		S	ITE INFORI	MATION				
	The second secon	R	eport Type:	Closure	9			························
General Site Info	rmation:		Mark to the state of the state	Tar 14 124				(17.51 mil
Site:		SRO 102 S	WD					
Company:		COG Oper	ating LLC					
Section, Townsh	nip and Range	Unit G	Sec 16	T26S	R28E			
Lease Number:		API-30-015	-21398					
County:		Eddy Cou		LLC c 16				
GPS:			32.04381° N	· · · · · · · · · · · · · · · · · · ·		104.09	047° W	
Surface Owner:		State						
Mineral Owner:								
Directions:								on CR
Release Data:						With the same	idakery-yaya	ertor as
Date Released:		10/21/2012				FOR		7
Type Release:		Produced \		I ITEL	CIVED	ļ		
Source of Contan	nination:	4" Discharç	je Line			A P P	 • • • • • • • • • • • • • • • • • •	1
Fluid Released:		75 bbls				AIN	2 3 2013	
Fluids Recovered		0 bbls	E Wiley of Wickels 49 may 19 18e 1	witers 4 Will was also will	LA EL MARIA GUARANO EL CARA	A REPORT AND	BIRVAY PANSON AND	in Man
with the second control of the second contro							SAME PEOIN	FIG. 18
Name:	Pat Ellis				lke Tavarez		- Japan Paris .	
Company:	COG Operating, LL	C			Tetra Tech			
Address:	One Concho Cente	r			1910 N. Big	Spring		
	600 W. Illinois Ave.							
City:	Midland Texas, 797	01			Midland, Te	xas		
Phone number:	(432) 686-3023							
Fax:	(432) 684-7137							
Email:	pellis@conchoresor	urces.com			ike.tavarez	:@tetratech.	.com	
Ranking Criteria						~~~~~£		

Depth to Groundwater:	Ranking Score	Site Data
<50 ft	20	
50-99 ft	10	10
>100 ft.	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	O
Total Ranking Score:	3. 10 · 3.	
A.C.	ceptable Soil RRAL (mg/kg)	
Benz	ene Total BTEX TPH	



March 13, 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., SRO 102 SWD Well Pad, Unit G, Section 16, Township 26 South, Range 28 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 SRO 102 SWD Well Pad, Unit G. Section 16, Township 26 South, Range 28 East, Eddy County, New Mexico (Site). The spill site coordinates are N 32.04381°, W 104.09047. 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 October 21, 2012, and released approximately seventy five (75) barrels of produced water from a 4" discharge line, with zero (0) barrels of standing fluids recovered. COG personnel have repaired the discharge line and returned the line to service. The spill footprint remained on the pad and measured approximately 10' x 100' and 40' x 55 '. The spill area is shown on Figure 3. The initial C-141 form is enclosed in Appendix A.

Hydrogeology and Groundwater

According to the Geology and Groundwater Resources of Eddy County, New Mexico (Report 3), the Rustler and Castile formation (Ochoa Series) is present west and east of the Pecos River. The Salado formation overlies the Castile formation east of the Pecos River and was removed by solution west of the river. The Rustler and Castile formations consist of anhydrite, gypsum, interbedded sandy clay and beds of dolomite. Groundwater from the Castile and Rustler formations west of the Pecos River is historically high in chloride and sulfate concentrations which increase towards the river.



According to the USGS, no water wells are listed in Section 16. One water well is reported in Section 18, with a depth to groundwater of 25' bgs. According to the NMOCD groundwater map the reported depth to groundwater in this area is approximately 80.0' below surface. The groundwater data is shown in 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 1,000 mg/kg.

Assessment and Remediation

During the time of the release, Tetra Tech was performing a remediation project on a previous spill at the SWD. To remediate the spill, Tetra Tech notified the NMOCD to assess and excavate the spill area. On October 25, 2012, three (3) trenches (T-1, T-2 and T-3) were installed to assess the spill area. Referring to Table 1, none of the samples exceeded the RRAL for TPH, Benzene or Total BTEX. On a previous assessment, Tetra Tech had installed a background trench at the facility. The background results are shown in Table 1. A background chloride high of 1,030 mg/kg was detected at 14-15' below surface.

Trenches (T-1, T-2 and T-3) detected chloride highs at 0-1' of 65,200 mg/kg, 22,500 mg/kg, and 23,500 mg/kg, respectively. T-2 and T-3 chlorides decrease with depth and significantly declined at approximately 8.0' to 10.0' below surface. The trench (T-1) bottom sample at 10.0' showed a chloride of 2,420 mg/kg and was not vertically defined.

According to the field data, the spill area was excavated. The areas of T-2 and T-3 excavation measured approximately 10' x 100' at a depth of 4.0' to 6.0' below surface. The area of T-1 excavation measured 40' x 55' at a depth of 6.0' below surface. In addition, a 40 mil liner was installed in the excavation bottom to cap the remaining impacted soils. The excavated areas and depths are highlighted in Table 1 and shown on Figure 4. Once excavated to the appropriate depths, the areas were backfilled with clean soil to grade. Approximately 740 cubic yards of soil were transported to the R360 facility for proper disposal.



On January 17, 2013, Tetra Tech installed one (1) soil boring with an air rotary rig in order to define the chloride in the area of T-1. Referring to Table 1, SB-1 showed no significant chloride impact from 6.0' to 30.0' below surface. Based on the results, the impacted soil encountered in the trench sampling appears to be limited or may have been a localized hot spot in the spill area.

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 remediation activities performed at the site, please call me at (432) 682-4559.

Respectfully submitted,

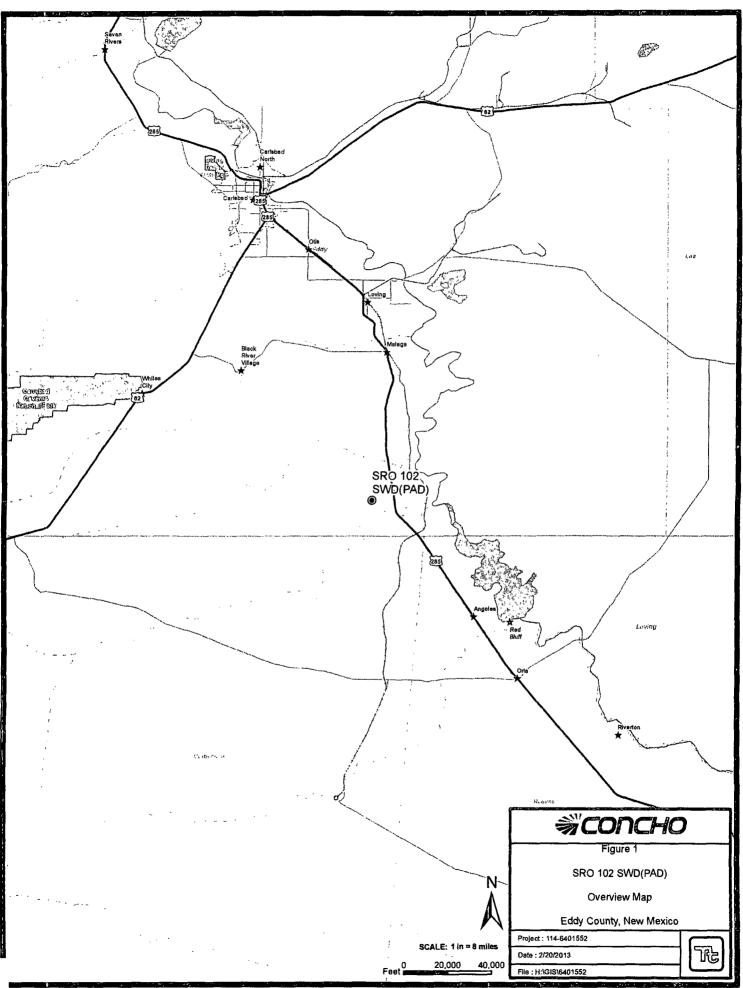
TETRAJECH

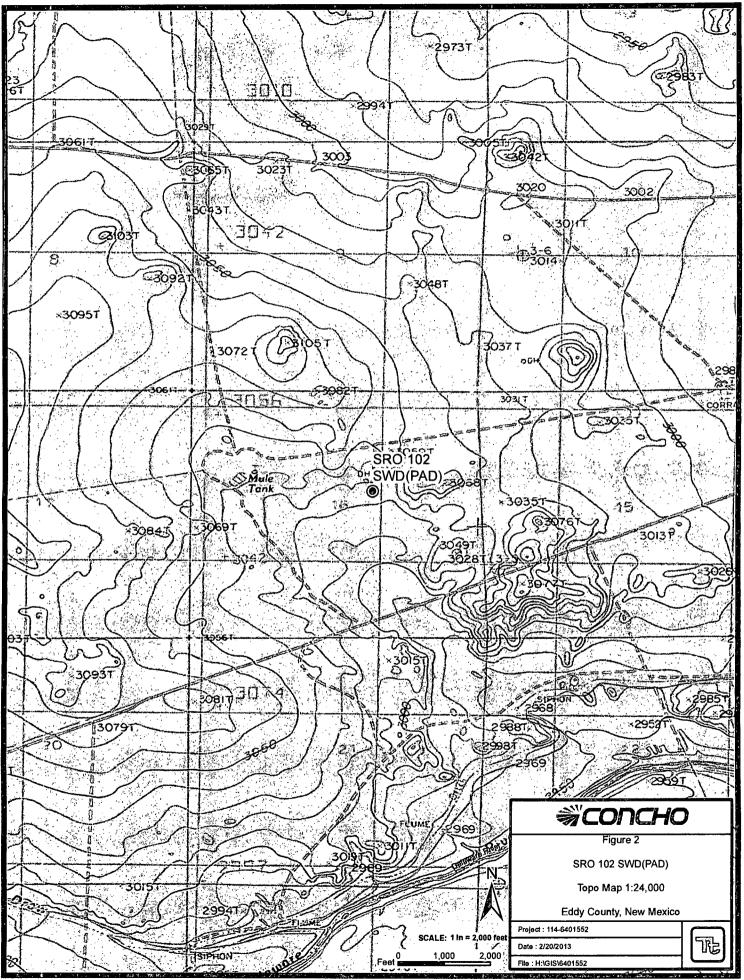
lke Tavarez, ÞG

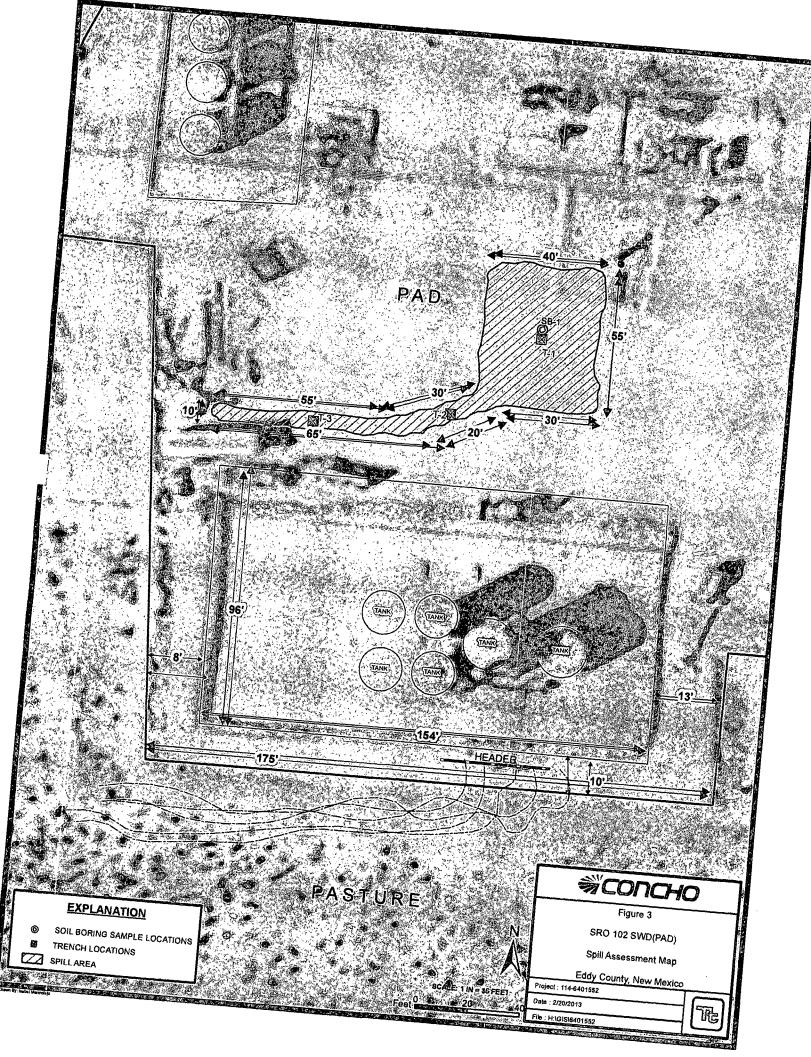
Senior Project Manager

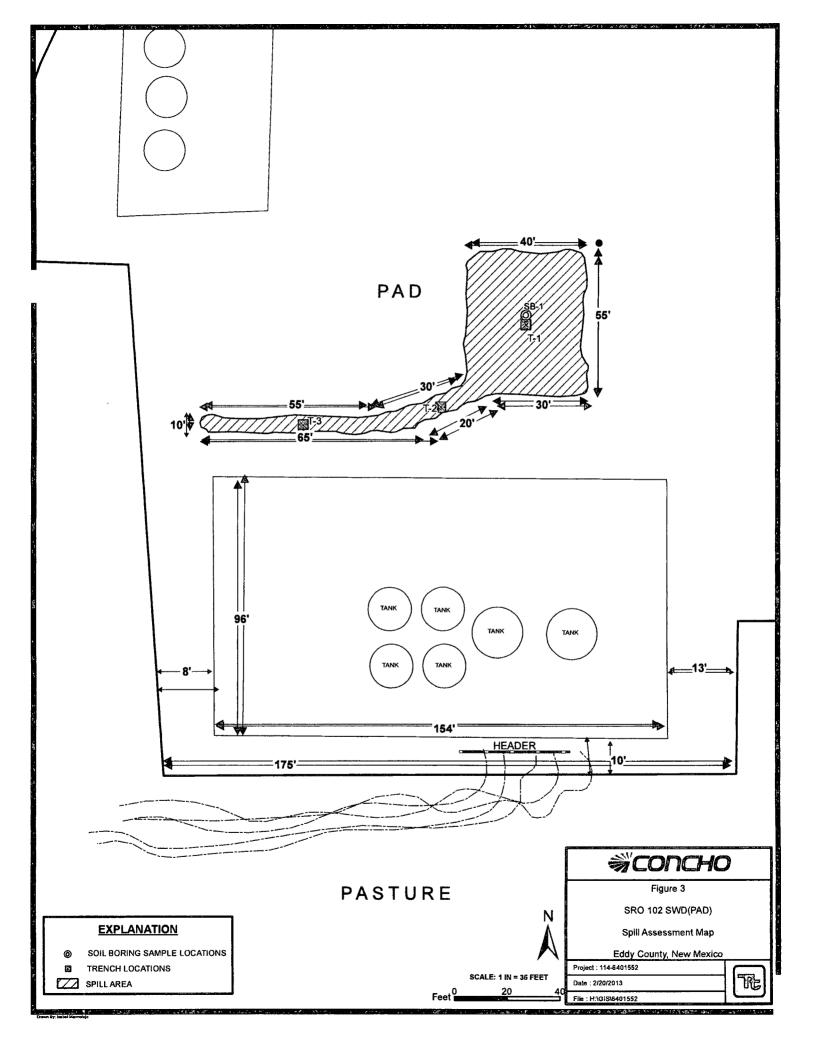
cc: Pat Ellis - COG

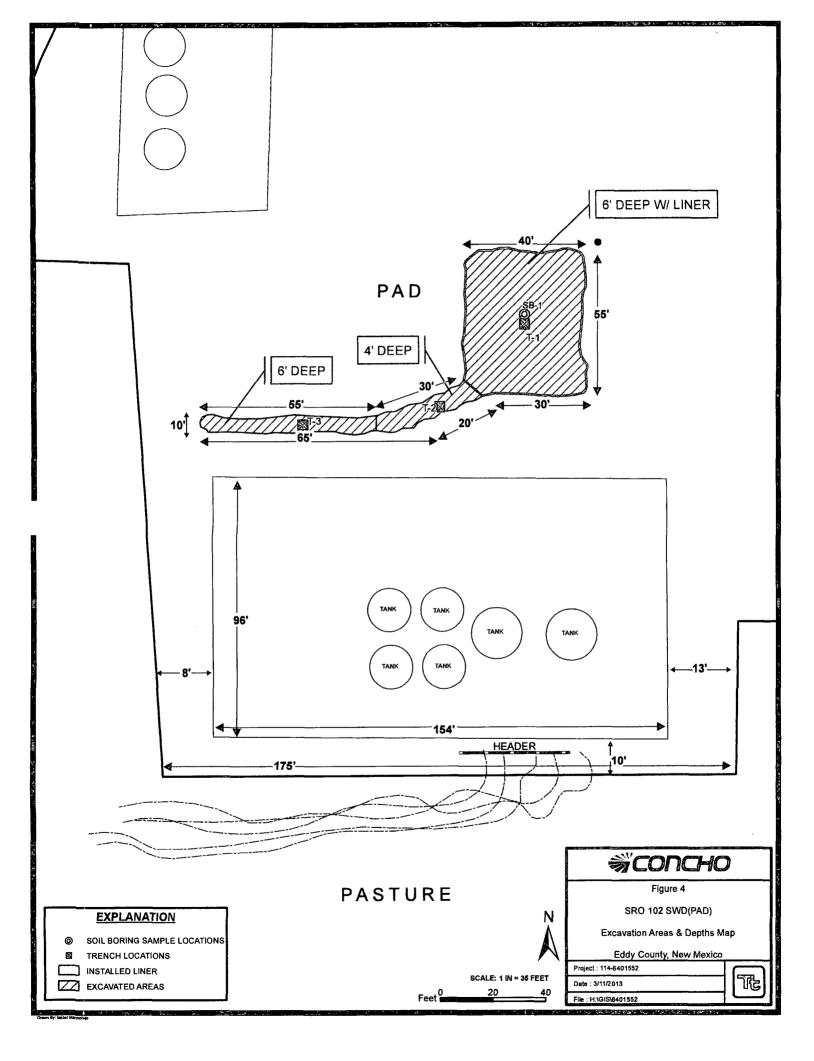
Figures











Tables

Table 1
COG Operating
SRO 102 SWD (Well Pad)
Eddy County, New Mexico

Sample	Sample	Sample	Soi	l Status	TF	H (mg/k	g)	Benzene	Toluene	Ethlybenzene	Xylene	Total BTEX	Chloride
ŒΙ	Date	Depth (ft)	In-Situ	Removed	GRO	DRO	Total	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)
Trench-1	10/25/2012	Surface		, X	69.8	79.9	150	0.105	0.342	<0.0200	0.914	<u>1</u> 7.36 ⊃	65,200
		2		X	1 Sale	影響的	57.77						4,270
		4	一类美	X X		3.25							2,310
		³ 6 ∫ ⊙		X		255	34.61						3,680
	п	8	Х		-	-	-	-	-	-	-	-	3,080
	II	10	Х		-	-	-	-	-	-	-	-	2,420
SB-1	1/17/2013	6-7	Х		-	-	-	-	-	_	-	-	767
	п	9-10	Х	,	-	-	-	-	-	-	-	-	546
	ti	14-15	Х		-	-	-	-	-	-	-	-	527
	u	19-20	Х		-	-	-	-	-	-	-	-	419
	п	24-25	Х		-	-	-	-	-	-	-	-	301
	п	29-30	Х		-	-		-	-	-	-	-	247
Trench-2	-10/25/2012	Surface		X	67.2	·_<50.0+	67.2	<0.0200	0.164	0.273	0.256	0.693	22,500
	u .	2	八颗素	X		1.11.20	25 W			A desired to	24.00		1,860,
		4		Χ	4-4-20		31 8 2 3	P (4)			TEST OF		2,430
	и	6	Х		-	-	-	-	-	-	-	•	1,080
	II	8	Х		-	-	-	-	-	-	-	-	1,450
	п	10	Х		-	-	-	-	-	-	-	-	920

Table 1 COG Operating SRO 102 SWD (Well Pad) Eddy County, New Mexico

Sample	Sample	Sample	Soi	l Status	TF	H (mg/k	(g)	Benzene	Toluene	Ethlybenzene	Xylene	Total BTEX	Chloride
ID	Date	Depth (ft)	In-Situ	Removed	GRO	DRO	Total	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)
Trench-3	10/25/2012	Surface		X	11.7	<50.0	11.7	<0.0200	<0.0200	<0.0200 V	<0.0200	<0:0200	23,500
	建物的	2		ر بر X	美斯· 克斯·克斯·克斯·克斯·克斯·克斯·克斯·克斯·克斯·克斯·克斯·克斯·克斯·克		47.18					gwy d	1,450
		4.		X		* 4		*	海影生				2,860
		6					92 7 E	18 2 2 4 1 1 1 1 1 1 1 1	為基準				2,360
	п	8	Х		-	-	-	-	-	-	-	-	531
		10	Х		-	-	-	-	-	· -	-	-	246
BG-1	3/22/2012	0-1	Х		-	-	-	-	-	-	-	-	<200
	n	2-3	Х		-	-	-	-	-	-	-	-	243
	n	4-5	Х		-	-	-	-	-	-	-	-	421
	п	6-7	Х		-	-	-	-	-	-	-	-	455
	n	9-10	Х		-	-	-	-	-	-	-	-	495
	u	14-15	Х		_	-	-	-	-	-	-	~	1,030
	tı	19-20	Х		-	-	-	_	-	-	-	-	846
	п	24-25	Х		-	-	-	-	-	-	-	-	851
					·		I	L	I	L	i		<u> </u>

(--)

Not Analyzed

Section 1

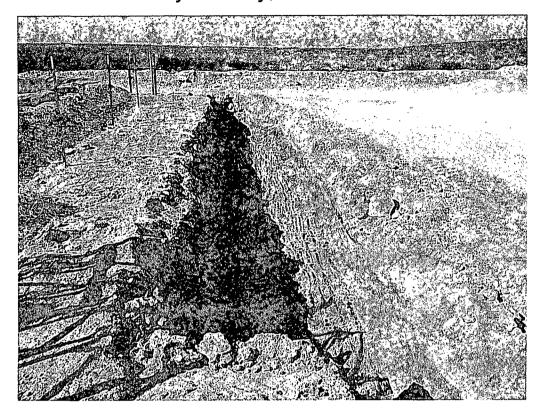
Excavated Depths

Liner Installed

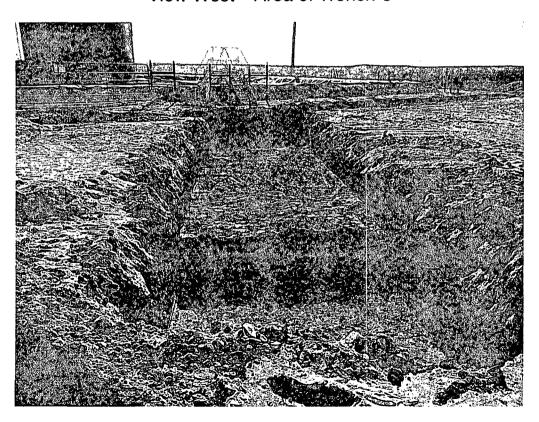
Photos

COG Operating LLC SRO 102 SWD (Well Pad) Eddy County, New Mexico





View West - Area of Trench-3



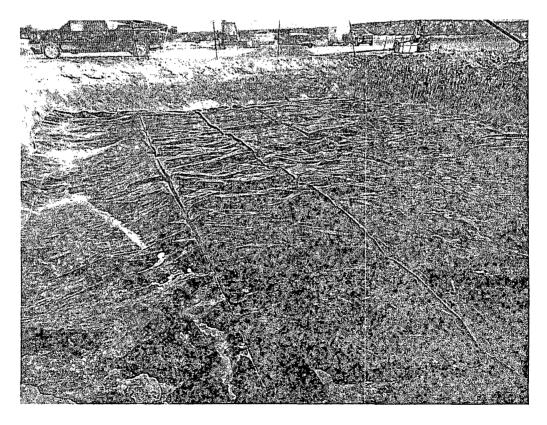
View South - Area of Trench-2

COG Operating LLC SRO 102 SWD (Well Pad) Eddy County, New Mexico





View Southeast - Area of Trench-1

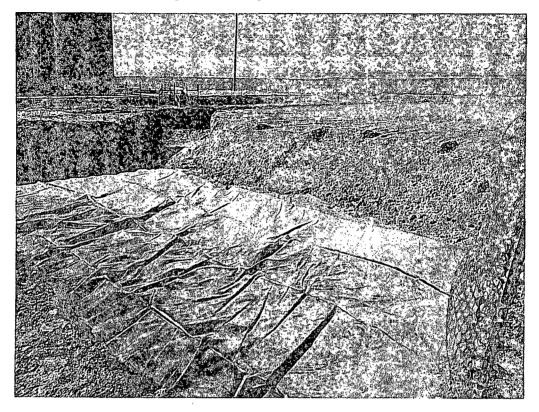


View North - Liner

TETRA TECH

COG Operating LLC SRO 102 SWD (Well Pad) Eddy County, New Mexico





View Southwest - Backfill

Appendix A

District 1
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 RECEIVED
Energy Minerals and Natural Resources

APR 2 3 2013

1220 South St. Francis PNMOCD ARTESIA Santa Fe, NM 87505 Form C-141 Revised October 10, 2003

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

Release Notification and Corrective Action

Oil Conservation Division

						OPERA	TOR		☐ Initia	ıl Report	\boxtimes	Final Report
Name of Co				ing LLC		Contact		t Ellis				
Address				Aidland, TX 797		Telephone N			77			
Facility Nar	ne	S	RO 102	SWD]	Facility Typ	<u>e S</u>	WD				
Surface Ow	ner: State			Mineral O	wner				Lease N	lo. (API#)	30-015	5-21398
				LOCA	TION	OF REI	LEASE					
Unit Letter G	Section 16	Township 26S	Range 28E	Feet from the	North/	South Line	Feet from the	East/\	Vest Line	County	Eddy	,
			3	Latitude N 32.0	4381°	Longitud	e W 104.09047	7°				
				NAT	URE	OF RELI	EASE					
Type of Relea						Volume of	Release 75 bbls		Volume F	Recovered 0	bbls	
Source of Re	ease: 4" Di	scharge Line				1	our of Occurrence	e		Hour of Dis	covery	
431						10/21/2012			10/21/201	2		
Was Immedia	ite Notice C		Yes [No ☐ Not Red	nuired	If YES, To	Whom?	Mi	ke Bratche	r-OCD		
By Whom? M	fichelle Mu					Date and H	our 10/23/2012					
Was a Water			·				lume Impacting the					
vias a viacor	ourse reac		Yes 🛚	No		N/A	rame impacting t	no wat	recurse.			
If a Watercou	rse was Im	pacted, Descri	be Fully.*	:		<u></u>				·		
		,	,									1
	CD 11		12 1 4 .2	TD 1 de								
Describe Cau	se of Proble	em and Remed	nai Actioi	n Taken.*								
Our 4" production service.	ced water d	ischarge line o	orroded a	and released fluid o	nto the	SRO 102 SV	/D location. The	dischar	ge line has	been repaire	d and r	eturned to
Describe Area	Affected a	ınd Cleanup A	ction Tak	en.*		·		,		90/		
chloride were prepared a clo	excavated sure report	and transporte for the NMO	d to prope CD to rev		xcavati	ons were bac	kfilled with clean	soil and	i brought u	p to surface	grade.	Tetra Tech
regulations all public health should their o	operators or the envir perations had ment. In ac	are required to onment. The ave failed to a ddition, NMO	report an acceptanc dequately CD accep	is true and completed of the certain related of a C-141 report investigate and related of a C-141 re	lease no t by the mediate	otifications are NMOCD made contamination	d perform correct arked as "Final Re on that pose a thre	tive acti eport" d eat to gr	ons for rele oes not reli ound water	eases which eve the oper , surface wa	may en ator of ter, hur	danger liability nan health
Signature:		111					OIL CONS	SERV	ATION	DIVISIC	N	
Printed Name	: Ike Tavare	ez (agent for	COG)		/	Approved by	District Superviso	or:				
Title: Project	Manager					Approval Dat	e:		Expiration I	Date:		
E-mail Addre	ss: <u>Ike.Tava</u>	arez@TetraTe		(432) 682-4559		Conditions of	Approval:	Attached				
Attach Addit	ional Shee			(432) 002-4333						<u> </u>		

District I
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

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

Form C-141

Revised October 10, 2003

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

Release Notification and Corrective Action

						OPERA	OR	<u> </u>	🔀 Initia	al Report	_Ļ_	Final Report
Name of Co	mpany	COG OP	ERATIN	G LLC	(Contact	Pa	at Ellis				
Address				idland, TX 79701	.	Telephone N		230-007	7			
Facility Nan			102 SW			Facility Typ		SWD				
Surface Own	ner Stat	te		Mineral Ov	vner				Lease N	Io. (API#)	30-01	5-21398
				* 00.04	2020 B	t Carr Pagni	TO A COMO					
						OFREI		1				
Unit Letter	Section	Township	Range	Feet from the	North/	South Line	Feet from the	East/W	est Line	County		
G	16	26S	28E					1	!		Eddy	
				Latitude 32 02	2.657	Longitu	ıde 104 05.431	l		<u>L</u>		
				NATU	JRE	OF RELI	EASE					
Type of Relea	ase Produc	ed water				Volume of	Release 75bbls		Volume F	Recovered (Obbls	
Source of Rel	lease 4" dis	scharge line				1	lour of Occurrenc			Hour of Dis	covery	
						10/21/2012			10/21/201	2		
Was Immedia	ate Notice C			_		If YES, To	Whom?					i
		⋈	Yes _	No 🗌 Not Req	uired			Mike B	ratcher-O	CD		
By Whom?	Michelle M	lullins				Date and H	lour 10/23/2012	11:17 a.	m.			
Was a Water						If YES, Vo	lume Impacting t	he Water	course.			
			Yes 🗵	No								
If a Watercou	ego vene Im	mantad Danam	ho Eully ?	k		<u> </u>						
II a Watercon	irse was iin	pacieu, Descri	be Fully.									
Describe Cau	se of Proble	em and Reme	ial Actio	n Taken.*								
2001.00												
Our 4" produ	ced water d	lischarge line	corroded a	and released fluid o	nto the	SRO 102 SV	VD location. The	discharg	e line has	been repaire	ed and i	returned to
service.		_						_		·		ļ
Describe Are	a Affected	and Cleanup A	Action Tal	cen.*								
				o the pad location a								
				neate any possible o	contam	ination item	the release and we	e wiii pre	sent a rem	lediation wo	rk plan	to the
NMOCD for	approvai pi	nor to any sig	mucam re	mediation work.								
I haraby carti	fu that the	information of	ven above	is true and comple	ete to th	e hest of my	knowledge and u	nderstand	that nurs	uant to NM	OCD	iles and
				nd/or file certain rel								
				e of a C-141 repor								
				investigate and re								
				stance of a C-141 re								
federal, state,	or local lav	ws and/or regu	lations.									
				•			OIL CON	SERVA	ATION	DIVISIO	N	
		/ 1						· · · · · · · · · · · · · · · · · · ·				
Signature:		<i>/</i> `	<u> </u>	3								
Dei et d'Alessa	/	In als	Duran			Approved by	District Supervis	or:				
Printed Name	<u>: </u>	Josn	Russo									
Title:	!	Senior Enviro	nmental (Coordinator	1	Approval Da	te:	F	xpiration	Date:		
		Semon Mittill			- +	pp. 0 .u. Du						
E-mail Addre	ess:	jrusso@d	concho.co	m	1	Conditions of	f Approval:				r	
				···			• •			Attached	L	
Date: 10	/25/2012	Pho	ne: 4:	32-212-2399						ļ		

^{*} Attach Additional Sheets If Necessary

Appendix B

Water Well Data Average Depth to Groundwater (ft) COG - SRO 102 SWD Eddy County, New Mexico

	24 S	24 South 27 East				
6	5	4	3	2	1	
7	8 26	9 43	10	11	12 27	
18 34	17	16	15	14	13 31	
19	20	21	22 70	23	24	
30	29	28	27	26	25	
31	32	33	34	35	36	

	2	24 S	out	h		28 East				
6 7 0	5	30	4	30	3	2	65	1	60	
7	8	50	9		10 17	11 20		12 73		
18	17 42		16 29		15 18	14 52		13 34		
19	20 48		21		22	23		24		
30	29		28		27	26		25		
31	32		33		34	35		36		

	24	South	29 East				
6	5	4	3	2	1		
7 160	8	9	10	11	12		
78	17	16 18)	15	14	13		
19	20	21	22	23	24		
30	29	26	27	26	25		
31	32	33	34	35	36		

	25	South	27 East					
6	5	4	3	2	1			
7	8	9	10	11	12 92			
18	17	16	15	14	13			
19	20	21	22	23	24			
30	29	28	27	26	25			
31	32	33 19	34	35	36			

	25	South	28 East				
6	5 59	4 35	3 32	2	1		
7	8	9	10	11	12		
18 67	17	16	15 48 49	14	13		
19	20 96	21	22	23	24		
30	29 15	28 90	27	26 30	25		
31	32	33	34	35	36 40		

	25 S	outh	29 East					
6 40~	5	4	3	2	1			
	8	9	10 40	11	12			
لر18	17	16	15 60	14	13			
19	20	21	22	23	24			
30 30	29	28	27	26	25			
31	32	33	34	35	36			

	26	South		27 Eas	t
6	5 12	4	3	2	1
7	8	9	10	11	12
18	17	16	15	14	13 36
19	20	21	22 50	23	24
30	29	28	27	26	25
31	32	33	34	35	36

	26 South		:	28 East		
6	5	4	3	2 120	1 ~	
7	8	9	10	11	12 100	
18 25	17	16 SITE	15	14 120	13 56	
19	20	21	22 120	23	24	
30	29	28	27	26	25	
31	32	33	34	35	36	

	26 S	outh	2	t	
6	5	4	3	2	1
7	8	9	10	11	12
18	47	16	15	14	13
19	20	21	22 57 69	23	24
30 U	29	28	27	26	25
31	32	33	34	35	36

New Me	xico State	Engineers	Well	Reports
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USGS Well Reports

Field water level

New Mexico Water and Infrastructure Data System

Geology and Groundwater Conditions in Southern Eddy, County, NM

NMOCD - Groundwater Data

Appendix C

Report Date: January 25, 2013 Work Order: 13012203 Page Number: 1 of 2

Summary Report

Ike Tavarez Tetra Tech

1910 N. Big Spring Street Midland, TX 79705 Report Date: January 25, 2013

Work Order: 13012203

Project Location: Eddy Co., NM

Project Name: COG/SRO 102 (Well Pad)

Project Number: 114-6401552

			Date	Time	Date
Sample	Description	Matrix	Taken	Taken	Received
318918	Soil Bore 1 6-7'	soil	2013-01-17	00:00	2013-01-21
318919	Soil Bore 1 9-10'	soil	2013-01-17	00:00	2013-01-21
318920	Soil Bore 1 14-15'	soil	2013-01-17	00:00	2013-01-21
318921	Soil Bore 1 19-20'	soil	2013-01-17	00:00	2013-01-21
318922	Soil Bore 1 24-25'	soil	2013-01-17	00:00	2013-01-21
318923	Soil Bore 1 29-30'	soil	2013-01-17	00:00	2013-01-21

Sample: 318918 - Soil Bore 1 6-7'

Param	Flag	Result	Units	RL
Chloride		767	mg/Kg	4

Sample: 318919 - Soil Bore 1 9-10'

Param	Flag	Result	Units	RL
Chloride		546	mg/Kg	4

Sample: 318920 - Soil Bore 1 14-15'

Param	Flag	Result	Units	RL
Chloride		527	mg/Kg	4

Report Date: January 25, 2013		Work Order: 13012203	Page	Number: 2 of 2			
Sample: 318921 - Soil Bore 1 19-20'							
Param	Flag	Result	Units	RL			
Chloride		419	mg/Kg	4			
Sample: 318922 Param	- Soil Bore 1 24-25'	Result	Units	m RL			
Chloride	riag	301	mg/Kg	4			
Sample: 318923	- Soil Bore 1 29-30'						
Param	Flag	Result	Units	RL			
Chloride		247	mg/Kg	4			



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Certifications

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: January 25, 2013

Work Order: 13012203

Project Location: Eddy Co., NM

Project Name:

COG/SRO 102 (Well Pad)

Project Number:

114-6401552

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

			Date	Time	Date
Sample	Description	Matrix	Taken	Taken	Received
318918	Soil Bore 1 6-7'	soil	2013-01-17	00:00	2013-01-21
318919	Soil Bore 1 9-10'	soil	2013-01-17	00:00	2013-01-21
318920	Soil Bore 1 14-15'	soil	2013-01-17	00:00	2013-01-21
318921	Soil Bore 1 19-20'	soil	2013-01-17	00:00	2013-01-21
318922	Soil Bore 1 24-25'	soil	2013-01-17	00:00	2013-01-21
318923	Soil Bore 1 29-30'	soil	2013-01-17	00:00	2013-01-21

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 12 pages and shall not be reproduced except in its entirety, without written approval of TraceAnalysis, Inc.

Michael april

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

Report Contents

Case Narrative
Analytical Report
Sample 318918 (Soil Bore 1 6-7')
Sample 318919 (Soil Bore 1 9-10')
Sample 318920 (Soil Bore 1 14-15')
Sample 318921 (Soil Bore 1 19-20')
Sample 318922 (Soil Bore 1 24-25')
Sample 318923 (Soil Bore 1 29-30')
Method Blanks
QC Batch 98319 - Method Blank (1)
QC Batch 98381 - Method Blank $\stackrel{\leftarrow}{(1)}$
Laboratory Control Spikes
QC Batch 98319 - LCS (1)
QC Batch 98381 - LCS (1)
QC Batch 98319 - MS (1)
QC Batch 98381 - MS (1)
Calibration Standards
QC Batch 98319 - CCV (1)
QC Batch 98319 - CCV (2)
QC Batch 98381 - CCV (1)
QC Batch 98381 - CCV (2)
Appendix 1
Report Definitions
Laboratory Certifications
Standard Flags
Attachments

Case Narrative

Samples for project COG/SRO 102 (Well Pad) were received by TraceAnalysis, Inc. on 2013-01-21 and assigned to work order 13012203. Samples for work order 13012203 were received intact at a temperature of 5.8 C.

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

		Prep	Prep	$_{ m QC}$	Analysis
Test	Method	Batch	Date	Batch	Date
Chloride (Titration)	SM 4500-Cl B	83284	2013-01-22 at 09:31	98319	2013-01-23 at 15:12
Chloride (Titration)	SM 4500-Cl B	83284	2013-01-22 at 09:31	98381	2013-01-24 at 15:55

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 13012203 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.

114-6401552

Work Order: 13012203 COG/SRO 102 (Well Pad) Page Number: 5 of 12 Eddy Co., NM

Analytical Report

Sample: 318918 - Soil Bore 1 6-7'

Laboratory:

Midland

Analysis: Chloride (Titration) QC Batch: 98319

Analytical Method:

SM 4500-Cl B 2013-01-23

Prep Method: N/A Analyzed By: AR

Prep Batch:

83284

Date Analyzed: Sample Preparation: 2013-01-22

Prepared By:

RL

Parameter Units Dilution RLFlag Cert Result Chloride 767 4.00 mg/Kg 5

Sample: 318919 - Soil Bore 1 9-10'

Laboratory:

Midland

Analysis: Chloride (Titration) QC Batch: 98319 Prep Batch: 83284

Analytical Method: Date Analyzed:

Sample Preparation:

SM 4500-Cl B 2013-01-23 2013-01-22

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

RL

Parameter	\mathbf{Flag}	Cert	Result	Units	Dilution	RL
Chloride			546	mg/Kg	5	4.00

Sample: 318920 - Soil Bore 1 14-15'

Laboratory:

Midland

Chloride (Titration) Analysis: QC Batch: 98319 Prep Batch: 83284

Analytical Method: Date Analyzed:

Sample Preparation:

SM 4500-Cl B 2013-01-23 2013-01-22

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

RLParameter Flag Cert Result Dilution RLUnits Chloride 4.00 527 mg/Kg 5

Work Order: 13012203 Report Date: January 25, 2013 Page Number: 6 of 12 114-6401552 COG/SRO 102 (Well Pad) Eddy Co., NM Sample: 318921 - Soil Bore 1 19-20' Laboratory: Midland Analysis: Chloride (Titration) Analytical Method: SM 4500-Cl B Prep Method: N/A QC Batch: 98319 Date Analyzed: 2013-01-23 Analyzed By: AR Prep Batch: 83284 Sample Preparation: 2013-01-22 Prepared By: ARRLParameter Flag Cert Result Units Dilution RLChloride 419 mg/Kg 5 4.00

Sample: 318922 - Soil Bore 1 24-25' Laboratory: Midland Chloride (Titration) Analysis: Analytical Method: SM 4500-Cl B Prep Method: N/A QC Batch: Date Analyzed: 98319 2013-01-23 Analyzed By: AR Prep Batch: 83284 Sample Preparation: 2013-01-22 Prepared By: AR RLCert Result Dilution Parameter Flag Units RLChloride 301 4.00 mg/Kg 5

Sample: 318923 - Soil Bore 1 29-30'

Laboratory: Midland Chloride (Titration) Analytical Method: Analysis: SM 4500-Cl B Prep Method: N/A QC Batch: 98381 Date Analyzed: 2013-01-24 Analyzed By: AR Prepared By: Prep Batch: 83284 Sample Preparation: 2013-01-22 AR.

114-6401552

Work Order: 13012203 COG/SRO 102 (Well Pad) Page Number: 7 of 12 Eddy Co., NM

Method Blanks

Method Blank (1)

QC Batch: 98319

QC Batch:

98319

Date Analyzed: 201

2013-01-23

Analyzed By: AR Prepared By: AR

Prep Batch: 83284

QC Preparation: 2013-01-22

Chloride Flag

 $\begin{array}{ccc} \text{Result} & \text{Units} & \text{RL} \\ \hline < 3.85 & \text{mg/Kg} & 4 \\ \end{array}$

Method Blank (1)

QC Batch: 98381

QC Batch: 98381 Prep Batch: 83284 Date Analyzed: 2013-01-24 QC Preparation: 2013-01-22 Analyzed By: AR Prepared By: AR

MDL Page Cont Page 1

114-6401552

Work Order: 13012203 COG/SRO 102 (Well Pad) Page Number: 8 of 12 Eddy Co., NM

Laboratory Control Spikes

Laboratory Control Spike (LCS-1)

QC Batch:

98319

Date Analyzed:

2013-01-23

Analyzed By: AR

Prep Batch: 83284

QC Preparation:

2013-01-22

Prepared By: AR

			LCS			Spike	Matrix		Rec.
Param	\mathbf{F}	\mathbf{C}	Result	Units	Dil.	Amount	Result	Rec.	Limit
Chloride			2570	mg/Kg	1	2500	< 3.85	103	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	F	\mathbf{C}	Result	Units	Dil.	Amount	Result	Rec.	Limit	RPD	Limit
Chloride			2660	mg/Kg	1	2500	< 3.85	106	85 - 115	3	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:

98381

Date Analyzed:

2013-01-24

Analyzed By: AR Prepared By: AR

Prep Batch: 83284

QC Preparation: 2013-01-22

LCS Spike Matrix Rec. F \mathbf{C} Dil. Param Result Units Amount Result Rec. Limit Chloride 2630 mg/Kg 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}	\mathbf{C}	Result	Units	Dil.	Amount	Result	Rec.	Limit	RPD	Limit
Chloride			2500	mg/Kg	1	2500	<3.85	100	85 - 115	5	20

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

Matrix Spike (MS-1)

QC Batch: 98319 Prep Batch: 83284 Spiked Sample: 318922

Date Analyzed: QC Preparation:

2013-01-23 2013-01-22 Analyzed By: AR Prepared By: AR

114-6401552

Work Order: 13012203 COG/SRO 102 (Well Pad) Page Number: 9 of 12 Eddy Co., NM

Param	F	C	MS Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	Rec. Limit
Chloride			2780	mg/Kg	5	2500	301	99	78.9 - 121

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

			MSD			Spike	Matrix		${f Rec}.$		RPD
Param	\mathbf{F}	C	Result	Units	Dil.	Amount	Result	Rec.	Limit	RPD	Limit
Chloride			2610	mg/Kg	5	2500	301	92	78.9 - 121	6	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: 318934

QC Batch: 98381 Date Analyzed:

2013-01-24

Analyzed By: AR

Prep Batch: 83284

QC Preparation: 2013-01-22

Prepared By: AR

			MS			Spike	Matrix		Rec.
Param	\mathbf{F}	C	Result	Units	Dil.	Amount	Result	Rec.	Limit
Chloride			2770	mg/Kg	5	2500	72.5	108	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.	Limit	RPD	Limit
Chloride			2880	mg/Kg	5	2500	72.5	112	78.9 - 121	4	20

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

114-6401552

Work Order: 13012203 COG/SRO 102 (Well Pad) Page Number: 10 of 12 Eddy Co., NM

Calibration Standards

Standard (CCV-1)

QC Batch: 98319

Date Analyzed: 2013-01-23

Analyzed By: AR

				CCVs True	CCVs Found	CCVs Percent	Percent Recovery	Date
Param	\mathbf{Flag}	Cert	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Chloride			mg/Kg	100	101	101	85 - 115	2013-01-23

Standard (CCV-2)

QC Batch: 98319

Date Analyzed: 2013-01-23

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	98.8	99	85 - 115	2013-01-23

Standard (CCV-1)

QC Batch: 98381

Date Analyzed: 2013-01-24

Analyzed By: AR

				CCVs	CCVs	CCVs	Percent	
				True	Found	Percent	Recovery	Date
Param	\mathbf{Flag}	Cert	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Chloride			mg/Kg	100	101	101	85 - 115	2013-01-24

Standard (CCV-2)

QC Batch: 98381

 $Date\ Analyzed:\ \ 2013-01-24$

Analyzed By: AR

Param	Flag	Cert	Units	True Conc.	Found Conc.	Percent Recovery	Recovery Limits	Date Analyzed
Chloride			mg/Kg	100	99.3	99	85 - 115	2013-01-24

Report Date: January 25, 2013 Work Order: 13012203 Page Number: 11 of 12 114-6401552 COG/SRO 102 (Well Pad) Eddy Co., NM

Appendix

Report Definitions

Name	Definition
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: January 25, 2013
 Work Order: 13012203
 Page Number: 12 of 12

 114-6401552
 COG/SRO 102 (Well Pad)
 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: 12102922 Page Number: 1 of 4 Report Date: November 5, 2012

Summary Report

Ike Tavarez Tetra Tech 1910 N. Big Spring Street

Midland, TX 79705

Report Date: November 5, 2012

Work Order: 12102922

Project Location: Eddy Co., NM

COG/SRO 102 (Well Pad) Project Name:

Project Number: 114-6401552

			Date	Time	Date
Sample	Description	Matrix	Taken	Taken	Received
312924	Trench-1 Surface	soil	2012-10-25	00:00	2012-10-29
312925	Trench-1 2'	soil	2012-10-25	00:00	2012-10-29
312926	Trench-1 4'	soil	2012-10-25	00:00	2012-10-29
312927	Trench-1 6'	soil	2012-10-25	00:00	2012-10-29
312928	Trench-1 8'	soil	2012-10-25	00:00	2012-10-29
312929	Trench-1 10'	soil	2012-10-25	00:00	2012-10-29
312930	Trench-2 Surface	soil	2012-10-25	00:00	2012-10-29
312931	Trench-2 2'	soil	2012-10-25	00:00	2012-10-29
312932	Trench-2 4'	soil	2012-10-25	00:00	2012-10-29
312933	Trench-2 6'	soil	2012-10-25	00:00	2012-10-29
312934	Trench-2 8'	soil	2012-10-25	00:00	2012-10-29
312935	Trench-2 10'	soil	2012-10-25	00:00	2012-10-29
312936	Trench-3 Surface	soil	2012-10-25	00:00	2012-10-29
312937	Trench-3 2'	soil	2012-10-25	00:00	2012-10-29
312938	Trench-3 4'	soil	2012-10-25	00:00	2012-10-29
312939	Trench-3 6'	soil	2012-10-25	00:00	2012-10-29
312940	Trench-3 8'	soil	2012-10-25	00:00	2012-10-29
312941	Trench-3 10'	soil	2012-10-25	00:00	2012-10-29

]	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)
312924 - Trench-1 Surface	0.105	0.342	< 0.0200	0.914	79.9	69.8
312930 - Trench-2 Surface	< 0.0200	0.164	0.273	0.256	< 50.0	67.2
312936 - Trench-3 Surface	< 0.0200	< 0.0200	< 0.0200	< 0.0200	<50.0	11.7

Sample: 312924 - Trench-1 Surface

Report Date: Novembe	r 5, 2012	Work Order: 12102922		Page Number: 2 of 4
Param	Flag	Result	Units	RL
Chloride		65200	mg/Kg	4
Sample: 312925 - Tr	ench-1 2'			
Param	Flag	Result	Units	RL
Chloride		4270	mg/Kg	4
Sample: 312926 - Tr	ench-1 4'			
Param	Flag	Result	Units	RL
Chloride		2310	mg/Kg	4
Sample: 312927 - Tr	ench-1 6'			
Param	Flag	Result	Units	RL
Chloride		3680	mg/Kg	4
Sample: 312928 - Tre	ench-1 8'			
Param	Flag	Result	Units	RL
Chloride		3080	mg/Kg	4
Sample: 312929 - Tro	ench-1 10'			
Param	Flag	Result	Units	RL
Chloride		2420	mg/Kg	4
Sample: 312930 - Tro	ench-2 Surface			
Param	Flag	Result	Units	RL
Chloride		22500	mg/Kg	4
Sample: 312931 - Tro	ench-2 2'			
Param	Flag	Result	Units	RL
Chloride		1860	mg/Kg	4

Report Date: November 5, 2012	Work Order: 1210292	2	Page Number: 3 of 4
Sample: 312932 - Trench-2 4'			
Param Flag	Result	Units	RL
Chloride	2430	mg/Kg	4
Sample: 312933 - Trench-2 6'			
Param Flag	Result	Units	RL
Chloride	1080	mg/Kg	4
Sample: 312934 - Trench-2 8'			
Param Flag	Result	Units	RL
Chloride	1450	mg/Kg	4
Sample: 312935 - Trench-2 10'			
Param Flag	Result	Units	RL
Chloride	920	mg/Kg	4
Sample: 312936 - Trench-3 Surfa	ce		
Param Flag	Result	Units	RL
Chloride	23500	mg/Kg	4
Sample: 312937 - Trench-3 2'			
Param Flag	Result	Units	RL
Chloride	1450	mg/Kg	4
Sample: 312938 - Trench-3 4'			
Param Flag	Result	Units	RL
Chloride	2860	mg/Kg	4
Sample: 312939 - Trench-3 6'			
Param Flag	Result	Units	RL
Chloride	2360	mg/Kg	4

Report Date: Nov	ember 5, 2012	Work Order: 12102922		Page Number: 4 of 4
Sample: 312940	- Trench-3 8'			
Param	Flag	Result	Units	RL
Chloride		531	mg/Kg	4
Sample: 312941	- Trench-3 10'			
Param	Flag	Result	Units	RL
Chloride		246	mg/Kg	4



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FAX 806 - 794 - 1298 FAX 915-585-4944

Texas 79703 (BioAquatic) 2501 Mayes Rd., Suite 100 Carroliton. Texas 75006

432-689-6301 972-242-7750

FAX 432 689 6313

E-Mail: lab@traceanalysis.com WE8: 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: November 5, 2012

Work Order: 12102922

Project Location:

Eddy Co., NM

Project Name:

COG/SRO 102 (Well Pad)

Project Number: 114-6401552

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

	-		Date	Time	Date
\mathbf{Sample}	Description	Matrix	Taken	Taken	Received
312924	Trench-1 Surface	soil	2012-10-25	00:00	2012-10-29
312925	Trench-1 2'	soil	2012-10-25	00:00	2012-10-29
312926	Trench-1 4'	soil	2012-10-25	00:00	2012-10-29
312927	Trench-1 6'	soil	2012-10-25	00:00	2012-10-29
312928	Trench-1 8'	soil	2012-10-25	00:00	2012-10-29
312929	Trench-1 10'	soil	2012-10-25	00:00	2012-10-29
312930	Trench-2 Surface	soil	2012-10-25	00:00	2012-10-29
312931	Trench-2 2'	soil	2012-10-25	00:00	2012-10-29
312932	Trench-2 4'	soil	2012-10-25	00:00	2012-10-29
312933	Trench-2 6'	soil	2012-10-25	00:00	2012-10-29
312934	Trench-2 8'	soil	2012-10-25	00:00	2012-10-29
312935	Trench-2 10'	soil	2012-10-25	00:00	2012-10-29
312936	Trench-3 Surface	soil	2012-10-25	00:00	2012-10-29
312937	Trench-3 2'	soil	2012-10-25	00:00	2012-10-29
312938	Trench-3 4'	soil	2012-10-25	00:00	2012-10-29
312939	Trench-3 6'	soil	2012-10-25	00:00	2012-10-29
312940	Trench-3 8'	soil	2012-10-25	00:00	2012-10-29
312941	Trench-3 10'	soil	2012-10-25	00:00	2012-10-29

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 27 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

Michael april

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Case Narrative

Samples for project COG/SRO 102 (Well Pad) were received by TraceAnalysis, Inc. on 2012-10-29 and assigned to work order 12102922. Samples for work order 12102922 were received intact at a temperature of 1.3 C.

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

		Prep	Prep	QC	Analysis
Test	Method	Batch	Date	Batch	Date
BTEX	S 8021B	81468	2012-10-30 at 09:30	96136	2012-10-30 at 09:30
Chloride (Titration)	SM 4500-Cl B	81531	2012-10-31 at 12:11	96192	2012-11-01 at 12:12
Chloride (Titration)	SM 4500-Cl B	81531	2012-10-31 at 12:11	96193	2012-11-01 at 12:13
Chloride (Titration)	SM 4500-Cl B	81622	2012-11-02 at 10:30	96310	2012-11-02 at 14:31
TPH DRO - NEW	S 8015 D	81493	2012-10-30 at 08:00	96158	2012-10-31 at 13:16
TPH GRO	S 8015 D	81475	2012-10-30 at 09:30	96141	2012-10-30 at 09:30

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 12102922 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.

114-6401552

Work Order: 12102922 COG/SRO 102 (Well Pad) Page Number: 6 of 27 Eddy Co., NM

Analytical Report

Sample: 312924 - Trench-1 Surface

Laboratory: Midland

Analysis: BTEX QC Batch: 96136 Prep Batch: 81468

S 8021B Analytical Method: Date Analyzed:

2012-10-30 2012-10-30 Sample Preparation:

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

			RL			
Parameter	Flag	Cert	Result	Units	Dilution	RL
Benzene		1	0.105	mg/Kg	1	0.0200
Toluene		1	0.342	mg/Kg	1	0.0200
Ethylbenzene		1	< 0.0200	mg/Kg	1	0.0200
Xylene		1	0.914	mg/Kg	1	0.0200

						Spike	Percent	Recovery
Surrogate	\mathbf{Flag}	Cert	Result	Units	Dilution	Amount	Recovery	Limits
Trifluorotoluene (TFT)			1.78	mg/Kg	1	2.00	89	70 - 130
4-Bromofluorobenzene (4-BFB)			2.36	mg/Kg	1	2.00	118	70 - 130

Sample: 312924 - Trench-1 Surface

Laboratory:

Prep Batch:

Midland

Analysis: Chloride (Titration) QC Batch: 96192 81531

Analytical Method: Date Analyzed: Sample Preparation:

SM 4500-Cl B 2012-11-01 2012-10-31

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

RLParameter Result Units Dilution RLFlag Cert 65200 4.00 Chloride mg/Kg 10

Sample: 312924 - Trench-1 Surface

Laboratory:

Prep Batch:

Midland

Analysis: TPH DRO - NEW QC Batch: 96158 81493

Analytical Method: Date Analyzed: Sample Preparation:

S 8015 D 2012-10-31 2012-10-30 Prep Method: N/A Analyzed By: CW Prepared By: CW

RLParameter Result Dilution RLFlag Cert Units DRO 50.0 79.9 mg/Kg

114-6401552

Work Order: 12102922 COG/SRO 102 (Well Pad) Page Number: 7 of 27

Eddy Co., NM

Surrogate		Flag	Cert	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
n-Tricosane	Qar	Qar		140	mg/Kg	1	100	140	55.1 - 135.7

Sample: 312924 - Trench-1 Surface

Midland Laboratory:

TPH GRO Analysis:

96141

Analytical Method:

S 8015 D 2012-10-30 Prep Method: S 5035

Analyzed By: YG

QC Batch: Prep Batch: 81475 Date Analyzed: Sample Preparation:

2012-10-30

Prepared By:

RLCert Result Units Dilution RLParameter Flag 69.8 mg/Kg 1.00 GRO 1 1

						Spike	Percent	Recovery
Surrogate	Flag	Cert	Result	Units	Dilution	Amount	Recovery	Limits
Trifluorotoluene (TFT)			2.31	mg/Kg	1	2.00	116	70 - 130
4-Bromofluorobenzene (4-BFB)			2.17	mg/Kg	1	2.00	108	70 - 130

Sample: 312925 - Trench-1 2'

Laboratory: Midland

Chloride (Titration) Analysis: QC Batch:

96192 Prep Batch: 81531

Analytical Method: Date Analyzed:

Sample Preparation:

SM 4500-Cl B 2012-11-01 2012-10-31

Prep Method: N/A Analyzed By: AR

AR

Prepared By:

			RL			
Parameter	Flag	Cert	Result	Units	Dilution	RL
Chloride			4270	mg/Kg	10	4.00

Sample: 312926 - Trench-1 4'

Laboratory: Midland

Prep Batch:

Analysis: Chloride (Titration) QC Batch:

96192 81531

Analytical Method: SM 4500-Cl B Date Analyzed:

Sample Preparation:

2012-11-01 2012-10-31 Prep Method: N/A Analyzed By: AR Prepared By: AR

continued ...

114-6401552

Work Order: 12102922 COG/SRO 102 (Well Pad) Page Number: 8 of 27 Eddy Co., NM

sample 312926 continued ...

			RL			
Parameter	Flag	Cert	Result	Units	Dilution	RL
			RL			
Parameter	Flag	Cert	Result	Units	Dilution	RL
Chloride			2310	mg/Kg	10	4.00

Sample: 312927 - Trench-1 6'

Laboratory:

Midland

Analysis: Chloride (Titration)

QC Batch:

Chloride

96192

Prep Batch: 81531

Analytical Method: Date Analyzed:

Sample Preparation:

SM 4500-Cl B 2012-11-01

2012-10-31

Prep Method: N/A Analyzed By:

ARPrepared By: AR

4.00

Parameter

RLFlag Cert Result 3680

Units Dilution RL10 4.00 mg/Kg

Sample: 312928 - Trench-1 8'

Laboratory:

Midland

Analysis: Chloride (Titration)

QC Batch: 96192 Prep Batch: 81531

Analytical Method: Date Analyzed:

Sample Preparation:

SM 4500-Cl B 2012-11-01

mg/Kg

2012-10-31

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

10

RLParameter Flag Cert Result Chloride 3080

Units Dilution RL

Sample: 312929 - Trench-1 10'

Laboratory: Midland

Analysis: QC Batch: 96193 Prep Batch: 81531

Chloride (Titration)

Analytical Method: Date Analyzed: Sample Preparation:

SM 4500-Cl B 2012-11-01 2012-10-31

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

114-6401552

Work Order: 12102922 COG/SRO 102 (Well Pad) Page Number: 9 of 27

Eddy Co., NM

			RL			
Parameter	Flag	Cert	Result	Units	Dilution	RL
Chloride			2420	mg/Kg	10	4.00

Sample: 312930 - Trench-2 Surface

Laboratory:

Midland

BTEX Analysis: QC Batch: 96136 Prep Batch: 81468

Analytical Method: Date Analyzed:

Sample Preparation:

S 8021B 2012-10-30 2012-10-30 Prep Method: S 5035 Analyzed By: YG Prepared By: YG

			RL			
Parameter	Flag	Cert	Result	Units	Dilution	RL
Benzene	U	1	< 0.0200	mg/Kg	1	0.0200
Toluene		1	0.164	mg/Kg	1	0.0200
Ethylbenzene		1	0.273	mg/Kg	1	0.0200
Xylene		1	0.256	mg/Kg	1	0.0200

						Spike	Percent	Recovery
Surrogate	Flag	Cert	Result	Units	Dilution	Amount	Recovery	Limits
Trifluorotoluene (TFT)			1.80	mg/Kg	1	2.00	90	70 - 130
4-Bromofluorobenzene (4-BFB)			2.29	mg/Kg	1	2.00	114	70 - 130

Sample: 312930 - Trench-2 Surface

Laboratory:

Midland

Chloride (Titration) Analysis: QC Batch: 96193 Prep Batch: 81531

Analytical Method: Date Analyzed: Sample Preparation:

SM 4500-Cl B 2012-11-01 2012-10-31

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

			RL			
Parameter	Flag	Cert	Result	Units	Dilution	RL
Chloride		· · · · · · · · · · · · · · · · · · ·	22500	mg/Kg	10	4.00

Sample: 312930 - Trench-2 Surface

Laboratory: Midland

Analysis: TPH DRO - NEW QC Batch: 96158 Prep Batch: 81493

Analytical Method: Date Analyzed: Sample Preparation:

S 8015 D 2012-10-31 2012-10-30 Prep Method: N/A Analyzed By: $\mathbf{C}\mathbf{W}$ Prepared By: CW

114-6401552

Work Order: 12102922 COG/SRO 102 (Well Pad) Page Number: 10 of 27 Eddy Co., NM

					RL			
Parameter		Flag	Cert	F	Result	Units	Dilution	RL
DRO		Jb	1	,	< 50.0	mg/Kg	1	50.0
						Spike	Percent	Recovery
Surrogate	Flag	Cert	Result	Units	Dilution	Amount	Recovery	Limits
n-Tricosane			131	mg/Kg	1	100	131	55.1 - 135.7

Sample: 312930 - Trench-2 Surface

Laboratory:

Midland

Analysis: QC Batch: TPH GRO

96141

Analytical Method:

S 8015 D 2012-10-30

Analyzed By:

Prep Method: S 5035 YG

Prep Batch: 81475

Date Analyzed: Sample Preparation: 2012-10-30

Prepared By: YG

			RL			
Parameter	Flag	Cert	Result	Units	Dilution	RL
GRO		1	67.2	mg/Kg	1	1.00

						Spike	Percent	Recovery
Surrogate	Flag	Cert	Result	Units	Dilution	Amount	Recovery	Limits
Trifluorotoluene (TFT)			1.94	mg/Kg	1	2.00	97	70 - 130
4-Bromofluorobenzene (4-BFB)			2.02	mg/Kg	1	2.00	101	70 - 130

Sample: 312931 - Trench-2 2'

Laboratory: Midland

Analysis: Chloride (Titration) QC Batch: 96193 Prep Batch: 81531

Analytical Method: Date Analyzed: Sample Preparation:

SM 4500-Cl B 2012-11-01 2012-10-31

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

			RL			
Parameter	Flag	Cert	Result	Units	Dilution	RL
Chloride			1860	mg/Kg	10	4.00

Sample: 312932 - Trench-2 4'

Laboratory: Midland

Analysis: Chloride (Titration) QC Batch: 96193 Date Analyzed: Prep Batch: 81531

Analytical Method: SM 4500-Cl B 2012-11-01 Sample Preparation: 2012-10-31

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

Report Date: November 5, 2012 114-6401552

Work Order: 12102922 COG/SRO 102 (Well Pad) Page Number: 11 of 27

Eddy Co., NM

			RL			
Parameter	Flag	Cert	Result	Units	Dilution	RL
Chloride			2430	mg/Kg	10	4.00

Sample: 312933 - Trench-2 6'

Laboratory:

Midland

Analysis: Chloride (Titration) QC Batch: 96193 Prep Batch: 81531 Analytical Method: SM 4500-C Date Analyzed: 2012-11-01 Sample Preparation: 2012-10-31

SM 4500-Cl B Prep Method: N/A 2012-11-01 Analyzed By: AR

Sample: 312934 - Trench-2 8'

Laboratory: Midland

Analysis: Chloride (Titration)

QC Batch: 96193 Prep Batch: 81531 Analytical Method: SM Date Analyzed: 201

SM 4500-Cl B 2012-11-01 2012-10-31 Prep Method: N/A Analyzed By: AR

Prepared By:

Prepared By:

AR

AR

Sample Preparation:

Sample: 312935 - Trench-2 10'

Laboratory:

Midland

Analysis: Chloride (Titration)
QC Batch: 96193
Prep Batch: 81531

Analytical Method: Date Analyzed: Sample Preparation:

SM 4500-Cl B 2012-11-01 2012-10-31 Prep Method: N/A Analyzed By: AR Prepared By: AR

Work Order: 12102922 Page Number: 12 of 27 Report Date: November 5, 2012 COG/SRO 102 (Well Pad) Eddy Co., NM 114-6401552

Sample: 312936 - Trench-3 Surface

Laboratory:	Midland
Anolyzaia	pTpY

Analytical Method: S 8021B Prep Method: S 5035 Analysis: BTEX QC Batch: 96136 Date Analyzed: 2012-10-30 Analyzed By: YG Prep Batch: 81468 Sample Preparation: 2012-10-30 Prepared By: YG

Parameter	Flag	Cert	Result	Units	Dilution	RL
Benzene	Ŭ	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	U	1	< 0.0200	mg/Kg	1	0.0200

						Spike	Percent	Recovery
Surrogate	Flag	Cert	Result	Units	Dilution	Amount	Recovery	Limits
Trifluorotoluene (TFT)			1.81	mg/Kg	1	2.00	90	70 - 130
4-Bromofluorobenzene (4-BFB)			1.88	mg/Kg	1	2.00	94	70 - 130

Sample: 312936 - Trench-3 Surface

Laboratory: Midland

Analysis: Chloride (Titration) Analytical Method: SM 4500-Cl B Prep Method: N/A QC Batch: 96193 Date Analyzed: 2012-11-01 Analyzed By: AR Prep Batch: 81531 Sample Preparation: 2012-10-31 Prepared By: AR

RLParameter Flag Cert Result Units Dilution RLChloride 23500 mg/Kg 10 4.00

Sample: 312936 - Trench-3 Surface

Laboratory: Midland

Analysis: TPH DRO - NEW Analytical Method: S 8015 D Prep Method: N/A QC Batch: 96158 Date Analyzed: Analyzed By: CW 2012-10-31 Prep Batch: 81493 2012-10-30 Sample Preparation: Prepared By: CW

			RL			
Parameter	Flag	Cert	Result	Units	Dilution	RL
DRO	ĴЪ	1	< 50.0	mg/Kg	1	50.0

						Spike	Percent	Recovery
Surrogate	Flag	Cert	Result	Units	Dilution	Amount	Recovery	Limits
n-Tricosane			127	mg/Kg	1	100	127	55.1 - 135.7

114-6401552

Work Order: 12102922 COG/SRO 102 (Well Pad) Page Number: 13 of 27 Eddy Co., NM

Sample: 312936 - Trench-3 Surface

Laboratory:

Midland

Analysis: TPH GRO QC Batch: 96141 Prep Batch: 81475

Analytical Method: Date Analyzed:

S 8015 D 2012-10-30 Sample Preparation: 2012-10-30 Prep Method: S 5035 Analyzed By: YG

YG

Prepared By:

RL

Result Units Dilution RLParameter Flag Cert GRO 11.7 mg/Kg 1.00 1

						Spike	Percent	Recovery
Surrogate	Flag	Cert	Result	Units	Dilution	Amount	Recovery	Limits
Trifluorotoluene (TFT)			2.11	mg/Kg	1	2.00	106	70 - 130
4-Bromofluorobenzene (4-BFB)			1.91	mg/Kg	1	2.00	96	70 - 130

Sample: 312937 - Trench-3 2'

Laboratory:

Midland

Analysis: Chloride (Titration) QC Batch: 96193 Prep Batch: 81531

Analytical Method: Date Analyzed:

SM 4500-Cl B 2012-11-01 Sample Preparation: 2012-10-31

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

RLCert Result Units Dilution RLParameter Flag Chloride 1450 mg/Kg 10 4.00

Sample: 312938 - Trench-3 4'

Laboratory:

Midland

Analysis: Chloride (Titration) QC Batch: 96193 Prep Batch: 81531

Analytical Method: Date Analyzed:

Sample Preparation:

SM 4500-Cl B 2012-11-01 2012-10-31

Prep Method: N/A Analyzed By: AR

AR

Prepared By:

Result Dilution Parameter Units RLFlag Cert Chloride 2860 mg/Kg 10 4.00

RL

Report Date 114-6401552	: November 5, 2012		ork Order: 12 S/SRO 102 (W		Page Number: 14 of 27 Eddy Co., NM		
Sample: 31	2939 - Trench-3 6'						
Laboratory: Analysis: QC Batch: Prep Batch:	Midland Chloride (Titration) 96310 81622	Date A	cal Method: nalyzed: Preparation:	SM 4500-Cl B 2012-11-02 2012-11-02	Prep Method: Analyzed By: Prepared By:	N/A AH AR	
			RL				
Parameter Chloride	Flag	Cert	Result 2360	Units mg/Kg	Dilution 5	$\frac{RL}{4.00}$	
Sample: 31 Laboratory: Analysis: QC Batch: Prep Batch:	2940 - Trench-3 8' Midland Chloride (Titration) 96310 81622 Flag	Date Ar	cal Method: nalyzed: Preparation: RL Result	SM 4500-Cl B 2012-11-02 2012-11-02 Units	Prep Method: Analyzed By: Prepared By: Dilution	N/A AH AR	
Chloride	riag	Cert	531	mg/Kg	5	4.00	
Laboratory: Analysis: QC Batch: Prep Batch:	2941 - Trench-3 10' Midland Chloride (Titration) 96310 81622	Date Ar Sample	Preparation:	SM 4500-Cl B 2012-11-02 2012-11-02	Prep Method: Analyzed By: Prepared By:	N/A AH AR	
Parameter	Flag	Cert	Result	Units	Dilution	RL	
Chloride			246	mg/Kg	5	4.00	

114-6401552

Work Order: 12102922 COG/SRO 102 (Well Pad) Page Number: 15 of 27 Eddy Co., NM

Method Blanks

Method Blank (1)

QC Batch: 96136

QC Batch:

96136

Date Analyzed:

2012-10-30

Analyzed By: YG

Prep Batch: 81468

QC Preparation: 2012-10-30

Prepared By: YG

	\mathtt{MDL}								
Parameter	\mathbf{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				

Surrogate	Flag	Cert	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)			1.80	mg/Kg	1	2.00	90	70 - 130
4-Bromofluorobenzene (4-BFB)			1.74	mg/Kg	1	2.00	87	70 - 130

Method Blank (1)

QC Batch: 96141

QC Batch:

96141

Prep Batch: 81475

Date Analyzed: QC Preparation: 2012-10-30

2012-10-30

Analyzed By: YG Prepared By: YG

		MDL							
Parameter	Flag	Cert	Result	Units	RL				
GRO		1	< 0.482	mg/Kg	1				

Surrogate	Flag	Cert	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)			1.84	mg/Kg	1	2.00	92	70 - 130
4-Bromofluorobenzene (4-BFB)			1.70	mg/Kg	1	2.00	85	70 - 130

Method Blank (1)

QC Batch: 96158

QC Batch: 96158 Prep Batch: 81493

Date Analyzed: QC Preparation: 2012-10-30

2012-10-31

Analyzed By: CW Prepared By: CW Report Date: November 5, 2012 114-6401552

Work Order: 12102922 COG/SRO 102 (Well Pad) Page Number: 16 of 27 Eddy Co., NM

Parameter		F	lag	Cert		MDL Result	Units	m RL
DRO				1		31.6	mg/Kg	50
						Spike	Percent	Recovery
Surrogate	\mathbf{Flag}	Cert	\mathbf{Result}	Units	Dilution	Amount	Recovery	Limits
n-Tricosane			114	mg/Kg	1	100	114	55.1 - 135.7

Method Blank (1)

QC Batch: 96192

QC Batch: 96192 Prep Batch: 81531 Date Analyzed: 2012-11-01 QC Preparation: 2012-10-31 Analyzed By: AR Prepared By: AR

Method Blank (1)

QC Batch: 96193

QC Batch: 96193 Prep Batch: 81531 Date Analyzed: 2012-11-01 QC Preparation: 2012-10-31 Analyzed By: AR Prepared By: AR

Method Blank (1)

QC Batch: 96310

QC Batch: 96310 Prep Batch: 81622 Date Analyzed: 2
QC Preparation: 2

2012-11-02 2012-11-02 Analyzed By: AH Prepared By: AH

114-6401552

Work Order: 12102922 COG/SRO 102 (Well Pad) Page Number: 17 of 27 Eddy Co., NM

Laboratory Control Spikes

Laboratory Control Spike (LCS-1)

QC Batch:

Date Analyzed:

2012-10-30

Analyzed By: YG

Prep Batch: 81468

QC Preparation: 2012-10-30

Prepared By: YG

			LCS			Spike	Matrix		Rec.
Param	${f F}$	\mathbf{C}	Result	Units	Dil.	Amount	Result	Rec.	Limit
Benzene		1	1.81	mg/Kg	1	2.00	< 0.00810	90	70 - 130
Toluene		1	1.82	mg/Kg	1	2.00	< 0.00750	91	70 - 130
Ethylbenzene		1	1.76	mg/Kg	1	2.00	< 0.00730	88	70 - 130
Xylene		1	5.56	mg/Kg	1	6.00	< 0.00700	93	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}	\mathbf{C}	Result	Units	Dil.	Amount	Result	Rec.	Limit	RPD	Limit
Benzene		1	1.86	mg/Kg	1	2.00	< 0.00810	93	70 - 130	3	20
Toluene		1	1.87	mg/Kg	1	2.00	< 0.00750	94	70 - 130	3	20
Ethylbenzene		1	1.81	mg/Kg	1	2.00	< 0.00730	90	70 - 130	3	20
Xylene		1	5.70	mg/Kg	1	6.00	< 0.00700	95	70 - 130	2	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.	Limit
Trifluorotoluene (TFT)	1.83	1.85	mg/Kg	1	2.00	92	92	70 - 130
4-Bromofluorobenzene (4-BFB)	1.85	1.80	mg/Kg	1	2.00	92	90	70 - 130

Laboratory Control Spike (LCS-1)

QC Batch:

96141

Date Analyzed:

2012-10-30

Analyzed By: YG

Prep Batch: 81475

QC Preparation: 2012-10-30

Prepared By: YG

			LCS			Spike	Matrix		Rec.
Param	\mathbf{F}	\mathbf{C}	Result	Units	Dil.	Amount	Result	Rec.	Limit
GRO		1	18.1	mg/Kg	1	20.0	< 0.482	90	70 - 130

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

Report Date: November 5, 2012 114-6401552

Work Order: 12102922 COG/SRO 102 (Well Pad) Page Number: 18 of 27 Eddy Co., NM

D	-	a	LCSD	TT **	D.1	Spike	Matrix	D.	Rec.	DDD	RPD
Param	F	C	Result	Units	Dil.	Amount	Result	Rec.	Limit	RPD	Limit
			LCSD			Spike	Matrix		Rec.		RPD
Param	\mathbf{F}	\mathbf{C}	Result	Units	Dil.	Amount	Result	Rec.	Limit	RPD	Limit
GRO		1	16.8	mg/Kg	1	20.0	< 0.482	84	70 - 130	7	20
Percent recovery is based on th	e spike	resu	lt. RPD	is based o	n the s	pike and sp	ike duplic	ate resi	ılt.		

Surrogate	Result	Result	Units	Dil.	Amount	Rec.	Rec.	Limit
Trifluorotoluene (TFT)	2.04	1.98	mg/Kg	1	2.00	102	99	70 - 130
4-Bromofluorobenzene (4-BFB)	1.80	1.80	mg/Kg	1	2.00	90	90	70 - 130
		•						

Laboratory Control Spike (LCS-1)

QC Batch: Prep Batch: 81493

96158

Date Analyzed:

2012-10-31

Analyzed By: CW

Prepared By: CW

			LCS			Spike	Matrix		Rec.
Param	\mathbf{F}	\mathbf{C}	Result	Units	Dil.	Amount	Result	Rec.	Limit
DRO		1	267	mg/Kg	1	250	31.6	94	66.9 - 119.9

QC Preparation: 2012-10-30

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
DRO		1	290	mg/Kg	1	250	31.6	103	66.9 - 119.9	8	20

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

	$_{ m LCS}$	LCSD			Spike	LCS	LCSD	Rec.
Surrogate	Result	Result	\mathbf{Units}	Dil.	Amount	Rec.	Rec.	Limit
n-Trìcosane	124	128	mg/Kg	1	100	124	128	76.8 - 140.2

Laboratory Control Spike (LCS-1)

QC Batch: Prep Batch: 81531

96192

Date Analyzed: QC Preparation: 2012-10-31

2012-11-01

Analyzed By: AR Prepared By: AR

			LCS			Spike	Matrix		Rec.
Param	\mathbf{F}	\mathbf{C}	Result	Units	Dil.	Amount	Result	Rec.	Limit
Chloride			2690	mg/Kg	1	2500	< 3.85	108	85 - 115

114-6401552

Work Order: 12102922 COG/SRO 102 (Well Pad) Page Number: 19 of 27

Eddy Co., NM

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			2550	mg/Kg	1	2500	< 3.85	102	85 - 115	5	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: Prep Batch: 81531

96193

Date Analyzed:

2012-11-01

Analyzed By: AR

QC Preparation: 2012-10-31 Prepared By: AR

			LCS			Spike	Matrix		Rec.
Param	\mathbf{F}	\mathbf{C}	Result	Units	Dil.	Amount	Result	Rec.	Limit
Chloride			2600	mg/Kg	1	2500	<3.85	104	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			2700	mg/Kg	1	2500	< 3.85	108	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:

96310 Prep Batch: 81622 Date Analyzed: QC Preparation:

2012-11-02 2012-11-02 Analyzed By: AH

Prepared By: AH

LCS Spike Matrix Rec. Param \mathbf{C} Result Units Dil. Amount Result Rec. Limit Chloride 2460 mg/Kg 2500 <3.85 98 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	F,	\mathbf{C}	Result	Units	Dil.	Amount	Result	Rec.	Limit	RPD	Limit
Chloride			2560	mg/Kg	1	2500	< 3.85	102	85 - 115	4	20

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

114-6401552

Work Order: 12102922 COG/SRO 102 (Well Pad) Page Number: 20 of 27 Eddy Co., NM

Matrix Spike (MS-1)

Spiked Sample: 312930

QC Batch:

96136

Date Analyzed:

2012-10-30

Analyzed By: YG

Prep Batch: 81468

QC Preparation: 2012-10-30

Prepared By: YG

			MS			Spike	Matrix		Rec.
Param	\mathbf{F}	\mathbf{C}	Result	Units	Dil.	Amount	Result	Rec.	Limit
Benzene		1	1.88	mg/Kg	1	2.00	< 0.00810	94	70 - 130
Toluene		1	2.04	mg/Kg	1	2.00	0.164	94	70 - 130
Ethylbenzene		1	2.02	mg/Kg	1	2.00	0.273	87	70 - 130
Xylene		1	5.97	mg/Kg	1	6.00	0.256	95	70 - 130

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.	Limit	RPD	Limit
Benzene		1	1.95	mg/Kg	1	2.00	< 0.00810	98	70 - 130	4	20
Toluene		1	2.09	mg/Kg	1	2.00	0.164	96	70 - 130	2	20
Ethylbenzene		1	2.01	mg/Kg	1	2.00	0.273	87	70 - 130	0	20
Xylene		1	6.20	mg/Kg	1	6.00	0.256	99	70 - 130	4	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.	Limit
Trifluorotoluene (TFT)	1.80	1.81	mg/Kg	1	2	90	90	70 - 130
4-Bromofluorobenzene (4-BFB)	2.03	2.01	mg/Kg	1	2	102	100	70 - 130

Matrix Spike (MS-1)

Spiked Sample: 312930

QC Batch:

Param

GRO

96141

Date Analyzed:

2012-10-30

98

Analyzed By: YG Prepared By: YG

Prep Batch: 81475

QC Preparation: 2012-10-30

MS Spike Matrix Rec. Result Units Dil. Amount Result Limit Rec. 39.0 < 0.482 70 - 130 40.0

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

C

			MSD			Spike	Matrix		Rec.		RPD
Param	\mathbf{F}	\mathbf{C}	Result	Units	Dil.	Amount	Result	Rec.	Limit	RPD	Limit
GRO		1	31.9	mg/Kg	1	40.0	< 0.482	80	70 - 130	20	20

mg/Kg

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

 $continued \dots$

### Analyzed By Prep Batch: 96158 Date Analyzed: 2012-10-31 Analyzed By Prep Batch: 81493 QC Preparation: 2012-10-30 Analyzed By Prepared By Param F C Result Units Dil. Amount Result Rec. I	Report Date: November 8 114-6401552	5, 2012				: 12102922 2 (Well Pa			F	Page Nu		21 of 27 Co., NM
New Note	matrix spikes continued	•										_
MS	α ,					TT */	D.I	-				Rec.
Result Result Units Units Dil. Amount Rec. Rec.	Surrogate		R	esult	Result	Units	D11.	Amount	Re	c. R	ec.	Limit
Result Result Units Units Dil. Amount Rec. Rec.				MS	MSD			Spike	MS	S M	SD	Rec.
### Analyzed By Prep Batch: 96158 Date Analyzed: 2012-10-31 Analyzed By Prep Batch: 81493 QC Preparation: 2012-10-30 Prepared By Prep Batch: 81493 QC Preparation: 2012-10-30 Analyzed By Prep Batch: 81493 QC Preparation: 2012-10-30 Prepared By Prep Batch: 81493 QC Preparation: 2012-10-30 Analyzed By Prepared By Prep Batch: 81493 QC Preparation: 2012-10-30 Prepared By Prepared By Prep Batch: 81493 QC Preparation: 2012-10-30 Prepared By Prepared By Prep Batch: 81493 Prepared By Prepared By Prep Batch: 81493 Prepared By Prep Batch: 81531 QC Preparation: 2012-10-31 Prepared By Prepared By Prep Batch: 81531 QC Preparation: 2012-10-31 Prepared By Prepared By Prep Batch: 81531 QC Preparation: 2012-10-31 Prepared By Prep Batch: 81531 QC Preparation: 2012-10-31 Prepared By Prepared By Prep Batch: 81531 QC Preparation: 2012-10-31 Prepared By Prepared By Prep Batch: 81531 QC Preparation: 2012-10-31 Prepared By Prepared By Prep Batch: 81531 QC Preparation: 2012-10-31 Prepared By Prepared By Prep Batch: 81531 QC Preparation: 2012-10-31 Prepared By Prepared By Prep Batch: 81531 Prepared By Prepared By Batch: 81531 Prepare	Surrogate					Units	Dil.					Limit
Matrix Spike (MS-1) Spiked Sample: 312924 QC Batch: 96158 Date Analyzed: 2012-10-31 Analyzed By Prep Batch: 81493 QC Preparation: 2012-10-30 Prepared By MS Spike Matrix Image: Matrix Spike Matrix Image: Matrix Spike Matrix Image: Matrix Spike Matrix Result No. Image: MSD No. Spike Matrix Spike Matrix Rec. Image: MSD No. Spike Matrix No. Rec. Limit No. RPD No. Image: MSD No. Result No. Rec. Limit No. RPD No. Image: MSD No. Result No. Rec. Limit No. RPD No. Image: MSD No. Result No. Rec. Limit No. RPD No. Image: MSD No. Result No. Rec. Limit No. RPD No. Image: MSD No. Result No. Rec. Limit No. RPD No. Image: MSD No. Result No. Rec. Image: MSD No. Image: MSD No. Result No. Image: MSD No.	Trifluorotoluene (TFT)			2.43	2.01		1	2	12	2 1		70 - 130
QC Batch: 96158 Date Analyzed: 2012-10-31 Analyzed By Prep Batch: 81493 QC Preparation: 2012-10-30 Prepared By Param F C Result Units Dil. Amount Result Rec. I DRO 1 423 mg/Kg 1 250 79.9 137 36.1 Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result. Rec. Limit RPD Param F C Result Units Dil. Amount Rec. Limit RPD DRO 1 425 mg/Kg 1 250 79.9 138 36.1 - 147.2 0 Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result. MS MSD Spike MS MSD Image: MS MSD Image: MS MSD Image: MS Image: MS MSD Image: MS MSD Image: MS Image: MS MSD Image: MS Ima	4-Bromofluorobenzene (4-	BFB)		2.08	2.10	mg/Kg	1	2	10	4 1	05 7	70 - 130
QC Batch: 96158 Date Analyzed: 2012-10-31 Analyzed By Prep Batch: 81493 QC Preparation: 2012-10-30 Prepared By Param F C Result Units Dil. Amount Result Rec. I DRO 1 423 mg/Kg 1 250 79.9 137 36.1 Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result. Rec. Limit RPD Param F C Result Units Dil. Amount Rec. Limit RPD DRO 1 425 mg/Kg 1 250 79.9 138 36.1 - 147.2 0 Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result. MS MSD Spike MS MSD Image: MS MSD Image: MS MSD Image: MS Image: MS MSD Image: MS MSD Image: MS Image: MS MSD Image: MS Ima												
Prep Batch: 81493 QC Preparation: 2012-10-30 Prepared By		Spiked Sample	e: 31292	4								
Param				-						_		
Param	Prep Batch: 81493		QC	Prepara	tion: 20)12-10-30				Prepa	red By:	CW
Param				MS			Spike	Mat	trix		F	Rec.
NSD	Param	F	C :		Units	Dil.	_			Rec.		imit
Param					mg/Kg		250					- 147.2
Param	Percent recovery is based	on the spike res	ult. RP	D is base	ed on the	spike and	spike du	plicate re	sult.			
Param F C Result Units Dil. Amount Result Rec. Limit RPD DRO 1 425 mg/Kg 1 250 79.9 138 36.1 - 147.2 0 Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result. MS MSD Spike MS MSD MSD Surrogate Result Result Units Dil. Amount Rec. Rec. I n-Tricosane Qur Qur 156 156 mg/Kg 1 100 156 156 78.3 Matrix Spike (MS-1) Spiked Sample: 312928	,	<u>.</u>				_	_	•				DDD
DRO	Down	TO CT		Tīm:ha	. D:1	_		Dag			DDD	RPD Limit
Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result. MS		·										20
MS										1-11.2		
Result Result Units Dil. Amount Rec. Rec. In-Tricosane Qar Qar 156 156 mg/Kg 1 100 156 156 78.3	Percent recovery is based	on the spike res	uit. KPi	U is base	ed on the	spike and	spike du	pncate re	suit.			
Matrix Spike (MS-1) Spiked Sample: 312928		MS	M	ISD			Spike	MS	3	MSD	F	Rec.
Matrix Spike (MS-1) Spiked Sample: 312928 QC Batch: 96192 Date Analyzed: 2012-11-01 Analyzed By Prep Batch: 81531 QC Preparation: 2012-10-31 Prepared By MS Spike Matrix Param F C Result Units Dil. Amount Result Rec. Chloride 5720 mg/Kg 10 2500 3080 106 78 Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result. MSD Spike Matrix Rec.		Resul	t Re			Dil.	Amoun	t Rec	с.	Rec.		imit
QC Batch: 96192 Date Analyzed: 2012-11-01 Analyzed By Prep Batch: 81531 QC Preparation: 2012-10-31 Prepared By MS Spike Matrix Param F C Result Units Dil. Amount Result Rec. Chloride 5720 mg/Kg 10 2500 3080 106 78 Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result. MSD Spike Matrix Rec.	n-Tricosane Qer Qer	156	1	.56	mg/Kg	1	100	156	3	156	78.3	- 131.6
Param F C Result Units Dil. Amount Result Rec. Chloride 5720 mg/Kg 10 2500 3080 106 78 Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result. MSD Spike Matrix Rec.	QC Batch: 96192	Spiked Sample	Dat	te Analy:								
Param F C Result Units Dil. Amount Result Rec. Chloride 5720 mg/Kg 10 2500 3080 106 78 Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result. MSD Spike Matrix Rec.				MS			Spik	e Ma	atrix			Rec.
Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result. MSD Spike Matrix Rec.	Param	\mathbf{F}	\mathbf{C}		Units	Dil.	-			Rec.		Limit
MSD Spike Matrix Rec.	Chloride				mg/K	g 10	2500) 3	080	106		9 - 121
MSD Spike Matrix Rec.	Percent recovery is based	on the spike res	ult. RP	D is base			spike du	plicate re	sult.			
•	,	£				_		-				
Param F C Pagult Units Dil Amount Regult Rea Limit DDD		- ~	MSD	.	5.11	_					DDD	RPD

Rec.

115

Limit

78.9 - 121

Result

3080

RPD

4

Limit

20

F C

Result

5950

Units

mg/Kg

Dil.

10

Amount

2500

Param

Chloride

114-6401552

Work Order: 12102922 COG/SRO 102 (Well Pad) Page Number: 22 of 27 Eddy Co., NM

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

Matrix Spike (MS-1)

Spiked Sample: 312938

QC Batch:

96193

Date Analyzed:

2012-11-01

Analyzed By: AR

Prep Batch: 81531

QC Preparation: 2012-10-31

Prepared By: AR

			MS			Spike	Matrix		Rec.
Param	\mathbf{F}	\mathbf{C}	Result	Units	Dil.	Amount	Result	Rec.	Limit
Chloride			5270	mg/Kg	10	2500	2860	96	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.	Limit	RPD	Limit
Chloride			5520	mg/Kg	10	2500	2860	106	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: 312948

QC Batch: Prep Batch: 81622

96310

Date Analyzed:

2012-11-02

QC Preparation: 2012-11-02

Analyzed By: AH

Prepared By: AH

			MS			Spike	Matrix		Rec.
Param	F	C	Result	Units	Dil.	Amount	Result	Rec.	Limit
Chloride			2610	mg/Kg	5	2500	579	81	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.	Limit	RPD	Limit
Chloride			2900	mg/Kg	5	2500	579	93	78.9 - 121	10	20

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

114-6401552

Work Order: 12102922 COG/SRO 102 (Well Pad) Page Number: 23 of 27 Eddy Co., NM

Calibration Standards

Standard (CCV-1)

QC Batch: 96136

Date Analyzed: 2012-10-30

Analyzed By: YG

				CCVs True	CCVs Found	CCVs $\operatorname{Percent}$	Percent Recovery	Date
Param	Flag	Cert	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Benzene		1	mg/kg	0.100	0.0947	95	80 - 120	2012-10-30
Toluene		1	mg/kg	0.100	0.0933	93	80 - 120	2012-10-30
Ethylbenzene		1	mg/kg	0.100	0.0863	86	80 - 120	2012-10-30
Xylene		1	mg/kg	0.300	0.271	90	80 - 120	2012-10-30

Standard (CCV-2)

QC Batch: 96136

Date Analyzed: 2012-10-30

Analyzed By: YG

Param	Flag	Cert	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Benzene		1	mg/kg	0.100	0.0912	91	80 - 120	2012-10-30
Toluene		1	mg/kg	0.100	0.0915	92	80 - 120	2012-10-30
Ethylbenzene		1	mg/kg	0.100	0.0862	86	80 - 120	2012-10-30
Xylene		1	mg/kg	0.300	0.272	91	80 - 120	2012-10-30

Standard (CCV-3)

QC Batch: 96136

Date Analyzed: 2012-10-30

Analyzed By: YG

Param	Flag	Cert	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Benzene	Fiag		mg/kg	0.100	0.0912	91	80 - 120	2012-10-30
Toluene		,	mg/kg	0.100	0.0912	92	80 - 120	2012-10-30
Ethylbenzene		1	mg/kg	0.100	0.0862	86	80 - 120	2012-10-30
Xylene		1	mg/kg	0.300	0.272	91	80 - 120	2012-10-30

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Work Order: 12102922 COG/SRO 102 (Well Pad) Page Number: 24 of 27 Eddy Co., NM

Standard (CCV-1)

QC Batch: 96141

Date Analyzed: 2012-10-30

Analyzed By: YG

				CCVs	CCVs	CCVs	Percent	
				\mathbf{True}	Found	Percent	Recovery	Date
Param	Flag	Cert	Units	Conc.	Conc.	Recovery	Limits	Analyzed
GRO		1	mg/Kg	1.00	0.879	88	80 - 120	2012-10-30

Standard (CCV-2)

QC Batch: 96141

Date Analyzed: 2012-10-30

Analyzed By: YG

				CCVs	CCVs	CCVs	Percent	
				True	Found	Percent	Recovery	Date
Param	Flag	Cert	Units	Conc.	Conc.	Recovery	Limits	Analyzed
GRO		1	mg/Kg	1.00	0.963	96	80 - 120	2012-10-30

Standard (CCV-3)

QC Batch: 96141

Date Analyzed: 2012-10-30

Analyzed By: YG

				CCVs	CCVs	CCVs	Percent	
				True	Found	Percent	Recovery	Date
Param	Flag	Cert	Units	Conc.	Conc.	Recovery	Limits	Analyzed
GRO		1	mg/Kg	1.00	1.07	107	80 - 120	2012-10-30

Standard (CCV-1)

QC Batch: 96158

Date Analyzed: 2012-10-31

Analyzed By: CW

				CCVs	CCVs	CCVs	Percent	
				True	Found	Percent	Recovery	Date
Param	Flag	Cert	Units	Conc.	Conc.	Recovery	Limits	Analyzed
DRO		1	mg/Kg	250	294	118	80 - 120	2012-10-31

Standard (CCV-2)

QC Batch: 96158

Date Analyzed: 2012-10-31

Analyzed By: CW

114-6401552

Work Order: 12102922 COG/SRO 102 (Well Pad) Page Number: 25 of 27

Eddy Co., NM

Param	Flag	Cert	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
	1 1006							
DRO		1	mg/Kg	250	242	97	80 - 120	2012-10-31

Standard (CCV-1)

QC Batch: 96192

Date Analyzed: 2012-11-01

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	98.6	99	85 - 115	2012-11-01

Standard (CCV-2)

QC Batch: 96192

Date Analyzed: 2012-11-01

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	101	101	85 - 115	2012-11-01

Standard (CCV-1)

QC Batch: 96193

Date Analyzed: 2012-11-01

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	101	101	85 - 115	2012-11-01

Standard (CCV-2)

QC Batch: 96193

Date Analyzed: 2012-11-01

Analyzed By: AR

114-6401552

Work Order: 12102922 COG/SRO 102 (Well Pad) Page Number: 26 of 27

Eddy Co., NM

Param	Flag	Cert	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Chloride			mg/Kg	100	99.1	99	85 - 115	2012-11-01

Standard (CCV-1)

QC Batch: 96310

Date Analyzed: 2012-11-02

Analyzed By: AH

				CCVs	CCVs	CCVs	Percent	
				True	Found	Percent	Recovery	Date
Param	Flag	Cert	$\mathbf{U}_{\mathbf{nits}}$	Conc.	Conc.	Recovery	Limits	Analyzed
Chloride			mg/Kg	100	97.7	98	85 - 115	2012-11-02

Standard (CCV-2)

QC Batch: 96310

Date Analyzed: 2012-11-02

Analyzed By: AH

				$\rm CCVs$	$\rm CCVs$	CCVs	Percent	
				True	Found	Percent	Recovery	Date
Param	\mathbf{Flag}	Cert	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Chloride			mg/Kg	100	102	102	85 - 115	2012-11-02

Report Date: November 5, 2012 Work Order: 12102922 Page Number: 27 of 27 114-6401552 COG/SRO 102 (Well Pad) Eddy Co., NM

Appendix

Report Definitions

Name	Definition
MDL	Method Detection Limit
MQL	Minimum Quantitation Limit
SDL	Sample Detection Limit

Laboratory Certifications

	Certifying	Certification	Laboratory
C	Authority	Number	Location
_	NCTRCA	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.
- 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

The scanned attachments will follow this page.

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

12109222 2932

An	Analysis Request of Chain of Custouy Record											PAGE: 1 : 2																		
				_							ANALYSIS REQUEST (Circle or Specify Method No.)																			
TETRATECH 1910 N. Big Spring St. Midland, Texas 79705 (432) 682-4559 • Fax (432) 682-3946															5 (Ext to C35)	1	ည် က	Vr Pd Hg									DS			
CLIENT NAM						SITE MANAG	ER:	SS.		P			ATIV	E	TX1005		- 1	Ba Ba			/624	079/0/78				1	pH, TDS			
PROJECT NO	<u>COG</u>		PR	O.II	FCT	NAME:	Tavacez				ME	TH:	OD T	\dashv	- 1	1	8	₽ B	seg		/8260						tions			
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929						Break-1	10'																							
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