Date Prep:	09.21.18 10.30		Basis:	Dry We	eight	
Seq Number:	3064136								
Parameter		Cas Number	Result	RL	Units	Analysis Da	ate I	Flag	Dil
Chloride		16887-00-6	488	5.33	mg/kg	09.21.18 15.	12		1



Certificate of Analytical Results 599287



GHD Services, INC- Midland, Midland, TX

Sample Id:	SB18-4-140918		Matrix:	Soil		Date Received	:09.17.	18 13.19	
Lab Sample Id	: 599287-013		Date Collec	ted: 09.14.18 09.55		Sample Depth	:4		
Analytical Me	thod: Chloride by EPA 3	000				Prep Method:	E300P		
Tech:	SCM					% Moisture:	3.35		
Analyst:	SCM		Date Prep:	09.21.18 10.30		Basis:	Dry W	/eight	
Seq Number:	3064136								
Parameter		Cas Number	Result	RL	Units	Analysis Da	ate	Flag	Dil
Chloride		16887-00-6	200	5.22	mg/kg	09.21.18 15.	22		1



Certificate of Analytical Results 599287



GHD Services, INC- Midland, Midland, TX

Sample Id: SB18-10-140918 Lab Sample Id: 599287-014			Matrix: Date Collec	Soil ted: 09.14.18 09.57	Date Received:09.17.18 13.19 Sample Depth: 10				
Analytical Me Tech: Analyst: Seg Number:	thod: Chloride by EPA 3 SCM SCM 3064136	000	Date Prep:	09.21.18 10.30		Prep Method: % Moisture: Basis:	E300P 7.87 Dry W	eight	
Parameter		Cas Number	Result	RL	Units	Analysis Da	ite 1	Flag	Dil
Chloride		16887-00-6	671	5.45	mg/kg	09.21.18 15.	33		1



Certificate of Analytical Results 599287



GHD Services, INC- Midland, Midland, TX

Sample Id:	SB19-4-140918		Matrix:	Soil		Date Received	:09.17.1	8 13.19	
Lab Sample Id	: 599287-015		Date Collec	ted: 09.14.18 10.03		Sample Depth	:4		
Analytical Met	hod: Chloride by EPA 3	00				Prep Method:	E300P		
Tech:	SCM					% Moisture:	1.99		
Analyst:	SCM		Date Prep:	09.21.18 10.30		Basis:	Dry We	eight	
Seq Number:	3064136								
Parameter		Cas Number	Result	RL	Units	Analysis Da	ate F	lag	Dil
Chloride		16887-00-6	26.8	5.05	mg/kg	09.21.18 15.	43		1



Certificate of Analytical Results 599287



GHD Services, INC- Midland, Midland, TX

Sample Id:	SB19-10-140918		Matrix:	Soil		Date Received	:09.17.18 1	3.19
Lab Sample Io	l: 599287-016		Date Collec	cted: 09.14.18 10.05		Sample Depth	:10	
Analytical Me	thod: Chloride by EPA	300				Prep Method:	E300P	
Tech:	SCM					% Moisture:	3.53	
Analyst:	SCM		Date Prep:	09.21.18 10.30		Basis:	Dry Weigh	t
Seq Number:	3064136							
Parameter		Cas Number	Result	RL	Units	Analysis Da	ate Flag	Dil
Chloride		16887-00-6	35.5	5.17	mg/kg	09.21.18 15.	53	1



Certificate of Analytical Results 599287



GHD Services, INC- Midland, Midland, TX

Sample Id: Lab Sample Id	SB20-4-140918 bb Sample Id: 599287-017			Soil ted: 09.14.18 10.10	Date Received:09.17.18 13.19 Sample Depth: 4			
Analytical Me Tech: Analyst: Seq Number:	thod: Chloride by EPA 3 SCM SCM 3064136	300	Date Prep:	09.21.18 10.30		Prep Method: % Moisture: Basis:	E300P 4.18 Dry We	ight
Parameter		Cas Number	Result	RL	Units	Analysis Da	ite Fl	ag Dil
Chloride		16887-00-6	21.0	5.22	mg/kg	09.21.18 16.	04	1



Certificate of Analytical Results 599287



GHD Services, INC- Midland, Midland, TX

Sample Id:	SB20-10-140918		Matrix:	Soil		Date Received	l:09.17.	18 13.19	
Lab Sample Id	: 599287-018		Date Collec	ted: 09.14.18 10.12		Sample Depth	:10		
Analytical Met	hod: Chloride by EPA 3	00				Prep Method:	E300P)	
Tech:	SCM					% Moisture:	3.51		
Analyst:	SCM		Date Prep:	09.21.18 10.30		Basis:	Dry W	eight	
Seq Number:	3064136								
Parameter		Cas Number	Result	RL	Units	Analysis Da	ate	Flag	Dil
Chloride		16887-00-6	29.1	5.19	mg/kg	09.21.18 16.	14		1



Certificate of Analytical Results 599287



GHD Services, INC- Midland, Midland, TX

Sample Id:	SB21-4-140918		Matrix:	Soil		Date Received	:09.17.	18 13.19	
Lab Sample Id	: 599287-019		Date Collec	ted: 09.14.18 10.22		Sample Depth:	:4		
Analytical Me	thod: Chloride by EPA 3	000				Prep Method:	E300F		
Tech:	SCM					% Moisture:	11.08		
Analyst:	SCM		Date Prep:	09.21.18 11.15		Basis:	Dry W	/eight	
Seq Number:	3064139								
Parameter		Cas Number	Result	RL	Units	Analysis Da	ite	Flag	Dil
Chloride		16887-00-6	4190	28.1	mg/kg	09.21.18 17.4	47		5







GHD Services, INC- Midland, Midland, TX

Sample Id:	SB21-10-140918		Matrix:	Soil		Date Received	:09.17.1	18 13.19	
Lab Sample Id: 599287-020			Date Collec	cted: 09.14.18 10.24	Sample Depth: 10				
Analytical Me	thod: Chloride by EPA	300				Prep Method:	E300P		
Tech:	SCM					% Moisture:	11.1		
Analyst:	SCM		Date Prep:	09.21.18 11.15		Basis:	Dry W	eight	
Seq Number:	3064139								
Parameter		Cas Number	Result	RL	Units	Analysis Da	ate I	lag	Dil
Chloride		16887-00-6	617	5.61	mg/kg	09.21.18 17.	16		1





Certificate of Analytical Results 599287



GHD Services, INC- Midland, Midland, TX

Sample Id: Lab Sample Id	SB22-4-140918 l: 599287-021		Matrix: Date Collec	Soil sted: 09.14.18 10.30		Date Received:09.17.18 13 Sample Depth:4			
Analytical Me Tech: Analyst: Seq Number:	thod: Chloride by EPA 3 SCM SCM 3064139	300	Date Prep:	09.21.18 11.15		Prep Method: % Moisture: Basis:	E300P 6.13 Dry We	eight	
Parameter		Cas Number	Result	RL	Units	Analysis Da	ate I	Flag	Dil
Chloride		16887-00-6	432	26.4	mg/kg	09.21.18 17.	58		5







GHD Services, INC- Midland, Midland, TX

Sample Id:	SB22-10-140918		Matrix:	Soil		Date Received	1:09.17.18 13	3.19
Lab Sample Id: 599287-022			Date Collec	cted: 09.14.18 10.32	Sample Depth: 10			
Analytical Me	thod: Chloride by EPA	300				Prep Method:	E300P	
Tech:	SCM					% Moisture:	6.33	
Analyst:	SCM		Date Prep:	09.21.18 11.15		Basis:	Dry Weigh	t
Seq Number:	3064139							
Parameter		Cas Number	Result	RL	Units	Analysis Da	ate Flag	Dil
Chloride		16887-00-6	257	5.36	mg/kg	09.21.18 18.	08	1








GHD Services, INC- Midland, Midland, TX

Sample Id:	SB23-4-140918		Matrix:	Soil		Date Received	:09.17	.18 13.19	
Lab Sample Id	: 599287-023		Date Collec	ted: 09.14.18 10.35		Sample Depth:	:4		
Analytical Me	thod: Chloride by EPA 3	000				Prep Method:	E3001	P	
Tech:	SCM					% Moisture:	5.52		
Analyst:	SCM		Date Prep:	09.21.18 11.15		Basis:	Dry W	Veight	
Seq Number:	3064139								
Parameter		Cas Number	Result	RL	Units	Analysis Da	nte	Flag	Dil
Chloride		16887-00-6	1860	26.2	mg/kg	09.21.18 18.	18		5







GHD Services, INC- Midland, Midland, TX

Sample Id:	SB23-10-140918		Matrix:	Soil		Date Received	:09.17.18	13.19
Lab Sample Ic	1: 599287-024		Date Collec	cted: 09.14.18 10.37		Sample Depth	:10	
Analytical Me	thod: Chloride by EPA	300				Prep Method:	E300P	
Tech:	SCM					% Moisture:	2.66	
Analyst:	SCM		Date Prep:	09.21.18 11.15		Basis:	Dry Weig	ht
Seq Number:	3064139							
Parameter		Cas Number	Result	RL	Units	Analysis Da	ate Flag	g Dil
Chloride		16887-00-6	127	5.14	mg/kg	09.21.18 18.	49	1





Certificate of Analytical Results 599287



GHD Services, INC- Midland, Midland, TX

Sample Id:	SB24-4-140918		Matrix:	Soil		Date Received	:09.17.1	8 13.19	
Lab Sample Id	: 599287-025		Date Collec	ted: 09.14.18 10.42		Sample Depth:	:4		
Analytical Me	thod: Chloride by EPA 3	00				Prep Method:	E300P		
Tech:	SCM					% Moisture:	6.29		
Analyst:	SCM		Date Prep:	09.21.18 11.15		Basis:	Dry We	eight	
Seq Number:	3064139								
Parameter		Cas Number	Result	RL	Units	Analysis Da	ite F	lag	Dil
Chloride		16887-00-6	1560	26.8	mg/kg	09.21.18 19.	00		5







GHD Services, INC- Midland, Midland, TX

Sample Id:	SB24-10-140918		Matrix:	Soil		Date Received	1:09.17.	18 13.19	
Lab Sample Io	l: 599287-026		Date Collec	cted: 09.14.18 10.44		Sample Depth	:10		
Analytical Me	thod: Chloride by EPA	300				Prep Method:	E300F	þ	
Tech:	SCM					% Moisture:	5.99		
Analyst:	SCM		Date Prep:	09.21.18 11.15		Basis:	Dry W	leight	
Seq Number:	3064139								
Parameter		Cas Number	Result	RL	Units	Analysis D	ate	Flag	Dil
Chloride		16887-00-6	311	5.27	mg/kg	09.21.18 19	.10		1





Certificate of Analytical Results 599287



GHD Services, INC- Midland, Midland, TX

Sample Id:	SB25-4-140918		Matrix:	Soil		Date Received	:09.17.1	8 13.19	
Lab Sample Id	: 599287-027		Date Collec	ted: 09.14.18 10.47		Sample Depth:	:4		
Analytical Me	thod: Chloride by EPA 3	00				Prep Method:	E300P		
Tech:	SCM					% Moisture:	5.49		
Analyst:	SCM		Date Prep:	09.21.18 11.15		Basis:	Dry We	eight	
Seq Number:	3064139								
Parameter		Cas Number	Result	RL	Units	Analysis Da	ite F	lag	Dil
Chloride		16887-00-6	2770	26.2	mg/kg	09.21.18 19.	20		5







·

GHD Services, INC- Midland, Midland, TX

Sample Id:	SB25-10-140918		Matrix:	Soil		Date Received	:09.17.18	13.19
Lab Sample Ic	1: 599287-028		Date Collec	cted: 09.14.18 10.49		Sample Depth	:10	
Analytical Me	thod: Chloride by EPA	300				Prep Method:	E300P	
Tech:	SCM					% Moisture:	3.52	
Analyst:	SCM		Date Prep:	09.21.18 11.15		Basis:	Dry Weig	ght
Seq Number:	3064139							
Parameter		Cas Number	Result	RL	Units	Analysis Da	ate Fla	ig Dil
Chloride		16887-00-6	927	5.14	mg/kg	09.21.18 19.	31	1





Certificate of Analytical Results 599287



GHD Services, INC- Midland, Midland, TX

Sample Id: Lab Sample Id	SB26-4-140918 l: 599287-029		Matrix: Soil Date Collected: 09.14.18 10.52			Date Received:09.17.18 13.19 Sample Depth:4				
Analytical Me	thod: Chloride by EPA	300				Prep Method:	E300P			
Tech:	SCM					% Moisture:	5.08			
Analyst:	SCM		Date Prep:	09.21.18 11.15		Basis:	Dry W	eight		
Seq Number:	3064139									
Parameter		Cas Number	Result	RL	Units	Analysis Da	ite I	Flag	Dil	
Chloride		16887-00-6	1680	26.4	mg/kg	09.21.18 20.	12		5	









TNI PACCREDIES

GHD Services, INC- Midland, Midland, TX

Sample Id:	SB26-10-140918		Matrix:	Soil		Date Received	l:09.17	.18 13.19	
Lab Sample Id	: 599287-030		Date Collec	cted: 09.14.18 10.54		Sample Depth: 10			
Analytical Me	thod: Chloride by EPA	300				Prep Method:	E300	Р	
Tech:	SCM					% Moisture:	2.82		
Analyst:	SCM		Date Prep:	09.21.18 11.15		Basis:	Dry V	Veight	
Seq Number:	3064139								
Parameter		Cas Number	Result	RL	Units	Analysis Da	ate	Flag	Dil
Chloride		16887-00-6	454	5.18	mg/kg	09.21.18 19.	41		1



Certificate of Analytical Results 599287



GHD Services, INC- Midland, Midland, TX

Sample Id:	SB27-4-140918		Matrix:	Soil		Date Received	:09.17.18	8 13.19	1
Lab Sample Id	: 599287-031		Date Collec	cted: 09.14.18 11.00		Sample Depth	:4		
Analytical Me	thod: Chloride by EPA 3	800				Prep Method:	E300P		
Tech:	SCM					% Moisture:	5.67		
Analyst:	SCM		Date Prep:	09.21.18 11.15		Basis:	Dry Wei	ight	
Seq Number:	3064139								
Parameter		Cas Number	Result	RL	Units	Analysis Da	ate Fl	ag	Dil
Chloride		16887-00-6	435	5.31	mg/kg	09.21.18 20.	22		1







GHD Services, INC- Midland, Midland, TX

Sample Id: Lab Sample Id	SB27-10-140918 : 599287-032		Matrix: Date Collec	Soil eted: 09.14.18 11.02		Date Received Sample Depth	:09.17.18 : 10	3 13.19
Analytical Me Tech:	thod: Chloride by EPA 3 SCM	300				Prep Method: % Moisture:	E300P 2.61	
Analyst: Sea Number:	SCM 3064139		Date Prep:	09.21.18 11.15		Basis:	Dry Wei	ght
Parameter	5004155	Cas Number	Result	RL	Units	Analysis Da	ate Fla	ag Dil
Chloride		16887-00-6	40.2	5.08	mg/kg	09.21.18 20.	53	1





Certificate of Analytical Results 599287



GHD Services, INC- Midland, Midland, TX

Sample Id: Lab Sample Id	SB28-4-140918 : 599287-033		Matrix: Date Collec	Soil ted: 09.14.18 11.07		Date Received Sample Depth:	:09.17.18 4	13.19
Analytical Me Tech: Analyst: Seq Number:	thod: Chloride by EPA 3 SCM SCM 3064139	300	Date Prep:	09.21.18 11.15		Prep Method: % Moisture: Basis:	E300P 5.53 Dry Wei	ght
Parameter		Cas Number	Result	RL	Units	Analysis Da	ite Fla	ag Dil
Chloride		16887-00-6	1650	26.6	mg/kg	09.21.18 21.	04	5



Certificate of Analytical Results 599287



GHD Services, INC- Midland, Midland, TX

Sample Id:	SB28-10-140918		Matrix:	Soil		Date Received	:09.17.18 13.1	.9
Lab Sample Io	1: 599287-034		Date Collec	cted: 09.14.18 11.09		Sample Depth: 10		
Analytical Me	ethod: Chloride by EPA	300				Prep Method:	E300P	
Tech:	SCM					% Moisture:	6.9	
Analyst:	SCM		Date Prep:	09.21.18 11.15		Basis:	Dry Weight	
Seq Number:	3064139							
Parameter		Cas Number	Result	RL	Units	Analysis Da	nte Flag	Dil
Chloride		16887-00-6	371	5.40	mg/kg	09.21.18 21.	14	1



Certificate of Analytical Results 599287



GHD Services, INC- Midland, Midland, TX

Sample Id:	SB29-4-140918		Matrix:	Soil		Date Received	:09.17.18 1	3.19
Lab Sample Id	: 599287-035		Date Collec	eted: 09.14.18 11.19		Sample Depth:	:4	
Analytical Me	thod: Chloride by EPA 3	00				Prep Method:	E300P	
Tech:	SCM					% Moisture:	4.76	
Analyst:	SCM		Date Prep:	09.21.18 11.15		Basis:	Dry Weigh	t
Seq Number:	3064139							
Parameter		Cas Number	Result	RL	Units	Analysis Da	ite Flag	Dil
Chloride		16887-00-6	1200	26.0	mg/kg	09.21.18 21.	24	5



Certificate of Analytical Results 599287



GHD Services, INC- Midland, Midland, TX

Sample Id:	SB29-10-140918		Matrix:	Soil		Date Received	1:09.17	.18 13.19	
Lab Sample Io	1: 599287-036		Date Collec	cted: 09.14.18 11.23		Sample Depth	n: 10		
Analytical Me	thod: Chloride by EPA	300				Prep Method:	E3001	Р	
Tech:	SCM					% Moisture:	9.21		
Analyst:	SCM		Date Prep:	09.21.18 11.15		Basis:	Dry W	Veight	
Seq Number:	3064139								
Parameter		Cas Number	Result	RL	Units	Analysis D	ate	Flag	Dil
Chloride		16887-00-6	1580	27.3	mg/kg	09.21.18 21	.35		5





Certificate of Analytical Results 599287



GHD Services, INC- Midland, Midland, TX

Sample Id:	SB30-4-140918		Matrix:	Soil		Date Received	1:09.17.1	8 13.19	
Lab Sample Id	: 599287-037		Date Collec		Sample Depth	:4			
Analytical Me	thod: Chloride by EPA 3	00				Prep Method:	E300P		
Tech:	SCM					% Moisture:	7.67		
Analyst:	SCM		Date Prep:	09.21.18 11.15		Basis:	Dry We	eight	
Seq Number:	3064139								
Parameter		Cas Number	Result	RL	Units	Analysis Da	ate F	lag	Dil
Chloride		16887-00-6	1390	27.3	mg/kg	09.21.18 21.	45		5



Certificate of Analytical Results 599287



GHD Services, INC- Midland, Midland, TX

Sample Id:	SB30-10-140918		Matrix:	Soil		Date Received	1:09.17.	18 13.19)
Lab Sample Id	1: 599287-038	Date Collected: 09.14				Sample Depth	:10		
Analytical Me	ethod: Chloride by EPA	300				Prep Method:	E300P		
Tech:	SCM					% Moisture:	8.57		
Analyst:	SCM		Date Prep:	09.21.18 11.15		Basis:	Dry W	eight	
Seq Number:	3064139								
Parameter		Cas Number	Result	RL	Units	Analysis D	ate]	Flag	Dil
Chloride		16887-00-6	143	5.48	mg/kg	09.21.18 21	.55		1



Certificate of Analytical Results 599287



GHD Services, INC- Midland, Midland, TX

Sample Id:	SB31-4-140918		Matrix:	Soil		Date Received	1:09.17	.18 13.19	
Lab Sample Io	1: 599287-039		Date Collec	cted: 09.14.18 11.29		Sample Depth	:4		
Analytical Me	ethod: Chloride by EPA	300				Prep Method:	E3001	P	
Tech:	SCM					% Moisture:	1.89		
Analyst:	SCM		Date Prep:	09.21.18 12.45		Basis:	Dry W	Veight	
Seq Number:	3064141								
Parameter		Cas Number	Result	RL	Units	Analysis D	ate	Flag	Dil
Chloride		16887-00-6	34.5	5.11	mg/kg	09.21.18 19	.27		1







GHD Services, INC- Midland, Midland, TX

Sample Id: Lab Sample Id	SB31-10-140918 l: 599287-040		Matrix: Date Collec	Soil cted: 09.14.18 11.31		Date Received Sample Depth	::09.17. : 10	18 13.19	
Analytical Me Tech: Analyst: Seq Number:	thod: Chloride by EPA SCM SCM 3064141	300	Date Prep:	09.21.18 12.45		Prep Method: % Moisture: Basis:	E300P 1.78 Dry W	eight	
Parameter		Cas Number	Result	RL	Units	Analysis Da	ate I	Flag	Dil
Chloride		16887-00-6	108	5.05	mg/kg	09.21.18 19.	44		1





Flagging Criteria



- **Page 91 of 107**
- X In our quality control review of the data a QC deficiency was observed and flagged as noted. MS/MSD recoveries were found to be outside of the laboratory control limits due to possible matrix /chemical interference, or a concentration of target analyte high enough to affect the recovery of the spike concentration. This condition could also affect the relative percent difference in the MS/MSD.
- **B** A target analyte or common laboratory contaminant was identified in the method blank. Its presence indicates possible field or laboratory contamination.
- **D** The sample(s) were diluted due to targets detected over the highest point of the calibration curve, or due to matrix interference. Dilution factors are included in the final results. The result is from a diluted sample.
- E The data exceeds the upper calibration limit; therefore, the concentration is reported as estimated.
- F RPD exceeded lab control limits.
- J The target analyte was positively identified below the quantitation limit and above the detection limit.
- U Analyte was not detected.
- L The LCS data for this analytical batch was reported below the laboratory control limits for this analyte. The department supervisor and QA Director reviewed data. The samples were either reanalyzed or flagged as estimated concentrations.
- **H** The LCS data for this analytical batch was reported above the laboratory control limits. Supporting QC Data were reviewed by the Department Supervisor and QA Director. Data were determined to be valid for reporting.
- **K** Sample analyzed outside of recommended hold time.
- **JN** A combination of the "N" and the "J" qualifier. The analysis indicates that the analyte is "tentatively identified" and the associated numerical value may not be consistent with the amount actually present in the environmental sample.
- ** Surrogate recovered outside laboratory control limit.
- **BRL** Below Reporting Limit.
- RL Reporting Limit
- MDL Method Detection Limit SDL Sample Detection Limit LOD Limit of Detection
- PQL Practical Quantitation Limit MQL Method Quantitation Limit LOQ Limit of Quantitation
- **DL** Method Detection Limit
- NC Non-Calculable

SMP Clie	nt Sample	BLK	Method Blank	
BKS/LCS	Blank Spike/Laboratory Control Sample	BKSD/LCSD	Blank Spike Duplicate/Labora	atory Control Sample Duplicate
MD/SD	Method Duplicate/Sample Duplicate	MS	Matrix Spike	MSD: Matrix Spike Duplicate

+ NELAC certification not offered for this compound.

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



GHD Services, INC- Midland CEMC VGSAU 148

Analytical Method:	Chloride by EPA 30	0						Pı	ep Metho	d: E3	00P	
Seq Number:	3064136]	Matrix:	Solid				Date Pre	p: 09.	21.18	
MB Sample Id:	7662772-1-BLK		LCS San	nple Id:	7662772-1	I-BKS		LCS	D Sample	Id: 766	52772-1-BSD	
Parameter	MB Result	Spike Amount	LCS Result	LCS %Rec	LCSD Result	LCSD %Rec	Limits	%RPD	RPD Limi	t Units	Analysis Date	Flag
Chloride	< 5.00	250	254	102	254	102	90-110	0	20	mg/kg	09.21.18 11:14	

Analytical Method:	Chloride by EPA 30	0						Pı	ep Metho	od: E30	0P	
Seq Number:	3064139			Matrix:	Solid				Date Pre	ep: 09.2	21.18	
MB Sample Id:	7662793-1-BLK		LCS San	nple Id:	7662793-1	I-BKS		LCS	D Sample	e Id: 766	2793-1-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	254	102	255	102	90-110	0	20	mg/kg	09.21.18 16:55	

Analytical Method:	Chloride by EPA 30	0						P	rep Metho	od: E30	OP	
Seq Number:	3064141			Matrix:	Solid				Date Pr	ep: 09.2	21.18	
MB Sample Id:	7662796-1-BLK		LCS Sar	nple Id:	7662796-1	I-BKS		LCS	D Sample	e Id: 766	2796-1-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	256	102	90-110	0	20	mg/kg	09.21.18 19:16	

Analytical Method:	Chloride by EPA 30	0						P	rep Metho	od: E30	OP	
Seq Number:	3064136			Matrix:	Soil				Date Pr	ep: 09.2	21.18	
Parent Sample Id:	599287-009		MS Sar	nple Id:	599287-00)9 S		MS	D Sample	e Id: 599	287-009 SD	
Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RPD	RPD Lim	it Units	Analysis Date	Flag
Chloride	20.9	262	262	92	264	93	90-110	1	20	mg/kg	09.21.18 14:10	

Analytical Method:	Chloride by	EPA 30	0						Pr	ep Meth	od: E30	00P	
Seq Number:	3064136				Matrix:	Soil				Date Pr	ep: 09.2	21.18	
Parent Sample Id:	599738-003			MS San	nple Id:	599738-00)3 S		MS	D Sample	e Id: 599	738-003 SD	
Parameter		Parent Result	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RPD	RPD Lim	it Units	Analysis Date	Flag
Chloride		30.0	252	271	96	271	96	90-110	0	20	mg/kg	09.21.18 11:45	

MS/MSD Percent Recovery Relative Percent Difference LCS/LCSD Recovery Log Difference [D] = 100*(C-A) / B RPD = 200* | (C-E) / (C+E) | [D] = 100 * (C) / [B] Log Diff. = Log(Sample Duplicate) - Log(Original Sample) LCS = Laboratory Control Sample A = Parent Result C = MS/LCS Result E = MSD/LCSD Result MS = Matrix Spike B = Spike Added D = MSD/LCSD % Rec

.

Page 53 of 60



GHD Services, INC- Midland CEMC VGSAU 148

Analytical Method:	Chloride by E	EPA 30	0						Pr	ep Metho	d: E3	00P	
Seq Number:	3064139			ľ	Matrix:	Soil				Date Pre	p: 09.	21.18	
Parent Sample Id:	599287-020			MS Sam	ple Id:	599287-02	0 S		MSI	O Sample	Id: 599	9287-020 SD	
Parameter	Pa R	arent lesult	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RPD 1	RPD Limit	Units	Analysis Date	Flag
Chloride		617	281	910	104	908	104	90-110	0	20	mg/kg	09.21.18 17:26	

Analytical Method:	Chloride by E	PA 300	0						Pı	rep Meth	od: E30	0P	
Seq Number:	3064139				Matrix:	Soil				Date Pr	ep: 09.2	1.18	
Parent Sample Id:	599287-030	599287-030 MS Sample				599287-03	30 S		MS	D Sample	e Id: 599	287-030 SD	
Parameter	Pa Re	rent esult	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RPD	RPD Lim	it Units	Analysis Date	Flag
Chloride		454	259	724	104	726	105	90-110	0	20	mg/kg	09.21.18 19:51	

Analytical Method:	Chloride by EPA	300						P	rep Metho	od: E3	00P	
Seq Number:	3064141			Matrix:	Soil				Date Pre	ep: 09.	21.18	
Parent Sample Id:	599287-039		MS Sat	mple Id:	599287-03	39 S		MS	D Sample	e Id: 599	9287-039 SD	
Parameter	Paren Resu	nt Spike lt Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RPD	RPD Lim	it Units	Analysis Date	Flag
Chloride	34	.5 255	308	107	307	107	90-110	0	20	mg/kg	09.21.18 19:33	

Analytical Method:	Chloride by EPA 30	0						P	rep Metho	od: E30	OP	
Seq Number:	3064141			Matrix:	Soil				Date Pr	ep: 09.2	21.18	
Parent Sample Id:	599293-009		MS San	nple Id:	599293-009 S MSD Sample Io				e Id: 599	293-009 SD		
Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RPD	RPD Lim	it Units	Analysis Date	Flag
Chloride	345	270	616	100	618	101	90-110	0	20	mg/kg	09.21.18 20:52	

Analytical Method: Seq Number:	Percent Moisture 3063618 Matrix MB Sample Id	: Solid : 3063618-1-BLK			
Parameter	MB Result		Units	Analysis Date	Flag
Percent Moisture	<		%	09.18.18 13:45	

MS/MSD Percent Recovery Relative Percent Difference LCS/LCSD Recovery Log Difference [D] = 100*(C-A) / B RPD = 200* | (C-E) / (C+E) | [D] = 100 * (C) / [B] Log Diff. = Log(Sample Duplicate) - Log(Original Sample) LCS = Laboratory Control Sample A = Parent Result C = MS/LCS Result E = MSD/LCSD Result MS = Matrix Spike B = Spike Added D = MSD/LCSD % Rec

.

Page 54 of 60



QC Summary 599287

CEMC VGSAU 148

Analytical Method:	Percent Moisture							
Seq Number:	3063619	Matrix: MB Sample Id:	Solid 3063619-1-BLK					
Parameter		MB Result				Units	Analysis Date	Flag
Percent Moisture		<				%	09.18.18 13:45	
Analytical Method:	Percent Moisture	Motrive	Soil					
Parent Sample Id:	599287-001	MD Sample Id:	599287-001 D					
Parameter	Parent Result	MD Result		%RPD F	RPD Limit	Units	Analysis Date	Flag
Percent Moisture	5.07	5.22		3	20	%	09.18.18 13:45	
Analytical Method:	Percent Moisture							
Seq Number:	3063618	Matrix:	Soil					
Parent Sample Id:	599287-011	MD Sample Id:	599287-011 D					
Parameter	Parent Result	MD Result		%RPD I	RPD Limit	Units	Analysis Date	Flag
Percent Moisture	2.11	2.32		9	20	%	09.18.18 13:45	
Analytical Method:	Percent Moisture							
Seq Number:	3063619	Matrix:	Soil					
Parent Sample Id:	599287-021	MD Sample Id:	599287-021 D					
Parameter	Parent Result	MD Result		%RPD F	RPD Limit	Units	Analysis Date	Flag
Percent Moisture	6.13	6.23		2	20	%	09.18.18 13:45	
Analytical Method:	Percent Moisture							
Seq Number: Parent Sample Id:	3063619 599287-031	Matrix: MD Sample Id:	Soil ק 599287-031					
Parameter	Parent	MD MD Result	<i>377207</i> 031 D	%RPD I	RPD Limit	Units	Analysis Date	Flag
	Kcsuit	Kesuit					Date	

MS/MSD Percent Recovery Relative Percent Difference LCS/LCSD Recovery Log Difference [D] = 100*(C-A) / B RPD = 200* | (C-E) / (C+E) | [D] = 100 * (C) / [B] Log Diff. = Log(Sample Duplicate) - Log(Original Sample) LCS = Laboratory Control Sample A = Parent Result C = MS/LCS Result E = MSD/LCSD Result MS = Matrix Spike B = Spike Added D = MSD/LCSD % Rec

.

Page 55 of 60

Final 1.000

XENCO

Chain of Custody

Houston,TX (281) 240-4200 Dallas,TX (214) 902-0300 San Antonio,TX (210) 509-3334 Midland,TX (432-704-5440) EL Paso,TX (915)585-3443 Lubbock,TX (806)794-1296

			Hobbs,	NM (575-392-7	550) Phoenix,	AZ (48	0-355-0	900) A	tlanta,G	A (770-4	49-88	00) Tampa	a,FL (8	13-620	2000)		www	.xenco	o.com	Pa	je	of	
Project Manager: Sc	ott Foord				Bill to: (if differ	ent)	Cene	ergy Pa	artners	c/o Jaso	on Mic	haelson					w	ork O	rder (Commo	ents		
Company Name: GI	HD				Company Na	ume:	Chev	ron Env	riroment	al Manag	jemen	t Company	/	Pro	gram:	UST/P	ST 🗌 F	PRP	Brow	nfields] Superfu	nd
Address: 21	35 S. Loop	250 West	t		Address:		1400	Smith	Street,	, Office	07084	1		1	State o	f Proje	ct:						
City, State ZIP: Mi	dland, TX.	79703		.	City, State ZI	P:	Hous	ston, T	X. 7700)2				Rep	orting:	_evel II	Le	vel III	PS"	T/UST []TRRP	Level I	/ 🗌
Phone: 71	3-734-3090)		Email:	Christopher	.Knig	ht@gł	hd.cor	n & Wi	lliam.F	oord(@ghd.cor	m	Deli	verable	es: ED	d 🗌		ADaP	тП	Other	;	
Project Name: CE	EMC Loving	SAV 14 Iton Water	8 Plant	Ти	rn Around						AN	ALYSIS I	REQL	JEST						<u> i</u>	Vork O	rder Note	s
Project Number: 07	3016-2018	-002 111	21241	Routi	ne 🔀						T		T			T	T	1	I				
P.O. Number:				Rush	:																		
Sampler's Name:				Due I	Date:																		
SAMPLE RECEIP	т та	emp Blank:	Yes No	Wet Ice:	No No	-																	
Temperature (°C):		1		Thermometer	JD.	Jers																	
Received Intact:	es (es	No		1	18	ntair		1								1		1					
Cooler Custody Seals:	Yes	N/A	Corre	ection Factor:	0.0] <u>ö</u>														TAT s	arts the	av recevied	by the
Sample Custody Seals:	e Custody Seals: Yes Ne N/A Total Containers:						e	sture			1									la	o, if recei	ved by 4:30	m
Sample Identifi	mple Identification Matrix Date Sampled Sampled					Numb	Chloric	% Mois												S	ample	Commen	ts
5816-4-1409	18	S	9/14/18	0825	4	1	$\overline{\mathbf{N}}$	\mathbf{X}															<u></u>
<u>5 B16-10-1409</u>	18			0830	10	1	\backslash	N															
SB16-20-140	918		ļ	0835	20	1		\geq															
<u>SB16-30-140</u>	118	<u> </u>	<u> </u>	0840	30	1		\square						_	_								
<u>SB16-40-1409</u>	18			0845	40	1	\searrow	\geq	ļ				_										
SB16-50-140	915		 	0850	50		[\square	ļ				_										*****
SB16-60-1400	218		<u> </u>	0855	60		\downarrow	\downarrow								_	<u> </u>	ļ	<u> </u>	<u> </u>			
<u>SBIG - 70-1404</u>	18		<u> </u>	0900	70		\downarrow											<u> </u>	-				
SB16-90-140	air	+ -		0905	<u>80</u> 9p		$\left \right\rangle$	\cdot	+-						+								
Total 200.7 / 6010) 200.8	/ 6020:	8R(CRA 13PP	M Texas 11		Sb A	s Ba	Be B		l a Cr		Fe F	Ph Mc	Mn		KS		SiO2	Na S	r TI Sr	UV Zn	
Circle Method(s)	and Metal(s	s) to be an	alyzed	TCLP / SP	LP 6010: 8F	RCRA	Sb	As B	a Be	Cd Cr	Co	Cu Pb N	Mn M	o Ni	Se Ag	g TI L	J	o / .g	16	31 / 24	<u>5.1 / 74</u>	70 / 7471	: Hg
Notice: Signature of this doc of service. Xenco will be liat of Xenco. A minimum charge	ument and reli ble only for the e of \$75.00 will	nquishment of cost of samp	of samples con bles and shall r b each project a	stitutes a valid p lot assume any p and a charge of	ourchase order f responsibility fo \$5 for each sam	rom cli r any lo ple sub	ent com osses or omitted t	pany to expensito Xence	Xenco, i es incuri o, but no	ts affiliat red by the t analyzed	es and e client d. Thes	subcontrac if such loss te terms will	tors. If ses are be enf	assign due to d orced u	s standa ircumst	rd terms ances be	s and co eyond the	ondition ne contr ted.	s ol				
Relinquished by: (Signature)		Received	by: (Signati	ure)		Date	e/Time)	Reli	nquis	hed by: ((Signa	ature)		Rec	eived	by: (S	ignatu	ure)		Date/Tim	ie
1 hall	hr	J,	BIPF	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	-	9-1	17-12	8/3	1:19	2													
3						<u> </u>				4											_		
5						1				6					1								

Work Order No:

Revised Date 051418 Rev. 2018.1

Page 56 of 60

Final 1.000

npany Name: C Iress: 2 v, State ZIP: N	GHD				Bill to: (if differ	ent)	Cen	ergy Partr	ers c/o Ja	son Micha	elson					Work	Order	Comments
Iress: 2 , State ZIP: N				,	Company Na	ame:	Chev	ron Enviro	nental Mar	agement C	ompany		Progr	am: US	ST/PST		Bro	
, State ZIP: N	2135 S. Loop 2	250 West	t		Address:		1400) Smith S	reet, Offic	e 07084			St	ate of F	Project:		_	
	Vidland, TX. 7	9703			City, State Z	IP:	Hous	ston, TX.	7002				Repo	ting:Le	vel II 🗌	Level I	П 🗌 Р	ST/UST TRRP Level IV
one: 7	713-734-3090			Em	ail: Christopher	.Knig	ht@g	hd.com &	William.	Foord@	hd.com		Delive	rables:	EDD [ADal	PT D Other:
ject Name: C	CEMC Loving	१ ८ । 9 Watei	f Plant		Turn Around					ANAI	YSIS BE	FOUI	EST					Work Order Notes
ect Number: 6)73010-2018-0	11 20	121241	Rc	outine X			TT										
Number:				RL	ish:													
pler's Name:				Dı	le Date:													
	PT Ter	np Blank:	Yes No	Wetl]												
perature (°C):	T Â	1			ater ID.	ers												
ived Intact:	(Yeb	No			NE	htain							1					
er Custody Seals:	: Yes (N), N/A	Corre	ection Fact	ior: O. U	្រី												TAT starts the day received by th
ple Custody Seals	s: Yes M	5/ N/A	Tota	Il Containe	ors:	erof	<u> </u>	ture										lab, if received by 4:30pm
Sample Identi	ification	Matrix	Date Sampled	Time Sample	d Depth	Numb	Chlorid	% Mois										Sample Comments
317-4-1400	918	<u> </u>	9/14/18	094	8 4		\downarrow											
317-10-1409	<u> 118</u>	<u> </u>	<u> </u>	095	0 10			$ \rangle $				L						
<u> 318 - 4 - 140</u>	918	<u> </u>	<u> </u>	0959	5 4		\uparrow											······································
119 - 4 - 140	918		┟──┤───┤	1095	/ 10		\vdash	$\left \right\rangle$										
519-10-1400	918	++	┼─┤──┦	1005	4	1	+	$\left\{ \right\}$					_				_	
320-4-140	918		├ ──┤	1003	4		+	\mathbf{k}								_	_	
B20-10-14	Dalg			1012	10		$\overline{\mathbf{\nabla}}$	Ŕ										
B21-4-14	0918			1022	. 4	1	1	$\overline{\mathbf{n}}$					-					
6		1 11.	1 J/		······	1	_			l		<u> </u>		<u> </u>				

Page 96 of 107

.

•

Page 97 of 107

•

Sampany Name: Chargen Manee: Chargen Manee: Chargen Manee: Program: UST/PST PAP Brownfieldel RAC Superfund State 2IP Vg. State 2IP Midland, TX. 79703 City, State 2IP: Houston, TX. 77002 Participantial intervision and the state of Project: Reporting:Level II Level III PST/UST TARP Level IV. One 713-734-3090 Email: Christopher Knight@ghd.com AMALYSIS REQUEST Work Order Notes Oject Name: CPCM Company Manee: Due Date: AMALYSIS REQUEST Work Order Notes SAMPLE RECEIPT Jeen palank: Yes @get NiA Contrainers: Yes @get NiA Yes @get NiA Contrainers: Yes @get NiA Yes @get NiA Contrainers: Yes @get @get @get @get @get @get @get @get	roject Manager: Scott Foord			`	Bill to: (if differe	ənt)	Cene	rgy Partne	rs c/o Jas	on Michae	Ison			<u></u>	Vork Orc	der Cor	mments
State sa: 2135 S. Loop 250 West Address: 1400 Smith Street, Office 07084 State 2IP: Midland, TX. 79703 City, State ZIP: Houston, TX. 77002 State of Project: Reporting:Level II [_Level III] PSTUST [_TRRP [_Level IV] none: 713-734-3090 Email Christopher-Knight@ghd.com & William.Foord@ghd.com Anal Ysis REQUEST Work Order Notes oject Name: OEMC Lowingten-Water Pient Turn Around Anal Ysis REQUEST Work Order Notes SAMPLE RECEIPT Jerne Blank: Yes (w) Wetto: Sample domaines Sample d	ompany Name: GHD				Company Na	me:	Chevr	on Envirom	ental Mana	gement Co	mpany	Pro	gram: U	ST/PST		Brownfie	
Vy. State 2IP: Midland, TX. 79703 City, State 2IP: Houston, TX. 77002 Reporting:Level II [Level III] PST/UST] TRRP] Level IV] pone: 713-734-3090 Email Christopher, Knight@ghd.com & William.Foord@ghd.com Peleverables: EDD] ADaPT] Other: orget Name: CEMC towingtion.Water Plant. Turn Around ANALYSIS REQUEST Work Order Notes oper Name: Orget State 2000 West Gar Notes Bush: Bush	ddress: 2135 S. Loop	250 West			Address:		1400	Smith Stre	et, Office	07084		- •	State of	Project:	in the second		
Inne: 713-734-3090 Email: Christopher Knight@ghd.com & William.Foord@ghd.com Deliverables: EDD ADaPT Other: oject Name: CEMC EVG3AU 14% Turn Around ANALYSIS REQUEST Work Order Notes oject Name: 073016-2018-002 II / 2 / 4 Routine © Rush: Work Order Notes impler's Name: Due Date: Bush: Due Date: Bush: ThermometarDecistopher Knight@ghd.com Work Order Notes SAMPLE RECEIPT Temp Blank: Yes (W) Wet los: Kas ¹ No Bush: ThermometarDecistopher Knight@ghd.com Bush: ThermometarDecistopher Knight@ghd.com ThermometarDecistopher Knight@ghd.com ThermometarDecistopher Knight@ghd.com Figure Around Figure Around <td>ty, State ZIP: Midland, TX. 7</td> <td>9703</td> <td></td> <td></td> <td>City, State ZI</td> <td>P:</td> <td>Hous</td> <td>ton, TX. 77</td> <td>002</td> <td></td> <td></td> <td>Rep</td> <td>orting:L</td> <td>evel II 🔲 L</td> <td>evel III 🗌</td> <td>]PST/U</td> <td>ST TRRP Level IV</td>	ty, State ZIP: Midland, TX. 7	9703			City, State ZI	P:	Hous	ton, TX. 77	002			Rep	orting:L	evel II 🔲 L	evel III 🗌]PST/U	ST TRRP Level IV
Oject Name: CEMC Consisten Water Flamt. Turn Around ANALYSIS REQUEST Work Order Notes oject Number: 073010-2018-002 11/212.4/l Routine X Rush: Due Date: No ampler's Name: Due Date: Due Date: SAMPLE RECEIPT Jerno Blank: Yes (k) Wet ko: Get Number: TAT starts the day received by the lab, if received by	none: 713-734-3090	<u> </u>		Email:	Christopher	.Knigl	ht@gh	nd.com &	Nilliam.F	oord@gh	nd.com	Deli	verables	EDD] A	Daрт [] Other:
oject Number: 073010-2018-002 [11 2] 2 4 Routine No O. Number: Rush: Rush: Bush: Bush: Rush: ampler's Name: Due Date: SAMPLE RECEIPT Temp Blank: Yes Yes Wet los: Case No seeved Intact: Yes Yes Wet los: Case No Thermometed Date: T	roject Name: CEMC Loving	SAU 14 on Water	Plant	Т	rn Around					ΔΝΔΙΝ	SIS RE						Work Order Notes
O. Number: Rush: Rush: Due Date: SAMPLE RECEIPT Jeenp Blank: Yee 60 Wet los: Gaso No seeved intact: Yee 10 Thermometer D Seeved intact: Thermometer D seeved intact: Yee 60 NA Correction Factor: 0 - 0 Seeved intact: Thermometer D seeved intact: Yee 60 NA Correction Factor: 0 - 0 Seeved intact: TAT starts the day received by the lab. if received by 4:30pm Sample Custody Seals: Yee 60 NA Total Containers: 5 Seeved intact: Seeved intact: Seeved intact: <td>oject Number: 073016-2018-</td> <td>302 111</td> <td>21241</td> <td>Bout</td> <td>ine 🕅</td> <td></td> <td>Ι</td> <td></td> <td>TT</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>T</td> <td></td> <td></td>	oject Number: 0 73016-2018-	302 111	21241	Bout	ine 🕅		Ι		TT						T		
Sampler's Name: Due Date: SAMPLE RECEIPT Temp Blank: Yes Wet los: Gas No menerature (°C): Thermometed Dometed by the los: Gas No Thermometed Dometed by the los: Gas No secieval intact: Yes Val Correction Factor: G-2 Gas No TAT starts the day received by the lab. if re	O. Number:			Rush);												
SAMPLE RECEIPT Temp Blank: Yes Wet Ice: Go No Set Ice: Set Ice: <t< td=""><td>ampler's Name:</td><td></td><td></td><td>Due</td><td>Date:</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></t<>	ampler's Name:			Due	Date:												
Sample dentificationItes (c) werte. (c)		mn Blank:	Ves Alo	Wat loo	Kon No												
Angle Laboration Color Angle		1 Diarin.		hormomotol		Sla											
soler Custody Seals:YesN/ACorrection Factor: $\overline{0-0}$ $\overline{5}$ $\overline{00}$ $\overline{00}$ $\overline{0}$ $\overline{0}$ $\overline{0}$ $\overline{0}$ $\overline{10}$ <	eceived Intact:	No		nennomete	te-	tain	3	<u> </u>									***************************************
Sample Custody Seals: Yes O N/A Total Containers: O	coler Custody Seals: Yes	N/A	Corre	ction Factor:	5-0	l So											AT ototo the device and built
Sample Identification Matrix Date Sampled Time Sampled Depth $\frac{9}{9}$ <td>ample Custody Seals: Yes 🐧</td> <td>N/A</td> <td>Total</td> <td>Containers:</td> <td></td> <td>5</td> <td></td> <td>nre</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>lab, if received by 4:30pm</td>	ample Custody Seals: Yes 🐧	N/A	Total	Containers:		5		nre									lab, if received by 4:30pm
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	Sample Identification	Matrix	Date Sampled	Time Sampled	Depth	Numbe	Chloride	% Moist									Sample Comments
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	B22-4-140918	S	9/14/18	1030	4		$\left \right\rangle$										
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	SB22-10-140918			1032	10	l	1										
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	51323-4-140918			1035	4	l	$\mathbf{\Sigma}$	\geq									
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	5823-10-140918	+		1037	10	1	\sum	\geq					_				····
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	5824-4-140418	┼∤		1042	4		\vdash						_				······
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	5024-10-140918 (B25 H 140918			1044	10		À	<u></u> , −			+		_				
$\frac{5826 - 4 - 140418}{5826 - 4 - 140418}$	5825-10-140918			1047	4		\downarrow				+						
	5B76-4-140018	+ $+$ $-$		1011	4		\vdash	+	+		+				+		
	5826-10 -140918			1054	10			\mathbf{E}			+				+		
	Circle Method(s) and Metal(s	to be an	alvzed	TCLP / SP	LP 6010 88		SD A	s da de As Ba B	D D Ca Ch Cr	a Ur Uc Co Cu	Ph Mn	Mo Ni	MN M Se Aa		se Ag S	1631	a Sr II Sn U V Zn /2451/7470/7471:Ha
Circle Method(s) and Metal(s) to be analyzed TCLP / SPLP 6010; 8BCBA, Sh As Ba Be Cd Cr Co Cu Ph Mp Mp Ni Se Ag TULL 1631 / 2451 / 2451 / 2470 / 2471 ; Ha	tice: Signature of this document and relia	quishment								00 00			Se Ay	11 0		1031	/ 243.1 / 7470 / 7471 . Hg
Circle Method(s) and Metal(s) to be analyzed TCLP / SPLP 6010: 8RCRA SD As Ba Be B Cd Ca Cr Co Cu Fe Pb Mg Mn Mo Ni K Se Ag SiO2 Na Sr TI Sn U V Zn Circle Method(s) and Metal(s) to be analyzed TCLP / SPLP 6010: 8RCRA Sb As Ba Be Cd Cr Co Cu Pb Mn Mo Ni Se Ag TI U 1631 / 245.1 / 7470 / 7471 : Hg	service. Xenco will be liable only for the	ost of samp	les and shall no	ot assume any	responsibility for	any lo	sses or	expenses in	o, its amilian curred by th	es and subo e client if su	ch losses a	are due to o	ircumstar	i terms and ices beyond	conditions the control		
Cotal 200.7 / 6010 200.8 / 6020: SRCHA 13PPM Texas 11 AI Sb As Ba Be B Cd Ca Cr Co Cu Fe Pb Mg Mn Mo Ni K Se Ag SiO2 Na Sr TI Sn U V Zn Circle Method(s) and Metal(s) to be analyzed TCLP / SPLP 6010: SRCHA Sb As Ba Be Cd Cr Co Cu Pb Mn Mo Ni Se Ag TI U 1631 / 245.1 / 7470 / 7471 : Hg tice: Signature of this document and relinquishment of samples constitutes a valid purchase order from client company to Xenco, its affiliates and subcontractors. It assigns standard terms and conditions service. Xenco will be liable only for the cost of samples and shall not assume any responsibility for any losses or expenses incurred by the client if such losses are due to circumstances beyond the control	Xenco. A minimum charge of \$75.00 will	be applied to	each project a	nd a charge of	\$5 for each samp	le sub	mitted t	o Xenco, but	not analyze	d. These ter	ms will be	enforced u	nless prev	iously negot	iated.		
Total 200.7 / 6010 200.8 / 6020: SRCRA 13PPM Texas 11 AT Sb As Ba Be B Cd Ca Cr Co Cu Fe Pb Mg Mn Mo Ni K Se Ag SiO2 Na Sr TI Sn U V Zn Circle Method(s) and Metal(s) to be analyzed TCLP / SPLP 6010: SRCRA Sb As Ba Be Cd Cr Co Cu Pb Mn Mo Ni Se Ag TI U 1631 / 245.1 / 7470 / 7471 : Hg tice: Signature of this document and relinquishment of samples constitutes a valid purchase order from client company to Xenco, its affiliates and subcontractors. It assigns standard terms and conditions service. Xenco will be liable only for the cost of samples and shall not assume any responsibility for any losses or expenses incurred by the client if such losses are due to circumstances beyond the control Xenco. A minimum charge of \$75.00 will be applied to each project and a charge of \$5 for each sample submitted to Xenco, but not analyzed. These terms will be enforced unless previously negotiated.			Received	by:/(Signat	ure)		Date	/Time	Rel	inquished	l by: (Sig	gnature)		Received	l by: (Sig	nature)	Date/Time
Total 200.7 / 6010 200.8 / 6020: SRCRA 13PPM Texas 11 Al Sb As Ba Be B Cd Ca Cr Co Cu Fe Pb Mg Mn Mo Ni K Se Ag SiO2 Na Sr TI Sn U V Zn Circle Method(s) and Metal(s) to be analyzed TCLP / SPLP 6010: SRCRA Sb As Ba Be Cd Cr Co Cu Pb Mn Mo Ni Se Ag TI U 1631 / 245.1 / 7470 / 7471 : Hg trice: Signature of this document and relinquishment of samples constitutes a valid purchase order from client company to Xenco, its affiliates and subcontractors. It assigns standard terms and conditions service. Xenco will be liable only for the cost of samples and shall not assume any responsibility for any losses or expenses incurred by the client if such losses are due to circumstances beyond the control Xenco. A minimum charge of \$75.00 will be applied to each project and a charge of \$5 for each sample submitted to Xenco, but not analyzed. These terms will be enforced unless previously negotiated. Received by: (Signature) Date/Time Relinquished by: (Signature) Received by: (Signature) Date/Time	Relinquished by: (Signature)	_	~~~	V/													

•

	Hobbs,NM (575-392-	7550) Phoenix, A	AZ (480	-355-09	900) Atla	nta,GA (770)-449-88	00) Tampa,F	FL (813-6	20-2000)	<u>v</u>	ww.xenco.	<u>.com</u> Paç	<u>geof</u>
roject Manager: Scott Foord		Bill to: (if differ	ent)	Cene	rgy Part	iers c/o Ja	son Mic	chaelson			- Cardonae	Work Or	der Comme	ints
ompany Name: GHD		Company Na	ime:	Chevro	on Enviro	mental Mar	lagemen	nt Company	P	rogram: l	JST/PST		3rownfields	RRC Superfund
ty State ZIP: Midland TX 70702		Address:	_	1400	Smith S	reet, Offic	e 07084	4		State of		ะ วิเองอาแโ		
17, State 21, 10101and, 17, 79705	Email	Christophor	Knick	HOUSI		//002	Foord	and com	["	eliverable	s FDD			Other:
VG\$AU 148			T.	n@yn		x wwinam		@gnu.com	Ľ			· ·	<u> </u>	
bject Name: CEMC Lovington Water Plar	t	urn Around			<u> </u>			ALYSIS RI	EQUES	T.	T T		V	Vork Order Notes
Sect Number: 073016-2018-002	Rout	tine [X]												
J. Number:	Due	D-4												
AMPLE RECEIPT Temp Blank: Yes	Wet Ice	: Kes No	2											
mperature (°C):	Thermomete		aine								ļļ.			
pler Custody Seals: Yes No N/A	Correction Factor	<u> </u>	, Sont											
mple Custody Seals: Yes No N/A	Total Containers		5 5		2								TAT st la	arts the day recevied by th b, if received by 4:30pm
Sample Identification Matrix Sar	ample Identification Matrix Date Time Sampled Sampled				% Moist								s	ample Comments
B17-4-140918 S 9/1	1/18 1100	4	1		$\overline{\mathbf{X}}$									
827-10-140918	1 1102	10	l	>	\mathbf{X}									
B28-4-140918	1107	4	l	$\mathbf{\Sigma}$	$\mathbf{\Sigma}$									
B28-10-140918	1109	10	1	\sum	\geq									
<u>B29-4-140918</u>	1110	4	ļ	\sum	$\left \right\rangle$									
1629-10-140918	1123	10		\sum	\sum		 							
1097-4-140918	1123	4	<u>ι</u>		$\left \right\rangle$									
(0,0) = 10 = 140.11	1127		$\frac{1}{1}$	$\left \right\rangle$					┼──┼				<u> </u>	
SB31-10-140910	1129			$\left \right\rangle$	$\overline{\left\langle \cdot \right\rangle}$		+				+			
											<u> </u>			
iotal 200.7 / 6010 200.8 / 6020:	8HCHA 13PF	M Texas 11		Sb As	s Ba E	e B Cd Bo Cd (Ca Cr		e Pb N	/lg Mn N ⊪Sc A≕	10 Nił	CSe Ag S	SiO2 Na Sr	TISnUVZn
				307	AS Da					ii se Ay			1031/24	5.1 / 7470 / 7471 : Ho
ice: Signature of this document and relinquishment of samples an ervice. Xenco will be liable only for the cost of samples an	lles constitutes a valid I shall not assume any	purchase order f responsibility for	rom clie r any los	nt comp sses or	pany to X expenses	nco, its affil incurred by	iates and the client	l subcontracto t if such losse:	ors. It assi s are due f	gns standar o circumsta	d terms a inces beyo	nd conditions and the control	4	
enco. A minimum charge of \$75.00 will be applied to each	project and a charge of	f \$5 for each sam	ple subr	nitted to	o Xenco,	ut not analy	zed. Thes	se terms will b	e enforce	l unless pre	viously ne	gotiated.		
Relinquished by: (Signature) Re	ceived by: (Signa	ture)		Date	/Time	R	elinquis	shed by: (S	Signatur	э)	Receiv	/ed by: (Sig	gnature)	Date/Time

Page 59 of 60

.



XENCO Laboratories Prelogin/Nonconformance Report- Sample Log-In



 Client: GHD Services, INC- Midland
 Acceptable Temperature Range: 0 - 6 degC

 Date/ Time Received: 09/17/2018 01:19:00 PM
 Air and Metal samples Acceptable Range: Ambient

 Work Order #: 599287
 Temperature Measuring device used : R8

 Sample Receipt Checklist
 Comments

· · ·	
#1 *Temperature of cooler(s)?	2.1
#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)?	N/A
#18 Water VOC samples have zero headspace?	N/A

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

Analyst:

PH Device/Lot#:

Checklist completed by:

Katie Lowe

Checklist reviewed by:

Debbie Semmons

Debbie Simmons

Date: 09/19/2018

Date: 09/17/2018

Page 99 of 107

Appendix C 2019 Remediation Work Plan

GHD | Chevron Environmental Management Company - Soil Assessment Report | 11121241 (3)



March 20, 2019

Reference No. 11121241

New Mexico Oil Conservation Division – District 1 1625 N. French Drive Hobbs, New Mexico 88240

Dear NMOCD:

Re: 2019 Remediation Work Plan VGSAU Produced Water Release (RP-3688) Lea County, New Mexico

1. Project Information

The Site is located in Unit S, Section 1, Township 18 South, Range 34 East, approximately one-half mile south of the Chevron Buckeye Field Management Team office in Lea County, New Mexico. Chevron submitted an initial C-141 Form to the New Mexico Oil Conservation Division (NMOCD) dated June 22, 2015 describing a release of 153.55 barrels (bbls) of produced water with 30 bbls being recovered. A failure of a fiberglass water line was listed as the cause of the release.

2. NMOCD Closure Requirement Criteria for Soils

Historical subsurface investigation activities were completed in accordance with the Guidelines for Remediation of Leaks, Spills, and Releases Rule 19.15.29 New Mexico Administrative Code (NMAC) from the NMOCD dated August 13, 1993. The former site-specific Recommended Remediation Action Levels (RRALs) previously applied to this location by the NMOCD were 10 milligrams per kilogram (mg/kg) for benzene, 50 mg/kg for total BTEX, 100 mg/kg for total TPH, and 600 mg/kg for chloride.

Rule 19.15.29 was revised and reissued on August 14, 2018. The following criteria from Table 1 (below) within NMAC 19.15.29.12 was utilized to determine site-specific screening limits.

Minimum depth below any point within the horizontal boundary of the release to ground water less than 10,000 mg/I TDS	Constituent	Limit*
>100 feet	Chloride**	20,000 mg/kg
	TPH (GRO+DRO+MRO)	2,500 mg/kg
	GRO+DRO	1,000 mg/kg
	BTEX	50 mg/kg
	Benzene	10 mg/kg

* Numerical limits or natural background level, whichever is greater.

** This applies to release of produced water or other fluids which may contain chloride.





Localized depth to groundwater was confirmed to be approximately 130 feet below ground surface (bgs) in 2018 based on the information from monitoring well MW-12 associated with the Buckeye Compressor Station facility and VGSAU 58 (AP-104) located approximately 0.80 miles northeast of VGSAU 148 (both sites monitored by GHD). Additionally, SB-16 was advanced at the Site in September 2018 to 101 feet bgs and groundwater was not encountered, confirming Site groundwater extends deeper than 100 feet bgs. Information also available from various sources including the New Mexico Office of the State Engineer (NMOSE) Point of Diversion (POD) mapping portal, Petroleum Recovery Research Center (PRRC) Mapping Portal, FEMA Flood Map Service, New Mexico OSE POD Locator, currently managed groundwater site(s) data by GHD, and the United States Geological Survey (USGS) Current Water Database for the Nation, concludes:

- a) the depth to groundwater at the Site is greater than 100-feet bgs;
- b) the site is not within 300 feet of any continuously flowing watercourse;
- c) the site is not within 200 feet of any lakebed, sinkhole or playa lake;
- d) the site is not within 300 feet of an occupied permanent residence, school, etc.;
- e) the site is not within 500 feet of a spring or private, domestic fresh water well;
- f) the site is not within 1,000 feet of any fresh water well or spring;
- g) the site is not within incorporated municipal boundaries or within a defined municipal fresh water well field;
- h) the site is not within 300 feet of a wetland;
- i) the site is not within an area overlying a subsurface mine;
- j) the site is not within an unstable area; and
- k) the site is not within a 100-year floodplain.

Consequently, the anticipated site-specific screening limits to be applied to this location by the NMOCD based on the revised Rule are <u>10 mg/kg for benzene</u>, <u>50 mg/kg for total BTEX</u>, <u>2</u>,<u>500 mg/kg for total TPH</u>, <u>and 20,000 mg/kg for chloride</u>.

Per 19.15.29.13, Restoration, Reclamation, and Re-vegetation, the impacted area must be remediated a minimum of 4-feet bgs with non-waste containing, uncontaminated, earthen material with chloride concentrations less than 600 mg/kg. Soil cover must consist of topsoil at a thickness comparable to background topsoil thicknesses, or one foot of suitable earthen material capable of establishing and maintaining vegetation at the site. Reclamation is considered complete when all disturbed areas have established vegetative cover with a life-form ratio of plus or minus 50 percent of pre-remedial levels, and plant cover of a minimum of 70 percent of previous levels, excluding noxious weeds.



Evaluation of the analytical data obtained from soil assessment and delineation activities performed from 2016 through 2018 indicate horizontal and vertical delineation of chloride impacts has been achieved at the Site to support remediation activities (excavation and lining of the area).

3. 2019 Scope of Work

The scope of work for this project in 2019 will involve soil remediation activities inclusive of excavation, sampling, lining the excavation, backfilling, and restoration (re-seeding of off-pad areas) of the impacted area (see Figure 1).

Chloride impacted soil will be excavated accompanied by confirmation soil sample analysis. Field screening of soils for chloride will be performed in order to guide excavation activities. Subsequently, the excavation will be lined, backfilled with clean caliche material and soil, graded and contoured to ensure proper surface area drainage, and the soil (off-pad areas) fertilized and re-seeded. The following outlines basic project details that will be completed by GHD and GHD subcontractors.

Field Program

- Prior to mobilizing excavation equipment to the Site, a New Mexico 811 utility notification will be made at least 48-hours prior to mobilization.
- In addition to the utility locate, data from the geophysical survey conducted prior to 2018 drilling activities will be re-evaluated for the proposed excavation area.
- Following all utility clearance activities, a Chevron Dig Plan will be prepared and approved by Chevron prior to performing any excavation activities.
- Underground utilities in proximity to the proposed excavation area will be day-lighted via hydroexcavation prior to remedial excavation activities.
- GHD anticipates that pipeline operators will not allow excavation within 10 feet of any pipelines, therefore remediation within these areas will be deferred until operations of the pipelines cease.
- Approximately 8,200 cubic yards (cy) of shallow sub-surface soil areas will be excavated (Figure 1). Impacted soil in the affected area will be excavated until field screening indicates that the soil is below the limit for chloride (600 mg/kg) specified in NMMAC 19.15.29.13 D (1), or until a depth of 4 feet bgs is reached.
- Soils will be field screened for chloride during excavation activities utilizing Hach chloride test strips. Soils with field test results greater than 3,000 mg/kg chloride with be transported to an approved disposal facility. If field screening indicates that soils are below 3,000 mg/kg chloride, it will be segregated into 50-100 cy stockpiles and a 5-point composite sample will be collected and analyzed for chloride by EPA Method 300. Soils with analytical results above 600 mg/kg will be transported to the R360 facility located in Hobbs, New Mexico for disposal. Stockpiled soils with analytical results below 600 mg/kg will be further consolidated on-site for use as backfill.



- Five-point composite confirmation soil samples will be collected from the excavation floor and sidewalls at 200 square feet intervals for analysis of chloride by EPA Method 300. Lateral limits of the excavation will halt once confirmation sample analytical results are 600 mg/kg chloride or less.
- If impacts appear to extend past four feet bgs, the sides of the excavation will be sloped and a 20-mil polyethylene liner will be placed in the bottom of the excavation. Liner seams will be overlapped a minimum of 24 inches. Each liner will be placed without rips or tears.
- The excavation will be backfilled with caliche and soil to grade.
- The disturbed areas will be fertilized and re-seeded with a Bureau of Land Management-approved seed mix.

Quality Assurance/ Quality Control

Confirmation soil sampling will be completed in accordance with our standard Quality Assurance/ Quality Control procedures designed to minimize cross-contamination between samples and to provide reliable laboratory results.

Reporting

A report summarizing remediation activities will be submitted. The report will include a Site description, project history, description of field events, a discussion of results, and recommendations (if any).

The report will include:

- A scaled Site plan showing the locations of the excavation and other Site features;
- Tabulation of field screening and laboratory analytical results; and
- Geotagged photographic documentation of field activities.

Vegetation Monitoring

Following completion of soil remediation activities at the Site, and as required by the New Mexico State Land Office (NMSLO), GHD will conduct vegetation monitoring visits to the Site. The status of vegetative growth within the remediated area will be documented with photographs and in field notes during each visit. A closure request report will be completed following one year of monitoring for submittal to NMSLO.

4. Work Plan Approval Request

GHD is prepared to initiate the scope of work following NMOCD approval of this work plan. If you have any questions or comments with regards to this work plan, please do not hesitate to contact our Houston office at (713) 734-3090. Your timely response to this correspondence is appreciated.



Sincerely,

GHD

parige A. Acel

Project Manager

PH/mss/1

Encl.

Attachment:

Figure 1 – Proposed Excavation Boundary Map

.

•





CEMC GHD

LEA COUNTY, NEW MEXICO VGSAU 148 PRODUCED WATER RELEASE ASSESSMENT

PROPOSED EXCAVATION BOUNDARIES

CAD File: I:\CAD\Files\Eight Digit Job Numbers\1112----\11121241-CEMC-Buckeye_VGSAU 148\Proposed\11121241-00(Proposed-02)GN-DL001.dwg

Dec 17, 2018

FIGURE 1



about GHD

GHD is one of the world's leading professional services companies operating in the global markets of water, energy and resources, environment, property and buildings, and transportation. We provide engineering, environmental, and construction services to private and public sector clients.

Paige Hall Paige.Hall@ghd.com 713.734.3090

Raaj Patel Raaj.Patel@ghd.com 713.734.3090

www.ghd.com