#### SITE INFORMATION Report Type: Closure Report General Site Information: Site: **Brigham H-3 Flow Line** Company: COG Operating LLC Section, Township and Range Unit H Sec 21 T17S R30E Lease Number: API# 30-015-30677 **Eddy County** County: GPS: 32.82050° N 103.98262° W Surface Owner: Federal Mineral Owner: Directions: From Loco Hills take Goat Roper Road north approx. 0.17 miles and turn west on the first caliche road north of Loco Hills. Follow the caliche raod approx 0.22 miles west to the location. Release Data: Date Released: 11/2/2012 Type Release: Produced Water with Skim Oil AUG 23 2013 Source of Contamination: Flowline Fluid Released: 13 bbls NNOCD ARTESIA Fluids Recovered: 12 bbls Official Communication: Name: lke Tavarez Pat Ellis Company: COG Operating, LLC Tetra Tech Address: One Concho Center 1910 N. Big Spring P.O. Box 600 W. Illnois Ave. City: Midland Texas, 79701 Midland, Texas Phone number: (432) 686-3023 (432) 682-4559 Fax: (432) 684-7137 Email: pellis@conchoresources.com ike.tavarez@tetratech.com

Depth to Groundwater:	Ranking Score	Site Data
<50 ft	20	0
50-99 ft	10	0
>100 ft.	0	0
WellHead Protection:	Ranking Score	Site Data
Water Source <1,000 ft., Private <200 ft.	20	
Water Source >1,000 ft., Private >200 ft.	0	0
Surface Body of Water:	Ranking Score	Site Data
<200 ft.	20	
200 ft - 1,000 ft.	10	
>1,000 ft.	0	

Total BTEX

50

TPH

5,000

Benzene

10



July 12, 2013

Mr. Mike Bratcher Environmental Engineer Specialist Oil Conservation Division, District 2 811 S. First Street Artesia, New Mexico 88210

Re: Closure Report for the COG Operating LLC., Brigham H-3 Flow Line, Section 21, Township 17 South, Range 30 East, Eddy County, New Mexico.

Mr. Bratcher:

Tetra Tech, Inc. (Tetra Tech) was contacted by COG Operating LLC. (COG) to assess a spill from the Brigham H-3 flowline located in Unit H, Section 21, Township 17 South, Range 30 East, Eddy County, New Mexico (Site). The spill site coordinates are N 32.82050°, W 103.98262°. The site location is shown on Figures 1 and 2.

#### **Background**

According to the State of New Mexico C-141 Initial Report, the leak was discovered on November 2, 2012, and released approximately thirteen (13) barrels of produced fluid and skim oil from a flowline. Approximately twelve (12) barrels of standing fluids were recovered. The spill initiated on the southeast edge of the pad adjacent to the lease road entering the well location and flowed south into the pasture. The initial C-141 form is enclosed in Appendix A.

#### Groundwater

According to the New Mexico State Engineers Office no water wells were listed within Section 21. According to the NMOCD groundwater map, the depth to groundwater is approximately 300' below surface. The groundwater data is shown on Appendix B.



#### Regulatory

A risk-based evaluation was performed for the Site in accordance with the New Mexico Oil Conservation Division (NMOCD) Guidelines for Remediation of Leaks, Spills and Releases, dated August 13, 1993. The guidelines require a risk-based evaluation of the site to determine recommended remedial action levels (RRAL) for benzene, toluene, ethylbenzene and xylene (collectively referred to as BTEX) and total petroleum hydrocarbons (TPH) in soil. The proposed RRAL for benzene was determined to be 10 parts per million (ppm) or milligrams per kilogram (mg/kg) and 50 ppm for total BTEX (sum of benzene, toluene, ethylbenzene, and xylene). Based upon the depth to groundwater, the proposed RRAL for TPH is 5,000 mg/kg.

#### Soil Assessment and Analytical Results

On December 11, 2012, Tetra Tech personnel inspected and sampled the spill area. Four (4) auger holes (AH-1 through AH-4) were installed using a stainless steel hand auger to assess the impacted soils. Selected samples were analyzed for TPH analysis by EPA method 8015 modified, BTEX by EPA Method 8021B and chloride by EPA method 300.0. Copies of laboratory analysis and chain-of-custody documentation are included in Appendix C. The sampling results are summarized in Table 1. The auger hole and spill area are shown on Figure 3.

Referring to Table 1, none of the samples exceeded the RRAL for either TPH or BTEX. Elevated chlorides were detected in the shallow soils ranging from 1,520 mg/kg to 5,340 mg/kg from 0 to 3.0' below surface. The chlorides significantly declined with depth at 4.0' below surface to 484 mg/kg. The deeper samples did show chloride concentrations spiking at 7-7.5' of 1,160 mg/kg and 8-8.5' of 1,190 mg/kg and declining to 862 mg/kg at 9-9.5' below surface. Deeper samples were not collected due to the dense caliche formation. The areas of AH-2, AH-3 and AH-4 showed no chloride impact to the subsurface soils.

#### Remedial Activities and Closure Request

On March 12, 2013, Tetra Tech personnel supervised the excavation of the impacted soils. The excavated areas and depths are highlighted in Table 1 and shown on Figure 4. In order to remove the elevated chloride concentrations, the proposed excavation depths ranged from 4.0' to 4.5' below surface. As requested by the BLM, confirmation sampling was collected from the side walls of the excavation, the results are shown in Table 1.

Approximately 80 cubic yards<sup>3</sup> of soil were removed and transported to the R360 facility for proper disposal. The site was then backfilled with clean material to surface grade, ripped and seeded.



Based on the remediation activities performed at this location, COG requests closure for this site. The C-141 (Final) is included in Appendix A. If you have any questions or comments concerning the assessment or the remediation activities performed at the site, please call me at (432) 682-4559.

Respectfully submitted, TETRA TECH

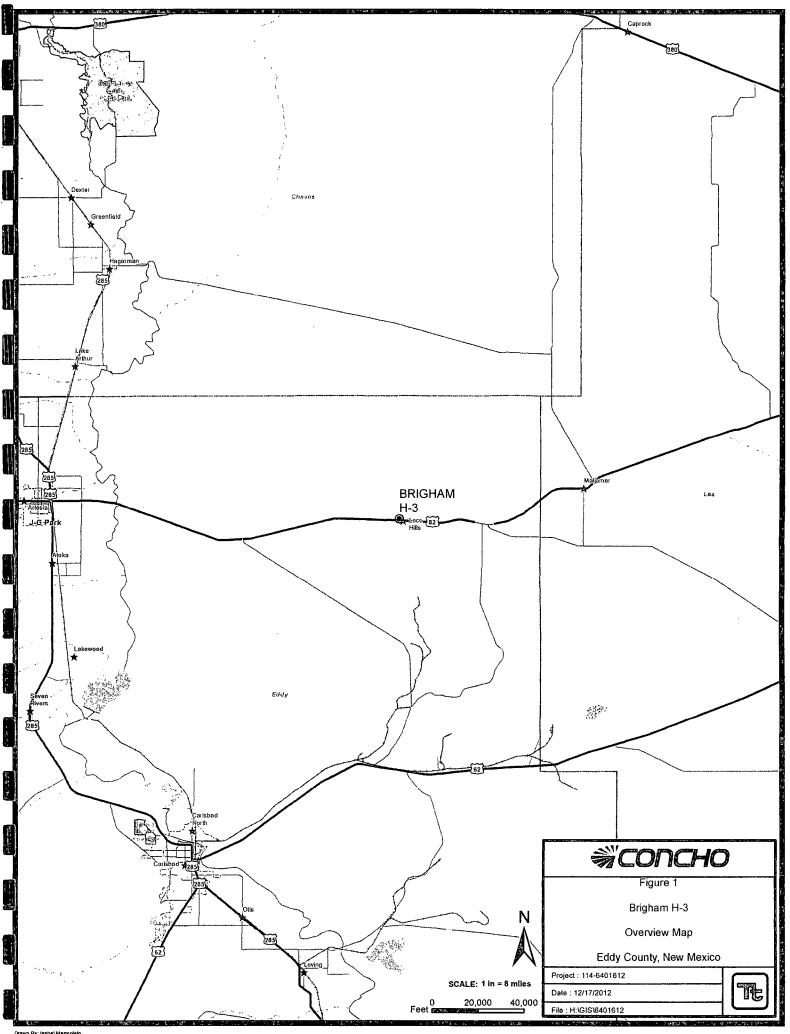
ke Tavare

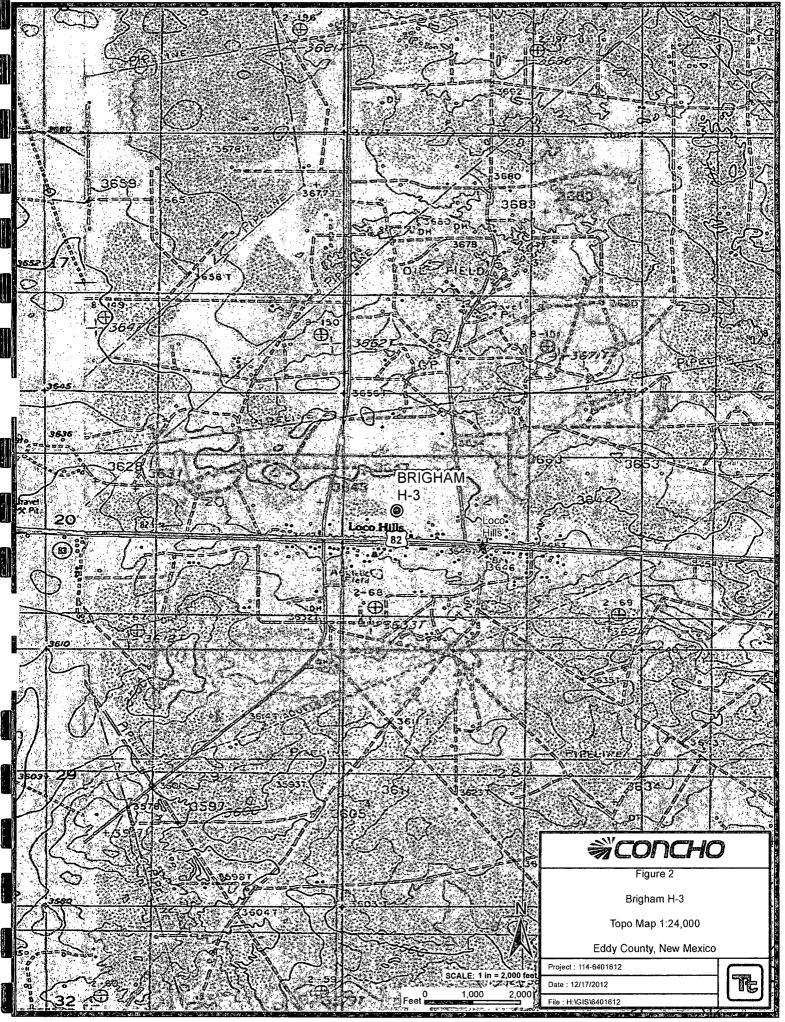
Senior Project Manager

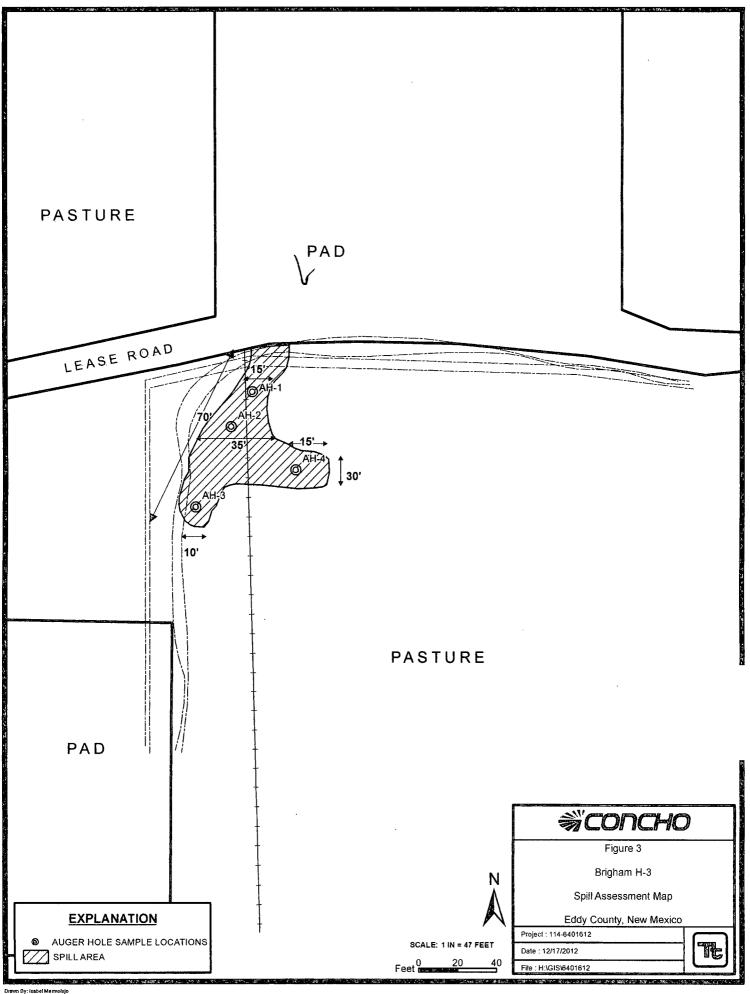
cc: Pat Ellis - COG

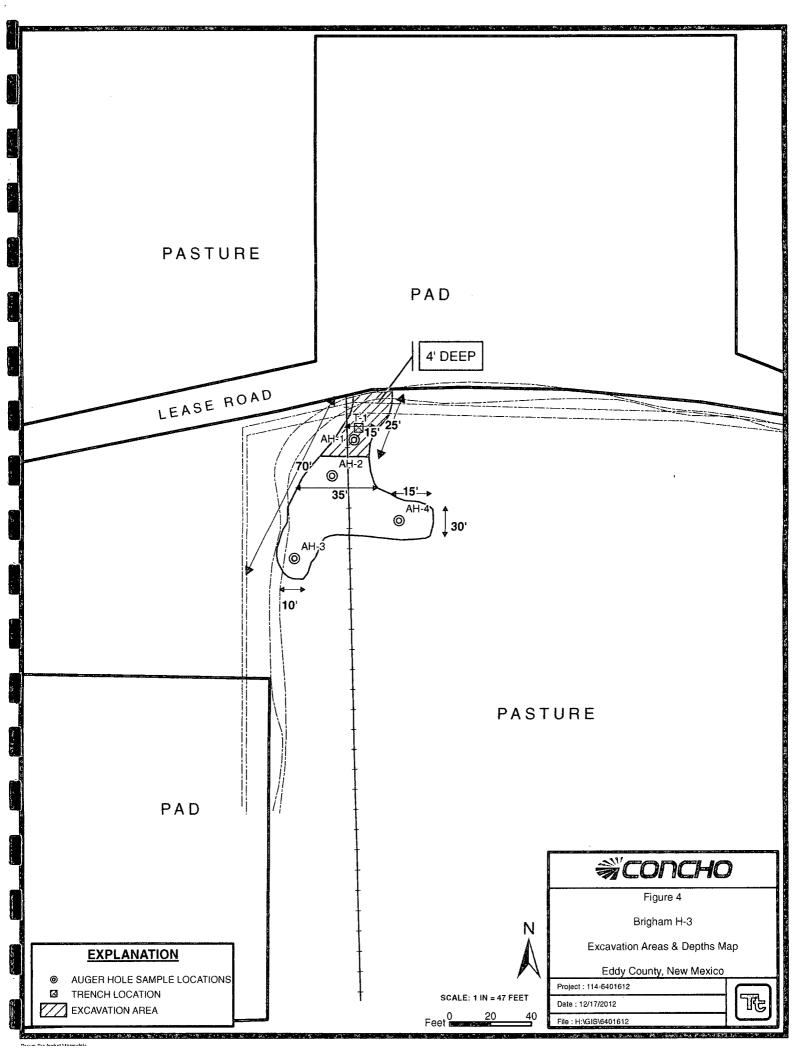
cc: BLM -Mike Burton

## Figures









## Tables

Table 1
COG Operating LLC.
Brigham H-3
Eddy County, New Mexico

Committee ID	0	Sample	Soil	Status		ΓΡΗ (mg/k	g)	Benzene	Toluene	Ethlybenzene	Xylene	Total	Chloride
Sample ID	Sample Date	Depth (ft)	In-Situ	Removed	GRO	DRO	Total	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	BTEX (mg/kg)	(mg/kg)
AH-1	12/11/2012	0-1		Χ	<4.00	68.0	68.0	<0.0200	<0.0200	<0.0200	<0.0200	<0.0200	5;340
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	The second second	2-2.5		Χ			在《福斯洛克》 《沙夏夏森安》						1,520
		3-3.5		X									2,450
		4-4.5		X		13 1 2 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1							484
	11	5-5.5	Х		-	-	-	-	-	-	-	_	746
	ш	6-6.5	Х		-	-	-	-	-	-	-	-	800
	II	7-7.5	Х		-	-	-	_	-	-	-	-	1,160
	II.	8-8.5	Х			_	_	-	-	-	-	-	1,190
	11	9-9.5	Х		-	-	-	-	-	-	-	-	862
T-1	3/13/2013	0	Х		-	_	_	-	-	-	-	-	1,920
	п	2	Х		-	-	-	-	-	-	_	-	372
	п	4	Х		-	_	-	-	•	-	-	-	1,530
	н	6	Χ		-	_	_	-	-	-	_	-	842
	II	8	Х		-	-	-	-	-	-	-	-	117
	· u	10	Х		-	-	-	-	-	-		-	460
	II	12	Х		-	-	-	-	-	-	-	-	103
CS-1 North Wall	3/13/2013	-	Х		-	-	-	_	-	-	-	-	349
CS-1 South Wall	3/14/2013	•	Х		-			-	-	-	-	-	29.1
CS-1 East Wall	3/13/2013	-	Х			-	_	-	-	-	-		<20.0
CS-1 West Wall	3/14/2013	-	Х		-	-	-	_	-	-	•	-	<20.0

# Table 1 COG Operating LLC. Brigham H-3 Eddy County, New Mexico

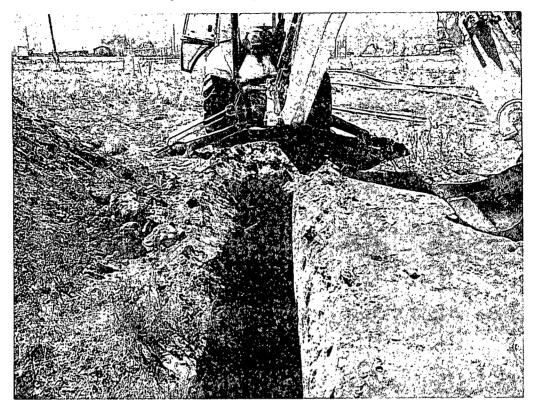
Commis ID	0	Sample	Soil Status		TPH (mg/kg)			Benzene	Toluene	Ethlybenzene	Xylene	Total	Chloride
Sample ID	Sample Date	Depth (ft)	In-Situ	Removed	GRO	DRO	Total	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	BTEX (mg/kg)	(mg/kg)
AH-2	12/11/2012	0-1	X		<40.0	707	707	<0.200	<0.200	<0.200	<0.200	<0.200	<20.0
	11	1-1.5	Х		-	-	-	-	-	-	-	-	<20.0
	н	2-2.5	Χ		-	-	-	-	-	-	-	-	<20.0
	II	3-3.5	Х		-	-	-	-	-	-	-	-	<20.0
AH-3	12/11/2012	0-1	Х		<20.0	<500	<500	<0.100	<0.100	<0.100	<0.100	<0.100	<20.0
	11	1-1.5	Х		-	-		-	-	-	-	-	<20.0
AH-4	12/10/2012	0-1	Х		<4.00	<50.0	<50.0	<0.0200	<0.0200	<0.0200	<0.0200	<0.0200	<20.0
	п	1-1.5	X		-	-	-	_	-	-	-	-	<20.0

( - ) Not Analyzed

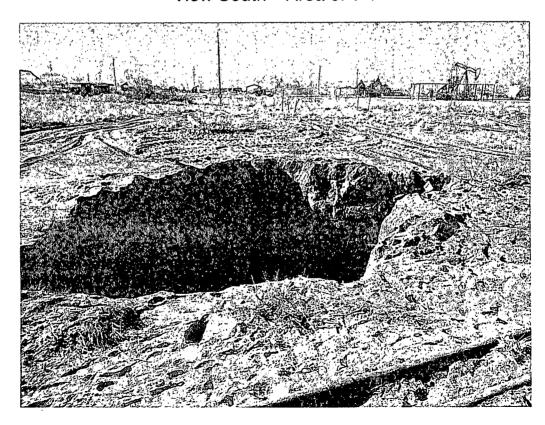
Excavated Depths

# COG Operating LLC Brigham H-3 Eddy County, New Mexico





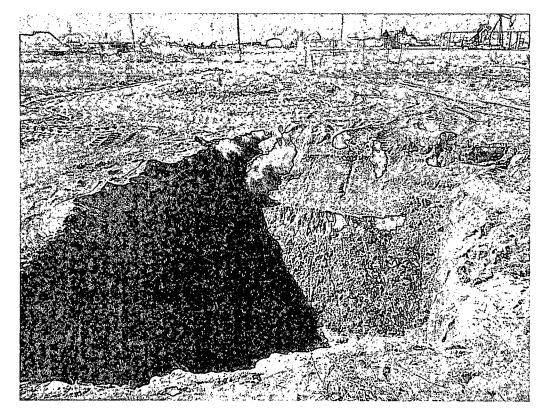
View South - Area of T-1



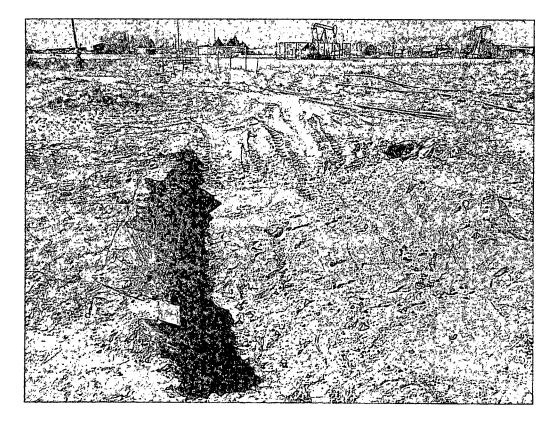
View South - Area of AH-1

# COG Operating LLC Brigham H-3 Eddy County, New Mexico





View South - Backfill



View South - Backfill

## Appendix A

District 1 1625 N. French Dr., Hobbs, NM 88240 District II 301 W. Grand Avenue, Artesia, NM 88210 District III 000 Rio Brazos Road, Aztec, NM 87410 District IV 1220 S. St. Francis Dr., Santa Fe, NM 87505

## State of New Mexico **Energy Minerals and Natural Resources**

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

Submit 2 Copies to appropriate District Office in accordance

Form C-141

Revised October 10, 2003

with Rule 116 on back side of form

#### **Release Notification and Corrective Action OPERATOR** Final Report COG OPERATING LLC Pat Ellis Name of Company Contact 432-230-0077 600 West Illinois Avenue, Midland, TX 79701 Telephone No. Address **Facility Name** Facility Type Flowline Brigham H 3 Lease No. (API#) 30-015-30677 Surface Owner Federal Mineral Owner LOCATION OF RELEASE Unit Letter North/South Line Feet from the East/West Line Section Township Range Feet from the County 11 21 17S Eddy Latitude 32.81998 **Longitude** 103.98310 NATURE OF RELEASE Volume of Release 13bbls Volume Recovered 12bbls Type of Release Produced water w/ skim oil Date and Hour of Occurrence Source of Release Flowline Date and Hour of Discovery 11/02/2012 11/02/2012 3:00 p.m. Was Immediate Notice Given? If YES, To Whom? ☐ Yes ☒ No ☒ Not Required By Whom? Date and Hour 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.\* A steel line corroded and released fluid into the adjacent pasture area. We have added a temporary clamp to the line and will replace the joint with a new section. Describe Area Affected and Cleanup Action Taken.\* Initially 13bbls of fluid were released from the steel line and we were able to recover 12bbls with a vacuum truck. Tetra Tech will sample the spill site area to delineate any possible contamination form the release and we will present a remediation work plan to the NMOCD/BLM for approval prior to any significant remediation work. 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 CONSERVATION DIVISION Signature: Approved by District Supervisor: Printed Name: Josh Russo Senior Environmental Coordinator Approval Date: **Expiration Date:** Title: E-mail Address: Conditions of Approval: jrusso@concho.com Attached

Attach Additional Sheets If Necessary

Phone:

432-212-2399

11/13/2012

Date:

<u>District I</u> 1625 N. French Dr., Hobbs, NM 88240 District II

1301 W. Grand Avenue, Artesia, NM 88210 District III
1000 Rio Brazos Road, Aztec, NM 87410 District IV

1220 S. St. Francis Dr., Santa Fe, NM 87505

State of New Mexico Energy Minerals and Natural Resources AUG 2 3 2013

Form C-141 Revised October 10, 2003

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

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

## Release Notification and Corrective Action

						<b>OPERA</b>	ГOR		☐ Initia	ıl Report	$\boxtimes$	Final Report
Name of Co	mpany	COG	Operat	ing LLC		Contact	Pa	at Ellis				
Address	550 W. T	exas, Suite	1300 Mic	lland, Texas <mark>7</mark> 97	701	Telephone N	No. (432)	230-00	77			
Facility Nan	ne		Brigham	Н 3	]	Facility Typ	e Fie	ow Line	е			
Surface Own	ner: Fed	eral		Mineral O	wner	***************************************			Lease N	lo. NM 046	7931	
Duriace Own	101.	<u> </u>					75-77-17		i Dease 1	10. 1111 010	7751	
						OF REI						
Unit Letter H	Section 21	Township 17S	Range 30E	Feet from the	North/	South Line	Feet from the	East/V	Vest Line	County	Eddy	,
			]	Latitude N 32.8		Ü		<u>2</u> °				
				NAT!	URE	OF RELI	EASE					
Type of Relea			cim oil				Release 13 bbls			Recovered 12		
Source of Rel						11/02/2012		e		Hour of Disc 2 3:00 p.m		
Was Immediate Notice Given?  ☐ Yes ☐ No ☐ Not Req						If YES, To	Whom?					
By Whom?					*	Date and H						
Was a Watercourse Reached?  ☐ Yes ☒ No						If YES, Vo	lume Impacting t	he Wate	rcourse.			
If a Watercou	rse was Im	pacted, Descri	ibe Fully.*	:	<del></del>	<u> </u>				. —		
Describe Cau	se of Proble	em and Remed	dial Action	Taken.*							· · · · · · · · · · · · · · · · · · ·	
A steel line co section.	orroded and	l released fluid	d into the a	ndjacent pasture ar	ea. We	have added	a temporary clamp	o to the	ine and wi	ll replace the	e joint v	with a new
Describe Area	a Affected a	and Cleanup A	Action Tak	en.*								
Tetra Tech pe	ersonnel ins al. The site	pected the site	and colle	cted samples to de surface grade with								
regulations al public health should their o	l operators or the envir perations had ment. In a	are required to conment. The ave failed to a ddition, NMO	report an acceptanc dequately CD accep	is true and comple d/or file certain rele e of a C-141 repor investigate and rel tance of a C-141 re	lease no t by the mediate	otifications ar NMOCD ma contamination	nd perform correct arked as "Final Re on that pose a thre	tive action eport" do eat to gro	ons for rele oes not reli ound water	eases which in eve the opera surface wat	nay en ator of er, hur	danger liability nan health
Cianatura		1/4	#				OIL CONS	SERV.	ATION	DIVISIO	N	
Signature: Printed Name	: Ike Tavar	ez Z				Approved by	District Supervisc	or:				
Title: Project					A	Approval Date	e:	Е	expiration I	Date:	····	
E-mail Addre	ss: Ike.Tava	arez@TetraTe	ch.com		-	Conditions of				Attached		
Date: 7-	-12-	13	Phone:	(432) 682-4559						Auachell	<u></u>	

Attach Additional Sheets If Necessary

# Appendix B

# Water Well Data Average Depth to Groundwater (ft) COG-Brigham H-3 Flowline Eddy County, New Mexico

	16 S	outh		29 East			16 S	outh		30 Eas	t		16	South		31 East	
	5	4	3	2	1	6	5	4	3	2	1	6	5	4	3	2 <b>290</b>	1
	8	9	10	11	12	7	8	9	10	11	12	7	8	9	10	11	12
3	17	16	15	14 220	13	18	17	16	15	14	13	18	17	16	15	14 314	288 13 2
				dry													113
) 10	20	21	22	23	24	19	20	21	22	23	24	19	20	21	22	23	24
)	29	28	27	26	25	30	29	28	27	26	25	30	29	28	27	26	25
	32	33	34	35	36	31	32	33	34	35	36	31	32	33	34	35	36
		<u> </u>		<u>·                                     </u>								290		L			<u> </u>
	17 S	outh		29 East			17 S	outh		30 Eas	t		17 :	South	;	31 East	
	5	4	3	2	1	6	5	4	3	2	1	6	5	4	3	2	1
	8	9	10	11	12	7	8	9	10	11	12	7	8	9	10	11	12
	17	16	15	14	13	18	17	16	15	14	13	18	17	16	15	14	13
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	32	33	34	35	36	31	32	33	34	35	36	31	32	33	34	35	36
			ļ	153		L									271		<u> </u>
	18 S	outh	;	29 East			18 S	outh	;	30 Eas	t		18 9	South	3	31 East	
	5	4	3	2	1	6	5	4	3	2	1	6	5	4	3	2	1
	8	9	10 9	95 11	12	7	8	9	10	11	12	7	8	9	10	11	12
	17	16	15	14	13	18	17	16	15	1	1		<del> </del>	-		<u> </u>	400
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	20	21	22	23	24	19	20	21	22	23	24	19	20	21	22	23	24
	29	28	27	26	1 <b>58</b> 25	30	29	28	27	26	25	30	29	28	27	26	25
		ļ															
		33	34	35	36	31	32	33	34	35	36	31	32	33	34	35	36
1	32	33	1	1	1 1	l l	l l	1	1	1		1	1		1	261	1

USGS Well Reports

Geology and Groundwater Conditions in Southern Eddy, County, NM

NMOCD - Groundwater Data

Field water level

New Mexico Water and Infrastructure Data System

# Appendix C

Report Date: March 25, 2013 Work Order: 13031528 Page Number: 1 of 2

## **Summary Report**

Ike Tavarez Tetra Tech 1910 N. Big Spring Street Midland, TX 79705

Report Date: March 25, 2013

Work Order: 13031528

Project Location: Eddy Co., NM Project Name: COG/Brigham H-3

Project Number: 114-6401612

			$\operatorname{Date}$	$\operatorname{Time}$	$\operatorname{Date}$
Sample	Description	Matrix	$\operatorname{Taken}$	Taken	Received
323559	CS-1 (AH-1) North Wall	soil	2013-03-13	00:00	2013-03-15
323560	CS-1 (AH-1) South Wall	soil	2013-03-14	00:00	2013-03-15
323561	CS-1 (AH-1) East Wall	soil	2013-03-13	00:00	2013-03-15
323562	CS-1 (AH-1) West Wall	soil	2013-03-14	00:00	2013-03-15

Sample: 323559 - CS-1 (AH-1) North Wall

Param	Flag	Result	Units	RL
Chloride		349	mg/Kg	4

Sample: 323560 - CS-1 (AH-1) South Wall

Param	Flag	Result	Units	RL
Chloride		29.1	mg/Kg	4

Sample: 323561 - CS-1 (AH-1) East Wall

Param	Flag	Result	Units	RL
Chloride		< 20.0	nig/Kg	4

Sample: 323562 - CS-1 (AH-1) West Wall

Report Date: March 25, 2013

Work Order: 13031528

Page Number: 2 of 2

Param	Flag	Result	Units	RL
Chloride		< 20.0	mg/Kg	4



6701 Aberdeen Avenue, Suite 9 200 East Sunset Road, Suite E 5002 Basin Street, Suite A1 (BioAquatic) 2501 Mayes Rd., Suite 100 Lubbock El Paso, Midland,

Texas 79424 800-378-1298 Texas 79922 Texas 79703

915-585-3443 432-689-6301 972-242-7750

806-794-1296

FAX 915 • 585 • 4944 FAX 432 • 689 • 6313

Suite 100 Carrollton, Texas 75006 972 -E-Mail: lab@traceanalysis.com WEB: www.traceanalysis.com

## Certifications

WBE HUB NCTRCA DBE NELAP DoD LELAP Kansas Oklahoma ISO 17025

## Analytical and Quality Control Report

Ike Tavarez Tetra Tech 1910 N. Big Spring Street Midland, TX, 79705

Report Date:

March 25, 2013

Work Order:

13031528

Project Location: Project Name:

Eddy Co., NM

Project Number:

COG/Brigham H-3 114-6401612

Enclosed are the Analytical Report and Quality Control Report for the following sample(s) submitted to TraceAnalysis, Inc.

			Date	$\operatorname{Time}$	Date
Sample	Description	Matrix	Taken	Taken	Received
323559	CS-1 (AH-1) North Wall	soil	2013-03-13	00:00	2013-03-15
323560	CS-1 (AH-1) South Wall	soil	2013-03-14	00:00	2013-03-15
323561	CS-1 (AH-1) East Wall	soil	2013-03-13	00:00	2013-03-15
323562	CS-1 (AH-1) West Wall	soil	2013-03-14	00:00	2013-03-15

These results represent only the samples received in the laboratory. The Quality Control Report is generated on a batch basis. All information contained in this report is for the analytical batch(es) in which your sample(s) were analyzed.

This report consists of a total of 10 pages and shall not be reproduced except in its entirety, without written approval of TraceAnalysis, Inc.

Dr. Blair Leftwich, Director Dr. Michael Abel, Project Manager

## Report Contents

Case Narrative	3
Analytical Report	4
Sample 323559 (CS-1 (AH-1) North Wall)	4
Sample 323560 (CS-1 (AH-1) South Wall)	4
Sample 323561 (CS-1 (AH-1) East Wall)	4
Sample 323562 (CS-1 (AH-1) West Wall)	4
Method Blanks	$\epsilon$
QC Batch 99926 - Method Blank (1)	6
Laboratory Control Spikes	7
QC Batch 99926 - LCS (1)	7
QC Batch 99926 - LCS (1)	7
Calibration Standards	8
QC Batch 99926 - CCV (1)	8
QC Batch 99926 - CCV (2)	8
Appendix	9
Report Definitions	9
Laboratory Certifications	
Standard Flags	
Attachments	C

## Case Narrative

Samples for project COG/Brigham H-3 were received by TraceAnalysis, Inc. on 2013-03-15 and assigned to work order 13031528. Samples for work order 13031528 were received intact at a temperature of 18.1 C. Samples were not on ice.

Samples were analyzed for the following tests using their respective methods.

		$\operatorname{Prep}$	$\operatorname{Prep}$	QC	Analysis
Test	Method	Batch	Date	Batch	Date
Chloride (Titration)	SM 4500-Cl B	84647	2013-03-21 at 09:58	99926	2013-03-22 at 13:46

Results for these samples are reported on a wet weight basis unless data package indicates otherwise.

A matrix spike (MS) and matrix spike duplicate (MSD) sample is chosen at random from each preparation batch. The MS and MSD will indicate if a site specific matrix problem is occurring, however, it may not pertain to the samples for work order 13031528 since the sample was chosen at random. Therefore, the validity of the analytical data reported has been determined by the laboratory control sample (LCS) and the method blank (MB). These quality control measures are performed with each preparation batch to ensure data integrity.

All other exceptions associated with this report have been footnoted on the appropriate analytical page to assist in general data comprehension. Please contact the laboratory directly if there are any questions regarding this project.

Work Order: 13031528 Report Date: March 25, 2013 Page Number: 4 of 10 114-6401612 COG/Brigham H-3 Eddy Co., NM

## **Analytical Report**

Sample: 323559 - CS-1 (AH-1) North Wall

Laboratory: Midland

Prep Batch:

Analysis: Chloride (Titration) QC Batch: 99926 84647

Analytical Method: SM 4500-Cl B Date Analyzed: 2013-03-22 Sample Preparation: 2013-03-21

Prep Method: N/AAnalyzed By: ARPrepared By: AR.

RLFlag Cert Parameter Result Units Dilution RLChloride 349mg/Kg 5 4.00

Sample: 323560 - CS-1 (AH-1) South Wall

Laboratory: Midland

Analysis: Chloride (Titration) QC Batch: 99926 Prep Batch: 84647

Analytical Method: SM 4500-Cl B Date Analyzed: 2013-03-22 Sample Preparation: 2013-03-21

Prep Method: N/A Analyzed By: AR. Prepared By: AR

RLParameter Flag Cert Result Units Dilution RLChloride 29.1mg/Kg 5 4.00

Sample: 323561 - CS-1 (AH-1) East Wall

Laboratory: Midland

Analysis: Chloride (Titration) QC Batch: 99926 Prep Batch: 84647

Analytical Method: SM 4500-Cl B Date Analyzed: 2013-03-22 Sample Preparation: 2013-03-21

Analyzed By: ARPrepared By: AR

N/A

Prep Method:

RLParameter Flag Cert Result Units Dilution RLChloride <20.0 mg/Kg 5 4.00 Report Date: March 25, 2013

114-6401612

Work Order: 13031528 COG/Brigham H-3

Page Number: 5 of 10

Eddy Co., NM

Sample: 323562 - CS-1 (AH-1) West Wall

Laboratory:

Midland

Analysis:

Chloride (Titration)

Analytical Method:

SM 4500-Cl B

Prep Method: N/A

QC Batch:

99926

Date Analyzed:

2013 - 03 - 22

Analyzed By: AR

Prep Batch: 84647 Sample Preparation:

2013-03-21

Prepared By:

AR

RL

			1 (1.1			
Parameter	Flag	Cert	Result	$\operatorname{Units}$	Dilution	RL
Chloride			<20.0	mg/Kg	5	4.00

Report Date: March 25, 2013

Work Order: 13031528 COG/Brigham H-3 114-6401612

Page Number: 6 of 10 Eddy Co., NM

## Method Blanks

Method Blank (1)

QC Batch: 99926

QC Batch: 99926 Prep Batch: 84647 Date Analyzed: 2013-03-22 QC Preparation: 2013-03-21

Analyzed By: AR Prepared By: AR

MDL

Parameter Flag  $\operatorname{Cert}$ Result Units RLChloride < 3.85 mg/Kg 4

Report Date: March 25, 2013 114-6401612

Work Order: 13031528 COG/Brigham H-3

Page Number: 7 of 10 Eddy Co., NM

## Laboratory Control Spikes

Laboratory Control Spike (LCS-1)

QC Batch:

99926

Date Analyzed:

2013-03-22

Analyzed By: AR

Prep Batch: 84647

QC Preparation: 2013-03-21

Prepared By: AR.

			LCS			Spike	Matrix		Rec.
Param	$\mathbf{F}$	$^{\mathrm{C}}$	Result	Units	Dil.	Amount	Result	$\mathrm{Rec.}$	$\operatorname{Limit}$
Chloride			2680	mg/Kg	1	2500	< 3.85	107	85 - 115

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

			LCSD			Spike	Matrix		Rec.		RPD
Param	$\mathbf{F}$	$\mathbf{C}$	Result	Units	Dil.	Amount	Result	Rec.	Limit	RPD	$\operatorname{Limit}$
Chloride			2610	mg/Kg	1	2500	< 3.85	104	85 - 115	3	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Matrix Spike (MS-1)

Spiked Sample: 323567

QC Batch:

99926

Date Analyzed:

2013-03-22

Analyzed By: AR

Prep Batch: 84647

QC Preparation: 2013-03-21

Prepared By: AR

			MS			$\operatorname{Spike}$	Matrix		Rec.
Param	$\mathbf{F}$	$^{\rm C}$	Result	Units	Dil.	Amount	Result	Rec.	$\operatorname{Limit}$
Chloride			7290	mg/Kg	10	2500	4850	98	78.9 - 121

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

			MSD			$_{ m Spike}$	Matrix		Rec.		RPD
Param	F	$\mathbf{C}$	Result	Units	Dil.	Amount	Result	Rec.	Limit	RPD	Limit_
Chloride			7610	mg/Kg	10	2500	4850	110	78.9 - 121	4	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Report Date: March 25, 2013

114 - 6401612

Work Order: 13031528 COG/Brigham H-3 Page Number: 8 of 10 Eddy Co., NM

## Calibration Standards

Standard (CCV-1)

QC Batch: 99926

Date Analyzed: 2013-03-22

Analyzed By: AR

				CCVs	CCVs Found	CCVs	Percent	Doto
				$\operatorname{True}$	round	$\operatorname{Percent}$	Recovery	$\operatorname{Date}$
Param	Flag	Cert	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Chloride			mg/Kg	100	99.3	99	85 - 115	2013-03-22

Standard (CCV-2)

QC Batch: 99926

Date Analyzed: 2013-03-22

Analyzed By: AR

**CCVs** CCVsCCVsPercent True Found Percent Recovery Date Param  $\operatorname{Cert}$ Units Conc.  ${\rm Conc.}$ Recovery Limits Analyzed Flag Chloride mg/Kg 100 101 101 85 - 115 2013-03-22 
 Report Date: March 25, 2013
 Work Order: 13031528
 Page Number: 9 of 10

 114-6401612
 COG/Brigham H-3
 Eddy Co., NM

## **Appendix**

## Report Definitions

Name	Definition
$\overline{\mathrm{MDL}}$	Method Detection Limit
MQL	Minimum Quantitation Limit
SDL	Sample Detection Limit

## **Laboratory Certifications**

	Certifying	Certification	Laboratory
$\mathbf{C}$	Authority	Number	Location
_	NCTRCA	WFWB384444Y0909	TraceAnalysis
-	DBE	VN 20657	TraceAnalysis
-	HUB	1752439743100-86536	TraceAnalysis
-	WBE	237019	TraceAnalysis

## Standard Flags

- F Description
- B Analyte detected in the corresponding method blank above the method detection limit
- H Analyzed out of hold time
- J Estimated concentration
- Jb The analyte is positively identified and the value is approximated between the SDL and MQL. Sample contains less then ten times the concentration found in the method blank. The result should be considered non-detect to the SDL.
- Je Estimated concentration exceeding calibration range.
- MI1 Split peak or shoulder peak
- MI2 Instrument software did not integrate
- MI3 Instrument software misidentified the peak
- MI4 Instrument software integrated improperly
- MI5 Baseline correction
- Qc Calibration check outside of laboratory limits.
- Qr RPD outside of laboratory limits
- Qs Spike recovery outside of laboratory limits.
- Qsr Surrogate recovery outside of laboratory limits.
  - U The analyte is not detected above the SDL

### Attachments

Report Date: March 25, 2013 114-6401612

Work Order: 13031528 COG/Brigham H-3 Page Number: 10 of 10 Eddy Co., NM

The scanned attachments will follow this page.

Please note, each attachment may consist of more than one page.

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Work Order: 12121344 Page Number: 1 of 4 Report Date: January 2, 2013

## **Summary Report**

(Corrected Report)

Ike Tavarez Tetra Tech

1910 N. Big Spring Street Midland, TX 79705

Report Date: January 2, 2013

Work Order: 12121344 

Project Location: Eddy Co., NM Project Name:

COG/Brigham H-3

Project Number: 114-6401612

			Date	Time	Date
Sample	Description	Matrix	Taken	Taken	Received
316728	AH-1 0-1'	soil	2012-12-11	00:00	2012-12-13
316729	AH-1 1-1.5'	soil	2012-12-11	00:00	2012-12-13
316730	AH-1 2-2.5'	soil	2012-12-11	00:00	2012-12-13
316731	AH-1 3-3.5'	soil	2012-12-11	00:00	2012-12-13
316732	AH-1 4-4.5'	soil	2012-12-11	00:00	2012-12-13
316733	AH-1 5-5.5'	soil	2012-12-11	00:00	2012-12-13
316734	AH-1 6-6.5'	soil	2012-12-11	00:00	2012-12-13
316735	AH-1 7-7.5'	soil	2012-12-11	00:00	2012-12-13
316736	AH-1 8-8.5'	soil	2012-12-11	00:00	2012-12-13
316737	AH-1 9-9.5'	soil	2012-12-11	00:00	2012-12-13
316738	AH-2 0-1'	soil	2012-12-11	00:00	2012-12-13
316739	AH-2 1-1.5'	soil	2012-12-11	00:00	2012-12-13
316740	AH-2 2-2.5'	soil	2012-12-11	00:00	2012-12-13
316741	AH-2 3-3.5'	soil	2012-12-11	00:00	2012-12-13
316742	AH-3 0-1'	soil	2012-12-11	00:00	2012-12-13
316743	AH3 1-1.5'	soil	2012-12-11	00:00	2012-12-13
316744	AH-4 0-1'	soil	2012-12-11	00:00	2012-12-13
316745	AH-4 1-1.5'	soil	2012-12-11	00:00	2012-12-13

		1	BTEX	TPH DRO - NEW	TPH GRO	
	Benzene	Toluene	Ethylbenzene	Xylene	DRO	GRO
Sample - Field Code	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)
316728 - AH-1 0-1'	< 0.0200	< 0.0200	< 0.0200	< 0.0200	68.0 Qs	< 4.00
316738 - AH-2 0-1'	< 0.200 1	< 0.200	< 0.200	< 0.200	707 Qs	<40.0

continued . . .

<sup>&</sup>lt;sup>1</sup>Dilution due to surfactants.

		1
	continue a	l

	BTEX			TPH DRO - NEW	TPH GRO	
	Benzene	Toluene	Ethylbenzene	Xylene	DRO	GRO
Sample - Field Code	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)
316742 - AH-3 0-1'	$< 0.100^{-2}$	< 0.100	< 0.100	< 0.100	<500 Qs	< 20.0
316744 - AH-4 0-1'	< 0.0200	< 0.0200	< 0.0200	< 0.0200	<50.0 Qs	< 4.00

### Sample: 316728 - AH-1 0-1'

Param	Flag	Result	$\operatorname{Units}$	RL
Chloride		5340	mg/Kg	4

### Sample: 316729 - AH-1 1-1.5'

Param	Flag	Result	$\operatorname{Units}$	RL
Chloride		2310	mg/Kg	4

#### Sample: 316730 - AH-1 2-2.5'

Param	Flag	Result	Units	RL
Chloride		1520	mg/Kg	4

### Sample: 316731 - AH-1 3-3.5'

Param	Flag	Result	Units	R.L
Chloride		2450	mg/Kg	4

#### Sample: 316732 - AH-1 4-4.5'

Param	Flag	Result	Units	RL
Chloride		484	mg/Kg	4

## Sample: 316733 - AH-1 5-5.5'

Param	Flag	Result	$\mathbf{U}\mathbf{mits}$	RL
Chloride		746	mg/Kg	4

Sample: 316734 - AH-1 6-6.5'

<sup>&</sup>lt;sup>2</sup>Dilution due to surfactants.

Report Date: January 2	2, 2013	Work Order: 12121344	Page 1	Page Number: 3 of 4	
Param Chloride	Flag	Result 800	Units mg/Kg	RL 4	
Chloride		800	mg/ Kg	4	
Sample: 316735 - Al	H-1 7-7.5'				
Param	Flag	Result	Units	RL	
Chloride		1160	mg/Kg	4	
Sample: 316736 - Al	H-1 8-8.5'				
Param	Flag	Result	Units	RL	
Chloride		1190	mg/Kg	4	
Sample: 316737 - Al	H-1 9-9.5'				
Param	Flag	Result	Units	RL	
Chloride		862	mg/Kg	4	
Sample: 316738 - Al	H-2 0-1'				
Param	Flag	Result	Units	RL	
Chloride		<20.0	mg/Kg	4	
Sample: 316739 - Al	H-2 1-1.5'				
Param	Flag	Result	Units	RL	
Chloride		<20.0	mg/Kg	4	
Sample: 316740 - Al	H-2 2-2.5'				
Param	Flag	Result	Units	RL	
Chloride		<20.0	mg/Kg	4	
Sample: 316741 - AI	H-2 3-3.5'				
Param	Flag	Result	Units	RL	
Chloride	<u> </u>	< 20.0	mg/Kg	4	

Report Date: January 2, 2013		Work Order: 12121344		Page Number: 4 of 4	
Sample: 316742	- AH-3 0-1'				
Param	Flag	Result	Units	$\operatorname{RL}$	
Chloride		<20.0	mg/Kg	4	
Sample: 316743	- AH3 1-1.5'				
Param	Flag	Result	Units	RL	
Chloride		<20.0	tng/Kg	4	
Sample: 316744	- AH-4 0-1'				
Param	Flag	Result	Units	RL	
Chloride		<20.0	mg/Kg	4	
Sample: 316745	- AH-4 1-1.5'				
Param	Flag	Result	Units	RL	
Chloride		< 20.0	mg/Kg	4	



6701 Aberdeen Avenue, Suite 9 200 East Sunset Road, Suite E 5002 Basin Street, Suite A1 (BioAquatic) 2501 Mayes Rd., Suite 100

Lubbock. Texas 79424 El Paso. Texas 79922 Midlend. Texas 79703 800-378-1296 806 - 794 - 1296 915-585-3443

FAX 806 - 794 - 1298 FAX 915 - 585 - 4944 FAX 432 689 6313

432-689-6301 Carroliton. Texas 75006 972-242-7750 E-Mail: lab@traceanalysis.com WEB: www.traceanalysis.com

## Certifications

**NCTRCA NELAP** DoDLELAP WBE HUB DBE Kansas Oklahoma ISO 17025

## Analytical and Quality Control Report

(Corrected Report)

Ike Tavarez Tetra Tech 1910 N. Big Spring Street Midland, TX, 79705

Report Date: January 2, 2013

Work Order: 12121344 

Project Location: Eddy Co., NM Project Name:

COG/Brigham H-3

Project Number: 114-6401612

Enclosed are the Analytical Report and Quality Control Report for the following sample(s) submitted to TraceAnalysis, Inc.

			Date	$\operatorname{Time}$	Date
Sample	Description	Matrix	Taken	Taken	Received
316728	AH-1 0-1'	soil	2012-12-11	00:00	2012-12-13
316729	AH-1 1-1.5'	soil	2012-12-11	00:00	2012-12-13
316730	AH-1 2-2.5	soil	2012-12-11	00:00	2012-12-13
316731	AH-1 3-3.5'	soil	2012-12-11	00:00	2012-12-13
316732	AH-1 4-4.5'	soil	2012-12-11	00:00	2012-12-13
316733	AH-1 5-5.5'	soil	2012-12-11	00:00	2012-12-13
316734	AH-1 6-6.5'	soil	2012-12-11	00:00	2012-12-13
316735	AH-1 7-7.5'	soil	2012-12-11	00:00	2012-12-13
316736	AH-1 8-8.5'	soil	2012-12-11	00:00	2012-12-13
316737	AH-1 9-9.5'	soil	2012-12-11	00:00	2012-12-13
316738	AH-2 0-1'	soil	2012-12-11	00:00	2012-12-13
316739	AH-2 1-1.5'	soil	2012-12-11	00:00	2012-12-13
316740	AH-2 2-2.5'	soil	2012-12-11	00:00	2012-12-13
316741	AH-2 3-3.5°	soil	2012-12-11	00:00	2012-12-13
316742	AH-3 0-1'	soil	2012-12-11	00:00	2012-12-13
316743	AH3 1-1.5'	soil	2012-12-11	00:00	2012-12-13

			Date	Time	Date
Sample	Description	Matrix	$\operatorname{Taken}$	Taken	Received
316744	AH-4 0-1	soil	2012-12-11	00:00	2012-12-13
316745	AH-4 1-1.5'	soil	2012-12-11	00:00	2012-12-13

#### Report Corrections (Work Order 12121344)

 $\bullet$  1/2/13: Corrected project name per chain of custody.

These results represent only the samples received in the laboratory. The Quality Control Report is generated on a batch basis. All information contained in this report is for the analytical batch(es) in which your sample(s) were analyzed.

This report consists of a total of 34 pages and shall not be reproduced except in its entirety, without written approval of TraceAnalysis, Inc.

Dr. Blair Leftwich, Director Dr. Michael Abel, Project Manager

Missel april

# Report Contents

Case Narrative
Analytical Report
Sample 316728 (AH-1 0-1')
Sample 316729 (AH-1 1-1.5')
Sample 316730 (AH-1 2-2.5')
Sample 316731 (AH-1 3-3.5')
Sample 316732 (AH-1 4-4.5')
Sample 316733 (AH-1 5-5.5')
Sample 316734 (AH-1 6-6.5')
Sample 316735 (AH-1 7-7.5')
Sample 316736 (AH-1 8-8.5')
Sample 316737 (AH-1 9-9.5)
Sample 316738 (AH-2 0-1')
Sample 316739 (AH-2 1-1.5')
Sample 316740 (AH-2 2-2.5')
Sample 316741 (AH-2 3-3.5')
Sample 316742 (AH-3 0-1')
Sample 316743 (AH3 1-1.5')
Sample 316744 (AH-4 0-1')
Sample 316745 (AH-4 1-1.5')
,
Method Blanks
QC Batch 97481 - Method Blank (1)
QC Batch 97553 - Method Blank (1)
QC Batch 97558 - Method Blank (1)
QC Batch 97588 - Method Blank (1)
QC Batch 97594 - Method Blank (1)
QC Batch 97666 - Method Blank (1)
QC Batch 97667 - Method Blank (1)
QC Batch 97669 - Method Blank (1)
Laboratory Control Spikes 1
QC Batch 97481 - LCS (1)
QC Batch 97553 - LCS (1)
QC Batch 97558 - LCS (1)
QC Batch 97588 - LCS (1)
QC Batch 97594 - LCS (1)
QC Batch 97666 - LCS (1)
QC Batch 97667 - LCS (1)
QC Batch 97669 - LCS (1)
QC Batch 97481 - MS (1)
QC Batch 97553 - MS (1)
QC Batch 97558 - MS (1)
QC Batch 97588 - MS (1)
QC Batch 97594 - MS (1)

QC Batch 97666 - MS (1)	
QC Batch 97667 - MS (1)	
QC Batch 97669 - MS (1)	
Calibration Standards	0
	2
QC Batch 97481 - CCV (1)	
QC Batch 97481 - CCV (2)	
QC Batch 97481 - CCV (3)	
QC Batch 97481 - CCV (4)	
QC Batch 97553 - CCV (1)	
QC Batch 97553 - CCV (2)	
QC Batch 97553 - CCV (3)	
QC Batch 97558 - CCV (1)	
QC Batch 97558 - CCV (2)	
QC Batch 97558 - CCV (3)	
QC Batch 97588 - CCV (1)	
QC Batch 97588 - CCV (2)	
QC Batch 97588 - CCV (3)	
QC Batch 97594 - CCV (1)	
QC Batch 97594 - CCV (2)	
QC Batch 97594 - CCV (3)	
QC Batch 97666 - CCV (1)	
QC Batch 97666 - CCV (2)	
QC Batch 97667 - CCV (1)	3
QC Batch 97667 - CCV (2)	3
QC Batch 97669 - CCV (1)	3
QC Batch 97669 - CCV (2)	3
(ξ) Daten 31003 - COV (2)	
Appendix	3;
Report Definitions	
Laboratory Certifications	
Standard Flags	
Result Comments	
Attachments	

## Case Narrative

Samples for project COG/Brigham H-3 were received by TraceAnalysis, Inc. on 2012-12-13 and assigned to work order 12121344. Samples for work order 12121344 were received intact at a temperature of 1.3 C.

Samples were analyzed for the following tests using their respective methods.

		Prep	$\operatorname{Prep}$	QC	Analysis
Test	Method	Batch	Date	Batch	Date
BTEX	S 8021B	82659	2012-12-18 at 16:47	97553	2012-12-18 at 16:47
BTEX	S 8021B	82683	2012-12-19 at 16:47	97588	2012-12-19 at 16:47
Chloride (Titration)	SM 4500-Cl B	82736	2012-12-20 at 14:28	97666	2012-12-21 at 16:07
Chloride (Titration)	SM 4500-Cl B	82736	2012-12-20 at 14:28	97667	2012-12-21 at 16:11
Chloride (Titration)	SM 4500-Cl B	82736	2012-12-20 at 14:28	97669	2012-12-21 at 16:19
TPH DRO - NEW	S 8015 D	82605	2012-12-14 at 12:00	97481	2012-12-17 at 09:53
TPH GRO	S 8015 D	82665	2012-12-18 at 16:47	97558	2012-12-18 at 16:47
TPH GRO	S 8015 D	82693	2012-12-19 at 16:47	97594	2012-12-19 at 16:47

Results for these samples are reported on a wet weight basis unless data package indicates otherwise.

A matrix spike (MS) and matrix spike duplicate (MSD) sample is chosen at random from each preparation batch. The MS and MSD will indicate if a site specific matrix problem is occurring, however, it may not pertain to the samples for work order 12121344 since the sample was chosen at random. Therefore, the validity of the analytical data reported has been determined by the laboratory control sample (LCS) and the method blank (MB). These quality control measures are performed with each preparation batch to ensure data integrity.

All other exceptions associated with this report have been footnoted on the appropriate analytical page to assist in general data comprehension. Please contact the laboratory directly if there are any questions regarding this project.

114-6401612

Work Order: 12121344 COG/Brigham H-3

Page Number: 6 of 34 Eddy Co., NM

## **Analytical Report**

Sample: 316728 - AH-1 0-1'

Laboratory:

Midland

Analysis: BTEX QC Batch: 97553

Analytical Method:

S 8021B 2012-12-18 Prep Method: S 5035

Prep Batch: 82659 Date Analyzed: Sample Preparation:

2012-12-18

Analyzed By: YG YGPrepared By:

			$\operatorname{RL}$			
Parameter	Flag	$\operatorname{Cert}$	Result	Units	Dilution	RL
Benzene	U	1	< 0.0200	mg/Kg	1	0.0200
Toluene	υ	1	< 0.0200	mg/Kg	1	0.0200
Ethylbenzene	U	1	< 0.0200	mg/Kg	1	0.0200
Xylene	U	i	< 0.0200	mg/Kg	1	0.0200

						$_{ m Spike}$	Percent	Recovery
Surrogate	Flag	$\operatorname{Cert}$	Result	Units	Dilution	Amount	Recovery	Limits
Trifluorotoluene (TFT)			1.97	mg/Kg	1	2.00	98	79.5 - 108
4-Bromofluorobenzene (4-BFB)			1.84	mg/Kg	1	2.00	92	71.4 - 108

Sample: 316728 - AH-1 0-1'

Laboratory:

Midland

Analysis: Chloride (Titration) QC Batch: 97666 Prep Batch: 82736

Analytical Method: SM 4500-Cl B Date Analyzed: 2012-12-21

2012-12-20

Prep Method: N/A Analyzed By: ARPrepared By: AR.

RLParameter Flag Cert Result Units Dilution RLChloride 5340 4.00mg/Kg 10

Sample Preparation:

Sample: 316728 - AH-1 0-1'

Laboratory:

Midland

Analysis: TPH DRO - NEW QC Batch: 97481 Prep Batch: 82605

Analytical Method: S 8015 D Date Analyzed: 2012-12-17 Sample Preparation: 2012-12-14

Prep Method: N/AAnalyzed By: CWPrepared By: CW

RLRLParameter Flag Cert Result Units Dilution DRO 68.0 mg/Kg 50.0 Qs 1

114-6401612

Work Order: 12121344 COG/Brigham H-3

Page Number: 7 of 34 Eddy Co., NM

							$\operatorname{Spike}$	Percent	Recovery
Surrogate		Flag	$\operatorname{Cert}$	Result	$\operatorname{Units}$	Dilution	Amount	Recovery	Limits
n-Tricosane	Qsr	Qsr		161	mg/Kg	1	100	161	70 - 130

Sample: 316728 - AH-1 0-1'

Laboratory:

Midland

Analysis:

TPH GRO

97558

Analytical Method:

S 8015 D

Prep Method:

1

QC Batch:

 $\overline{GRO}$ 

Date Analyzed:

1

2012-12-18

S 5035 Analyzed By:

Prep Batch:

82665

Sample Preparation: 2012-12-18

Prepared By:

YGYG

Cert Parameter Flag

υ

RLResult < 4.00

Dilution Units

RL

4.00

Percent Recovery Spike Units Dilution Limits Surrogate Flag Cert Result Amount Recovery Trifluorotoluene (TFT) 2.16 70 - 130 mg/Kg 1 2.00 108 4-Bromofluorobenzene (4-BFB) 1.91 mg/Kg 1 2.00 96 70 - 130

Sample: 316729 - AH-1 1-1.5'

Laboratory:

Midland

Analysis:

Chloride (Titration)

Analytical Method:

SM 4500-Cl B

Prep Method: N/A

OC Batch: Prep Batch: 82736

Chloride

97666

Date Analyzed: Sample Preparation: 2012-12-21

Analyzed By: AR.

2012-12-20

Prepared By: AR

Parameter Flag Cert

RLResult 2310

Units mg/Kg

mg/Kg

Dilution RL

4.00

 $\overline{10}$ 

Sample: 316730 - AH-1 2-2.5'

Laboratory:

Midland

Analysis:

Chloride (Titration)

Analytical Method:

SM 4500-Cl B

Prep Method: N/A

QC Batch: Prep Batch:

97666 82736 Date Analyzed: Sample Preparation:

2012-12-21 2012-12-20 Analyzed By: AR. Prepared By: AR.

 $continued \dots$ 

Report Date: January 2, 2013 V 114-6401612			rk Order: 121 OG/Brigham		Page Number: 8 of 3 Eddy Co., Ni	
sample 3167.	30 continued					
_			RL			7.7
Parameter	Flag	Cert	Result	Units	Dilution	RL
			RL	,		
Parameter	Flag	Cert	Result	Units	Dilution	RL
Chloride			1520	mg/Kg	10	4.00
Sample: 31 Laboratory: Analysis: QC Batch: Prep Batch:	6731 - AH-1 3-3.5'  Midland Chloride (Titration) 97666 82736	Date An	Preparation:	SM 4500-Cl B 2012-12-21 2012-12-20	Prep Method: Analyzed By: Prepared By:	N/A AR AR.
Parameter	Flag	Cert	RL Result	Units	Dilution	RL
Parameter Chloride	Flag	Cert		Units mg/Kg	Dilution 10	RL 4.00

Sample:	316733	- AH-1	5-5.5
---------	--------	--------	-------

Laboratory: Midland

Parameter

 $\overline{\text{Chloride}}$ 

Analysis: Chloride (Titration)

QC Batch: 97667 Prep Batch: 82736

Flag

 $\operatorname{Cert}$ 

Analytical Method: SM 4500-Cl B Date Analyzed: 2012-12-21 Sample Preparation: 2012-12-20

RL

484

Units

mg/Kg

Result

Prep Method: N/A Analyzed By: AR Prepared By: AR

Dilution

5

RL

4.00

114-6401612

Work Order: 12121344 COG/Brigham H-3

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Eddy Co., NM

			RL			
Parameter	Flag	Cert	Result	Units	Dilution	RL
Chloride			746	mg/Kg	5	4.00

Sample: 316734 - AH-1 6-6.5'

Laboratory:

Midland

Analysis: Chloride (Titration)

QC Batch: 97667 Prep Batch: 82736 Analytical Method: Date Analyzed:

SM 4500-Cl B 2012-12-21 Sample Preparation: 2012-12-20

Prep Method: N/A Analyzed By:

ARPrepared By: AR

			RL			
Parameter	Flag	$\operatorname{Cert}$	Result	Units	Dilution	RL
Chloride			800	mg/Kg	5	4.00

Sample: 316735 - AH-1 7-7.5'

82736

Laboratory:

Prep Batch:

Midland

Chloride (Titration) Analysis: QC Batch: 97667

Analytical Method: Date Analyzed: Sample Preparation:

SM 4500-Cl B 2012-12-21 2012-12-20

Prep Method: N/A Analyzed By:

ARPrepared By: AR

			RL			
Parameter	Flag	$\operatorname{Cert}$	Result	Units	Dilution	$\mathrm{RL}$
Chloride			1160	mg/Kg	10	4.00

Sample: 316736 - AH-1 8-8.5'

Laboratory:

Midland

Chloride (Titration) Analysis:

QC Batch: 97667 Prep Batch: 82736 Analytical Method: Date Analyzed:

Sample Preparation:

SM 4500-Cl B 2012-12-21 2012-12-20

Prep Method: N/A Analyzed By: ARPrepared By: AR

RLFlag Cert Result Dilution Units RLParameter 1190 10 4.00Chloride mg/Kg

Page Number: 10 of 34 Work Order: 12121344 Report Date: January 2, 2013 Eddy Co., NM 114-6401612 COG/Brigham H-3

Sample: 316737 - AH-1 9-9.5'

Laboratory: Midland

Analysis: Chloride (Titration) Prep Method: N/AAnalytical Method: SM 4500-Cl B QC Batch: Analyzed By: AR. 97667 Date Analyzed: 2012-12-21 AR

Prep Batch: 82736 Sample Preparation: 2012-12-20 Prepared By:

RLRLParameter Cert Result Units Dilution Flag Chloride 862 4.00mg/Kg 5

Sample: 316738 - AH-2 0-1'

Laboratory: Midland

Analysis: **BTEX** S 8021B Prep Method: S 5035 Analytical Method: QC Batch: 97553 2012-12-18 Analyzed By: YGDate Analyzed: Prep Batch: YG82659 Sample Preparation: 2012-12-18 Prepared By:

RLResult Parameter Flag Cert Units Dilution RLBenzene < 0.200 mg/Kg 10 0.0200 υ ı Toluene < 0.200 mg/Kg 10 0.0200 U Ethylbenzene 10 < 0.200 mg/Kg 0.0200IJ Xylene < 0.200 mg/Kg 10 0.0200Ü

						$\operatorname{Spike}$	Percent	Recovery
Surrogate	$\operatorname{Flag}$	$\operatorname{Cert}$	Result	Units	Dilution	Amount	Recovery	Limits
Trifluorotoluene (TFT)			19.1	mg/Kg	10	20.0	96	79.5 - 108
4-Bromofluorobenzene (4-BFB)			18.0	mg/Kg	10	20.0	90	71.4 - 108

Sample: 316738 - AH-2 0-1'

Laboratory: Midland

Analysis: Chloride (Titration) Analytical Method: SM 4500-Cl B Prep Method: N/A QC Batch: Date Analyzed: 97667 Analyzed By: 2012-12-21 ARPrep Batch: 82736 Sample Preparation: 2012-12-20 Prepared By: AR.

RLParameter Dilution Cert Result Units RLFlag Chloride < 20.0mg/Kg 4.00 5 IJ

114-6401612

Work Order: 12121344 COG/Brigham H-3

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Eddy Co., NM

Sample: 316738 - AH-2 0-1'

Laboratory:

Midland

Analysis: QC Batch: TPH DRO - NEW -

97481

Prep Batch: 82605

Analytical Method:

S 8015 D

Date Analyzed:

2012-12-17

Prep Method: N/A Analyzed By:

CW

Sample Preparation: 2012-12-14 Prepared By:

CW

RL

Parameter	Flag	Cert	Result	Units	Dilution	RL
DRO	Qs	1	707	mg/Kg	10	50.0

							Spike	Percent	Recovery
Surrogate		$\operatorname{Flag}$	$\operatorname{Cert}$	Result	Units	Dilution	Amount	Recovery	Limits
n-Tricosane	Qвг	Qsr		187	mg/Kg	10	100	187	70 - 130

Sample: 316738 - AH-2 0-1'

Laboratory:

Midland

TPH GRO Analysis: QC Batch: 97558

Analytical Method:

S 8015 D 2012-12-18

Prep Method: S 5035 Analyzed By: YG

Prep Batch:

82665

Date Analyzed: Sample Preparation: 2012-12-18

Prepared By:

YG

RLCert Result Units Dilution RLParameter Flag GRO <40.0 mg/Kg  $\overline{10}$ 4.00 ı

						$\operatorname{Spike}$	Percent	Recovery
Surrogate	$\operatorname{Flag}$	$\operatorname{Cert}$	Result	Units	Dilution	${f Amount}$	Recovery	Limits
Trifluorotoluene (TFT)			18.0	mg/Kg	10	20.0	90	70 - 130
4-Bromofluorobenzene (4-BFB)			18.7	mg/Kg	10	20.0	94	70 - 130

Sample: 316739 - AH-2 1-1.5'

Laboratory:

Midland

Analysis: Chloride (Titration) QC Batch:

Analytical Method:

SM 4500-Cl B

Prep Method: N/A AR

97667

Date Analyzed:

2012-12-21

Analyzed By:

Prep Batch: 82736

Sample Preparation:

2012-12-20

Prepared By: AR.

RL

Parameter	Flag	Cert	Result	Units	Dilution	RL
Chloride	υ		< 20.0	mg/Kg	5	4.00

114-6401612

Work Order: 12121344 COG/Brigham H-3

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Eddy Co., NM

Sample: 316740 - AH-2 2-2.5'

Laboratory:

Midland

Analysis: QC Batch:

97667

Chloride (Titration) Date Analyzed:

Analytical Method:

SM 4500-Cl B 2012-12-21

Prep Method: N/A Analyzed By:

AR. AR

> RL4.00

Prep Batch: 82736

Sample Preparation: 2012-12-20 Prepared By:

5

Dilution

RLParameter Flag Cert Result Units Chloride <20.0 mg/Kg U

Sample: 316741 - AH-2 3-3.5'

Laboratory:

Midland

Analysis:

Chloride (Titration)

97667

Analytical Method:

SM 4500-Cl B

Prep Method: N/A

QC Batch:

Date Analyzed:

2012-12-21

ARAnalyzed By: AR.

Prep Batch:

82736

Sample Preparation: 2012-12-20

RL

Prepared By:

Dilution Parameter Flag Cert Result Units Chloride <20.0 mg/Kg U

Sample: 316742 - AH-3 0-1'

Laboratory:

Midland

Analysis:

**BTEX** 97588

Analytical Method:

S 8021B 2012-12-19 Prep Method:

5

S 5035 YG

RL

4.00

QC Batch: Prep Batch:

82683

Date Analyzed: Sample Preparation:

2012-12-19

Analyzed By: YG Prepared By:

				RL			
Parameter		Flag	$\operatorname{Cert}$	Result	Units	Dilution	RL
Benzene	2	U	1	< 0.100	mg/Kg	5	0.0200
Toluene		U	1	< 0.100	mg/Kg	5	0.0200
Ethylbenzene		U	ı	< 0.100	mg/Kg	5	0.0200
Xylene		U	i	< 0.100	mg/Kg	5	0.0200

						Spike	Percent	Recovery
Surrogate	Flag	$\operatorname{Cert}$	Result	$\operatorname{Units}$	Dilution	Amount	Recovery	Limits
Trifluorotoluene (TFT)			9.74	mg/Kg	5	10.0	97	79.5 - 108
4-Bromofluorobenzene (4-BFB)			9.14	mg/Kg	5	10.0	91	71.4 - 108

114-6401612

Work Order: 12121344 COG/Brigham H-3

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Eddy Co., NM

Sample: 316742 - AH-3 0-1'

Laboratory:

Midland

Chloride (Titration) Analysis:

QC Batch: 97669 Prep Batch: 82736 Analytical Method:

SM 4500-Cl B

Date Analyzed: 2012-12-21 Sample Preparation: 2012-12-20 Prep Method: N/A Analyzed By:

Prepared By:

AR. AR

RL.

			~ (·			
Parameter	$\operatorname{Flag}$	Cert	Result	Units	Dilution	RL
Chloride	U		< 20.0	nig/Kg	5	4.00

Sample: 316742 - AH-3 0-1'

Laboratory:

Midland

Analysis: QC Batch: 97481

TPH DRO - NEW

Analytical Method:

S 8015 D 2012-12-17 Prep Method: N/A

CWAnalyzed By: Prepared By: CW

Prep Batch: 82605

Date Analyzed: Sample Preparation: 2012-12-14

			KL			
Parameter	Flag	Cert	Result	Units	Dilution	RL
DRO	Qя	1	< 500	mg/Kg	10	50.0

							Spike	Percent	Recovery
Surrogate		Flag	Cert	Result	$\operatorname{Units}$	Dilution	Amount	Recovery	Limits
n-Tricosane	Qвг	Qar		155	nıg/Kg	10	100	155	70 - 130

Sample: 316742 - AH-3 0-1'

Laboratory:

Midland

Analysis: TPH GRO QC Batch: 97594 Prep Batch: 82693

Analytical Method: Date Analyzed:

Sample Preparation:

S 8015 D 2012-12-19 2012-12-19

Prep Method: S 5035 Analyzed By: YGPrepared By: YG

RLFlag Parameter Cert Result Units Dilution RLGRO < 20.0 mg/Kg 5 4.00 υ

						Spike	Percent	Recovery
Surrogate	Flag	$\operatorname{Cert}$	Result	$\operatorname{Units}$	Dilution	Amount	Recovery	Limits
Trifluorotoluene (TFT)			9.05	mg/Kg	5	10.0	90	70 - 130
4-Bromofluorobenzene (4-BFB)			9.24	${ m mg/Kg}$	5	10.0	92	70 - 130

Report Date: January 2, 2013 114-6401612

Work Order: 12121344 COG/Brigham H-3

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Sample: 316743 - AH3 1-1.5'

Laboratory:

Midland

Chloride (Titration) Analysis:

Analytical Method:

SM 4500-Cl B

Prep Method: N/A

QC Batch:

97669

Date Analyzed:

2012-12-21

Analyzed By: AR.

Prep Batch: 82736

Sample Preparation: 2012-12-20 Prepared By: AR.

RL

Parameter Flag Cert Result Units Dilution RL4.00 Chloride <20.0 5 mg/Kg U

#### Sample: 316744 - AH-4 0-1'

Laboratory:

Midland

Analysis: QC Batch:

BTEX 97588 Prep Batch: 82683

Analytical Method:

Sample Preparation:

Date Analyzed:

S 8021B 2012-12-19 2012-12-19 Prep Method: S 5035

Analyzed By: YG Prepared By: YG

RL

			2022			
Parameter	$\operatorname{Flag}$	$\operatorname{Cert}$	Result	Units	Dilution	RL
Benzene	U	1	< 0.0200	mg/Kg	1	0.0200
Toluene	U	1	< 0.0200	mg/Kg	1	0.0200
Ethylbenzene	U	1	< 0.0200	mg/Kg	1	0.0200
Xylene	T.F	1	< 0.0200	mg/Kg	1	0.0200

						Spike	Percent	Recovery
Surrogate	Flag	$\operatorname{Cert}$	Result	Units	Dilution	Amount	Recovery	Limits
Trifluorotoluene (TFT)			1.98	mg/Kg	1	2.00	99	79.5 - 108
4-Bromofluorobenzene (4-BFB)			1.81	mg/Kg	1	2.00	90	71.4 - 108

#### Sample: 316744 - AH-4 0-1'

Laboratory:

Midland

Analysis: Chloride (Titration) QC Batch: 97669

Analytical Method: Date Analyzed:

SM 4500-Cl B 2012-12-21

Prep Method: N/A Analyzed By: AR

Prep Batch:

82736

Sample Preparation:

2012-12-20

Prepared By: AR

RLParameter Flag Cert Result Units Dilution RLChloride <20.0 mg/Kg 5 4.00 U

Report Date: January 2, 2013 114-6401612

Work Order: 12121344 COG/Brigham H-3

Page Number: 15 of 34 Eddy Co., NM

Sample: 316744 - AH-4 0-1'

Laboratory:

Midland

TPH DRO - NEW Analysis: QC Batch: 97481 Prep Batch: 82605

Analytical Method: Date Analyzed:

Sample Preparation:

S 8015 D 2012-12-17 2012-12-14 Prep Method: N/AAnalyzed By:

CWPrepared By: CW

RL

Parameter Flag Cert Result Units Dilution RLDRO < 50.0 mg/Kg 50.0 Qs 1

							Spike	Percent	Recovery
Surrogate		$\operatorname{Flag}$	$\operatorname{Cert}$	$\operatorname{Result}$	$\operatorname{Units}$	Dilution	Amount	Recovery	Limits
n-Tricosane	Qsr	Qsr		131	mg/Kg	1	100	131	70 - 130

#### Sample: 316744 - AH-4 0-1'

Laboratory:

Midland

Analysis: TPH GRO QC Batch: 97594 Prep Batch: 82693

Analytical Method: Date Analyzed:

Sample Preparation:

S 8015 D 2012-12-19 2012-12-19 Prep Method: S 5035

Analyzed By: YG Prepared By: YG

RLFlag Parameter Cert Result Units Dilution RLGRO < 4.00 mg/Kg 4.00 U

						Spike	Percent	Recovery
Surrogate	$\operatorname{Flag}$	$\operatorname{Cert}$	Result	Units	Dilution	Amount	Recovery	Limits
Trifluorotoluene (TFT)			2.44	mg/Kg	1	2.00	122	70 - 130
4-Bromofluorobenzene (4-BFB)			1.82	mg/Kg	1	2.00	91	70 - 130

#### Sample: 316745 - AH-4 1-1.5'

Laboratory:

Midland

Analysis: Chloride (Titration) QC Batch: 97669 Prep Batch: 82736

Analytical Method: Date Analyzed: Sample Preparation: SM 4500-Cl B 2012-12-21 2012-12-20

Prep Method: N/A Analyzed By: AR. Prepared By: AR

RL

Parameter Flag Cert Result Units RLDilution  $\overline{\text{Chloride}}$ < 20.0 U mg/Kg 5 4.00

114-6401612

Work Order: 12121344 COG/Brigham H-3

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## Method Blanks

Method Blank (1)

QC Batch: 97481

QC Batch: Prep Batch: 82605

97481

Date Analyzed:

2012-12-17

Analyzed By: CW

QC Preparation: 2012-12-14 Prepared By: CW

			$\mathrm{MDL}$		
Parameter	Flag	$\operatorname{Cert}$	Result	Units	RL
DRO		1	< 6.88	mg/Kg	50

						$\operatorname{Spike}$	Percent	Recovery
Surrogate	$\operatorname{Flag}$	$\operatorname{Cert}$	Result	$\operatorname{Units}$	Dilution	Amount	Recovery	Limits
n-Tricosane			117	mg/Kg	1	100	117	70 - 130

Method Blank (1)

QC Batch: 97553

QC Batch: 97553 Prep Batch:

82659

Date Analyzed: QC Preparation:

2012-12-18 2012-12-18

YG Analyzed By: Prepared By: YG

MDL Parameter Units RLFlag Cert Result Benzene mg/Kg 0.02 < 0.00810 Toluene < 0.00750 mg/Kg 0.02Ethylbenzene < 0.00730 mg/Kg 0.02mg/Kg Xylene < 0.00700 0.02

						$\operatorname{Spike}$	Percent	Recovery
Surrogate	$\mathbf{Flag}$	$\operatorname{Cert}$	Result	Units	Dilution	Amount	Recovery	Limits
Trifluorotoluene (TFT)			2.01	mg/Kg	1	2.00	100	79.5 - 108
4-Bromofluorobenzene (4-BFB)			1.85	mg/Kg	1	2.00	92	71.4 - 108

Method Blank (1)

QC Batch: 97558

QC Batch: 97558 Prep Batch: 82665 Date Analyzed: 2012-12-18 QC Preparation: 2012-12-18

Analyzed By: YG Prepared By: YG Report Date: January 2, 2013 114-6401612

Work Order: 12121344 COG/Brigham H-3 Page Number: 17 of 34 Eddy Co., NM

Parameter	Flag		Cert		$rac{ ext{MDL}}{ ext{Result}}$		Units	m RL
GRO			1		< 2.32		ng/Kg	4
Surrogate	Flag	Cert	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT) 4-Bromofluorobenzene (4-BFB)			1.84 1.85	mg/Kg mg/Kg	1 1	2.00 2.00	92 92	70 - 130 70 - 130

Method Blank (1) QC Batch: 97588

QC Batch: 97588 Da
Prep Batch: 82683 Qc

Date Analyzed: 2012-12-19 QC Preparation: 2012-12-19 Analyzed By: YG Prepared By: YG

	$\mathrm{MDL}$								
Parameter	Flag	Cert	Result	Units	RL				
Benzene		1	< 0.00810	mg/Kg	0.02				
Toluene		1	< 0.00750	mg/Kg	0.02				
Ethylbenzene		1	< 0.00730	mg/Kg	0.02				
Xylene		1	< 0.00700	mg/Kg	0.02				

						$\operatorname{Spike}$	Percent	Recovery
Surrogate	Flag	Cert	Result	Units	Dilution	Amount	Recovery	Limits
Trifluorotoluene (TFT)			1.92	mg/Kg	1	2.00	96	79.5 - 108
4-Bromofluorobenzene (4-BFB)			1.81	${ m mg/Kg}$	1	2.00	90	71.4 - 108

Method Blank (1) QC Batch: 97594

 QC Batch:
 97594
 Date Analyzed:
 2012-12-19

 Prep Batch:
 82693
 QC Preparation:
 2012-12-19

Analyzed By: YG Prepared By: YG

			MDL		
Parameter	Flag	Cert	Result	Units	RL
GRO		1	< 2.32	mg/Kg	4

						Spike	Percent	Recovery
Surrogate	Flag	Cert	Result	$_{ m Units}$	Dilution	${f Amount}$	Recovery	Limits
Trifluorotoluene (TFT)			1.82	mg/Kg	1	2.00	91	70 - 130
4-Bromofluorobenzene (4-BFB)			1.85	mg/Kg	1	2.00	92	70 - 130

Report Date: January 114-6401612	2, 2013		er: 12121344 righam H-3		Page Number: 18 of 34 Eddy Co., NM			
Method Blank (1)	QC Batch: 97666							
QC Batch: 97666 Prep Batch: 82736		Date Analyzed: QC Preparation:	2012-12-21 2012-12-20		Analyzed By: Prepared By:	AR. AR.		
Parameter	Flag	Cert		MDL Result	Units	RL		
Chloride				<3.85	mg/Kg	4		
Method Blank (1)	QC Batch: 97667							
QC Batch: 97667 Prep Batch: 82736		Date Analyzed: QC Preparation:	2012-12-21 2012-12-20		Analyzed By: Prepared By:	AR AR		
Parameter	$\operatorname{Flag}$	Cert		MDL Result	Units	RL		
Chloride	1 100	5020		<3.85	mg/Kg	4		
Method Blank (1)	QC Batch: 97669							
QC Batch: 97669 Prep Batch: 82736		Date Analyzed: QC Preparation:	2012-12-21 2012-12-20		Analyzed By: Prepared By:	AR.		
Parameter	Flag	Cert		MDL Result	${ m Units}$	m RL		
Chloride	1 148			< 3.85	mg/Kg	4		

.

Report Date: January 2, 2013 114-6401612

Work Order: 12121344 COG/Brigham H-3

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## Laboratory Control Spikes

#### Laboratory Control Spike (LCS-1)

QC Batch:

97481

Date Analyzed:

2012-12-17

Analyzed By: CW

Prepared By: CW

Prep Batch: 82605

QC Preparation: 2012-12-14

			LCS			$\operatorname{Spike}$	Matrix		Rec.
Param	$\mathbf{F}$	$^{\mathrm{C}}$	Result	${ m Units}$	Dil.	Amount	Result	Rec.	${f Limit}$
DRO		1	239	mg/Kg	1	250	<6.88	96	70 - 130

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

			LCSD			$\operatorname{Spike}$	Matrix		Rec.		RPD
Param	$\mathbf{F}$	$\mathbf{C}$	Result	Units	Dil.	Amount	Result	Rec.	$\operatorname{Limit}$	RPD	Limit
DRO		1	258	mg/Kg	1	250	<6.88	103	70 - 130	8	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	LCS	LCSD			$\operatorname{Spike}$	LCS	LCSD	Rec.
Surrogate	Result	Result	$_{ m Units}$	Dil.	Amount	Rec.	Rec.	Limit
n-Tricosane	113	118	mg/Kg	1	100	113	118	70 - 130

#### Laboratory Control Spike (LCS-1)

QC Batch:

97553

Date Analyzed:

2012-12-18

Analyzed By: YG Prepared By: YG

Prep Batch: 82659

QC Preparation: 2012-12-18

			LCS			Spike	Matrix		Rec.
Param	$\mathbf{F}$	C	Result	Units	Dil.	Amount	Result	Rec.	$\operatorname{Limit}$
Benzene		1	1.68	mg/Kg	1	2.00	< 0.00810	84	72.4 - 111
Toluene		1	1.71	mg/Kg	1	2.00	< 0.00750	86	77 - 110
Ethylbenzene		1	1.77	mg/Kg	1	2.00	< 0.00730	88	71.8 - 115
Xylene		1	5.20	mg/Kg	1	6.00	< 0.00700	87	78.3 - 114

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

			LCSD			Spike	Matrix		Rec.		RPD
Param	$\mathbf{F}$	$^{\rm C}$	Result	Units	Dil.	$\mathbf{A}\mathbf{mount}$	Result	Rec.	Limit	RPD	$_{ m Limit}$
Benzene		1	1.80	mg/Kg	1	2.00	< 0.00810	90	72.4 - 111	7	20
Toluene		1	1.84	mg/Kg	1	2.00	< 0.00750	92	77 - 110	7	20
Ethylbenzene		1	1.89	mg/Kg	1	2.00	< 0.00730	94	71.8 - 115	7	20
Xylene		1	5.56	mg/Kg	1	6.00	< 0.00700	93	78.3 - 114	7	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

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Surrogate	LCS Result	LCSD Result	Units	Dil.	$rac{ ext{Spike}}{ ext{Amount}}$	LCS Rec.	LCSD Rec.	Rec. Limit
Triffuorotoluene (TFT)	2.01	2.00	mg/Kg	1	2.00	100	100	82.1 - 110
4-Bromofluorobenzene (4-BFB)	2.01	1.86	mg/Kg	1	2.00	100	93	79.6 - 114

#### Laboratory Control Spike (LCS-1)

QC Batch:

97558

Date Analyzed:

2012-12-18

Analyzed By: YG

Prep Batch: 82665

QC Preparation: 2012-12-18

Prepared By: YG

			LCS			$\operatorname{Spike}$	Matrix		Rec.
Param	$\mathbf{F}$	$\mathbf{C}$	Result	Units	Dil.	Amount	Result	Rec.	$\operatorname{Limit}$
GRO		ı	20.9	mg/Kg	1	20.0	< 2.32	104	70 - 130

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

			LCSD			$\operatorname{Spike}$	Matrix		${ m Rec.}$		RPD
Param	F	$^{\rm C}$	Result	Units	Dil.	Amount	Result	Rec.	Limit	RPD	Limit
GRO		1	20.8	mg/Kg	1	20.0	< 2.32	104	70 - 130	0	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	LCS	LCSD			$_{ m Spike}$	LCS	LCSD	Rec.
Surrogate	Result	Result	Units	Dil.	Amount	Rec.	Rec.	Limit
Trifluorotoluene (TFT)	1.95	1.96	mg/Kg	1	2.00	98	98	70 - 130
4-Bromofluorobenzene (4-BFB)	1.93	1.95	mg/Kg	1	2.00	96	98	70 - 130

#### Laboratory Control Spike (LCS-1)

QC Batch:

97588

Date Analyzed:

2012-12-19

Analyzed By: YG

Prep Batch: 82683

QC Preparation: 2012-12-19

Prepared By: YG

			LCS			Spike	Matrix		Rec.
Param	$\mathbf{F}$	$\mathbf{C}$	Result	Units	Dil.	Amount	Result	Rec.	Limit
Benzene		ı	1.76	mg/Kg	1	2.00	< 0.00810	88	72.4 - 111
Toluene		1	1.78	mg/Kg	1	2.00	< 0.00750	89	77 - 110
Ethylbenzene		l	1.86	mg/Kg	1	2.00	< 0.00730	93	71.8 - 115
Xylene		1	5.45	mg/Kg	1	6.00	< 0.00700	91	78.3 - 114

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

			LCSD			$_{ m Spike}$	Matrix		Rec.		RPD
Param	F	$\mathbf{C}$	Result	Units	Dil.	Amount	Result	Rec.	Limit	RPD	Limit
Benzene		1	1.62	mg/Kg	1	2.00	< 0.00810	81	72.4 - 111	8	20

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control spikes continued . . .

•			LCSD			Spike	Matrix		Rec.		RPD
Param	$\mathbf{F}$	$\mathbf{C}$	Result	Units	Dil.	Amount	Result	Rec.	$_{ m Limit}$	RPD	Limit
Toluene		1	1.65	mg/Kg	1	2.00	< 0.00750	82	77 - 110	8	20
Ethylbenzene		1	1.69	mg/Kg	1	2.00	< 0.00730	84	71.8 - 115	10	20
Xylene		ı	5.03	mg/Kg	1	6.00	< 0.00700	84	78.3 - 114	8	20

Work Order: 12121344

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	LCS	LCSD			$\operatorname{Spike}$	LCS	LCSD	Rec.
Surrogate	Result	Result	Units	Dil.	Amount	Rec.	Rec.	$\operatorname{Limit}$
Trifluorotoluene (TFT)	1.96	1.95	mg/Kg	1	2.00	98	98	82.1 - 110
4-Bromofluorobenzene (4-BFB)	1.90	1.85	mg/Kg	1	2.00	95	92	79.6 - 114

#### Laboratory Control Spike (LCS-1)

QC Batch: Prep Batch: 82693

97594

Date Analyzed:

2012-12-19 QC Preparation: 2012-12-19 Analyzed By: YG

Prepared By: YG

			LCS			Spike	Matrix		Rec.
Param	$\mathbf{F}$	$\mathbf{C}$	Result	Units	Dil.	Amount	Result	Rec.	$\operatorname{Limit}$
GRO		1	20.5	mg/Kg	1	20.0	4.49	102	70 - 130

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

			LCSD			Spike	Matrix		Rec.		RPD
Param	$\mathbf{F}$	$^{\rm C}$	Result	Units	Dil.	Amount	Result	Rec.	Limit	R.PD	Limit
GRO		)	21.1	mg/Kg	1	20.0	4.49	106	70 - 130	3	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	LCS	LCSD			Spike	LCS	LCSD	Rec.
Surrogate	Result	Result	Units	Dil.	Amount	Rec.	Rec.	$_{ m Limit}$
Trifluorotoluene (TFT)	2.54	2.21	mg/Kg	1	2.00	127	110	70 - 130
4-Bromofluorobenzene (4-BFB)	1.97	1.96	mg/Kg	1	2.00	98	98	70 - 130

#### Laboratory Control Spike (LCS-1)

QC Batch:

Prep Batch: 82736

97666

Date Analyzed: QC Preparation: 2012-12-20

2012-12-21

Analyzed By: AR Prepared By: AR

			LCS			$\operatorname{Spike}$	Matrix		Rec.
Param	$\mathbf{F}$	$^{\mathrm{C}}$	Result	Units	Dil.	${f Amount}$	Result	Rec.	Limit
Chloride			2500	mg/Kg	1	2500	< 3.85	100	85 - 115

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Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

			LCSD			Spike	Matrix		Rec.		RPD
Param	$\mathbf{F}$	$\mathbf{C}$	Result	Units	Dil.	Amount	Result	Rec.	Limit	RPD	Limit
Chloride			2390	mg/Kg	1	2500	< 3.85	96	85 - 115	4	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

#### Laboratory Control Spike (LCS-1)

QC Batch:

97667

Date Analyzed:

2012-12-21

Analyzed By: AR.

Prep Batch: 82736

QC Preparation: 2012-12-20

Prepared By: AR.

			LCS			$\operatorname{Spike}$	Matrix		Rec.
Param	$\mathbf{F}$	$\mathbf{C}$	Result	Units	Dil.	Amount	Result	Rec.	$_{ m Limit}$
Chloride			2620	mg/Kg	1	2500	< 3.85	105	85 - 115

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

			LCSD			Spike	Matrix		Rec.		RPD
Param	$\mathbf{F}$	$^{\rm C}$	Result	Units	Dil.	Amount	Result	Rec.	Limit	RPD	Limit
Chloride			2520	mg/Kg	1	2500	< 3.85	101	85 - 115	4	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

#### Laboratory Control Spike (LCS-1)

QC Batch:

97669

Date Analyzed:

2012-12-21

Analyzed By: AR

Prep Batch: 82736

QC Preparation: 2012-12-20

Prepared By: AR

			LCS			Spike	Matrix		Rec.
Param	$\mathbf{F}$	$^{\rm C}$	Result	Units	Dil.	Amount	Result	Rec.	Limit
Chloride			2420	mg/Kg	1	2500	< 3.85	97	85 - 115

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

			LCSD			Spike	Matrix		Rec.		RPD
Param	$\mathbf{F}$	$\mathbf{C}$	Result	Units	Dil.	Amount	Result	Rec.	Limit	RPD	Limit
Chloride			2560	mg/Kg	1	2500	< 3.85	102	85 - 115	6	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

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Matrix Spike (MS-1)

Spiked Sample: 316621

QC Batch:

97481

Date Analyzed:

2012 - 12 - 17

Analyzed By: CW

Prep Batch: 82605

QC Preparation: 2012-12-14

Prepared By: CW

				MS			$\operatorname{Spike}$	Matrix		${ m Rec.}$
Param		$\mathbf{F}$	$^{\rm C}$	Result	Units	Dil.	$\mathbf{A}\mathbf{m}\mathbf{o}\mathbf{u}\mathbf{n}\mathbf{t}$	Result	Rec.	$\operatorname{Limit}$
DRO	Qs	Qя	1	11300	mg/Kg	5	250	10400	360	70 - 130

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

				MSD			$\operatorname{Spike}$	Matrix		Rec.		RPD
Param		$\mathbf{F}$	$^{\rm C}$	Result	Units	Dil.	Amount	Result	Rec.	Limit	RPD	Limit
DRO	Qs	Qя	1	10500	mg/Kg	5	250	10400	40	70 - 130	7	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

			MS	MSD			$_{ m Spike}$	MS	MSD	Rec.
Surrogate			Result	Result	$_{ m Units}$	Dil.	${f Amount}$	Rec.	Rec.	$\operatorname{Limit}$
n-Tricosane	Qsr	Qвг	477	434	mg/Kg	5	100	477	434	70 - 130

Matrix Spike (MS-1)

Spiked Sample: 316702

QC Batch: Prep Batch: 82659

97553

Date Analyzed:

2012-12-18 QC Preparation: 2012-12-18

Analyzed By: YG

Prepared By: YG

			MS			$\operatorname{Spike}$	Matrix		Rec.
Param	F	$^{\rm C}$	Result	Units	Dil.	Amount	Result	Rec.	$\mathbf{Limit}$
Benzene		ì	2.16	mg/Kg	1	2.00	< 0.00810	108	66.3 - 138
Toluene		1	2.22	mg/Kg	1	2.00	< 0.00750	111	64.8 - 142
Ethylbenzene		j	2.30	mg/Kg	1	2.00	< 0.00730	115	72 - 132
Xylene		ı	6.77	mg/Kg	1	6.00	< 0.00700	113	60.8 - 148

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

			MSD			Spike	Matrix		Rec.		RPD
Param	F	$\mathbf{C}$	Result	Units	Dil.	Amount	Result	Rec.	${f Limit}$	RPD	Limit
Benzene		ı	2.04	mg/Kg	1	2.00	< 0.00810	102	66.3 - 138	6	20
Toluene		1	2.06	mg/Kg	1	2.00	< 0.00750	103	64.8 - 142	8	20
Ethylbenzene		i	2.14	mg/Kg	1	2.00	< 0.00730	107	72 - 132	7	20
Xylene		1	6.29	mg/Kg	1	6.00	< 0.00700	105	60.8 - 148	7	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	MS	MSD			$\operatorname{Spike}$	MS	MSD	Rec.
Surrogate	Result	Result	Units	Dil.	Amount	Rec.	Rec.	$\operatorname{Limit}$
Trifluorotoluene (TFT)	2.00	1.98	mg/Kg	1	2	100	99	76.6 - 112

 $continued \dots$ 

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matrix spikes continued ...

	MS	MSD			$\operatorname{Spike}$	MS	MSD	Rec.
Surrogate	Result	Result	Units	Dil.	Amount	Rec.	Rec.	Limit
4-Bromofluorobenzene (4-BFB)	1.86	1.83	mg/Kg	1	2	93	92	67.6 - 125

Matrix Spike (MS-1) Spiked Sample: 316702

QC Batch:

97558

Date Analyzed:

2012-12-18

Analyzed By: YG

Prep Batch: 82665

QC Preparation: 2012-12-18

Prepared By: YG

			MS			Spike	Matrix		Rec.
Param	$\mathbf{F}$	$\mathbf{C}$	Result	Units	Dil.	Amount	Result	Rec.	$_{ m Limit}$
GRO		1	23.0	mg/Kg	1	20.0	< 2.32	115	70 - 130

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

			MSD			$\operatorname{Spike}$	Matrix		Rec.		RPD
Param	$\mathbf{F}$	$\mathbf{C}$	Result	Units	Dil.	${f A}{f m}{f o}{f u}{f n}{f t}$	Result	Rec.	$\operatorname{Limit}$	RPD	$\operatorname{Limit}$
GRO		1	22.7	mg/Kg	1	20.0	< 2.32	114	70 - 130	1	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	MS	MSD			$\operatorname{Spike}$	MS	MSD	Rec.
Surrogate	Result	Result	Units	Dil.	Amount	Rec.	Rec.	$\mathbf{Limit}$
Trifluorotoluene (TFT)	1.77	1.79	mg/Kg	1	2	88	90	70 - 130
4-Bromofluorobenzene (4-BFB)	1.99	2.01	mg/Kg	1	2	100	100	70 - 130

Matrix Spike (MS-1) Spiked Sample: 316746

QC Batch:

97588

Date Analyzed:

2012-12-19

Analyzed By: YG

Prep Batch: 82683

QC Preparation:

2012-12-19

Prepared By: YG

			MS			$\operatorname{Spike}$	Matrix		$\mathrm{Rec}.$
Param	$\mathbf{F}$	$^{\mathrm{C}}$	Result	Units	Dil.	${f Amount}$	Result	Rec.	Limit
Benzene		1	1.88	mg/Kg	1	2.00	< 0.00810	94	66.3 - 138
Toluene		1	1.90	mg/Kg	1	2.00	< 0.00750	95	64.8 - 142
Ethylbenzene		i	1.96	mg/Kg	1	2.00	< 0.00730	98	72 - 132
Xylene		1	5.77	mg/Kg	1	6.00	< 0.00700	96	60.8 - 148

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

			MSD			Spike	Matrix		Rec.		RPD
Param	F	$\mathbf{C}$	Result	Units	Dil.	Amount	Result	Rec.	Limit	RPD	$\operatorname{Limit}$
Benzene		1	1.97	mg/Kg	1	2.00	< 0.00810	98	66.3 - 138	5	20

continued ...

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matrix	spikes	continued			,
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			MSD			Spike	Matrix		Rec.		RPD
Param	F	C	Result	Units	Dil.	Amount	Result	Rec.	$\operatorname{Limit}$	RPD	Limit
Toluene		1	1.99	mg/Kg	1	2.00	< 0.00750	100	64.8 - 142	5	20
Ethylbenzene		1	2.08	$\mathrm{mg}/\mathrm{Kg}$	1	2.00	< 0.00730	104	72 - 132	6	20
Xylene		1	6.13	mg/Kg	1	6.00	< 0.00700	102	60.8 - 148	6	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	MS	MSD			Spike	MS	MSD	Rec.
Surrogate	Result	Result	Units	Dil.	Amount	Rec.	Rec.	$\mathbf{Limit}$
Trifluorotoluene (TFT)	1.97	1.95	mg/Kg	1	2	98	98	76.6 - 112
4-Bromofluorobenzene (4-BFB)	1.86	1.84	mg/Kg	1	2	93	92	67.6 - 125

Matrix Spike (MS-1) Spiked Sample: 316746

QC Batch:

97594

Date Analyzed: 2012-12-19 Analyzed By: YG

Prep Batch: 82693

QC Preparation: 2012-12-19

Prepared By: YG

			MS			$_{ m Spike}$	Matrix		Rec.
Param	F	$^{\rm C}$	Result	Units	Dil.	Amount	Result	Rec.	$\operatorname{Limit}$
GRO		1	22.8	mg/Kg	1	20.0	< 2.32	114	70 - 130

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

			MSD			$_{ m Spike}$	Matrix		Rec.		RPD
Param	F	$\mathbf{C}$	Result	Units	Dil.	Amount	Result	Rec.	$_{ m Limit}$	RPD	Limit
GRO		1	21.5	mg/Kg	1	20.0	< 2.32	108	70 - 130	6	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	MS	MSD			Spike	MS	MSD	Rec.
Surrogate	Result	Result	Units	Dil.	Amount	Rec.	Rec.	$\mathbf{Limit}$
Trifluorotoluene (TFT)	1.74	1.78	mg/Kg	1	2	87	89	70 - 130
4-Bromofluorobenzene (4-BFB)	1.98	1.92	mg/Kg	1	2	99	96	70 - 130

Matrix Spike (MS-1) Spiked Sample: 316731

QC Batch: Prep Batch: 82736

97666

Date Analyzed:

2012-12-21

QC Preparation: 2012-12-20

Analyzed By: AR

Prepared By: AR

			MS			Spike	Matrix		Rec.
Param	F	C_	Result	Units	Dil.	Amount	Result	Rec.	Limit
Chloride			4520	mg/Kg	10	2500	2450	83	78.9 - 121

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Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

			MSD			Spike	Matrix		Rec.		RPD
Param	$\mathbf{F}$	$\mathbf{C}$	Result	Units	Dil.	Amount	Result	Rec.	${f Limit}$	RPD	Limit
Chloride			4760	mg/Kg	10	2500	2450	92	78.9 - 121	5	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Matrix Spike (MS-1) Spiked Sample: 316741

QC Batch: 97667 Prep Batch: 82736 Date Analyzed: 2012-12-21 QC Preparation: 2012-12-20 Analyzed By: AR Prepared By: AR

Rec. MSSpike Matrix Dil. Amount  $\mathbf{F}$  $\mathbf{C}$ Result Param Result Units Rec. Limit Chloride 2400 mg/Kg 2500 < 19.296 78.9 - 121

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

			MSD			Spike	Matrix		Rec.		RPD
Param	$\mathbf{F}$	$\mathbf{C}$	Result	Units	Dil.	Amount	Result	Rec.	$\mathbf{Limit}$	RPD	$\operatorname{Limit}$
Chloride			2590	mg/Kg	5	2500	<19.2	104	78.9 - 121	8	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Matrix Spike (MS-1) Spiked Sample: 316751

QC Batch: 97669 Prep Batch: 82736 Date Analyzed: 2012-12-21 QC Preparation: 2012-12-20

Analyzed By: AR Prepared By: AR

			MS			Spike	Matrix		Rec.
Param	$\mathbf{F}$	$\mathbf{C}$	Result	Units	Dil.	Amount	Result	Rec.	${f Limit}$
Chloride			3920	mg/Kg	10	2500	1700	89	78.9 - 121

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

			MSD			Spike	Matrix		Rec.		RPD
Param	$\mathbf{F}$	$^{\mathrm{C}}$	Result	Units	Dil.	Amount	Result	Rec.	Limit	RPD	Limit
Chloride			4130	mg/Kg	10	2500	1700	97	78.9 - 121	5	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

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## Calibration Standards

Standard (CCV-1)

QC Batch: 97481

Date Analyzed: 2012-12-17

Analyzed By: CW

				CCVs	CCVs	CCVs	Percent	
				True	Found	Percent	Recovery	Date
Param	Flag	Cert	$\operatorname{Units}$	Conc.	Conc.	Recovery	Limits	Analyzed
DRO		1	mg/Kg	250	277	111	80 - 120	2012-12-17

Standard (CCV-2)

QC Batch: 97481

Date Analyzed: 2012-12-17

Analyzed By: CW

				CCVs	CCVs	$\mathrm{CCVs}$	Percent	
				True	Found	Percent	Recovery	Date
Param	Flag	Cert	Units	Conc.	Conc.	Recovery	Limits	Analyzed
DRO		1	mg/Kg	250	274	110	80 - 120	2012-12-17

Standard (CCV-3)

QC Batch: 97481

Date Analyzed: 2012-12-17

Analyzed By: CW

				$\mathrm{CCVs}$	$\mathrm{CCVs}$	$\mathrm{CCVs}$	Percent	
				True	Found	Percent	Recovery	Date
Param	Flag	$\operatorname{Cert}$	Units	Conc.	Conc.	Recovery	Limits	Analyzed
DRO		1	mg/Kg	250	280	112	80 - 120	2012-12-17

Standard (CCV-4)

QC Batch: 97481

Date Analyzed: 2012-12-17

Analyzed By: CW

				$\mathrm{CCVs}$	CCVs	CCVs	Percent	
				True	Found	Percent	Recovery	Date
Param	$\operatorname{Flag}$	$\operatorname{Cert}$	Units	Conc.	Conc.	Recovery	Limits	Analyzed
DRO		1	mg/Kg	250	273	109	80 - 120	2012-12-17

Report Date: January 2, 2013 Work Order: 1

114-6401612

Work Order: 12121344 COG/Brigham H-3 Page Number: 28 of 34 Eddy Co., NM

Standard (CCV-1)

QC Batch: 97553 Date Analyzed: 2012-12-18 Analyzed By: YG

				CCVs	CCVs	$\mathrm{CCVs}$	Percent	
				True	Found	Percent	Recovery	Date
Param	Flag	$\operatorname{Cert}$	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Benzene		1	mg/kg	0.100	0.0934	93	80 - 120	2012-12-18
Toluene		1	mg/kg	0.100	0.0931	93	80 - 120	2012-12-18
Ethylbenzene		1	mg/kg	0.100	0.0930	93	80 - 120	2012-12-18
Xylene		1	${ m mg/kg}$	0.300	0.271	90	80 - 120	2012-12-18

#### Standard (CCV-2)

QC Batch: 97553 Date Analyzed: 2012-12-18 Analyzed By: YG

				$rac{ ext{CCVs}}{ ext{True}}$	${ m CCVs}$ Found	CCVs Percent	Percent Recovery	Date
Param	Flag	$\operatorname{Cert}$	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Benzene		1	mg/kg	0.100	0.0962	96	80 - 120	2012-12-18
Toluene		1	mg/kg	0.100	0.0962	96	80 - 120	2012-12-18
Ethylbenzene		ļ	mg/kg	0.100	0.0965	96	80 - 120	2012-12-18
Xylene		ı	mg/kg	0.300	0.282	94	80 - 120	2012-12-18

#### Standard (CCV-3)

QC Batch: 97553 Date Analyzed: 2012-12-18 Analyzed By: YG

				$\mathrm{CCVs}$	$\mathrm{CCVs}$	$\mathrm{CCVs}$	Percent	
				True	Found	Percent	Recovery	Date
Param	Flag	$\operatorname{Cert}$	$\operatorname{Units}$	Conc.	Conc.	Recovery	Limits	Analyzed
Benzene		1	mg/kg	0.100	0.0937	94	80 - 120	2012-12-18
Toluene		1	mg/kg	0.100	0.0933	93	80 - 120	2012-12-18
Ethylbenzene		1	mg/kg	0.100	0.0927	93	80 - 120	2012-12-18
Xylene		1	mg/kg	0.300	0.270	90	80 - 120	2012-12-18

#### Standard (CCV-1)

QC Batch: 97558 Date Analyzed: 2012-12-18 Analyzed By: YG

114-6401612

Work Order: 12121344 COG/Brigham H-3 Page Number: 29 of 34

Eddy Co., NM

Param	Flag	Cert	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
$\overline{\mathrm{GRO}}$		1	mg/Kg	1.00	1.03	103	80 - 120	2012-12-18

#### Standard (CCV-2)

QC Batch: 97558

Date Analyzed: 2012-12-18

Analyzed By: YG

				CCVs	CCVs	CCVs	Percent	
				True	Found	Percent	Recovery	Date
Param	$\operatorname{Flag}$	$\operatorname{Cert}$	Units	Conc.	Conc.	Recovery	Limits	Analyzed
GRO		1	mg/Kg	1.00	1.12	112	80 - 120	2012-12-18

#### Standard (CCV-3)

QC Batch: 97558

Date Analyzed: 2012-12-18

Analyzed By: YG

				CCVs True	CCVs Found	CCVs Percent	Percent Recovery	Date
Param	Flag	Cert	Units	Conc.	Conc.	Recovery	Limits	Analyzed
GRO		1	mg/Kg	1.00	1.02	102	80 - 120	2012-12-18

#### Standard (CCV-1)

QC Batch: 97588

Date Analyzed: 2012-12-19

Analyzed By: YG

				CCVs	CCVs	CCVs	Percent	
				True	Found	Percent	Recovery	Date
Param	Flag	$\operatorname{Cert}$	$_{ m Units}$	Conc.	Conc.	Recovery	Limits	Analyzed
Benzene		]	mg/kg	0.100	0.0960	96	80 - 120	2012-12-19
Toluene		1	mg/kg	0.100	0.0953	95	80 - 120	2012-12-19
Ethylbenzene		j	mg/kg	0.100	0.0942	94	80 - 120	2012-12-19
Xylene		1	mg/kg	0.300	0.276	92	80 - 120	2012-12-19

#### Standard (CCV-2)

QC Batch: 97588

Date Analyzed: 2012-12-19

Analyzed By: YG

114-6401612

Work Order: 12121344 COG/Brigham H-3 Page Number: 30 of 34

Eddy Co., NM

Param	Flag	Cert	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Benzene		1	mg/kg	0.100	0.0954	95	80 - 120	2012-12-19
Toluene		1	mg/kg	0.100	0.0953	95	80 - 120	2012-12-19
Ethylbenzene		1	mg/kg	0.100	0.0942	94	80 - 120	2012-12-19
Xylene		1	${ m mg/kg}$	0.300	0.276	92	80 - 120	2012-12-19

### Standard (CCV-3)

QC Batch: 97588

Date Analyzed: 2012-12-19

Analyzed By: YG

Param	Flag	Cert	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Benzene		1	nig/kg	0.100	0.0974	97	80 - 120	2012-12-19
Toluene		1	mg/kg	0.100	0.0965	96	80 - 120	2012-12-19
Ethylbenzene		1	mg/kg	0.100	0.0958	96	80 - 120	2012-12-19
Xylene		1	mg/kg	0.300	0.279	93	80 - 120	2012-12-19

#### Standard (CCV-1)

QC Batch: 97594

Date Analyzed: 2012-12-19

Analyzed By: YG

				CCVs	CCVs	CCVs	Percent	
				True	Found	Percent	Recovery	Date
Param	$\operatorname{Flag}$	$\operatorname{Cert}$	Units	Conc.	$\operatorname{Conc}$ .	Recovery	Limits	Analyzed
GRO		ŀ	mg/Kg	1.00	0.971	97	80 - 120	2012-12-19

#### Standard (CCV-2)

QC Batch: 97594

Date Analyzed: 2012-12-19

Analyzed By: YG

				CCVs	CCVs	CCVs	Percent	
				True	Found	Percent	Recovery	Date
Param	$\operatorname{Flag}$	$\operatorname{Cert}$	Units	Conc.	Conc.	Recovery	Limits	Analyzed
GRO		i	mg/Kg	1.00	0.960	96	80 - 120	2012-12-19

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Work Order: 12121344

COG/Brigham H-3

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Eddy Co., NM

Standard (CCV-3)

QC Batch: 97594

Date Analyzed: 2012-12-19

Analyzed By: YG

				CCVs	CCVs	CCVs	Percent	D .
				True	Found	Percent	Recovery	$\operatorname{Date}$
Param	$\operatorname{Flag}$	Cert	Units	Conc.	Conc.	Recovery	Limits	Analyzed
GRO		1	mg/Kg	1.00	0.969	97	80 - 120	2012-12-19

Standard (CCV-1)

QC Batch: 97666

Date Analyzed: 2012-12-21

Analyzed By: AR

				CCVs	CCVs	CCVs	Percent	T
				$\operatorname{True}$	Found	Percent	Recovery	$\operatorname{Date}$
Param	Flag	Cert	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Chloride			mg/Kg	100	100	100	85 - 115	2012-12-21

Standard (CCV-2)

QC Batch: 97666

Date Analyzed: 2012-12-21

Analyzed By: AR

				$\mathrm{CCVs}$	CCVs	CCVs	Percent	
				True	Found	Percent	Recovery	Date
Param	$\operatorname{Flag}$	Cert	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Chloride			mg/Kg	100	99.8	100	85 - 115	2012-12-21

Standard (CCV-1)

QC Batch: 97667

Date Analyzed: 2012-12-21

Analyzed By: AR

				CCVs	CCVs	CCVs	Percent	
				True	Found	Percent	Recovery	Date
Param	Flag	$\operatorname{Cert}$	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Chloride			mg/Kg	100	100	100	85 - 115	2012-12-21

Standard (CCV-2)

QC Batch: 97667

Date Analyzed: 2012-12-21

Analyzed By: AR

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Work Order: 12121344

COG/Brigham H-3

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Eddy Co., NM

Param	Flag	Cort	Units	CCVs True	CCVs Found	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
	riag	$\operatorname{Cert}$	Omes	Conc.	Conc.	necovery	Limits	Anaryzed
Chloride			mg/Kg	100	99.7	100	85 - 115	2012-12-21

#### Standard (CCV-1)

QC Batch: 97669

Date Analyzed: 2012-12-21

Analyzed By: AR

				CCVs	CCVs	CCVs	Percent	
				True	Found	Percent	Recovery	Date
Param	Flag	Cert	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Chloride			mg/Kg	100	99.2	99	85 - 115	2012-12-21

### Standard (CCV-2)

QC Batch: 97669

Date Analyzed: 2012-12-21

Analyzed By: AR

				CCVs	$\mathrm{CCVs}$	$\mathrm{CCVs}$	Percent	
				True	Found	Percent	Recovery	Date
Param	Flag	Cert	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Chloride			mg/Kg	100	101	101	85 - 115	2012-12-21

 Report Date: January 2, 2013
 Work Order: 12121344
 Page Number: 33 of 34

 114-6401612
 COG/Brigham H-3
 Eddy Co., NM

## Appendix

## Report Definitions

Name	Definition
$\overline{\mathrm{MDL}}$	Method Detection Limit
MQL	Minimum Quantitation Limit
SDL	Sample Detection Limit

### **Laboratory Certifications**

	Certifying	Certification	Laboratory
С	Authority	Number	Location
-	NCTR.CA	WFWB384444Y0909	TraceAnalysis
-	DBE	VN 20657	TraceAnalysis
-	HUB	1752439743100-86536	TraceAnalysis
-	WBE	237019	TraceAnalysis
1	NELAP	T104704392-12-4	Midland

### Standard Flags

- F Description
- B Analyte detected in the corresponding method blank above the method detection limit
- H Analyzed out of hold time
- J Estimated concentration
- Jb The analyte is positively identified and the value is approximated between the SDL and MQL. Sample contains less then ten times the concentration found in the method blank. The result should be considered non-detect to the SDL.
- Je Estimated concentration exceeding calibration range.
- MI1 Split peak or shoulder peak
- MI2 Instrument software did not integrate
- MI3 Instrument software misidentified the peak
- MI4 Instrument software integrated improperly
- MI5 Baseline correction
- Qc Calibration check outside of laboratory limits.
- Qr RPD outside of laboratory limits
- Qs Spike recovery outside of laboratory limits.
- Qsr Surrogate recovery outside of laboratory limits.
- U The analyte is not detected above the SDL

### Result Comments

 Report Date: January 2, 2013
 Work Order: 12121344
 Page Number: 34 of 34

 114-6401612
 COG/Brigham H-3
 Eddy Co., NM

- 1 Dilution due to surfactants.
- 2 Dilution due to surfactants.

## Attachments

The scanned attachments will follow this page. Please note, each attachment may consist of more than one page.

12121-17

An	Analysis Request of Chain of Custody Record													PAGE: OF: 2  ANALYSIS REQUEST																
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CLIENT NAM	AE:					8	SITE MANAGE	7: Ike Tavarez		ERS	T		SER\	/ATIV	/E	TX1005		Ba	Ea Ea			30/624	29/07					s, pH,		
PROJECT N	O.:		PR C	OJ	ECT	NAME:	. H-I			CONTAIN						7 S		ls Ag As	Is Ag As	Volatiles		8240/82	II. VOI. 62 /608	86		ac.	tos)	s/Cation		
LAB I.D. NUMBER	DATE	TIME	IJ	COMP			Eddy SAMPL	Ca, N M E IDENTIFICATION		NUMBER OF CONTAINERS	HCL (1777)	HN03	ICE	NONE	Party pood	TPH 8015	PAH 8270	RCRA Meta	TCLP Volatiles	TCLP Semi	RCI	GC.MS Vol.	PCB's 8080/608	Pest 808/6	Chloride >	Gamma Sp	PLM (Asbestos)	Major Anions/Cations, pH, TDS		
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TETRA TEO	Date: 12-13-12 Time: 0900 Date: 12/13/12			×	NUMBER OF CONTAINERS FILTERED (Y/N) HCL HNO3 ICE NONE PRESERVATIVE  RETEX 80218	of Custody Record
TETRA TECH CONTACT PERSON:  TETRA TECH CONTACT PERSON:  TETRA TECH CONTACT PERSON:  TETRA TECH CONTACT PERSON:  ARBILL #					TPH 8015 Mov. TX1005 (Ext. to C35) PAH 8270 RCRA Metals Ag As Ba Cd Cr Pb Hg Se TCLP Metals Ag As Ba Cd Vr Pd Hg Se TCLP Volatiles TCLP Semi Volatiles RCI GC.MS Vol. 8240/8260/624 GC.MS Semi. Vol. 8270/625 PCB's 8080/608 Pest. 808/608 Chlorids Gamma Spec. Alpha Beta (Air) PLM (Asbestos)	PAGE:   OF: ANALYSIS REQUEST (Circle or Specify Method No.)

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