		SI	TE INFORM	IATION	ατροποιομού το στο ματροποιομού το ποιομού το το ποιομού το στο			
	ng ng gana an an an anna ann an sana g	Repor	t Type: Clo	sure Rep	ort			
General Site Info	rmation:	·教育: 1997年夏				S C C S & MARINE		
Site:		Southwest C	Central Tank Bat	tery	<u>al de la la de constante de la desta de la desta de la desta de la de</u>			
Company:		COG Operat	ing LLC					
Section, Townsh	ip and Range	Unit O	Sec 20	T17S	R30E			
Lease Number:	<u> </u>	NMNM-0467	932	· ····································				
County:		Eddy Count	v		· · ·			
GPS:	· · · ·	32.8154	•		103.99518			
Surface Owner:		Federal		· · · · · · ·	- -			
Mineral Owner:		1		<u></u>				
Directions:		From Loco Hill Highway 82 fo the east, turn	ls, New Mexico, into r 0.6 miles and turr south through a we	ersection of Hi south into lea I location and	ghway 82 and Hagerman ase road. Go 0.1 miles an I go 0.1 miles to location	Cutoff Road, go west on id lease road will vear to		
					a an			
Release Data: 🐒		Spill #1		Spill #2	KALLAN REPART	Spill #3		
Date Released:		8/2/2010		8/31/2010)	12/31/2010		
Type Release:		oil and produ	ced water	produced	water	produced water		
Source of Contam	ination:	water tank		6" steel lin	e	equalizer line		
Fluid Released:		4 bbls oil and	60 water	100 bbls		150 bbls		
Fluids Recovered:	· · · · · · · · · · · · · · · · · · ·	2 bbls oil and	30 water	98 bbls		80 bbls		
Official Commun	ication:	and of the		a company	NEW THE STATE			
Name:	Pat Ellis				lke Tavarez	<u></u>		
Company:	COG Operating 11	<u>^</u>	RECE	NEDT	Tetra Tech			
Addroop	EEO MI Toyan Avo	Sto 1200	I I U U Com Ded IL	IVEU	4040 N. Dia Corina			
Address.	550 W. Texas Ave.	Ste. 1300	AUG 23	2012	1910 N. BIG Spring			
Р.О. Вох		· · · ·		2013				
City:	Midland Texas, 797	<u>′01</u>	HNMOGD A	BTECH	Midland, Texas			
Phone number:	(432) 686-3023	<u> </u>		MEO!A	432-682-4559			
Fax:	(432) 684-7137	·						
Email:	pellis@conchoreso	urces.com			ike.tavarez@tetratech	com		
				and a second second second second second				
Ranking Criteria					a in the second second second	and the second states and the second s		
	¹ J. 2017 Tech. S. L. 2018 in some control and the second state of the second sta	Bahlurur of Kitkerson and States and States	10 × 63.9 700 ° 88 96 ° 208 /227 6 28 28 28 28	Rander and a series of the and the ser and	[15] Y. Y. DET TANK, M. Y. A. YAN, M. P. P. DAVIG, A MILLAR OF TAXABLE MATRIX AND A CONTRACT OF A DATA STREET, AND A DATA ST			
Depth to Groundwa	ater:	********	Ranking Score	<u> </u>	Site Data			
<50 ft			20		<u> </u>			
50-99 ft			10					
>100 ft.			0	•	0			
Malling d Drotootic								
WellHead Protectio	1 n: 00.# Drivato <200.f	4	Ranking Score		Site Data			
Water Source >1,00	00 ft Private >200 ft	ł. ł	20	·.	0			
	10 h., i maio - 200 h.		<u>~</u>					
Surface Body of W	ater:	• · · · · · · · · · · · · · · · · · · ·	Ranking Score	1	Site Data			
<200 ft			20	1				
200 ft - 1,000 ft.			10					
>1,000 ft.	•		0	and a local sector and a local sector and a local sector and	. 0			
Tota	II Ranking Score:	Accepta Benzene	able Soil RRAL (Total BTEX	mg/kg)				
		10	50	5,000				



June 20, 2013

Mr. Mike Bratcher Environmental Engineer Specialist Oil Conservation Division District 2 1301 West Grand Avenue Artesia, New Mexico 88210

Re: Closure Report for the COG Operating LLC., Southwest Central Tank Battery, Unit 0, Section 20, 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 (3) three spills at the Southwest Central Tank Battery, Unit 0, Section 20, Township 17 South, Range 30 East, Eddy County, New Mexico (Site). The spill site coordinates are N 32.81557°, W 103.99519°. The site location is shown on Figures 1 and 2.

Background

COG Operating has reported three spills at the facility and submitted the initial C-141 forms for each spill to the NMOCD. For this work plan, the spills will be referenced as Spill #1, #2 and #3. The approximate spill footprint areas are shown on Figure 3.

Spill #1

According to the State of New Mexico C-141 Initial Report, the leak was discovered on August 2, 2010, and released approximately sixty (60) barrels of produced water and four (4) barrels of crude oil. The spill was caused by a failed water pump and overflowed the water tanks. COG personnel repaired the pump and returned the tank to operation. Thirty (30) barrels of produced water and two (2) barrels of crude oil were recovered. The spill initiated at the battery and impacted the north side of the facility pad measuring approximately 100' x 110' and migrated south off the pad in the pasture measuring approximately 100' x 110'. The initial C-141 form is enclosed in Appendix A.



Spill #2

According to the State of New Mexico C-141 Initial Report, the leak was discovered on August 31, 2010, and released approximately one hundred (100) barrels of produced water. The spill was caused by a corroding 6" steel line which developed a hole. A new poly line was installed to replace the steel line. Ninety eight (98) barrels of produced water were recovered by the use of a vacuum truck. The spill initiated from the steel line located south of tank battery and fluids migrated south into the pasture measuring approximately 35' x 35'. The spill area encompassed part of the 1st spill footprint. The initial C-141 form is enclosed in Appendix A.

Spill #3

According to the State of New Mexico C-141 Initial Report, the leak was discovered on December 31, 2010, and released approximately one hundred and fifty (150) barrels of produced water. The spill was caused by a PVC adaptor freezing and cracking. Eighty (80) barrels of produced water were recovered by the use of a vacuum truck. The spill initiated at the tank battery and migrated off the pad impacting an area of approximately 8' x 100' and 40' x 150' overlapping the two previous spills in the pasture south of the tank battery. The initial C-141 form is enclosed in Appendix A.

Groundwater

No water wells were listed within Section 20. According to the NMOCD groundwater map, the average depth to groundwater in this area is approximately 250' 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 5,000 mg/kg.

Soil Assessment and Analytical Results Spill#1

Spill #1 and Spill #2

On August 10, 2010, Tetra Tech personnel inspected and sampled the spill area. A total of seven (7) auger holes (AH-1 through AH-7) 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 B. The sampling results are summarized in Table 1. The auger hole locations are shown on Figure 3.

Referring to Table 1, all the submitted samples were below RRAL for TPH and BTEX. Auger holes (AH-1, AH-2, AH-3, AH-4 and AH-7) were not vertically defined and showed elevated chloride concentrations of 4,320 mg/kg (9-9.5'), 4,120 mg/kg (7-7.5'), 9,530 mg/kg (5-5.5'), 1,070 mg/kg (9-9.5'), and 2,040 mg/kg (2.5-3') respectively. Auger holes (AH-5 and AH-6) did detect elevated chloride concentrations at surface and significantly declined with depth. In order to define the impact of the chloride concentrations, Tech Tetra installed boreholes using an air rotary drilling rig.

Prior to drilling the soil borings, the second spill occurred at the site. The footprint of the second spill overlapped a portion of the first spill in the pasture. The footprint of the second spill is shown on Figure 3. On November 17, 2010, Tetra Tech supervised the installation of soil borings. The soil boring samples were collected to a maximum depth of 30' below ground surface. The soil boring locations are shown on Figure 3. The sampling results are summarized in Table 1. The soil boring locations are shown on Figure 3. Referring to Table 1, the chloride impact was defined and significantly declined with depth at approximately 10.0' below surface.

Spill #3

On December 31, 2010, the third spill occurred at the site overlapping the first and second spill area in the pasture. On February 15, 2011, Tetra Tech installed additional soil borings. Tech personnel supervised the installation of five soil borings (SB-1 through SB-5) utilizing an air rotary drilling rig. The soil boring locations are shown on Figure 3. The sampling results are summarized in Table 1. The soil boring locations are shown on Figure 3. Referring to Table 1, the chloride impact declined with depth with chloride concentrations declining to 634 mg/kg at SB-1 (10.0'), 240 mg/kg at SB-2 (15.0') and 269 mg/kg at SB-3 (20.0').

Closure Activities

Based on the approved work plan, Tetra Tech personnel supervised the excavation of the site. For safety concerns, COG had moved two of the water tanks located along the east edge of the pad. The tanks were installed on the east side of the pad, which encompassed a portion of the spill area.

The final excavation depths of the soil remediation were met as stated in the approved work plan. The excavation depths are highlighted in Table 1 and shown on Figure 4. Once excavated to the appropriate depths, Tetra Tech collected confirmation samples from the pad and in the pasture area.



Referring to Table 1, all of the bottom hole confirmation samples collected on the pad showed that the maximum extent of chloride contamination was removed. The confirmation samples collected in the pasture showed elevated chloride concentrations present in the excavation bottoms at 7.0' and 10.0' below surface. Based on the data, the areas of AH-1, AH-2 and AH-3 were capped with a 40 mil liner at a depth of approximately 4.0' below surface. The areas of AH-4 and AH-7 on the pad were also capped with clay material at approximately 3.0' below surface. All of the excavated areas were backfilled with clean soil to grade. Approximately 2,100 cubic yards of soil were excavated and hauled to R360 for proper disposal.

Based on the remedial activities performed, COG request closure of the site. Copies of the C-141's (Finals) are included in Appendix A. If you have any questions or comments concerning the remedial activities, please call at (432) 682-4559.

Pat Ellis – COG Mike Burton – BLM

CC:

Respectfully submitted, TETRA TECH

4

Tke Tavarez PG Project Manager

FIGURES

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Drawn By: Isabel Mannolej



Drawn By: (sabel Marmolejo





Feet

30

EXPLANATION

- SPILL #1 AUGER HOLE SAMPLE LOCATIONS 0
- ⊕ LEAK SOURCE
- SPILL #1 SOIL BORING SAMPLE LOCATIONS 0
- SPILL #2 SOIL BORING SAMPLE LOCATIONS 0
- ۲ SOUTHWEST CENTRAL TANK BATTERY

× FENCE HEADER ----- STEEL LINE SPILL #1 SPILL #2 SPILL #3



Drawn By; Isabel Marmole

TABLES

C.	mala ID	Sample	Sample	Depth	Soi	I Status	л. П	2H (mg/l	(g)	Benzene	Toluene Ethlybenzene	Xylene	Chloride (ma/ka)	
Ja		Date	Depth (ft)	(BEB)	In-Situ	Removed	ĠRO	DRO	Total	(mg/kg)	(mg/kg)	(mg/kĝ)	(mg/kg)	Gilloride (iliging)
Pasture -	Spill 3 - Spill	Assessment	(Ov	erlappe	d Spills	1 and 2)								
	SB-1	2/15/11	0-1			X					2 2			8,780
	Liner		273°			X					and a let		18 - P . 43	3 190
			5	15.22		X		P. Start Start					2. Fr 3	 3,270
			是74代的	and the second	是是的。	× X								6,050
			10'		Х									639
			15'		X									<200
			20'		Х									<200
			25'		Х							- ·		<200
			30'		Х									<200
Pasture -	Spill 1 and Spil	12 - Assess	sment Data		<u> </u>									
	AH-1	8/10/10	0-1'		- · · .	X	<2.00	234	234	<0.0200	<0.0200	<0.0200	<0.0200	3,220
			1-1.5	100		. X					-		-	5,080
		"	2-2.5			X	· _ <	-	-	-		- 194	-	5,970
	Liner		3-3.5			X	-	· -	: - ·	-	-			12,100
	-		4-4.5'			X			-	-	-	- .	- ·	12,800
		11	5-5.5'			X	· -	-	-	-		-	1	13,700
		н	6-6.5			X			-		-		-	13,000
			7-7.5'		X		-	-	-	-	-	~	-	10,000
		"	8-8.5'		Х		-	-	-	-	-	-	-	7,010
		11	9-9.5'		Х	l	-	-	-	-	-	-	-	4,320
	SB-4	11/17/10	0-1'			X	<u>.</u>	: · _ ·	-	- ·	-	· ·		3,710
	Liner	"	3'			X	-	-,		-	-	-	-	2,080
		"	5'	·		X	-	· -	-	· -	-	-	-	8,930
		17	7		· .	X	-		-		-	-	-	11,300
		"	10'		Х		-	-	-	-	-	-	-	3,190
		17	15'		Х			-	-	-	-	-	-	302
		н	20'		Х		-	-	-	-	-	-	-	<200
		н	25'		Х		-	-	-	-	-	-	-	<200
		н	30'		Х		-	-	-	-	-	-	-	<200
CS-1 Sout	th Wall	2/28/13	-		X	1	-	-	-	-		-	-	<20.0
CS-1 East	Wall	н	-		X		-	-	-		-	-	-	215
CS-1 Wes	t Wall	н	-		X		-	-	-	-	-		-	105
CS-1 Bott	om Hole	"	7'		х		-	-	-	-	-	-	-	8,160

.

.

Sample ID		Sample	Sample	Sample Depth	Soil Status TPH (mg/kg)			Benzene	ne Ethlybenzene Xylene	Chloride (ma/ka)					
30	impie in	Date	Depth (ft)	(BEB)	In-Situ	Removed	GRO	DRO	Total	(mg/kg)	(mg/kg)	(mg/kg) (mg/kg) (mg/kg))	
Pasture	- Spill 3 - Spill	Assessment	(Overlap	ped Spil	ls 1 and 2)									
	SB-2	2/15/11	~~ 0-1 '		au Maria	5 X 945						the and the state of the state		8 320	
	Liner		3-2-1	1.00	11 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	X. 🛸							196	5,590	
			· [2] 5'			X		E.C.	10 10 10					5,700	
			» 7	and the second	C C York	× X		23	Constant of the second s				1.9 	5,520	
			10'	le and the stand best		х. <u>х</u>	2	23272				On the set		3,450	
			15'		Х									240	
			20'		Х									<200	
			25'		Х									281	
	-		30'		Х									245	
Pasture -	Spill 1 and Spi	2 - Asses	sment Data	:							· ·				
	AH-2	8/10/10	0-1'		·	X	<2.00	323	323	<0.0200	<0.0200	<0.0200	<0.0200	3,210	
			1-1.5'			X	•	-	• •	- ·	-	-		451	
			2-2.5			X		· -	·	-120	- ·	.	-	868	
	Liner		3-3.5'		<u> </u>	X	· · -	20 - 2	-	-	-	-		963	
		"	4-4.5'			X	-	-				-	-	2,790	
		n	5-5.5			·. X	-	÷ -	-	-		-		3,460	
		11	6-6.5	· · · · ·		X	-	-	1 - 1	•.511	-	-	-	2;940	
		"	7-7.5'			X	-	-	· - ·	-	-	-	-	4,120	
	SB-3	11/17/10	0-1'			X	-		- 1			-	-	3,340	
	Liner	"	3'			X	-	-	-		-	·	-	1,120	
		kτ	5'		5.9	X		-		• • . •	-	-	-	2,360	
		"	7			X	-		-	-	-	-	-	2,590	
		"	10'	., .		. X	-	-		-	-	• -	-	1,690	
		11	15'	1	X		-	-	-	-	-	-	-	<200	
		11	20'		X		-	-	-	-	-	-	-	<200	
		"	25'		X		-	-	-	-	-		-	<200	
CS-2 Nor	th Wall	3/1/13	-	[x	1	-	-	-	-	-	-	- 1	215	
CS-2 Sou	ith Wall	"	-	<u> </u>	X		-	- 1	-	-	-	-	-	210	
CS-2 Eas	t Wall	ਸ	-		x		-	-	- 1	-	-	-	-	653	
CS-2 Bot	tom Hole	"	10'	<u> </u>	X		-	- 1	-	-	-	-	-	4,300	

	Sample	Sample	Depth	Soi	l Status	्रा	PH (mg/k	(g)	Benzene Toluene	ene Ethlybenzene Xylene	Xylene	Chiorido (malka)	
Sample ID	Date	Depth (ft)	(BEB)	In-Situ	Removed	GRO	DRO	Total	(mg/kg)	(mg/kg)	(mg/kg)	, (mg/kg)	
Pasture - Spill 3 - Spill A	ssessment	(Ov	erlappe	d Spill 1	and 2)				•				
SB-3	2/15/11	0-1			X				REAL DA				11,800
Liner		3.4.4			X		2 Las		19. A.A.	5		1. S. S.	4,910
		5'			X		5	2			A Part of the Part	(<u>F</u> .	3;240.
		7 '**			X		1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1						9,690
	•	10		S. W. Sales	X X		Sec. 1		A State of the second	Sugar Star			4,090
		15'		Х									2,090
		20'		Х									269
		25'		Х									<200
		30'		Х				•••					<200
		40'		Х									<200
		50'		Х									<200
Pasture - Spill 1 and Spi	ll 2 - Asses	sment Data											
AH-3	8/10/10	0-1'			X	<10.0	3,020	3,020	<0.100	<0,100	<0.100	<0.100	1,220
	"	1-1.5'			X	-	-	-	-	-		-	1,590
	11	2-2.5		a ta a sa t	X		-		-	2 - .	-		4,980
Liner	17	3-3.5'			X	-		•	_	-	-	-	6,860
	"	4-4.5			X		· - `	-	-	-	-	-	7 740
	19	5-5.5'	I		X			-				-	9,530
SB-5	11/17/10	0-1'		1. 1910	X			<u> </u>	-		-	-	2,710
Liner	11	3'			X	· -	-		-	-	-	-	7,480
	11	5'		· .	X	· _		-	-		-	-	7,320
	14	. 7'			Х	· -	-		· · -	-	-	-	11,000
	11	10'			X		-	-			-	-	4,740
	11	15'		Х		-	-	-	-	-	-	-	3,880
	11	20'		Х		-	-	-	-		-	-	266
	ħ	25'		Х		-	-	-	-	-	-	-	<200
	11	30'		Х		~	-	-	-	-	-	-	205
CS-3 Southeast Wall	3/1/13	-		X		-	-	-	-	-	-	- 1	352
CS-3 East Wall	14	-		х		-	-	-	-	-	-	-	78.3
CS-3 West Wall	11	-		Х		-	-	-	-	-	-	-	308
CS-3 Bottom Hole	н	10'		Х		~	-	-	-	-	-	-	6,130

Table 1

COG Operating LLC. SOUTHWEST CENTRAL TANK BATTERY EDDY COUNTY, NEW MEXICO

	D Sample	Sample	Depth	Soi	I Status	1 a a la com	PH (mg/l	(g)	Benzene	Toluene	Ethlypenzene	Xylene	
	Date	Depth (ft)	(BEB)	In-Situ	Removed	GRO	DRO	Total	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	Chloride (mg/kg)
Pad Area - Spill 1 - Ass	essment Da	ta		÷	· · · · · · · · · · · · · · · · · · ·	4							
AH-4	8/10/10	0-1		1	X	<2.00	*<50:0	<50.0	<0.0200	<0.0200	<0.0200	<0.0200	8,740
	11	1-1:5		and a	📚 🛪 X. 😪						N. ZECEGI	19 19 19 18 S	☆ 3720
	11	2-2:5			X							5. 14. 2 S	3,500
	17	3-3[5]	1. A		₩ X 🔆			14.5		1.02 No.		and the	3,500
	11	4-4.5'		Х		-	-	-	-	-	-	-	1,490
	11	5-5.5'		Х		-	-	-	-	-	-	-	3,210
	U	6-6.5'		Х		~	-	-	-	-	-	-	1,220
	D.	7-7.5'		Х		-	-	-	-	-	-	-	559
	0	8-8.5'		X		-	-	-	-	-	-	-	640
		9-9.5'		X		-	-	-	-	-	-	-	1,070
SB-2	11/17/10	0-1		8	X	<u>,2</u> /			- 4 - 5 - 4	2			11 600
Clay	"	3.	1.18	0.84.52	X	in the second				1.02 104 			13 400
	U U	5'		X	Charles and a second	-	-	-	-	-	-	-	2,270
	"	7'		X		-	-	-	-	-	-	-	2,770
	"	10'	1	X		-	-	-	-	-	-		1,320
	11	15'		Х		-	-	-	-	-	-	-	<200
	"	20'		Х		-	-	-	-	-	-	-	<200
	18	25'		X		-	-	-	-	-	-	-	<200
CS-4 North Wall	3/8/13	-	r	X		-	-	-	-	-	-	-	364
CS-4 South Wall	"	-		X		-	-	-	-	-	-	-	3,740
CS-4 East Wall	"	-		X		-		-	- 1	-	-	-	2,490
CS-3 Bottom Hole	"	-		X		-	-	-	-	-	-	- 1	519
CS-4 West Wall	3/11/13	-		X		-	-	-	-	-	-	-	4,850

Completo	Sample	Sample	Depth	Soi	l Status	स्ट इ.स. १९४२	PH (mg/l	(g)	Benzene	Toluene	Ethlybenzene	Xylene	
Sample ID	Date	Depth (ft)	(BEB)	In-Situ	Removed	GRO	DRO	Total	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	Chioride (mg/kg)
Pad Area - Spill 1 - Asse	essment Da	ta			•				· · · · · · · · · · · · · · · · · · ·				
AH-5	8/10/10	; * 0-1'			* - X -	<2.00	<50.0	\$<50.0					7.900
	"	1-1.5'		Х		-	-	-	-	-	-	-	1,090
		2-2.5'		Х		~	-	-	-	-	-	-	255
	н	3-3.5'		Х		-		-	-	-	-	-	<200
ALLO	0/10/10	Constantine of		1.20.2020	an a	-0.00				1 			1.54 CAO- 12 TO
AU-0	0/10/10	1 1 5'		×			<50.0		<u> 1997 - 1997</u> 9	<u>11. 1834 (</u>	كالمشغشين الشرافي غيرا		209
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	"	7'		X		-	-	-	· -		-	-	2,930
	"	10'		X		· -	-	-	-	-	-	-	570
	11	15'		X		-	-	-	-	-	-	-	293
	11	20'		X		-	-	-	-	-	-	-	370
CS-5 North Wall	3/8/13	- 1		X		-	-	-	- 1	- 1	-	-	· 349
CS-5 East Wall	11	-		X		-	-	-	-	-	-	-	1,140
CS-5 West Wall	11	-		X		- 1	-	-	-	-	-	-	162
CS-5 Bottom Hole	"	-		Х		-	-	-	-	-	-	-	2,040
CS-5 South Wall	3/11/13	-		X		-	-	-	-	-	-	-	737

BEB Below Excavation Bottom

Not Analyzed

(---) Excavation Depths

Liner Installation

PHOTOGRAPHS



View South – Liner installation in area of AH-1 thru AH-3.

COG Operating LLC Southwest Central Tank Battery Eddy County, New Mexico



View Southwest – Excavation of AH-6.



View Northeast – Excavation of AH-5.

COG Operating LLC Southwest Central Tank Battery Eddy County, New Mexico



View Southwest – Excavation and clay cap installation in area of AH-7.



View South - Backfill of areas on pad.

APPENDIX A

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

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

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

Release Notification and Corrective Action

		OPERATOR	Initial Report	🛛 Final Report
Name of Company COG Operating	g LLC	Contact Pat Ellis		
Address 550 W. Texas, Suite 1300	Midland, Texas 79701	Telephone No. (432) 685-4332		
Facility Name Southwest Central T	ank Battery	Facility Type Tank Battery		
			· · · · · · · · · · · · · · · · · · ·	
Surface Owner: Federal	Mineral Owne	er	Lease No. NMNM	1-0467932

LOCATION OF RELEASE								
Unit Letter Sec O 2	ection 20	Township 17S	Range 30E	Feet from the	North/South Line	Feet from the	East/West Line	County Eddy

Latitude N 32.81578° Longitude W 103.99519°

NATURE OF RELEASE

Type of Release: Produced Water	Volume of Release 150 bbls	Volume Recovered 80 bbls oil
Source of Release: PVC adaptor at equalizer line	Date and Hour of Occurrence 12/31/2010	Date and Hour of Discovery 12/31/2010 7:00 a.m.
Was Immediate Notice Given?	If YES, To Whom?	
By Whom?	Date and Hour 01/30/2011 10:31	a.m.
Was a Watercourse Reached?	If YES, Volume Impacting the W N/A	RECEIVED
If a Watercourse was Impacted, Describe Fully.*		
N1/ A		
IN/A	NA	OCD ARTESIA
Describe Cause of Problem and Remedial Action Taken.*		
The PVC adaptor froze and cracked at the equalizer line behind the tanks. upgrading from PVC to plastic coated steel.	All the fittings have been replaced	and the tank battery is in the process of
Describe Area Affected and Cleanup Action Taken.*		
Tetra Tech inspected and assessed the spill area for extents. A work plan RRAL were removed and transported to proper disposal. Once excavated Tech prepared closure report and submitted to NMOCD for review.	was prepared and submitted to NMC to the appropriate depths, the excav	OCD for approval. Soils exceeding the ation was backfilled with clean soil. Tetra
I hereby certify that the information given above is true and complete to the	e best of my knowledge and unders	and that pursuant to NMOCD rules and
regulations all operators are required to report and/or file certain release no	bifications and perform corrective a	ctions for releases which may endanger
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 do federal, state, or local laws and/or regulations.	bes not relieve the operator of respon	sibility for compliance with any other
Maden	OIL CONSER	VATION DIVISION
Signature:		
Printed Name: Ike Tavarez (agent for COG)	Approved by District Supervisor:	
Title: Project Manager	Approval Date:	Expiration Date:
E-mail Address: ike.tavarez@tetratech.com	Conditions of Approval:	Attached
Date: 6.20-13 Phone: (432) 682-4559		

Phone: (432) 682-4559 * Attach Additional Sheets If Necessary

State of New Mexico Energy Minerals and Natural Resources

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

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

Release Notification and Corrective Action

	OPERATOR	Initial Report	🛛 Final Report
Name of Company COG Operating LLC	Contact Pat Ellis		
Address 550 W. Texas, Suite 1300 Midland, Texas 79701	Telephone No. (432) 685-4332		
Facility Name Southwest Central Tank Battery	Facility Type Tank Battery		

Surface Owner: Federal

Lease No. NMNM-0467932

LOCATION OF RELEASE

Mineral Owner

Unit Letter	Section	Township	Range	Feet from the	North/South Line	Feet from the	East/West Line	County	· · · · · · · · · · · · · · · · · · ·
О	20	17S	30E						Eddy

Latitude N 32.81578° Longitude W 103.99519°

NATURE OF RELEASE

Type of Release: Produced Water	Volume of Release 100 bbls	Volume Recovered 98 bbls oil
Source of Release: 6" steel line	Date and Hour of Occurrence	Date and Hour of Discovery
	08/31/2010	08/31/2010 5:00 a.m.
Was Immediate Notice Given?	If YES, To Whom?	-
Yes No Not Required	Terry C	Gregston –BLM
	Jim An	105-BLM
	Mike B	ratcher-OCD
By Whom?	Date and Hour 08/31/2010 5:24 r	o.m.
Was a Watercourse Reached?	If YES, Volume Impacting the Wa	atercourse.
TYes X No	N/A	
		DEARIVEN
If a Watercourse was Impacted, Describe Fully.*		REVENLD
N/A		AUG 2 3 2013
	1	NMOCD ARTESIA
Describe Cause of Problem and Remedial Action Taken.*		
Due to corrosion, a 6" steel water line developed a hole in it. A ¹ / ₂ inch pl	ug was installed to repair the line and	d a new, plastic coasted line is being
installed to replace the existing line.		
Describe Area Affected and Cleanup Action Taken.*		
1		
Tetra Tech inspected and assessed the spill area for extents. A work plan	was prepared and submitted to NMO	CD for approval. Soils exceeding the
RRAL were removed and transported to proper disposal. Once excavated	to the appropriate depths, the excava	tion was backfilled with clean soil Tetra
Tech prepared closure report and submitted to NMOCD for review	to the appropriate depuis, the execution	and was saekined whiterean son. Tena
I hereby certify that the information given above is true and complete to the	e best of my knowledge and underst	and that pursuant to NMOCD rules and
regulations all operators are required to report and/or file certain release po	tifications and perform corrective ac	and that pursuant to trimoce futes and
nublic health or the environment. The accentance of a $C_{-}1/1$ report by the	NMOCD marked as "Final Peport"	does not relieve the operator of lightlity
should their operations have foiled to adequately investigate and remediate	contemination that page a threat to	does not reneve the operator of hability
should then operations have faned to adequately investigate and remediate or the environment. In addition, NMOCD according of a C 141 report de	contamination that pose a tifeat to g	gibility for compliance water, numan nearm
for the environment. In addition, NWOCD acceptance of a C-141 report of	bes not reneve the operator of respon	sionity for compliance with any other
Teuerar, state, or locating ws and/or regulations.		
	<u>OIL CONSER</u>	VATION DIVISION
Signature:		
	Approved by District Supervisor:	
Printed Name: Ike Tavarez (agent for COG)		·
Title: Project Manager	Approval Date:	Expiration Date:
E-mail Address: ike.tavarez@tetratech.com	Conditions of Approval:	Attached
· · · · · · · · · · · · · · · · · · ·		Attached
Date: $12.7.1.13$ Phone: (432) 682-4559		

* Attach Additional Sheets If Necessary

Oil Conservation Division 1220 South St. Francis Dr. Santa Fe, NM 87505 Submit 2 Copies to appropriate District Office in accordance with Rule 116 on back side of form

Lease No. NMNM-0467932

Release Notification and Corrective Action

	OPERATOR	Initial Report	🛛 🛛 Final Report
Name of Company COG Operating LLC	Contact Pat Ellis		
Address 550 W. Texas, Suite 1300 Midland, Texas 79701	Telephone No. (432) 685-4332		
Facility Name Southwest Central Tank Battery	Facility Type Tank Battery		

Surface Owner: Federal

LOCATION OF RELEASE

Mineral Owner

Unit Letter Section Township Range Feet from the North/South Line Feet from the East/West Line County	
	/
O 20 17S 30E	Eddy

Latitude N 32.81578° Longitude W 103.99519°

NATURE OF RELEASE

Type of Release: Crude Oil and Produced Water	Volume of Release 4 bbls oil 60 bbls pw	Volume R	acovered 2 bbls oil 30 bbls pw		
Source of Release: Water Tank	Date and Hour of Occurrence	Date and H	Hour of Discovery		
	08/03/2010	08/03/2010	0 5:00 a.m.		
Was Immediate Notice Given?	If YES, To Whom? Mike Bratche	er-OCD			
By Whom?	Date and Hour 08/03/2010 3:16	p.m.	<u> </u>		
Was a Watercourse Reached?	If YES, Volume Impacting the W	atercourse.			
🗌 Yes 🛛 No	N/A				
		DECEN	VED		
If a Watercourse was Impacted, Describe Fully.*	j b		VED		
N/A		AUG 23	2013		
	1				
	l NI		RTESIA		
Describe Cause of Problem and Remedial Action Taken.*					
Produced water tanks ran over due to an inoperable water pump because of	of a blown fuse in the panel box. The	e electrical pro	blem has been repaired.		
Describe Area Affected and Cleanup Action Taken.*					
Tates Task inspected and accessed the spill area for extents. A work alon	was propored and submitted to NIM		ust Sails sussading the		
DDAL was assessed and assessed the spin area for extents. A work plan	was prepared and submitted to invite	JCD for appro	val. Sons exceeding the		
Tash proposed elegure removed and transported to proper disposal. Once excavated	to the appropriate depths, the excav	ation was back	chiled with clean soil. Tetra		
Tech prepared closure report and submitted to NMOCD for review.					
I haraby cartify that the information given above is true and complete to the	he heat of my knowledge and under	tond that pure	ant to NMOCD rules and		
requisitions all apareters are required to report and/or file contain release p	atifications and perform compating	stand that purst	and to NMOCD fulles and		
regulations an operators are required to report and/of the certain release in multiple health on the anning month. The accounting of a C 141 report by the	a NMOCD marked as "Eight Depart	schons for release	ases which may endanger		
public heard of the environment. The acceptance of a C-141 report by the	e NMOCD marked as Final Report	does not rene	eve the operator of hability		
should their operations have lated to adequately investigate and remediat	e contamination that pose a threat to	ground water,	surface water, numan nearth		
or the environment. In addition, NNOCD acceptance of a C-141 report d	oes not relieve the operator of respo	nsibility for co	mpliance with any other		
rederal, state, or local laws ind/or regulations.					
$/\Lambda$	<u>OIL CONSER</u>	<u>VATION</u>	DIVISION		
Signature:					
Approved by District Supervisor:					
Printed Name: Ike Tavarez (agent for COG)					
Title: Project Manager	Approval Date:	Expiration D	Date:		
E-mail Address: ike.tavarez@tetratech.com	Conditions of Approval:		Attached		
			Anacoeu 🛄		
Date: 6-20-15 Phone: (432) 682-4559	······				

* Attach Additional Sheets If Necessary

State of New Mexico Energy Minerals and Natural Resources

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



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

Release Notificati	ion and Co	rrective A	ction	ng ana ang ang ang ang ang ang ang ang a		
	OPERAT	OR	🛛 Initi	al Report 🔲 Final Repo		
Name of Company COG OPERATING LLC	Contact	Pa	nt Ellis			
Address 550 W. Texas, Suite 100, Midland, TX 79701	Telephone N	to. <u>432-</u>	230-0077			
Facility Name Southwest Central Tank Battery	Facinty Typ	e tani	CBattery			
Surface Owner Federal Mineral Owne	er		Lease M	lo. NMNM-0467932		
LOCATI	ON OF REL	LEASE				
Unit LetterSectionTownshipRangeFeet from theNoO2017S30E1000000000000000000000000000000000000	orth/South Line	Feet from the	East/West Line	County Eddy		
Latitude 32.8155	578 Longiti	ude 103.99519				
NATUR	RE OF RELI	EASE	······			
Type of Release Crude Oil and Produced Water	Volume of 4bbls of cri	Release ide oil	2 Volume 1	Recovered		
	60bbls of p	roduced water	30bbls of	produced water		
Source of Release Water tank	Date and H 08/02/2010	our of Occurrenc	e Date and 08/02/20	Hour of Discovery 10 5:00 a.m.		
Was Immediate Notice Given? X Yes No Not Requir	If YES, To red	Whom?	Mike Bratcher-C)CD		
By Whom? Josh Russo	Date and H	Date and Hour 08/03/2010 3:16 p.m.				
Was a Watercourse Reached?	If YES, Vo	lume Impacting t	he Watercourse.			
If a Watercourse was impacted Describe Fully *				n an		
Describe Cause of Problem and Remedial Action Taken.*						
Produced water tanks ran over due to an inoperable water pump becau	ise of a blown fus	e in the panel bo	x. The electrical pi	roblem has been repaired.		
Describe Area Affected and Cleanup Action Taken.*		-		· · · · · · · · · · · · · · · · · · ·		
Initially 4bbls of crude oil and 60bbls of produced water was released dimensions of the release was 15 yards x 65 yards on location, and 5 y condition and the impacted material has been disposed of appropriatel Sec.20-T17S-R30E, Eddy Co., NM, API # 30-015-29561). Tetra Tecl release and we will present a remediation work plan to the BLM/NMC	from the produce yards x 70 yards o ly. (The closest w h will sample the OCD for approval	d water tanks at t ff of the location vell location to the spill site area to o prior to any sign	he Southwest Cent The well pad has e release is the WD lelineate any possi ificant remediation	tral Tank Battery. The been returned to its original McIntyre "E" #4, Unit O, ble contamination from the work.		
I hereby certify that the information given above is true and complete regulations all operators are required to report and/or file certain releas public health or the environment. The acceptance of a C-141 report by should their operations have failed to adequately investigate and remeor the environment. In addition, NMOCD acceptance of a C-141 report federal, state, or local laws and/or regulations.	to the best of my se notifications at y the NMOCD m diate contamination ort does not reliev	knowledge and und perform correct arked as "Final R on that pose a thr e the operator of	nderstand that pur tive actions for rel eport" does not rel eat to ground wate responsibility for c	suant to NMOCD rules and eases which may endanger ieve the operator of liability r, surface water, human health compliance with any other		
Simon 21755	- #**	<u>OIL CON</u>	SERVATION	DIVISION		
Printed Name: Josh Russo	Approved by	District Supervis	or:	· · · ·		
Title: HSE Coordinator	Approval Dat	ie:	Expiration	Date:		
E-mail Address: jrusso@conchoresources.com	Conditions of	f Approval:		Attached		
Date: 08/13/2010 Phone: 432-212-2399						

State of New Mexico Energy Minerals and Natural Resources

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

Revised October 10, 2003

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

1220 S. St. Pfat	icis Dr., Sant	a re, nivi 8750:	, ,	Sa	inta F	Fe, NM 875	05					side of form
	A		Rel	ease Notific	catio	n and Co	orrective A	ction				
						OPERAT	FOR] Initis	al Report		Final Repor
Name of Co	ompany	COG OP	ERATIN	IG LLC		Contact	P	at Ellis	<u>y</u>			т пап керот
Address	550 W.	Texas. Suite	e 100, Mi	dland, TX 7970	1	Telephone N	No. 432-	230-0077				
Facility Na	me	Southwest C	entral Ta	ink Battery		Facility Typ	e Tan	k Battery				
Surface Ow	vner Fedo	eral		Mineral C	Owner				Lease N	lo. NMN	IM-04	67932
				LOCA	ATIC	N OF REI	LEASE					
Unit Letter	Section	Township	Range	Feet from the	Nort	h/South Line	Feet from the	East/We	st Line	County		
0	20	178	30E								Eddy	
L	- J		<u> </u>			~ ~ .	<u> </u>	1				
				Latitude 32.	81557	8 Longit	ude 103.99519					
,		· · · · · · · · · · · · · · · · · · ·		NAT	URI	COF REL	EASE					
Type of Rele	ease Produ	ced water			<u> </u>	Volume of	Release 100bbls	<u>s v</u>	/olume F	Recovered 9	98bbls	
5001CE OF K	Source of Release - 0 - Reef which the					08/31/2010)		08/31/201	10 8:00	a.m.	<i>{</i>
Was Immed	iate Notice	Given?	1			If YES, To	Whom?					
		X	Yes L	No Not R	equirec	1		Terry Greg	gstonE osBLI	slm M		
								Mike Brat	tcher—O	CD		
By Whom?	By Whom? Josh Russo Was a Watercourse Reached?					Date and I	lour 08/31/2010	5:24 p.	m.			
] Yes [>] No			name impacting		ourse.			
If a Waterco	urse was In	pacted. Deser	ibe Fully.	*								
Describe Ca	use of Prob	lem and Reme	dial Actic	on Taken.*								
Due to corro	sion, a 67 s	teel water line	develope	d a hole in it. A 1/2	inch p	lug was install	ed to repair the li	ne and a ne	ew, plasti	ic coated lir	ie is be	ing built to
		-					- <u>, , , , , , , , , , , , , , , , , , ,</u>					
Describe Ar	ea Affected	and Cleanup	Action Ta	ken.*								
Initially 100	bbls of prod	luced water wa	as release	d from the 6" stee	l line a	t the Southwest	t Central Tank Ba	attery. We	were abl	le to recove	r 98bbl	ls with a
vacuum truc	k. The fluid	flowed from	the steel l	ine, to behind the ID Moluture F #4	tank ba	ittery into the p	basture with the di	imensions	of the sp	ill area mea	suring	35' x 35'.
Tetra Tech v	vill sample	the spill site a	rea to deli	neate any possible	e conta	mination from	the release and w	e will pres	ent a ren	rediation w	ork pla	n to the
BLM/NMO	CD for appr	oval prior to a	ıny signifi	cant remediation	work.							
I hereby cert	tify that the	information g	iven abov	e is true and comp	olete to	the best of my	knowledge and u	inderstand	that purs	suant to NM	IOCD 1	rules and
regulations a	all operators	are required t	to report a	nd/or file certain	release	notifications a	nd perform correc	ctive action	ns for rel	eases which	i may e	endanger
should their	operations l	fronment. The have failed to	e acceptan adequatel	ce of a C-141 rep v investigate and i	ort by t cmedi:	he NMOCD m ate contaminati	arked as "Final R on that pose a thr	cport" doe	s not reli	ieve the ope	rator o ater hi	of liability uman health
or the enviro	onment. In	addition. NMC	DCD acce	ptance of a C-141	report	does not reliev	e the operator of	responsibi	lity for c	ompliance v	with an	iy other
federal, state	e, or local la	ws and/or reg	ulations.	R (1999)						DILLON	())]	
		って	>				<u>OIL CON</u>	SERVA	TION	DIVISI	<u> </u>	
Signature:		~ ·	$\stackrel{\cdot}{=}$									
Printed Nam	ne:	Josh	n Russo			Approved by	District Supervis	sor:				
Title			'a ord in at-	**		Anna and Da	•			Ð		
		HSE C	oorainato	ľ		Approval Da	ie:	Ex	piration	Date:		
E-mail Add	ress:	jrusso@con	choresour	ces.com		Conditions of	f Approval:			Attached	d []	
Date: 09/0'	7/2010	Phone:	432-212	-2399								

 Date:
 09/07/2010
 Phone:
 432

 * Attach Additional Sheets If Necessary

Ord Spill

State of New Mexico Energy Minerals and Natural Resources

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

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

Release Notification and Corrective Action

	OPERATOR	🛛 Initia	l Report 🔲 Final Repor
Name of Company COG OPERATING LLC	Contact	Pat Ellis	
Address 550 W. Texas, Suite 100, Midland, 7	X 79701 Telephone No. 4	432-230-0077	
Facility Name Southwest Central	Facility Type 1	Tank Battery	
Surface Owner Federal M	ineral Owner	Lease N	lo. NMNM-0467932

LOCATION OF RELEASE

Unit Letter N	Section 20	Township 17S	Range 30E	Feet from the	North/South Line	Feet from the	East/West Line	County Eddy

Latitude 32 48.908 Longitude 103 59.683

NATURE OF RELEASE

Type of Release Produced water	Volume of Release 150bbls	Volume Re	ecovered 80bbls			
Source of Release PVC adaptor at equalizer line	Date and Hour of Occurrence	Date and H	lour of Discovery			
	12/31/2010	12/31/2010) 7:00 a.m.			
Was Immediate Notice Given?	If YES, To Whom?					
Yes 🗌 No 🗌 Not Required	d Mike Bratcher—OCD					
	Terry	Gregston-BI	LM			
By Whom? Josh Russo	Date and Hour 01/03/2011 10:31 a.m.					
Was a Watercourse Reached?	If YES. Volume Impacting the Wa	tercourse.				
Yes 🛛 No						
If a Watercourse was Impacted, Describe Fully.*						
Describe Cause of Problem and Remedial Action Taken.*						
The DMC - bester from and an deal of the employee line line holid the trade	All Ettings have been nonlogg and th	a taul hattan	is in the process of uppending			
I he PVC adaptor troze and cracked at the equalizer line bening the tanks	s. All buings have been replace and th	ie tank battery	is in the process of upgrading			
an PVC to plastic coated steel.						
Describe Area Affected and Cleanup Action Taken *						
Bescribe Area Arietteu and Cleanup Action Taken.						
Initially 150 bbls was released from the cracked fitting behind the tanks a	nd we were able to recover 80bbls wit	h a vacuum tr	uck From the source the snill			
area measured 8' x 100' to the southeast and ended up 40' x 150' in the u	nasture. The closest well location to the	ie release is th	e W D. McIntyre E#4 API#			
30-015-29561 Tetra Tech will sample the spill site area to delineate any	nossible contamination from the relevant	ise and we wil	I present a remediation work			
plan to the NMOCD/BLM 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 underst	and that pursu	ant to NMOCD rules and			
regulations all operators are required to report and/or file certain release	notifications and perform corrective ad	tions for relea	ases which may endanger			
public health or the environment. The acceptance of a C-141 report by the	he NMOCD marked as "Final Report"	does not relie	we the operator of liability			
should their operations have failed to adequately investigate and remedia	te 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 respon	sibility for con	mpliance with any other			
federal, state, or local laws and/or regulations.	•	-				
	OIL CONSER	VATION I	DIVISION			
Signature:						
	Approved by District Supervisor:		,			
Printed Name: Josh Russo	· • • • • • • • • • • • • • • • • • • •					
Title: HSE Coordinator	Approval Date:	Expiration D	ate:			
E-mail Address: jrusso@conchoresources.com	Conditions of Approval:	1	Attached			
Date: 01/05/2011 Phone: 432-212-2399						

* Attach Additional Sheets If Necessary

APPENDIX B

•

Water Well Data Average Depth to Groundwater (ft) COG - Southwest Central Tank Battery Eddy County, New Mexico

6 5 4 7 8 9 18 17 1 19 20 2 110 29 2 30 29 2 31 32 2 6 5 4 7 8 9 18 17 1 19 20 2 30 29 210 20 20 2 30 29 210 30 29 210	4 9 16 21	3 10	2	1		_				o Lasi							
7 8 9 18 17 1 19 20 2 10 29 2 30 29 2 31 32 3 6 5 4 7 8 9 18 17 1 19 20 2 30 29 210	9 16 21	10				6	5	4	3	2	1	6	5	4	3	2	1
18 17 19 20 10 29 30 29 31 32 6 5 7 8 18 17 19 20 20 2	16 21		11	12	1	7	8	9	10	11	12	7	8	9	10	11	12
19 20 2 110 29 2 30 29 2 31 32 3 17 Sou 6 5 2 7 8 9 18 17 1 19 20 2 30 29 210	21	15	14	13	1	18	17	16	15	14	13	18	17 .	16	15	14	13
110 29 2 30 29 2 31 32 3 17 Sou 6 5 2 7 8 9 18 17 1 19 20 2 30 29 210		22	23	24		19	20	21	22	23	24	19	20	21	22	23	24
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30 29 2	28	27	26	25	1	30	29	28	27	26	25	30	29	28	27	26	25
31 32 3	33	34	35	36	1	31	32	33	34	35	36	31	32	33	34	35	36

New Mexico State Engineers Well Reports

USGS Well Reports

Geology and Groundwater Conditions in Southern Eddy, County, NM

NMOCD - Groundwater Data

Site Location - Southwest Central Tank Battery



New Mexico Office of the State Engineer Water Column/Average Depth to Water

No records found.

PLSS Search:

Section(s): 1-36

Township: 17S Range: 30E

The data is furnished by the NMOSE/ISC and is accepted by the recipient with the expressed understanding that the OSE/ISC make no warranties, expressed or implied, concerning the accuracy, completeness, reliability, usability, or suitability for any particular purpose of the data.

APPENDIX C

Summary Report

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

Report Date: March 15, 2013

Work Order: 13030828

Project Location:Eddy Co., NMProject Name:COG/SW Central TBProject Number:114-6400625

			Date	Time	Date
Sample	Description	Matrix	Taken	Taken	Received
322880	CS-1 (AH-1) South Wall	soil	2013-02-28	00:00	2013-03-08
322881	CS-1 (AH-1) East Wall	soil	2013-02-28	00:00	2013-03-08
322882	CS-1 (AH-1) West Wall	soil	2013-02-28	00:00	2013-03-08
322883	CS-1 (AH-1) Bottom Hole	soil	2013-02-28	00:00	2013-03-08

Sample: 322880 - CS-1 (AH-1) South Wall

Param	\mathbf{F} lag	Result	Units	RL
Chloride		<20.0	mg/Kg	4

Sample: 322881 - CS-1 (AH-1) East Wall

Param	Flag	Result	Units	RL
Chloride		215	mg/Kg	4

Sample: 322882 - CS-1 (AH-1) West Wall

Param	Flag	Result	Units	RL
Chloride		105	mg/Kg	4

Sample: 322883 - CS-1 (AH-1) Bottom Hole

TraceAnalysis, Inc. • 6701 Aberdeen Ave., Suite 9 • Lubbock, TX 79424-1515 • (806) 794-1296

Report Date: March 15, 2013		Work Order: 13030828	Pa	Page Number: 2 of 2	
Param	Flag	Result	Units	RL	
Chloride	μ	8160	mg/Kg	4	



Analytical and Quality Control Report

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

Report Date: March 15, 2013

Work Order: 13030828

Project Location:Eddy Co., NMProject Name:COG/SW Central TBProject Number:114-6400625

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
322880	CS-1 (AH-1) South Wall	soil	2013-02-28	00:00	2013-03-08
322881	CS-1 (AH-1) East Wall	soil	2013-02-28	00:00	2013-03-08
322882	CS-1 (AH-1) West Wall	soil	2013-02-28	00:00	2013-03-08
322883	CS-1 (AH-1) Bottom Hole	soil	2013-02-28	00:00	2013-03-08

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.

Michael al

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

Report Contents

Case Narrative	3
Analytical Report	4
Sample 322880 (CS-1 (AH-1) South Wall)	4
Sample 322881 (CS-1 (AH-1) East Wall)	4
Sample 322882 (CS-1 (AH-1) West Wall)	4
Sample 322883 (CS-1 (AH-1) Bottom Hole)	4
Method Blanks	6
()C Batch 00745 Method Blank (1)	6
$\mathbf{Q} \in \mathbf{Dation} \rightarrow \mathbf{M} \in \mathbf{M} \in \mathbf{M} \in \mathbf{M} \in \mathbf{M} \in \mathbf{M} \cap \mathbf{M} = \mathbf{M} \in \mathbf{M} \cap \mathbf{M} = \mathbf{M} \in \mathbf{M} \cap \mathbf{M} = \mathbf{M} \cap $	0
Laboratory Control Spikes	7
QC Batch 99745 - LCS (1)	7
$\overline{\text{QC}}$ Batch 99745 - MS (1)	7
Calibration Standards	8
OC Batch 99745 - CCV (1)	8
OC Batch 90745 - CCV (2)	2 2
QO Dation 50740 = OOV (2) =	Q
Appendix	9
Report Definitions	9
Laboratory Certifications	9
Standard Flags	9
Attachments	9

Case Narrative

Samples for project COG/SW Central TB were received by TraceAnalysis, Inc. on 2013-03-08 and assigned to work order 13030828. Samples for work order 13030828 were received intact at a temperature of 5.8 C.

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

		Prep	Prep	\mathbf{QC}	Analysis
Test	Method	Batch	Date	Batch	Date
Chloride (Titration)	SM 4500-Cl B	84430	2013-03-13 at 10:25	99745	2013-03-15 at 14:12

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 13030828 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: 13030828 COG/SW Central TB Page Number: 4 of 10 Eddy Co., NM

Analytical Report

Sample: 322880 - CS-1 (AH-1) South Wall

Laboratory: Analysis: QC Batch: Prep Batch:	Midland Chloride (Titration) 99745 84430	Analytic Date An Sample I	al Method: alyzed: Preparation:	SM 4500-Cl B 2013-03-15 2013-03-13	Prep Method: Analyzed By: Prepared By:	N/A AR AR
_			RL			
Parameter	Flag	Cert	Result	Units	Dilution	RL
Chloride	UU		<20.0	mg/Kg	5	4.00

Sample: 322881 - CS-1 (AH-1) East Wall

Laboratory: Analysis: QC Batch: Prep Batch:	Midland Chloride (Titration) 99745 84430	Analytic Date An Sample	cal Method: nalyzed: Preparation:	SM 4500-Cl B 2013-03-15 2013-03-13	Prep Method: Analyzed By: Prepared By:	N/A AR AR
			RL			
Parameter	\mathbf{Flag}	Cert	Result	Units	Dilution	\mathbf{RL}
Chloride			215	mg/Kg	5	4.00

Sample: 322882 - CS-1 (AH-1) West Wall

Laboratory: Analysis: QC Batch: Prep Batch:	Midland Chloride (Titration) 99745 84430		Analyt Date A Sample	ical Method: Analyzed: e Preparation:	SM 4500-Cl B 2013-03-15 2013-03-13	Prep Method: Analyzed By: Prepared By:	N/A AR AR
Parameter	F	lag	Cert	RL Result	Units	s Dilution	RL
Chloride				105	mg/Kg	g <u>5</u>	4.00

Report Date: March 15, 2013	Work Order: 13030828	Page Number: 5 of 10
114-6400625	COG/SW Central TB	Eddy Co., NM

Sample: 322883 - CS-1 (AH-1) Bottom Hole

Laboratory:	Midland					
Analysis:	Chloride (Titration)	Analytic	al Method:	SM 4500-Cl B	Prep Method:	N/A
QC Batch:	99745	Date An	alyzed:	2013-03-15	Analyzed By:	AR
Prep Batch:	84430	Sample 1	Preparation:	2013-03-13	Prepared By:	AR
			RL			
Parameter	Flag	Cert	Result	Units	Dilution	\mathbf{RL}
Chloride			8160	mg/Kg	10	4.00

Work Order: 13030828 COG/SW Central TB Page Number: 6 of 10 Eddy Co., NM

Method Blanks

Method Bla	ank (1)	QC Batch: 99745				
QC Batch: Prep Batch:	99 7 45 84430		Date Analyzed: QC Preparation:	2013-03-15 2013-03-13	Analyzed By: Prepared By:	AR AR
Parameter		Flag	Cert	MDL Result	Units	RL
Chloride				<3.85	mg/Kg	4

Work Order: 13030828 COG/SW Central TB Page Number: 7 of 10 Eddy Co., NM

Laboratory Control Spikes

Laboratory Control Spike (LCS-1)

QC Batch: 99745 Prep Batch: 84430			Dat QC	e Analyzeo Preparatio	l: 201 on: 201	3-03-15 3-03-13			An Pr	alyzed E epared B	y: AR y: AR
Param		F	С	LCS Result	Units	Dil.	Spike Amount	M F	fatrix lesult	Rec.	Rec. Limit
Chloride				2790	mg/Kg	1	2500	<	<3.85	112	85 - 115
Percent recovery is based on the	spike	resu	lt. RPI) is based	on the s	pike and sp	oike duplic	ate res	sult.		
Param	F	С	LCSI Resul) t Units	Dil.	Spike Amount	Matrix Result	Rec.	Rec. Limit	RPE	RPD Limit
Chloride			2640	mg/Kg	; 1	2500	<3.85	106	85 - 11	5 6	20
Matrix Spike (MS-1) Spike OC Batch: 99745	ed Sa	mple:	32288	5 e Analyzeo	l: 201	3-03-15			An	alvzed E	v: AR
Prep Batch: 84430			QC	Preparatio	on: 201	3-03-13			Pro	epared B	y: AR
				MS			Spike	Ma	trix		Rec.
Param		F	C	Result	Units	Dil.	Amount	Re	sult R	.ec.	Limit
Chloride				2780	mg/Kg	5	2500	2	10 1	.03 7	8.9 - 121
Percent recovery is based on the	spike	resu	lt. RPI) is based	on the sp	oike and sp	oike duplic	ate res	sult.		
			MSD			Spike	Matrix		Rec.		RPD
Param	\mathbf{F}	С	Result	Units	Dil.	Amount	Result	Rec.	Limit	RPD	Limit
Chloride			2640	mg/Kg	5	2500	210	97	78.9 - 12	1 5	20

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

Report Date:	March	15,	2013
114-6400625			

Work Order: 13030828 COG/SW Central TB Page Number: 8 of 10 Eddy Co., NM

Calibration Standards

Standard (CCV-1)

9

QC Batch:	99745			Date A	nalyzed: 2	013-03-15		Analy	zed By: AR
					CCVs True	CCVs Found	CCVs Percent	Percent Recovery	Date
Param		Flag	Cert	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Chloride				mg/Kg	100	100	100	85 - 115	2013-03-15

Standard (CCV-2)

QC Batch:	99745			Date A	analyzed: 2	013-03-15		Analy	zed By: AR
					CCVs True	CCVs Found	CCVs Percent	Percent Recovery	Date
Param		Flag	Cert	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Chloride				mg/Kg	100	100	100	85 - 115	2013-03-15

Work Order: 13030828 COG/SW Central TB Page Number: 9 of 10 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
С	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.
- 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

Work Order: 13030828 COG/SW Central TB 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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Please fill out all copies - Laboratory retains Yellow copy - Return Orginal copy to Tetra Tech - Project Manager retains Pink copy - Accounting receives Gold copy.

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Summary Report

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

Report Date: March 25, 2013

Work Order: 13031527

Project Location:Eddy Co., NMProject Name:COG/SW Central TBProject Number:114-6400625

			Date	Time	Date
Sample	Description	Matrix	Taken	Taken	Received
323555	CS-3 (AH-3) Southeast Wall	soil	2013-03-01	00:00	2013-03-15
323556	CS-3 (AH-3) East Wall	soil	2013-03-01	00:00	2013-03-15
323557	CS-3 (AH-3) West Wall	soil	2013-03-01	00:00	2013-03-15
323558	CS-3 (AH-3) Bottom Hole	soil	2013-03-01	00:00	2013-03-15

Sample: 323555 - CS-3 (AH-3) Southeast Wall

Param	Flag	Result	Units	RL
Chloride		352	mg/Kg	4

Sample: 323556 - CS-3 (AH-3) East Wall

Param	Flag	Result	Units	RL
Chloride		78.3	mg/Kg	4

Sample: 323557 - CS-3 (AH-3) West Wall

Param	Flag	Result	Units	RL
Chloride		308	mg/Kg	4

Sample: 323558 - CS-3 (AH-3) Bottom Hole

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Report Date: Marc	h 25, 2013	Work Order: 13031527		Page Number: 2 of 2		
Param	Flag	Result	Units	RL		
Chloride		6130	mg/Kg	4		



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: 13031527

Project Location:Eddy Co., NMProject Name:COG/SW Central TBProject Number:114-6400625

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
323555	CS-3 (AH-3) Southeast Wall	soil	2013-03-01	00:00	2013-03-15
323556	CS-3 (AH-3) East Wall	soil	2013-03-01	00:00	2013-03-15
323557	CS-3 (AH-3) West Wall	soil	2013-03-01	00:00	2013 - 03 - 15
323558	CS-3 (AH-3) Bottom Hole	soil	2013-03-01	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 11 pages and shall not be reproduced except in its entirety, without written approval of TraceAnalysis, Inc.

Michael Al

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

Report Contents

Case Narrative

Analytical Report Sample 323555 (CS-3 (AH-3) Southeast Wall) Sample 323556 (CS-3 (AH-3) East Wall) Sample 323557 (CS-3 (AH-3) West Wall) Sample 323558 (CS-3 (AH-3) Bottom Hole)	4 4 4 4
Method Blanks QC Batch 99925 - Method Blank (1)	6 6
Laboratory Control Spikes QC Batch 99925 - LCS (1) QC Batch 99926 - LCS (1) QC Batch 99925 - MS (1) QC Batch 99925 - MS (1) QC Batch 99926 - MS (1)	7 7 7 7 8
Calibration Standards QC Batch 99925 - CCV (1) QC Batch 99925 - CCV (2) QC Batch 99926 - CCV (1) QC Batch 99926 - CCV (1) QC Batch 99926 - CCV (2)	9 9 9 9 9
Appendix 1 Report Definitions 1 Laboratory Certifications 1 Standard Flags 1 Attachments 1	0. 0. 0. 0.

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Case Narrative

Samples for project COG/SW Central TB were received by TraceAnalysis, Inc. on 2013-03-15 and assigned to work order 13031527. Samples for work order 13031527 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.

		Prep	Prep	\mathbf{QC}	Analysis
Test	Method	Batch	Date	Batch	Date
Chloride (Titration)	SM 4500-Cl B	84647	2013-03-21 at 09:58	99925	2013-03-22 at 13:45
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 13031527.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: 13031527 COG/SW Central TB Page Number: 4 of 11 Eddy Co., NM

Analytical Report

Sample: 323555 - CS-3 (AH-3) Southeast Wall

Laboratory: Analysis: QC Batch: Prep Batch:	Midland Chloride (Titration) 99925 84647	Analytic Date An Sample I	al Method: alyzed: Preparation:	SM 4500-Cl B 2013-03-22 2013-03-21	Prep Method: Analyzed By: Prepared By:	N/A AR AR
_		~	RL	.		DI
Parameter	Flag	Cert	Result	Units	Dilution	RL
Chloride			352	mg/Kg	5	4.00

Sample: 323556 - CS-3 (AH-3) East Wall

Laboratory: Analysis: QC Batch: Prep Batch:	Midland Chloride (Titration) 99925 84647	Analytic Date An Sample l	al Method: alyzed: Preparation:	SM 4500-Cl B 2013-03-22 2013-03-21	Prep Method: Analyzed By: Prepared By:	N/A AR AR
			RL			
Parameter	Flag	Cert	Result	Units	Dilution	RL
Chloride			78.3	mg/Kg	5	4.00

Sample: 323557 - CS-3 (AH-3) West Wall

Laboratory:	Midland					
Analysis:	Chloride (Titration)	Analytic	al Method:	SM 4500-Cl B	Prep Method:	N/A
QC Batch:	99925	Date An	alyzed:	2013-03-22	Analyzed By:	AR
Prep Batch:	84647	Sample Preparation:		2013-03-21	Prepared By:	\mathbf{AR}
			RL			
Parameter	Flag	Cert	Result	Units	Dilution	\mathbf{RL}
Chloride			308	mg/Kg	5	4.00

Report Date: March 25, 2013	Work Order: 13031527	Page Number: 5 of 11
114-6400625	COG/SW Central TB	Eddy Co., NM

Sample: 323558 - CS-3 (AH-3) Bottom Hole

Chloride			6130	mg/Kg	10	4.00
Parameter	Flag	Cert	RL Result	Units	Dilution	\mathbf{RL}
Prep Batch:	84647	Sample 1	Preparation:	2013-03-21	Prepared By:	AR
QC Batch:	99926	Date An	alyzed:	2013-03-22	Analyzed By:	\mathbf{AR}
Analysis:	Chloride (Titration)	Analytic	al Method:	SM 4500-Cl B	Prep Method:	N/A
Laboratory:	Midland					

114-6400625		COG/SW	V Central TB
Method Bl	anks		
Method Blank (1)	QC Batch: 99925		
QC Batch: 99925		Date Analyzed:	2013-03-22

Report Date: March 25, 2013

Analyzed By: AR 2013-03-22 QC Preparation: 2013-03-22 Prep Batch: 84647 Prepared By: AR MDL Flag Parameter Cert Result Units RLmg/Kg Chloride <3.85 4 Method Blank (1) QC Batch: 99926 QC Batch: 99926 Date Analyzed: 2013-03-22 Analyzed By: AR Prep Batch: 84647 QC Preparation: Prepared By: AR 2013-03-21 ,

Work Order: 13031527

Page Number: 6 of 11

Eddy Co., NM

			MDL		
Parameter	\mathbf{Flag}	Cert	Result	Units	RL
Chloride			<3.85	mg/Kg	4

.

Work Order: 13031527 COG/SW Central TB Page Number: 7 of 11 Eddy Co., NM

Laboratory Control Spikes

Laboratory Control Spike (LCS-1)

QC Batch: 99925 Prep Batch: 84647			Dat QC	e Analyzec Preparatic	l: 2013 on: 2013	3-03-22 3-03-21			An Pre	alyzed B epared B	y: AR y: AR
D		n	a	LCS	TT	D:1	Spike	M	atrix	D	Rec.
Chlorido		F	_ <u>C</u>	Result 2750	Units wg/Kg		2500		2 <u>85</u>	$\frac{\text{Rec.}}{110}$	$\frac{111111}{85 - 115}$
				2700	I	.1 .1	2000		1,	110	00 - 110
Percent recovery is based on	the spike	resu	lt. RPL) is based (on the sp	orke and sp	nke duplica	ate res	uit.		
			LCSD	•		Spike	Matrix		Rec.		RPD
Param	\mathbf{F}	С	Result	Units	Dil.	Amount	Result	Rec.	Limit	RPD	Limit
Chloride			2560	mg/Kg	1	2500	<3.85	102	85 - 11	5 7	20
Laboratory Control Spike	e (LCS-1	.)	Dat	e Analyzec	: 201;	3-03-22			An	alvzed B	v: AR
Prep Batch: 84647			QC	Preparatio	on: 2013	3-03-21	Casilar	٦Æ	Pre	pared B	y: AR
Daram		F	C	LOS Recult	Unite	, Dil	Amount	IVI R		Rog	nec. Limit
Chloride		1.		2680	mø/Kø	1	2500		3 85	107	$\frac{11111}{85 - 115}$
Percent recovery is based on	the spike	resu	lt. RPI) is based of	on the sp	oike and sp	ike duplica	ite resi	ilt.	101	
Param	F	С	Regult	Unite	Dil	anga A mount	Result	Bec	Limit	מממ	
1 WE WITH						AUGUIU				nr.,	Limit

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

Matrix Spike (MS-1) Spiked Sample: 323557

QC Batch:	99925	Date Analyzed:	2013-03-22	Analyzed By:	\mathbf{AR}
Prep Batch:	84647	QC Preparation:	2013-03-21	Prepared By:	\mathbf{AR}

Report Date: March 25, 2013 114-6400625		Work Order: 13031527 COG/SW Central TB						Page Number: 8 of 11 Eddy Co., NM				
Param		F	С	MS Result	Units	Dil.	Spike Amount	M R	atrix esult	Rec.] I	Rec. Jimit
Chloride				2830	mg/Kg	5	2500		308	101	78.	9 - 121
Percent recovery is based on the a	spike	e rest	ilt. RPI) is based	on the s	pike and s	spike dupli	cate re	esult.			
Param	F	С	MSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	Re Lin	e. iit	RPD	RPD Limit
Chloride			2880	mg/Kg	5	2500	308	103	78.9 -	121	2	20
Matrix Spike (MS-1) Spike QC Batch: 99926 Prep Batch: 84647	d Sa	mple	:: 323567 Dat QC	7 e Analyze Preparati	d: 201 on: 201	.3-03-22 .3-03-21				Analy Prepa	zed By: red By:	AR AR
Param		F	С	MS Result	Units	Dil.	Spike Amount	M Re	atrix esult	Rec.	I L	Rec.
Chloride				7290	mg/Kg	10	2500	4	850		78.9	9 - 121
Percent recovery is based on the s	spike	resi	ılt. RPI) is based	on the s	pike and s	pike duplie	cate re	sult.			
			MSD			Spike	Matrix		Re	e.		RPD
Param	F	С	Result	Units	Dil.	Amount	Result	Rec.	Lin	nit	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.

Work Order: 13031527 COG/SW Central TB Page Number: 9 of 11 Eddy Co., NM

Calibration Standards

Standard (CCV-1)

QC Batch:	99925			Date A	nalyzed: 2	013-03-22		Analy	zed By: AR
_			-		CCVs True	CCVs Found	CCVs Percent	Percent Recovery	Date
Param		Flag	Cert	\mathbf{Units}	Conc.	Conc.	Recovery	Limits	Analyzed
Chloride				mg/Kg	100	99.8	100	85 - 115	2013-03-22

Standard (CCV-2)

QC Batch: 99925				Date A	malyzed:	2013-03-22	Analyzed By: Al			
					CCVs	CCVs	CCVs	Percent		
					True	Found	Percent	Recovery	Date	
Param		Flag	Cert	Units	Conc.	Conc.	Recovery	Limits	Analyzed	
Chloride				mg/Kg	100	100	100	85 - 115	2013-03-22	

Standard (CCV-1)

QC Batch:	99926			Date A	malyzed:	2013-03-22		Analy	zed By: AR
					CCVs	CCVs	CCVs	Percent	
					True	Found	Percent	Recovery	Date
Param		Flag	Cert	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Chloride				mg/Kg	100	99.3	99	85 - 115	2013-03-22

Standard (CCV-2)

QC Batch:	99926			Date Analyzed: 201				Analy	Analyzed By: AR		
					CCVs True	CCVs Found	CCVs	Percent Recovery	Date		
Param		Flag	Cert	Units	Conc.	Conc.	Recovery	Limits	Analyzed		
Chloride				mg/Kg	100	101	101	85 - 115	2013-03-22		

Work Order: 13031527 COG/SW Central TB Page Number: 10 of 11 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
С	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

Work Order: 13031527 COG/SW Central TB Page Number: 11 of 11 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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								-				(Circ	ANA le or	LYSI Spe	S Ri cify	EQUE Meti	EST 10d i	No.)				
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Summary Report

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

Report Date: March 15, 2013

Work	Order:	13030829

Project Location:Eddy Co., NMProject Name:COG/SW Central TBProject Number:114-6400625

			Date	Time	Date
Sample	Description	Matrix	Taken	Taken	Received
322884	CS-2 (AH-2) North Wall	soil	2013-03-01	00:00	2013-03-08
322885	CS-2 (AH-2) South Wall	soil	2013-03-01	00:00	2013-03-08
322886	CS-2 (AH-2) East Wall	soil	2013-03-01	00:00	2013-03-08
322887	CS-2 (AH-2) Bottom Hole	soil	2013-03-01	00:00	2013-03-08

Sample: 322884 - CS-2 (AH-2) North Wall

Param	Flag	Result	Units	RL
Chloride		215	mg/Kg	4

Sample: 322885 - CS-2 (AH-2) South Wall

Param	\mathbf{Flag}	Result	Units	RL
Chloride		210	mg/Kg	4

Sample: 322886 - CS-2 (AH-2) East Wall

Param	\mathbf{F} lag	\mathbf{Result}	Units	RL
Chloride		653	mg/Kg	4

Sample: 322887 - CS-2 (AH-2) Bottom Hole

TraceAnalysis, Inc. • 6701 Aberdeen Ave., Suite 9 • Lubbock, TX 79424-1515 • (806) 794-1296

Report Date: Marc	h 15, 2013	Work Order: 13030829	F	Page Number: 2 of 2
Param	Flag	Result	Units	RL
Chloride	<u> </u>	4300	mg/Kg	4

TraceAnalysis, Inc. • 6701 Aberdeen Ave., Suite 9 • Lubbock, TX 79424-1515 • (806) 794-1296



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 15, 2013

Work Order: 13030829

Project Location:Eddy Co., NMProject Name:COG/SW Central TBProject Number:114-6400625

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
322884	CS-2 (AH-2) North Wall	soil	2013-03-01	00:00	2013-03-08
322885	CS-2 (AH-2) South Wall	soil	2013-03-01	00:00	2013-03-08
322886	CS-2 (AH-2) East Wall	soil	2013-03-01	00:00	2013-03-08
322887	CS-2 (AH-2) Bottom Hole	soil	2013-03-01	00:00	2013-03-08

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

Michael

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

Report Contents

Case Narrative	3
Analytical Report	4
Sample 322884 (CS-2 (AH-2) North Wall)	4
Sample 322885 (CS-2 (AH-2) South Wall)	4
Sample 322886 (CS-2 (AH-2) East Wall)	4
Sample 322887 (CS-2 (AH-2) Bottom Hole)	4
Method Blanks	6
QC Batch 99745 - Method Blank (1)	6
QC Batch 99746 - Method Blank (1)	6
Laboratory Control Spikes	7
QC Batch 99745 - LCS (1)	7
QC Batch 99746 - LCS (1)	7
QC Batch 99745 - MS (1)	7
\overrightarrow{QC} Batch 99746 - MS (1)	8
Calibration Standards	9
QC Batch 99745 - CCV (1)	9
QC Batch 99745 - CCV (2)	9
QC Batch 99746 - CCV (1)	9
\overrightarrow{QC} Batch 99746 - CCV (2)	9
Appendix	10
Report Definitions	10
Laboratory Certifications	10
Standard Flags	10
Attachments	10

Case Narrative

Samples for project COG/SW Central TB were received by TraceAnalysis, Inc. on 2013-03-08 and assigned to work order 13030829. Samples for work order 13030829 were received intact at a temperature of 5.8 C.

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

		Prep	Prep	\mathbf{QC}	Analysis
Test	Method	Batch	Date	Batch	Date
Chloride (Titration)	SM 4500-Cl B	84430	2013-03-13 at 10:25	99745	2013-03-15 at 14:12
Chloride (Titration)	SM 4500-Cl B	84430	2013-03-13 at 10:25	99746	2013-03-15 at 14:13

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 13030829 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: 13030829 COG/SW Central TB Page Number: 4 of 11 Eddy Co., NM

Analytical Report

Sample: 322884 - CS-2 (AH-2) North Wall

Laboratory: Analysis: QC Batch: Prep Batch:	Midland Chloride (Titration) 99745 84430	Analyti Date A Sample	cal Method: nalyzed: Preparation:	SM 4500-Cl B 2013-03-15 2013-03-13	Prep Method: Analyzed By: Prepared By:	N/A AR AR
Paramotor	Fluo	Cort	RL Besult	Unite	Dilution	RI.
Chloride	1 105		215	mg/Kg	5	4.00

Sample: 322885 - CS-2 (AH-2) South Wall

Laboratory: Analysis: QC Batch: Prep Batch:	aboratory: Midland analysis: Chloride (Titration) QC Batch: 99745 Prep Batch: 84430		Analytical M Date Analyz Sample Prep	fethod: ed: paration:	SM 4500-Cl 1 2013-03-15 2013-03-13	В	Prep Method: Analyzed By: Prepared By:	N/A AR AR
				RL				
Parameter	\mathbf{F}	lag	Cert	Result	Ur	nits	Dilution	\mathbf{RL}
Chloride				210	ing/	Kg	5	4.00

Sample: 322886 - CS-2 (AH-2) East Wall

Laboratory: Analysis: QC Batch: Prep Batch:	aboratory: Midland nalysis: Chloride (Titration) C Batch: 99746 rep Batch: 84430		rtical Method: Analyzed: le Preparation:	SM 4500-Cl B 2013-03-15 2013-03-13	Prep Method: Analyzed By: Prepared By:	N/A AR AR
Parameter	Flag	Cert	RL Result	Units	Dilution	\mathbf{RL}
Chloride			653	mg/Kg	5	4.00

Report Date: March 15, 2013	Work Order: 13030829	Page Number: 5 of 11
114-6400625	COG/SW Central TB	Eddy Co., NM

Sample: 322887 - CS-2 (AH-2) Bottom Hole

Chloride			4300	mg/Kg	10	4.00
Parameter	Flag	Cert	RL Result	Units	Dilution	\mathbf{RL}
Prep Batch: 84430		Sample 1	Preparation:	2013-03-13	Prepared By:	AR
QC Batch:	99746	Date An	alyzed:	2013-03-15	Analyzed By:	AR
Analysis:	Chloride (Titration)	Analytic	al Method:	SM 4500-Cl B	Prep Method:	N/A
Laboratory:	Midland					

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Report Date: March 14 114-6400625	5, 2013	Work Ord COG/SW	ler: 13030829 7 Central TB		Page Number: 6 of 1 Eddy Co., NM			
Method B								
Method Blank (1)	QC Batch: 99745							
QC Batch: 99745 Prep Batch: 84430		Date Analyzed: QC Preparation:	2013-03-15 2013-03-13		Analyzed By: Prepared By:	AR AR		
Parameter	Flag	Cert		MDL Result	Units	RL		
Chloride				<3.85	mg/Kg	4		
Method Blank (1)	QC Batch: 99746							
QC Batch: 99746 Prep Batch: 84430		Date Analyzed: QC Preparation:	2013-03-15 2013-03-13		Analyzed By: Prepared By:	AR AR		
Parameter	Flag	Cert		MDL Result	Units	\mathbf{RL}		
Chloride				<3.85	mg/Kg	4		

Work Order: 13030829 COG/SW Central TB

Page Number: 7 of 11 Eddy Co., NM

Laboratory Control Spikes

Laboratory Control Spike (LCS-1)

QC Batch: Prep Batch:	99745 84430			Dat QC	e Analyzec Preparatic	: 2013 on: 2013	3-03-15 3-03-13			Ana Pre	ulyzed Bj pared B [,]	y: AR y: AR
•				·								
					LCS			Spike	М	latrix		Rec.
Param			\mathbf{F}	С	Result	Units	Dil.	Amount	R	esult l	Rec.	Limit
Chloride	·····				2790	mg/Kg	1	2500	<	3.85	112	85 - 115
Percent recov	very is based on th	e spike	resu	lt. RPI) is based o	on the sp	oike and sp	ike duplica	ate res	ult.		
				LCSD	I		Spike	Matrix		Rec.		RPD
Param		\mathbf{F}	С	Result	Units	Dil.	Amount	Result	Rec.	Limit	RPD	Limit
Chloride				2640	mg/Kg	1	2500	<3.85	106	85 - 115	6	20
Laboratory	Control Spike (LCS-1)									
QC Batch:	99746			Date	e Analyzed	: 2013	3-03-15			Ana –	lyzed By	7: AR
Prep Batch:	84430			QC	Preparatio	n: 2013	3-03-13			Prej	pared By	\sim AR.
					LCS			Spike	М	atrix		Rec.
Param			F	С	Result	Units	Dil.	Amount	R	esult H	lec.	Limit
Chloride					2650	mg/Kg	1	2500	<	3.85	106	35 - 115
Percent recov	ery is based on the	e spike	resu	lt. RPD	is based o	on the sp	vike and sp	ike duplica	te res	ult.		
				LCSD			Spike	Matrix		Rec.		RPD
Param		\mathbf{F}	\mathbf{C}	Result	Units	Dil.	Amount	Result	Rec.	Limit	RPD	Limit
Chloride				2460	mg/Kg	1	2500	<3.85	98	85 - 115	7	20

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

QC Batch:	99745	Date Analyzed:	2013-03-15	Analyzed By:	\mathbf{AR}
Prep Batch:	84430	QC Preparation:	2013-03-13	Prepared By:	AR

Report Date: March 15, 2013 114-6400625			Work Order: 13030829 COG/SW Central TB						Page Number: 8 of 11 Eddy Co., NM			
				MS			Spike	Ma	atrix			Rec.
Param		F	C	Result	Units	Dil.	Amount	Re	esult	Rec.	I	.imit
Chloride				2780	mg/Kg	5	2500	2	210	103	78.	9 - 121
Percent recovery is based on the s	pike	rest	ılt. RPI) is based	on the s	spike and s	spike dupli	cate re	sult.			
			MSD			Spike	Matrix		Ro	0		RPD
Param	F	\mathbf{C}	Result	Units	Dil	Amount	Result	Rec.	Lin	nit.	RPD	Limit
Chloride			2640	mg/Kg	5	2500	210	97	78.9 -	121	5	$\frac{20}{20}$
Percent recovery is based on the s				_								
Percent recovery is based on the s Matrix Spike (MS-1) Spiked QC Batch: 99746 Prep Batch: 84430	l Sai	mple	: 322885 Dat QC	7 e Analyze Preparati	d: 201 on: 201	13-03-15 13-03-13				Analy Prepa	zed By red By:	AR AR
Percent recovery is based on the s Matrix Spike (MS-1) Spiked QC Batch: 99746 Prep Batch: 84430 Param	l Sa	mple	: 322885 Dat QC C	7 e Analyze Preparati MS Result	d: 201 on: 201 Units	13-03-15 13-03-13 Dil.	Spike Amount	Ma Ro	atrix csult	Analy Prepa Rec.	zed By red By	AR AR Rec.
Percent recovery is based on the s Matrix Spike (MS-1) Spiked QC Batch: 99746 Prep Batch: 84430 Param <u>Chloride</u>	l Sa	mple	: 322887 Dat QC C	7 Preparati MS Result 6640	d: 201 on: 201 Units mg/Kg	13-03-15 13-03-13 Dil. 10	Spike Amount 2500	Ma Ro 4	atrix sult 300	Analy Prepa Rec. 94	zed By red By I 78.	AR. AR. Sec. Jimit 9 - 121
Percent recovery is based on the s Matrix Spike (MS-1) Spiked QC Batch: 99746 Prep Batch: 84430 Param <u>Chloride</u> Percent recovery is based on the s	l Sa	nple F resu	: 322887 Dat QC C	7 e Analyze Preparati MS Result 6640 D is based	d: 201 on: 201 Units mg/Kg on the s	13-03-15 13-03-13 Dil. 10 spike and s	Spike Amount 2500 spike duplic	Ma Rc 4: cate re	atrix sult 300 sult.	Analy Prepa Rec. 94	zed By red By I 78.	AR AR Rec. .imit 9 - 121
Percent recovery is based on the s Matrix Spike (MS-1) Spiked QC Batch: 99746 Prep Batch: 84430 Param <u>Chloride</u> Percent recovery is based on the s	l Sa pike	mple F resu	: 322887 Dat QC C Ilt. RPI MSD	7 Preparati MS <u>Result</u> 6640 D is based	d: 201 on: 201 Units mg/Kg on the s	13-03-15 13-03-13 Dil. 10 spike and s Spike	Spike Amount 2500 pike duplic Matrix	Ma Ro 4 cate re	atrix sult 300 sult. Re	Analy Prepa Rec. 94 c.	zed By red By I 78.	AR AR Rec. <u>.imit</u> 9 - 121 RPD
Percent recovery is based on the s Matrix Spike (MS-1) Spiked QC Batch: 99746 Prep Batch: 84430 Param <u>Chloride</u> Percent recovery is based on the s Param	l Sa pike	mple F resu	: 322887 Dat QC C Ilt. RPI MSD Result	7 Preparati MS Result 6640 D is based Units	d: 201 on: 201 Units mg/Kg on the s Dil.	13-03-15 13-03-13 Dil. 10 spike and s Spike Amount	Spike Amount 2500 pike duplio Matrix Result	Ma Ro 4: cate re Rec.	atrix sult 300 sult. Re Lin	Analy Prepa Rec. 94 c. uit	zed By red By I 78. RPD	AR AR cimit 9 - 121 RPD Limit

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

Work Order: 13030829 COG/SW Central TB Page Number: 9 of 11 Eddy Co., NM

Calibration Standards

Standard (CCV-1)

QC Batch:	99745			Date A	.nalyzed: 2	013-03-15		Analy	zed By: AR
					CCVs True	CCVs Found	CCVs Percent	Percent Recovery	Date
Param		Flag	Cert	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Chloride				mg/Kg	100	100	100	85 - 115	2013-03-15

Standard (CCV-2)

QC Batch:	99745			Date A	analyzed: 2	013-03-15		zed By: AR	
					CCVs	$\rm CCVs$	CCVs	Percent	
					True	Found	Percent	Recovery	Date
Param		\mathbf{F} lag	Cert	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Chloride				mg/Kg	100	100	100	85 - 115	2013-03-15

Standard (CCV-1)

QC Batch:	99746			Date A	Analyzed: 2	013-03-15		zed By: AR	
					CCVs	CCVs	CCVs	Percent	
					True	Found	Percent	Recovery	Date
Param		Flag	Cert	\mathbf{Units}	Conc.	Conc.	Recovery	Limits	Analyzed
Chloride				mg/Kg	100	99.8	100	85 - 115	2013-03-15

Standard (CCV-2)

QC Batch:	99746			Date A	Analyzed: 2	2013-03-15		Analy	zed By: AR
					CCVs True	CCVs Found	CCVs Percent	Percent Recovery	Date
Param		Flag	Cert	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Chloride				mg/Kg	100	100	100	85 - 115	2013-03-15

Work Order: 13030829 COG/SW Central TB Page Number: 10 of 11 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
С	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

-

Work Order: 13030829 COG/SW Central TB Page Number: 11 of 11 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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									ANALYSIS REQUES ((Circle or Specify Method No.)																		
				IJĘ	1910 N. Big Midland, Tex (432) 682-4559	TÈCH Spring St. (as 79705 • Fax (432) 682-3946								05 (Ext. to C35)		d Cr Pb Hg Se cr Vr Pd Hg Se									TDS		
CLIENT NAM	AE:				SITE MANAGE		ERS		P	RES	ERV			TX10		Ba C Ba C			0/624	70/625					, pH		
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Please fill out all copies - Laboratory retains Yellow copy - Return Orginal copy to Tetra Tech - Project Manager retains Pink copy - Accounting receives Gold copy. .

:
Summary Report

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

Report Date: March 25, 2013

Work Order: 13031529

Project Location:Eddy Co., NMProject Name:COG/SW Central TBProject Number:114-6400625

			Date	Time	Date
Sample	Description	Matrix	Taken	Taken	Received
323563	CS-4 (AH-4) North Wall	soil	2013-03-08	00:00	2013-03-15
323564	CS-4 (AH-4) South Wall	soil	2013-03-08	00:00	2013-03-15
323565	CS-4 (AH-4) East Wall	soil	2013-03-08	00:00	2013-03-15
323566	CS-4 (AH-4) Bottom hole	soil	2013-03-08	00:00	2013-03-15
323567	CS-4 (AH-4) West Wall	soil	2013-03-11	00:00	2013-03-15
323568	CS-5 (AH-7) North Wall	soil	2013-03-08	00:00	2013-03-15
323569	CS-5 (AH-7) East Wall	soil	2013-03-08	00:00	2013-03-15
323570	CS-5 (AH-7) West Wall	soil	2013-03-08	00:00	2013-03-15
323571	CS-5 (AH-7) Bottom hole	soil	2013-03-08	00:00	2013 - 03 - 15
323572	CS-5 (AH-7) South Wall	soil	2013-03-11	00:00	2013-03-15

Sample: 323563 - CS-4 (AH-4) North Wall

Param	Flag	Result	Units	RL
Chloride		364	mg/Kg	4

Sample: 323564 - CS-4 (AH-4) South Wall

Param	Flag	Result	Units	RL
Chloride		3740	mg/Kg	4

Sample: 323565 - CS-4 (AH-4) East Wall

TraceAnalysis, Inc. • 6701 Aberdeen Ave., Suite 9 • Lubbock, TX 79424-1515 • (806) 794-1296

Report Date: March 25, 2013		Work Order: 13031529	Page Number: 2 of 2		
Param	Flag	Result	Units	\mathbf{RL}	
Chloride		2490	mg/Kg	4	
Sample: Param Chloride	: 323566 - CS-4 (AH-4) Bottom Flag	hole Result 519	Units mg/Kg	RL 4	
Sample:	: 323567 - CS-4 (AH-4) West W	all			
Param	Flag	Result	Units	RL	
Chloride		4850	mg/Kg	4	
Sample:	: 323568 - CS-5 (AH-7) North V	Vall			
Param	Flag	Result	Units	RL	
Chloride		349	mg/Kg	4	
Sample:	: 323569 - CS-5 (AH-7) East Wa	all			
Param	Flag	Result	Units	RL	
Chloride		1140	mg/Kg	4	
Sample:	: 323570 - CS-5 (AH-7) West W	all			
Param	Flag	Result	Units	RL	
Chloride		162	mg/Kg	4	
Sample:	: 323571 - CS-5 (AH-7) Bottom	hole			
Param	Flag	Result	Units	RL	
Chloride		2040	mg/Kg	4	
Sample:	323572 - CS-5 (AH-7) South V	Vall			
Param	Flag	Result	Units	RL	
Chloride		737	mg/Kg	4	

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(BioAduatic) 2501 Mayes Ro., Suite 100

Carroliton,

Texas 79703 Texas 75006

E-Mail: lab@traceanalysis.com WEB: www.traceanalysis.com

Certifications

DoD LELAP **NCTRCA** NELAP ISO 17025 WBE HUB DBE Kansas Oklahoma

Analytical and Quality Control Report

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

Report Date: March 25, 2013

Work Order: 13031529

972-242-7750

Project Location: Eddy Co., NM COG/SW Central TB **Project Name:** Project Number: 114-6400625

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
323563	CS-4 (AH-4) North Wall	soil	2013-03-08	00:00	2013-03-15
323564	CS-4 (AH-4) South Wall	soil	2013-03-08	00:00	2013-03-15
323565	CS-4 (AH-4) East Wall	soil	2013-03-08	00:00	2013-03-15
323566	CS-4 (AH-4) Bottom hole	soil	2013-03-08	00:00	2013-03-15
323567	CS-4 (AH-4) West Wall	soil	2013-03-11	00:00	2013-03-15
323568	CS-5 (AH-7) North Wall	soil	2013-03-08	00:00	2013-03-15
323569	CS-5 (AH-7) East Wall	soil	2013-03-08	00:00	2013-03-15
323570	CS-5 (AH-7) West Wall	\mathbf{soil}	2013-03-08	00:00	2013-03-15
323571	CS-5 (AH-7) Bottom hole	soil	2013-03-08	00:00	2013-03-15
323572	CS-5 (AH-7) South Wall	soil	2013-03-11	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 13 pages and shall not be reproduced except in its entirety, without written approval of TraceAnalysis, Inc.

Michael abel

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

Report Contents

Case Narrative	4
Analytical Report	5
Sample 323563 (CS-4 (AH-4) North Wall)	5
Sample 323564 (CS-4 (AH-4) South Wall)	5
Sample 323565 (CS-4 (AH-4) East Wall)	5
Sample 323566 (CS-4 (AH-4) Bottom hole)	5
Sample 323567 (CS-4 (AH-4) West Wall)	6
Sample 323568 (CS-5 (AH-7) North Wall)	6
Sample 323569 (CS-5 (AH-7) East Wall)	6
Sample 323570 (CS-5 (AH-7) West Wall)	7
Sample 323571 (CS-5 (AH-7) Bottom hole)	7
Sample 323572 (CS-5 (AH-7) South Wall)	7
	•
Method Blanks	8
OC Batch 99926 - Method Blank (1)	8
OC Batch 99927 - Method Blank (1)	8
	0
Laboratory Control Spikes	9
QC Batch 99926 - LCS (1)	9
QC Batch 99927 - LCS (1)	9
QC Batch 99926 - MS (1)	9
OC Batch 99927 - MS (1)	õ
•••••••••••••••••••••••••••••••••••••••	0
Calibration Standards	1
QC Batch 99926 - CCV (1)	1
QC Batch 99926 - CCV (2)	1
QC Batch 99927 - CCV (1)	1
QC Batch 99927 - CCV (2)	1
Appendix 12	2
Report Definitions	2
Laboratory Certifications	2
Standard Flags	2
Attachments	2

Case Narrative

Samples for project COG/SW Central TB were received by TraceAnalysis, Inc. on 2013-03-15 and assigned to work order 13031529. Samples for work order 13031529 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.

		Prep	Prep	\mathbf{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
Chloride (Titration)	SM 4500-Cl B $$	84647	2013-03-21 at 09:58	99927	2013-03-22 at 13:47

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 13031529 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: 13031529 COG/SW Central TB Page Number: 5 of 13 Eddy Co., NM

Analytical Report

Sample: 323563 - CS-4 (AH-4) North Wall

Chloride			364	mg/Kg	5	4.00
Parameter	Flag	Cert	RL Result	Units	Dilution	RL
Prep Batch:	84647	Sample 1	Preparation:	2013-03-21	Prepared By:	AR
QC Batch:	99926	Date An	alyzed:	2013-03-22	Analyzed By:	AR
Analysis:	Chloride (Titration)	Analytic	al Method:	SM 4500-Cl B	Prep Method:	N/A
Laboratory:	Midland					

Sample: 323564 - CS-4 (AH-4) South Wall

Laboratory: Analysis: QC Batch: Prep Batch:	Midland Chloride (Titration) 99926 84647	Analytic Date An Sample I	al Method: alyzed: Preparation:	SM 4500-Cl B 2013-03-22 2013-03-21	Prep Method: Analyzed By: Prepared By:	N/A AR AR
			\mathbf{RL}			
Parameter	Flag	Cert	Result	Units	Dilution	\mathbf{RL}
Chloride			3740	mg/Kg	10	4.00

Sample: 323565 - CS-4 (AH-4) East Wall

Laboratory:	Midland					
Analysis:	Chloride (Titration)	Analytic	al Method:	SM 4500-Cl B	Prep Method:	N/A
QC Batch:	99926	Date An	alyzed:	2013-03-22	Analyzed By:	AR
Prep Batch:	84647	Sample	Sample Preparation: 2013-03-21		Prepared By:	AR.
			RL			
Parameter	Flag	Cert	Result	Units	Dilution	\mathbf{RL}
Chloride			2490	mg/Kg	10	4.00

Report Date: March 25, 2013	Work Order: 13031529	Page Number: 6 of 13
114-6400625	COG/SW Central TB	Eddy Co., NM

Sample: 323566 - CS-4 (AH-4) Bottom hole

Laboratory:	Midland					
Analysis:	Chloride (Titration)	Analyti	ical Method:	SM 4500-Cl B	Prep Method:	N/A
QC Batch:	99926	Date A	nalyzed:	2013-03-22	Analyzed By:	AR
Prep Batch:	84647	Sample	Sample Preparation: 2013-03-21		Prepared By:	AR
			RL			
Parameter	Flag	Cert	Result	Units	Dilution	\mathbf{RL}
Chloride			519	mg/Kg	5	4.00

Sample: 323567 - CS-4 (AH-4) West Wall

Laboratory: Analysis: QC Batch: Prep Batch:	Midland Chloride (Titration) 99926 84647	Analytic Date An Sample 1	al Method: alyzed: Preparation:	SM 4500-Cl B 2013-03-22 2013-03-21	Prep Method: Analyzed By: Prepared By:	N/A AR AR
			\mathbf{RL}			
Parameter	Flag	Cert	Result	Units	Dilution	$\mathbb{R}\mathbb{L}$
Chloride			4850	mg/Kg	10	4.00

Sample: 323568 - CS-5 (AH-7) North Wall

Chloride			349	mg/Kg	5	4.00
Parameter	Flag	Cert	RL Result	Units	Dilution	RL
Prep Batch:	Sample Preparation: 2013-03-21		2013-03-21	Prepared By:	AR	
QC Batch:	99927	Date An	alyzed:	2013-03-22	Analyzed By:	AR
Analysis:	Chloride (Titration)	Analytic	al Method:	SM 4500-Cl B	Prep Method:	N/A
Laboratory:	Midland					

Sample: 323569 - CS-5 (AH-7) East Wall

Laboratory:	Midland				
Analysis:	Chloride (Titration)	Analytical Method:	SM 4500-Cl B	Prep Method:	N/A
QC Batch:	99927	Date Analyzed:	2013-03-22	Analyzed By:	AR.
Prep Batch:	84647	Sample Preparation:	2013-03-21	Prepared By:	\mathbf{AR}

Report Date: March 25, 20 114-6400625)13	Woi CO	rk Order: 1303152 G/SW Central TI	29 B	Page Number: 7 of 1 Eddy Co., NM		
Parameter	Flag	Cert	RL Result	Units	Dilution	RL	
Chloride			1140	mg/Kg	5	4.00	

Sample: 323570 - CS-5 (AH-7) West Wall

Laboratory: Analysis: QC Batch: Prep Batch:	Midland Chloride (Titration) 99927 84647	Analyt Date A Sample	ical Method: malyzed: Preparation:	SM 4500-Cl B 2013-03-22 2013-03-21	Prep Method: Analyzed By: Prepared By:	N/A AR AR
			RL			
Parameter	Flag	Cert	Result	Units	Dilution	$\mathbb{R}\mathbb{L}$
Chloride			162	mg/Kg	5	4.00

Sample: 323571 - CS-5 (AH-7) Bottom hole

Laboratory:MidlandAnalysis:Chloride (Titration)QC Batch:99927Prep Batch:84647		Analytic Date Ar Sample	cal Method: 1alyzed: Preparation:	SM 4500-Cl B 2013-03-22 2013-03-21	Prep Method: Analyzed By: Prepared By:	N/A AR AR
			RL			
Parameter	Flag	Cert	Result	Units	Dilution	\mathbf{RL}
Chloride			2040	mg/Kg	10	4.00

Sample: 323572 - CS-5 (AH-7) South Wall

Laboratory: Analysis: QC Batch: Prep Batch:	Midland Chloride (Titration) 99927 84647		lytical Method: e Analyzed: ple Preparation:	SM 4500-Cl B 2013-03-22 2013-03-21	Prep Method: Analyzed By: Prepared By:	N/A AR AR	
Paramotor	Flag	Cert	RL Besult	Unite	Dilution	RL.	
Chloride	1 mg		737	mg/Kg	5	4.00	

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Method Blanks Method Blank (1) QC Batch: 99926 QC Batch: 99926 Date Analyzed: 2013-03-22 Analyzed By: AR Prep Batch: 84647 QC Preparation: 2013-03-21 Prepared By: \mathbf{AR} MDL Parameter Flag CertResult Units +RLmg/Kg 4 Chloride <3.85 Method Blank (1) QC Batch: 99927 QC Batch: Date Analyzed: Analyzed By: AR 999272013-03-22 Prep Batch: 84647 QC Preparation: 2013-03-21 Prepared By: AR

Work Order: 13031529

COG/SW Central TB

Report Date: March 25, 2013

114-6400625

Page Number: 8 of 13

Eddy Co., NM

			MDL		
Parameter	Flag	Cert	Result	Units	RL
Chloride			<3.85	mg/Kg	4

Work Order: 13031529 COG/SW Central TB Page Number: 9 of 13 Eddy Co., NM

Laboratory Control Spikes

Laboratory Control Spike (LCS-1)

QC Batch: Prep Batch:	99926 84647			Date QC 1	e Analyzed Preparatio	$: 2013 \\ n: 2013$	3-03-22 3-03-21			Aı Pr	alyzed 1 epared 1	By: AR By: AR
1				·	1						-	
					LCS			Spike	Μ	atrix		Rec.
Param		F		С	Result	Units	Dil.	Amount	R	esult	Rec.	Limit
Chloride					2680	mg/Kg	1	2500	<	(3.85	107	85 - 115
Percent recov	ery is based on the spil	æ re	sul	t. RPD	is based o	on the sp	oike and sp	oike duplica	ate res	ult.		
							Colleg	Motnia		Pog		חסמ
Dorom	E	2	C	Rogult	Unite	Dil		Rocult	Rec	Limit	- RPI	D Limit
Chloride	I		<u> </u>	1000000000000000000000000000000000000	mg/Kg	1	2500	<3.85	104	85 - 11	$\frac{101}{5}$	$\frac{20}{20}$
	· · · · · · · · · · · · · · · · · · ·			- DDD	·		:11					
Laboratory	Control Spike (LCS	-1)										
OC Batch	99927			Date	Analyzed	· 2013	3-03-22			Ar	nalvzed !	Bv: AR
Prep Batch:	84647			QC :	Preparatio	n: 2013	3-03-21			Pr	epared I	By: AR
					LCS			Spike	М	atrix		Rec.
Param		\mathbf{F}		С	Result	Units	Dil.	Amount	\mathbf{R}	\mathbf{esult}	Rec.	Limit
Chloride					2500	mg/Kg	1	2500	<	3.85	100	85 - 115
Percent recov	ery is based on the spik	œ re	sul	t. RPD	is based o	on the sp	oike and sp	ike duplicε	te res	ult.		
				LCSD			Spike	Matrix		Rec.		RPD
Param	F		С	Result	Units	Dil.	Amount	Result	Rec.	Limit	RPI	D Limit
Chloride		-		2700	mg/Kg	1	2500	<3.85	108	85 - 11	5 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: 323567

QC Batch:	99926	Date Analyzed:	2013-03-22	Analyzed By:	\mathbf{AR}
Prep Batch:	84647	QC Preparation:	2013-03-21	Prepared By:	AR.

Report Date: March 25, 2013 114-6400625			Work Order: 13031529 COG/SW Central TB						Page Number: 10 of 13 Eddy Co., NM		
Param Chloride	F	С	MS Result 7290	Units mg/Kg	Dil. 10	Spike Amount 2500	Ma Res 48	trix sult Rec 50 98	. I 78.	Rec. Limit 9 - 121	
Percent recovery is based on the spi	ke re	sult. RP	D is based	on the s	spike and s	spike dupli	cate res	ult.			
Param F Chloride	<u>`</u>	MSD C Resul 7610	t Units mg/Kg	Dil. 5 10	Spike Amount 2500	Matrix Result 4850	Rec.	Rec. Limit 78.9 - 121	RPD 4	RPD Limit 20	
Percent recovery is based on the spi	ke re	suit. RP.	D is based	on the s	spike and s	вріке ацрії	cate res	un.			
Matrix Spike (MS-1) Spiked S	amr	ole: 32357	2								
QC Batch: 99927 Prep Batch: 84647		Da QC	te Analyze Preparati	d: 201 ion: 201	13-03-22 13-03-21			Analy Prepa	zed By: red By:	AR AR	
2	_	~	MS			Spike	Mat	rix]	Rec.	
Param Chloride	F'	C	Result 3200	Units mg/Kg	5	Amount 2500	Res	ult Rec.	78	$\frac{1}{9} = 121$	
Percent recovery is based on the spil	ke re	sult. RPI	D is based	on the s	pike and s	pike duplic	cate resi	alt.			
		MSD			Spike	Matrix		Rec.	~~~	RPD	
Param F Chloride		C Result 3090	: Units mg/Kg	5	Amount 2500	Result 737	Rec. 94	Limit 78.9 - 121	RPD 4	Limit 20	

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

Work Order: 13031529 COG/SW Central TB Page Number: 11 of 13 Eddy Co., NM

Calibration Standards

Standard (CCV-1)

QC Batch:	99926			Date A	analyzed:	2013-03-22		Analy	zed By: AR
					CCVs True	CCVs Found	CCVs Percent	Percent Recovery	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 I	Analyzed: 2	2013-03-22		Analy	zed 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	2013-03-22

Standard (CCV-1)

QC Batch:	99927			Date A	Analyzed: 2	2013-03-22		Analy	zed 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	2013-03-22

Standard (CCV-2)

QC Batch:	99927			Date A	analyzed: 2	013-03-22		Analy	zed By: AR
					CCVs True	CCVs Found	CCVs Percent	Percent Recovery	Date
Param		Flag	Cert	\mathbf{Units}	Conc.	Conc.	Recovery	Limits	Analyzed
Chloride				mg/Kg	100	98.8	99	85 - 115	2013-03-22

Work Order: 13031529 COG/SW Central TB Page Number: 12 of 13 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

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Work Order: 13031529 COG/SW Central TB Page Number: 13 of 13 Eddy Co., NM

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The scanned attachments will follow this page.

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

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				1910 N. Big Midland, To (432) 682-4559	TECH 9 Spring St. 9 • Fax (432) 682-3946								5 (Ext. to C35)	d Cr Pb Hg Se	1 Vr Pd Hg Se									8	
CLIENT NAME: COG PROJECT NO.: //4-6400625 COG-500 Centinel				SITE MANAC	BER: Tauarz	NERS		P	PRESERVATIVE METHOD			TX100	s Ba Co	s Ba C	s		260/624	270/625					ns, pH. 1		
PROJECT NO .: //4-6400625	F	PROJ <u>Cac</u>	EC.	TNAME: SL> Central TI	ξ	CONTA	(N/Y						MOD.	ls Ag A	Is Ag A	les Volatile		8240/8	11. VOL. 2 //608	8	ç.	(Air)	stos)	JS/Latin	
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