

Robert Speer Portfolio Manager, Upstream Business Unit Remediation Team Chevron Environmental Management Company 1400 Smith St. 07049 Houston, TX 77002 Tel (731) 372-6117 Cell (713) 301-7274 rspeer@chevron.com

October 1, 2015

Kellie Jones Environmental Specialist, District 1 New Mexico Oil Conservation Division 811 South First St. Artesia, NM 88210

RECEIVED

APPROVED Conditional By Kellie Jones at 2:13 pm, Oct 27, 2015

 Sample SS-2, needs to be further delineated. In additional a work plan for addressing this point will need to be provided.
 Ensure State Land Office approval/concurrence.

Re: Abo Reef Gathering System Soil Assessment and Delineation Activities Report

Dear Ms. Jones:

Please find enclosed for your files copies of the following report for the Abo Reef Gathering System Trunkline release project site.

By Kellie Jones at 2:13 pm, Oct 27, 2015

 Abo Reef Gathering System – 2015 Soil Assessment and Delineation Activities Report, Unit J – Section 6 – Township 18 South – Range 35 East, Lea County, NM

This report was prepared by Conestoga-Rovers & Associates (CRA) on behalf of Chevron Environmental Management Company (CEMC) to document assessment activities for a release of 1.565 bbls of oil and 34.696 bbls of produced water as documented in our January 2011 submittal of form C-141. Soil sampling in the release area indicate that vertical and horizontal delineation of BTEX, TPH, and Chlorides have been achieved at the site, and that no further assessment or remediation activities are warranted for this project.

Should you have any questions regarding the content of this report, please do not hesitate to contact me. I look forward to working with you in the future.

Sincerely,

Rob Speer Environmental Project Manager

State of New Mexico Energy Minerals and Natural Resources

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

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

Release Notification and Corrective Action

	OPERATOR	Initial Report	Final Report
Name of Company: Chevron (CEMC)	Contact: Rob Speer		
Address: 1400 Smith Street, Houston, Texas 77002	Telephone No. (713) 372-6117		
Facility Name: NM State AB TN9 – Abo Reef Gathering	Facility Type: Oil Well		
System			

Surface Owner: State of New Mexico Mineral Owner: State of New Mexico API No.

LOCATION OF RELEASE

					LIGHT OF HEL			
Unit Letter	Section	Township	Range	Feet from the	North/South Line	Feet from the	East/West Line	County
J	6	185	35 Ē	1				Lea

Latitude: <u>32.772021°</u> Longitude: <u>-103.493259°</u>

Type of Release: Spill to Land Volume of Release: 1.565 bbs oil Volume Recovered: Unknown Amount and 34.696 bbls water Source of Release: Gas Gathering Trunkline Date and Hour of Occurrence: Date and Hour of Discovery: 7/3/11 and 12:00 PM 1/3/11 and 12:00 PM Was Immediate Notice Given? Not indicated on initial C-141 Form If YES, To Whom? Not indicated on initial C-141 Form Yes No Not Required By Whom? Not indicated on initial C-141 Form Date and Hour: Not indicated on initial C-141 Form Was a Watercourse Reached? If YES, Volume Impacting the Watercourse. 🗌 Yes 🖾 No If a Watercourse was Impacted, Describe Fully.* Describe Cause of Problem and Remedial Action Taken.* Fluids were released through a damaged (result of grass fire) gas gathering line as a result of leaking wellhead check valve. Describe Area Affected and Cleanup Action Taken.* Isolation valves were closed and locked. The damaged gas gathering line was disconnected and access was capped off. Free standing fluid was recovered.

Initial remedial excavation and sampling activities commenced. Results of soil sampling indicated the presence of chloride and TPH concentrations in shallow soils. In response, a comprehensive soil assessment was performed to confirm the extents of the soil impacts.

Results of the additional assessment activities are provided in the attached report.

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

	OIL CONSEI	RVATION DIV	ISION
Signature: Corto pree			
Printed Name: Rob Speer	Approved by Environmental Specia	alist:	
Title: Project Manager	Approval Date:	Expiration Date:	
E-mail Address: rspeer@chevron .com	Conditions of Approval:	Atta	ached
Date: 9-30-15 Phone: (713) 372-6117			

* Attach Additional Sheets If Necessary

NATURE OF RELEASE





Soil Assessment and Delineation Activities Report

Abo Reef Gathering System (AB TN-9) Trunkline Release Unit J, Section 6, Township 18 South, Range 35 East Lovington, New Mexico

Chevron Environmental Management Company

1755 Wittington Place, Suite 500 Dallas Texas 75234 074638 | Report No 3 | September 25, 2015



Soil Assessment and Delineation Activities Report

Abo Reef Gathering System (AB TN-9) Trunkline Release Unit J, Section 6, Township 18 South, Range 35 East Lovington, New Mexico

Chevron Environmental Management Company

Thomas C. Larson Principal, Midland Operations Manager

Jake L. Ferenz Project Manager

1755 Wittington Place Suite 500 Dallas Texas USA 074638 | Report No 3 |September 25, 2015

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1. Introduction

GHD is pleased to present this Soil Assessment and Delineation Activities Report to Chevron Environmental Management Company (CEMC) for the Abo Reef Gathering System (AB TN-9) trunkline release location (hereafter referred to as the "Site").

2. Project Information and Background

The Site is located in Unit J, Section 6, Township 18 South, Range 35 East, approximately 2.91miles southeast of Buckeye, New Mexico, in eastern Lea County (Figure 1 and Figure 2).

Chevron submitted an initial C-141 form (Appendix A) to the New Mexico Oil Conservation Division (NMOCD) dated January 7, 2011, describing a release of 1.565 barrels (bbls) of oil and 34.696 bbls of water with zero (0) volume being recovered. The source of the release was recorded to have been a gas gathering trunkline and the release was described as follows:

"The source of the leak is a gas gathering line that was supposed to be out of service. It was damaged during the grass fire last year. It appears . . . the check valve on gathering system leaked allowing gas to vent out of the pipe where it had been burned. . . . I suspect the oil came from a leaking wellhead check valve at the well."

Crain Environmental (Crain) conducted the initial field assessment activities at the Site in January 2011. Crain's assessment included a site visit, soil sample collection, analytical laboratory analyses and preliminary determinations of impacts to environmental media. GHD met with Ms. Crain on April 21, 2011 to review and transfer the file material for the Site as well as to discuss the history of delineation efforts to date for the Site.

The Site contains an excavation that is configured in a generally rectangular fashion and dimensioned approximately 50-feet by 100-feet. The long axis of the excavation is oriented approximately north-south, with an underground pipeline in proximity to its western border. A spoil pile was positioned north of the excavated pit at the time of Crain's initial Site visit. This excavation is apparently associated with remediation efforts for a prior release at the Site that occurred at an unknown time. Information regarding the nature and extent of that potential prior release are also unknown. Based on the dimensions of the excavation, approximately 1,000 yd³ of soils were removed from the excavation. The actual volume and final disposition of the excavated soils are unknown.

In 2014, Chevron contracted GHD to perform a comprehensive soil assessment at the Site by implementing a soil boring program. On March 14, 2014, GHD mobilized to the Site to perform a field visit – marking proposed boring locations and one-call parameters. On March 17, 2014, GHD advanced four soil borings to approximately 50-feet below ground surface (bgs), each. In addition, GHD collected a number of soil grab samples from the surface and sidewalls of the existing excavation. Results of the 2014 soil boring and sampling program indicated total petroleum hydrocarbons (TPH) and chlorides in the shallow subsurface.

In May 2014, GHD prepared and submitted a soil assessment and delineation activities report to CEMC detailing recommendations to further investigate and determine the vertical extent of TPH and chloride impacts at the Site. CEMC concurred with the recommendations outlined in GHD's

2014 report, thus GHD returned to the Site in 2015 to execute the planned field activities. The results of those activities are provided herein.

3. Recommended Remediation Action Limits

Information available on the Petroleum Recovery Research Center (PRRC) Mapping Portal and the United States Geological Survey (USGS) Current Water Database for the Nation; the depth to groundwater at the Site is greater than 100-feet bgs; the nearest private domestic water source is greater than 200-feet from the release site; the nearest public/municipal water source is greater than 1,000-feet from the release site; and the release site lies more than 1,000 horizontal feet from the nearest surface water body. Consequently, the NMOCD total ranking criteria score is zero (0) for the Site. The anticipated site-specific Recommended Remediation Action Levels (RRALs) to be applied to this location by the NMOCD are 10 milligram per kilogram (mg/kg) for benzene; 50 mg/kg for total benzene, toluene, ethylbenzene, and xylenes (BTEX); 5,000 mg/kg for TPH; and an NMOCD accepted 500 mg/kg for chlorides.

4. Drilling and Sampling - 2014

On March 11, 2014, GHD's contracted service provider, Harrison & Cooper, Inc. (HCI) of Lubbock, Texas submitted an initial New Mexico One Call utility locate ticket (2014110881). GHD submitted a MCBU Chevron Dig Plan with appropriate attachments for approval to the Chevron Buckeye Field Management Team. On March 17, 2014 GHD and HCI mobilized to the Site to begin soil boring activities. The soil borings were pre-cleared via air knife techniques to a depth of 5-feet bgs or until refusal. The remainder of each boring was advanced using an air rotary drill rig. Four soil borings were advanced on the north, south, east and west sides of the existing excavation. Soil borings were advanced to total depths of 50-feet bgs based on field screening for chlorides. Chloride concentrations in soil were field screened by mixing soil samples with distilled water. The rinsate was then screened using Hach chloride test strips. Soil borings were logged in accordance with the Unified Soil Classification System and recorded.

Soil samples were collected for laboratory analysis from each boring (SB-1, SB-2, SB-3 and SB-4) at varying intervals beginning at the surface (0-feet bgs). Four grab soil samples (SS-1, SS-2, SS-3 and SS-4) were collected from the floor of the existing excavation, and four sidewall samples (SW-1, SW-2, SW-3, and SW-4) were collected at 2.5-feet bgs from within the existing excavation. 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 Odessa, Texas for analysis of BTEX by EPA Method 8021B; TPH gasoline range organics (GRO) plus TPH diesel range organics (DRO) by EPA Method 8015B Modified and for chloride analysis by EPA Method E300.0.

4.1 Soil Sampling Analytical Results - 2014

The soil type observed in soil samples collected during the 2014 drilling program consisted of light gray, dense caliche from the surface to approximately 20-feet bgs. Yellow to orange, very fine grain sandstone with broken caliche was observed from approximately 20-feet to total depth (50-feet). Moisture content observed in the soil samples was dry in all instances.

All soil samples collected from the Site in 2014 for laboratory analysis were below laboratory reporting limits and below RRALs for BTEX. In addition, soil samples (SB-1, SB-2, SB-3, and SB-4) collected from soil borings advanced by drill rig delineating the horizontal and vertical extent (outside) of the excavation was analyzed for TPH and chlorides. All soil samples collected outside of the excavation were below site RRALs, indicating that there does not appear to be any impacts beyond the footprint of the excavation.

Soil grab samples collected from the floor of the existing excavation (surface) for laboratory analysis were above RRALs for TPH at 688 mg/kg for SS-1 and 979 mg/kg for SS-4. The remaining (SS-2 and SS-3) soil samples indicate concentrations below the RRALs for TPH. Soil sample SS-2 indicates chloride concentrations above the RRALs at 8,100 mg/kg, with the remaining soil samples (SS-1, SS-3 and SS-4) indicating concentrations below the RRALs for chloride.

Soil samples collected from the sidewalls of the existing excavation (2.5-feet bgs) for laboratory analysis were above RRALs for TPH at 1,780 mg/kg for SW-3 and 1,160 mg/kg for SW-4. Side wall samples SW-3 and SW-4 also indicated concentrations above RRALs for chloride at 816 mg/kg and 977 mg/kg, respectively. All remaining side wall samples collected (SW-1 and SW-2) indicated concentrations below RRALs for both TPH and chloride. Soil laboratory analytical results from GHD's 2014 activities and Crain's 2011 assessment are summarized in Table 1, and on Figure 3.

5. Drilling and Sampling - 2015

On June 12, 2015, GHD and its contracted service provider, Lobo's of Odessa, Texas mobilized to the Site to construct a dirt ramp consisting of on-site soil materials for drill rig access. Lobo's utilized heavy machinery to dig, construct, and shape an extended dirt ramp into the existing excavation.

On August 11, 2015, HCI of Lubbock, Texas submitted an initial New Mexico One Call utility locate ticket (2015331611). GHD submitted a MCBU Chevron Dig Plan with appropriate attachments for approval to the Chevron Buckeye Field Management Team. On August 19, 2015 GHD and HCI mobilized to the Site to begin soil boring activities. The soil borings were pre-cleared via air knife techniques to a depth of 5-feet bgs or until refusal. The remainder of each boring was advanced using an air rotary drill rig. Two soil borings were advanced to approximately 50-feet bgs, each; from within the existing excavation. A photo log documenting the 2014 and 2015 drilling activities is included as Appendix B. Soil borings were logged in accordance with the Unified Soil Classification System and recorded. Visual representation of the 2014 and 2015 boring logs can be found in Appendix C.

Soil samples were collected for laboratory analysis from each boring (SB-1 and SB-2) at varying intervals beginning at the surface (0-feet bgs). Soil samples were packed into laboratory prepared jars and stored in a cooler with ice. The soil samples were sent to Xenco in Odessa, Texas for analysis of TPH gasoline range organics (GRO) plus TPH diesel range organics (DRO) by EPA Method 8015B Modified and for chloride analysis by EPA Method 300/300.1. The soil laboratory analytical reports for 2014 and 2015 are included as Appendix D.

5.1 Soil Sampling Analytical Results - 2015

The soil type observed in soil samples collected during the 2015 drilling program consisted of light gray, dense caliche interbedded with poor to moderately cemented very fine grain sandstone from the surface to approximately 18-feet bgs. Yellow to orange, sand with broken caliche was observed

from approximately 20-feet to total depth (50-feet). Moisture content observed in the soil samples was dry in all instances.

All sixteen (16) soil samples collected from the Site in 2015 for laboratory analysis were below laboratory reporting limits with the exception of SB-1 (0-feet bgs) at 85.4 mg/L, TPH. All sixteen (16) soil samples collected from the Site in 2015 for laboratory analysis were well below the Site RRALs for TPH and chlorides. A soil analytical summary of the 2015 results is presented in Table 2. A Site Details and Analytical Results Map (2014 - 2015) is presented as Figure 3.

6. Conclusions

A thorough subsurface investigation was implemented at the Site. Evaluation of the analytical data obtained from soil assessment and delineation activities performed in July of 2014 and August of 2015 indicates that vertical and horizontal delineation of BTEX, TPH, and chloride impacts have been achieved at the Site. Based on data provided in this report, no further delineation or remedial efforts are warranted.

Figures





Sep 14, 2015

FIGURE 1

SITE LOCATION MAP

CAD File: I:\CAD\Files\07----\074638-CEMC-Abo Reef Gathering System\074638-00\074638-00(003)\074638-00(003)GN-DL001.dwg

New Mexico East (US Feet)





CHEVRON ENVIRONMENTAL MANAGEMENT COMPANY LEA COUNTY, NEW MEXICO ABO REEF GATHERING SYSTEM (AB TN9)

074638-00 Sep 14, 2015

FIGURE 2

SITE AERIAL MAP

CAD File: I:\CAD\Files\07----\074638-CEMC-Abo Reef Gathering System\074638-00\074638-00(003)\074638-00(003)GN-DL001.dwg



Source: UDSA FSA Imagery, May 10, 2014



GHD

CHEVRON ENVIRONMENTAL MANAGEMENT COMPANY LEA COUNTY, NEW MEXICO ABO REEF GATHERING SYSTEM (AB TN9)

SITE DETAILS AND ANALYTICAL RESULTS MAP

CAD File: I:\CAD\Files\07----\074638-CEMC-Abo Reef Gathering System\074638-00\074638-00(003)\074638-00(003)\074638-00(003)GN-DL001.dwg

FIGURE 3

Lat/Long: 32.7719° North, 103.4933° West 074638-00 Sep 15, 2015

	Underground Pipeline	
epth	Depth of Sample (ft)	
ΡH	Total Petroleum Hydrocarbons Concentration (mg/kg)	
RO	TPH as Diesel Range Organics	
GRO	TPH as Gasoline Range Organics	
IS	Indicates Not Sampled	
	the second of the second second	

LEGEND Soil Boring Location - 2014 Soil Boring Location - 2015 Soil Sample Location Sidewall Sample Location Approximate Area of Existing Excavation D G

	「ころういいない」である	のであっていたいのかの			-	State of the state
5 20' <27.1 9.07	30' <23.8 5.55	40' 18.4 18.0	50 [°] <16.4 20.4		*	
				24		

Tables

Table 1

Soil Analytical Summary - 2014 ABO Reef Gathering System (AB TN9) Lea County, New Mexico

Sample	Depth				Ethyl-		Total	ТРН	(SW 8015	Modified)	
ID	(bgs)	Sample Date	Benzene	Toluene	Benzene	Xylenes	BTEX	GRO	DRO	(GRO+DRO)	Chlorides
NMOCD Reco			10				50			5,000	500
A	ction Level	IS	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)
SB-1	0'	3/17/14	< 0.00169	<0.00169	<0.00169	<0.00169	<0.00169	<25.4	<25.4	<25.4	18.1
SB-1	15'	3/17/14	< 0.00104	< 0.00104	< 0.00104	< 0.00104	< 0.00104	<25.4	<25.4	<25.4	2.90
SB-1	30'	3/17/14									4.44
SB-1	50'	3/17/14									3.82
SB-2	0'	3/17/14	<0.00151	<0.00151	<0.00151	<0.00151	<0.00151	<22.7	<22.7	<22.7	18.2
SB-2	15'	3/17/14	<0.00110	<0.00110	<0.00110	<0.00110	<0.00110	<22.7	<22.7	<22.7	6.39
SB-2	30'	3/17/14									8.07
SB-2	50'	3/17/14									15.5
SB-3	0'	3/17/14	<0.00155	<0.00155	<0.00155	<0.00155	<0.00155	<23.4	136	136	12.6
SB-3	15'	3/17/14	< 0.00126	<0.00126	< 0.00126	<0.00126	< 0.00126	<18.9	<18.9	<18.9	5.32
SB-3	30'	3/17/14									7.20
SB-3	50'	3/17/14									3.00
SB-4	0'	3/17/14	<0.00101	<0.00101	<0.00101	<0.00101	<0.00101	<15.2	23.8	23.8	6.70
SB-4	15'	3/17/14	< 0.00102	< 0.00102	< 0.00102	< 0.00102	< 0.00102	<15.3	<15.3	<15.3	2.33
SB-4	30'	3/17/14									3.04
SB-4	50'	3/17/14									2.39
SS-1 (Crain)	Surface	1/18/11						31.2	696	727.20	160
SS-1	Surface	3/17/14	< 0.00107	< 0.00107	< 0.00107	< 0.00107	<0.00107	<16.0	633	688	10.5
SS-2 (Crain)	Surface	1/18/11						<10.0	17.00	17.00	8200
SS-2	Surface	3/17/14	< 0.00112	< 0.00112	< 0.00112	< 0.00112	< 0.00112	<16.8	33.9	33.9	8100
SS-3 (Crain)	Surface	1/18/11						<10.0	30.3	30.3	160
SS-3	Surface	3/17/14	<0.00108	<0.00108	<0.00108	<0.00108	< 0.00108	<16.3	262	287	61.9
SS-4	Surface	3/17/14	<0.00108	<0.00108	<0.00108	<0.00108	<0.00108	<16.2	908	979	8.55
SW-1	2.5'	3/17/14	< 0.00103	< 0.00103	< 0.00103	< 0.00103	< 0.00103	<15.6	<15.6	<15.6	284
SW-2	2.5'	3/17/14	< 0.00103	< 0.00103	< 0.00103	< 0.00103	< 0.00103	<15.6	<15.6	<15.6	54.3
SW-3	2.5'	3/17/14	<0.00115	<0.00115	<0.00115	<0.00115	<0.00115	56.0	1610	1780	816
SW-4	2.5'	3/17/14	< 0.00104	<0.00104	<0.00104	<0.00104	< 0.00104	<15.6	983	1160	977

Notes:

1. All analytical results reported in (mg/kg) milligrams per kilogram

2. Chloride analyses by Method EPA 300/300.1

3. BTEX analysis by Method EPA 8021 B

4. TPH analysis by Method SW 8015 Modified

5. Highlighted cells indicate concentrations exceeding guidance RRALs

6. bgs - below ground surface

7. '--' indicates sample was not analyzed

8. < indicates below laboratory Reporting Limit (RL)

9. (SB) indicates Soil Borings; (SS) indicates Soil Sample; (SW) indicates Side Wall

Table 2

Soil Analytical Summary - 2015 ABO Reef Gathering System (AB TN9) Lea County, New Mexico

Sampla	Donth		TPH	(SW 8015 I	Modified)	
Sample ID	Depth (bgs)	Sample Date	GRO	DRO	(GRO+DRO)	Chlorides
NMOCD Reco	mmended	Remediation			5,000	500
Α	ction Leve	ls	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)
SB-1	0'	8/19/15	<17.4	85.4	85.4	60.9
SB-1	5'	8/19/15	<18.1	<18.1	<18.1	8.81
SB-1	10'	8/19/15	<19.2	<19.2	<19.2	5.31
SB-1	15'	8/19/15	<16.8	<16.8	<16.8	6.05
SB-1	20'	8/19/15	<27.1	<27.1	<27.1	9.07
SB-1	30'	8/19/15	<23.8	<23.8	<23.8	5.55
SB-1	40'	8/19/15	18.4	<16.8	18.4	18.0
SB-1	50'	8/19/15	<16.4	<16.4	<16.4	20.4
SB-2	0'	8/19/15	<22.0	<22.0	<22.0	24.7
SB-2	5'	8/19/15	<15.3	<15.3	<15.3	20.4
SB-2	10'	8/19/15	<15.7	<15.7	<15.7	15.9
SB-2	15'	8/19/15	<20.5	<20.5	<20.5	16.7
SB-2	20'	8/19/15	<17.1	<17.1	<17.1	27.4
SB-2	30'	8/19/15	<16.5	<16.5	<16.5	6.87
SB-2	40'	8/19/15	<16.8	<16.8	<16.8	7.89
SB-2	50'	8/19/15	<16.8	<16.8	<16.8	10.6

Notes:

1. All analytical results reported in (mg/kg) milligrams per kilogram

2. Chloride analyses by Method EPA 300/300.1

3. TPH analysis by Method SW 8015B Modified

4. bgs - below ground surface

5. < indicates below laboratory Reporting Limit (RL)

6. (SB) indicates Soil Borings

Appendix A Original Form C-141

State of New Mexico Energy Minerals and Natural Resources

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

Submit 2 Copies to appropriate District Office in accordance with Rule 116 on back side of form

lama af C			OPERA	TOR		Initial Repor Contact Jo		port		
		nevron USA						14 V 2'	12	
Address 56	5 Texas Ca	mp Rd. Lovi	ngton, N	.M. 88260			to. 575-396-44 e Oil Well	14 A Z	52	
acility Nat	me: NM	State AB TN	9 - AUO I				e on tren		1 .	NT
Surface Ow	vner NM			Mineral	Owner	NM			Lease	N0.
				LO	CATI	ON OF RI	ELEASE			-
Jnit Letter	Section	Township	Range	Feet from the	South	Line	Feet from the	East L	ine	County
										Lea
			1	Latitude: 32	2.46.459 N) / Longitud	e: -103.29.588 F RELEAS	E		API #
ype of Rele	ease Snill				142	Volume of			Volume	Recovered
ype of Ker	case spin					and an arriver of the second	ls oil; 34.696 Bbl	S	0	
						water				
ource of Re	elease Ga	s Gathering T	runkline S	spill		 A constraint of the state of th	lour of Occurren	ce		d Hour of Discovery
						1-3-11 12: If YES, To			1-5-11 1	2:00 p.m.
as Immed	iate Notice	Given?	'es 🗌 N	lo 🗌 Not Req	uired	11 11.0, 10	, ,, ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,			
y Whom?						Date and I				
	rcourse Rea	iched?	1 +	7.53		If YES, V	olume Impacting	the Wat	ercourse.	
] Yes 🛛							
Describe Ca	use of Prob	lem and Rem	edial Actio	thering line that we	ae eunnace	ed to be out of s	ervice. It was dama	aged durin	ng the grass	fire last year. It appears the old
Describe Ca Per Tejay Sir athering syst omewhat exp nspected. Th athering syst	nuse of Prob mpson, the so tem casing va pected to hav be valves at th tm can be rea	lem and Remo ource of the leak alve got opened e water conden- ne wells that pro netivated	edial Actic is a gas ga at AB-9 an se and come vide access	on Taken.* thering line that wa d the check valve of e out of the gas. I so to the gas gatherin	as suppose on gatherin	ed to be out of s ng system leake	ervice. It was dama d allowing gas to v a leaking wellhead	check val	ve at the w	fire last year. It appears the old here it had been burned. It woul- rell. Not leaking at the time Carlo line section is now isolated and
Describe Ca Per Tejay Sir gathering syst comewhat exp nspected. Th gathering syst Describe Ar	ause of Prob mpson, the so tem casing va pected to hav te valves at th tm can be rea rea Affected	lem and Remo ource of the leak alve got opened re water condens te wells that pro activated and Cleanup ed and locked.	edial Actic is a gas ga at AB-9 an se and como vide access Action Ta	on Taken.* thering line that wa d the check valve of c out of the gas. I st to the gas gatherin ken.	as suppose on gatherin uspect the og should l nat was da	ed to be out of s ng system leake oil came from have been close	ervice. It was dama d allowing gas to v a leaking wellhead d and operations lo connected and acce	check va cks instal	off. Free s	tanding fluid was recovered.
Describe Ca Per Tejay Sin athering syst omewhat exp spected. Th athering syst Describe Ar solation valv hereby cer egulations sublic healt sould their or the envir	nuse of Prob mpson, the so tem casing va pected to hav the valves at the tim can be rea rea Affected ves were close rtify that the all operator th or the envy r operations comment. In	elem and Remo burce of the leak alve got opened e water conden- ne wells that pro inctivated and Cleanup ed and locked. The information g is are required vironment. The have failed to addition, NM	edial Actic is a gas ga at AB-9 an se and como vide access Action Ta The gatherir given abov to report a e acceptar adequatel OCD acce	on Taken.* thering line that wa d the check valve of c out of the gas. I st to the gas gatherin ken. ng system branch the re is true and con and/or file certain nee of a C-141 re	as suppose on gatherin uspect the ing should l nat was da aplete to on release port by the	ed to be out of s ng system leake oil came from have been close maged was disc the best of my notifications a he NMOCD r	ervice. It was dama d allowing gas to v a leaking wellhead d and operations lo connected and acce y knowledge and and perform corro narked as "Final tion that pose a th ve the operator o	ss capped understa ective ac Report" f respons	off. Free s off. Free s and that pu tions for r does not r ground wa sibility for	tanding fluid was recovered. insuant to NMOCD rules and eleases which may endanger elieve the operator of liability ter, surface water, human hea- compliance with any other
Describe Ca Per Tejay Sin gathering syst comewhat exp nspected. Th gathering syst Describe Ar solation valv I hereby cer regulations public healt should their or the envir	nuse of Prob mpson, the so tem casing va pected to hav the valves at the tim can be rea rea Affected ves were close rtify that the all operator th or the envy r operations comment. In	elem and Remo burce of the leak alve got opened re water condens te wells that pro activated and Cleanup ed and locked. The information g res are required vironment. Th	edial Actic is a gas ga at AB-9 an se and como vide access Action Ta The gatherir given abov to report a e acceptar adequatel OCD acce	on Taken.* thering line that wa d the check valve of c out of the gas. I st to the gas gatherin ken. ng system branch the re is true and con and/or file certain nee of a C-141 re	as suppose on gatherin uspect the ing should l nat was da aplete to on release port by the	ed to be out of s ng system leake oil came from have been close maged was disc the best of my notifications a he NMOCD r	ervice. It was dama d allowing gas to v a leaking wellhead d and operations lo connected and acce y knowledge and and perform corro narked as "Final tion that pose a th ve the operator o	ss capped understa ective ac Report" f respons	off. Free s off. Free s and that pu tions for r does not r ground wa sibility for	tanding fluid was recovered. Insuant to NMOCD rules and eleases which may endanger elieve the operator of liability ter, surface water, human hea
Describe Ca Per Tejay Sin athering syst omewhat exp nspected. Th athering syst Describe Ar solation valv thereby cer regulations public healt should their or the enviro federal, stat	nuse of Prob mpson, the so tem casing va pected to hav the valves at the tim can be rea rea Affected ves were close rtify that the all operator th or the envy r operations comment. In	elem and Remo burce of the leak alve got opened e water conden- ne wells that pro inctivated and Cleanup ed and locked. The information g is are required vironment. The have failed to addition, NM	edial Actic is a gas ga at AB-9 an se and como vide access Action Ta The gatherir given abov to report a e acceptar adequatel OCD acce	on Taken.* thering line that wa d the check valve of c out of the gas. I st to the gas gatherin ken. ng system branch the re is true and con and/or file certain nee of a C-141 re	as suppose on gatherin uspect the ing should l nat was da aplete to on release port by the	ed to be out of s ng system leake oil came from have been close maged was disc the best of my notifications a he NMOCD r ate contaminal does not relie	ervice. It was dama d allowing gas to v a leaking wellhead d and operations lo connected and acce y knowledge and and perform corro narked as "Final tion that pose a th ve the operator o	en out of check val cks instal ss capped understa ective ac Report" meat to g f respons	off. Free s off. Free s and that pu tions for r does not r ground wa sibility for	tanding fluid was recovered. insuant to NMOCD rules and eleases which may endanger elieve the operator of liability ter, surface water, human hea- compliance with any other
Describe Ca Per Tejay Sii athering syst omewhat exp nspected. Th athering syst Describe Ar solation valv hereby cer egulations public healt should their or the envir- federal, stat	nuse of Prob mpson, the so tem casing va pected to hav the valves at the tim can be rea rea Affected ves were close rtify that the all operator th or the envy r operations comment. In	elem and Remo burce of the leak alve got opened re water condens the wells that pro- netivated i and Cleanup ed and locked. The information g is are required vironment. The have failed to addition, NM aws and/or reg	edial Actic is a gas ga at AB-9 an se and como vide access Action Ta The gatherir given abov to report a e acceptar adequatel OCD acce	on Taken.* thering line that wa d the check valve of c out of the gas. I st to the gas gatherin ken. ng system branch the re is true and con and/or file certain nee of a C-141 re	as suppose on gatherin uspect the ing should l nat was da aplete to on release port by the	ed to be out of s ng system leake oil came from have been close maged was disc the best of my notifications a he NMOCD r ate contaminal does not relie	ervice. It was dama d allowing gas to v a leaking wellhead d and operations lo connected and acce y knowledge and and perform corre- narked as "Final tion that pose a th ve the operator o <u>OIL COP</u>	en out of check val cks instal ss capped understa ective ac Report" meat to g f respons	off. Free s off. Free s and that pu tions for r does not r ground wa sibility for	tanding fluid was recovered. insuant to NMOCD rules and eleases which may endanger elieve the operator of liability ter, surface water, human hea- compliance with any other
Describe Ca Per Tejay Sin athering syst omewhat exp nspected. Th athering syst Describe Ar solation valv hereby cer regulations public healt should their or the enviru federal, stat Signature: Printed Nar	ause of Prob mpson, the so tem casing va pected to hav te valves at the tm can be rea rea Affected ves were close tify that the all operator th or the env r operations onment. In te, or local li-	elem and Remo burce of the leak alve got opened re water condens the wells that pro- netivated i and Cleanup ed and locked. The information g is are required vironment. The have failed to addition, NM aws and/or reg	edial Actic is a gas ga at AB-9 an se and como vide access Action Ta The gatherir given abov to report a e acceptar adequatel OCD acce	on Taken.* thering line that wa d the check valve of c out of the gas. I st to the gas gatherin ken. ng system branch the re is true and con and/or file certain nee of a C-141 re	as suppose on gatherin uspect the ing should l nat was da aplete to on release port by the	ed to be out of s ng system leake oil came from have been close maged was disc the best of my notifications a he NMOCD r ate contaminal does not relie	ervice. It was dama d allowing gas to v a leaking wellhead d and operations lo connected and acce y knowledge and and perform corre- narked as "Final tion that pose a th ve the operator o <u>OIL CON</u> y District Superv	en out of check val cks instal ss capped understa ective ac Report" meat to g f respons	off. Free s off. Free s and that pu tions for r does not r ground wa sibility for	tanding fluid was recovered. Insuant to NMOCD rules and eleases which may endanger elieve the operator of liability ter, surface water, human hea- compliance with any other <u>N DIVISION</u>
Describe Ca Per Tejay Sin gathering syst comewhat exp nspected. Th gathering syst Describe Ar Isolation valv I hereby cer regulations public healt should their or the envir federal, stat Signature: Printed Nar	ause of Prob mpson, the so tem casing va pected to hav the valves at the transmission of the solution rea Affected ves were close rtify that the all operators the or the enver the or the enver conment. In the, or local li- me: Josie De ations : Safe	elem and Remo burce of the leak alve got opened re water conden- te wells that pro activated and Cleanup ed and locked. The information g rs are required vironment. The have failed to addition, NM aws and/or reg	edial Actic is a gas ga at AB-9 an se and como vide access Action Ta The gatherin given abov to report a e acceptar adequatel OCD acce gulations.	on Taken.* thering line that wa d the check valve of c out of the gas. I st to the gas gatherin ken. ng system branch the re is true and con and/or file certain nee of a C-141 re	as suppose on gatherin uspect the leg should l nat was da aplete to on release port by th I remedia 1 report	ed to be out of s ng system leake oil came from have been close amaged was dise the best of my notifications a he NMOCD r ate contaminal does not relie Approved by Approval D	ervice. It was dama d allowing gas to v a leaking wellhead d and operations lo connected and acce y knowledge and and perform corre- narked as "Final tion that pose a th ve the operator o <u>OIL CON</u> y District Superv	en out of check val cks instal ss capped understa ective ac Report" meat to g f respons	off. Free si off. Free si and that pu tions for r does not r ground wa sibility for	tanding fluid was recovered. Insuant to NMOCD rules and eleases which may endanger elieve the operator of liability ter, surface water, human hea- compliance with any other <u>N DIVISION</u>

Appendix B Photograph Log



Photo 1 – View of 2014 air knife activities facing south



Photo 2 - View of 2014 soil boring advancement facing west





Photo 3 - View of 2014 soil boring advancement facing north west



Photo 4 - View of 2014 boring backfill with bentonite pellets





Photo 3 - View of 2015 air knife activities from inside excavation facing north



Photo 4 - View of 2015 drill rig egress into excavation facing north





Photo 3 - View of 2015 soil boring advancement facing north west



Photo 4 - View of site at completion of field activities facing north



Appendix C Soil Boring Logs

						SOIL	BC		OG	;	
Project: Client:	Abo Reef Lea Coun CEMC					1	No.	SB-1			File No.:74638Date:3/17/2014Drilling Co.:Harrison & Cooper, Inc.Supervisor:Kenny CooperType Rig:Air/Mud RotaryLogged by:John Fergerson
	LABC	RATORY	TEST DAT	A		FIE	LD D	ΔΑΤΑ			BORING DATA
	Resu	ults Report	ed in mg/kg	1		Photo-	6		/el		
Benzene	Toluene	Ethyl- benzene	Xylenes	Total TPH (C6-C35)	Chlorides	Ionization Detection Reading (ppm)	Sampling	Depth (feet)	Water Level	Screen	Start Time: 11:25 Finish Time: 12:06
							\times	\bigcirc			Top Soil: Sandy Silt, grayish yellow, unconsolidated, dry
								- 5			Caliche: light grey, weathered, dense, interbedded with very fine grain sand, dry Sand: yellow/orange, very fine grain, unconsolidated, interbedded with well cemented very fine grain sandstone, with broken caliche in matrix, dry Sand: light yellow/orange, very fine grain, unconsolidated, interbedded with moderate-well cemented very fine grain sandstone, dry
	Sampling	Interval			Sc	Stratification is In bil Classification Ba	ferreo sed o	d And May Not	be E Ial P	Exact	t. Sdure Water First Noted Analyzed Sample
									$\mathbf{\mathbf{\hat{y}}}$		

						SOIL	BC	RING LO	C	;	
Project: Client:	Abo Reef Lea Coun CEMC	Gathering ity, New Me	System exico			1	No.	SB-1			File No.:74638Date:3/17/2014Drilling Co.:Harrison & Cooper, Inc.Supervisor:Kenny CooperType Rig:Air/Mud RotaryLogged by:John Fergerson
			TEST DAT			FIE	LD D	ΔΑΤΑ			BORING DATA
	Res	ults Report	ed in mg/kg			Photo-	b		<u>vel</u>		
Benzene	Toluene	Ethyl- benzene	Xylenes	Total TPH (C6-C35)	Chlorides	lonization Detection Reading (ppm)	Sampling	Depth (feet)	Water Level	Screer	
							X	- 45			Sand: light yellow/orange, very fine grain, unconsolidated, interbedded with moderate-well cemented very fine grain sandstone, dry
	Sampling	Interval			Sc	Stratification is Ini il Classification Ba	ferre sed	d And May Not	be E Ial P	Exact	act. cedure Water First Noted
									\mathbf{O}		

						SOIL	BC		00	3	
Project: Client:		Gathering ty, New Me				1	lo.	SB-2			File No.:74638Date:3/17/2014Drilling Co.:Harrison & Cooper, Inc.Supervisor:Kenny CooperType Rig:Air/Mud RotaryLogged by:John Fergerson
	LABC	DRATORY	TEST DAT	A		FIE	_D [DATA			BORING DATA
	Res	ults Report	ed in mg/kg	1		Photo-	0		/el		
Benzene	Toluene	Ethyl- benzene	Xylenes	Total TPH (C6-C35)	Chlorides	Ionization Detection Reading (ppm)	Sampling	Depth (feet)	Water Level	Screen	Start Time: 13:00 Finish Time: 13:29
-							X				Top Soil: Sandy Silt, grayish yellow, unconsolidated, dry
-											Silty Sandy Clay: dull orange, dry
								- 5			Caliche: light yellow orange, dense-weathered, dry
-								- 10			Caliche: light brown, gray, dense, dry
							$\mathbf{\nabla}$				Caliche: light gray, weathered-dense, interbedded with fine grain sand, dry
							X	- 15 - 20 - 25 - 30			Sand: yellow/orange, very fine grain, uncosolidated, interbedded with well cemented very fine grain sandstone, broken caliche in matrix, dry
- - - - -								- 35			interbedded with slight-moderate cemented very fine grain sandstone, dry
	Sampling	Interval			So	Stratification is Ini il Classification Ba	erre sed	40	be I Jal F	Exac Proce	dure Analyzed Sample
									$\mathbf{\hat{\mathbf{A}}}$		

						SOIL	BC	RING L	C	;	
Project: Client:	Abo Reef Lea Coun CEMC	Gathering ty, New Me	System exico			1	No.	SB-2			File No.:74638Date:3/17/2014Drilling Co.:Harrison & Cooper, Inc.Supervisor:Kenny CooperType Rig:Air/Mud RotaryLogged by:John Fergerson
			TEST DAT			FIE	LD D	ΔΤΑ			BORING DATA
	Resu	ults Report	ed in mg/kg			Photo-	g		/e		
Benzene	Toluene	Ethyl- benzene	Xylenes	Total TPH (C6-C35)	Chlorides	lonization Detection Reading (ppm)	Sampling	Depth (feet)	Water Level	Screen	Start Time: 13:00 Finish Time: 13:29
								- 45			Sand: light yellow/orange, very fine grain, unconsolidated, interbedded with slight-moderate cemented very fine grain sandstone, dry
	Sampling	Interval			So	Stratification is Ini il Classification Ba	ferred sed (d And May Not	be E Ial P	Exact	dure $\sum_{=}^{-}$ Water First Noted \frown Analyzed Sample
									\geqslant		

						SOIL	BC	RING L	OG)	
Project: Client:		Gathering ty, New Me				1	lo.	SB-3			File No.:74638Date:3/17/2014Drilling Co.:Harrison & Cooper, Inc.Supervisor:Kenny CooperType Rig:Air/Mud RotaryLogged by:John Fergerson
	LABC	RATORY	TEST DAT	A		FIE	_D D	DATA			BORING DATA
	Res	ults Report	ed in mg/kg	1		Photo-	6		/el		
Benzene	Toluene	Ethyl- benzene	Xylenes	Total TPH (C6-C35)	Chlorides	Ionization Detection Reading (ppm)	Sampling	Depth (feet)	Water Level	Screen	Start Time: 14:08 Finish Time: 14:33
_							Х	\sim			Top Soil: Sandy Silt, grayish/yellow, unconsolidated, dry
							X	- 5			Caliche: light gray, dense-weathered, dry
							X	- 25			grain sand, dry Sand: yellow/orange, very fine grain, unconsolidated, interbedded with well cemented very fine grain sandstone, broken caliche in matrix, dry
								- 35			Sand: light yellow/orange, very fine grain, unconsolidated, interbedded with moderate-well cemented very fine grain sandstone, broken caliche in matrix, dry
\boxtimes	Sampling	Interval			So	Stratification is Ini il Classification Ba		d And May Not			
									$\mathbf{\mathbf{\hat{y}}}$		

						SOIL	BC	RING L	C	;	
Project: Client:	Abo Reef Lea Coun CEMC	Gathering ty, New Me	System exico			1	No.	SB-3			File No.:74638Date:3/17/2014Drilling Co.:Harrison & Cooper, Inc.Supervisor:Kenny CooperType Rig:Air/Mud RotaryLogged by:John Fergerson
			TEST DAT			FIE	LD D	ΔΤΑ			BORING DATA
	Resu	ults Report	ed in mg/kg			Photo-	g		/e		
Benzene	Toluene	Ethyl- benzene	Xylenes	Total TPH (C6-C35)	Chlorides	lonization Detection Reading (ppm)	Sampling	Depth (feet)	Water Level	Screen	Start Time: 14:08 Finish Time: 14:33
								- 45			Sand: light yellow/orange, very fine grain, unconsolidated, interbedded with slight-moderate cemented very fine grain sandstone, dry
	Sampling	Interval			So	Stratification is Ini il Classification Ba	ferreo sed o	d And May Not	be E Ial P	Exact	
									\geqslant		

						SOIL	BC	RING L	06)	
Project: Client:		Gathering ty, New Me				1	lo.	SB-4			File No.:74638Date:3/17/2014Drilling Co.:Harrison & Cooper, Inc.Supervisor:Kenny CooperType Rig:Air/Mud RotaryLogged by:John Fergerson
	LABC	DRATORY	TEST DAT	A		FIE	_D D	DATA			BORING DATA
	Resu	ults Report	ed in mg/kg	1		Photo-	6		/e		
Benzene	Toluene	Ethyl- benzene	Xylenes	Total TPH (C6-C35)	Chlorides	Ionization Detection Reading (ppm)	Sampling	Depth (feet)	Water Level	Screen	Start Time: 15:06 Finish Time: 15:35
_							Х				Top Soil: Sandy Silt, grayish/yellow, unconsolidated, dry
							X	- 5			Caliche: light gray, dense-weathered, dry
							X	- 20			Sand: yellow/orange, very fine grain, unconsolidated, iinterbedded with well cemented very fine grain sandstone, broken caliche in matrix, dry
	Sampling	Interval			So	Stratification is Ini					interbedded with moderate-well cemented very fine grain sandstone, broken caliche in matrix, dry
									\mathbf{S}		

						SOIL	BC	RING LO	C	;				
Project: Client:	Abo Reef Lea Coun CEMC	Gathering ity, New Me	System exico			1	No.	SB-4			Date: Drilling Co.: Supervisor: Type Rig:	74638 3/17/2014 Harrison & Cooper, lı Kenny Cooper Air/Mud Rotary John Fergerson	nc.	
			TEST DAT			FIE	LD D	ΔΑΤΑ			В	ORING DATA		
	Res	ults Report	ed in mg/kg			Photo-	b		<u>e</u>					
Benzene	Toluene	Ethyl- benzene	Xylenes	Total TPH (C6-C35)	Chlorides	lonization Detection Reading (ppm)	Sampling	Depth (feet)	Water Level	screen	Start Time: 15:06	Finish Time:		
								- 45			Tota	t-moderate cemented roken caliche in mati	d very fine grain rix, dry	
X	Sampling	Interval			Sc	Stratification is Ini il Classification Ba	ferre sed	d And May Not on Visual-Manu	be E al P	Exact roce	dure		Water First Note	
									$\mathbf{>}$					



PROJECT NAME: Abo Reef Gathering System PROJECT NUMBER: 074638 CLIENT: CEMC LOCATION: Lea County, New Mexico HOLE DESIGNATION: SB-1 DATE COMPLETED: August 19, 2015 DRILLING METHOD: Air Rotary FIELD PERSONNEL: J. Fergerson

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH ft BGS			SAMP	LE	
			DEPTH (ft)	INTERVAL	REC (ft)	USCS	
	Clayey SILT, dull brown, unconsolidated with caliche in matrix, dry					ML	
2				AIR	1.0		
4				V			
	Caliche, light brownish gray, dense-weathered, dry	5.00					
6							
3				AIR	1.0		
10							
12							
	becomes light yellowish orange, interbedded with poor to moderately cemented			AIR	1.0		
14	very fine grained sandstone						
14				Ĭ			
16							
				AIR	1.0		
18 —	SAND, light yellowish orange, very fine grained, unconsolidated with broken caliche in matrix, interbedded with poor-moderately cemented very fine grained	18.00				SP	
	sandstone, dry			¥			
20							
22				AIR	1.0		
24				V			
				AIR			
N	OTES:			¥ AIR			
_						Page 1	of

HOLE DESIGNATION: SB-1

DRILLING METHOD: Air Rotary

FIELD PERSONNEL: J. Fergerson

DATE COMPLETED: August 19, 2015

PROJECT NAME: Abo Reef Gathering System

PROJECT NUMBER: 074638

CLIENT: CEMC

LOCATION: Lea County, New Mexico

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS		DEPTH ft BGS	0		SAMP	PLE	-
				DEPTH (ft)	INTERVAL	REC (ft)	nscs	
28	becomes dull orange, very fine grained, unconsolidated, interbedded with poor-moderately cemented very fine grained sandstone, slightly moist				AIR	1.0		
30								
32					AIR	1.0		
36								
38	becomes moderately to well cemented very fine grained sandstone				AIR	1.0		
40					AIR	1.0		
44					Y			
46					AIR	1.0		
48			50.00		Y			
50	BOREHOLE TERMINATED @ 50.0ft BGS	· · ·	50.00					
N	DTES:						Page	L





PROJECT NAME: Abo Reef Gathering System PROJECT NUMBER: 074638 CLIENT: CEMC LOCATION: Lea County, New Mexico HOLE DESIGNATION: SB-2 DATE COMPLETED: August 19, 2015 DRILLING METHOD: Air Rotary FIELD PERSONNEL: J. Fergerson

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH ft BGS	ft)		SAMP	
			DEPTH (ft)	INTERVAL	REC (ft)	nscs
	Clayey SILT, dull brown, unconsolidated with caliche in matrix, dry					ML
2				AIR	1.0	
					1.0	
4				¥		
	Caliche, light brownish gray, dense-weathered, dry	5.00				
6	Calicite, light blownish gray, dense-weathered, dry					
				AIR	1.0	
3						
				Y		
10						
12				AIR	1.0	
	becomes light yellowish orange, weathered-dense, interbedded with poor to moderately cemented very fine grained sandstone				1.0	
14				¥		
16						
18 —		18.00		AIR	1.0	SP
	SAND, light yellowish orange, very fine grained, unconsolidated with broken caliche in matrix, interbedded with poor-moderately cemented very fine grained	10.00				
	sandstone, dry			Y		
20						
22				AIR	1.0	
24				Y		
N	OTES:			AIR ▼		
						Page 1 o

HOLE DESIGNATION: SB-2

DRILLING METHOD: Air Rotary

FIELD PERSONNEL: J. Fergerson

DATE COMPLETED: August 19, 2015



PROJECT NAME: Abo Reef Gathering System

PROJECT NUMBER: 074638

CLIENT: CEMC

LOCATION: Lea County, New Mexico

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH ft BGS	t)		SAMF	
			DEPTH (ft)	INTERVAL	REC (ft)	nscs
28	becomes dull orange, very fine grained, unconsolidated, interbedded with poor-moderately cemented very fine grained sandstone, slightly moist			AIR	1.0	
30						
32				AIR	1.0	
36						
38	becomes moderately to well cemented very fine grained sandstone			AIR	1.0	
42				AIR	1.0	
44				¥		
46				AIR	1.0	
50 —	BOREHOLE TERMINATED @ 50.0ft BGS	50.00		Y	-	
<u></u> <u>NC</u>	DTES:					Page 2
Appendix D Soil Laboratory Analytical Reports

Analytical Report 481523

for

Conestoga Rovers & Associates

Project Manager: Jacob Ferenz

ABO Reef Gathering System

074638

28-MAR-14

Collected By: Client





12600 West I-20 East Odessa, Texas 79765

Xenco-Houston (EPA Lab code: TX00122): Texas (T104704215-14-16-TX), Arizona (AZ0765), Florida (E871002), Louisiana (03054) New Jersey (TX007), North Carolina(681), Oklahoma (9218), Pennsylvania (68-03610)

Xenco-Atlanta (EPA Lab Code: GA00046): Florida (E87429), North Carolina (483), South Carolina (98015), Kentucky (85), DoD (L10-135) Louisiana (04176), USDA (P330-07-00105)

> Xenco-Lakeland: Florida (E84098) Xenco-Odessa (EPA Lab code: TX00158): Texas (T104704400-TX) Xenco-Dallas (EPA Lab code: TX01468): Texas (T104704295-TX) Xenco Phoenix (EPA Lab Code: AZ00901): Arizona(AZ0757) Xenco-Phoenix Mobile (EPA Lab code: AZ00901): Arizona (AZM757) Xenco Tucson (EPA Lab code:AZ000989): Arizona (AZ0758)





Project Manager: **Jacob Ferenz Conestoga Rovers & Associates** 2135 S Loop 250 W Midland, TX 79703

Reference: XENCO Report No(s): **481523 ABO Reef Gathering System** Project Address:

Jacob Ferenz:

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) 481523. 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. 481523 will be filed for 60 days, and after that time they will be properly disposed without further notice, unless otherwise arranged with you. We reserve the right to return to you any unused samples, extracts or solutions related to them if we consider so necessary (e.g., samples identified as hazardous waste, sample sizes exceeding analytical standard practices, controlled substances under regulated protocols, etc).

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

Kms Boah

 Kelsey Brooks

 Project Manager

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Sample Cross Reference 481523



Conestoga Rovers & Associates, Midland, TX

ABO Reef Gathering System

Sample Id	Matrix	Date Collected	Sample Depth	Lab Sample Id
074638-JMF-SB1	S	03-17-14 11:25	- 0 ft	481523-001
074638-JMF-SB1	S	03-17-14 11:34	- 15 ft	481523-002
074638-JMF-SB1	S	03-17-14 11:44	- 30 ft	481523-003
074638-JMF-SB1	S	03-17-14 12:06	- 50 ft	481523-004
074638-JMF-SB2	S	03-17-14 13:00	- 0 ft	481523-005
074638-JMF-SB2	S	03-17-14 13:12	- 15 ft	481523-006
074638-JMF-SB2	S	03-17-14 13:14	- 30 ft	481523-007
074638-JMF-SB2	S	03-17-14 13:29	- 50 ft	481523-008
074638-JMF-SB3	S	03-17-14 14:08	- 0 ft	481523-009
074638-JMF-SB3	S	03-17-14 14:13	- 15 ft	481523-010
074638-JMF-SB3	S	03-17-14 14:17	- 30 ft	481523-011
074638-JMF-SB3	S	03-17-14 14:33	- 50 ft	481523-012
074638-JMF-SB4	S	03-17-14 15:06	- 0 ft	481523-013
074638-JMF-SB4	S	03-17-14 15:12	- 15 ft	481523-014
074638-JMF-SB4	S	03-17-14 15:14	- 30 ft	481523-015
074638-JMF-SB4	S	03-17-14 15:35	- 50 ft	481523-016
074638-JMF-SS1	S	03-17-14 15:58	- 3.5 ft	481523-017
074638-JMF-SS2	S	03-17-14 16:00	- 3.5 ft	481523-018
074638-JMF-SS3	S	03-17-14 16:02	- 3.5 ft	481523-019
074638-JMF-SS4	S	03-17-14 16:04	- 3.5 ft	481523-020
074638-JMF-SW1	S	03-17-14 16:08	- 2.5 ft	481523-021
074638-JMF-SW2	S	03-17-14 16:11	- 2.5 ft	481523-022
074638-JMF-SW3	S	03-17-14 16:14	- 2.5 ft	481523-023
074638-JMF-SW4	S	03-17-14 16:16	- 2.5 ft	481523-024



CASE NARRATIVE



Client Name: Conestoga Rovers & Associates Project Name: ABO Reef Gathering System

 Project ID:
 074638

 Work Order Number(s):
 481523

 Report Date:
 28-MAR-14

 Date Received:
 03/19/2014

Sample receipt non conformances and comments:

Sample receipt non conformances and comments per sample:

None

Analytical non conformances and comments:

Batch: LBA-937197 Inorganic Anions by EPA 300/300.1

Chloride recovered above QC limits in the Matrix Spike. Samples affected are: 481523-023, -024, -021, - 022, -020.

The Laboratory Control Sample for Chloride is within laboratory Control Limits. No further action required.



Contact: Jacob Ferenz

Project Location:

Certificate of Analysis Summary 481523

Conestoga Rovers & Associates, Midland, TX

Project Name: ABO Reef Gathering System



Date Received in Lab: Wed Mar-19-14 12:25 pm

Report Date: 28-MAR-14

roject Location:								Project Ma	nager:	Kelsey Brook	s		
	Lab Id:	481523-0	001	481523-0	02	481523-0	03	481523-0	004	481523-0	005	481523-	006
An alusia De au este l	Field Id:	074638-JMI	F-SB1	074638-JMF	-SB1	074638-JMF	-SB1	074638-JMI	F-SB1	074638-JM	F-SB2	074638-JM	IF-SB2
Analysis Requested	Depth:	0 ft		15 ft		30 ft		50 ft		0 ft		15 ft	
	Matrix:	SOIL		SOIL		SOIL		SOIL		SOIL		SOIL	-
	Sampled:	Mar-17-14	11:25	Mar-17-14 1	1:34	Mar-17-14 1	1:44	Mar-17-14	12:06	Mar-17-14	13:00	Mar-17-14	13:12
BTEX by EPA 8021B	Extracted:	Mar-22-14	14:00	Mar-22-14 1	4:00					Mar-22-14	14:00	Mar-22-14	14:00
	Analyzed:	Mar-22-14	17:31	Mar-22-14 1	7:46					Mar-22-14	18:02	Mar-22-14	18:19
	Units/RL:	mg/kg	RL	mg/kg	RL					mg/kg	RL	mg/kg	RL
Benzene		ND	0.00169	ND	0.00104					ND	0.00151	ND	0.00110
Toluene		ND	0.00339	ND	0.00209					ND	0.00301	ND	0.00220
Ethylbenzene		ND	0.00169	ND	0.00104					ND	0.00151	ND	0.00110
m_p-Xylenes		ND	0.00339	ND	0.00209					ND	0.00301	ND	0.00220
o-Xylene		ND	0.00169	ND	0.00104					ND	0.00151	ND	0.00110
Total Xylenes		ND	0.00169	ND	0.00104					ND	0.00151	ND	0.00110
Total BTEX		ND	0.00169	ND	0.00104					ND	0.00151	ND	0.00110
Inorganic Anions by EPA 300/300.1	Extracted:	Mar-25-14	09:30	Mar-25-14 0	9:30	Mar-25-14 ()9:30	Mar-25-14	09:30	Mar-25-14	09:30	Mar-25-14	09:30
	Analyzed:	Mar-26-14	11:22	Mar-26-14 1	2:08	Mar-26-14 1	2:31	Mar-26-14	12:53	Mar-26-14	13:16	Mar-26-14	13:39
	Units/RL:	mg/kg	RL	mg/kg	RL	mg/kg	RL	mg/kg	RL	mg/kg	RL	mg/kg	RL
Chloride		18.1	6.78	2.90	2.10	4.44	3.03	3.82	2.08	18.2	6.06	6.39	2.21
Percent Moisture	Extracted:												
	Analyzed:	Mar-24-14	13:05	Mar-24-14 1	3:05	Mar-24-14 1	13:05	Mar-24-14	13:05	Mar-24-14	13:05	Mar-24-14	13:05
	Units/RL:	%	RL	%	RL	%	RL	%	RL	%	RL	%	RL
Percent Moisture		41.0	1.00	4.90	1.00	33.9	1.00	3.88	1.00	34.0	1.00	9.63	1.00
TPH By SW8015 Mod	Extracted:	Mar-20-14	15:00	Mar-20-14 1	5:00					Mar-20-14	15:00	Mar-20-14	15:00
	Analyzed:	Mar-20-14	21:53	Mar-20-14 2	2:20					Mar-20-14	23:39	Mar-21-14	00:05
	Units/RL:	mg/kg	RL	mg/kg	RL					mg/kg	RL	mg/kg	RL
C6-C12 Gasoline Range Hydrocarbons		ND	25.4	ND	15.7					ND	22.7	ND	16.6
C12-C28 Diesel Range Hydrocarbons		ND	25.4	ND	15.7					ND	22.7	ND	16.6
Total TPH		ND	25.4	ND	15.7					ND	22.7	ND	16.6

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Kelsey Brooks Project Manager

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Contact: Jacob Ferenz

Project Location:

Certificate of Analysis Summary 481523

Conestoga Rovers & Associates, Midland, TX

Project Name: ABO Reef Gathering System



Date Received in Lab: Wed Mar-19-14 12:25 pm

Report Date: 28-MAR-14

roject Location:								Project Ma	nager:	Kelsey Brooks			
	Lab Id:	481523-0	007	481523-0	08	481523-0)09	481523-0	010	481523-0	11	481523-0)12
Anglucia Deguested	Field Id:	074638-JMI	F-SB2	074638-JMF	-SB2	074638-JMI	F-SB3	074638-JMI	F-SB3	074638-JMF	-SB3	074638-JMF	F-SB3
Analysis Requested	Depth:	30 ft		50 ft		0 ft		15 ft		30 ft		50 ft	
	Matrix:	SOIL		SOIL		SOIL		SOIL		SOIL		SOIL	
	Sampled:	Mar-17-14	13:14	Mar-17-14 1	3:29	Mar-17-14	14:08	Mar-17-14	14:13	Mar-17-14 1	4:17	Mar-17-14	14:33
BTEX by EPA 8021B	Extracted:					Mar-24-14	09:00	Mar-24-14	09:00				
	Analyzed:					Mar-24-14	13:59	Mar-24-14	14:15				
	Units/RL:					mg/kg	RL	mg/kg	RL				
Benzene						ND	0.00155	ND	0.00126				
Toluene						ND	0.00310	ND	0.00252				
Ethylbenzene						ND	0.00155	ND	0.00126				
m_p-Xylenes						ND	0.00310	ND	0.00252				
o-Xylene						ND	0.00155	ND	0.00126				
Total Xylenes						ND	0.00155	ND	0.00126				
Total BTEX						ND	0.00155	ND	0.00126				
Inorganic Anions by EPA 300/300.1	Extracted:	Mar-25-14	09:30	Mar-25-14 0)9:30	Mar-25-14	09:30	Mar-25-14	09:30	Mar-25-14 0	9:30	Mar-25-14 (09:30
	Analyzed:	Mar-26-14	14:47	Mar-26-14 1	5:09	Mar-26-14	15:32	Mar-26-14	15:55	Mar-26-14 1	6:18	Mar-26-14	17:03
	Units/RL:	mg/kg	RL	mg/kg	RL	mg/kg	RL	mg/kg	RL	mg/kg	RL	mg/kg	RL
Chloride		8.07	2.72	15.5	4.19	12.6	6.24	5.32	2.53	7.20	3.12	3.00	2.10
Percent Moisture	Extracted:												
	Analyzed:	Mar-24-14	13:05	Mar-24-14 1	3:05	Mar-24-14 13:05		Mar-24-14 13:05		Mar-24-14 13:05		Mar-24-14	13:05
	Units/RL:	%	RL	%	RL	%	RL	%	RL	%	RL	%	RL
Percent Moisture		26.4	1.00	4.52	1.00	35.9	1.00	21.0	1.00	35.9	1.00	4.75	1.00
TPH By SW8015 Mod	Extracted:					Mar-20-14	15:00	Mar-20-14	15:00				
	Analyzed:					Mar-21-14	00:57	Mar-21-14	01:23				
	Units/RL:					mg/kg	RL	mg/kg	RL				
C6-C12 Gasoline Range Hydrocarbons						ND	23.4	ND	18.9				
C12-C28 Diesel Range Hydrocarbons						136	23.4	ND	18.9				
Total TPH						136	23.4	ND	18.9				

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Kelsey Brooks Project Manager

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Contact: Jacob Ferenz

Project Location:

Certificate of Analysis Summary 481523

Conestoga Rovers & Associates, Midland, TX

Project Name: ABO Reef Gathering System



Date Received in Lab: Wed Mar-19-14 12:25 pm

Report Date: 28-MAR-14

roject Location:								Project Ma	nager:	Kelsey Brook	s		
	Lab Id:	481523-0	013	481523-0	14	481523-0	15	481523-0	016	481523-	017	481523-	-018
Analysis Requested	Field Id:	074638-JMI	F-SB4	074638-JMF	-SB4	074638-JMF	-SB4	074638-JMI	F-SB4	074638-JM	F-SS1	074638-JN	IF-SS2
Analysis Kequesiea	Depth:	0 ft		15 ft		30 ft		50 ft		3.5 ft		3.5 f	ť
	Matrix:	SOIL		SOIL		SOIL		SOIL		SOIL	,	SOII	L
	Sampled:	Mar-17-14	15:06	Mar-17-14 1	5:12	Mar-17-14 1	5:14	Mar-17-14	15:35	Mar-17-14	15:58	Mar-17-14	16:00
BTEX by EPA 8021B	Extracted:	Mar-22-14	14:00	Mar-22-14 1	4:00					Mar-22-14	14:00	Mar-22-14	4 14:00
	Analyzed:	Mar-22-14	19:07	Mar-22-14 1	9:23					Mar-22-14	19:39	Mar-22-14	19:55
	Units/RL:	mg/kg	RL	mg/kg	RL					mg/kg	RL	mg/kg	RL
Benzene		ND	0.00101	ND	0.00102					ND	0.00107	ND	0.00112
Toluene		ND	0.00203	ND	0.00204					ND	0.00214	ND	0.00223
Ethylbenzene		ND	0.00101	ND	0.00102					ND	0.00107	ND	0.00112
m_p-Xylenes		ND	0.00203	ND	0.00204					ND	0.00214	ND	0.00223
o-Xylene		ND	0.00101	ND	0.00102					ND	0.00107	ND	0.00112
Total Xylenes		ND	0.00101	ND	0.00102					ND	0.00107	ND	0.00112
Total BTEX		ND	0.00101	ND	0.00102					ND	0.00107	ND	0.00112
Inorganic Anions by EPA 300/300.1	Extracted:	Mar-25-14	09:30	Mar-25-14 0	9:30	Mar-25-14 ()9:30	Mar-25-14	09:30	Mar-25-14	09:30	Mar-25-14	09:30
	Analyzed:	Mar-26-14	17:26	Mar-26-14 1	7:48	Mar-26-14	8:11	Mar-26-14	19:19	Mar-26-14	19:42	Mar-26-14	20:04
	Units/RL:	mg/kg	RL	mg/kg	RL	mg/kg	RL	mg/kg	RL	mg/kg	RL	mg/kg	RL
Chloride		6.70	4.07	2.33	2.05	3.04	2.57	2.39	2.12	10.5	4.28	8100	1120
Percent Moisture	Extracted:												
	Analyzed:	Mar-24-14	13:05	Mar-24-14 1	3:05	Mar-24-14	13:05	Mar-24-14	13:05	Mar-24-14	13:05	Mar-24-14	13:05
	Units/RL:	%	RL	%	RL	%	RL	%	RL	%	RL	%	RL
Percent Moisture		1.61	1.00	2.37	1.00	22.3	1.00	5.55	1.00	6.64	1.00	10.8	1.00
TPH By SW8015 Mod	Extracted:	Mar-20-14	15:00	Mar-20-14 1	5:00					Mar-20-14	15:00	Mar-20-14	15:00
	Analyzed:	Mar-21-14	01:46	Mar-21-14 0	02:13					Mar-21-14	02:36	Mar-21-14	03:03
	Units/RL:	mg/kg	RL	mg/kg	RL					mg/kg	RL	mg/kg	RL
C6-C12 Gasoline Range Hydrocarbons		ND	15.2	ND	15.3					ND	16.0	ND	16.8
C12-C28 Diesel Range Hydrocarbons		23.8	15.2	ND	15.3					633	16.0	33.9	16.8
Total TPH		23.8	15.2	ND	15.3					688	16.0	33.9	16.8

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Kelsey Brooks Project Manager

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Contact: Jacob Ferenz

Project Location:

Certificate of Analysis Summary 481523

Conestoga Rovers & Associates, Midland, TX

Project Name: ABO Reef Gathering System



Date Received in Lab: Wed Mar-19-14 12:25 pm

Report Date: 28-MAR-14

roject Location:								Project Ma	nager:	Kelsey Brook	TS .		
	Lab Id:	481523-0)19	481523-0	020	481523-0	021	481523-		481523-	1	481523-	024
	Field Id:	074638-JM		074638-JM		074638-JMI		074638-JM		074638-JM		074638-JM	
Analysis Requested	Depth:	3.5 ft		3.5 ft		2.5 ft		2.5 ft		2.5 ft		2.5 ft	
	-												
	Matrix:	SOIL		SOIL		SOIL		SOIL		SOIL		SOIL	
	Sampled:	Mar-17-14	16:02	Mar-17-14	16:04	Mar-17-14	16:08	Mar-17-14	16:11	Mar-17-14	16:14	Mar-17-14	16:16
BTEX by EPA 8021B	Extracted:	Mar-22-14	14:00	Mar-22-14	14:00	Mar-22-14	14:00	Mar-22-14	14:00	Mar-22-14	14:00	Mar-22-14	14:00
	Analyzed:	Mar-22-14	20:44	Mar-22-14	21:00	Mar-22-14	21:16	Mar-22-14	21:32	Mar-22-14	21:48	Mar-22-14	22:03
	Units/RL:	mg/kg	RL	mg/kg	RL	mg/kg	RL	mg/kg	RL	mg/kg	RL	mg/kg	RL
Benzene		ND	0.00108	ND	0.00108	ND	0.00103	ND	0.00103	ND	0.00115	ND	0.00104
Toluene		ND	0.00217	ND	0.00216	ND	0.00207	ND	0.00206	ND	0.00230	ND	0.00207
Ethylbenzene		ND	0.00108	ND	0.00108	ND	0.00103	ND	0.00103	ND	0.00115	ND	0.00104
m_p-Xylenes		ND	0.00217	ND	0.00216	ND	0.00207	ND	0.00206	ND	0.00230	ND	0.00207
o-Xylene		ND	0.00108	ND	0.00108	ND	0.00103	ND	0.00103	ND	0.00115	ND	0.00104
Total Xylenes		ND	0.00108	ND	0.00108	ND	0.00103	ND	0.00103	ND	0.00115	ND	0.00104
Total BTEX		ND	0.00108	ND	0.00108	ND	0.00103	ND	0.00103	ND	0.00115	ND	0.00104
Inorganic Anions by EPA 300/300.1	Extracted:	Mar-25-14	09:30	Mar-26-14	09:30	Mar-26-14	09:30	Mar-26-14	09:30	Mar-26-14	09:30	Mar-26-14	09:30
	Analyzed:	Mar-26-14	20:27	Mar-27-14	14:14	Mar-26-14	22:43	Mar-26-14	23:29	Mar-26-14	23:51	Mar-27-14	00:14
	Units/RL:	mg/kg	RL	mg/kg	RL	mg/kg	RL	mg/kg	RL	mg/kg	RL	mg/kg	RL
Chloride		61.9	4.37	8.55	4.32	284	10.4	54.3	10.3	816	23.0	977	41.6
Percent Moisture	Extracted:												
	Analyzed:	Mar-24-14	13:05	Mar-24-14	17:20	Mar-24-14	17:20	Mar-24-14	17:20	Mar-24-14	17:20	Mar-24-14	17:20
	Units/RL:	%	RL	%	RL	%	RL	%	RL	%	RL	%	RL
Percent Moisture		8.38	1.00	7.51	1.00	3.67	1.00	3.35	1.00	13.2	1.00	3.76	1.00
TPH By SW8015 Mod	Extracted:	Mar-20-14	15:00	Mar-20-14	15:00	Mar-20-14	15:00	Mar-20-14	15:00	Mar-21-14	17:00	Mar-21-14	17:00
	Analyzed:	Mar-21-14	03:27	Mar-21-14	03:54	Mar-21-14	04:18	Mar-21-14	04:44	Mar-21-14	20:42	Mar-21-14	21:07
	Units/RL:	mg/kg	RL	mg/kg	RL	mg/kg	RL	mg/kg	RL	mg/kg	RL	mg/kg	RL
C6-C12 Gasoline Range Hydrocarbons		ND	16.3	ND	16.2	ND	15.6	ND	15.5	56.0	17.2	ND	15.6
C12-C28 Diesel Range Hydrocarbons		262	16.3	908	16.2	ND	15.6	ND	15.5	1610	17.2	983	15.6
Total TPH		287	16.3	979	16.2	ND	15.6	ND	15.5	1780	17.2	1160	15.6

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

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Kelsey Brooks Project Manager

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Flagging Criteria



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

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

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

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4143 Greenbriar Dr, Stafford, TX 77477
9701 Harry Hines Blvd , Dallas, TX 75220
5332 Blackberry Drive, San Antonio TX 78238
2505 North Falkenburg Rd, Tampa, FL 33619
12600 West I-20 East, Odessa, TX 79765
6017 Financial Drive, Norcross, GA 30071
3725 E. Atlanta Ave, Phoenix, AZ 85040

Fax (281) 240-4200 (281) 240-4280 (214) 902 0300 (214) 351-9139 (210) 509-3334 (210) 509-3335 (813) 620-2000 (813) 620-2033 (432) 563-1800 (432) 563-1713 (770) 449-8800 (770) 449-5477 (602) 437-0330



Project Name: ABO Reef Gathering System

Lab Batch #:	936/18	Sample: 481523-001 / SMP	Batc	h: 1 Matrix	: Soil		
Units:	mg/kg	Date Analyzed: 03/20/14 21:53	SU	JRROGATE R	ECOVERY S	STUDY	
	TPH	By SW8015 Mod	Amount Found [A]	True Amount [B]	Recovery %R	Control Limits %R	Flage
		Analytes			[D]		
1-Chlorooctan	e		79.3	99.8	79	70-135	
o-Terphenyl			42.1	49.9	84	70-135	
Lab Batch #:	936718	Sample: 481523-002 / SMP	Batc	h: 1 Matrix	: Soil		
Units:	mg/kg	Date Analyzed: 03/20/14 22:20	SU	JRROGATE R	ECOVERY S	STUDY	
	TPH	By SW8015 Mod Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flage
1-Chlorooctan	e	Analytes	93.1	99.8	93	70-135	
o-Terphenyl			48.3	49.9	97	70-135	
Lab Batch #:	936718	Sample: 481523-005 / SMP	Batc	h: 1 Matrix	: Soil		
Units:	mg/kg	Date Analyzed: 03/20/14 23:39	su	JRROGATE R	ECOVERY S	STUDY	
	TPH	By SW8015 Mod	Amount Found [A]	True Amount [B]	Recovery %R	Control Limits %R	Flage
		Analytes			[D]		
1-Chlorooctan	e		96.5	99.8	97	70-135	
o-Terphenyl			51.0	49.9	102	70-135	
Lab Batch #:	936718	Sample: 481523-006 / SMP	Batc	h: 1 Matrix	: Soil		
Units:	mg/kg	Date Analyzed: 03/21/14 00:05	SU	JRROGATE R	ECOVERY S	STUDY	
	TPH	By SW8015 Mod Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flage
1-Chlorooctan	e		97.5	99.9	98	70-135	
o-Terphenyl			51.2	50.0	102	70-135	
Lab Batch #:	936718	Sample: 481523-009 / SMP	Batc	h: 1 Matrix	: Soil	· ·	
Units:	mg/kg	Date Analyzed: 03/21/14 00:57	SU	JRROGATE R	ECOVERY S	STUDY	
	TPH	By SW8015 Mod Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flage
1-Chlorooctan	e	<i>.</i>	93.6	99.9	94	70-135	
				1	1		

* Surrogate outside of Laboratory QC limits

** Surrogates outside limits; data and surrogates confirmed by reanalysis

*** Poor recoveries due to dilution

Surrogate Recovery [D] = 100 * A / B



Project Name: ABO Reef Gathering System

Dub Dutten #1	936718	Sample: 481523-010 / SMP	Batc	h: 1 Matrix	. 501		
Units:	mg/kg	Date Analyzed: 03/21/14 01:23	SU	JRROGATE R	ECOVERY S	STUDY	
	TPH	By SW8015 Mod	Amount Found [A]	True Amount [B]	Recovery %R	Control Limits %R	Flag
		Analytes			[D]		
1-Chlorooctan	e		96.2	99.6	97	70-135	
o-Terphenyl			49.5	49.8	99	70-135	
Lab Batch #:	936718	Sample: 481523-013 / SMP	Batc	h: 1 Matrix	: Soil		
Units:	mg/kg	Date Analyzed: 03/21/14 01:46	SU	JRROGATE R	ECOVERY S	STUDY	
	TPH]	By SW8015 Mod Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flage
1-Chlorooctan	e	Anarytes	77.4	99.7	78	70-135	
o-Terphenyl			38.9	49.9	78	70-135	
Lab Batch #:	936718	Sample: 481523-014 / SMP	Batc	h: 1 Matrix	: Soil		
Units:	mg/kg	Date Analyzed: 03/21/14 02:13	su	JRROGATE R	ECOVERY	STUDY	
	TPH	By SW8015 Mod	Amount Found [A]	True Amount [B]	Recovery %R	Control Limits %R	Flag
		Analytes			[D]		
1-Chlorooctan	e		92.5	99.8	93	70-135	
o-Terphenyl			46.2	49.9	93	70-135	
Lab Batch #:	936718	Sample: 481523-017 / SMP	Batc	h: 1 Matrix	: Soil		
Units:	mg/kg	Date Analyzed: 03/21/14 02:36	SU	RROGATE R	ECOVERY S	STUDY	
	TPH 1	By SW8015 Mod Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flage
1-Chlorooctan	e		90.4	99.8	91	70-135	
o-Terphenyl			50.0	49.9	100	70-135	
Lab Batch #:	936718	Sample: 481523-018 / SMP	Batc	h: 1 Matrix	: Soil	<u> </u>	
Units:	mg/kg	Date Analyzed: 03/21/14 03:03	SU	JRROGATE R	ECOVERY S	STUDY	
	TPH	By SW8015 Mod Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flag
1-Chlorooctan	e		79.8	99.8	80	70-135	
	~		12.0	77.0	1 00	10-155	

* Surrogate outside of Laboratory QC limits

** Surrogates outside limits; data and surrogates confirmed by reanalysis

*** Poor recoveries due to dilution

Surrogate Recovery [D] = 100 * A / B



Project Name: ABO Reef Gathering System

Lab Batch #	lers : 48152 : 936718	Sample: 481523-019 / SMP	Batc	Project ID h: 1 Matrix			
U nits:	mg/kg	Date Analyzed: 03/21/14 03:27	SU	RROGATE R	ECOVERY S	STUDY	
	TPH]	By SW8015 Mod	Amount Found [A]	True Amount [B]	Recovery %R	Control Limits %R	Flags
		Analytes			[D]		
1-Chloroocta	ne		83.6	99.6	84	70-135	
o-Terphenyl			43.1	49.8	87	70-135	
Lab Batch #	: 936718	Sample: 481523-020 / SMP	Bate	h: 1 Matrix	: Soil		
Units:	mg/kg	Date Analyzed: 03/21/14 03:54	SU	RROGATE R	ECOVERY S	STUDY	
	TPH	By SW8015 Mod Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1-Chloroocta	ne		95.3	99.7	96	70-135	
o-Terphenyl			54.3	49.9	109	70-135	
Lab Batch #	: 936718	Sample: 481523-021 / SMP	Batc	h: 1 Matrix	: Soil		
Units:	mg/kg	Date Analyzed: 03/21/14 04:18	SU	RROGATE R	ECOVERY S	STUDY	
	TPH	By SW8015 Mod	Amount Found [A]	True Amount [B]	Recovery %R	Control Limits %R	Flage
		Analytes			[D]		
1-Chloroocta	ne		90.9	99.9	91	70-135	
o-Terphenyl			47.5	50.0	95	70-135	
Lab Batch #	: 936718	Sample: 481523-022 / SMP	Batc	h: 1 Matrix	: Soil		
Units:	mg/kg	Date Analyzed: 03/21/14 04:44	SU	RROGATE R	ECOVERY S	STUDY	
	TPH 1	By SW8015 Mod Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flage
1-Chloroocta	ne		91.5	99.9	92	70-135	
o-Terphenyl			46.8	50.0	94	70-135	
Lab Batch #	: 936868	Sample: 481523-023 / SMP	Batc	h: 1 Matrix	: Soil	I	
Units:	mg/kg	Date Analyzed: 03/21/14 20:42	SU	RROGATE R	ECOVERY S	STUDY	
	TPH	By SW8015 Mod Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flage
1-Chloroocta	ne	· · · · · · · · · · · · · · · · · · ·	94.2	99.7	94	70-135	
			74.2	77.1	24	10-135	

* Surrogate outside of Laboratory QC limits

** Surrogates outside limits; data and surrogates confirmed by reanalysis

*** Poor recoveries due to dilution

Surrogate Recovery [D] = 100 * A / B



Project Name: ABO Reef Gathering System

	a	Sample: 481523-024 / SMP					
Units:	mg/kg	Date Analyzed: 03/21/14 21:07	SU	JRROGATE R	ECOVERY S	STUDY	
	TPH]	By SW8015 Mod	Amount Found [A]	True Amount [B]	Recovery %R	Control Limits %R	Flags
		Analytes			[D]		
1-Chlorooct	ane		97.2	99.8	97	70-135	
o-Terpheny			53.4	49.9	107	70-135	
Lab Batch	# : 936861	Sample: 481523-001 / SMP	Batc	h: 1 Matrix	: Soil		
Units:	mg/kg	Date Analyzed: 03/22/14 17:31	SU	JRROGATE R	ECOVERY S	STUDY	
	BTEX	X by EPA 8021B Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1,4-Difluoro	benzene	Anaryus	0.0283	0.0300	94	80-120	
4-Bromoflu	orobenzene		0.0284	0.0300	95	80-120	
Lab Batch	#: 936861	Sample: 481523-002 / SMP	Batc	h: 1 Matrix	: Soil		
Units:	mg/kg	Date Analyzed: 03/22/14 17:46	st	JRROGATE R	ECOVERY	STUDY	
	BTEX	X by EPA 8021B	Amount Found [A]	True Amount [B]	Recovery %R	Control Limits %R	Flage
		Analytes			[D]		
1,4-Difluoro	obenzene		0.0275	0.0300	92	80-120	
4-Bromoflu			0.0291	0.0300	97	80-120	
Lab Batch	#: 936861	Sample: 481523-005 / SMP	Batc	h: 1 Matrix	: Soil		
Units:	mg/kg	Date Analyzed: 03/22/14 18:02	SU	JRROGATE R	ECOVERY S	STUDY	
	BTEX	X by EPA 8021B Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1,4-Difluoro	benzene		0.0280	0.0300	93	80-120	
4-Bromoflu			0.0299	0.0300	100	80-120	
Lab Batch		Sample: 481523-006 / SMP	Batc				
Units:	mg/kg	Date Analyzed: 03/22/14 18:19		JRROGATE R	ECOVERY S	STUDY	
	BTEX	X by EPA 8021B Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flag
1,4-Difluoro	benzene		0.0283	0.0300	94	80-120	
1,7 Dinuon	, senizene		0.0205	0.0300	74	00-120	

* Surrogate outside of Laboratory QC limits

** Surrogates outside limits; data and surrogates confirmed by reanalysis

*** Poor recoveries due to dilution

Surrogate Recovery [D] = 100 * A / B



Project Name: ABO Reef Gathering System

VVOFK OF Lab Batch #	ders : 48152 #: 936861	Sample: 481523-013 / SMP	Bate	Project ID h: 1 Matrix						
Units:	mg/kg	Date Analyzed: 03/22/14 19:07	SU	RROGATE R	ECOVERY S	STUDY				
	BTE	X by EPA 8021B	Amount Found [A]	True Amount [B]	Recovery %R	Control Limits %R	Flags			
		Analytes			[D]					
1,4-Difluoro	benzene		0.0279	0.0300	93	80-120				
4-Bromofluo	robenzene		0.0299	0.0300	100	80-120				
Lab Batch #	#: 936861	Sample: 481523-014 / SMP	Batc	h: 1 Matrix	: Soil					
Units:	mg/kg	Date Analyzed: 03/22/14 19:23	SU	RROGATE R	ECOVERY S	STUDY				
	BTEX	X by EPA 8021B	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags			
140.0	1	Analytes	0.005.6	0.0200		00.100				
1,4-Difluoro			0.0276	0.0300	92	80-120				
4-Bromonuo Lab Batch #		Samelar 491522 017 / SMD	0.0303	0.0300	101	80-120				
		Sample: 481523-017 / SMP	Batc							
Units:	mg/kg	Date Analyzed: 03/22/14 19:39	SURROGATE RECOVERY STUDY							
	BTEX	X by EPA 8021B	Amount Found [A]	True Amount [B]	Recovery %R	Control Limits %R	Flags			
		Analytes			[D]					
1,4-Difluoro	benzene		0.0278	0.0300	93	80-120				
4-Bromofluo	robenzene		0.0299	0.0300	100	80-120				
Lab Batch #	: 936861	Sample: 481523-018 / SMP	Bate	h: 1 Matrix	: Soil					
Units:	mg/kg	Date Analyzed: 03/22/14 19:55	SU	RROGATE R	ECOVERY S	STUDY				
	BTE	X by EPA 8021B Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags			
1,4-Difluoro	henzene	Anarytes	0.0283	0.0300	94	80-120				
4-Bromofluo			0.0285	0.0300	104	80-120				
Lab Batch #		Sample: 481523-019 / SMP	Batc			00-120				
Units:	mg/kg	Date Analyzed: 03/22/14 20:44		RROGATE R		STUDY				
	BTE	X by EPA 8021B Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags			
1,4-Difluoro	benzene		0.0279	0.0300	93	80-120				
4-Bromofluo			0.0303	0.0300	101	=-				

* Surrogate outside of Laboratory QC limits

** Surrogates outside limits; data and surrogates confirmed by reanalysis

*** Poor recoveries due to dilution

Surrogate Recovery [D] = 100 * A / B



Project Name: ABO Reef Gathering System

Lab Batch		Sample: 481523-020 / SMP	Batc	h: 1 Matri	x: Soil		
Units:	mg/kg	Date Analyzed: 03/22/14 21:00	SU	RROGATE H	RECOVERY	STUDY	
	BTE	X by EPA 8021B	Amount Found [A]	True Amount [B]	Recovery %R	Control Limits %R	Flage
		Analytes			[D]		
1,4-Difluoro	benzene		0.0276	0.0300	92	80-120	
4-Bromoflue	orobenzene		0.0298	0.0300	99	80-120	
Lab Batch	#: 936861	Sample: 481523-021 / SMP	Batc	h: 1 Matri	x: Soil		
Units:	mg/kg	Date Analyzed: 03/22/14 21:16	SU	RROGATE I	RECOVERYS	STUDY	
	BTEX	X by EPA 8021B	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1,4-Difluoro	henzene	Analytes	0.0265	0.0300	88	80-120	
4-Bromoflue			0.0203	0.0300	97	80-120	
Lab Batch		Sample: 481523-022 / SMP	Batc			80-120	
Units:	mg/kg	Date Analyzed: 03/22/14 21:32		RROGATE F	-	TUDV	
	6 6		50				
	BTEX	X by EPA 8021B	Amount Found [A]	True Amount [B]	Recovery %R	Control Limits %R	Flags
		Analytes			[D]		
1,4-Difluoro	benzene		0.0266	0.0300	89	80-120	
4-Bromoflue	orobenzene		0.0282	0.0300	94	80-120	
Lab Batch	#: 936861	Sample: 481523-023 / SMP	Batc	h: 1 Matri	x: Soil		
Units:	mg/kg	Date Analyzed: 03/22/14 21:48	SU	RROGATE H	RECOVERYS	STUDY	
	BTE	X by EPA 8021B	Amount Found [A]	True Amount [B]	Recovery %R	Control Limits %R	Flags
		Analytes			[D]		
1,4-Difluoro			0.0261	0.0300	87	80-120	
4-Bromoflue			0.0308	0.0300	103	80-120	
Lab Batch		Sample: 481523-024 / SMP	Batc				
Units:	mg/kg	Date Analyzed: 03/22/14 22:03	SU	RROGATE I	RECOVERYS	STUDY	
	BTE	X by EPA 8021B Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1 4-Difluoro	4-Difluorobenzene			0.0300	95	80-120	
1, 4 -Dilluoit	Bromofluorobenzene			0.0500	93	00-120	

* Surrogate outside of Laboratory QC limits

** Surrogates outside limits; data and surrogates confirmed by reanalysis

*** Poor recoveries due to dilution

Surrogate Recovery [D] = 100 * A / B



Project Name: ABO Reef Gathering System

Lab Batch #:		Sample: 481523-009 / SMP	Bate	h: 1 Matri	x: Soil						
Units:	mg/kg	Date Analyzed: 03/24/14 13:59	SU	SURROGATE RECOVERY STUDY							
	BTE	X by EPA 8021B	Amount Found [A]	True Amount [B]	Recovery %R	Control Limits %R	Flage				
		Analytes			[D]						
1,4-Difluorober	nzene		0.0276	0.0300	92	80-120					
4-Bromofluorol	benzene		0.0301	0.0300	100	80-120					
Lab Batch #:	936919	Sample: 481523-010 / SMP	Bate	h: 1 Matri	x: Soil						
Units:	mg/kg	Date Analyzed: 03/24/14 14:15	SU	RROGATE I	RECOVERY S	STUDY					
	BTE	X by EPA 8021B Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags				
1,4-Difluorober	izene	Anaryus	0.0279	0.0300	93	80-120					
4-Bromofluorol			0.0279	0.0300	103	80-120					
Lab Batch #:		Sample: 652765-1-BLK / BI			x: Solid	00-120					
	mg/kg	Date Analyzed: 03/20/14 18:12		RROGATE I		TUDV					
	8	2	50								
	TPH	By SW8015 Mod	Amount Found [A]	True Amount [B]	Recovery %R	Control Limits %R	Flags				
		Analytes			[D]						
1-Chlorooctane			77.1	100	77	70-135					
o-Terphenyl			42.2	50.0	84	70-130					
Lab Batch #:	936868	Sample: 652882-1-BLK / Bl	LK Bate	h: 1 Matri	x: Solid						
Units:	mg/kg	Date Analyzed: 03/21/14 19:28	SU	RROGATE I	RECOVERY	STUDY					
	TPH	By SW8015 Mod	Amount Found [A]	True Amount [B]	Recovery %R	Control Limits %R	Flags				
		Analytes			[D]						
1-Chlorooctane			77.6	100	78	70-135					
o-Terphenyl			39.6	50.0	79	70-130					
Lab Batch #:	936861	Sample: 652876-1-BLK / Bl	LK Bate	h: 1 Matri	x: Solid						
Units:	mg/kg	Date Analyzed: 03/22/14 15:56	SU	RROGATE I	RECOVERYS	STUDY					
	BTE	X by EPA 8021B	Amount Found [A]	True Amount [B]	Recovery %R	Control Limits %R	Flage				
	Analytes				[D]						
1,4-Difluorober	4-Difluorobenzene			0.0300	90	80-120					
4-Bromofluorol	romofluorobenzene			0.0300	98	80-120					

* Surrogate outside of Laboratory QC limits

** Surrogates outside limits; data and surrogates confirmed by reanalysis

*** Poor recoveries due to dilution

Surrogate Recovery [D] = 100 * A / B



Project Name: ABO Reef Gathering System

Work Orders Lab Batch #: 93		Sample: 652884-1-BLK / B	LK Bate	Project ID h: 1 Matrix	: Solid		
U nits: m	g/kg	Date Analyzed: 03/24/14 12:21	SU	JRROGATE R	ECOVERY S	STUDY	
	BTE	X by EPA 8021B	Amount Found [A]	True Amount [B]	Recovery %R	Control Limits %R	Flags
		Analytes			[D]		
1,4-Difluorobenze	ene		0.0276	0.0300	92	80-120	
4-Bromofluorober	nzene		0.0306	0.0300	102	80-120	
Lab Batch #: 93	36718	Sample: 652765-1-BKS / B	KS Bate	h: 1 Matrix	: Solid		
Units: m	g/kg	Date Analyzed: 03/20/14 18:35	SU	JRROGATE R	ECOVERY S	STUDY	
	TPH	By SW8015 Mod Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1-Chlorooctane		Anaryus	103	100	103	70-135	
o-Terphenyl			53.1	50.0	105	70-133	
Lab Batch #: 93	36868	Sample: 652882-1-BKS / B				70-130	
	g/kg	Date Analyzed: 03/21/14 19:53					
	g/Kg	Date Analyzeu. 05/21/14 19.55	SU	JRROGATE R	ECOVERY S	STUDY	
	TPH	By SW8015 Mod	Amount Found [A]	True Amount [B]	Recovery %R	Control Limits %R	Flags
		Analytes			[D]		
1-Chlorooctane			108	100	108	70-135	
o-Terphenyl			53.2	50.0	106	70-130	
Lab Batch #: 93	36861	Sample: 652876-1-BKS / B	KS Bate	h: 1 Matrix	: Solid		
Units: m	g/kg	Date Analyzed: 03/22/14 16:11	SU	JRROGATE R	ECOVERY S	STUDY	
	BTE	X by EPA 8021B	Amount Found [A]	True Amount [B]	Recovery %R	Control Limits %R	Flags
		Analytes			[D]		
1,4-Difluorobenze	ene		0.0294	0.0300	98	80-120	
4-Bromofluorober	nzene		0.0338	0.0300	113	80-120	
Lab Batch #: 93	36919	Sample: 652884-1-BKS / B	KS Bate	h: 1 Matrix	: Solid		
Units: m	g/kg	Date Analyzed: 03/24/14 12:38	SU	JRROGATE R	ECOVERY S	STUDY	
	BTE	X by EPA 8021B	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1,4-Difluorobenze	Analytes			0.0200		80.120	
			0.0288	0.0300	96	80-120	
4-Bromofluorober	izene		0.0354	0.0300	118	80-120	

* Surrogate outside of Laboratory QC limits

** Surrogates outside limits; data and surrogates confirmed by reanalysis

*** Poor recoveries due to dilution

Surrogate Recovery [D] = 100 * A / B



Project Name: ABO Reef Gathering System

Lab Batch	ders : 48152 #: 936718	Sample: 652765-1-BSD / B	SD Bate	Project ID h: 1 Matrix			
Units:	mg/kg	Date Analyzed: 03/20/14 18:58	SU	JRROGATE R	ECOVERY S	STUDY	
	TPH	By SW8015 Mod	Amount Found [A]	True Amount [B]	Recovery %R	Control Limits %R	Flags
		Analytes			[D]		
1-Chlorooct	ane		85.8	100	86	70-135	
o-Terphenyl			49.7	50.0	99	70-130	
Lab Batch	#: 936868	Sample: 652882-1-BSD / B	SD Bate	h: 1 Matrix	: Solid		
Units:	mg/kg	Date Analyzed: 03/21/14 20:18	SU	JRROGATE R	ECOVERY S	STUDY	
	TPH	By SW8015 Mod	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1-Chlorooct	ane	Analytes	108	100	108	70-135	
o-Terphenyl			53.9	50.0	108	70-135	
Lab Batch		Sample: 652876-1-BSD / B				/0-130	
Units:	mg/kg	Date Analyzed: 03/22/14 16:27					
Units:	iiig/kg	Date Analyzeu: 03/22/14 10.27	SU	JRROGATE R	ECOVERYS	STUDY	
	BTEX	X by EPA 8021B	Amount Found [A]	True Amount [B]	Recovery %R	Control Limits %R	Flags
		Analytes			[D]		
1,4-Difluoro	benzene		0.0294	0.0300	98	80-120	
4-Bromoflue	orobenzene		0.0342	0.0300	114	80-120	
Lab Batch	#: 936919	Sample: 652884-1-BSD / B	SD Bate	h: 1 Matrix	: Solid		
Units:	mg/kg	Date Analyzed: 03/24/14 12:54	SU	JRROGATE R	ECOVERY S	STUDY	
	BTEX	X by EPA 8021B	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1 4 Diffuore	hangana	Analytes	0.0205	0.0200		00.120	
1,4-Difluoro 4-Bromofluo			0.0295	0.0300	98	80-120	
Lab Batch		Sample: 481523-002 S / MS		0.0300 h: 1 Matrix	117 • Soil	80-120	
Units:	mg/kg	Date Analyzed: 03/20/14 22:45		JRROGATE R		STUDV	
*				1			
	TPH By SW8015 Mod Analytes		Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flage
1-Chlorooct	-Chlorooctane			99.7	93	70-135	
	-Cirlotoctane -Terphenyl			,,,,	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	10 155	

* Surrogate outside of Laboratory QC limits

** Surrogates outside limits; data and surrogates confirmed by reanalysis

*** Poor recoveries due to dilution

Surrogate Recovery [D] = 100 * A / B



Project Name: ABO Reef Gathering System

Work Orders Lab Batch #: 93		23, Sample: 481586-001 S / MS	S Bate	Project ID h: 1 Matrix			
Units: m	g/kg	Date Analyzed: 03/21/14 21:59	SU	RROGATE R	RECOVERY	STUDY	
	TPH	By SW8015 Mod	Amount Found [A]	True Amount [B]	Recovery %R	Control Limits %R	Flags
		Analytes			[D]		
1-Chlorooctane			106	99.8	106	70-135	
o-Terphenyl			61.3	49.9	123	70-130	
Lab Batch #: 93	36861	Sample: 481523-001 S / MS	S Bate	h: 1 Matrix	c: Soil		
Units: m	g/kg	Date Analyzed: 03/22/14 16:43	SU	RROGATE R	RECOVERY	STUDY	
	BTE	X by EPA 8021B	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
140.01		Analytes	0.0202	0.0200		00.100	
1,4-Difluorobenze			0.0285	0.0300	95	80-120	
		G 491704 001 C / M	0.0312	0.0300	104	80-120	
Lab Batch #: 93		Sample: 481704-001 S / MS					
Units: m	lg/kg	Date Analyzed: 03/24/14 13:10	SU	RROGATE F	RECOVERYS	STUDY	
	BTE	X by EPA 8021B	Amount Found [A]	True Amount [B]	Recovery %R	Control Limits %R	Flags
		Analytes			[D]		
1,4-Difluorobenze	ene		0.0264	0.0300	88	80-120	
4-Bromofluorober	nzene		0.0334	0.0300	111	80-120	
Lab Batch #: 93	36718	Sample: 481523-002 SD / N	ASD Bate	h: 1 Matrix	c: Soil		
Units: m	ig/kg	Date Analyzed: 03/20/14 23:12	SU	RROGATE F	RECOVERY	STUDY	
	ТРН	By SW8015 Mod Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1-Chlorooctane			122	100	122	70-135	
o-Terphenyl			60.8	50.0	122	70-130	
Lab Batch #: 93	36868	Sample: 481586-001 SD / M	MSD Bate	h: 1 Matrix	: Soil	I	<u> </u>
Units: m	ıg/kg	Date Analyzed: 03/21/14 22:24	SU	RROGATE R	RECOVERY	STUDY	
	TPH	By SW8015 Mod	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1 Chlore t	Analytes			00.0		70.125	
	Chlorooctane			99.8	105	70-135	
o-Terphenyl			62.7	49.9	126	70-130	

* Surrogate outside of Laboratory QC limits

** Surrogates outside limits; data and surrogates confirmed by reanalysis

*** Poor recoveries due to dilution

Surrogate Recovery [D] = 100 * A / B



Project Name: ABO Reef Gathering System

Work Orde Lab Batch #:		23, Sample: 481523-001 SD / N	MSD Batch: 1 Matrix: Soil									
Units:	mg/kg	Date Analyzed: 03/22/14 16:59	SURROGATE RECOVERY STUDY									
	BTE	X by EPA 8021B	Amount Found [A]	True Amount [B]	Recovery %R	Control Limits %R	Flags					
1.4-Difluorober	nzene	Analytes	0.0305	0.0300	[D]	80-120						
4-Bromofluorol			0.0303	0.0300	102	80-120						
Lab Batch #:	936919	Sample: 481704-001 SD / M	ASD Batc	h: 1 Matrix:	Soil							
Units:	mg/kg	Date Analyzed: 03/24/14 13:26	SU	RROGATE RI	ECOVERY	STUDY						
	BTE	X by EPA 8021B	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags					
1 4 Difluoraba	7000	Analytes	0.02(1	0.0200		80.120						
1,4-Difluorober			0.0261	0.0300	87	80-120						
4-Bromofluorol	benzene		0.0349	0.0300	116	80-120	1					

* Surrogate outside of Laboratory QC limits

** Surrogates outside limits; data and surrogates confirmed by reanalysis

*** Poor recoveries due to dilution

Surrogate Recovery [D] = 100 * A / B



BS / BSD Recoveries



Project Name: ABO Reef Gathering System

Work Order #: 481523							Proj	ect ID: (074638		
Analyst: ARM	D	ate Prepar	red: 03/22/20	14			Date A	nalyzed: (03/22/2014		
Lab Batch ID: 936861 Sample: 652876-1-I	BKS	Batc	h #: 1					Matrix: S	Solid		
Units: mg/kg		BLAN	K /BLANK	SPIKE / 1	BLANK S	SPIKE DUP	LICATE	RECOV	ERY STUI	DY	
BTEX by EPA 8021B Analytes	Blank Sample Result [A]	Spike Added [B]	Blank Spike Result [C]	Blank Spike %R [D]	Spike Added [E]	Blank Spike Duplicate Result [F]	Blk. Spk Dup. %R [G]	RPD %	Control Limits %R	Control Limits %RPD	Flag
Benzene	< 0.00100	0.100	0.106	106	0.100	0.108	108	2	70-130	35	
Toluene	< 0.00200	0.100	0.106	106	0.100	0.107	107	1	70-130	35	
Ethylbenzene	< 0.00100	0.100	0.112	112	0.100	0.113	113	1	71-129	35	
m_p-Xylenes	< 0.00200	0.200	0.230	115	0.200	0.234	117	2	70-135	35	
o-Xylene	< 0.00100	0.100	0.115	115	0.100	0.117	117	2	71-133	35	
Analyst: ARM	D	ate Prepar	ed: 03/24/20	14			Date A	nalyzed: (03/24/2014		
Lab Batch ID: 936919 Sample: 652884-1-H	BKS	Batc	h #: 1					Matrix: S	Solid		
Units: mg/kg		BLAN	K /BLANK	SPIKE /]	BLANK S	SPIKE DUP	LICATE	RECOVI	ERY STUI	DY	
BTEX by EPA 8021B Analytes	Blank Sample Result [A]	Spike Added [B]	Blank Spike Result [C]	Blank Spike %R [D]	Spike Added [E]	Blank Spike Duplicate Result [F]	Blk. Spk Dup. %R [G]	RPD %	Control Limits %R	Control Limits %RPD	Flag
Benzene	< 0.00100	0.100	0.105	105	0.100	0.107	107	2	70-130	35	
Toluene	< 0.00200	0.100	0.105	105	0.100	0.107	107	2	70-130	35	
Ethylbenzene	< 0.00100	0.100	0.112	112	0.100	0.113	113	1	71-129	35	
m_p-Xylenes	< 0.00200	0.200	0.231	116	0.200	0.234	117	1	70-135	35	
o-Xylene	< 0.00100	0.100	0.115	115	0.100	0.117	117	2	71-133	35	

Relative Percent Difference RPD = $200^{*}|(C-F)/(C+F)|$ Blank Spike Recovery [D] = $100^{*}(C)/[B]$ Blank Spike Duplicate Recovery [G] = $100^{*}(F)/[E]$ All results are based on MDL and Validated for QC Purposes



BS / BSD Recoveries



Project Name: ABO Reef Gathering System

						Pro	ject ID:	074638		
D	ate Prepar	red: 03/25/201	14			Date A	nalyzed: (03/26/2014		
BKS	Batc	h #: 1					Matrix:	Solid		
	BLAN	K /BLANK	SPIKE /]	BLANK S	SPIKE DUP	LICATE	RECOV	ERY STUI	DY	
Blank Sample Result [A]	Spike Added [B]	Blank Spike Result [C]	Blank Spike %R [D]	Spike Added [E]	Blank Spike Duplicate Result [F]	Blk. Spk Dup. %R [G]	RPD %	Control Limits %R	Control Limits %RPD	Flag
<2.00	50.0	51.4	103	50.0	51.0	102	1	80-120	20	
D	ate Prepar	red: 03/26/201	14		·	Date A	nalyzed: (03/26/2014		
-BKS Batch #: 1 Matrix: Solid										
BLANK /BLANK SPIKE / BLANK SPIKE DUPLICATE RECOVERY STUDY										
Blank Sample Result [A]	Spike Added	Blank Spike Result	Blank Spike %R	Spike Added	Blank Spike Duplicate	Blk. Spk Dup. %R	RPD %	Control Limits %R	Control Limits %RPD	Flag
	[B]	[C]		[E]	Result [F]	[G]				
<2.00	50.0	52.0	104	50.0	54.0	108	4	80-120	20	
D	ate Prepar	red: 03/20/201	14			Date A	nalyzed: (03/20/2014		
BKS	Bate	h #: 1					Matrix:	Solid		
	BLAN	K /BLANK	SPIKE /]	BLANK S	SPIKE DUP	LICATE	RECOV	ERY STUI	DY	
Blank Sample Result [A]	Spike Added [B]	Blank Spike Result [C]	Blank Spike %R [D]	Spike Added	Blank Spike Duplicate Result [F]	Blk. Spk Dup. %R [G]	RPD %	Control Limits %R	Control Limits %RPD	Flag
	[20]	[0]	[2]	[12]		1.01				
<15.0	1000	804	80	1000	808	81	0	70-135	35	
	BKS Blank Sample Result [A] C2.00 BKS Blank Sample Result [A] C2.00 DBKS DBKS Blank Sample Result [A] C2.00 CD BKS CD	BKS Blank Sample Result [A] [B] <22.00 50.0 Date Prepar BKS Batc Blank Sample Result [A] [B] <22.00 50.0 Date Prepar BLAN Added [B] <2.00 50.0 Date Prepar BLAN Blank Spike Added [B] Spike Added [B] Spike Added [B] Spike Added [B] Spike Added [B] Spike Added [B] Spike Added [A] Spike Added [B] Spike Added [B] Spike Added [B] Spike Added [B] Spike Added [B] Spike Added [B] Spike Added [B] Spike Added [B] Spike Added [B] Spike Added [B] Spike Added [A] Spike Added [B] Spike Added [A] Spike Added [A] Spike Spike Added [A] Spike Spike Spike Added [A] Spike Spik Spike Spike Spike Spike Spike Spike Spi	BKS Batch #: 1 BKS Batch #: 1 BLANK /BLANK Spike [A] Added Spike Result [A] [B] [C] <2.00 50.0 51.4 Date Prepared: 03/26/20 BKS Batch #: 1 BLANK /BLANK Spike Result [A] [B] [C] <2.00 50.0 51.4 BLANK /BLANK Spike Result [B] [C] <2.00 50.0 52.0 Date Prepared: 03/20/20 BKS Batch #: 1 BLANK /BLANK Spike Result [A] [B] [C] 	Blank Spike Blank Blank Sample Result Added Spike Blank Spike %R [A] [B] [C] [D] %R [D] <2.00	BKS Batch #: 1 BLANK /BLANK SPIKE / BLANK S Blank Sample Result [A] Spike Added Blank Spike Result [B] Blank Spike Result Blank Spike %R <2.00	BKS Batch #: 1 BLANK /BLANK SPIKE / BLANK SPIKE DUP Blank Spike Blank Spike Added Spike Blank Spike Added Spike [A] [B] [C] [D] [E] Blank Spike Duplicate [A] [B] [C] [D] [E] Result [F] <2.00	Date Prepared: 03/25/2014 Date A BKS Batch #: 1 BLANK /BLANK SPIKE / BLANK SPIKE DUPLICATE Blank Sample Result [A] Spike Added Blank Spike Result [B] Spike [C] Blank Spike %R Spike (B] Blank Spike %R Blank Added Spike %R Blank Spike [E] Blank Result [F] Blank [G] 50.0 51.4 103 50.0 51.0 102 Date Prepared: 03/26/2014 Date A BLANK /BLANK SPIKE / BLANK SPIKE DUPLICATE Blank Sample Result [A] Spike Added Blank Spike Result [C] Spike NR Blank Spike %R Spike %R Blank Spike %R Spike ND Blank Spike %R Spike ND Blank Spike %R Spike ND Blank Spike %R Spike ND Blank Spike %R Spike ND Blank Spike ND Spike ND Blank Spike ND Spike ND Blank Spike ND Blank Spike ND Spike ND Blank Spike ND Spike ND Blank Spike ND Spike ND Blank Spike ND Spike ND Blank Spike ND Blank Spike ND Spike ND Blank Spike ND Spike ND Blank Spike ND Spike ND Blank Spike ND Spike ND Blank Spike ND Spike ND Blank Spike ND Spike ND Blank Spike Sp	Date Prepared: 03/25/2014Date Analyzed: 0BKSBatch #: 1Matrix: 3BlankBlankSpike Spike ResultSpike %R [D]Blank (D)Spike %R (D)Blank Spike Result [F]Blank %R [G]Blank %R (G]Blank (G)Blank (G)Blank (G)Blank (G)Blank (G)Blank (G)Blank (G)Spike (G)Blank (G)Spike (G)Blank (G)Blank (G)Blank (G)Spike (G)Blank (G)Blank (G)	BKS Batch #: 1 Matrix: Solid BLANK /BLANK SPIKE / BLANK SPIKE DUPLICATE RECOVERY STUL Blank sample Result [A] Spike (B] Blank Spike (C] Blank Spike (B] Blank Spike (C] Blank Spike (B] Blank Spike (B] Blank Spike (C] Blank Spike (B] Blank Spike (C] Blank Spike (C] Blank Spike (C] Control Limits %R <2.00	Date Prepared: $03/25/2014$ Date Analyzed: $03/26/2014$ BKSBatch #: 1Matrix: SolidBLANK /BLANK SPIKE / BLANK SPIKE DUPL/CATE RECOVERY STUDYBlank Sample Result [A]Blank Added Result [B]Blank Spike (C)Blank Spike (B)Blank Spike (B)Blank Spike (B)Blank Spike (B)Blank Spike (B)Blank Spike (B)Blank Spike (B)Blank Spike (B)Blank Spike (B)Blank Spike (B)Blank Spike (B)Blank Spike (B)Blank Spike (B)Blank Spike Spike (B)Blank Spike Spike (B)Blank Spike Spike (B)Blank Spike Spike (B)Blank Spike Spike (B)Blank Spike Spike (B)Blank Spike Spike (B)Blank Spike Spike Spike (B)Blank Spike Spike Spike (B)Blank Spike Spike Spike (B)Blank Spike Spike Spike (B)Blank Spike Spike Spike (B)Blank Spike Spike Spike (B)Blank Spike Spike Spike (B)Blank Spike Spike Spike Spike Spike SpikeBlank Spike Spike Spike Spike SpikeBlank Spike Sp

Relative Percent Difference RPD = $200^{*}|(C-F)/(C+F)|$ Blank Spike Recovery [D] = $100^{*}(C)/[B]$ Blank Spike Duplicate Recovery [G] = $100^{*}(F)/[E]$ All results are based on MDL and Validated for QC Purposes



BS / BSD Recoveries



Project Name: ABO Reef Gathering System

Work Order	Order #: 481523 Project ID: 074638												
Analyst:	ARM	D	ate Prepar	red: 03/21/201	.4	4 Date Analyzed: 03/21/2014							
Lab Batch ID	: 936868 Sample: 652882-1-1	BKS	Batc	h #: 1		Matrix: Solid							
Units:	mg/kg		BLAN	K /BLANK S	SPIKE / I	BLANK S	SPIKE DUP	LICATE	RECOVI	ERY STUI	ЭY		
	TPH By SW8015 Mod	Blank Sample Result [A]	Spike Added	Blank Spike Result	Blank Spike %R	Spike Added	Blank Spike Duplicate	Blk. Spk Dup. %R	RPD %	Control Limits %R	Control Limits %RPD	Flag	
Analy	rtes		[B]	[C]	[D]	[E]	Result [F]	[G]					
C6-C12 G	asoline Range Hydrocarbons	<15.0	1000	907	91	1000	846	85	7	70-135	35		
C12-C28	Diesel Range Hydrocarbons	<15.0	1000	990	99	1000	834	83	17	70-135	35		

Relative Percent Difference RPD = $200^{*}|(C-F)/(C+F)|$ Blank Spike Recovery [D] = $100^{*}(C)/[B]$ Blank Spike Duplicate Recovery [G] = $100^{*}(F)/[E]$ All results are based on MDL and Validated for QC Purposes

XENCO Laboratories Projec	Form 3 - MS ct Name: ABO Ree	Service State	CONT.						
Work Order #: 481523			Duct	ect ID: ⁽⁾	74638				
Lab Batch #: 937197			v						
Date Analyzed: 03/26/2014	Date Prepared: 03/2			Analyst: A					
QC- Sample ID: 481523-021 S	Batch #:	L	1	Matrix: S	601l				
Reporting Units: mg/kg	MAT	RIX / MA	ATRIX SPIKE	RECO	VERY STU	JDY			
Inorganic Anions by EPA 300 Analytes	Parent Sample Result [A]	Spike Added [B]	Spiked Sample Result [C]	%R [D]	Control Limits %R	Flag			
Chloride	284	260	619	129	80-120	X			
Lab Batch #: 937197	204	200	019	129	00-120				
Date Analyzed: 03/27/2014	Date Prepared: 03/2	26/2014	Λ	Analyst: A	MB				
QC- Sample ID: 481937-001 S	Batch #:			Matrix: S					
Reporting Units: mg/kg		MATRIX / MATRIX SPIKE RECOVERY STU							
Inorganic Anions by EPA 300	Parent Sample Result	Spike Added	Spiked Sample Result [C]	%R [D]	Control Limits %R	Flag			
Analytes	[A]	[B]							
Chloride	1210	1070	2510	121	80-120	X			
Lab Batch #: 937259					1				
Date Analyzed: 03/26/2014	Date Prepared: 03/2	25/2014	A	Analyst: A	MB				
QC- Sample ID: 481523-001 S	Batch #:	l	1	Matrix: S	loil				
Reporting Units: mg/kg	MAT	RIX / MA	ATRIX SPIKE	RECO	VERY STU	JDY			
Inorganic Anions by EPA 300 Analytes	Parent Sample Result [A]	Spike Added [B]	Spiked Sample Result [C]	%R [D]	Control Limits %R	Flag			
Chloride	18.1	170	186	99	80-120				
Lab Batch #: 937259		1			-	1			
Date Analyzed: 03/26/2014	Date Prepared: 03/2	25/2014	A	Analyst: A	MB				
QC- Sample ID: 481523-011 S	Batch #:			Matrix: S					
Reporting Units: mg/kg	MAT	RIX / MA	ATRIX SPIKE	RECO	VERY STU	JDY			
Inorganic Anions by EPA 300	Parent Sample Result [A]	Spike Added [B]	Spiked Sample Result [C]	%R [D]	Control Limits %R	Flag			
Analytes									
Chloride	7.20	78.0	86.0	101	80-120				



Form 3 - MS / MSD Recoveries

Project Name: ABO Reef Gathering System



Work Order # : 481523							Project II): 074638				
Lab Batch ID: 936861	QC- Sa	ample ID:	481523-	-001 S	Ba	tch #:	1 Matrix	: Soil				
Date Analyzed: 03/22/2014	Date I	Prepared: (03/22/20	014	An	alyst: A	RM					
Reporting Units: mg/kg			Μ	ATRIX SPIKI	E / MAT	RIX SPI	KE DUPLICA'	TE RECO	OVERY S	STUDY		
BTEX by EF	A 8021B		Spike Added	Spiked Sample Result [C]	Spiked Sample %R	Spike Added	Duplicate Spiked Sample Result [F]	Spiked Dup. %R	RPD %	Control Limits %R	Control Limits %RPD	Flag
Analyte	8		[B]		[D]	[E]		[G]				
Benzene	<	0.00169	0.169	0.149	88	0.169	0.157	93	5	70-130	35	
Toluene	<	0.00339	0.169	0.140	83	0.169	0.148	88	6	70-130	35	
Ethylbenzene	<	0.00169	0.169	0.136	80	0.169	0.145	86	6	71-129	35	
m_p-Xylenes	<	0.00339	0.339	0.281	83	0.337	0.296	88	5	70-135	35	
o-Xylene	<	0.00169	0.169	0.140	83	0.169	0.148	88	6	71-133	35	
Lab Batch ID: 936919	QC- Sa	ample ID: 4	481704-	-001 S	Ba	tch #:	1 Matrix	: Soil				
Date Analyzed: 03/24/2014	Date I	Prepared: (03/24/20	014	An	alyst: A	RM					
Reporting Units: mg/kg			Μ	ATRIX SPIKI	E / MAT	RIX SPI	KE DUPLICA'	TE RECO	OVERY S	STUDY		
BTEX by EF	A 8021B		Spike Added [B]	Spiked Sample Result [C]	Spiked Sample %R [D]	Spike Added [E]	Duplicate Spiked Sample Result [F]	Spiked Dup. %R [G]	RPD %	Control Limits %R	Control Limits %RPD	Flag
Benzene	<	0.00547	0.547	0.518	95	0.547	0.536	98	3	70-130	35	
Toluene	<	0.0109	0.547	0.530	97	0.547	0.556	102	5	70-130	35	
Ethylbenzene	<	0.00547	0.547	0.555	101	0.547	0.575	105	4	71-129	35	
m_p-Xylenes	<	.0.0109	1.09	1.14	105	1.09	1.19	109	4	70-135	35	
o-Xylene	<(0.00547	0.547	0.567	104	0.547	0.594	109	5	71-133	35	

Matrix Spike Percent Recovery [D] = 100*(C-A)/BRelative Percent Difference RPD = 200*|(C-F)/(C+F)| Matrix Spike Duplicate Percent Recovery [G] = 100*(F-A)/E

ND = Not Detected, J = Present Below Reporting Limit, B = Present in Blank, NR = Not Requested, I = Interference, NA = Not Applicable N = See Narrative, EQL = Estimated Quantitation Limit, NC = Non Calculable - Sample amount is > 4 times the amount spiked.



Form 3 - MS / MSD Recoveries

Project Name: ABO Reef Gathering System



Work Order # :	481523						Project II	D: 07463	8			
Lab Batch ID:	936718	QC- Sample ID:	481523	-002 S	Ba	tch #:	1 Matrix	x: Soil				
Date Analyzed:	03/20/2014	Date Prepared:	03/20/2	2014	Ar	nalyst: A	ARM					
Reporting Units:	mg/kg		Ν	IATRIX SPIK	E / MAT	'RIX SPI	KE DUPLICA	TE REC	OVERY	STUDY		
	TPH By SW8015 Mod	Parent Sample	Spike	Spiked Sample Result	Sample	Spike	Duplicate Spiked Sample	-	RPD	Control Limits	Control Limits	Flag
	Analytes	Result [A]	Added [B]	[C]	%R [D]	Added [E]	Result [F]	%R [G]	%	%R	%RPD	
C6-C12 Gasolin	ne Range Hydrocarbons	<15.7	1050	865	82	1050	1020	97	16	70-135	35	
C12-C28 Diese	l Range Hydrocarbons	<15.7	1050	883	84	1050	1100	105	22	70-135	35	
Lab Batch ID:	936868	QC- Sample ID:	481586	-001 S	Ba	tch #:	1 Matrix	x: Soil				
Date Analyzed:	03/21/2014	Date Prepared:	03/21/2	2014	Ar	nalyst: A	ARM					
Reporting Units:	mg/kg		N	IATRIX SPIK	E / MAT	'RIX SPI	KE DUPLICA	TE REC	OVERY	STUDY		
	TPH By SW8015 Mod	Parent Sample	Spike	Spiked Sample Result	Sample	Spike	Duplicate Spiked Sample	-	RPD	Control Limits	Control Limits	Flag
	Analytes	Result [A]	Added [B]	[C]	%R [D]	Added [E]	Result [F]	%R [G]	%	%R	%RPD	
C6-C12 Gasolin	ne Range Hydrocarbons	<15.4	1030	934	91	1030	988	96	6	70-135	35	
C12-C28 Diese	l Range Hydrocarbons	<15.4	1030	1000	97	1030	1030	100	3	70-135	35	

Matrix Spike Duplicate Percent Recovery [G] = 100*(F-A)/E





Project Name: ABO Reef Gathering System

Work Order #: 481523					
Lab Batch #: 936913			Project I	D: 074638	
Date Analyzed: 03/24/2014 13:05 Date Prep	ared: 03/24/2014	4 Ana	lyst: WRU		
QC- Sample ID: 481522-026 D Ba	t ch #: 1	Ma	trix: Soil		
Reporting Units: %	SAMPLE	/ SAMPLE	DUPLIC	ATE REC	OVERY
Percent Moisture Analyte	Parent Sample Result [A]	Sample Duplicate Result [B]	RPD	Control Limits %RPD	Flag
Percent Moisture	3.34	3.63	8	20	
Lab Batch #: 936913			•		
	ared: 03/24/2014	4 Ana	lyst:WRU		
	t ch #: 1	Ma	trix: Soil		
Reporting Units: %	SAMPLE	/ SAMPLE	DUPLIC	ATE REC	OVERY
Percent Moisture Analyte	Parent Sample Result [A]	Sample Duplicate Result [B]	RPD	Control Limits %RPD	Flag
Percent Moisture	21.0	23.9	13	20	
Lab Batch #: 936927	21.0	2017	10		
	ared: 03/24/2014	4 Ana	lyst: WRU		
	tch #: 1		trix: Soil		
Reporting Units: %	SAMPLE	/ SAMPLE	DUPLIC	ATE REC	OVERY
Percent Moisture Analyte	Parent Sample Result [A]		RPD	Control Limits %RPD	Flag
Percent Moisture	7.51	7.52	0	20	
-	ared: 03/24/2014 tch #: 1	Ma	llyst: WRU trix: Soil		
Reporting Units: %	SAMPLE	/ SAMPLE	DUPLIC	ATE REC	OVERY
Percent Moisture Analyte	Parent Sample Result [A]	Sample Duplicate Result [B]	RPD	Control Limits %RPD	Flag
Percent Moisture	4.42	4.14	7	20	

Spike Relative Difference RPD 200 * $|\,(B\text{-}A)/(B\text{+}A)\,|$ All Results are based on MDL and validated for QC purposes.

BRL - Below Reporting Limit

Cooler Temp. Thermo. Corr. Factor	Preserved where applicable On Ice	4 Clustody Seal #	3 Received By: 5	Date Time:	Relinquished by: 3 4 4 5 3 4 4
	Date Time: Received By:	Relinquished By:	Received By:		Aelinquished by:
	te Time:	Relinguished By:	CONTROL CONTROL OF CONTROL O	Date Time:	Isheddy Sampler:
	FED-EX / UPS: Tracking #			0 pm	TAT Starts Day received by Lab, if received by 3:00 pm
			TRRP Checklist		3 Day EMERGENCY
		UST / RG -411	Level 3 (CLP Forms)		2 Day EMERGENCY Contract TAT
		TRRP Level IV	Level III Std QC+ Forms		Next Day EMERGENCY
		Level IV (Full Data Pkg /raw data)	Level II Std QC		
		rmation	Data Deliverable Information		rurnaround Time (Business days)
•	1		1413	15 3/17/14	Oldest JMF-S83
		x	1408	6 3/11/14	OTHESE JIME - SES
		<	14 1329 5 1	50 3/11/14	074638-JMF-SBZ
			1 5 hisihili	30 3/1	74658-JMF
			3/17/14/312 5 1	15 3/1	-Jimf
		v		0 3/1	THESS-JMF-
			1206	1	JMF-
			1 S HAIL HILLIGE	30 3/1	- JMC -
	5		1 5 hEII hI/LI/E	15: 3/1	185- JMC-8291-LO
Field Comments	-		5	0 3/1	074638-JMF-581
	BTE TPH Wo	Accetate INO3 I2SO4 IaOH IAOH IEOH ONE	ate Time Matrix bottles + of + of + O	Sample Depth r	
www=waste water	X (GR rid	Number of preserved bottles	Collection		Field ID / Point of Collection
	0+				John Perserson
W = Wipe	DR		PO Number:	PC	ris Knight/Jake Ferenz
SW = Surface Water	0)			P .	torgerson @ craworld.com 686
GW =Ground Water DW = Drinking Water P = Product			Invoice To: NM	19703	Email: S. Loop 250 W, Midland, TK
S = Soil/Sed/Solid		JAN LOUNDIAN		Pr	Company Address:
A= Air		-1- haula28		P	Company Name / Branch: CCA
	Analytical Information		Project Information		Client / Reporting Information
48122	Xenco Quote # Xenco Job #		www.xenco.com		conne center - san Annonno, Texas (210-509-3334)
Tampa, Florida (813-620-2000)	Norcross, Georgia (770-449-8800)				
Lakeland, Florida (863-646-8526)	Odessa, Texas (432-563-1800)				allas. Texas (214.902.0300)
					Stafford, Texas (281-240-4200)
		م 2	Page 1		
	Y	OF CUSTODY	CHAIN O		XENCO

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Final 1.000

Lice Cooler Temp. Thermo. Corr. Factor	Preserved where applicable On Ice	Preserved wi	4 Custody Seal #		Received By:	Date Time:	Relinquished by: 5	Relinquished by: 5
		Date Time;	Relinquíshed By:	2	Received By:	Date Time:	y:	Relinquished by:
	Date Time: 3/19/14/12:752	Date Time:	Relinquished By:	unthe	Received By:	Date Time:		1 Reinquished by Sampler:
	FED-EX / UPS: Tracking #	OURIER DELIVERY	ECEIVED BY 3:00 pm	TIME SAMPLES CHANGE	MENTED BELOW EACH	Y MUST BE DOCU	TAT Starts Day received by Lab, if received by 3:00 pm SAMPLE CUSTODY MUST	TAT Star
				TRRP Checklist			ERGENCY	3 Day EMERGENCY
			UST / RG -411	Level 3 (CLP Forms)	Level 3		ERGENCY Contract TAT	2 Day EMERGENCY
			TRRP Level IV	Level III Std QC+ Forms	Level I		Next Day EMERGENCY	Next Day
		kg /raw data)	Level IV (Full Data Pkg /raw data)	Level II Std QC	Level I		TAT 5 Day TAT	Same Day TAT
	Notes:	-	ation	Data Deliverable Information			Turnaround Time (Business days)	Turna
				-	5 4091 hi/u/s	2	74638-JMF-554	10 6741
		V V V V		-	3/17/14 1602		074638-JMF-553	9 074
		V V V		- S	3/17/14 1600	3.5 3/	074638-JMF-552	8 0746
		< < < < < < < < < < < <		-		3,5 3/	155-JMF-551	7 074638-
		۷ ۲		-	3/17/14 1535	50 3/1	74638-JMF-5B4	6 0741
				-	3/17/14/1514 3	30-31	038-JMF-5B4	5 074638-
				< -	3/17/19/212	1	74638-JMF-5B4	4 074
		ヘイノ		2	3/17/14/1506	1/2 0	-38-JMF-584	3 0746
		< <			3/17/4 1433	1	074638-JMF-5B3	2 07H
		< <		S I	2111 H1/11/E	1/2 - 32	38-JMF-583	1 074638-
Field Comments		BIE TPH Chlu	HNO3 H2SO4 NaOH NaHSO4 MEOH	Matrix bottles HCI NaOH/Zn Acetate	Date Time N	Sample Depth	Field ID / Point of Collection	No.
TITE TRUCE TRUCE		X (GI	Number of preserved bottles	Numb	Collection	0		
WW - Waste Water		20 Ls					une: Crg Cr30 N	N S SIGNES
W = Wipe 0 = 011		+6			PO Number:	PC	Chris Knight Dake Ferenz	Chris K
SL = Sludge WW= Waste Water		DRC				686-0086	fergerson @ craworld. com 686-	fergerse
DW = Drinking Water P = Product SW = Surface water))		WN CK	Invoice To:	79703 1 (432) Im	Email: Phone No: (Price Land, TX -	2/35 S. L. Email:
S = Soil/Sed/Solid GW =Ground Water			201 201 201		Project Location:	Pn		Company Address:
A= Air		24	Sustern Aruban		Project Name/Number:	Pr	he / Branch: CRA	Company Name / Branch:
Matrix Codes	Analytical Information	A		Project Information	Proiec		Client / Reporting Information	Client / I
481333	Xenco Job #	Xenco Quote #		www.xenco.com			Service Center - San Antonio, Texas (210-509-3334)	Service Ce
Tampa, Florida (813-620-2000)	Norcross, Georgia (770-449-8800)	Norcross, Geo					Dallas, Texas (214-902-0300)	Dallas, Tex
Lakeland, Florida (863-646-8526)	Odessa, Texas (432-563-1800)	Odessa, Texas					Setting the Standard since 1990 Stafford,Texas (281-240-4200)	Setting the Stafford, Te
				Page 2 of				
								R

Final 1.000

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5 Control of the document and relinquishment of samples constitutes a valid purchase order from client company to XENCO Laboratories and its attilitates, subcontractors and assigns XENCO's standard terms and conditions of service unless previously neglotiated under a tully executed client contract.	conditions of service unless	NCO's standard terms and condi	gns XENCO	actors and ass	filiates, subcontr	poratories and its a	to XENCO Lat	ient company	order from c	a valid purchase	uishment of samples constitutes a	5 lottce: Signature of this document and reling
Contraction	4	erved where and	Pres	al #	4 Custodv Seal #			3 Received By:		Date Time:		3 Relinquished by:
	Received By:	Date Time:		ed By:	Relinquished By:		0	Received By:		Date Time:		Wellinguished by:
	Received By:	Date Time; Date Time;		ed By:	Relinquished By:	Phr	2 :	Heceived By:	1225	JIG/14		1 Mr Marine
	The second secon		RIER DELIV	CLUDING COU	CHANGE POSSESSION, INCLUDING COURIER DELIVERY	PLES CHANGE P	H TIME SAM	BELOW EAC	OCUMENTED	Y MUST BE DO	SAMPLE CUSTODY MUST BE DOCUMENTED BELOW EACH TIME SAMPLES	Bethaniehod hy Sampler
	EV / IIBC. Tenation #									00 pm	by Lab, if received by 3:(TAT Starts Day received by Lab, if received by 3:00 pm
							TRRP Checklist	TRRP				3 Day EMERGENCY
				-411	UST / RG -411	(sn	Level 3 (CLP Forms)	Level			Contract TAT	2 Day EMERGENCY
				rel IV	TRRP Level IV	Forms	Level III Std QC+ Forms	Level			Y7 Day TAT	Next Day EMERGENCY
			/raw data)	Level IV (Full Data Pkg /raw data)	Level IV (Level II Std QC	Level			5 Pay TAT	Same Day TAT
	Notes:				on	Data Deliverable Information	Data Del				s days)	Turnaround Time (Business days)
												10
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		5		<			5 -	1616	3/17/14	2.5	-Swy	4 074638-JMF
		<	< <	<			5 1	1614	h1/11/2	2.5	- SW3	3 074638-JMF-SW3
		<	5	<			1	1611	3/17/14		-SWZ	2 074638-JMF-SWZ
		2	5				5	1602	3/17/14	2,5	-SWI	1 074638-JMF-SWI
Field Tomore		TPH Chlo	BTE	NaHSO4 MEOH NONE	HNO3 H2SO4 NaOH	8 HCI NaOH/Zn Acetate	# of Matrix bottles	Time	Date	Sample Depth		
WWW- WASIC WAIC		lGR	EX	d bottles	Number of preserved bottles	Numb			Collection		at of Collection	
WW- Wasto Water		0t 15									1	John Fergerson
W = Wipe 0 = 0il		· Di						er:	PO Number:		c Ferenz	Chrisknight I Jekc
SL = Sludge WW= Waste Water		R0)	- 1							36-0081	cranorld. con li	Kergerson@Cra
DW = Drinking Water P = Product SW = Surface water						NN	rtx1	Invoice To:	Invoice T	19703	1.1	Email: Loop 250 N, I vid land, IX
S = Soil/Sed/Solid GW =Ground Water						•		cation:	Project Location:			Company Address:
A= Air				074638	-	ABO REEL Gatharing System/	pathar	2eef	A80		RA	ranch:
Matrix Codes	Analytical Information	Analytical				on	Project Information	Proje			ition	Client / Reporting Information
481723	Aetico aog #					www.xenco.com	WWW					
Tampa, Florida (813-620-2000)	0-449-8800)	Norcross, Georgia (770-449-8800)	Norcross, G								Tavae (210-500-232/)	Service Center - San Antonio Texas (210-500-2324)
Lakeland, Florida (863-646-8526)	3-1800)	Ouessa, Texas (432-303-1800)	Quess									Dallas. Texas (214-902-0300)
-		- Town (400 E	Odere								0)	Stafford, Texas (281-240-4200)
					L		-				000	Setting the Standard since 1000
			Y	TOT	COS	CHAIN OF CUSIODY	AII					
			TT	ヨンヨ	2TTC	うう		フロ				



XENCO Laboratories Prelogin/Nonconformance Report- Sample Log-In

Comments



Client: Conestoga Rovers & Associates Acceptable Temperature Range: 0 - 6 degC Air and Metal samples Acceptable Range: Ambient Date/ Time Received: 03/19/2014 12:25:00 PM **Temperature Measuring device used :** Work Order #: 481523 Sample Receipt Checklist 2.5 #1 *Temperature of cooler(s)? #2 *Shipping container in good condition? Yes #3 *Samples received on ice? Yes #4 *Custody Seals intact on shipping container/ cooler? N/A #5 Custody Seals intact on sample bottles? N/A #6 *Custody Seals Signed and dated? N/A #7 *Chain of Custody present? Yes #8 Sample instructions complete on Chain of Custody? Yes #9 Any missing/extra samples? No #10 Chain of Custody signed when relinquished/ received? Yes #11 Chain of Custody agrees with sample label(s)? Yes #12 Container label(s) legible and intact? Yes #13 Sample matrix/ properties agree with Chain of Custody? Yes #14 Samples in proper container/ bottle? Yes N/A #15 Samples properly preserved? #16 Sample container(s) intact? Yes #17 Sufficient sample amount for indicated test(s)? Yes #18 All samples received within hold time? Yes #19 Subcontract of sample(s)? No #20 VOC samples have zero headspace (less than 1/4 inch bubble)? N/A N/A

#21 <2 for all samples preserved with HNO3,HCL, H2SO4? #22 >10 for all samples preserved with NaAsO2+NaOH, ZnAc+NaOH?

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

Analyst:

PH Device/Lot#:

Checklist completed by:

rulaboland Ruriko Konuma

Date: 03/19/2014

N/A

Checklist reviewed by:

mos kelsey Brooks

Date: 03/19/2014

Analytical Report 514048

for GHD Services, INC- Midland

Project Manager: Jacob Ferenz

ABO Reef

074638

01-SEP-15

Collected By: Client





12600 West I-20 East Odessa, Texas 79765

Xenco-Houston (EPA Lab code: TX00122): Texas (T104704215-15-19), Arizona (AZ0765), Florida (E871002), Louisiana (03054) Oklahoma (9218)

Xenco-Atlanta (EPA Lab Code: GA00046): Florida (E87429), North Carolina (483), South Carolina (98015), Kentucky (85), DoD (L10-135) Texas (T104704477), Louisiana (04176), USDA (P330-07-00105)

> Xenco-Lakeland: Florida (E84098) Xenco-Odessa (EPA Lab code: TX00158): Texas (T104704400-TX) Xenco-Dallas (EPA Lab code: TX01468): Texas (T104704295-TX) Xenco Phoenix (EPA Lab Code: AZ00901): Arizona (AZ0757) Xenco-Phoenix Mobile (EPA Lab code: AZ00901): Arizona (AZM757) Xenco Tucson (EPA Lab code: AZ000989): Arizona (AZ0758)



01-SEP-15

Project Manager: Jacob Ferenz GHD Services, INC- Midland 2135 S Loop 250 W Midland, TX 79703

Reference: XENCO Report No(s): **514048 ABO Reef** Project Address:

Jacob Ferenz:

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) 514048. 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. 514048 will be filed for 60 days, and after that time they will be properly disposed without further notice, unless otherwise arranged with you. We reserve the right to return to you any unused samples, extracts or solutions related to them if we consider so necessary (e.g., samples identified as hazardous waste, sample sizes exceeding analytical standard practices, controlled substances under regulated protocols, etc).

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

Ams boah

 Kelsey Brooks

 Project Manager

 Recipient of the Prestigious Small Business Administration Award of Excellence in 1994. Certified and approved by numerous States and Agencies.

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

Houston - Dallas - Odessa - San Antonio - Tampa - Lakeland - Atlanta - Phoenix - Oklahoma - Latin America



Sample Cross Reference 514048



GHD Services, INC- Midland, Midland, TX

ABO Reef

Sample Id	Matrix	Date Collected	Sample Depth	Lab Sample Id
SS-081915-JF-SB1 0'	S	08-19-15 10:00	- 0 ft	514048-001
SS-081915-JF-SB1 5'	S	08-19-15 10:05	- 5 ft	514048-002
SS-081915-JF-SB1 10'	S	08-19-15 10:10	- 10 ft	514048-003
SS-081915-JF-SB1 15'	S	08-19-15 10:20	- 15 ft	514048-004
SS-081915-JF-SB1 20'	S	08-19-15 10:25	- 20 ft	514048-005
SS-081915-JF-SB1 30'	S	08-19-15 10:30	- 30 ft	514048-006
SS-081915-JF-SB1 40'	S	08-19-15 10:35	- 40 ft	514048-007
SS-081915-JF-SB1 50'	S	08-19-15 10:40	- 50 ft	514048-008
SS-081915-JF-SB2 0'	S	08-19-15 10:45	- 0 ft	514048-009
SS-081915-JF-SB2 5'	S	08-19-15 10:50	- 5 ft	514048-010
SS-081915-JF-SB2 10'	S	08-19-15 10:55	- 10 ft	514048-011
SS-081915-JF-SB2 15'	S	08-19-15 11:00	- 15 ft	514048-012
SS-081915-JF-SB2 20'	S	08-19-15 11:05	- 20 ft	514048-013
SS-081915-JF-SB2 30'	S	08-19-15 11:10	- 30 ft	514048-014
SS-081915-JF-SB2 40'	S	08-19-15 11:15	- 40 ft	514048-015
SS-081915-JF-SB2 50'	S	08-19-15 11:20	- 50 ft	514048-016



CASE NARRATIVE



Client Name: GHD Services, INC- Midland Project Name: ABO Reef

Project ID: 074638 Work Order Number(s): 514048 Report Date:01-SEP-15Date Received:08/21/2015

Sample receipt non conformances and comments:

Sample receipt non conformances and comments per sample:

None


Project Id: 074638

Contact: Jacob Ferenz

Project Location:

Certificate of Analysis Summary 514048

GHD Services, INC- Midland, Midland, TX

Project Name: ABO Reef



Date Received in Lab: Fri Aug-21-15 04:15 pm

Report Date: 01-SEP-15

								Project Mai	nager:	Kelsey Brooks	8		
	Lab Id:	514048-0	001	514048-0	002	514048-003		514048-004		514048-005		514048-0	06
An aluais De au este d	Field Id:	SS-081915-JF	-SB1 0'	SS-081915-JF-	-SB1 5'	SS-081915-JF-	SB1 10'	SS-081915-JF-5	SB1 15'	SS-081915-JF-5	SB1 20'	SS-081915-JF-S	SB1 30'
Analysis Requested	Depth:	0 ft		5 ft		10 ft		15 ft		20 ft		30 ft	
	Matrix:	SOIL		SOIL		SOIL		SOIL		SOIL		SOIL	
	Sampled:	Aug-19-15	Aug-19-15 10:00		Aug-19-15 10:05		Aug-19-15 10:10		0:20	Aug-19-15	10:25	Aug-19-15 1	10:30
Inorganic Anions by EPA 300/300.1	00/300.1 <i>Extracted:</i> Au		16:00	Aug-28-15	16:00	Aug-28-15	16:00	Aug-28-15	6:00	Aug-28-15	16:00	Aug-28-15 1	16:00
	Analyzed:		20:16	Aug-29-15	20:39	Aug-29-15 2	21:01	Aug-29-15 2	21:24	Aug-29-15 2	22:32	Aug-29-15 2	22:55
	Units/RL:	mg/kg	RL	mg/kg	RL	mg/kg	RL	mg/kg	RL	mg/kg	RL	mg/kg	RL
Chloride		60.9	11.6	8.81	2.42	5.31	2.56	6.05	2.24	9.07	3.61	5.55	3.17
Percent Moisture	Extracted:												
	Analyzed:	Aug-27-15	17:30	Aug-27-15	17:30	Aug-27-15	17:30	Aug-27-15	7:30	Aug-27-15	17:30	Aug-27-15 1	17:30
	Units/RL:	%	RL	%	RL	%	RL	%	RL	%	RL	%	RL
Percent Moisture		14.0	1.00	17.3	1.00	21.7	1.00	10.6	1.00	44.6	1.00	37.0	1.00
TPH By SW8015B Mod	Extracted:	Aug-29-15	18:00	Aug-29-15 18:00		Aug-29-15 18:00		Aug-29-15 18:00		Aug-29-15 18:00		Aug-29-15 1	18:00
	Analyzed:	Aug-31-15	19:28	Aug-31-15 21:09		Aug-31-15 2	21:57	Aug-31-15 2	22:34	Aug-31-15 2	23:10	Aug-30-15 (00:19
	Units/RL:	mg/kg	RL	mg/kg	RL	mg/kg	RL	mg/kg	RL	mg/kg	RL	mg/kg	RL
C6-C10 Gasoline Range Hydrocarbons		ND	17.4	ND	18.1	ND	19.2	ND	16.8	ND	27.1	ND	23.8
C10-C28 Diesel Range Hydrocarbons		85.4	17.4	ND	18.1	ND	19.2	ND	16.8	ND	27.1	ND	23.8
Total TPH		85.4	17.4	ND	18.1	ND	19.2	ND	16.8	ND	27.1	ND	23.8

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

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

Huns Roah

Kelsey Brooks Project Manager



Project Id: 074638

Contact: Jacob Ferenz

Project Location:



GHD Services, INC- Midland, Midland, TX

Project Name: ABO Reef



Date Received in Lab: Fri Aug-21-15 04:15 pm

Report Date: 01-SEP-15

								Project Mai	nager:	Kelsey Brooks	3		
	Lab Id:	514048-0	07	514048-0	08	514048-0	09	514048-0	10	514048-0	11	514048-0	12
Amalusia Doguostod	Field Id:	SS-081915-JF-	SB1 40'	SS-081915-JF-SB1 50'		SS-081915-JF-SB2 0'		SS-081915-JF-SB2 5'		SS-081915-JF-SB2 10'		SS-081915-JF-	SB2 15'
Analysis Requested	Depth:	40 ft		50 ft		0 ft		5 ft		10 ft		15 ft	
	Matrix:	SOIL		SOIL		SOIL		SOIL		SOIL		SOIL	
	Sampled:	Aug-19-15	Aug-19-15 10:35		Aug-19-15 10:40		10:45	Aug-19-15	10:50	Aug-19-15	10:55	Aug-19-15	11:00
Inorganic Anions by EPA 300/300.1	Extracted:	Aug-28-15 16:00		Aug-28-15	16:00	Aug-28-15	16:00	Aug-29-15	11:30	Aug-29-15	11:30	Aug-29-15	11:30
	Analyzed:	Aug-29-15	Aug-29-15 23:17		23:40	Aug-30-15 (00:03	Aug-30-15 (02:19	Aug-30-15	03:05	Aug-30-15 (03:27
	Units/RL:		RL	mg/kg	RL	mg/kg	RL	mg/kg	RL	mg/kg	RL	mg/kg	RL
Chloride		18.0	2.23	20.4	2.19	24.7	2.93	20.4	2.04	15.9	2.10	16.7	2.73
Percent Moisture	Extracted:												
	Analyzed:	Aug-27-15	17:30	Aug-27-15 17:30		Aug-27-15 17:30		Aug-27-15 17:30		Aug-28-15 17:30	17:30	Aug-28-15	17:30
	Units/RL:	%	RL	%	RL	%	RL	%	RL	%	RL	%	RL
Percent Moisture		10.5	1.00	8.75	1.00	31.8	1.00	2.13	1.00	4.67	1.00	26.8	1.00
TPH By SW8015B Mod	Extracted:	Aug-29-15	18:00	Aug-29-15	18:00	Aug-29-15 18:00		Aug-29-15 18:00		Aug-29-15 18:00		Aug-29-15	18:00
	Analyzed:	Aug-30-15	14:08	Aug-30-15	19:01	Aug-30-15 19:32		Aug-30-15 20:03		Aug-30-15	20:35	Aug-30-15 2	22:08
	Units/RL:	mg/kg	RL	mg/kg	RL	mg/kg	RL	mg/kg	RL	mg/kg	RL	mg/kg	RL
C6-C10 Gasoline Range Hydrocarbons		18.4	16.8	ND	16.4	ND	22.0	ND	15.3	ND	15.7	ND	20.5
C10-C28 Diesel Range Hydrocarbons		ND	16.8	ND	16.4	ND	22.0	ND	15.3	ND	15.7	ND	20.5
Total TPH		18.4	16.8	ND	16.4	ND	22.0	ND	15.3	ND	15.7	ND	20.5

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

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Kelsey Brooks Project Manager



Project Id: 074638

Contact: Jacob Ferenz

Project Location:

Certificate of Analysis Summary 514048

GHD Services, INC- Midland, Midland, TX

Project Name: ABO Reef



Date Received in Lab: Fri Aug-21-15 04:15 pm

Report Date: 01-SEP-15

Project Manager: Kelsey Brooks

Percent Moisture Extracted: Aug-28-15 17:30 Aug-28-15 17:30 Aug-28-15 17:30 Aug-28-15 17:30 Aug-28-15 17:30 Units/RL: % RL %									- J		neise) Brooms	1
$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$		Lab Id:	514048-0	013	514048-0	14	514048-0)15	514048-0	016		
Depth: 20 ft 30 ft 40 ft 50 ft Matrix: SOIL SOIL SOIL SOIL SOIL Image: Aug-19-15 11:05 Aug-19-15 11:10 Aug-19-15 11:15 Aug-19-15 11:10 Aug-29-15 11:30 Imorganic Anions by EPA 300/300.1 Extracted: Aug-29-15 11:30 Aug-29-15 11:30 Aug-29-15 11:30 Aug-29-15 11:30 Analyzed: Aug-29-15 03:50 Aug-29-15 04:13 Aug-29-15 04:35 Aug-29-15 05:44 Units/RL: mg/kg RL mg/kg	Analysis Proprested	Field Id:	SS-081915-JF-	SB2 20'	SS-081915-JF-	SB2 30'	SS-081915-JF-	SB2 40'	SS-081915-JF-	SB2 50'		
Samplei Aug-19-15 1:0 Aug-19-15 1:10 Aug-19-15 1:15 Aug-19-15 1:20 (Aug-19-15 1:20) Inorganic Anions by EPA 300/300.1 Extracted: Aug-29-15 1:30 Aug-29-15 0:344 Aug-29-15 0:344	Anuiysis Kequesteu	Depth:	20 ft		30 ft		40 ft		50 ft			
Inorganic Anions by EPA 300/300.1 Extracted: Aug-29-15 11:30 Aug-29-15 11:30 Aug-29-15 11:30 Aug-29-15 11:30 Analyzed: Aug-30-15 03:50 Aug-30-15 04:13 Aug-30-15 04:35 Aug-30-15 05:44 Units/RL: mg/kg RL mg/kg RL mg/kg RL Chloride 27.4 2.28 6.87 2.20 7.89 2.24 10.6 2.24 Percent Moisture Extracted: Aug-28-15 17:30 Aug-28-15 17:30 Aug-28-15 17:30 Aug-28-15 17:30 Aug-28-15 17:30 Percent Moisture Extracted: Mug-28-15 17:30 Aug-28-15 17:30 Aug-28-15 17:30 Aug-28-15 17:30 Aug-28-15 17:30 Percent Moisture 12.1 1.00 9.24 1.00 10.9 1.00 10.6 1.00 TPH By SW8015B Mod Extracted: Aug-29-15 18:00 Aug-30-15 12:23 Aug-20-15 18:00 Aug-30-15 22:39 Aug-31-15 20:17 Aug-31-15 12:22 Aug-31-15 12:53 Aug-31-15 12:53		Matrix:	SOIL		SOIL		SOIL		SOIL			
Analyzed: Aug-30-15 03:50 Aug-30-15 04:13 Aug-30-15 04:35 Aug-30-15 05:44 Units/RL: mg/kg RL		Sampled:	Aug-19-15	11:05	Aug-19-15	1:10	Aug-19-15	11:15	Aug-19-15	11:20		
Units/RL: mg/kg RL Mg/kg	Inorganic Anions by EPA 300/300.1	Extracted:	Aug-29-15	11:30	Aug-29-15	11:30	Aug-29-15	11:30	Aug-29-15	11:30		
Chloride 27.4 2.28 6.87 2.20 7.89 2.24 10.6 2.24 Percent Moisture Extracted: Aug-28-15 17:30 Aug-28-15 17:30 Aug-28-15 17:30 Aug-28-15 17:30 Units/RL: % RL % RL % RL % RL % RL Percent Moisture Extracted: Aug-28-15 17:30 Aug-28-15 17:30 Aug-28-15 17:30 Percent Moisture 12.1 1.00 9.24 1.00 10.9 1.00 10.6 1.00 TPH By SW8015B Mod Extracted: Aug-29-15 18:00 Aug-29-15 18:00 Aug-29-15 18:00 Aug-29-15 18:00 Analyzed: Aug-30-15 22:39 Aug-31-15 20:17 Aug-31-15 12:22 Aug-31-15 12:53		Analyzed:	Aug-30-15	e)4:13	Aug-30-15 (04:35	Aug-30-15	05:44		
Percent Moisture Extracted: Aug-28-15 17:30 Aug-28-15 17:30 Aug-28-15 17:30 Aug-28-15 17:30 Aug-28-15 17:30 Units/RL: % RL %		Units/RL:	mg/kg	RL	mg/kg	RL	mg/kg	RL	mg/kg	RL		
Analyzed: Aug-28-15 17:30 Aug-28-15 17:30 Aug-28-15 17:30 Aug-28-15 17:30 Units/RL: % RL %	Chloride		27.4	2.28	6.87	2.20	7.89	2.24	10.6	2.24		
Units/RL: % RL % % RL % % RL %	Percent Moisture Extracted:											
Percent Moisture 12.1 1.00 9.24 1.00 10.9 1.00 10.6 1.00 TPH By SW8015B Mod Extracted: Aug-29-15 18:00 Aug-29-15 18:00 Aug-29-15 18:00 Aug-29-15 18:00 Aug-29-15 18:00 Aug-29-15 18:00 Aug-31-15 12:22 Aug-31-15 12:53		Analyzed:	Aug-28-15	17:30	Aug-28-15	17:30	Aug-28-15	17:30	Aug-28-15	17:30		
TPH By SW8015B Mod Extracted: Aug-29-15 18:00 Aug-29-15 18:00 Aug-29-15 18:00 Aug-29-15 18:00 Analyzed: Aug-30-15 22:39 Aug-31-15 20:17 Aug-31-15 12:22 Aug-31-15 12:53		Units/RL:	%	RL	%	RL	%	RL	%	RL		
Analyzed: Aug-30-15 22:39 Aug-31-15 20:17 Aug-31-15 12:22 Aug-31-15 12:53	Percent Moisture		12.1	1.00	9.24	1.00	10.9	1.00	10.6	1.00		
	TPH By SW8015B Mod	Extracted:	Aug-29-15	18:00	Aug-29-15	18:00	Aug-29-15	18:00	Aug-29-15	18:00		
		Analyzed:	Aug-30-15	22:39	Aug-31-15 2	20:17	Aug-31-15	12:22	Aug-31-15	12:53		
Units/RL: mg/kg RL mg/kg RL mg/kg RL mg/kg RL		Units/RL:	mg/kg	RL	mg/kg	RL	mg/kg	RL	mg/kg	RL		
C6-C10 Gasoline Range Hydrocarbons ND 17.1 ND 16.5 ND 16.8 ND 16.8	C6-C10 Gasoline Range Hydrocarbons		ND	17.1	ND	16.5	ND	16.8	ND	16.8		
C10-C28 Diesel Range Hydrocarbons ND 17.1 ND 16.5 ND 16.8	C10-C28 Diesel Range Hydrocarbons		ND	17.1	ND	16.5	ND	16.8	ND	16.8		
Total TPH ND 17.1 ND 16.5 ND 16.8 ND 16.8	Total TPH		ND	17.1	ND	16.5	ND	16.8	ND	16.8		

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Kelsey Brooks Project Manager

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Flagging Criteria



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

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

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

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(432) 563-1800	(432) 563-1713
(770) 449-8800	(770) 449-5477
(602) 437-0330	

Final 1.000



Project Name: ABO Reef

Lub Dutth	# : 975961	Sample: 514048-006 / SMP	Batc	h: 1 Matrix	• 5011		
Units:	mg/kg	Date Analyzed: 08/30/15 00:19	SU	JRROGATE R	ECOVERY S	STUDY	
	ТРН В	Sy SW8015B Mod	Amount Found [A]	True Amount [B]	Recovery %R	Control Limits %R	Flage
		Analytes			[D]		
1-Chlorooct	ane		94.3	100	94	70-135	
o-Terpheny			48.3	50.0	97	70-135	
Lab Batch	#: 975961	Sample: 514048-007 / SMP	Batc	h: 1 Matrix	: Soil		
Units:	mg/kg	Date Analyzed: 08/30/15 14:08	SU	JRROGATE R	ECOVERY S	STUDY	
	TPH B	Sy SW8015B Mod Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1-Chlorooct	ane	Anarytes	107	100	107	70-135	
o-Terphenyl			53.5	50.0	107	70-135	
Lab Batch		Sample: 514048-008 / SMP	Batc			10 100	
Units:	mg/kg	Date Analyzed: 08/30/15 19:01		JRROGATE R		STUDY	
	TPH B	Sy SW8015B Mod	Amount Found [A]	True Amount [B]	Recovery %R	Control Limits %R	Flage
		Analytes	[]	[2]	[D]	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	
1-Chlorooct	ane		90.0	100	90	70-135	
o-Terpheny			45.5	50.0	91	70-135	
Lab Batch	#: 975961	Sample: 514048-009 / SMP	Batc	h: 1 Matrix	: Soil	<u>.</u>	
Units:	mg/kg	Date Analyzed: 08/30/15 19:32	SU	RROGATE R	ECOVERY S	STUDY	
	ТРН В	Sy SW8015B Mod Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flage
1-Chlorooct	ane		89.6	100	90	70-135	
o-Terpheny			45.3	50.0	91	70-135	
Lab Batch		Sample: 514048-010 / SMP	Batc	h: 1 Matrix	: Soil	I	
Units:	mg/kg	Date Analyzed: 08/30/15 20:03	SU	JRROGATE R	ECOVERY S	STUDY	
	TPH B	Sy SW8015B Mod	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flage
1-Chlorooct	000	Analytes	112	100	112	70-135	
			117	100	117	1 / U-110	

* Surrogate outside of Laboratory QC limits

** Surrogates outside limits; data and surrogates confirmed by reanalysis

*** Poor recoveries due to dilution

Surrogate Recovery [D] = 100 * A / B



Project Name: ABO Reef

	#: 975961	Sample: 514048-011 / SMP	Bate		: Soil		
Units:	mg/kg	Date Analyzed: 08/30/15 20:35	SU	JRROGATE R	ECOVERY S	STUDY	
	TPH E	By SW8015B Mod	Amount Found [A]	True Amount [B]	Recovery %R	Control Limits %R	Flag
		Analytes			[D]		
1-Chlorooct	ane		88.0	100	88	70-135	
o-Terpheny			44.6	50.0	89	70-135	
Lab Batch	#: 975961	Sample: 514048-012 / SMP	Bate	h: 1 Matrix	: Soil		
Units:	mg/kg	Date Analyzed: 08/30/15 22:08	SU	JRROGATE R	ECOVERY S	STUDY	
	TPH E	By SW8015B Mod Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flag
1-Chlorooct	ane	Analytes	102	100	102	70-135	
o-Terpheny			51.3	50.0	102	70-135	
1 2	#: 975961	Sample: 514048-013 / SMP	Bate				
Units:	mg/kg	Date Analyzed: 08/30/15 22:39	SU	JRROGATE R		STUDY	
	TPH B	By SW8015B Mod	Amount Found [A]	True Amount [B]	Recovery %R	Control Limits %R	Flag
		Analytes	[]	[2]	[D]	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	
1-Chlorooct	ane		89.5	100	90	70-135	
o-Terpheny	1		44.8	50.0	90	70-135	
Lab Batch	#: 975961	Sample: 514048-015 / SMP	Bate	h: 1 Matrix	: Soil		
Units:	mg/kg	Date Analyzed: 08/31/15 12:22	SU	JRROGATE R	ECOVERY S	STUDY	
	TPH E	By SW8015B Mod Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flag
1-Chlorooct	ane		91.4	100	91	70-135	
o-Terpheny	1		45.7	50.0	91	70-135	
	#: 975961	Sample: 514048-016 / SMP	Bate	h: 1 Matrix	: Soil	I	
Units:	mg/kg	Date Analyzed: 08/31/15 12:53	SU	JRROGATE R	ECOVERY S	STUDY	
	TPH E	By SW8015B Mod Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flag
1-Chlorooct	ane		94.7	100	95	70-135	
			77.1	100	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	,0155	

* Surrogate outside of Laboratory QC limits

** Surrogates outside limits; data and surrogates confirmed by reanalysis

*** Poor recoveries due to dilution

Surrogate Recovery [D] = 100 * A / B



Project Name: ABO Reef

Lab Batch #: 9		Sample: 514048-001 / SMP		h: 1 Matrix			
Units: n	ng/kg	Date Analyzed: 08/31/15 19:28	SU	URROGATE R	ECOVERY S	STUDY	
	TPH B	y SW8015B Mod	Amount Found [A]	True Amount [B]	Recovery %R	Control Limits %R	Flage
		Analytes			[D]		
1-Chlorooctane			97.0	100	97	70-135	
o-Terphenyl			46.0	50.0	92	70-135	
Lab Batch #: 9	75961	Sample: 514048-014 / SMP	Bato	ch: 1 Matrix	: Soil		
Units: n	ng/kg	Date Analyzed: 08/31/15 20:17	SU	URROGATE R	ECOVERY S	STUDY	
	TPH B	ay SW8015B Mod	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1-Chlorooctane		Analytes	93.1	100	93	70-135	
o-Terphenyl			46.2	50.0	92	70-135	
Lab Batch #: 9	75961	Sample: 514048-002 / SMP	Bate			10 155	
Units: n	ng/kg	Date Analyzed: 08/31/15 21:09	SU	URROGATE R		STUDY	
	TPH B	y SW8015B Mod	Amount Found [A]	True Amount [B]	Recovery %R	Control Limits %R	Flage
		Analytes	[A]	[D]	[D]	70K	
1-Chlorooctane			103	100	103	70-135	
o-Terphenyl			50.7	50.0	101	70-135	
Lab Batch #: 9	75961	Sample: 514048-003 / SMP	Bato	ch: 1 Matrix	: Soil		
Units: n	ng/kg	Date Analyzed: 08/31/15 21:57	SU	URROGATE R	ECOVERY S	STUDY	
	ТРН В	y SW8015B Mod Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flage
1-Chlorooctane		1 mary ces	112	100	112	70-135	
o-Terphenyl			55.1	50.0	112	70-135	
Lab Batch #: 9	75961	Sample: 514048-004 / SMP	Bato				
	ng/kg	Date Analyzed: 08/31/15 22:34		URROGATE R		STUDY	
	TPH B	y SW8015B Mod	Amount Found [A]	True Amount [B]	Recovery %R	Control Limits %R	Flag
		Analytes			[D]		
1-Chlorooctane			102	100	102	70-135	
o-Terphenyl			50.2	50.0	100	70-135	

* Surrogate outside of Laboratory QC limits

** Surrogates outside limits; data and surrogates confirmed by reanalysis

*** Poor recoveries due to dilution

Surrogate Recovery [D] = 100 * A / B



Project Name: ABO Reef

Lab Batch #:		Sample: 514048-005 / SMP	Bate	ch: 1 Matrix	• ·····		
Units:	mg/kg	Date Analyzed: 08/31/15 23:10	SU	URROGATE R	ECOVERY S	STUDY	
	TPH F	By SW8015B Mod	Amount Found [A]	True Amount [B]	Recovery %R	Control Limits %R	Flag
		Analytes			[D]		
1-Chlorooctane	,		98.4	100	98	70-135	
o-Terphenyl			48.9	50.0	98	70-135	
Lab Batch #:	975961	Sample: 697535-1-BLK / B	LK Bate	ch: 1 Matrix	: Solid		
Units:	mg/kg	Date Analyzed: 08/29/15 18:59	SU	URROGATE R	ECOVERY S	STUDY	
	TPH F	By SW8015B Mod Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1-Chlorooctane	,	111111 j 000	117	100	117	70-135	
o-Terphenyl			59.6	50.0	119	70-135	
Lab Batch #:	975961	Sample: 697535-1-BKS / BI	KS Bate	h: 1 Matrix	: Solid		
Units:	mg/kg	Date Analyzed: 08/29/15 19:45	SU	URROGATE R	ECOVERY S	STUDY	
	TPH F	By SW8015B Mod	Amount Found [A]	True Amount [B]	Recovery %R	Control Limits %R	Flage
		Analytes			[D]		
1-Chlorooctane	•		101	100	101	70-135	
o-Terphenyl			46.3	50.0	93	70-135	
Lab Batch #:	975961	Sample: 697535-1-BSD / BS	SD Bate	ch: 1 Matrix	: Solid		
Units:	mg/kg	Date Analyzed: 08/29/15 20:34	SU	URROGATE R	ECOVERY S	STUDY	
	TPH F	By SW8015B Mod Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1-Chlorooctane	<u></u>	Anarytes	106	100	106	70-135	
o-Terphenyl			47.3	50.0	95	70-135	
Lab Batch #:	975961	Sample: 514048-008 S / MS				, , , , , , , , , , , , , , , , , , , ,	
Units:	mg/kg	Date Analyzed: 08/31/15 16:08		URROGATE R		STUDY	
	TPH F	By SW8015B Mod	Amount Found [A]	True Amount [B]	Recovery %R	Control Limits %R	Flag
		Analytes			[D]		
1-Chlorooctane	•		115	100	115	70-135	
o-Terphenyl			50.9	50.0	102	70-135	

* Surrogate outside of Laboratory QC limits

** Surrogates outside limits; data and surrogates confirmed by reanalysis

*** Poor recoveries due to dilution

Surrogate Recovery [D] = 100 * A / B



Project Name: ABO Reef

Lab Batch	rders : 51404 #: 975961	Sample: 514048-008 SD / N	MSD Batcl	Project ID: h: 1 Matrix:			
Units:	Units: mg/kg Date Analyzed: 08/31/15 16:42		SU	RROGATE RI	ECOVERY	STUDY	
	TPH F	By SW8015B Mod Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1-Chlorooc	tane		115	100	115	70-135	
o-Terpheny	/1		52.0	50.0	104	70-135	

* Surrogate outside of Laboratory QC limits

** Surrogates outside limits; data and surrogates confirmed by reanalysis

*** Poor recoveries due to dilution

Surrogate Recovery [D] = 100 * A / B



BS / BSD Recoveries



Project Name: ABO Reef

Work Order #: 514048							Pro	ject ID:(5/4638		
Analyst: JUM	D	ate Prepar	red: 08/28/201	15			Date A	nalyzed: (08/29/2015		
Lab Batch ID: 975766 Sample: 697370-1-E	BKS	Batc	h #: 1					Matrix: S	Solid		
Units: mg/kg		BLAN	K /BLANK	SPIKE / 1	BLANK	SPIKE DUP	LICATE	RECOVI	ERY STUI	DY	
Inorganic Anions by EPA 300/300.1 Analytes	Blank Sample Result [A]	Spike Added [B]	Blank Spike Result [C]	Blank Spike %R [D]	Spike Added [E]	Blank Spike Duplicate Result [F]	Blk. Spk Dup. %R [G]	RPD %	Control Limits %R	Control Limits %RPD	Flag
Chloride	<2.00	50.0	50.6	101	50.0	50.3	101	1	90-110	20	
Analyst: JUM	D	ate Prepar	red: 08/29/201	15			Date A	nalyzed: (08/30/2015	•	·
Lab Batch ID: 975769 Sample: 697375-1-E	BKS	Batc	h #: 1					Matrix: S	Solid		
Units: mg/kg		BLAN	K /BLANK S	SPIKE / 1	BLANK	SPIKE DUP	LICATE	RECOVI	ERY STUI	DY	
Inorganic Anions by EPA 300/300.1	Blank	Spike	Blank	Blank	Spike	Blank	Blk. Spk		Control	Control	
	Sample Result [A]	Added	Spike Result	Spike %R	Added	Spike Duplicate Result [F]	Dup. %R	RPD %	Limits %R	Limits %RPD	Flag
Analytes	[A]	[B]	Result [C]	%R [D]	Added [E]	Duplicate Result [F]	%R [G]	%	%R	%RPD	Flag
Analytes Chloride	[A] <2.00	[B] 50.0	Result [C] 49.6	% R [D] 99	Added	Duplicate	%R [G] 100	% 1	% R 90-110		Flag
Analytes Chloride Analyst: PJB	[A] <2.00 D	[B] 50.0 ate Prepar	Result [C] 49.6 red: 08/29/201	% R [D] 99	Added [E]	Duplicate Result [F]	%R [G] 100	% 1 nalyzed: (% R 90-110 08/29/2015	%RPD	Flag
Analytes Chloride Analyst: PJB Lab Batch ID: 975961 Sample: 697535-1-E	[A] <2.00 D	[B] 50.0 ate Prepar Batc	Result [C] 49.6 red: 08/29/201 h #: 1	% R [D] 99	Added [E] 50.0	Duplicate Result [F] 50.0	%R [G] 100 Date A	% 1 nalyzed: (Matrix: S	%R 90-110 08/29/2015 Solid	% RPD 20	Flag
Analytes Chloride Analyst: PJB	[A] <2.00 D	[B] 50.0 ate Prepar Batc	Result [C] 49.6 red: 08/29/201	% R [D] 99	Added [E] 50.0	Duplicate Result [F] 50.0	%R [G] 100 Date A	% 1 nalyzed: (Matrix: S	%R 90-110 08/29/2015 Solid	% RPD 20	Flag
Analytes Chloride Analyst: PJB Lab Batch ID: 975961 Sample: 697535-1-E	[A] <2.00 D	[B] 50.0 ate Prepar Batc	Result [C] 49.6 red: 08/29/201 h #: 1	% R [D] 99	Added [E] 50.0	Duplicate Result [F] 50.0	%R [G] 100 Date A	% 1 nalyzed: (Matrix: S	%R 90-110 08/29/2015 Solid	% RPD 20	Flag
Analytes Chloride Analyst: PJB Lab Batch ID: 975961 Sample: 697535-1-E Units: mg/kg TPH By SW8015B Mod	[A] <2.00 D BKS Blank Sample Result	[B] 50.0 ate Prepar Batc BLAN Spike Added	Result [C] 49.6	%R [D] 99 15 SPIKE /] Blank Spike %R	Added [E] 50.0 BLANK S Spike Added	Duplicate Result [F] 50.0 SPIKE DUP Blank Spike Duplicate	%Ř [G] 100 Date A LICATE Blk. Spk Dup. %R	% 1 nalyzed: (Matrix: S RECOVI	%R 90-110 08/29/2015 Solid ERY STUI Control Limits	%RPD 20 DY Control Limits	

Relative Percent Difference RPD = $200^{*}|(C-F)/(C+F)|$ Blank Spike Recovery [D] = $100^{*}(C)/[B]$ Blank Spike Duplicate Recovery [G] = $100^{*}(F)/[E]$ All results are based on MDL and Validated for QC Purposes

XENCO Laboratories Proje	Form 3 - M ect Name: ABO R		veries		A STATE OF	KONTE TOPY			
Work Order #: 514048					74629				
Lab Batch #: 975766			0	ect ID: ⁰					
Date Analyzed: 08/29/2015	Date Prepared: 0	8/28/2015	А	nalyst: J	UM				
QC- Sample ID: 514047-027 S	Batch #:	1	I	Matrix: S	Soil				
Reporting Units: mg/kg	MA	TRIX / MA	ATRIX SPIKE	RECO	VERY STU	JDY			
Inorganic Anions by EPA 300	Parent Sample Result [A]		Spiked Sample Result [C]	%R [D]	Control Limits %R	Flag			
Chloride	3.63	51.8	57.6	104	80-120	1			
Lab Batch #: 975766	5.05	51.6	57.0	104	00-120				
Date Analyzed: 08/29/2015	Date Prepared: 0	8/28/2015	А	analyst: J	UM				
QC- Sample ID: 514468-003 S	Batch #:	1		Matrix: S					
Reporting Units: mg/kg		TRIX / MA	ATRIX SPIKE			JDY			
Inorganic Anions by EPA 300	Parent Sample Result	Spike	Spiked Sample Result [C]	%R [D]	Control Limits %R	Flag			
Analytes	[A]	[B]							
Chloride	1720	2500	4350	105	80-120				
Lab Batch #: 975769					1	1			
Date Analyzed: 08/30/2015	Date Prepared: 0	8/29/2015	Analyst: JUM						
QC- Sample ID: 514048-010 S	Batch #:	1	Matrix: Soil						
Reporting Units: mg/kg	MA	TRIX / MA	ATRIX SPIKE RECOVERY STUDY						
Inorganic Anions by EPA 300 Analytes	Parent Sample Result [A]	Spike	Spiked Sample Result [C]	%R [D]	Control Limits %R	Flag			
Chloride	20.4	51.1	70.6	98	80-120				
Lab Batch #: 975769		1		-		1			
Date Analyzed: 08/30/2015	Date Prepared: 0	8/29/2015	А	analyst: J	UM				
QC- Sample ID: 514049-004 S	-	1		Matrix: Soil					
Reporting Units: mg/kg		TRIX / MA	ATRIX SPIKE	RECO	VERY STU	JDY			
Inorganic Anions by EPA 300 Analytes	Parent Sample Result [A]		Spiked Sample Result [C]	%R [D]	Control Limits %R	Flag			
			10.10	100	00.120				
Chloride	599	1150	1840	108	80-120				





Project Name: ABO Reef



Work Order # :	514048						Project II	D: 074638	8			
Lab Batch ID:	975961	QC- Sample ID:	514048	-008 S	Ba	tch #:	1 Matrix	x: Soil				
Date Analyzed:	08/31/2015	Date Prepared:	08/29/2	015	An	alyst: F	уB					
Reporting Units:	mg/kg		Μ	ATRIX SPIK	E / MAT	RIX SPI	KE DUPLICA	TE REC	OVERY S	STUDY		
T	PH By SW8015B Mod	Parent Sample	Spike	Spiked Sample Result	Sample	Spike	Duplicate Spiked Sample	-	RPD	Control Limits	Control Limits	Flag
	Analytes	Result [A]	Added [B]	[C]	%R [D]	Added [E]	Result [F]	%R [G]	%	%R	%RPD	
C6-C10 Gasoline	Range Hydrocarbons	<16.4	1100	964	88	1100	1030	94	7	70-135	35	
C10-C28 Diesel	Range Hydrocarbons	<16.4	1100	990	90	1100	1000	91	1	70-135	35	

Matrix Spike Duplicate Percent Recovery [G] = 100*(F-A)/E

ND = Not Detected, J = Present Below Reporting Limit, B = Present in Blank, NR = Not Requested, I = Interference, NA = Not Applicable N = See Narrative, EQL = Estimated Quantitation Limit, NC = Non Calculable - Sample amount is > 4 times the amount spiked.



Work Order #: 514048

Sample Duplicate Recovery



Project Name: ABO Reef

Lab Batch #: 975638 Date Analyzed: 08/27/2015 17:30 QC- Sample ID: 514047-011 D	Date Prepar Batch	ed:08/27/2015	5 Ana	Project I lyst: WRU rix: Soil	D: 074638	
Reporting Units: %		SAMPLE	SAMPLE	DUPLIC	ATE REC	OVERY
Percent Moisture Analyte		Parent Sample Result [A]	Sample Duplicate Result [B]	RPD	Control Limits %RPD	Flag
Percent Moisture		16.8	16.9	1	20	
Lab Batch #: 975638 Date Analyzed: 08/27/2015 17:30 QC- Sample ID: 514047-021 D Reporting Units: %	Date Prepar Batch			lyst: WRU rix: Soil	ATE DEC	OVERV
Percent Moisture Analyte		Parent Sample Result [A]	Sample Duplicate Result [B]	RPD	Control Limits %RPD	Flag
Percent Moisture		8.95	8.49	5	20	
Lab Batch #: 975640 Date Analyzed: 08/27/2015 17:30 QC- Sample ID: 513982-001 D Reporting Units: %	Date Prepar Batch	-		lyst: WRU rix: Soil DUPLIC	ATE REC	OVERY
Percent Moisture Analyte		Parent Sample Result [A]	Sample Duplicate Result [B]	RPD	Control Limits %RPD	Flag
Percent Moisture		1.70	1.32	25	20	F
Lab Batch #: 975640 Date Analyzed: 08/27/2015 17:30 QC- Sample ID: 514225-006 D	Date Prepar Batch	ed:08/27/2015		lyst:WRU rix: Soil		1
Reporting Units: %		SAMPLE	SAMPLE	DUPLIC	ATE REC	OVERY
Percent Moisture Analyte		Parent Sample Result [A]	Sample Duplicate Result [B]	RPD	Control Limits %RPD	Flag
Percent Moisture		5.33	5.10	4	20	

Spike Relative Difference RPD 200 * | (B-A)/(B+A) |

All Results are based on MDL and validated for QC purposes.

BRL - Below Reporting Limit



Sample Duplicate Recovery



Project Name: ABO Reef

Work Order #: 514048

Lab Batch #: 975822			Project I	D: 074638	
Date Analyzed: 08/28/2015 17:30 Date Prep	ared: 08/28/2015	5 Anal	lyst:WRU		
QC- Sample ID: 513914-002 D Bat	t ch #: 1	Mat	rix: Soil		
Reporting Units: %	SAMPLE	SAMPLE	DUPLIC	ATE REC	OVERY
Percent Moisture	Parent Sample Result [A]	Sample Duplicate Result	RPD	Control Limits %RPD	Flag
Analyte		[B]			
Percent Moisture	9.85	9.89	0	20	
Lab Batch #: 975822					
	ared: 08/28/2015	5 Anal	lyst:WRU		
Date Analyzed: 08/28/2015 17:30 Date Prep	ared: 08/28/2015 tch #: 1		l yst: WRU rix: Soil		
Date Analyzed: 08/28/2015 17:30 Date Prep	t ch #: 1		rix: Soil	ATE REC	OVERY
Date Analyzed: 08/28/2015 17:30 Date Prep QC- Sample ID: 514048-011 D Bate	t ch #: 1	Mat	rix: Soil	ATE REC Control Limits %RPD	OVERY Flag

Spike Relative Difference RPD 200 * | (B-A)/(B+A) | All Results are based on MDL and validated for QC purposes. BRL - Below Reporting Limit

3 4 Date Time: Received By: Custody Seal # Preserved where applicable On ice Cooler Temp. Thermo. Corr. Factor Date Time: Received By: Custody Seal # Preserved where applicable X X Y	Preserved where applicable	Preserved w	4 Custody Seal #	3 Received By:	Date Time:		3 Aelinquished by:
	ime: Received By:	Date Time:	Relinquished By:	Received By:	Date Time:	4 MARINA	Relinquished by:
By:	16:15	N 74	Relinquished By:	DOCUMENTED BELOW EACH TIME SAMPLES CHANGE POSSESSION, INCLOUND COOMERCE	NI B	R SAMTPLE CUST	Rélinquished by Sapapler:
# Bu	FED-EX / UPS: Tracking #	COURSES DELIVERY				TAT Starts Day received by Lab, if received by 3:00 pm	TAT Starts Day reco
				TRRP Checklist			3 Day EMERGENCY
			UST / RG -411	Level 3 (CLP Forms)	-	Contract TAT	2 Day EMERGENCY
			TRRP Level IV	Level III Std QC+ Forms		Y X Day TAT	Next Day EMERGENCY
W	Jec Joh	Pkg /raw data)	Level IV (Full Data Pkg /raw data)	Level II Std QC		5 Day TAT	Same Day TAT
-	NOINE I		1	Data Deliverable Information			Turnaround Time (Business days)
	Nobe	×		iaso s i	5' 8/14/15	JF -513-2	· SI-08/915-
				1	8/14/15	1	8 55-081915-
				-	8/14/15	JF -50-1	5
				1030 5 1	6/14/15	JF-50-1	35
					8/2/15	- JF- 50-1	4 00 001 m
				1020 5 1	Shalis	IF-SB-1	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
					Shells	101-0	- CC- 1 Sigls
		×		1001 S	Richer		
		×		1000 5 1	SIMIS	- 1= 59-1	-210100-01
Field Comments		none TP Ch	HNO3 H2SO4 NaOH NaHSO4 MEOH	Time Matrix bottles HCI NaOH/Zn Acetate	Sample Depth Date	Field ID / Point of Collection	No. Field ID /
		H (lori	Number of preserved bottles	Numbe	Collection	Le of the second	- MUL
WW= Waste Water		GR de					Samplers's Name: 1
0 = 0)		0- S			PO Number:	02	Project Contact:
WW= Wipe		DRO			Invoice To:	Kright e GHD. Com	Ples.
P = Product SW = Surface water)		Reef		5234 Suite Soc	Company Address: 5 ton
S = Soil/Sed/Solid GW =Ground Water DW = Drinking Water		1			Project Name/Number:	Inc - Oclas	Client / Reporting Information
A= Air		Miaty		Project Information			
5AQAX Matrix Codes	Analytical Information	Xenco Quote #		www.xenco.com		Dallas, Texas (214-902-0300) Service Center - San Antonio, Texas (210-509-3334)	Dallas, Texas (214-902-0300) Service Center - San Antonic
Tampa, Florida (813-620-2000)	(770-449-8800)	Norcross, Georgia (770-449-8800)				200)	Stafford, Texas (281-240-4200)
Lakeland, Florida (863-646-8526)	Texas (432-563-1800)	Odessa, Texas (43)				1990	Setting the Standard since 1990
		þ	2				LABORATORIES
			CITCIONV	MININI OF (

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Final 1.000

3 Custody Seal # Preserved vinite applicable 3 Preserved vinite applicable 4 Date Time: Received By: Custody Seal # Preserved vinite applicable 5 5 5 5	Relinquished by: Received By: Parts Time: Received By: Parts Time: Relinquished by: Parts Time: 3	The Prod of Pale Units in the Production of the	THE DOCUMENTED BELOW EACH TIME SAMPLES CHANGE POSSESSION, INCLUDING COURIER DELIVERY	created by Lab. if received by 3:00 pm	TRRP Checklist	2 Day EMERGENCY Contract TAT Level 3 (CLP Forms) UST / RG-411		Turnaround Time (Business days)	10 Data Deliverable Information Notes:			3	30. 8448 100 0 1	- JF-SD- 2 15 8171101 2 1	Clore - Cl	No. Field ID / Point of Collection Sample The bolts HINO3 H2SO4 NaOH/Zn Acetate HINO3 H2SO4 NaOH NaHSO4 MEOH NaHSO4 MEOH NAHSO4 MEOH	Collection Number of preserved bottles	GR.	C. Ferenz @ 6HD. Lam	Stopler Kright & GHU. Com	Invoice To:	200 Place, Suiteson Project Location 15234 Phone No: Krishte GHD. Com Invoice To:	Whene / Bring Project Name/Number: 0 Services, Inc - Dallas Project Location: Whet instance, Scites 200 Abo Reef 1625, TX 15234 Phone No: 1625, TX 15234 Phone No: 1725, TX 15234 Phone Phone No: 1725, TX 15234 Phone P
O's standard terms and conditions of sei			le Time:	FED-EX / UPS: Tracking #			 1.00	Spr SSOW	Notes:														

Final 1.000



Work Order #: 514048

XENCO Laboratories Prelogin/Nonconformance Report- Sample Log-In



Client: GHD Services, INC- Midland Date/ Time Received: 08/21/2015 04:15:00 PM

Acceptable Temperature Range: 0 - 6 degC Air and Metal samples Acceptable Range: Ambient

Temperature Measuring device used :

Sample Receipt Checkl	ist	Comments
#1 *Temperature of cooler(s)?	3.4	
#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 Sample instructions complete on Chain of Custody?	Yes	
#9 Any missing/extra samples?	No	
#10 Chain of Custody signed when relinquished/ received?	Yes	
#11 Chain of Custody agrees with sample label(s)?	Yes	
#12 Container label(s) legible and intact?	Yes	
#13 Sample matrix/ properties agree with Chain of Custody?	Yes	
#14 Samples in proper container/ bottle?	Yes	
#15 Samples properly preserved?	Yes	
#16 Sample container(s) intact?	Yes	
#17 Sufficient sample amount for indicated test(s)?	Yes	
#18 All samples received within hold time?	Yes	
#19 Subcontract of sample(s)?	No	
#20 VOC samples have zero headspace (less than 1/4 inch bubble)?	N/A	
#21 <2 for all samples preserved with HNO3,HCL, H2SO4? Except for samples for the analysis of HEM or HEM-SGT which are verified by the analysts.	N/A	
#22 >10 for all samples preserved with NaAsO2+NaOH, ZnAc+NaOH?	N/A	

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

Analyst:

PH Device/Lot#:

Date: 08/23/2015

Checklist completed by: Murg Moah Kelsey Brooks Checklist reviewed by: Murg Moah Kelsey Brooks

Date: 08/25/2015