#### SITE INFORMATION Report Type: Closure Report General Site Information: 一种 人名英格兰 医克里氏 Jenkins B Federal Water Flood (Northwest Central) Site: Company: COG Operating LLC Section, Township and Range T17S R<sub>30</sub>E **Unit C** Sec 20 Lease Number: (API#) 30-015-21945 County: **Eddy County** GPS: 32.83021° N 103.99532° W Surface Owner: Federal Mineral Owner: From the intersection of Hwy 82 and CR 217, turn right and travel North for approximatly 0.6 Directions: miles. Then turn left and travel West for 0.5 miles. The location will be on the right to the north. 1st Spill Release Data: 2nd Spill 6/26/2012 Date Released: 3/23/2012 Type Release: Produced Water and Oil Oil Source of Contamination: Skim Tank Gun Barrel 3 bbls Oil 17 bbls Produced Water Fluid Released: 75 bbls Oil Fluids Recovered: 3 bbls Oil 15 bbls Produced Water 70 bbls Oil Official Communication: TO THE TO THE STATE OF THE STAT Name: Robert McNeil lke Tavarez Company: COG Operating, LLC Tetra Tech Address: One Concho Center 1910 N. Big Spring 600 W. Illinois Ave. City: Midland Texas, 79701 Midland, Texas Phone number: (432) 686-3023 (432) 682-4559 Fax: (432) 684-7137 Email: rmcneil@conchoresources.com ike.tavarez@tetratech.com Ranking Criteria Depth to Groundwater: Ranking Score Site Data <50 ft 20 50-99 ft 10 10 >100 ft. 0 0 WellHead Protection: Ranking Score Site Data Water Source <1,000 ft., Private <200 ft. 20 Water Source >1,000 ft., Private >200 ft. Surface Body of Water: Ranking Score Site Data <200 ft. 20 200 ft - 1,000 ft. 10 >1,000 ft. 0 Total Ranking Score: RECEIVED Acceptable Soil RRAL (mg/kg) Benzene Total BTEX **TPH** MAR 05 2014 10 50 5,000

INCCD ARTESIA



November 19, 2013

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

Re: Closure Report for the COG Operating LLC., Jenkins B Federal Water Flood, Unit N, Section 17, Township 17 South, Range 29 East, Eddy County, New Mexico.

Mr. Bratcher:

Tetra Tech, Inc. (Tetra Tech) was contacted by COG Operating LLC. (COG) to assess a spill from the Jenkins B Federal Water Flood, located in Unit N, Section 17, Township 17 South, Range 29 East, Eddy County, New Mexico (Site). The spill site coordinates are N 32.83021°, W 103.99532°. The site location is shown on Figures 1 and 2.

#### Background

#### 1st Spill

According to the State of New Mexico C-141 Initial Report, the leak was discovered on 23 March, 2012 and released approximately three (3) barrels of oil and seventeen (17) barrels of produced water from a Skim Tank. Three (3) barrels of oil and fifteen (15) barrels of produced water were recovered. Due to the rush of fluid from a new well and a plugged strainer the skim tank overflowed. The strainer has been cleaned out. The initial C-141 form is enclosed in Appendix A.

### 2<sup>nd</sup> Spill

According to the State of New Mexico C-141 Initial Report, the leak was discovered on 27 June, 2012 and released approximately seventy five (75) barrels of oil from the gun barrel. Seventy (70) barrels of oil were recovered. The motor valves failed to open and the gun barrel overflowed. Electricians were called out to ensure the problem was resolved.



#### Groundwater

No water wells were listed within Section 17. According to the NMOCD groundwater map, the average depth to groundwater in this area is 250' below surface. The groundwater data is shown in Figure B.

#### Regulatory

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

#### Soil Assessment and Analytical Results

On April 20, 2012, Tetra Tech personnel inspected and sampled the spill area. Three (3) auger holes (AH-1 through AH-3) were installed using a stainless steel hand auger to assess the impacted soils. Selected samples were analyzed for TPH analysis by EPA method 8015 modified, BTEX by EPA Method 8021B and chloride by EPA method 300.0. Copies of laboratory analysis and chain-of-custody documentation are included in Appendix C. The sampling results are summarized in Table 1. The auger hole locations are shown on Figure 3.

Referring to Table 1, AH-2 was above the RRAL for Total BTEX and Total TPH but declined below regulatory levels at 1.5' below surface. Auger holes (AH-1 and AH-3) did not exceed the RRAL for total BTEX or TPH. In addition, all auger holes (AH-1, AH-2, and AH-3) also showed elevated chloride concentrations and AH-1 and AH-3 were not vertically defined. Deeper samples were not collected due to a dense formation.



On June 6, 2012, Tetra Tech supervised the installation of two (2) boreholes (BH-1 and BH-2) using an air rotary drilling rig to assess the soils. The soil bores were installed in the areas of AH-1 and AH-3 to define the vertical extents. Copies of the laboratory analysis chain-of-custody documentation are included in Appendix C. The soil boring results are summarized in Table 1 and shown on Figure 3. Referring to Table 1, both of the boreholes were not vertically defined due to the flowing sands at the depths of 50' to 80'.

On June 12, 2013, Tetra Tech supervised the installation of one (1) soil bore using a hollow stem auger drilling rig to further delineate the impacted soils. Referring to Table 1, SB-1 exceeded the RRAL for Total TPH and Total BTEX but was vertically delineated at a depth of 2.0' below surface. Elevated chloride concentrations were detected at depths down to 90' below surface. However, the chloride concentrations declined with depth and showed 2,000 mg/kg at 90', 1,060 mg/kg at 100' and 92.5 mg/kg at 105', respectively.

#### Remediation

Between November 6 and November 8, 2013, Tetra Tech personnel were onsite to remove the impacted material as highlighted (green) in Table 1 and shown on Figure 4. Due to the facility equipment onsite, the areas of AH-1, AH-2, AH-3, BH-1, BH-2, and SB-1 were excavated to an approximate depth of 4.0' below surface. Approximately 76 yards of material was removed. A 40 mil plastic liner was installed in the areas in order to cap the remaining impact and prevent further migration of chlorides. Approximately 200 cubic yards of the impacted material was transported offsite for proper disposal. The excavated areas were backfilled with clean soil to surface grade.



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

Respectfully submitted,

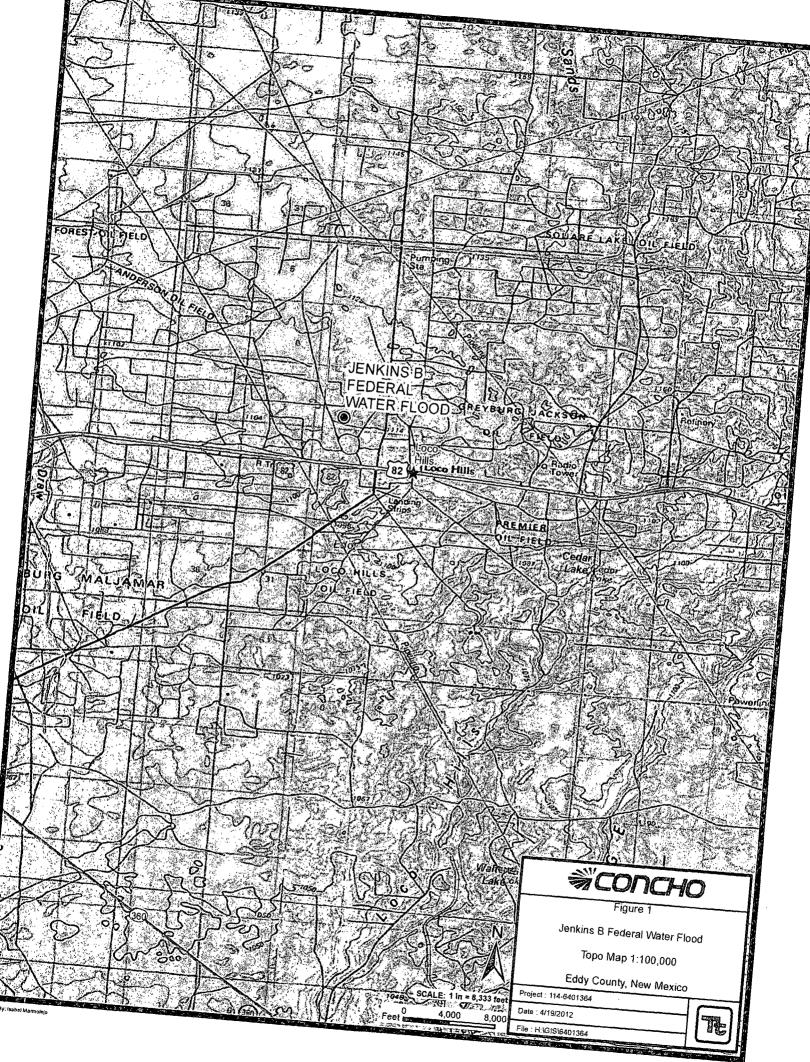
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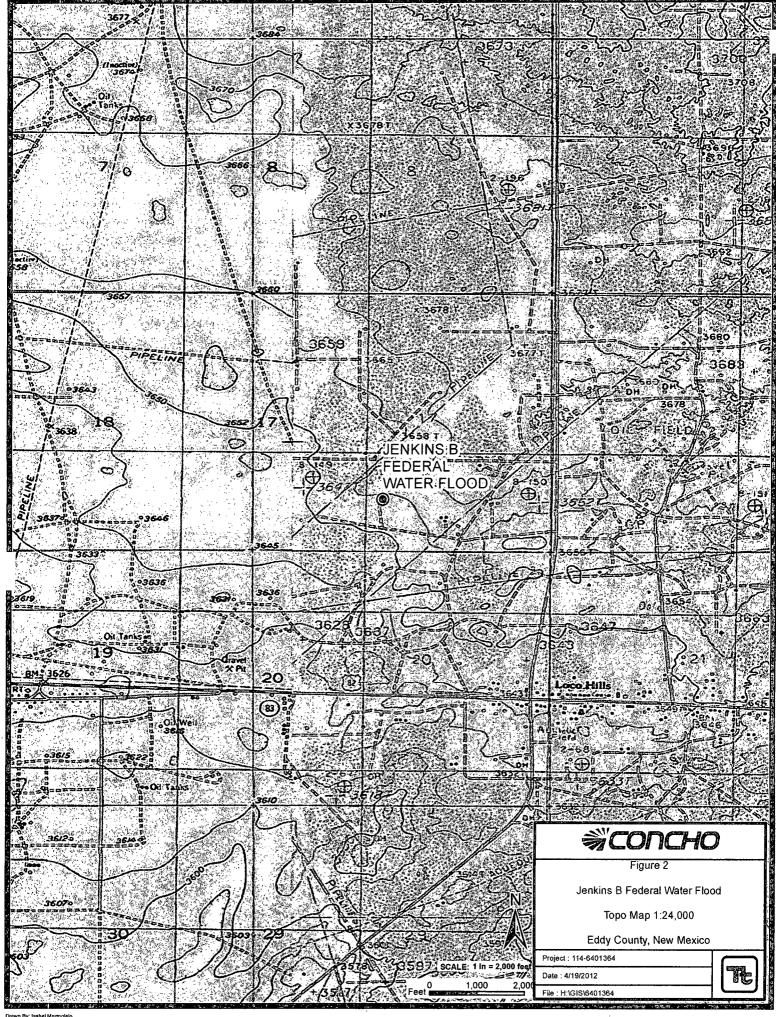
Clair Gonzales, Geologist

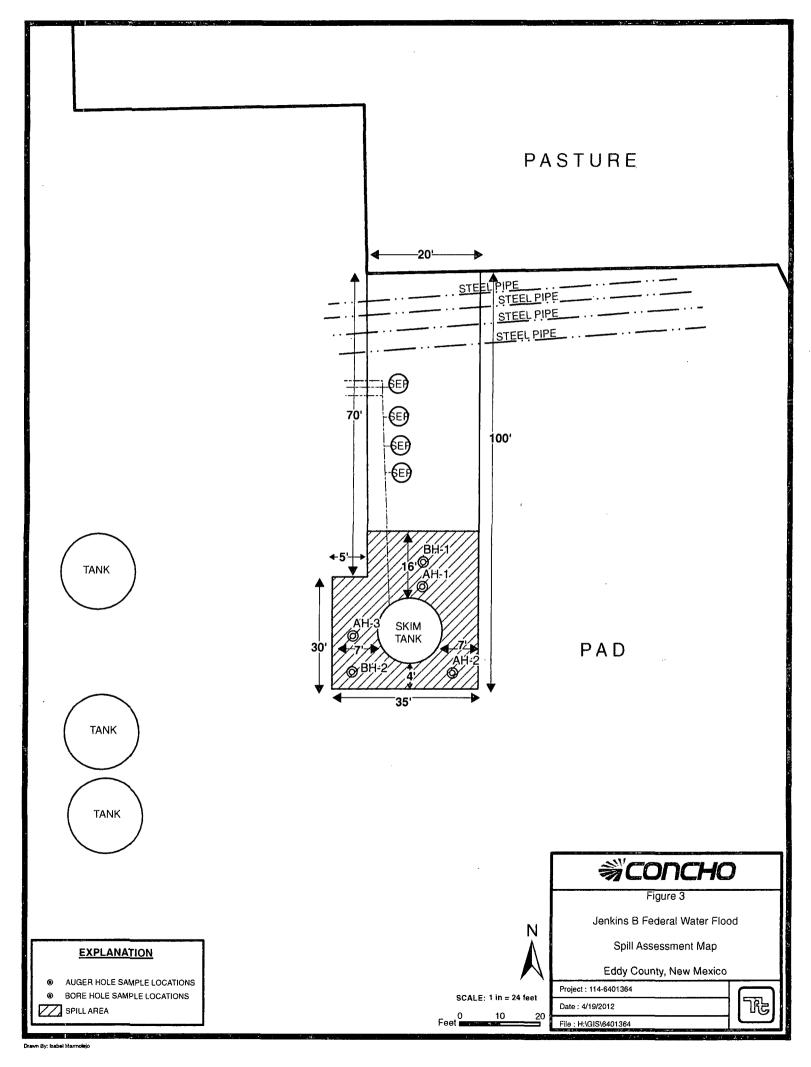
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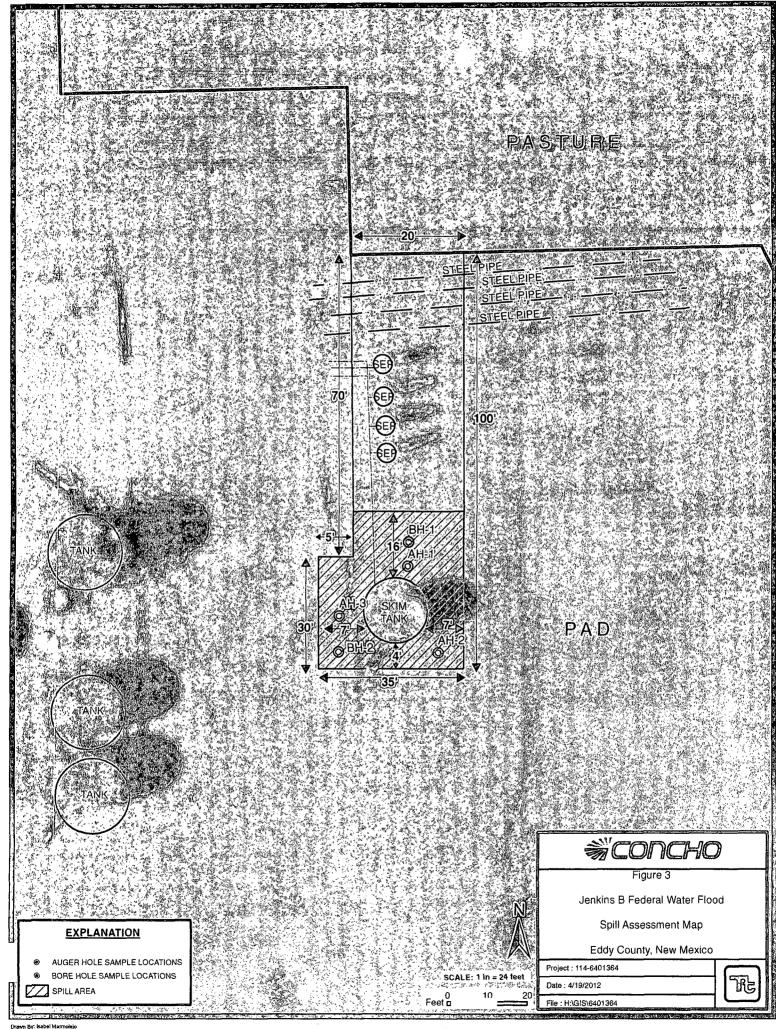
Robert McNeil – COG Mike Burton- BLM

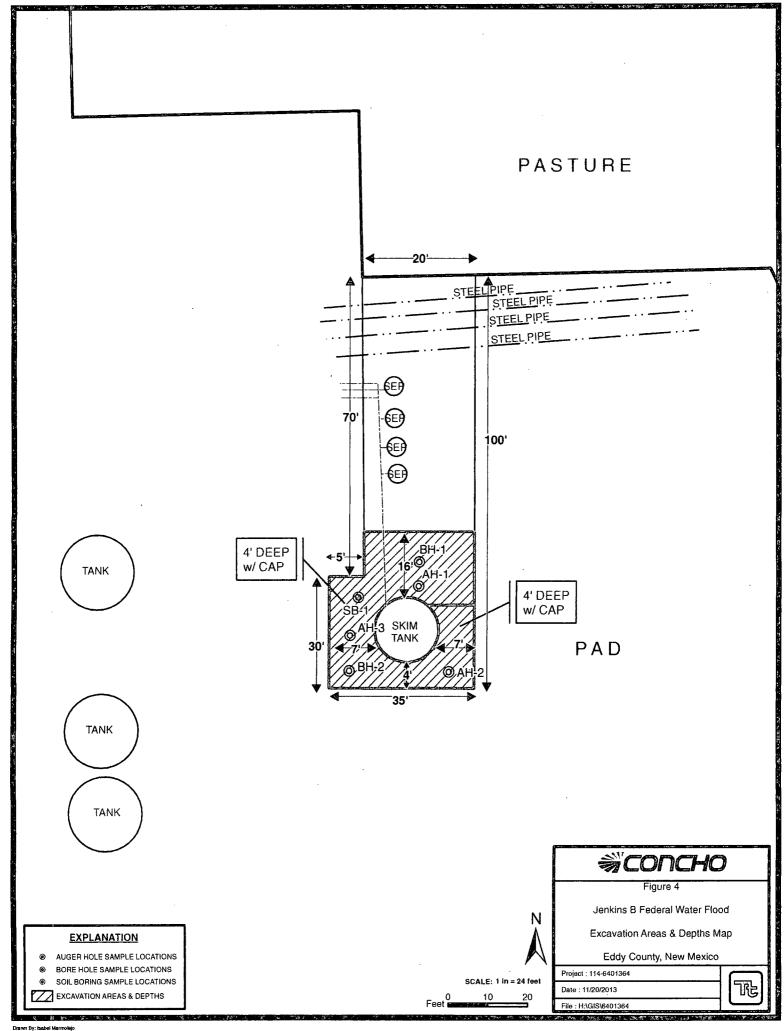
# Figures











# Tables

Table 1
COG Operating LLC.
Jenkins B Federal Water Flood
Eddy County, New Mexico

Sample	Sample	Sample	BEB	Soi	Status	TP	H (mg/k	g)	Benzene	Toluene	Ethlybenzene	Xylene	Total BTEX	Chloride
ID	Date	Depth (ft)	Depth (ft)	In-Situ	Removed	GRO	DRO	Total	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)
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	n	7-7.5	0.5	Х		-	-	-	-	-	_	-	-	2,980
	11	8-8.5	0.5	Х		-	-	-	-	-	-	-	-	4,590
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	II	9-10	0.5	Х		-	-	-	-	-	-	-	-	2,570
	п	14-15	0.5	Х		-	-	-	-	-	-	-	-	5,890
	11	19-20	0.5	Х		-	-	-	-	-	-	-	-	8,650
	11	24-25	0.5	Х		-	-	-	-	-	-	-	-	7,640
	и	29-30	0.5	Х		-	-	-	-	-	-	-	-	7,190
	п	39-40	0.5	Х		-	-	-	-	-	-	-	-	14,700
	11	49-50	0.5	X		-	-	-	-	-	-	-	-	9,100
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	U	69-70	0.5	X		-	-	-	-	-	-	-	-	3,800
	11	79-80	0.5	X		-	-	-	-	-	-		-	5,550

Table 1
COG Operating LLC.
Jenkins B Federal Water Flood
Eddy County, New Mexico

Sample	Sample	Sample	BEB	Soi	l Status	· TP	H (mg/k	g)	Benzene	Toluene	Ethlybenzene	Xylene	Total	Chloride
ID	Date	Depth (ft)	Depth (ft)	In-Situ	Removed	GRO	DRO	Total	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	BTEX (mg/kg)	(mg/kg)
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Auger	11	9-10	0	Х		-	-	-		-	-	_	-	7,920
	n	19-20	0	Х		-	-	-	-	-	-	-	-	9,460
	II	39-40	0	Х		-	-	-	-	-	-	-	-	12,000
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Table 1
COG Operating LLC.
Jenkins B Federal Water Flood
Eddy County, New Mexico

Sample	Sample	Sample	BEB	Soi	l Status	aT.	PH (mg/k	(g)	Benzene	Toluene	Ethlybenzene	Xylene	Total	Chloride
ID	Date	Depth (ft)	Depth (ft)	In-Situ	Removed	GRO	DRO	Total	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	BTEX (mg/kg)	(mg/kg)
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!	'u	9-10	0.5	Х		-	-	-	-	-	-		-	6,230
	11	14-15	0.5	Х		-	-	-	-	-	<u>-</u>	-	-	6,350
	"	19-20	0.5	Х		-	-	-	-	-	-	-	-	6,890
	, ""	24-25	0.5	Х		-	-	-	-	-	· -	-	-	4,830
	19	29-30	0.5	Х		-	-	-	-	-	-	-	-	6,870
	"	39-40	0.5	Х		-	-	-	-	-	-	-	-	7,860
	n	49-50	0.5	Х		-	-	-	-	-	-	-	-	5,840
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	11	69-70	0.5	Х		-	-	-	-	-	-	-	-	4,680
	11	79-80	0.5	Х		-	-		-	-	-	-	-	4,420
				•										

BEB Below Excavation Bottom

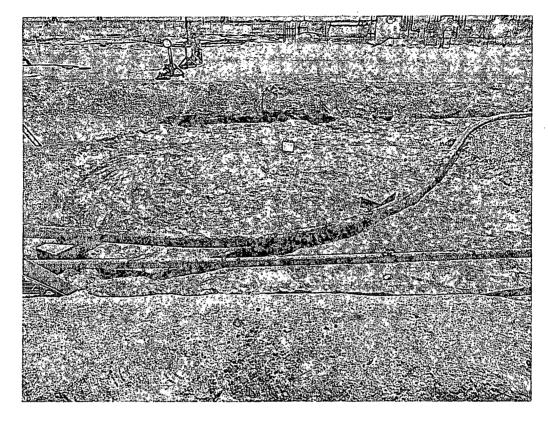
(--) Not Analyzed

Excavated Depths

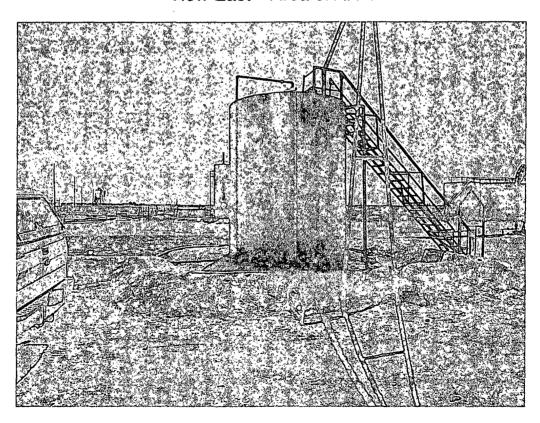
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# Photos



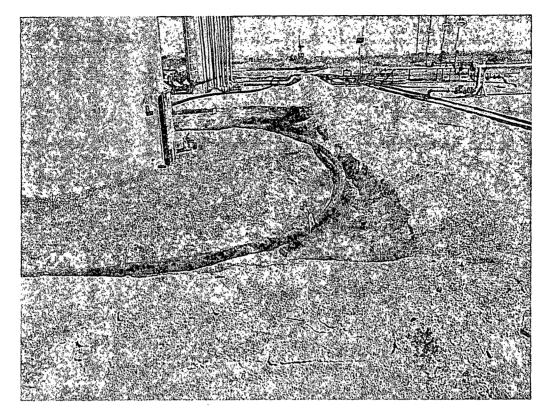


View East - Area of AH-1

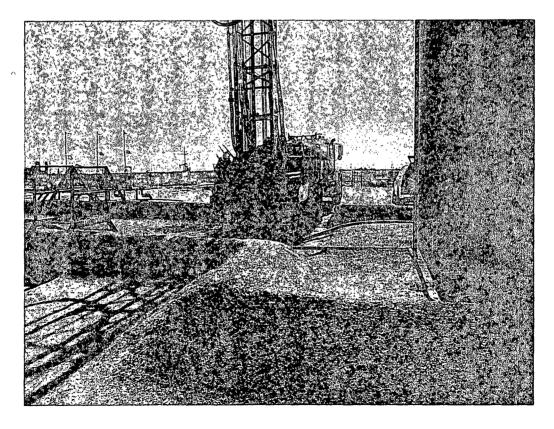


View East - Areas of AH-1 and AH-3



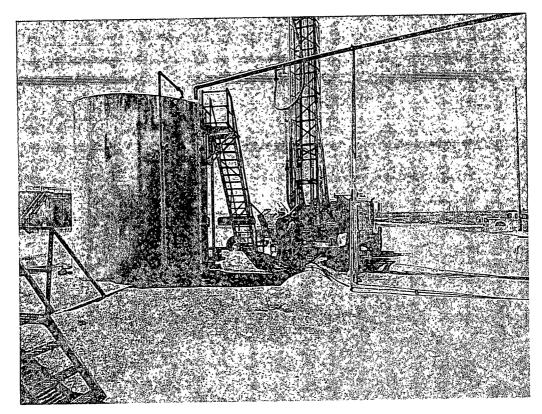


View North - Areas of AH-2 and AH-3

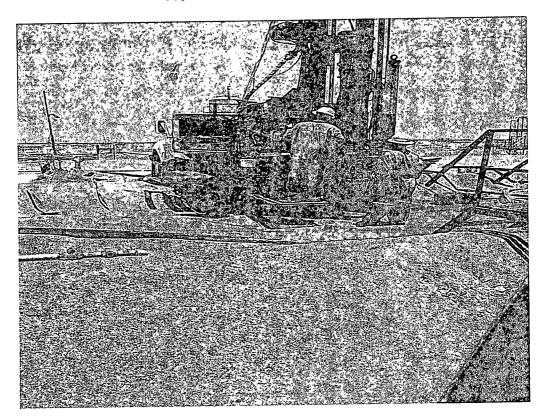


View East - Area of BH-1



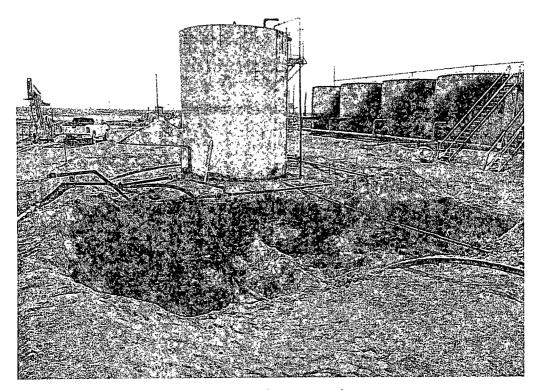


View South - Area of BH-1

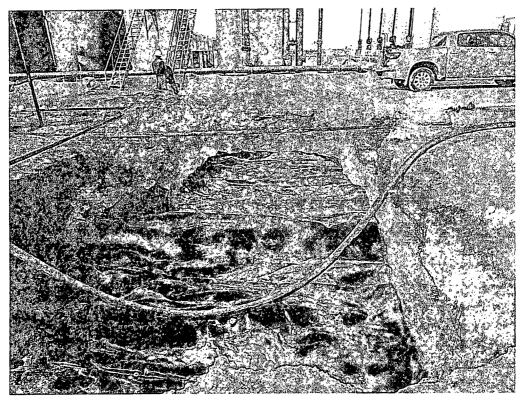


View East - Areas of SB-1



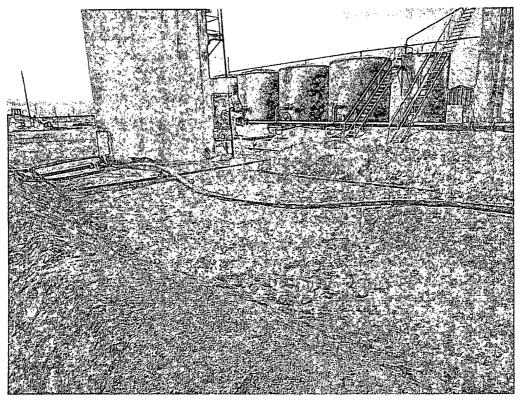


View East - Excavated area



View South - Lined excavated area.





View Southeast - Backfilled excavated area

# Appendix A

<u>District I</u> 1625 N. French Dr., Hobbs, NM 88240 District II 1301 W. Grand Avenue, Artesia, NM 88210 District III
1000 Rio Brazos Road, Aztec, NM 87410 District IV

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

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

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

RECEIVED MAR **05** 2014

Form C-141 Revised October 10, 2003

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

			Itti	asc i will	cano.	OPERA'			Initi	al Report	$\boxtimes$	Final Report
Name of Co	ompany (	COG Opera	ting LLC			Contact Pa					<u> </u>	
				nd, Texas 797	01		No. (432) 230-0	077				
Facility Nar	ne Jenkins	B Federal W	ater Flood	(Northwest Cen	itral)		e Tank Batte					
Surface Ow	mer: Feder	-21		Mineral	Owner			116	ace N	No. (API #)	30-01	5-21945
Juliace Ow	nor. reder	aı		WillCrat	Owner				asc 1			ell location
				LOC	ATIO	N OF RE	LEASE					
Unit Letter	Section	Township	Range	Feet from the		n/South Line	Feet from the	East/West	Line	County		
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Source of Re	lease: Skim	Tank				Date and F 3/23/2012	lour of Occurrence	e Dat	e and 3/2012	Hour of Disc	covery	atol
Was Immediate Notice Given?  ☐ Yes ☐ No ☐ Not Re						If YES, To	Whom?					
By Whom?						Date and H	lour	<del></del>				
Was a Watercourse Reached?  ☐ Yes ☑ No							lume Impacting t	he Watercou	rse.			
If a Watercou N/A	ırse was Im	pacted, Descri	be Fully.*									
Describe Cau	se of Probl	em and Remed	dial Action	Taken.*				<del></del>				
Due to a rush Injector has b			and a plug	gged strainer at o	our Texa	co BE #8 Inje	ctor the skim tank	overflowed.	The	strainer at the	e Texac	eo BE #8
Describe Are	a Affected	and Cleanup A	oction Tak	en.*			***					
The release w	as containe		ion. The c				num truck. The sporoximately 4.0'					
I hereby certify that the information given above is true and complete regulations all operators are required to report and/or file certain relea public health or the environment. The acceptance of a C-141 report b should their operations have failed to adequately investigate and reme or the environment. In addition, NMOCD acceptance of a C-141 report federal, state, or local laws and/or regulations.						otifications ar e NMOCD ma e contamination	nd perform correct arked as "Final Roon that pose a three	tive actions f eport" does n eat to ground	or rele ot reli water	eases which re eve the opera s, surface wat	may end ator of l er, hum	danger liability nan health
Signature:		1/ 5	`		1		OIL CONS	SERVAT)	ION	DIVISIO	<u>N</u>	
Printed Name	: Ike Tavar	ez (Ng	ent a	In Coc	2)	Approved by	District Superviso	or:				
Title: Project Manager						Approval Date	e:	Expira	ation I	Date:		
E-mail Addre	ss: [ke.Tav	arez@TetraTe	ch.com			Conditions of	Approval:			Attached		
Date:	11 15	- 13	Dhono	(432) 682 4550	-							Ì

<sup>\*</sup> Attach Additional Sheets If Necessary

District I 1625 N. French Dr., Hobbs, NM 88240 District II
1301 W. Grand Avenue, Artesia, NM 88210 District III 1000 Rio Brazos Road, Aztec, NM 87410 District IV 1220 S. St. Francis Dr., Santa Fe, NM 87505

## State of New Mexico

Energy Minerals and Natural Resources MAR 05 2014

Form C-141 Revised October 10, 2003

with Rule 116 on back side of form

Oil Conservation Division NMOCD ARTESIA District Office in accordance with Rule 116 on back 1220 South St. Francis Dr. Santa Fe, NM 87505

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Name of Co	mpany C	OG Operat	ting LLC	<u> </u>	······································		Contact Par	t Ellis					
Address 55	0 W. Texa	s, Suite 130	0 Midla	nd, Te	xas 7970			No. (432) 230-0					
Facility Nar	ne Jenkins	Water Flood					Facility Typ	e Tank Batte	ry				
Surface Ow	ner: Feder	al			Mineral C	luner				I ease N	No. (API #)	30-015	20072
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Unit Letter N	Section 17	Township 17S	Range 30E	Feet	from the	North	/South Line	Feet from the	East/W	est Line	County		
	1,	173	302										
				Lat	itude 32	49.817	' Longitud	e 103 59.765					
					NAT	URE	OF RELI	EASE					
Type of Relea							Volume of	Release 75 bbls		Volume R	ecovered 70	bbls	
Source of Release: Gun Barrel							Date and Hour of Occurrence Date and Hour of D						
Was Immediate Notice Given?							6/26/2012 If YES, To	Whom?		6//26/201	3 9:30 a.m	1.	
was militeura	ne nonce C		Yes 🗀	l No l	☐ Not Re	equired	11 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Mike Bı					
By Whom?		<del></del>					Date and H	our 6/27/2012	9:27 a.m				
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			Yes 🏻	No			N/A						
If a Watercou N/A	rse was Imp	pacted, Descri	be Fully.*	:			•			**************************************			
Describe Cau	se of Proble	em and Remed	dial Action	n Taker	1.*						******		
The gun barre problem with					ery overflo	wed due	e to motor val	ves that did not o	pen. Ele	ctricians v	vere called ou	it to ens	ure that the
Describe Area	a Affected a	and Cleanup A	Action Tak	en.*									
inside the dike the area was b	ed walls of packfilled w	the facility. The clean mate	The contan	ninated	area was e	excavate	d to approxin	ecovered with a value of the second second with a value of the second se	surface,	a 40 mil p	lastic liner wa	as instal	lled, and
I hereby certify that the information given above is true and complete regulations all operators are required to report and/or file certain release public health or the environment. The acceptance of a C-141 report is should their operations have failed to adequately investigate and remover the environment. In addition, NMOCD acceptance of a C-141 reported environment, and all all and/or regulations.							otifications and NMOCD made contamination	d perform correct trked as "Final Re on that pose a thre	tive actio eport" do eat to gro	ns for rele es not relic und water.	ases which meve the opera surface wate	nay enda tor of li er, huma	anger ability an health
Cianatura		11 6	$\angle$					OIL CONS	SERVA	ATION	DIVISION	<u>V</u>	i
Signature: Printed Name	: Ike Tavare	ez (MS	ant.	Ju	Co	<u>(                                    </u>	Approved by District Supervisor:					ş	
Title: Project	Manager			* · · · · · · · · · · · · · · · · · · ·					xpiration Γ	ration Date:			
		0.77		· · · · · · · · · · · · · · · · · · ·									
E-mail Addre			ch.com			°	Conditions of	Approval:			Attached		
Date: //	-19-	13	Phone:	<u>(432)</u> 6	582-4559						1		Ì

<sup>\*</sup> Attach Additional Sheets If Necessary

District I
1625 N. French Dr., Hobbs, NM 88240
District II
1301 W. Grand Avenue, Artesia, NM 88210
District III
1000 Rio Brazos Road, Aztec, NM 87410
District IV
1220 S. St. Francis Dr., Santa Fe, NM 87505

## State of New Mexico Energy Minerals and Natural Resources

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

Form C-141

Revised October 10, 2003

		OPERA?	<b>FOR</b>		🛭 Initi	al Report		Final Repor
Name of Company COG OPERATING LLC		Contact		Pat Ellis				· · · · · · · · · · · · · · · · · · ·
Address 550 W. Texas, Suite 100, Midland, TX 79		Telephone 1		-230-00				
Facility Name Jenkins B Federal Water Flood (Northwest Cen	itral)	Facility Typ	e Sk	im Tank				
Surface Owner Federal Minera	l Owner				Lease N			5-21945 location
Loc	CATIO	OF RE	LEASE					
Unit Letter Section Township Range 30E Feet from the	e North	South Line	Feet from the	East/\	West Line	County	Eddy	•
Latitude 3	32 49.813	Longitu	ide 103 59.736	5	,			
N.	ATURE	OF REL	EASE					
Type of Release Produced water / Oil		Volume of		obls oil obls pw			3bbls o 15bbls p	
Source of Release Skim tank		Date and H 03/23/2012	lour of Occurrer	ice		Hour of Dis		
Was Immediate Notice Given? ☐ Yes ☒ No ☒ Not	t Required	If YES, To					***************************************	
By Whom?		Date and I						
Was a Watercourse Reached?  ☐ Yes ☑ No		If YES, Vo	lume Impacting	the Wate	ercourse.			
If a Watercourse was Impacted, Describe Fully.*		-l						
Describe Cause of Problem and Remedial Action Taken.*							<del></del>	
Due to a rush of fluid from a new well and a plugged strainer a injector has been cleaned out.	t our Texac	o BE #8 Inje	ctor the skim tan	ık overflo	wed. The	strainer at th	e Texac	:o BE #8
Describe Area Affected and Cleanup Action Taken.*		·		<del></del>		· · · · · · · · · · · · · · · · · · ·		
Initially 20bbls were released from the skim tank and we were skim tank. The release was contained on the location. Tetra To and we will present a work plan to the NMOCD/BLM for approximately approx	ech will sau	mple the spill	site area to delir	reate any				
I hereby certify that the information given above is true and corregulations all operators are required to report and/or file certain public health or the environment. The acceptance of a C-141 reshould their operations have failed to adequately investigate and or the environment. In addition, NMOCD acceptance of a C-14 federal, state, or local laws and/or regulations.	in release ne eport by the d remediate	otifications are NMOCD made contamination	nd perform corre arked as "Final I on that pose a th	ctive acti Report" d reat to gr	ons for rele oes not reli ound water	eases which eve the oper , surface wa	may end ator of l ter, hun	danger liability nan health
			OIL CON	SERV	ATION	<b>DIVISIO</b>	N	
Signature:								
Printed Name: Josh Russo		Approved by	District Supervi	sor:	····			<del></del>
Title: HSE Coordinator		Approval Dat	e:	E	Expiration I	Date:		·
E-mail Address: jrusso@conchoresources.com		Conditions of	Approval:			Attached		
Date: 04/02/2012 Phone: 432-212-2399 Attach Additional Sheets If Necessary	<u>,                                     </u>	···				<u> </u>		····

District I
1625 N. French Dr., Hobbs, NM 88240
District II
1301 W. Grand Avenue, Artesia, NM 88210
District III
1000 Rio Brazos Road, Aztec, NM 87410
District IV
1220 S. St. Francis Dr., Santa Fe, NM 87505

\* 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 Revised October 10, 2003 hmit 2 Copies to appropriate

Form C-141

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

						UPERA.	IUK	l∑i Iu	itial Keport	linal Kepor		
Name of Co			ERATING			Contact	Pa	at Ellis				
Address				and, TX 7970		Telephone N		230-0077				
Facility Nan	ne	Jenkins	Water Flo	od		Facility Typ	e Tanl	k Battery				
Surface Ow	ner Fede	rai		Mineral C	Owner			Leas	e No. (API#) Close	30-015-20972 est well location		
				LOCA	ATIO	N OF RE	FASE					
Unit Letter	Section	Township	Range	Feet from the		South Line	Feet from the	East/West Lin	e County			
N	17	178	30E							ldy .		
				Latitude 32 4	9.817	Longit	ade 103 59.765					
				NAT	URE	OF REL	EASE					
Type of Relea							Release 75bbls			)bbls		
Source of Rel	ease Gun	barrel 				Date and H 06/26/2012	our of Occurrenc		nd Hour of Disco 2012 9:30 a.m.	very		
Was Immedia	ite Notice (		Yes $\square$	No 🗌 Not Re	enuired	If YES, To	Whom?	Mike Bratcher	-OCD			
By Whom?	Michella					Date and U	our 06/27/2012					
Was a Watero							Jume Impacting t					
			Yes 🛛	No			· · · · · · · · · · · · · · · · · · ·		•			
If a Watercou	rse was Imp	acted, Descri	be Fully.*							*		
Describe Caus	se of Proble	m and Remed	lial Action	ſaken,*								
The gun harre	I at the Jeni	cins Water Flo	ood & Tank	Battery overflo	wed due	to motor val	ves that did not o	nen Electrician	is have been calle	d out to ensure		
that the proble	m with the	motor valves	has been re	solved.			· • • • • • • • • • • • • • • • • • • •		o myo boom dane			
Describe Area	Affected a	nd Cleanup A	ction Taker	.*								
contained insi-	de the dike	d walls of the	facility. Te	ra Tech will sa	mple the	spill site area	to recover 70bbls a to delineate any nificant remediati	possible contant	truck. The entire	release was release and we		
I hereby certif	y that the ir	formation giv	en above is	true and compl	ete to th	e best of my	cnowledge and ur	derstand that p	ursuant to NMOC	D rules and		
regulations all	operators a	re required to	report and/	or file certain re	elease no	tifications an	d perform correct	ive actions for r	eleases which ma	ay endanger		
public health of	or the enviro	onment. The	acceptance (	of a C-141 report	rt by the	NMOCD ma	rked as "Final Re	port" does not r	elieve the operate	or of liability		
or the environ	perations na ment In ac	ive failed to a	dequately in	vestigate and re	mediate	contamination	on that pose a thre the operator of re	at to ground wa	ter, surface water	, human health		
federal, state,	or local law	s and/or regul	ations.	ICC 01 & C-141 1	eport do	ics not refleve	the operator of h	esponsionity to	compnance with	any ones		
		7 /					OIL CONS	ERVATIO	N DIVISION			
Signature:	//	1/	$\overline{}$					,		-		
	<del>- / '</del>	_ (		······································	A	approved by I	District Superviso	r:				
Printed Name:		Josh I										
Title:		HSE Co	ordinator		A	approval Date	ï	Expiratio	n Date:			
E-mail Addres	<u>s:</u>	jrusso@conch	oresources.	com	c	onditions of	Approval:		Attached [	_		
Date: 06	/26/2012	Phone:	432-21	2-2300		Attached L						

# Appendix B

# Water Well Data Average Depth to Groundwater (ft) COG-Jenkins B Fed Water Flood Eddy County, New Mexico

	16 Sc	uth	2	9 East			16 S	outh		30 Eas	t			16	South		31 East	-
5	5	4	3	2	1	6	5	4	3	2	1	7	6	5	4	3	2 290	11
,	8	9	10	11	12	7	8	9	10	11	12	1	7	8	9	10	11	12
8	17	16	15	14 220	13	18	17	16	15	14	13	1	18	17	16	15	14 113	13
9	20	21	22	dry 23	24	19	20	21	22	23	24	4	19	20	21	22	<b>314</b>	299 24
10																		
0	29	28	27	26	25	30	29	28	27	26	25		30	29	28	27	26	25
1	32	33	34	35	36	31	32	33	34	35	36	1	31	32	33	34	35	36
	<u></u>	<u> </u>			لـــــا	<u> </u>		<u> </u>		1			290					<u></u>
	17 So			9 East			17 Sc			30 Eas	_	-			South		31 East	
i	5	4	3	2	1	6	5	4	3	2	1		6	5	4	3	2	1
7	8	9	10	11	12	7	8	9	10	11	12	1	7	8	9	10	11	12
8	17	16	15	14	13	18	17	16	15	14	13	1	18	17	16	15 ,	14	13
9	20	21	22 7	3 23	24	19	20 <b>80</b>	21	22	23	24	+	19	20	21	22	23	24
<u> </u>	29 210	28	80 27	26	25	30	29	28	27	26	25	-	30	29	28	27	26	25
	208											J						
1	32	33	34	35	36	31	32	33	34	35	36		31	32	33	34	35	36
_	<u> </u>	<u> </u>		153		<u> </u>		!	1				<u> </u>			271		Щ.
	18 So	uth	2	9 East	•		18 Sc	outh	. ;	30 East	<u>t_</u>			18 9	South	;	31 East	
	5	4	3	2	1	6	5	4	3	2	1	1	6	5	4	3	2	1
	8	9	10 9	5 11	12	7	8	9	10	11	12	1	7	8	9	10	11	12
3	17	16	15	14	13	18	17	16	15	14	13	1	18	17	16	15	14	<b>400</b>
			ļ										<u></u>	<u> </u>		<u> </u>	317	1
9	20	21	22	23	24 158	19	20	21	22	23	24		19	20	21	22	23	24
)	29	28	27	26	25	30	29	28	27	26	25	1	30	29	28	27	26	25
	32	33	34	35	36	31	32	33	34	35	36	1	31	32	33	34	35	36
	1		1		1	1	1	1	1		1	1			1	1	261	1

New Mexico State Engineers Well Reports

USGS Well Reports

Geology and Groundwater Conditions in Southern Eddy, County, NM

NMOCD - Groundwater Data

Field water level

New Mexico Water and Infrastructure Data System

# Appendix C

Report Date: May 1, 2012 Work Order: 12042404 Page Number: 1 of 4

## **Summary Report**

Ike Tavarez Tetra Tech

1910 N. Big Spring Street Midland, TX 79705

Report Date: May 1, 2012

Work Order: 12042404 

Project Location: Eddy Co., NM

Project Name:

COG/Jenkins B Federal Water Flood

Project Number: 114-6401364

			Date	Time	Date
Sample	Description	Matrix	Taken	Taken	Received
$\overline{295008}$	AH-1 0.5' BEB 0-1'	soil	2012-04-20	00:00	2012-04-23
295009	AH-1 0.5' BEB 1-1.5'	soil	2012-04-20	00:00	2012-04-23
295010	AH-1 0.5' BEB 2-2.5'	soil	2012-04-20	00:00	2012-04-23
295011	AH-1 0.5' BEB 3-3.5'	soil	2012-04-20	00:00	2012-04-23
295012	AH-1 0.5' BEB 4-4.5'	soil	2012-04-20	00:00	2012-04-23
295013	AH-1 0.5' BEB 5-5.5'	soil	2012-04-20	00:00	2012-04-23
295014	AH-1 0.5' BEB 6-6.5'	soil	2012-04-20	00:00	2012-04-23
295015	AH-1 0.5' BEB 7-7.5'	soil	2012-04-20	00:00	2012-04-23
295016	AH-1 0.5' BEB 8-8.5'	soil	2012-04-20	00:00	2012-04-23
295017	AH-1 0.5' BEB 9-9.5'	soil	2012-04-20	00:00	2012-04-23
295018	AH-2 0.5' BEB 0-1'	soil	2012-04-20	00:00	2012-04-23
295019	AH-2 0.5' BEB 1-1.5'	soil	2012-04-20	00:00	2012-04-23
295020	AH-2 0.5' BEB 2-2.5'	soil	2012-04-20	00:00	2012-04-23
295021	AH-3 0.5' BEB 0-1'	soil	2012-04-20	00:00	2012-04-23
295022	AH-3 0.5' BEB 1-1.5'	soil	2012-04-20	00:00	2012-04-23
295023	AH-3 0.5' BEB 2-2.5'	soil	2012-04-20	00:00	2012-04-23
295024	AH-3 0.5' BEB 3-3.5'	soil	2012-04-20	00:00	2012-04-23
295025	AH-3 0.5' BEB 4-4.5'	soil	2012-04-20	00:00	2012-04-23

		]	BTEX		TPH DRO - NEW	TPH GRO
	Benzene	Toluene	Ethylbenzene	Xylene	DRO	GRO
Sample - Field Code	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)
295008 - AH-1 0.5' BEB 0-1'	< 0.0200	0.0941	0.782	1.62	378 Qs	166 Qs
295018 - AH-2 0.5' BEB 0-1'	4.74	61.1	73.4	<b>95.2</b>	5970 Qs	$4150~_{\mathrm{Qs}}$
295019 - AH-2 0.5' BEB 1-1.5'	< 0.0200	< 0.0200	< 0.0200	< 0.0200	< 50.0	4.90 Qr,Qs
295021 - AH-3 0.5' BEB 0-1'	< 0.0200	0.106	0.105	$\boldsymbol{0.362}$	50.3 Qs	33.6 Qs

Sample: 295008 - AH-1 0.5' BEB 0-1'

Report Date: May 1, 2012	Work Order: 12042404	Page	Number: 2 of 4
Param Flag Chloride	Result 6670	Units mg/Kg	RL 4
Sample: 295009 - AH-1 0.5' BEB 1-	1.5'		
Param Flag Chloride	Result 1080	Units mg/Kg	RL 4
Sample: 295010 - AH-1 0.5' BEB 2-	2.5'		
Param Flag Chloride	Result 159	Units mg/Kg	RL 4
Sample: 295011 - AH-1 0.5' BEB 3-	3.5'		
Param Flag Chloride	Result 606	Units nig/Kg	RL 4
Sample: 295012 - AH-1 0.5' BEB 4-	4.5'		
Param Flag Chloride	Result 987	Units mg/Kg	RL 4
Sample: 295013 - AH-1 0.5' BEB 5-	5.5'		
Param Flag Chloride	Result 1790	Units mg/Kg	RL 4
Sample: 295014 - AH-1 0.5' BEB 6-	6.5'		
Param Flag Chloride	Result <b>2910</b>	Units mg/Kg	RL 4
Sample: 295015 - AH-1 0.5' BEB 7-	7.5'		
Param Flag Chloride	Result <b>2980</b>	Units mg/Kg	RL 4

Report Date: May 1, 2012	Work Order: 12042404	Page	Number: 3 of 4
Sample: 295016 - AH-1 0.5' BEB 8-8.5'	·		
Param Flag	Result	Units	RL
Chloride	4590	mg/Kg	4
Sample: 295017 - AH-1 0.5' BEB 9-9.5'			
Param Flag	Result	Units	RL
Chloride	6480	mg/Kg	4
Sample: 295018 - AH-2 0.5' BEB 0-1'			
Param Flag	Result	Units	RL
Chloride	6540	mg/Kg	4
Sample: 295019 - AH-2 0.5' BEB 1-1.5'		<b></b>	D.
Param Flag Chloride	Result <b>5560</b>	Units mg/Kg	$\frac{RL}{4}$
Sample: 295020 - AH-2 0.5' BEB 2-2.5'			
Param Flag	Result	${ m Units}$	m RL
Chloride Flag	166	mg/Kg	4
Sample: 295021 - AH-3 0.5' BEB 0-1'			
Param Flag	Result	$\mathbf{U}$ nits	m RL
Chloride	6130	nig/Kg	4
		O, G	1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 -
Sample: 295022 - AH-3 0.5' BEB 1-1.5'			
Param Flag	Result	Units	RL
Chloride	4090	mg/Kg	4
Sample: 295023 - AH-3 0.5' BEB 2-2.5'			
Param Flag	Result	Units	RL
Chloride	900	mg/Kg	4

Report Date: May 1, 2012 Work Order: 12042404 Page Number: 4 of 4 Sample: 295024 - AH-3 0.5' BEB 3-3.5' Param Flag Result UnitsRLmg/Kg Chloride 885 Sample: 295025 - AH-3 0.5' BEB 4-4.5' UnitsParam Flag Result RLChloride ıng/Kg 4 1810



6701 Aberdeen Avenue, Suite 9 200 East Sunset Road, Suite E

5002 Basin Street, Suite A1 (BioAquatic) 2501 Mayes Rd., Suite 100 El Paso Midland.

Texas 79424 800-378-1296 Texas 79922 Texas 79703

806-794-1296 915-585-3443 432-689-6301

FAX 806 - 794 - 1298 FAX 915 -585 -4944 FAX 432 689 8313

972-242-7750

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

#### Certifications

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: May 1, 2012

Work Order: 12042404 

Project Location: Eddy Co., NM

Project Name:

COG/Jenkins B Federal Water Flood

Project Number: 114-6401364

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
295008	AH-1 0.5' BEB 0-1'	soil	2012-04-20	00:00	2012-04-23
295009	AH-1 0.5' BEB 1-1.5'	soil	2012-04-20	00:00	2012-04-23
295010	AH-1 0.5' BEB 2-2.5'	soil	2012-04-20	00:00	2012-04-23
295011	AH-1 0.5' BEB 3-3.5'	soil	2012-04-20	00:00	2012-04-23
295012	AH-1 0.5' BEB 4-4.5'	soil	2012-04-20	00:00	2012-04-23
295013	AH-1 0.5' BEB 5-5.5'	soil	2012-04-20	00:00	2012-04-23
295014	AH-1 0.5' BEB 6-6.5'	soil	2012-04-20	00:00	2012-04-23
295015	AH-1 0.5' BEB 7-7.5'	soil	2012-04-20	00:00	2012-04-23
295016	AH-1 0.5' BEB 8-8.5'	soil	2012-04-20	00:00	2012-04-23
295017	AH-1 0.5' BEB 9-9.5'	soil	2012-04-20	00:00	2012-04-23
295018	AH-2 0.5' BEB 0-1'	soil	2012-04-20	00:00	2012-04-23
295019	AH-2 0.5' BEB 1-1.5'	soil	2012-04-20	00:00	2012-04-23
295020	AH-2 0.5' BEB 2-2.5'	soil	2012-04-20	00:00	2012-04-23
295021	AH-3 0.5' BEB 0-1'	soil	2012-04-20	00:00	2012-04-23
295022	AH-3 0.5' BEB 1-1.5'	soil	2012-04-20	00:00	2012-04-23
295023	AH-3 0.5' BEB 2-2.5'	soil	2012-04-20	00:00	2012-04-23
295024	AH-3 0.5' BEB 3-3.5'	soil	2012-04-20	00:00	2012-04-23
295025	AH-3 0.5' BEB 4-4.5'	soil	2012-04-20	00:00	2012-04-23

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

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

Dr. Blair Leftwich, Director

Dr. Michael Abel, Project Manager

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Sample 295012 (AH-1 0.5' BEB 4-4.5')	۶
Sample 295013 (AH-1 0.5' BEB 5-5.5')	8
Sample 295014 (AH-1 0.5' BEB 6-6.5')	g
Sample 295015 (AH-1 0.5' BEB 7-7.5')	g
Sample 295016 (AH-1 0.5' BEB 8-8.5')	9
Sample 295017 (AH-1 0.5' BEB 9-9.5')	g
Sample 295018 (AH-2 0.5' BEB 0-1')	10
Sample 295019 (AH-2 0.5' BEB 1-1.5')	11
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Sample 295025 (AH-3 0.5' BEB 4-4.5')	15
Method Blanks	10
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Go Seeder vol. 15 House Diam (1)	10
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QC Batch 90611 - CCV (1)	31
QC Batch 90611 - CCV (2)	31
QC Batch 90612 - CCV (1)	31
QC Batch 90612 - CCV (2)	31
QC Batch 90738 - CCV (1)	32
QC Batch 90738 - CCV (2)	32
QC Batch 90739 - CCV (1)	32
QC Batch 90739 - CCV (2)	32
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# Case Narrative

Samples for project COG/Jenkins B Federal Water Flood were received by TraceAnalysis, Inc. on 2012-04-23 and assigned to work order 12042404. Samples for work order 12042404 were received intact at a temperature of 3.9 C.

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

		$\operatorname{Prep}$	$\operatorname{Prep}$	QC	Analysis
Test	Method	Batch	Date	Batch	Date
BTEX	S 8021B	76841	2012-04-24 at 10:30	90566	2012-04-24 at 10:23
BTEX	S 8021B	76879	2012-04-25 at 10:55	90611	2012-04-25 at 11:11
Chloride (Titration)	SM 4500-Cl B	76915	2012-04-27 at 09:48	90738	2012-04-30 at 10:14
Chloride (Titration)	SM 4500-Cl B	76915	2012-04-27 at 09:48	90739	2012-05-01 at 10:15
Chloride (Titration)	SM 4500-Cl B	76915	2012-04-27 at 09:48	90740	2012-05-01 at 10:16
TPH DRO - NEW	S 8015 D	76815	2012-04-24 at 13:11	90553	2012-04-24 at 14:58
TPH DRO - NEW	S 8015 D	76854	2012-04-25 at 13:34	90586	2012-04-25 at 13:36
TPH GRO	S 8015 D	76841	2012-04-24 at 10:30	90567	2012-04-24 at 10:51
TPH GRO	S 8015 D	76879	2012-04-25 at 10:55	90612	2012-04-25 at 11:39

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 12042404 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.

Report Date: May 1, 2012 114-6401364

Work Order: 12042404 COG/Jenkins B Federal Water Flood Page Number: 6 of 34 Eddy Co., NM

# **Analytical Report**

Sample: 295008 - AH-1 0.5' BEB 0-1'

Laboratory: Midland

Analysis: BTEX QC Batch: 90566 Prep Batch: 76841

Analytical Method: S 8021B
Date Analyzed: 2012-04-24
Sample Preparation: 2012-04-24

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

RLParameter Flag Cert Result Dilution RLUnits Benzene < 0.0200 mg/Kg 0.02001 Toluene 0.0941mg/Kg 1 0.0200Ethylbenzene 0.782mg/Kg 1 0.0200Xylene 1.62 1 0.0200mg/Kg

Surrogate	Flag	Cert	Result	Units	Dilution	${ m Spike} \ { m Amount}$	Percent Recovery	Recovery Limits
Triffuorotoluene (TFT)			2.06	mg/Kg	1	2.00	103	75 - 135.4
4-Bromofluorobenzene (4-BFB)			2.41	mg/Kg	1	2.00	120	63.6 - 158.9

Sample: 295008 - AH-1 0.5' BEB 0-1'

Laboratory: Midland

Analysis: Chloride (Titration)
QC Batch: 90738
Prep Batch: 76915

Analytical Method: Date Analyzed:

Sample Preparation:

SM 4500-Cl B 2012-04-30 2012-04-27 Prep Method: N/A Analyzed By: AR Prepared By: AR

Sample: 295008 - AH-1 0.5' BEB 0-1'

Laboratory:

Midland

Analysis: TPH DRO - NEW QC Batch: 90553 Prep Batch: 76815 Analytical Method: S 8015 D
Date Analyzed: 2012-04-24
Sample Preparation: 2012-04-24

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

114-6401364

Work Order: 12042404 COG/Jenkins B Federal Water Flood Page Number: 7 of 34 Eddy Co., NM

							Spike	Percent	Recovery
Surrogate		Flag	Cert	Result	${ m Units}$	Dilution	Amount	Recovery	Limits
n-Tricosane	Qar	Qar		166	mg/Kg	1	100	166	49.3 - 157.5

Sample: 295008 - AH-1 0.5' BEB 0-1'

Laboratory:

Midland

Analysis:

TPH GRO 90567

Analytical Method:

S 8015 D 2012-04-24 Prep Method: S 5035 Analyzed By: tc

QC Batch: Prep Batch: 76841

Date Analyzed: Sample Preparation:

2012-04-24

Prepared By: tc

			$\mathrm{RL}$			
Parameter	Flag	$\operatorname{Cert}$	Result	Units	Dilution	$\mathrm{RL}$
GRO	Qs	1	166	mg/Kg	1	2.00

						$\operatorname{Spike}$	Percent	Recovery
Surrogate	$\operatorname{Flag}$	$\operatorname{Cert}$	Result	Units	Dilution	Amount	Recovery	Limits
Trifluorotoluene (TFT)			2.16	mg/Kg	1	2.00	108	58.5 - 155.1
4-Bromofluorobenzene (4-BFB)			2.61	mg/Kg	1	2.00	130	45.1 - 162.2

Sample: 295009 - AH-1 0.5' BEB 1-1.5'

Laboratory:

Midland

Analysis: QC Batch:

Chloride (Titration)

Analytical Method:

SM 4500-Cl B 2012-04-30

Prep Method: N/A Analyzed By: AR

Prep Batch:

90738 76915

Date Analyzed: Sample Preparation:

2012-04-27

Prepared By: AR

RL

Parameter Flag Cert Result Units Dilution RLChloride 1080 mg/Kg 4.00 5

Sample: 295010 - AH-1 0.5' BEB 2-2.5'

Laboratory:

Midland

Analysis:

Chloride (Titration)

Analytical Method:

SM 4500-Cl B

Prep Method: N/A Analyzed By: AR

AR

QC Batch: Prep Batch: 90738 76915 Date Analyzed: Sample Preparation:

2012-04-30 2012-04-27

Prepared By:

 $continued \dots$ 

Report Date	: May	1,	2012
114-6401364			

Work Order: 12042404 COG/Jenkins B Federal Water Flood Page Number: 8 of 34 Eddy Co., NM

sample z	295010	continued			
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Parameter	Flag	Cert	Result	Units	Dilution	RL
			RL			
Parameter	Flag	Cert	Result	Units	Dilution	m RL
Chloride			159	mg/Kg	5	4.00

### Sample: 295011 - AH-1 0.5' BEB 3-3.5'

Laboratory:

Midland

Analysis: QC Batch: 90738

Chloride (Titration)

Analytical Method: Date Analyzed:

SM 4500-Cl B 2012-04-30

Prep Method: N/A Analyzed By: AR

Prep Batch:

76915

Sample Preparation: 2012-04-27

Prepared By: AR

RLParameter Cert Result Flag Chloride 606

Units Dilution RLmg/Kg 4.00 5

### Sample: 295012 - AH-1 0.5' BEB 4-4.5'

Laboratory:

Midland

Analysis: QC Batch: 90739

Chloride (Titration)

Analytical Method: Date Analyzed:

SM 4500-Cl B 2012-05-01

Prep Method: N/A Analyzed By: AR

Prep Batch: 76915 Sample Preparation: 2012-04-27

Prepared By: AR.

			RL			
Parameter	Flag	Cert	Result	Units	Dilution	RL
Chloride			987	nig/Kg	5	4.00

#### Sample: 295013 - AH-1 0.5' BEB 5-5.5'

Laboratory:

Midland

Analysis:

Chloride (Titration)

Analytical Method: Date Analyzed:

SM 4500-Cl B 2012-05-01

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

QC Batch: Prep Batch:

90739 76915

Sample Preparation:

2012-04-27

114-6401364

Work Order: 12042404 COG/Jenkins B Federal Water Flood Page Number: 9 of 34

Eddy Co., NM

			RL			
Parameter	Flag	Cert	Result	Units	Dilution	RL
Chloride			1790	mg/Kg	10	4.00

Sample: 295014 - AH-1 0.5' BEB 6-6.5'

Laboratory:

Midland

Analysis: Chloride (Titration) QC Batch: 90739 Prep Batch: 76915 Analytical Method: Date Analyzed:

Sample Preparation:

SM 4500-Cl B 2012-05-01 2012-04-27 Prep Method: N/A

Analyzed By: AR
Prepared By: AR

Sample: 295015 - AH-1 0.5' BEB 7-7.5'

Laboratory:

Midland

Analysis: Chloride (Titration) QC Batch: 90739 Prep Batch: 76915 Analytical Method:
Date Analyzed:

Sample Preparation:

SM 4500-Cl B 2012-05-01 2012-04-27 Prep Method: N/A

Analyzed By: AR Prepared By: AR

Sample: 295016 - AH-1 0.5' BEB 8-8.5'

Flag

Laboratory:

Parameter

Chloride

Midland

Analysis: Chloride (Titration) QC Batch: 90739 Prep Batch: 76915 Analytical Method: Date Analyzed:

Sample Preparation:

SM 4500-Cl B 2012-05-01 2012-04-27 Prep Method: N/A Analyzed By: AR

AR.

Prepared By:

RL Cert Result

4590

 $\begin{array}{c|cc} Units & Dilution & RL \\ \hline mg/Kg & 10 & 4.00 \end{array}$ 

114-6401364

Work Order: 12042404 COG/Jenkins B Federal Water Flood Page Number: 10 of 34 Eddy Co., NM

Sample: 295017 - AH-1 0.5' BEB 9-9.5'

Laboratory:

Midland

Analysis: QC Batch:

Prep Batch:

Chloride (Titration)

90739 76915

Analytical Method: Date Analyzed:

Sample Preparation:

SM 4500-Cl B

2012-05-01 2012-04-27 Prep Method: N/A Analyzed By: AR.

AR.

Prepared By:

RL

 $\operatorname{Cert}$ Result Parameter Flag Units Dilution RLChloride 6480 mg/Kg 10 4.00

Sample: 295018 - AH-2 0.5' BEB 0-1'

Laboratory:

Midland

Analysis: QC Batch:

Prep Batch:

**BTEX** 90566 76841

Analytical Method: Date Analyzed:

Sample Preparation:

S 8021B 2012-04-24

2012-04-24

Prep Method: S 5035Analyzed By: tc

Prepared By:

tc

RL

Result Parameter Flag Units Dilution RLCert 4.74 Benzene mg/Kg 50 0.0200 Toluene 61.1 mg/Kg 50 0.02001 Ethylbenzene 73.4 mg/Kg 50 0.02001 95.2 mg/Kg 50 0.0200Xylene

	T-1	~ .	75 1.	**	D.0	Spike	Percent	Recovery
Surrogate	Flag	$\operatorname{Cert}$	Result	Units	Dilution	Amount	Recovery	Limits
Trifluorotoluene (TFT)			47.4	mg/Kg	50	50.0	95	75 - 135.4
4-Bromofluorobenzene (4-BFB)			57.6	mg/Kg	50	50.0	115	63.6 - 158.9

Sample: 295018 - AH-2 0.5' BEB 0-1'

Laboratory:

Prep Batch:

Midland

76915

Analysis: Chloride (Titration) QC Batch: 90739

Analytical Method: Date Analyzed:

Sample Preparation:

SM 4500-Cl B 2012-05-01 2012-04-27

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

RLFlag Cert

Parameter Result Units Dilution RLChloride 6540 mg/Kg 10 4.00

114-6401364

Work Order: 12042404 COG/Jenkins B Federal Water Flood Page Number: 11 of 34

Eddy Co., NM

### Sample: 295018 - AH-2 0.5' BEB 0-1'

Laboratory:

Midland

Analysis: QC Batch: TPH DRO - NEW

90553

Analytical Method:

Date Analyzed:

S 8015 D 2012-04-24 Prep Method: N/A Analyzed By: DA

Prep Batch:

76815

Sample Preparation:

2012-04-24

Prepared By: DA

			$\mathrm{RL}$			
Parameter	Flag	$\operatorname{Cert}$	Result	Units	Dilution	RL
DRO	Qs	1	5970	mg/Kg	5	50.0

							Spike	Percent	Recovery
Surrogate		Flag	Cert	Result	Units	Dilution	Amount	Recovery	Limits
n-Tricosane	Qar	Qar		571	mg/Kg	5	100	571	49.3 - 157.5

#### Sample: 295018 - AH-2 0.5' BEB 0-1'

Laboratory:

Midland

TPH GRO Analysis: QC Batch: 90567 Prep Batch: 76841

Analytical Method: Date Analyzed:

Sample Preparation:

S 8015 D 2012-04-24 2012-04-24 Prep Method: S 5035

Analyzed By: tcPrepared By: tc

			RL			
Parameter	$\operatorname{Flag}$	Cert	Result	$_{ m Units}$	Dilution	RL
GRO	Qs	1	4150	mg/Kg	50	2.00

						$\operatorname{Spike}$	Percent	Recovery
Surrogate	Flag	$\operatorname{Cert}$	Result	Units	Dilution	Amount	Recovery	Limits
Trifluorotoluene (TFT)			49.6	mg/Kg	50	50.0	99	58.5 - 155.1
4-Bromofluorobenzene (4-BFB)			61.0	mg/Kg	50	50.0	122	45.1 - 162.2

### Sample: 295019 - AH-2 0.5' BEB 1-1.5'

Laboratory:

Midland

Analysis: BTEX QC Batch: 90611 Prep Batch: 76879

Analytical Method: S 8021B Date Analyzed: 2012-04-25 Sample Preparation: 2012-04-25

Prep Method: S 5035 Analyzed By: tcPrepared By: tc

RLFlag Parameter Cert Result Units Dilution RLBenzene 0.0200 < 0.0200 mg/Kg U 1 1 Toluene mg/Kg < 0.0200 1 0.0200U Ethylbenzene mg/Kg U < 0.0200 1 0.0200Xylene < 0.0200 mg/Kg 1 0.0200U

114-6401364

Work Order: 12042404 COG/Jenkins B Federal Water Flood Page Number: 12 of 34 Eddy Co., NM

Surrogate	Flag	Cert	Result	Units	Dilution	${ m Spike} \ { m Amount}$	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)			2.04	mg/Kg	1	2.00	102	75 - 135.4
4-Bromofluorobenzene (4-BFB)			1.97	mg/Kg	1	2.00	98	63.6 - 158.9

Sample: 295019 - AH-2 0.5' BEB 1-1.5'

Laboratory:

Midland

Analysis:

Chloride (Titration)

90739

Analytical Method: Date Analyzed:

SM 4500-Cl B 2012-05-01

Prep Method: N/A Analyzed By: AR.

QC Batch: Prep Batch:

76915

Sample Preparation:

2012-04-27

Prepared By:

RL

Result 5560

Units

AR.

RL

50.0

Parameter Flag CertDilution RLChloride mg/Kg 10 4.00

Sample: 295019 - AH-2 0.5' BEB 1-1.5'

Laboratory:

Midland

Analysis:

TPH DRO - NEW

Analytical Method:

S 8015 D

Prep Method: N/A

QC Batch: Prep Batch:

90586 76854 Date Analyzed: Sample Preparation: 2012-04-25

Analyzed By: DA

2012-04-25

Prepared By: DA

RL

Result Parameter Flag Cert < 50.0 DRO U

Dilution Units mg/Kg

						$\operatorname{Spike}$	Percent	Recovery
Surrogate	Flag	Cert	Result	$\operatorname{Units}$	Dilution	Amount	Recovery	Limits
n-Tricosane			114	mg/Kg	1	100	114	49.3 - 157.5

Sample: 295019 - AH-2 0.5' BEB 1-1.5'

Laboratory:

Midland

Analysis:

TPH GRO

Analytical Method:

S 8015 D

Prep Method: S 5035

QC Batch:

90612

Date Analyzed:

2012-04-25

Analyzed By: tc

76879 Prep Batch:

Sample Preparation: 2012-04-25 Prepared By: tc

RLCert Result Units Dilution Parameter Flag RL $\overline{GRO}$ 4.90 mg/Kg 2.00Qr,Qs 1

114-6401364

Work Order: 12042404 COG/Jenkins B Federal Water Flood Page Number: 13 of 34

Eddy Co., NM

Surrogate	Flag	Cert	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)			2.12	mg/Kg	1	2.00	106	58.5 - 155.1
4-Bromofluorobenzene (4-BFB)			1.96	mg/Kg	1	2.00	98	45.1 - 162.2

Sample: 295020 - AH-2 0.5' BEB 2-2.5'

Laboratory:

Midland

Analysis:

Chloride (Titration)

Analytical Method:

SM 4500-Cl B

Prep Method: N/A

QC Batch:

90739

Date Analyzed:

2012-05-01

Analyzed By: ARAR

Prep Batch:

76915

Sample Preparation: 2012-04-27

Prepared By:

ъī

Chloride 166 mg/Kg 5 4.00			1 (.1.)			
Chloride 166 mg/Kg 5 4.00	Parameter	~ .	Result	Units	Dilution	$_{ m RL}$
	Chloride			mg/Kg	5	4.00

Sample: 295021 - AH-3 0.5' BEB 0-1'

Laboratory:

Midland

Analysis: QC Batch: **BTEX** 90566

Analytical Method:

S 8021B 2012-04-24

S 5035 Prep Method: Analyzed By: tc

tc

Prep Batch:

76841

Date Analyzed: Sample Preparation: 2012-04-24

Prepared By:

RLParameter Flag CertResult Units Dilution RLBenzene < 0.0200 mg/Kg 0.0200 $\mathbf{u}$ Toluene 0.106 1 0.0200 mg/Kg Ethylbenzene 0.105 1 mg/Kg 0.0200Xylene 0.362mg/Kg 1 0.0200

Surrogate	Flag	Cert	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)			2.20	mg/Kg	1	2.00	110	75 - 135.4
4-Bromofluorobenzene (4-BFB)			2.14	mg/Kg	1	2.00	107	63.6 - 158.9

Sample: 295021 - AH-3 0.5' BEB 0-1'

Laboratory:

Midland

Analysis: Chloride (Titration) 90739

Analytical Method: Date Analyzed:

SM 4500-Cl B 2012-05-01

Prep Method: N/A Analyzed By: AR.

QC Batch: Prep Batch:

76915

Sample Preparation:

2012-04-27

Prepared By: AR

114-6401364

Work Order: 12042404 COG/Jenkins B Federal Water Flood Page Number: 14 of 34

Eddy Co., NM

			RL			
Parameter	$\operatorname{Flag}$	Cert	Result	Units	Dilution	RL
Chloride			6130	mg/Kg	10	4.00

Sample: 295021 - AH-3 0.5' BEB 0-1'

Laboratory:

Midland

Analysis:

TPH DRO - NEW

Analytical Method: Date Analyzed:

S 8015 D

Prep Method: N/A

QC Batch:

90553

2012-04-24

Analyzed By: DA

Prep Batch:

76815

Sample Preparation: 2012-04-24

Prepared By: DA

			RL			
Parameter	Flag	Cert	Result	Units	Dilution	RL
DRO	Qs	1	50.3	${ m mg/Kg}$	1	50.0

						$\operatorname{Spike}$	$\operatorname{Percent}$	Recovery
Surrogate	$\operatorname{Flag}$	Cert	Result	${ m Units}$	Dilution	Amount	Recovery	Limits
n-Tricosane			145	${ m mg/Kg}$	1	100	145	49.3 - 157.5

Sample: 295021 - AH-3 0.5' BEB 0-1'

Laboratory:

Midland

Analysis: TPH GRO 90567

Analytical Method: Date Analyzed:

S 8015 D

2012-04-24

Prep Method: S 5035 Analyzed By: tc

tc

QC Batch: Prep Batch:

76841

Sample Preparation: 2012-04-24

Prepared By:

			RL			
Parameter	Flag	$\operatorname{Cert}$	Result	Units	Dilution	RL
GRO	Qs	l	33.6	mg/Kg	1	2.00

						$\operatorname{Spike}$	Percent	Recovery
Surrogate	$\operatorname{Flag}$	$\operatorname{Cert}$	Result	Units	Dilution	Amount	Recovery	Limits
Trifluorotoluene (TFT)			2.34	mg/Kg	1	2.00	117	58.5 - 155.1
4-Bromofluorobenzene (4-BFB)			2.27	mg/Kg	1	2.00	114	45.1 - 162.2

Sample: 295022 - AH-3 0.5' BEB 1-1.5'

Laboratory:

Midland

Analysis: Chloride (Titration)

Analytical Method: Date Analyzed:

SM 4500-Cl B 2012-05-01

Prep Method: N/A Analyzed By: AR

QC Batch: 90740 Prep Batch: 76915

Sample Preparation:

2012-04-27

Prepared By: AR

114-6401364

Work Order: 12042404 COG/Jenkins B Federal Water Flood Page Number: 15 of 34

Eddy Co., NM

			RL			
Parameter	$\operatorname{Flag}$	$\operatorname{Cert}$	Result	Units	Dilution	RL
Chloride			4090	m mg/Kg	10	4.00

Sample: 295023 - AH-3 0.5' BEB 2-2.5'

Laboratory:

Midland

Analysis:

Chloride (Titration)

Flag

Flag

Flag

Analytical Method:

SM 4500-Cl B

Units

mg/Kg

Units

mg/Kg

Prep Method: N/A

AR

QC Batch:

90740

Date Analyzed:

2012-05-01

Analyzed By:

AR.

Prep Batch:

Parameter

Chloride

76915

Sample Preparation: 2012-04-27

900

Prepared By:

RLCert

Result

Dilution RL5 4.00

Sample: 295024 - AH-3 0.5' BEB 3-3.5'

Laboratory:

Midland

Analysis:

Chloride (Titration)

Analytical Method:

SM 4500-Cl B

Prep Method: N/A

AR

4.00

QC Batch:

90740

Date Analyzed:

Cert

2012-05-01

Analyzed By:

Prep Batch:

Parameter

Chloride

2012-04-27

10

76915

Sample Preparation:

Prepared By: AR

RL

Result

885

RLDilution

Sample: 295025 - AH-3 0.5' BEB 4-4.5'

Laboratory:

Midland

Analysis:

Chloride (Titration)

Analytical Method:

SM 4500-Cl B

Prep Method: N/A

QC Batch:

Parameter

Chloride

90740

Date Analyzed:

2012-05-01 2012-04-27 Analyzed By: AR

Prep Batch:

76915

Sample Preparation:

Prepared By: AR.

RLCert Result 1810

Units Dilution RLmg/Kg 10 4.00

114-6401364

Work Order: 12042404 COG/Jenkins B Federal Water Flood Page Number: 16 of 34 Eddy Co., NM

# Method Blanks

Method Blank (1)

QC Batch: 90553

QC Batch:

90553

Date Analyzed:

2012-04-24

Analyzed By: DA

Prep Batch:

76815

QC Preparation: 2012-04-24 Prepared By: DA

MDL

 $\operatorname{Cert}$ Result Units RLParameter Flag DRO < 14.5mg/Kg 50

Spike Percent Recovery Surrogate Flag Cert Result Units Dilution Amount Recovery Limits n-Tricosane 118 mg/Kg 1 100 118 52 - 140.8

Method Blank (1)

QC Batch: 90566

QC Batch: 90566 Date Analyzed:

2012-04-24

Analyzed By: tc

Prep Batch:

76841

QC Preparation:

2012-04-24

Prepared By:

MDL Units RLParameter Flag Cert Result Benzene < 0.00470 mg/Kg 0.02 1 Toluene mg/Kg < 0.00980 0.02 1 Ethylbenzene < 0.00500 mg/Kg 0.021 Xylene < 0.0170 mg/Kg 0.02

						$_{ m Spike}$	Percent	Recovery
Surrogate	$\operatorname{Flag}$	$\operatorname{Cert}$	Result	Units	Dilution	Amount	Recovery	Limits
Trifluorotoluene (TFT)			1.88	mg/Kg	1	2.00	94	78 - 123.6
4-Bromofluorobenzene (4-BFB)			1.76	mg/Kg	1	2.00	88	55.9 - 112.4

Method Blank (1)

QC Batch: 90567

QC Batch: 90567 Prep Batch: 76841

Date Analyzed: QC Preparation:

2012-04-24 2012-04-24

Analyzed By: tc Prepared By:

114-6401364

Work Order: 12042404 COG/Jenkins B Federal Water Flood Page Number: 17 of 34 Eddy Co., NM

Parameter	Flag		Cert		MDL Result		Units	RL
GRO			mg/Kg	2				
C	121	C14	D14	[ ]	D:1:	Spike	Percent	Recovery
Surrogate	Flag	Cert	Result	Units	Dilution	Amount	Recovery	Limits
Trifluorotoluene (TFT)			1.96	mg/Kg	1	2.00	98	78.6 - 111
4-Bromoffuorobenzene (4-BFB)			1.72	${ m mg/Kg}$	1	2.00	86	55 - 100

Method Blank (1)

QC Batch: 90586

QC Batch:

90586

Date Analyzed:

2012-04-25

Analyzed By: DA Prepared By: DA

Prep Batch: 76854

QC Preparation: 2012-04-25

			$\mathrm{MDL}$		
Parameter	$\operatorname{Flag}$	$\operatorname{Cert}$	Result	Units	RL
DRO		1	<14.5	mg/Kg	50

						Spike	Percent	Recovery
Surrogate	Flag	Cert	Result	Units	Dilution	Amount	Recovery	Limits
n-Tricosane			110	mg/Kg	1	100	110	52 - 140.8

Method Blank (1)

QC Batch: 90611

QC Batch: 90611 Prep Batch: 76879

Date Analyzed: 2012-04-25 QC Preparation: 2012-04-25

Analyzed By: tc Prepared By: tc

			MDL		
Parameter	$\operatorname{Flag}$	Cert	Result	Units	RL
Benzene		1	< 0.00470	mg/Kg	0.02
Toluene		1	< 0.00980	mg/Kg	0.02
Ethylbenzene		1	< 0.00500	mg/Kg	0.02
Xylene		1	< 0.0170	mg/Kg	0.02

						$_{ m Spike}$	Percent	Recovery
Surrogate	$\operatorname{Flag}$	$\operatorname{Cert}$	Result	Units	Dilution	Amount	Recovery	Limits
Trifluorotoluene (TFT)			1.61	mg/Kg	1	2.00	80	78 - 123.6
4-Bromofluorobenzene (4-BFB)			1.58	$\mathrm{mg}/\mathrm{Kg}$	1	2.00	79	55.9 - 112.4

114-6401364

Work Order: 12042404 COG/Jenkins B Federal Water Flood Page Number: 18 of 34

Eddy Co., NM

Method Blank (1)

QC Batch: 90612

QC Batch: Prep Batch: 76879

90612

Date Analyzed:

2012-04-25

QC Preparation:

2012-04-25

Analyzed By: tc

Prepared By:

MDL

Parameter Units RLFlag  $\operatorname{Cert}$ Result GRO <1.22 mg/Kg  $\overline{2}$ 

Spike Percent Recovery Surrogate Flag Cert Result Units Dilution Amount Recovery Limits Triffuorotoluene (TFT) 2.00 85 78.6 - 111 1.70 mg/Kg 1 76 55 - 1004-Bromofluorobenzene (4-BFB) 1.52 mg/Kg 1 2.00

Method Blank (1)

QC Batch: 90738

QC Batch: 90738

Date Analyzed:

2012-04-30

Analyzed By: AR

AR.

Prep Batch: 76915 QC Preparation: 2012-04-27 Prepared By:

MDLParameter Result Units Flag Cert RLChloride < 3.85 mg/Kg

Method Blank (1)

QC Batch: 90739

QC Batch: Prep Batch: 90739

76915

Date Analyzed: QC Preparation:

QC Preparation:

2012-05-01 2012-04-27 Analyzed By:

Prepared By:

AR

AR

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

Method Blank (1)

QC Batch: 90740

QC Batch: Prep Batch: 76915

90740

Date Analyzed:

2012-05-01

2012-04-27

Analyzed By: AR.

Prepared By: AR

Work Order: 12042404

Page Number: 19 of 34 Eddy Co., NM

114-6401364

COG/Jenkins B Federal Water Flood

MDL Result  ${\bf Units}$ RLParameter Flag  $\operatorname{Cert}$ Chloride mg/Kg 4 < 3.85

Report Date: May 1, 2012 114-6401364

Work Order: 12042404 COG/Jenkins B Federal Water Flood Page Number: 20 of 34 Eddy Co., NM

# Laboratory Control Spikes

### Laboratory Control Spike (LCS-1)

QC Batch:

90553

Date Analyzed:

2012-04-24

Analyzed By: DA

Prep Batch: 76815

QC Preparation: 2012-04-24

Prepared By:

			LCS			Spike	Matrix		Rec.
Param	$\mathbf{F}$	$^{\rm C}$	Result	Units	Dil.	Amount	Result	Rec.	Limit
DRO		1	242	mg/Kg	1	250	<14.5	97	62 - 128.3

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

			LCSD			Spike	Matrix		${ m Rec.}$		RPD
Param	F	$^{\rm C}$	Result	Units	Dil.	Amount	Result	Rec.	$\operatorname{Limit}$	RPD	Limit
DRO		1	262	mg/Kg	1	250	<14.5	105	62 - 128.3	8	20

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

	LCS	LCSD			$\operatorname{Spike}$	LCS	LCSD	Rec.
Surrogate	Result	Result	$_{ m Units}$	Dil.	Amount	Rec.	Rec.	${f Limit}$
n-Tricosane	117	125	ıng/Kg	1	100	117	125	58.6 - 149.6

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

QC Batch:

90566

Date Analyzed:

2012-04-24

Analyzed By: tc

Prep Batch: 76841

QC Preparation: 2012-04-24

Prepared By: tc

			LCS			Spike	Matrix		$\mathrm{Rec}.$
Param	$\mathbf{F}$	$^{\mathrm{C}}$	Result	Units	Dil.	Amount	Result	Rec.	$\operatorname{Limit}$
Benzene		1	2.38	mg/Kg	1	2.00	< 0.00470	119	86.5 - 124.9
Toluene		1	2.32	$_{ m mg/Kg}$	1	2.00	< 0.00980	116	84.7 - 122.5
Ethylbenzene		1	2.18	$_{ m mg/Kg}$	1	2.00	< 0.00500	109	79.4 - 118.9
Xylene		1	6.51	mg/Kg	1	6.00	< 0.0170	108	79.5 - 118.9

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

			LCSD			Spike	Matrix		Rec.		RPD
Param	$\mathbf{F}$	$^{\rm C}$	Result	Units	Dil.	Amount	Result	Rec.	Limit	RPD	$_{ m Limit}$
Benzene		1	2.33	mg/Kg	1	2.00	< 0.00470	116	86.5 - 124.9	2	20
Toluene		1	2.25	mg/Kg	1	2.00	< 0.00980	112	84.7 - 122.5	3	20
Ethylbenzene		1	2.15	mg/Kg	1	2.00	< 0.00500	108	79.4 - 118.9	1	20
Xylene		1	6.41	mg/Kg	1	6.00	< 0.0170	107	79.5 - 118.9	2	20

114-6401364

Work Order: 12042404 COG/Jenkins B Federal Water Flood Page Number: 21 of 34

Eddy Co., NM

Surrogate	LCS Result	LCSD Result	Units	Dil.	Spike Amount	LCS Rec.	LCSD Rec.	Rec. Limit
Triffuorotoluene (TFT)	1.94	2.24	mg/Kg	1	2.00	97	112	73.9 - 127
4-Bromofluorobenzene (4-BFB)	1.44	1.76	$\mathrm{mg}/\mathrm{Kg}$	1	2.00	72	88	70.4 - 119.9

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

QC Batch:

90567

Date Analyzed:

2012-04-24

Analyzed By: tc

Prep Batch: 76841

QC Preparation: 2012-04-24

Prepared By: tc

			LCS			Spike	Matrix		Rec.
Param	$\mathbf{F}$	$\mathbf{C}$	Result	Units	Dil.	${f A}{f mount}$	Result	Rec.	${f Limit}$
GRO		1	15.6	mg/Kg	1	20.0	< 1.22	78	68.3 - 105.7

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

			LCSD			Spike	Matrix		Rec.		RPD
Param	$\mathbf{F}$	С	Result	Units	Dil.	Amount	Result	Rec.	$\operatorname{Limit}$	RPD	Limit
GRO		1	16.0	mg/Kg	1	20.0	<1.22	80	68.3 - 105.7	2	20

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

Surrogate	LCS Result	LCSD Result	Units	Dil.	Spike Amount	LCS Rec.	LCSD Rec.	Rec. Limit
Trifluorotoluene (TFT)	1.89	1.95	mg/Kg	1	2.00	94	98	80 - 111.2
4-Bromofluorobenzene (4-BFB)	1.80	1.82	mg/Kg	1	2.00	90	91	66.4 - 106.6

### Laboratory Control Spike (LCS-1)

QC Batch:

90586

Date Analyzed:

2012-04-25

Analyzed By: DA

Prep Batch: 76854

QC Preparation:

2012-04-25

Prepared By: DA

			LCS			$\operatorname{Spike}$	Matrix		${ m Rec.}$
Param	F	C	Result	Units	Dil.	Amount	Result	Rec.	Limit
DRO		1	261	mg/Kg	1	250	<14.5	104	62 - 128.3

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

			LCSD			$\operatorname{Spike}$	Matrix		Rec.		RPD
Param	$\mathbf{F}$	$^{\mathrm{C}}$	Result	Units	Dil.	Amount	Result	Rec.	$\operatorname{Limit}$	RPD	Limit
DRO		1	271	mg/Kg	1	250	<14.5	108	62 - 128.3	4	20

114-6401364

Work Order: 12042404 COG/Jenkins B Federal Water Flood Page Number: 22 of 34

Eddy Co., NM

	LCS	S LCSD			Spike	LCS	LCSD	Rec.
Surrogate	Resu	lt Result	Units	Dil.	Amount	Rec.	Rec.	${f Limit}$
n-Tricosane	110	115	mg/Kg	1	100	110	115	58.6 - 149.6

### Laboratory Control Spike (LCS-1)

QC Batch:

90611

Date Analyzed:

2012-04-25

Analyzed By: tc

Prep Batch: 76879

QC Preparation: 2012-04-25

Prepared By: tc

			LCS			$\operatorname{Spike}$	Matrix		Rec.	
Param	$\mathbf{F}$	$\mathbf{C}$	Result	Units	Dil.	Amount	Result	Rec.	${f Limit}$	
Benzene		ı	2.06	mg/Kg	1	2.00	< 0.00470	103	86.5 - 124.9	
Toluene		1	2.04	mg/Kg	1	2.00	< 0.00980	102	84.7 - 122.5	
Ethylbenzene		1	1.99	mg/Kg	1	2.00	< 0.00500	100	79.4 - 118.9	
Xylene		1	5.95	mg/Kg	1	6.00	< 0.0170	99	79.5 - 118.9	

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

			LCSD	•		$_{ m Spike}$	Matrix		Rec.		RPD
Param	$\mathbf{F}$	С	Result	Units	Dil.	Amount	Result	Rec.	$\mathbf{Limit}$	RPD	$\operatorname{Limit}$
Benzene		1	2.14	mg/Kg	1	2.00	< 0.00470	107	86.5 - 124.9	4	20
Toluene		1	2.10	mg/Kg	1	2.00	< 0.00980	105	84.7 - 122.5	3	20
Ethylbenzene		ı	2.03	mg/Kg	1	2.00	< 0.00500	102	79.4 - 118.9	2	20
Xylene		1	6.06	mg/Kg	1	6.00	< 0.0170	101	79.5 - 118.9	2	20

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

	LCS	LCSD			Spike	LCS	LCSD	Rec.
Surrogate	Result	Result	Units	Dil.	Amount	Rec.	Rec.	Limit
Trifluorotoluene (TFT)	1.61	1.88	mg/Kg	1	2.00	80	94	73.9 - 127
4-Bromofluorobenzene (4-BFB)	1.65	1.89	mg/Kg	1	2.00	82	94	70.4 - 119.9

### Laboratory Control Spike (LCS-1)

QC Batch:

90612

Date Analyzed:

2012-04-25

Analyzed By: tc

Prep Batch: 76879

QC Preparation: 2012-04-25

Prepared By: tc

			LCS			$\operatorname{Spike}$	Matrix		Rec.
Param	$\mathbf{F}$	$\mathbf{C}$	Result	Units	Dil.	$\mathbf{A}$ mount	Result	Rec.	$\operatorname{Limit}$
GRO		1	17.1	mg/Kg	1	20.0	<1.22	86	68.3 - 105.7

114-6401364

Work Order: 12042404 COG/Jenkins B Federal Water Flood Page Number: 23 of 34

Eddy Co., NM

			LCSD			Spike	Matrix		Rec.		RPD
Param	$\mathbf{F}$	$\mathbf{C}$	Result	$\operatorname{Units}$	Dil.	Amount	Result	Rec.	${f Limit}$	RPD	$\operatorname{Limit}$
GRO		1	17.3	mg/Kg	1	20.0	< 1.22	86	68.3 - 105.7	1	20

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

	LCS	LCSD			$\operatorname{Spike}$	LCS	LCSD	Rec.
Surrogate	Result	Result	Units	Dil.	Amount	Rec.	Rec.	Limit
Trifluorotoluene (TFT)	1.91	1.97	mg/Kg	1	2.00	96	98	80 - 111.2
4-Bromofluorobenzene (4-BFB)	1.78	1.83	$\mathrm{mg}/\mathrm{Kg}$	1	2.00	89	92	66.4 - 106.6

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

QC Batch:

90738

Date Analyzed:

2012-04-30

Analyzed By: AR Prepared By: AR

Prep Batch: 76915

QC Preparation: 2012-04-27

			LCS			$\operatorname{Spike}$	Matrix		Rec.
Param	$\mathbf{F}$	$^{\rm C}$	Result	Units	Dil.	Amount	Result	Rec.	$_{ m Limit}$
Chloride			2580	$\mathrm{mg}/\mathrm{Kg}$	1	2500	<3.85	103	85 - 115

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

			LCSD			Spike	Matrix		Rec.		RPD
Param	$\mathbf{F}$	$^{\rm C}$	Result	Units	Dil.	Amount	Result	Rec.	$\operatorname{Limit}$	RPD	$\operatorname{Limit}$
Chloride			2540	mg/Kg	1	2500	< 3.85	102	85 - 115	2	20

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

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

QC Batch:

90739

Date Analyzed:

2012-05-01

Analyzed By: AR

Prep Batch: 76915

QC Preparation: 2012-04-27

Prepared By: AR

			LCS			Spike	Matrix		${ m Rec.}$
Param	$\mathbf{F}$	$^{\mathrm{C}}$	Result	Units	Dil.	Amount	Result	Rec.	$\mathbf{Limit}$
Chloride			2350	mg/Kg	1	2500	< 3.85	94	85 - 115

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

			LCSD			Spike	Matrix		Rec.		RPD
Param	$\mathbf{F}$	$\mathbf{C}$	Result	Units	Dil.	Amount	Result	Rec.	$\operatorname{Limit}$	RPD	Limit
Chloride			2190	mg/Kg	1	2500	< 3.85	88	85 - 115	7	20

114-6401364

Work Order: 12042404 COG/Jenkins B Federal Water Flood Page Number: 24 of 34

Eddy Co., NM

Laboratory Control Spike (LCS-1)

QC Batch:

90740

Date Analyzed:

2012-05-01

Analyzed By: AR.

Prep Batch: 76915

QC Preparation: 2012-04-27

Prepared By: AR.

			LCS			Spike	Matrix		Rec.
Param	$\mathbf{F}$	$^{\rm C}$	Result	Units	Dil.	Amount	Result	Rec.	$_{ m Limit}$
Chloride			2410	mg/Kg	1	2500	< 3.85	96	85 - 115

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

			LCSD			$\operatorname{Spike}$	Matrix		Rec.		RPD
Param	$\mathbf{F}$	$^{\mathrm{C}}$	Result	Units	Dil.	Amount	Result	Rec.	Limit	RPD	Limit
Chloride			2500	mg/Kg	1	2500	< 3.85	100	85 - 115	4	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: 295039

QC Batch:

90553

Date Analyzed:

2012-04-24

Analyzed By: DA

Prep Batch:

76815

QC Preparation: 2012-04-24

Prepared By: DA

			MS			$\operatorname{Spike}$	Matrix		${ m Rec.}$
Param.	$\mathbf{F}$	$^{\mathrm{C}}$	Result	${ m Units}$	Dil.	Amount	Result	Rec.	Limit
DRO		1	2340	mg/Kg	5	250	2210	52	45.5 - 127

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

				MSD			$\operatorname{Spike}$	Matrix		Rec.		RPD
Param		$\mathbf{F}$	$\mathbf{C}$	Result	$\mathbf{Units}$	Dil.	Amount	Result	Rec.	Limit	RPD	Limit
DRO	Qs	Qв	1	2700	mg/Kg	5	250	2210	196	45.5 - 127	14	20

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

			MS	MSD			$\operatorname{Spike}$	MS	MSD	Rec.
Surrogate			Result	Result	$\mathbf{Units}$	Dil.	Amount	Rec.	Rec.	${f Limit}$
n-Tricosane	Qsr	Qar	378	411	mg/Kg	5	100	378	411	45.4 - 145.8

Matrix Spike (MS-1) Spiked Sample: 295021

QC Batch:

90566

Date Analyzed:

2012-04-24

Analyzed By: tc Prepared By: tc

Prep Batch: 76841

QC Preparation: 2012-04-24

114-6401364 COG/Jenkins B Federal W

Work Order: 12042404 Page Number: 25 of 34 COG/Jenkins B Federal Water Flood Eddy Co., NM

Param	F	$\mathbf{C}$	MS Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	Rec. Limit
Benzene		1	2.39	mg/Kg	1	2.00	< 0.00470	120	69.3 - 159.2
Toluene		1	2.42	$_{ m mg/Kg}$	1	2.00	0.1064	116	68.7 - 157
Ethylbenzene		1	2.52	mg/Kg	1	2.00	0.1049	121	71.6 - 158.2
Xylene		1	7.76	mg/Kg	_ 1	6.00	0.3622	123	70.8 - 159.8

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

			MSD			$\operatorname{Spike}$	Matrix		Rec.		RPD
Param	$\mathbf{F}$	$\mathbf{C}$	Result	Units	Dil.	Amount	Result	Rec.	$\mathbf{Limit}$	RPD	$\operatorname{Limit}$
Benzene		1	2.45	mg/Kg	1	2.00	< 0.00470	122	69.3 - 159.2	2	20
Toluene		1	2.49	mg/Kg	1	2.00	0.1064	119	68.7 - 157	3	20
Ethylbenzene		1	2.60	mg/Kg	1	2.00	0.1049	125	71.6 - 158.2	3	20
Xylene		}	7.90	mg/Kg	1	6.00	0.3622	126	70.8 - 159.8	$^2$	20

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

	MS	MSD			Spike	MS	MSD	Rec.
Surrogate	Result	Result	Units	Dil.	Amount	Rec.	Rec.	${f Limit}$
Trifluorotoluene (TFT)	2.44	2.20	mg/Kg	1	2	122	110	71.4 - 133.9
4-Bromoffuorobenzene (4-BFB)	2.44	2.15	$\mathrm{mg}/\mathrm{Kg}$	1	2	122	108	72.6 - 144.1

Matrix Spike (MS-1) Spiked Sample: 295018

Param

 $\overline{GRO}$ 

QC Batch: 90567 Date Analyzed: 2012-04-24 Prep Batch: 76841 QC Preparation: 2012-04-24

F

MS Spike Matrix Rec.
C Result Units Dil. Amount Result Rec. Limit

500

4149.32

Analyzed By: tc

28.2 - 157.2

Prepared By:

650

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

7400

				MSD			$\mathbf{Spike}$	Matrix		Rec.		RPD
Param		$\mathbf{F}$	$^{\rm C}$	Result	Units	Dil.	Amount	Result	Rec.	$\mathbf{Limit}$	RPD	$\operatorname{Limit}$
GRO	Qs	Qs	1	7620	mg/Kg	50	500	4149.32	694	28.2 - 157.2	3	20

mg/Kg

50

	MS	MSD			$\operatorname{Spike}$	MS	MSD	$\mathrm{Rec.}$
Surrogate	Result	Result	Units	Dil.	Amount	Rec.	Rec.	$\operatorname{Limit}$
Trifluorotoluene (TFT)	53.8	52.0	mg/Kg	50	50	108	104	75.5 - 122.3
4-Bromofluorobenzene (4-BFB) Qsr Qsr	70.0	69.2	mg/Kg	50	50	140	138_	77.9 - 122.4

114-6401364

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Matrix Spike (MS-1)

Spiked Sample: 294998

QC Batch: Prep Batch: 76854

90586

Date Analyzed: QC Preparation:

2012-04-25 2012-04-25

Analyzed By: DA

Prepared By: DA

			MS			Spike	Matrix		Rec.
Param	$\mathbf{F}$	$\mathbf{C}$	Result	Units	Dil.	${f Amount}$	Result	Rec.	$\operatorname{Limit}$
DRO		1	274	mg/Kg	1	250	120	62	45.5 - 127

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

			MSD			$_{ m Spike}$	Matrix		$\operatorname{Rec}$ .		RPD
Param	$\mathbf{F}$	$^{\rm C}$	Result	Units	Dil.	Amount	Result	Rec.	Limit	RPD	Limit
DRO		1	288	mg/Kg	1	250	120	67	45.5 - 127	5	20

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

	MS	MSD			Spike	MS	MSD	Rec.
Surrogate	Result	Result	${ m Units}$	Dil.	Amount	Rec.	$\mathrm{Rec.}$	${f Limit}$
n-Tricosane	126	121	mg/Kg	1	100	126	121	45.4 - 145.8

Matrix Spike (MS-1)

Spiked Sample: 295157

QC Batch: 90611 Date Analyzed:

2012-04-25

Analyzed By: tc

Prep Batch: 76879

QC Preparation: 2012-04-25 Prepared By: tc

			MS			Spike	Matrix		Rec.
Param	$\mathbf{F}$	$^{\mathrm{C}}$	Result	Units	Dil.	Amount	Result	Rec.	$\mathbf{Limit}$
Benzene		1	56.8	mg/Kg	50	50.0	3.918	106	69.3 - 159.2
Toluene		1	108	mg/Kg	50	50.0	45.884	124	68.7 - 157
Ethylbenzene		1	110	mg/Kg	50	50.0	50.3205	119	71.6 - 158.2
Xylene		1	263	mg/Kg	50	150	93.1734	113	70.8 - 159.8

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

			MSD			$_{ m Spike}$	Matrix		Rec.		RPD
Param	$\mathbf{F}$	$\mathbf{C}$	Result	Units	Dil.	Amount	Result	Rec.	Limit	RPD	Limit
Benzene		1	56.9	mg/Kg	50	50.0	3.918	106	69.3 - 159.2	0	20
Toluene		1	101	${ m mg/Kg}$	50	50.0	45.884	110	68.7 - 157	7	20
Ethylbenzene		1	102	mg/Kg	50	50.0	50.3205	103	71.6 - 158.2	8	20
Xylene		1	247	mg/Kg	50	150	93.1734	102	70.8 - 159.8	6	20

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

	MS	MSD	1		$\operatorname{Spike}$	MS	MSD	Rec.
Surrogate	Result	Result	Units	Dil.	Amount	Rec.	Rec.	Limit
Trifluorotoluene (TFT)	40.9	44.3	mg/Kg	50	50	82	89	71.4 - 133.9

 $continued \dots$ 

Work Order: 12042404

Page Number: 27 of 34

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COG/Jenkins B Federal Water Flood

Eddy Co., NM

$matrix\ spikes$	continued				
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•	MS	MSD			Spike	MS	MSD	Rec.
Surrogate	Result	Result	Units	Dil.	Amount	Rec.	Rec.	Limit
4-Bromofluorobenzene (4-BFB)	53.2	55.3	mg/Kg	50	50	106	111	72.6 - 144.1

Matrix Spike (MS-1)

Spiked Sample: 295158

QC Batch:

90612

Date Analyzed:

2012-04-25

Analyzed By: tc

Prep Batch: 76879

QC Preparation: 2012-04-25

Prepared By: tc

			MS			Spike	Matrix		Rec.
Param	$\mathbf{F}$	$^{\rm C}$	Result	Units	Dil.	Amount	Result	Rec.	${f Limit}$
GRO		1	6340	mg/Kg	50	500	5925.95	83	28.2 - 157.2

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

			MSD			Spike	Matrix		Rec.		RPD
Param	F	) آ	C Result	$\operatorname{Units}$	Dil.	Amount	Result	Rec.	${f Limit}$	RPD	$\operatorname{Limit}$
GRO	Qr,Qs Qr,	Qs	7790	mg/Kg	50	500	5925.95	373	28.2 - 157.2	20	20

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

	MS	MSD			Spike	MS	MSD	Rec.
Surrogate	Result	Result	Units	Dil.	Amount	Rec.	Rec.	${f Limit}$
Trifluorotoluene (TFT)	51.2	51.0	mg/Kg	50	50	102	102	75.5 - 122.3
4-Bromofluorobenzene (4-BFB) QST QST	66.2	65.4	mg/Kg	50	50	132	131	77.9 - 122.4

Matrix Spike (MS-1)

Spiked Sample: 295011

QC Batch:

90738

Date Analyzed:

2012-04-30

Analyzed By: AR

Prep Batch: 76915

QC Preparation: 2012-04-27

Prepared By: AR.

			MS			$_{ m Spike}$	Matrix		Rec.
Param	$\mathbf{F}$	$^{\rm C}$	Result	Units	Dil.	Amount	Result	Rec.	$\mathbf{Limit}$
Chloride			3100	mg/Kg	5	2500	606	100	79.4 - 120.6

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

			MSD			Spike	Matrix		$\mathrm{Rec.}$		RPD
Param	$\mathbf{F}$	$^{\mathrm{C}}$	Result	Units	Dil.	Amount	Result	Rec.	$_{ m Limit}$	RPD	Limit
Chloride			3190	mg/Kg	5	2500	606	103	79.4 - 120.6	3	20

114-6401364

Work Order: 12042404

COG/Jenkins B Federal Water Flood

Page Number: 28 of 34

Eddy Co., NM

Matrix Spike (MS-1)

Spiked Sample: 295021

QC Batch: Prep Batch: 76915

90739

Date Analyzed:

QC Preparation: 2012-04-27

2012-05-01

Analyzed By: AR.

Prepared By: AR

			MS			Spike	Matrix		Rec.
Param	$\mathbf{F}$	$\mathbf{C}$	Result	Units	Dil.	Amount	Result	Rec.	$_{ m Limit}$
Chloride			8280	mg/Kg	10	2500	6130	86	79.4 - 120.6

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

			MSD			Spike	Matrix		Rec.		RPD
Param	$\mathbf{F}$	$\mathbf{C}$	Result	Units	Dil.	Amount	Result	Rec.	Limit	RPD	$_{ m Limit}$
Chloride			8750	mg/Kg	10	2500	6130	105	79.4 - 120.6	6	20

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

Matrix Spike (MS-1)

Spiked Sample: 295025

QC Batch:

90740

Date Analyzed:

2012-05-01

Analyzed By: AR

Prep Batch: 76915

QC Preparation:

2012-04-27

Prepared By: AR.

MS Spike Matrix Rec.  $\mathbf{F}$ Param  $\mathbf{C}$ Dil. Limit Result Units Amount Result Rec. Chloride 4540 2500 109 79.4 - 120.6 mg/Kg 10 1810

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

			MSD			$\operatorname{Spike}$	Matrix		Rec.		RPD
Param	F	С	Result	Units	Dil.	Amount	Result	Rec.	Limit	RPD	Limit
Chloride			4330	mg/Kg	10	2500	1810	101	79.4 - 120.6	5	20

Report Date: May 1, 2012 114-6401364 Work Order: 12042404 COG/Jenkins B Federal Water Flood Page Number: 29 of 34

Eddy Co., NM

# Calibration Standards

Standard (CCV-2)

QC Batch: 90553

Date Analyzed: 2012-04-24

Analyzed By: DA

				CCVs True	CCVs Found	$rac{CCVs}{Percent}$	Percent Recovery	Date
Param	Flag	$\operatorname{Cert}$	${ m Units}$	Conc.	Conc.	Recovery	Limits	Analyzed
DRO		ı	mg/Kg	250	236	94	80 - 120	2012-04-24

Standard (CCV-3)

QC Batch: 90553

Date Analyzed: 2012-04-24

Analyzed By: DA

TD.	T)	<b>a</b> ,	FT · ·	CCVs True	CCVs Found	CCVs Percent	Percent Recovery	Date
Param	$\operatorname{Flag}$	$\operatorname{Cert}$	${ m Units}$	Conc.	$\operatorname{Conc.}$	Recovery	Limits	Analyzed
DRO			mg/Kg	250	253	101	80 - 120	2012-04-24

Standard (CCV-1)

QC Batch: 90566

Date Analyzed: 2012-04-24

Analyzed By: tc

				$\mathrm{CCVs}$	CCVs	CCVs	Percent	D.	
				$\operatorname{True}$	Found	$\operatorname{Percent}$	Recovery	$\operatorname{Date}$	
Param	Flag	$\operatorname{Cert}$	Units	Conc.	Conc.	Recovery	Limits	Analyzed	
Benzene		1	mg/kg	0.100	0.109	109	80 - 120	2012-04-24	
Toluene		ł	mg/kg	0.100	0.107	107	80 - 120	2012-04-24	
Ethylbenzene		1	mg/kg	0.100	0.108	108	80 - 120	2012-04-24	
Xylene		1	mg/kg	0.300	0.323	108	80 - 120	2012-04-24	

Standard (CCV-2)

QC Batch: 90566

Date Analyzed: 2012-04-24

Analyzed By: tc

114-6401364

Work Order: 12042404 COG/Jenkins B Federal Water Flood Page Number: 30 of 34

Eddy Co., NM

Param	$\operatorname{Flag}$	Cert	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Benzene		1	mg/kg	0.100	0.111	111	80 - 120	2012-04-24
Toluene		1	nig/kg	0.100	0.109	109	80 - 120	2012-04-24
Ethylbenzene		1	mg/kg	0.100	0.105	105	80 - 120	2012-04-24
Xylene		1	mg/kg	0.300	0.317	106	80 - 120	2012-04-24

### Standard (CCV-1)

QC Batch: 90567

Date Analyzed: 2012-04-24

Analyzed By: tc

				$ ext{CCVs}$	CCVs	CCVs	Percent	<b>D</b> .
Param	Flag	Cert	Units	True Conc.	Found Conc.	Percent Recovery	$egin{array}{c}  ext{Recovery} \  ext{Limits} \end{array}$	Date Analyzed
GRO		1	mg/Kg	1.00	1.10	110	80 - 120	2012-04-24

### Standard (CCV-2)

QC Batch: 90567

Date Analyzed: 2012-04-24

Analyzed By: tc

				$rac{ ext{CCVs}}{ ext{True}}$	CCVs Found	$\begin{array}{c} { m CCVs} \\ { m Percent} \end{array}$	Percent Recovery	Date
Param	Flag	Cert	Units	Conc.	Conc.	Recovery	Limits	Analyzed
GRO		1	mg/Kg	1.00	1.14	114	80 - 120	2012-04-24

### Standard (CCV-2)

QC Batch: 90586

Date Analyzed: 2012-04-25

Analyzed By: DA

				CCVs	$\mathrm{CCVs}$	CCVs	Percent	
				True	Found	Percent	Recovery	Date
Param	Flag	$\operatorname{Cert}$	Units	Conc.	Conc.	Recovery	Limits	Analyzed
DRO		1	mg/Kg	250	272	109	80 - 120	2012-04-25

### Standard (CCV-3)

QC Batch: 90586

Date Analyzed: 2012-04-25

Analyzed By: DA

114-6401364

Work Order: 12042404 COG/Jenkins B Federal Water Flood Page Number: 31 of 34 Eddy Co., NM

_				CCVs True	CCVs Found	CCVs Percent	Percent Recovery	Date
Param	Flag	$\operatorname{Cert}$	$\operatorname{Units}$	$\operatorname{Conc.}$	Conc.	Recovery	Limits	Analyzed_
DRO		1	mg/Kg	250	250	100	80 - 120	2012-04-25

## Standard (CCV-1)

QC Batch: 90611

Date Analyzed: 2012-04-25

Analyzed By: tc

				CCVs	CCVs	CCVs	Percent		
				True	Found	Percent	Recovery	Date	
Param	$\operatorname{Flag}$	$\operatorname{Cert}$	$\mathbf{U}_{\mathbf{nits}}$	Conc.	Conc.	Recovery	Limits	Analyzed	
Benzene		1	mg/kg	0.100	0.0925	92	80 - 120	2012-04-25	
Toluene		ı	mg/kg	0.100	0.0912	91	80 - 120	2012-04-25	
Ethylbenzene		1	mg/kg	0.100	0.0883	88	80 - 120	2012-04-25	
Xylene		1	mg/kg	0.300	0.266	89	80 - 120	2012-04-25	

### Standard (CCV-2)

QC Batch: 90611

Date Analyzed: 2012-04-25

Analyzed By: tc

				CCVs	CCVs	CCVs	Percent	
				True	Found	Percent	Recovery	Date
Param	Flag	$\operatorname{Cert}$	$\operatorname{Units}$	Conc.	Conc.	Recovery	Limits	Analyzed
Benzene		1	mg/kg	0.100	0.104	104	80 - 120	2012-04-25
Toluene		ì	mg/kg	0.100	0.105	105	80 - 120	2012-04-25
Ethylbenzene		1	mg/kg	0.100	0.0991	99	80 - 120	2012-04-25
Xylene		1	mg/kg	0.300	0.295	98	80 - 120	2012-04-25

### Standard (CCV-1)

QC Batch: 90612

Date Analyzed: 2012-04-25

Analyzed By: tc

				$\mathrm{CCVs}$	$\mathrm{CCVs}$	$\mathrm{CCVs}$	Percent	
				True	Found	Percent	Recovery	Date
Param	$\operatorname{Flag}$	$\operatorname{Cert}$	Units	Conc.	Conc.	Recovery	Limits	Analyzed
GRO		1	mg/Kg	1.00	1.07	107	80 - 120	2012-04-25

114-6401364

Work Order: 12042404 COG/Jenkins B Federal Water Flood Page Number: 32 of 34 Eddy Co., NM

Standard (CCV-2)

QC Batch: 90612

Date Analyzed: 2012-04-25

Analyzed By: tc

				CCVs	CCVs	$\mathrm{CCVs}$	Percent	
				True	Found	Percent	Recovery	Date
Param	$\operatorname{Flag}$	$\operatorname{Cert}$	Units	Conc.	Conc.	Recovery	Limits	Analyzed
GRO		ı	mg/Kg	1.00	1.18	118	80 - 120	2012-04-25

Standard (CCV-1)

QC Batch: 90738

Date Analyzed: 2012-04-30

Analyzed By: AR

Param	Flag	Cert	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
	1,00							./
Chloride			${ m mg/Kg}$	100 .	101	101	85 - 115	2012-04-30

Standard (CCV-2)

QC Batch: 90738

Date Analyzed: 2012-04-30

Analyzed By: AR

				CCVs	CCVs	$\mathrm{CCVs}$	Percent	
				True	Found	Percent	Recovery	Date
Param	$\operatorname{Flag}$	$\operatorname{Cert}$	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Chloride			mg/Kg	100	99.0	99	85 - 115	2012-04-30

Standard (CCV-1)

QC Batch: 90739

Date Analyzed: 2012-05-01

Analyzed By: AR

				CCVs	CCVs	CCVs	Percent	
				True	Found	Percent	Recovery	Date
Param	$\operatorname{Flag}$	Cert	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Chloride			mg/Kg	100	100	100	85 - 115	2012-05-01

Standard (CCV-2)

QC Batch: 90739

Date Analyzed: 2012-05-01

Analyzed By: AR

114 - 6401364

Work Order: 12042404 COG/Jenkins B Federal Water Flood Page Number: 33 of 34

Eddy Co., NM

Param	Flag	Cert	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Chloride			mg/Kg	100	99.9	100	85 - 115	2012-05-01

## Standard (CCV-1)

QC Batch: 90740

Date Analyzed: 2012-05-01

Analyzed By: AR

				CCVs True	CCVs Found	${ m CCVs} \ { m Percent}$	Percent	Date
Param	Flag	Cert	Units	Conc.	Conc.	Recovery	Recovery Limits	Analyzed
Chloride			mg/Kg	100	99.8	100	85 - 115	2012-05-01

## Standard (CCV-2)

QC Batch: 90740

Date Analyzed: 2012-05-01

Analyzed By: AR

				$\rm CCVs$	$\rm CCVs$	$\mathrm{CCVs}$	Percent	
				True	Found	Percent	Recovery	Date
Param	Flag	$\operatorname{Cert}$	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Chloride			mg/Kg	100	100	100	85 - 115	2012-05-01

Work Order: 12042404 COG/Jenkins B Federal Water Flood Page Number: 34 of 34

Eddy Co., NM

Report Date: May 1, 2012 114-6401364

# **Appendix**

## Report Definitions

Name	Definition
$\overline{\mathrm{MDL}}$	Method Detection Limit
MQL	Minimum Quantitation Limit
$\mathrm{SDL}$	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
1	NELAP	T104704392-11-3	Midland

# Standard Flags

- F Description
- B Analyte detected in the corresponding method blank above the method detection limit
- H Analyzed out of hold time
- J Estimated concentration
- Jb The analyte is positively identified and the value is approximated between the SDL and MQL. Sample contains less then ten times the concentration found in the method blank. The result should be considered non-detect to the SDL.
- Je Estimated concentration exceeding calibration range.
- Qc Calibration check outside of laboratory limits.
- Qr RPD outside of laboratory limits
- Qs Spike recovery outside of laboratory limits.
- Qsr Surrogate recovery outside of laboratory limits.
- U The analyte is not detected above the SDL

## Attachments

The scanned attachments will follow this page.

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

-11 DU ISTUT **Analysis Request of Chain of Custody Record** PAGE: ANALYSIS REQUEST (Circle or Specify Method No.) **TETRATECH** Ext. to C35) တ္တို့ တို့ 1910 N. Big Spring St. Fg Fg Midland, Texas 79705 a B (432) 682-4559 • Fax (432) 682-3946 5 וֹ≥ 8 8 GC.MS Semi. Vol. 8270/625 CLIENT NAME: SITE MANAGER: **PRESERVATIVE** Ba Ba NUMBER OF CONTAINERS RCI GC.MS Vol. 8240/8260/6 (OG Ike Tarrivez **METHOD** TCLP Metals Ag As TCLP Volatiles TCLP Semi Volatiles PROJECT NO.: PROJECT NAME: PCB's 8080/608 Pest. 808/608 114-6401364 Jenkins B Federal Water Flood FILTERED (Y/N) LAB I.D. MATRIX COMP SAMPLE IDENTIFICATION DATE TIME GRAB HANO3 NONE NUMBER 2012 295008 0.5' BEB AH-1 00/ 4-4.5' 015 7-7.5 016 8-8.51

Date: 4 - 2n -12 SAMPLED BY: (Print & Initial) 185 Date: Date: SAMPLE SHIPPED BY: (Circle) RELINQUISHED BY: (Signature) RECÉIVED BY: (Signature) AIRBILL #: Time: OTHER: HAND DELIVERED RELINQUISHED BY: (Signature) Date: RECEIVED BY: (Signature) Date: TETRA TECH CONTACT PERSON: Results by: Time: RECEIVING LABORATORY: RECEIVED BY: (Signature) **RUSH Charges** The Towarez Authorized: ZIP: PHONE: SAMPLE CONDITION WHEN RECEIVED:

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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018	4/3			5		X	AH-2 0.5	BEB O-1'	1			X		Ì	X \								Ī	Ý					1
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021							AH-3 0.5	BEB D-1	Ш						XX						<u> </u>		\	4		Ц		$\coprod$	
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Report Date: June 15, 2012 Work Order: 12060828 Page Number: 1 of 5

# **Summary Report**

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

Report Date: June 15, 2012

Work Order: 12060828

Project Location: Eddy Co., NM

Project Name: COG/Jenkins B Federal Water Flood

Project Number: 114-6401364

			Date	${f Time}$	Date
Sample	Description	Matrix	Taken	Taken	Received
300502	BH-1 @ AH-1 (6 in. BEB) 0-1'	soil	2012-06-06	00:00	2012-06-08
300503	BH-1 @ AH-1 (6 in. BEB) 2-3'	soil	2012-06-06	00:00	2012-06-08
300504	BH-1 @ AH-1 (6 in. BEB) 4-5'	soil	2012-06-06	00:00	2012-06-08
300505	BH-1 @ AH-1 (6 in. BEB) 6-7'	soil	2012-06-06	00:00	2012-06-08
300506	BH-1 @ AH-1 (6 in. BEB) 9-10'	soil	2012-06-06	00:00	2012-06-08
300507	BH-1 @ AH-1 (6 in. BEB) 14-15'	soil	2012-06-06	00:00	2012-06-08
300508	BH-1 @ AH-1 (6 in. BEB) 19-20'	soil	2012-06-06	00:00	2012-06-08
300509	BH-1 @ AH-1 (6 in. BEB) 24-25'	soil	2012-06-06	00:00	2012-06-08
300510	BH-1 @ AH-1 (6 in. BEB) 29-30'	soil	2012-06-06	00:00	2012-06-08
300511	BH-1 @ AH-1 (6 in. BEB) 39-40'	soil	2012-06-06	00:00	2012-06-08
300512	BH-1 @ AH-1 (6 in. BEB) 49-50'	soil	2012-06-06	00:00	2012-06-08
300513	BH-1 @ AH-1 (6 in. BEB) 59-60'	soil	2012-06-06	00:00	2012-06-08
300514	BH-1 @ AH-1 (6 in. BEB) 69-70'	soil	2012-06-06	00:00	2012-06-08
300515	BH-1 @ AH-1 (6 in. BEB) 79-80'	soil	2012-06-06	00:00	2012-06-08
300516	BH-2 @ AH-3 (6 in. BEB) 0-1'	soil	2012-06-06	00:00	2012-06-08
300517	BH-2 @ AH-3 (6 in. BEB) 2-3'	soil	2012-06-06	00:00	2012-06-08
300518	BH-2 @ AH-3 (6 in. BEB) 4-5'	soil	2012-06-06	00:00	2012-06-08
300519	BH-2 @ AH-3 (6 in. BEB) 6-7'	soil	2012-06-06	00:00	2012-06-08
300520	BH-2 @ AH-3 (6 in. BEB) 9-10'	soil	2012-06-06	00:00	2012-06-08
300521	BH-2 @ AH-3 (6 in. BEB) 14-15'	soil	2012-06-06	00:00	2012-06-08
300522	BH-2 @ AH-3 (6 in. BEB) 19-20'	soil	2012-06-06	00:00	2012-06-08
300523	BH-2 @ AH-3 (6 in. BEB) 24-25'	soil	2012-06-06	00:00	2012-06-08
300524	BH-2 @ AH-3 (6 in. BEB) 29-30'	soil	2012-06-06	00:00	2012-06-08
300525	BH-2 @ AH-3 (6 in. BEB) 39-40'	soil	2012-06-06	00:00	2012-06-08
300526	BH-2 @ AH-3 (6 in. BEB) 49-50'	soil	2012-06-06	00:00	2012-06-08
300527	BH-2 @ AH-3 (6 in. BEB) 59-60'	soil	2012-06-06	00:00	2012-06-08
300528	BH-2 @ AH-3 (6 in. BEB) 69-70'	soil	2012-06-06	00:00	2012-06-08
300529	BH-2 @ AH-3 (6 in. BEB) 79-80'	soil	2012-06-06	00:00	2012-06-08

Report Date: June 15, 2012	Work Order: 12060828	Page	Number: 2 of 5
Sample: 300502 - BH-1 @ AH-1	(6 in. BEB) 0-1'		
Param Flag	Result	Units	RL
Chloride	1740	mg/Kg	4
·			
Sample: 300503 - BH-1 @ AH-1	(6 in. BEB) 2-3'		
Param Flag	Result	Units	RL
Chloride	3190	mg/Kg	4
Sample: 300504 - BH-1 @ AH-1	(6 in. BEB) 4-5'		
Param Flag	Result	Units	RL
Chloride	780	mg/Kg	4
Sample:         300505 - BH-1 @ AH-1           Param         Flag           Chloride	(6 in. BEB) 6-7'  Result  1440	Units mg/Kg	RL 4
Sample: 300506 - BH-1 @ AH-1 ( Param Flag	Result	Units	m RL
Chloride	2570	mg/Kg	4
Sample: 300507 - BH-1 @ AH-1 (           Param         Flag           Chloride         Flag	(6 in. BEB) 14-15'  Result  5890	Units ıng/Kg	RL 4
Sample: 300508 - BH-1 @ AH-1 (	(6 in. BEB) 19-20'		
Param Flag	Result	Units	RL
Chloride	8650	mg/Kg	4
Sample: 300509 - BH-1 @ AH-1 (	(6 in. BEB) 24-25'		
Param Flag	Result	Units	RL
Chloride	7640	mg/Kg	4

Report Date: June 15	5, 2012	Work Order: 12060828	Page Number: 3 of 5				
Sample: 300510 - l	BH-1 @ AH-1 (6 in.	BEB) 29-30'					
Param	Flag	Result	Units	RL			
Chloride	C)	7190	mg/Kg	4			
Sample: 300511 - 1	BH-1 @ AH-1 (6 in.	BEB) 39-40'					
Param	Flag	Result	Units	RL			
Chloride		14700	mg/Kg	4			
Sample: 300512 - I	BH-1 @ AH-1 (6 in.	BEB) 49-50'					
Param	Flag	Result	Units	RL			
Chloride		9100	ıng/Kg	4			
Sample: 300513 - I Param Chloride	BH-1 @ AH-1 (6 in. Flag	Result 12000	Units mg/Kg	RL 4			
Sample: 300514 - I	3H-1 @ AH-1 (6 in.	BEB) 69-70'					
Param	Flag	Result	Units	$\operatorname{RL}$			
Chloride		3800	mg/Kg	4			
Sample: 300515 - I	3H-1 @ AH-1 (6 in.	BEB) 79-80'					
Param	Flag	Result	Units	RL			
Chloride		5550	mg/Kg	4			
Sample: 300516 - E	3H-2 @ AH-3 (6 in.	,					
Param	Flag	Result	Units	RL			
Chloride		1730	mg/Kg	4			
Sample: 300517 - E	3H-2 @ AH-3 (6 in.	BEB) 2-3'					
Param	Flag	Result	Units	RL			
Chloride		1180	mg/Kg	4			

Report Date: June 15, 2012		Work Order: 12060828	Page I	Number: 4 of 5
Sample: 300518 - B	H-2 @ AH-3 (6 in.	BEB) 4-5'		
Param	Flag	Result	Units	RL
Chloride	O.	2830	mg/Kg	4
Sample: 300519 - B	H-2 @ AH-3 (6 in.	BEB) 6-7'		
Param	Flag	Result	Units	$\mathrm{RL}$
Chloride	Nat .	3290	mg/Kg	4
Sample: 300520 - B	H-2 @ AH-3 (6 in.	BEB) 9-10'		
Param	$\operatorname{Flag}$	Result	Units	RL
Chloride		6230	mg/Kg	4
Chloride  Sample: 300522 - B	`	·	mg/Kg	4
Param Chloride	Flag	Result 6890	Units mg/Kg	$\frac{RL}{4}$
Sample: 300523 - B	H-2 @ AH-3 (6 in. )		6/ **6	
Param	Flag	Result	Units	RL
Chloride		4830	ing/Kg	4
Sample: 300524 - B	H-2 @ AH-3 (6 in. ]	BEB) 29-30'		
Param	Flag	Result	Units	RL
Chloride		6870	mg/Kg	4
Sample: 300525 - B	H-2 @ AH-3 (6 in. ]	BEB) 39-40'		
Param	Flag	Result	Units	RL
Chloride		7860	mg/Kg	4

Report Date: June 15, 2012 Work Order: 12060828 Page Number: 5 of 5 Sample: 300526 - BH-2 @ AH-3 (6 in. BEB) 49-50' Param Flag Result UnitsRLChloride 5840 mg/Kg 4 Sample: 300527 - BH-2 @ AH-3 (6 in. BEB) 59-60' RLParam Result Units 8290 Chloride mg/Kg Sample: 300528 - BH-2 @ AH-3 (6 in. BEB) 69-70' Flag Result Units RLParam Chloride 4680 mg/Kg Sample: 300529 - BH-2 @ AH-3 (6 in. BEB) 79-80' Param Flag Result Units RL4420 mg/Kg

Chloride



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### 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: June 15, 2012

Work Order: 12060828

Project Location:

Eddy Co., NM

Project Name:

COG/Jenkins B Federal Water Flood

Project Number:

114-6401364

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

			Date	$\operatorname{Time}$	Date
Sample	Description	Matrix	Taken	Taken	Received
300502	BH-1 @ AH-1 (6 in. BEB) 0-1'	soil	2012-06-06	00:00	2012-06-08
300503	BH-1 @ AH-1 (6 in. BEB) 2-3'	soil	2012-06-06	00:00	2012-06-08
300504	BH-1 @ AH-1 (6 in. BEB) 4-5'	soil	2012-06-06	00:00	2012-06-08
300505	BH-1 @ AH-1 (6 in. BEB) 6-7'	soil	2012-06-06	00:00	2012-06-08
300506	BH-1 @ AH-1 (6 in. BEB) 9-10'	soil	2012-06-06	00:00	2012-06-08
300507	BH-1 @ AH-1 (6 in. BEB) 14-15'	soil	2012-06-06	00:00	2012-06-08
300508	BH-1 @ AH-1 (6 in. BEB) 19-20'	soil	2012-06-06	00:00	2012-06-08
300509	BH-1 @ AH-1 (6 in. BEB) 24-25'	soil	2012-06-06	00:00	2012-06-08
300510	BH-1 @ AH-1 (6 in. BEB) 29-30'	soil	2012-06-06	00:00	2012-06-08
300511	BH-1 @ AH-1 (6 in. BEB) 39-40'	soil	2012-06-06	00:00	2012-06-08
300512	BH-1 @ AH-1 (6 in. BEB) 49-50'	soil	2012-06-06	00:00	2012-06-08
300513	BH-1 @ AH-1 (6 in. BEB) 59-60'	soil	2012-06-06	00:00	2012-06-08
300514	BH-1 @ AH-1 (6 in. BEB) 69-70'	soil	2012-06-06	00:00	2012-06-08
300515	BH-1 @ AH-1 (6 in. BEB) 79-80'	soil	2012-06-06	00:00	2012-06-08
300516	BH-2 @ AH-3 (6 in. BEB) 0-1'	soil	2012-06-06	00:00	2012-06-08
300517	BH-2 @ AH-3 (6 in. BEB) 2-3'	soil	2012-06-06	00:00	2012-06-08
300518	BH-2 @ AH-3 (6 in. BEB) 4-5'	soil	2012-06-06	00:00	2012-06-08
300519	BH-2 @ AH-3 (6 in. BEB) 6-7'	soil	2012-06-06	00:00	2012-06-08

			Date	Time	Date
$\mathbf{Sample}$	Description	Matrix	Taken	Taken	Received
300520	BH-2 @ AH-3 (6 in. BEB) 9-10'	soil	2012-06-06	00:00	2012-06-08
300521	BH-2 @ AH-3 (6 in. BEB) 14-15'	soil	2012-06-06	00:00	2012-06-08
300522	BH-2 @ AH-3 (6 in. BEB) 19-20'	soil	2012-06-06	00:00	2012-06-08
300523	BH-2 @ AH-3 (6 in. BEB) 24-25'	soil	2012-06-06	00:00	2012-06-08
300524	BH-2 @ AH-3 (6 in. BEB) 29-30'	soil	2012-06-06	00:00	2012-06-08
300525	BH-2 @ AH-3 (6 in. BEB) 39-40'	soil	2012-06-06	00:00	2012-06-08
300526	BH-2 @ AH-3 (6 in. BEB) 49-50'	$\operatorname{soil}$	2012-06-06	00:00	2012-06-08
300527	BH-2 @ AH-3 (6 in. BEB) 59-60'	soil	2012-06-06	00:00	2012-06-08
300528	BH-2 @ AH-3 (6 in. BEB) 69-70'	soil	2012-06-06	00:00	2012-06-08
300529	BH-2 @ AH-3 (6 in. BEB) 79-80'	soil	2012-06-06	00:00	2012-06-08

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

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

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	Sample 300505 (BH-1 @AH-1 (6 in. BEB) 6-7')
	Sample 300506 (BH-1 @AH-1 (6 in. BEB) 9-10')
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### Case Narrative

Samples for project COG/Jenkins B Federal Water Flood were received by TraceAnalysis, Inc. on 2012-06-08 and assigned to work order 12060828. Samples for work order 12060828 were received intact at a temperature of 3.5 C.

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

		$\operatorname{Prep}$	$\operatorname{Prep}$	QC	Analysis
Test	Method	Batch	Date	Batch	Date
Chloride (Titration)	SM 4500-Cl B	78114	2012-06-12 at 09:13	92103	2012-06-13 at 16:02
Chloride (Titration)	SM 4500-Cl B	78114	2012-06-12 at 09:13	92156	2012-06-14 at 12:12
Chloride (Titration)	SM 4500-Cl B	78114	2012-06-12 at 09:13	92157	2012-06-14 at 12:13
Chloride (Titration)	SM 4500-Cl B	78114	2012-06-12 at 09:13	92158	2012-06-14 at 12:14

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 12060828 since the sample was chosen at random. Therefore, the validity of the analytical data reported has been determined by the laboratory control sample (LCS) and the method blank (MB). These quality control measures are performed with each preparation batch to ensure data integrity.

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

114-6401364

Work Order: 12060828 COG/Jenkins B Federal Water Flood Page Number: 6 of 23 Eddy Co., NM

### **Analytical Report**

Sample: 300502 - BH-1 @ AH-1 (6 in. BEB) 0-1'

Laboratory:

Midland

Analysis:

Chloride (Titration)

92103

Analytical Method:

SM 4500-Cl B 2012-06-13

Prep Method:

N/AAR

QC Batch: Prep Batch: 78114

Date Analyzed: Sample Preparation:

2012-06-12

Analyzed By: Prepared By:

AR.

RL

Parameter Chloride

Flag Cert Result 1740

Units mg/Kg Dilution 10

RL4.00

Sample: 300503 - BH-1 @ AH-1 (6 in. BEB) 2-3'

Laboratory:

Midland

Analysis:

Chloride (Titration)

Analytical Method:

SM 4500-Cl B

Prep Method: N/A

QC Batch:

92103

Date Analyzed:

 $\operatorname{Cert}$ 

2012-06-13

Analyzed By: AR

Prep Batch:

78114

Sample Preparation:

2012-06-12

Prepared By: AR.

Parameter Chloride

Flag

RLResult 3190

Units mg/Kg Dilution 10

RL4.00

Sample: 300504 - BH-1 @ AH-1 (6 in. BEB) 4-5'

Laboratory:

Midland

Analysis:

Chloride (Titration)

Analytical Method:

SM 4500-Cl B

Prep Method: N/A

QC Batch:

92103

Date Analyzed:

2012-06-13

Analyzed By: AR.

Prep Batch: 78114

Sample Preparation:

2012-06-12

Prepared By: AR

RL

Parameter	Flag	$\operatorname{Cert}$	Result	Units	Dilution	RL
Chloride			780	mg/Kg	5	4.00

114-6401364

Work Order: 12060828

COG/Jenkins B Federal Water Flood

Page Number: 7 of 23

Eddy Co., NM

Sample: 300505 - BH-1 @ AH-1 (6 in. BEB) 6-7'

Laboratory:

Midland

Analysis:

Chloride (Titration)

Analytical Method:

SM 4500-Cl B

Prep Method: N/A

QC Batch:

92103

Date Analyzed:

Cert

Cert

2012-06-13

Analyzed By: AR

Prep Batch: 78114

Sample Preparation:

2012-06-12

Prepared By:

10

RL

Flag Parameter Chloride

Result 1440

Units mg/Kg Dilution

RL

4.00

AR.

Sample: 300506 - BH-1 @ AH-1 (6 in. BEB) 9-10'

Laboratory:

Midland

Analysis:

Chloride (Titration)

Analytical Method:

SM 4500-Cl B

Prep Method: N/A

QC Batch:

92103

Date Analyzed:

2012-06-13

Analyzed By:

AR. AR

Prep Batch: 78114

Sample Preparation:

2012-06-12

Prepared By:

Parameter

Chloride

Flag

Result 2570

RL

Units mg/Kg Dilution

10

RL

4.00

Sample: 300507 - BH-1 @ AH-1 (6 in. BEB) 14-15'

Laboratory:

Midland

Analysis:

Chloride (Titration)

Analytical Method:

SM 4500-Cl B

Prep Method: N/A

QC Batch:

Chloride

92103

Date Analyzed:

2012-06-13

Analyzed By: AR

Prep Batch:

78114

2012-06-12

Prepared By:

Sample Preparation:

AR

Cert Parameter Flag

RLResult 5890 Units

mg/Kg

10

Dilution

RL4.00

Sample: 300508 - BH-1 @ AH-1 (6 in. BEB) 19-20'

Laboratory:

Analysis:

Midland

Chloride (Titration)

Analytical Method:

SM 4500-Cl B

Prep Method: N/A

QC Batch:

92156

Date Analyzed:

2012-06-14

Analyzed By:

AR.

Prep Batch:

78114

Sample Preparation:

2012-06-12

Prepared By:

AR.

114-6401364

Work Order: 12060828 COG/Jenkins B Federal Water Flood Page Number: 8 of 23 Eddy Co., NM

			$\mathrm{RL}$			
Parameter	Flag	Cert	Result	Units	Dilution	RL
Chloride			8650	mg/Kg	10	4.00

Sample: 300509 - BH-1 @ AH-1 (6 in. BEB) 24-25'

Laboratory:

Midland

Analysis: Chloride (Titration) QC Batch: 92156

Analytical Method:

SM 4500-Cl B

Prep Method: N/A

Prep Batch: 78114

Date Analyzed: Sample Preparation:

2012-06-14 2012-06-12 Analyzed By: ARPrepared By: AR.

RLParameter Flag Cert Result Units Dilution RLChloride 7640 mg/Kg 10 4.00

Sample: 300510 - BH-1 @ AH-1 (6 in. BEB) 29-30'

Laboratory:

Midland

Analysis:

Chloride (Titration)

Analytical Method:

SM 4500-Cl B

Prep Method: N/A

QC Batch:

92156

Date Analyzed:

2012-06-14 2012-06-12

Analyzed By: AR.

Prep Batch:

78114

Prepared By:

Sample Preparation:

AR.

RLParameter Flag Cert Dilution RLResult Units Chloride 719010 4.00 mg/Kg

Sample: 300511 - BH-1 @ AH-1 (6 in. BEB) 39-40'

Laboratory:

Midland

Analysis:

Chloride (Titration)

Analytical Method:

SM 4500-Cl B

Prep Method: N/A

QC Batch:

92156

Date Analyzed:

2012-06-14

Analyzed By: AR

Prep Batch: 78114 Sample Preparation:

2012-06-12

Prepared By: AR.

RLParameter Cert Flag Result Units Dilution RLChloride  $\overline{14700}$ 10 4.00 mg/Kg

114-6401364

Work Order: 12060828 COG/Jenkins B Federal Water Flood Page Number: 9 of 23 Eddy Co., NM

Sample: 300512 - BH-1 @ AH-1 (6 in. BEB) 49-50'

Laboratory:

Midland

Analysis: QC Batch: Chloride (Titration)

92156

Analytical Method: Date Analyzed:

SM 4500-Cl B 2012-06-14

Prep Method: N/A Analyzed By:

AR.

Prep Batch: 78114

Sample Preparation:

2012-06-12

Prepared By: AR

Parameter Chloride

Flag

Cert

Result 9100

RL

Units mg/Kg Dilution 10

RL4.00

Sample: 300513 - BH-1 @ AH-1 (6 in. BEB) 59-60'

Laboratory:

Midland

Analysis:

Chloride (Titration)

Analytical Method: Date Analyzed:

SM 4500-Cl B 2012-06-14

Prep Method: N/A Analyzed By:

AR. AR.

QC Batch: Prep Batch: 78114

92156

Sample Preparation:

2012-06-12

Prepared By:

RL

Parameter Flag Chloride

Cert Result 12000

Units mg/Kg Dilution RL

 $\overline{10}$ 4.00

Sample: 300514 - BH-1 @ AH-1 (6 in. BEB) 69-70'

Laboratory:

Midland

Analysis:

Chloride (Titration)

Analytical Method:

SM 4500-Cl B

Prep Method: N/A

QC Batch: Prep Batch:

92156 78114

Date Analyzed: Sample Preparation: 2012-06-14 2012-06-12

Analyzed By: ARPrepared By: AR.

Parameter Chloride

Cert

RLResult

Units

Flag

3800

mg/Kg

Dilution RL10 4.00

Sample: 300515 - BH-1 @ AH-1 (6 in. BEB) 79-80'

Laboratory:

Midland

Analysis:

Chloride (Titration)

Analytical Method:

SM 4500-Cl B

Prep Method: N/A

QC Batch:

92156

Date Analyzed:

2012-06-14

Analyzed By:

Prep Batch:

78114

Sample Preparation:

2012-06-12

Prepared By:

AR. AR

114-6401364

Work Order: 12060828 COG/Jenkins B Federal Water Flood Page Number: 10 of 23

Eddy Co., NM

			RL			
Parameter	Flag	Cert	Result	Units	Dilution	RL
Chloride			5550	mg/Kg	10	4.00

Sample: 300516 - BH-2 @ AH-3 (6 in. BEB) 0-1'

Laboratory:

Midland

Analysis:

Chloride (Titration)

Analytical Method:

SM 4500-Cl B

Prep Method: N/A

QC Batch:

92156

Date Analyzed:

2012-06-14

Analyzed By: AR

Prep Batch:

78114

Sample Preparation:

2012-06-12

Prepared By:

RL

Parameter	Flag	Cert	Result	Units	Dilution	RL
Chloride			1730	mg/Kg	10	4.00

Sample: 300517 - BH-2 @ AH-3 (6 in. BEB) 2-3'

Laboratory:

Midland

Analysis:

Chloride (Titration)

Analytical Method:

SM 4500-Cl B

Prep Method: N/A

QC Batch:

Date Analyzed:

2012-06-14

Analyzed By: AR.

Prep Batch:

92156 78114

Sample Preparation:

2012-06-12

Prepared By: AR

Cert Result

Parameter Flag Chloride

Units mg/Kg Dilution 10

RL4.00

RL

4.00

AR.

Sample: 300518 - BH-2 @ AH-3 (6 in. BEB) 4-5'

Laboratory:

Midland

Analysis:

Chloride (Titration)

Analytical Method:

SM 4500-Cl B

Prep Method: N/A

QC Batch:

92157

Date Analyzed:

2012-06-14

Analyzed By: ARAR

Prep Batch:

78114

Sample Preparation:

2012-06-12

Prepared By:

RL

RL

1180

Parameter Flag Cert Result Chloride 2830

Units Dilution mg/Kg 10

114-6401364

Work Order: 12060828 COG/Jenkins B Federal Water Flood Page Number: 11 of 23

Eddy Co., NM

Sample: 300519 - BH-2 @ AH-3 (6 in. BEB) 6-7'

Laboratory:

Midland

Analysis: QC Batch:

Prep Batch:

Chloride (Titration)

92157 78114 Analytical Method:

Sample Preparation:

Date Analyzed:

SM 4500-Cl B 2012-06-14

2012-06-12

Prep Method: Analyzed By:

AR. Prepared By: AR.

RL

Parameter Chloride

Cert

Cert

Result 3290

Units mg/Kg Dilution 10

RL4.00

N/A

Sample: 300520 - BH-2 @ AH-3 (6 in. BEB) 9-10'

Laboratory:

Midland

Analysis: QC Batch: Chloride (Titration)

Analytical Method: Date Analyzed:

SM 4500-Cl B 2012-06-14

2012-06-12

Prep Method: Analyzed By:

N/A AR.

Prep Batch:

92157 78114

Sample Preparation:

Prepared By: AR.

RL

Parameter Chloride

Flag

Flag

Result 6230

Units mg/Kg

Dilution  $\overline{10}$ 

RL

4.00

Sample: 300521 - BH-2 @ AH-3 (6 in. BEB) 14-15'

Laboratory:

Midland

Analysis: QC Batch: Chloride (Titration)

Analytical Method:

SM 4500-Cl B 2012-06-14

Prep Method: N/A Analyzed By:

Prep Batch:

92157 78114 Date Analyzed: Sample Preparation:

2012-06-12

AR. Prepared By: AR.

RL

Parameter Flag Chloride

Cert

Result 6350

Units mg/Kg

Dilution RL4.00 10

Sample: 300522 - BH-2 @ AH-3 (6 in. BEB) 19-20'

Laboratory:

Midland

Analysis:

Chloride (Titration)

Analytical Method: Date Analyzed:

SM 4500-Cl B 2012-06-14

Prep Method: N/AAR. Analyzed By:

QC Batch: Prep Batch: 78114

92157

Sample Preparation:

2012-06-12

Prepared By:

AR.

Report Date: June 15, 2012 114-6401364

Work Order: 12060828 COG/Jenkins B Federal Water Flood Page Number: 12 of 23 Eddy Co., NM

#### Sample: 300523 - BH-2 @ AH-3 (6 in. BEB) 24-25'

Laboratory: Mid

Midland

Analysis: Chloride (Titration)

Analytical Method:

SM 4500-Cl B 2012-06-14 Prep Method: N/A

QC Batch: Prep Batch: 92157 78114 Date Analyzed: 2012-06-14 Sample Preparation: 2012-06-12 Analyzed By: AR Prepared By: AR

#### Sample: 300524 - BH-2 @ AH-3 (6 in. BEB) 29-30'

Laboratory:

Midland

Analysis: Chloride (Titration) QC Batch: 92157 Analytical Method:
Date Analyzed:

SM 4500-Cl B 2012-06-14 Prep Method: N/A Analyzed By: AR

Prep Batch:

78114

Sample Preparation: 2012-06-12

Prepared By: AR.

#### Sample: 300525 - BH-2 @ AH-3 (6 in. BEB) 39-40'

Laboratory:

Prep Batch:

Midland

78114

Analysis: Chloride (Titration) QC Batch: 92157 Analytical Method: Date Analyzed:

Sample Preparation:

SM 4500-Cl B 2012-06-14 2012-06-12 Prep Method: N/A Analyzed By: AR

AR.

Prepared By:

114-6401364

Work Order: 12060828 COG/Jenkins B Federal Water Flood Page Number: 13 of 23

Eddy Co., NM

Sample: 300526 - BH-2 @ AH-3 (6 in. BEB) 49-50'

Laboratory:

Midland

Analysis:

Chloride (Titration)

Analytical Method:

SM 4500-Cl B

Prep Method: N/A

QC Batch:

92157

Date Analyzed:

2012-06-14

Analyzed By:

Prep Batch:

78114

Sample Preparation:

2012-06-12

ARPrepared By: AR

RL

Parameter Chloride

Flag Cert Result 5840

Units mg/Kg Dilution 10

RL4.00

Sample: 300527 - BH-2 @ AH-3 (6 in. BEB) 59-60'

Laboratory:

Midland

Analysis:

Chloride (Titration)

Analytical Method:

SM 4500-Cl B

Prep Method: N/A

QC Batch:

92157

Date Analyzed: Sample Preparation:

2012-06-14

Analyzed By:

ARAR

Prep Batch: 78114

2012-06-12

Prepared By:

RL

Parameter Chloride

Cert

Result 8290

Units mg/Kg Dilution

10

RL

4.00

Sample: 300528 - BH-2 @ AH-3 (6 in. BEB) 69-70'

Laboratory:

Midland

Analysis:

Chloride

Chloride (Titration)

Analytical Method:

SM 4500-Cl B

Prep Method:

N/A

QC Batch:

92158

Date Analyzed: Sample Preparation:

2012-06-14 2012-06-12 Analyzed By:

AR

Prep Batch: 78114

Cert

RLResult

Prepared By:

AR.

Flag

Flag

Parameter

4680

Units mg/Kg

10

Dilution

RL

4.00

N/A

AR.

Sample: 300529 - BH-2 @ AH-3 (6 in. BEB) 79-80'

Laboratory:

Midland

Analysis:

Chloride (Titration)

Analytical Method:

SM 4500-Cl B

Prep Method: Analyzed By:

QC Batch: Prep Batch: 78114

92158

Date Analyzed: Sample Preparation:

2012-06-14 2012-06-12

Prepared By: AR Report Date: June 15, 2012 114-6401364

Work Order: 12060828 COG/Jenkins B Federal Water Flood Page Number: 14 of 23 Eddy Co., NM

114-6401364

Work Order: 12060828 COG/Jenkins B Federal Water Flood Page Number: 15 of 23 Eddy Co., NM

### Method Blanks

Method Blank (1)

QC Batch: 92103

QC Batch:

92103

2012-06-13

Analyzed By: AR

Prep Batch: 78114

Date Analyzed: QC Preparation:

2012-06-12

Prepared By: AR

MDL

Parameter Chloride

Flag

Flag

Cert

Result < 3.85

MDL

Result

< 3.85

Units mg/Kg RL

Method Blank (1)

QC Batch: 92156

QC Batch: Prep Batch: 78114

92156

Date Analyzed:

2012-06-14

Analyzed By: AR.

AR

Parameter

Chloride

Cert

QC Preparation: 2012-06-12

Prepared By:

RL

QC Batch: 92157

QC Batch:

92157

Method Blank (1)

Date Analyzed:

2012-06-14

Units

mg/Kg

Analyzed By: AR

Prep Batch: 78114

QC Preparation: 2012-06-12

Prepared By:

AR

Parameter Chloride

Flag

 $\operatorname{Cert}$ 

MDL Result < 3.85

Units mg/Kg RL4

Method Blank (1)

QC Batch: 92158

QC Batch:

92158

Date Analyzed: QC Preparation: 2012-06-14

2012-06-12

Analyzed By: AR

Prepared By: AR

Prep Batch: 78114

Report Date: June 15, 2012 114-6401364

Work Order: 12060828 COG/Jenkins B Federal Water Flood Page Number: 16 of 23 Eddy Co., NM

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

114-6401364

Work Order: 12060828 COG/Jenkins B Federal Water Flood Page Number: 17 of 23 Eddy Co., NM

### Laboratory Control Spikes

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

QC Batch:

92103

Date Analyzed:

2012-06-13

Analyzed By: AR.

Prep Batch: 78114

Prepared By: AR.

QC Preparation: 2012-06-12

			LCS			Spike	Matrix		Rec.
Param	$\mathbf{F}$	$\mathbf{C}$	Result	Units	Dil.	${f Amount}$	Result	Rec.	$\operatorname{Limit}$
Chloride			2540	mg/Kg	1	2500	< 3.85	102	85 - 115

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

			LCSD			Spike	Matrix		Rec.		RPD
Param	$\mathbf{F}$	$^{\rm C}$	Result	Units	Dil.	Amount	Result	Rec.	Limit	RPD	$\mathbf{Limit}$
Chloride			2680	mg/Kg	1	2500	< 3.85	107	85 - 115	5	20

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

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

QC Batch:

92156

Date Analyzed:

2012-06-14

Analyzed By: AR.

Prep Batch: 78114 QC Preparation: 2012-06-12 Prepared By: AR

			LCS			$\mathbf{Spike}$	Matrix		Rec.
Param	$\mathbf{F}$	$^{\mathrm{C}}$	Result	Units	Dil.	Amount	Result	Rec.	$\mathbf{Limit}$
Chloride			2460	mg/Kg	1	2500	< 3.85	98	85 - 115

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

			LCSD			$\operatorname{Spike}$	Matrix		Rec.		RPD
Param	${f F}$	$\mathbf{C}$	Result	Units	Dil.	Amount	Result	Rec.	Limit	RPD	$\operatorname{Limit}$
Chloride			2570	mg/Kg	1	2500	< 3.85	103	85 - 115	4	20

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

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

QC Batch:

92157

Date Analyzed:

2012-06-14

Analyzed By: AR

Prep Batch: 78114

QC Preparation: 2012-06-12

Prepared By: AR

Report Date: June 15, 2012 114-6401364

Work Order: 12060828 COG/Jenkins B Federal Water Flood Page Number: 18 of 23 Eddy Co., NM

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

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

			LCSD			Spike	Matrix		Rec.		RPD
Param	$\mathbf{F}$	$^{\rm C}$	Result	Units	Dil.	Amount	Result	Rec.	Limit	RPD	Limit
Chloride			2570	mg/Kg	1	2500	< 3.85	103	85 - 115	4	20

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

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

QC Batch: 92158 Prep Batch: 78114 Date Analyzed: 2012-06-14 QC Preparation: 2012-06-12 Analyzed By: AR. Prepared By: AR.

			LCS			Spike	Matrix		Rec.
Param	F	$^{\rm C}$	Result	Units	Dil.	Amount	Result	Rec.	${f Limit}$
Chloride			2440	mg/Kg	1	2500	< 3.85	98	85 - 115

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

			LCSD			$\operatorname{Spike}$	Matrix		$\operatorname{Rec}$ .		RPD
Param	$\mathbf{F}$	$\mathbf{C}$	Result	Units	Dil.	Amount	Result	Rec.	Limit	RPD	Limit
Chloride			2550	mg/Kg	1	2500	<3.85	102	85 - 115	4	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: 300507

QC Batch: 92103 Prep Batch: 78114

Date Analyzed: 2012-06-13 QC Preparation: 2012-06-12 Analyzed By: AR Prepared By: AR

			MS			$\operatorname{Spike}$	Matrix		Rec.
Param	$\mathbf{F}$	$\mathbf{C}$	Result	Units	Dil.	Amount	Result	Rec.	$\operatorname{Limit}$
Chloride		-	8570	mg/Kg	10	2500	5890	107	79.4 - 120.6

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

			MSD			Spike	Matrix		${ m Rec.}$		RPD
Param	$\mathbf{F}$	$\mathbf{C}$	Result	Units	Dil.	Amount	Result	Rec.	Limit	RPD	Limit
Chloride			8330	mg/Kg	10	2500	5890	98	79.4 - 120.6	3	20

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

Report Date: June 15, 2012 114-6401364

Work Order: 12060828

COG/Jenkins B Federal Water Flood

Page Number: 19 of 23 Eddy Co., NM

Matrix Spike (MS-1)

Spiked Sample: 300517

QC Batch: Prep Batch: 78114

92156

Date Analyzed:

2012-06-14

QC Preparation: 2012-06-12

Analyzed By: AR.

Prepared By: AR.

			MS			Spike	Matrix		Rec.
Param	$\mathbf{F}$	$^{\mathrm{C}}$	Result	Units	Dil.	${f Amount}$	Result	Rec.	$\operatorname{Limit}$
Chloride			3680	mg/Kg	10	2500	1180	100	79.4 - 120.6

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

				MSD			$_{ m Spike}$	Matrix		Rec.		RPD
Param	*	$\mathbf{F}$	$^{\rm C}$	Result	Units	Dil.	Amount	Result	Rec.	$\mathbf{Limit}$	RPD	Limit
Chloride				3880	mg/Kg	10	2500	1180	108	79.4 - 120.6	5	20

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

Matrix Spike (MS-1)

Spiked Sample: 300527

QC Batch:

92157

Date Analyzed:

2012-06-14

Analyzed By: AR

Rec.

Limit

Prep Batch: 78114

QC Preparation: 2012-06-12

Prepared By:

MS Spike Matrix Param F C Result Units Dil. Amount Result Rec. 11000 2500 8290 108 79.4 - 120.6 Chloride mg/Kg 10

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

			MSD			$\operatorname{Spike}$	Matrix		Rec.		RPD
Param	$\mathbf{F}$	$^{\rm C}$	Result	Units	Dil.	Amount	Result	Rec.	Limit	RPD	Limit
Chloride			11100	mg/Kg	10	2500	8290	112	79.4 - 120.6	1	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: 300538

QC Batch:

92158

Date Analyzed:

2012-06-14

Analyzed By: AR.

Prep Batch: 78114

QC Preparation:

2012-06-12

Prepared By: AR.

			MS			Spike	Matrix		Rec.
Param	F	$\mathbf{C}$	Result	Units	Dil.	Amount	Result	Rec.	${f Limit}$
Chloride			3640	mg/Kg	10	2500	1230	96	79.4 - 120.6

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

114-6401364

Work Order: 12060828 COG/Jenkins B Federal Water Flood Page Number: 20 of 23 Eddy Co., NM

			MSD			Spike	Matrix		Rec.		RPD
Param	F	$^{\rm C}$	Result	Units	Dil.	Amount	Result	Rec.	$\operatorname{Limit}$	RPD	Limit
Chloride			3900	mg/Kg	10	2500	1230	107	79.4 - 120.6	7	20

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

114-6401364

Work Order: 12060828 COG/Jenkins B Federal Water Flood Page Number: 21 of 23

Eddy Co., NM

### Calibration Standards

Standard (CCV-1)

QC Batch: 92103

Date Analyzed: 2012-06-13

Analyzed By: AR

				CCVs	CCVs	CCVs	Percent	
				True	Found	Percent	Recovery	$\operatorname{Date}$
Param	Flag	Cert	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Chloride			mg/Kg	100	99.8	100	85 - 115	2012-06-13

Standard (CCV-2)

QC Batch: 92103

Date Analyzed: 2012-06-13

Analyzed By: AR

				CCVs	CCVs	$\mathrm{CCVs}$	Percent	
				True	Found	Percent	Recovery	Date
Param	$\operatorname{Flag}$	$\operatorname{Cert}$	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Chloride			mg/Kg	100	100	100	85 - 115	2012-06-13

Standard (CCV-1)

QC Batch: 92156

Date Analyzed: 2012-06-14

Analyzed By: AR

	T)	<b>~</b> .	**	CCVs True	CCVs Found	CCVs Percent	Percent Recovery	Date
Param	$\operatorname{Flag}$	Cert	$\operatorname{Units}$	Conc.	Conc.	Recovery	$\operatorname{Limits}$	Analyzed
Chloride			mg/Kg	100	101	101	85 - 115	2012-06-14

Standard (CCV-2)

QC Batch: 92156

Date Analyzed: 2012-06-14

Analyzed By: AR

				CCVs	CCVs	CCVs	Percent	
				True	Found	Percent	Recovery	Date
Param	$\operatorname{Flag}$	$\operatorname{Cert}$	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Chloride			mg/Kg	100	98.9	99	85 - 115	2012-06-14

Report Date: June 15, 2012 Work Order: 12060828 Page Number: 22 of 23 114-6401364 COG/Jenkins B Federal Water Flood Eddy Co., NM Standard (CCV-1) QC Batch: 92157 Date Analyzed: 2012-06-14 Analyzed By: AR. **CCVs CCVs CCVs** Percent True Found Percent Recovery Date Param Flag Cert Units Conc. Conc. Recovery Limits Analyzed Chloride 100 mg/Kg 101 101 85 - 115 2012-06-14 Standard (CCV-2) QC Batch: 92157 Date Analyzed: 2012-06-14 Analyzed By: AR **CCVs CCVs** CCVsPercent True Found Percent Recovery Date Param Flag Cert Units Conc. Conc. Recovery Limits Analyzed Chloride mg/Kg 100 98.9 99 85 - 115 2012-06-14 Standard (CCV-1) QC Batch: 92158 Date Analyzed: 2012-06-14 Analyzed By: AR. **CCVs** CCVs**CCVs** Percent True Found Percent Recovery Date Param Flag Cert Units Conc. Conc. Recovery Limits Analyzed Chloride mg/Kg 100 100 100 85 - 115 2012-06-14 Standard (CCV-2) QC Batch: 92158 Date Analyzed: 2012-06-14 Analyzed By: AR

**CCVs** 

True

Conc.

100

Param

Chloride

Flag

Cert

Units

mg/Kg

**CCVs** 

Found

Conc.

100

**CCVs** 

Percent

Recovery

100

Percent

Recovery

Limits

85 - 115

Date

Analyzed

2012-06-14

Page Number: 23 of 23 Eddy Co., NM

## Appendix

### Report Definitions

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

#### **Laboratory Certifications**

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

### Standard Flags

- F Description
- B Analyte detected in the corresponding method blank above the method detection limit
- H Analyzed out of hold time
- J Estimated concentration
- Jb The analyte is positively identified and the value is approximated between the SDL and MQL. Sample contains less then ten times the concentration found in the method blank. The result should be considered non-detect to the SDL.
- Je Estimated concentration exceeding calibration range.
- Qc Calibration check outside of laboratory limits.
- Qr RPD outside of laboratory limits
- Qs Spike recovery outside of laboratory limits.
- Qsr Surrogate recovery outside of laboratory limits.
  - U The analyte is not detected above the SDL

#### Attachments

The scanned attachments will follow this page.

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

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CLIENT NAM						SITE MANAGEI	avarez		NERS		PR	ME	RVATI THOD	VE		TX1005	Ba	As Ba C			260/624	8270/625					ns, pH,		
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Report Date: June 28, 2013 Work Order: 13061821 Page Number: 1 of 3

### **Summary Report**

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

Report Date: June 28, 2013

Work Order: 13061821

Project Location: Eddy Co., NM

Project Name: COG/Jenkins B Federal Water Flood

Project Number: 114-6401364

			Date	$\operatorname{Time}$	Date
Sample	Description	Matrix	Taken	Taken	Received
332532	SB-1 @ AH-1 0-1'	soil	2013-06-12	00:00	2013-06-18
332533	SB-1 @ AH-1 2-3'	soil	2013-06-12	00:00	2013-06-18
332534	SB-1 @ AH-1 4-5'	soil	2013-06-12	00:00	2013-06-18
332535	SB-1 @ AH-1 6-7'	soil	2013-06-12	00:00	2013-06-18
332536	SB-1 @ AH-1 9-10'	soil	2013-06-12	00:00	2013-06-18
332537	SB-1 @ AH-1 19-20'	soil	2013-06-12	00:00	2013-06-18
332538	SB-1 @ AH-1 39-40'	soil	2013-06-12	00:00	2013-06-18
332539	SB-1 @ AH-1 59-60'	soil	2013-06-13	00:00	2013-06-18
332540	SB-1 @ AH-1 79-80'	soil	2013-06-13	00:00	2013-06-18
332541	SB-1 @ AH-1 89-90'	soil	2013-06-13	00:00	2013-06-18
332542	SB-1 @ AH-1 99-100'	soil	2013-06-14	00:00	2013-06-18
332543	SB-1 @ AH-1 104-105'	soil	2013-06-14	00:00	2013-06-18

			BTEX	TPH DRO - NEW	TPH GRO	
}	Benzene	Toluene	Ethylbenzene	Xylene	DRO	GRO
Sample - Field Code	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)
332532 - SB-1 @ AH-1 0-1'	<1.00 Qs	59.8 Qs	94.8	165	8530 Qs	4900
332533 - SB-1 @ AH-1 2-3'	< 0.0200	< 0.0200	< 0.0200	<0.0200 Qc	<50.0 Qs	<4.00

Sample: 332532 - SB-1 @ AH-1 0-1'

Param	Flag	Result	${ m Units}$	RL
Chloride		2240	mg/Kg	4

Sample: 332533 - SB-1 @ AH-1 2-3'

Report Date: June 2	8, 2013	Work Order: 13061821	Page Number: 2 of 3					
Param	Flag_	Result	Units	RL				
Chloride		11700	mg/Kg	4				
Sample: 332534 -	SB-1 @ AH-1 4-5'							
Param	Flag	Result	Units	RL				
Chloride		5130	mg/Kg	4				
Sample: 332535 -	SB-1 @ AH-1 6-7'							
Param	Flag	Result	Units	RL				
Chloride		1220	mg/Kg	4				
Sample: 332536 -	SB-1 @ AH-1 9-10'							
Param	$\operatorname{Flag}$	Result	Units	m RL				
Chloride		7920	mg/Kg	4				
Sample: 332537 -	SB-1 @ AH-1 19-20'							
Param	Flag	Result	Units	RL				
Chloride		9460	mg/Kg	4				
Sample: 332538 -	SB-1 @ AH-1 39-40'							
Param	Flag	Result	Units	RL				
Chloride		12000	mg/Kg	4				
Sample: 332539 - 3	SB-1 @ AH-1 59-60'							
Param	Flag	Result	Units	RL				
Chloride		2440	mg/Kg	4				
Sample: 332540 - 8	SB-1 @ AH-1 79-80'							
Param	Flag	Result	Units	RL				
Chloride		6150	mg/Kg	4				

Report Date: June	28, 2013	Work Order: 13061821	Page 1	Number: 3 of 3
Sample: 332541 -	SB-1 @ AH-1 89-90	,		
Param	Flag	Result	Units	$\operatorname{RL}$
Chloride		2000	mg/Kg	4
Sample: 332542 -	- SB-1 @ AH-1 99-10	0'		
Param	Flag	Result	Units	RL
Chloride		1060	mg/Kg	4
Sample: 332543 -	· SB-1 @ AH-1 104-1	05'		
Param	Flag	Result	Units	RL
Chloride		92.5	mg/Kg	4



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#### Certifications

NELAP DoD LELAP Kansas Oklahoma ISO 17025 DBE  $\mathbf{WBE}$ NCTRCA

## Analytical and Quality Control Report

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

Report Date: June 28, 2013

Work Order:

13061821



Project Location: Eddy Co., NM

COG/Jenkins B Federal Water Flood Project Name:

Project Number: 114-6401364

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

			Date	${f Time}$	Date
Sample	Description	Matrix	Taken	Taken	Received
332532	SB-1 @ AH-1 0-1'	soil	2013-06-12	00:00	2013-06-18
332533	SB-1 @ AH-1 2-3'	soil	2013-06-12	00:00	2013-06-18
332534	SB-1 @ AH-1 4-5'	soil	2013-06-12	00:00	2013-06-18
332535	SB-1 @ AH-1 6-7'	soil	2013-06-12	00:00	2013-06-18
332536	SB-1 @ AH-1 9-10'	soil	2013-06-12	00:00	2013-06-18
332537	SB-1 @ AH-1 19-20'	soil	2013-06-12	00:00	2013-06-18
332538	SB-1 @ AH-1 39-40'	soil	2013-06-12	00:00	2013-06-18
332539	SB-1 @ AH-1 59-60'	soil	2013-06-13	00:00	2013-06-18
332540	SB-1 @ AH-1 79-80'	soil	2013-06-13	00:00	2013-06-18
332541	SB-1 @ AH-1 89-90'	soil	2013-06-13	00:00	2013-06-18
332542	SB-1 @ AH-1 99-100'	soil	2013-06-14	00:00	2013-06-18
332543	SB-1 @ AH-1 104-105'	soil	2013-06-14	00:00	2013-06-18

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

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

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### Case Narrative

Samples for project COG/Jenkins B Federal Water Flood were received by TraceAnalysis, Inc. on 2013-06-18 and assigned to work order 13061821. Samples for work order 13061821 were received intact at a temperature of 4.3 C.

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

		$\operatorname{Prep}$	$\operatorname{Prep}$	QC	Analysis
Test	Method	Batch	Date	Batch	Date
BTEX	S 8021B	86863	2013-06-21 at 16:26	102539	2013-06-21 at 16:26
BTEX	S 8021B	86950	2013-06-26 at 16:28	102642	2013-06-26 at 16:28
Chloride (Titration)	SM 4500-Cl B	86840	2013-06-21 at 13:49	102555	2013-06-24 at 12:40
Chloride (Titration)	SM 4500-Cl B	86840	2013-06-21 at 13:49	102556	2013-06-24 at 12:41
TPH DRO - NEW	S 8015 D	86869	2013-06-23 at 22:00	102549	2013-06-24 at 11:02
TPH GRO	S 8015 D	86863	2013-06-21 at 16:26	102540	2013-06-21 at 16:26
TPH GRO	S 8015 D	86950	2013-06-26 at 16:28	102643	2013-06-26 at 16:28

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 13061821 since the sample was chosen at random. Therefore, the validity of the analytical data reported has been determined by the laboratory control sample (LCS) and the method blank (MB). These quality control measures are performed with each preparation batch to ensure data integrity.

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

114-6401364

Work Order: 13061821 COG/Jenkins B Federal Water Flood Page Number: 6 of 28 Eddy Co., NM

# **Analytical Report**

Sample: 332532 - SB-1 @ AH-1 0-1'

Laboratory: Lubbock

Analysis: BTEX QC Batch: 102539 Prep Batch: 86863 Analytical Method: S 8021B Date Analyzed: 2013-06-21 Sample Preparation: 2013-06-21 Prep Method: S 5035 Analyzed By: JS Prepared By: JS

RLParameter Flag Cert Result Units Dilution RLBenzene < 1.00mg/Kg 0.0200 50 Qв Toluene mg/Kg 50 59.8 0.0200Qs Ethylbenzene 94.8 mg/Kg 50 0.0200 Xylene 165 mg/Kg 50 0.0200

							$\operatorname{Spike}$	$\operatorname{Percent}$	Recovery
Surrogate		$\operatorname{Flag}$	$\operatorname{Cert}$	Result	Units	Dilution	Amount	Recovery	Limits
Trifluorotoluene (TFT)	Qsr	Qsr		4.49	mg/Kg	50	2.00	224	69.6 - 120
4-Bromofluorobenzene (4-BFB)	Qsr	Qsr		4.43	mg/Kg	50	2.00	222	69.2 - 120

Sample: 332532 - SB-1 @ AH-1 0-1'

Laboratory: Midland

Prep Batch:

Prep Batch:

Analysis: Chloride (Titration) QC Batch: 102555

86840

Analytical Method: SM 4500-Cl B Date Analyzed: 2013-06-24 Sample Preparation: 2013-06-21

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

Sample: 332532 - SB-1 @ AH-1 0-1'

Laboratory: Midland

Analysis: TPH DRO - NEW QC Batch: 102549

86869

Analytical Method: S 8015 D
Date Analyzed: 2013-06-24
Sample Preparation: 2013-06-23

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

114-6401364

Work Order: 13061821 COG/Jenkins B Federal Water Flood Page Number: 7 of 28 Eddy Co., NM

							Spike	Percent	Recovery
Surrogate		Flag	Cert	Result	Units	Dilution	${f A}{f mount}$	Recovery	Limits
n-Tricosane	Qsr	Qar		453	${ m mg/Kg}$	5	100	453	55.1 - 135.7

#### Sample: 332532 - SB-1 @ AH-1 0-1'

Laboratory:

Lubbock

Analysis: TPH GRO QC Batch: 102540

Analytical Method:

S 8015 D 2013-06-21 Prep Method: S 5035

Prep Batch: 86863

Date Analyzed: Sample Preparation: 2013-06-21 Analyzed By: JSPrepared By: JS

			RL
Parameter	Flag	Cert	Result

Parameter	•	${f Flag}$	$\operatorname{Cert}$	Result	Units	Dilution	RL
GRO			1	4900	mg/Kg	50	4.00

							$_{ m Spike}$	$\operatorname{Percent}$	Recovery
Surrogate		$\mathbf{Flag}$	Cert	Result	Units	Dilution	Amount	Recovery	Limits
Trifluorotoluene (TFT)	Qar	Qsr		132	mg/Kg	50	2.00	6600	69.6 - 124
4-Bromofluorobenzene (4-BFB)	Qsr	Qar		106	mg/Kg	50	2.00	5300	77.7 - 120

#### Sample: 332533 - SB-1 @ AH-1 2-3'

Laboratory: Lubbock

Analysis: BTEX QC Batch: 102642 Prep Batch: 86950

Analytical Method: S 8021BDate Analyzed: 2013-06-26 Sample Preparation: 2013-06-26 Prep Method: S 5035 Analyzed By: MTPrepared By: MT

			RL		,	
Parameter	$\operatorname{Flag}$	Cert	Result	Units	Dilution	RL
Benzene	υ	1	< 0.0200	mg/Kg	1	0.0200
Toluene		1	< 0.0200	mg/Kg	1	0.0200
Ethylbenzene	Ü	1	< 0.0200	mg/Kg	1	0.0200
Xvlene	JII. Oc		< 0.0200	mg/Kg	1	0.0200

Surrogate	Flag	Cert	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)			1.43	mg/Kg	1	2.00	72	69.6 - 120
4-Bromofluorobenzene (4-BFB)			1.89	mg/Kg	1	2.00	94	69.2 - 120.

114-6401364

Work Order: 13061821 COG/Jenkins B Federal Water Flood Page Number: 8 of 28 Eddy Co., NM

Sample: 332533 - SB-1 @ AH-1 2-3'

Laboratory:

Midland

Analysis: Chloride (Titration)

QC Batch:

Parameter

Chloride

102555

Analytical Method:

SM 4500-Cl B

Prep Method: N/A Analyzed By: AR.

4.00

CW

Prep Batch:

86840

Date Analyzed: Sample Preparation: 2013-06-24 2013-06-21

Prepared By: AR

Flag Cert

RLResult 11700

Units

mg/Kg

Dilution RL

Sample: 332533 - SB-1 @ AH-1 2-3'

Laboratory:

Midland

Analysis: QC Batch: TPH DRO - NEW

102549

Analytical Method:

S 8015 D 2013-06-24 Prep Method: N/A Analyzed By: CW

Prep Batch:

86869

Date Analyzed: Sample Preparation: 2013-06-23

Prepared By:

10

RL

Parameter Flag Cert Result Units Dilution RLDRO < 50.0 mg/Kg 50.0 Qs 2

•	`						Spike	Percent	Recovery
Surrogate		Flag	$\operatorname{Cert}$	Result	Units	Dilution	Amount	Recovery	Limits
n-Tricosane				86.4	mg/Kg	1	.100	86	55.1 - 135.7

Sample: 332533 - SB-1 @ AH-1 2-3'

Laboratory:

Lubbock

Analysis:

TPH GRO

102643

Analytical Method:

S 8015 D 2013-06-26

Prep Method: S 5035 Analyzed By: MT

QC Batch: Prep Batch: 86950 Date Analyzed: Sample Preparation: 2013-06-26

Prepared By: MT

RL

Units Dilution Parameter Flag Cert Result RL**GRO** < 4.00 mg/Kg 4.00 υ

						Spike	Percent	Recovery
Surrogate	$\operatorname{Flag}$	$\operatorname{Cert}$	Result	Units	Dilution	Amount	Recovery	Limits
Trifluorotoluene (TFT)			1.74	mg/Kg	1	2.00	87	69.6 - 124
4-Bromofluorobenzene (4-BFB)			2.13	mg/Kg	1	2.00	106	77.7 - 120

114-6401364

Work Order: 13061821 COG/Jenkins B Federal Water Flood Page Number: 9 of 28

Eddy Co., NM

AR.

Sample: 332534 - SB-1 @ AH-1 4-5'

Laboratory:

Prep Batch:

Midland

86840

Analysis: Chloride (Titration) QC Batch: 102555

Analytical Method: Date Analyzed:

Sample Preparation:

SM 4500-Cl B 2013-06-24 2013-06-21

Prep Method: N/A Analyzed By: AR

Prepared By:

RL

Parameter Flag Cert Result Units

Dilution RLChloride 5130 10 4.00 mg/Kg

Sample: 332535 - SB-1 @ AH-1 6-7'

Laboratory:

Midland

Chloride (Titration) Analysis: QC Batch: 102555 Prep Batch: 86840

Analytical Method: Date Analyzed:

SM 4500-Cl B 2013-06-24 Sample Preparation: 2013-06-21

Prep Method: Analyzed By:

N/A AR AR

AR

RL

Prepared By:

Parameter Flag Cert Result Units Dilution RLChloride 1220 10 4.00 mg/Kg

Sample: 332536 - SB-1 @ AH-1 9-10'

Laboratory:

Midland

Chloride (Titration) Analysis: QC Batch: 102556 Prep Batch: 86840

Analytical Method: Date Analyzed:

Sample Preparation:

SM 4500-Cl B 2013-06-24 2013-06-21

Prep Method: N/A Analyzed By: AR

Prepared By:

RL

Parameter Cert Dilution RLFlag Result Units Chloride 7920 mg/Kg 10 4.00

Sample: 332537 - SB-1 @ AH-1 19-20'

Laboratory:

Midland

Analysis: Chloride (Titration) OC Batch: 102556 86840 Prep Batch:

Analytical Method: Date Analyzed:

Sample Preparation:

SM 4500-Cl B 2013-06-24 2013-06-21

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

114-6401364

Work Order: 13061821 COG/Jenkins B Federal Water Flood Page Number: 10 of 28

Eddy Co., NM

			RL			
Parameter	Flag	$\operatorname{Cert}$	Result	$\mathbf{U}_{\mathbf{nits}}$	Dilution	RL
Chloride			9460	mg/Kg	10	4.00

Sample: 332538 - SB-1 @ AH-1 39-40'

Laboratory:

Midland

Analysis:

Chloride (Titration)

Analytical Method:

SM 4500-Cl B

Prep Method: N/A

QC Batch: Prep Batch:

10255686840

Date Analyzed: Sample Preparation: 2013-06-24 2013-06-21 Analyzed By: AR

Prepared By: AR.

			RL			
Parameter	$\operatorname{Flag}$	$\operatorname{Cert}$	Result	Units	Dilution	RL
Chloride			12000	mg/Kg	10	4.00

Sample: 332539 - SB-1 @ AH-1 59-60'

Laboratory:

Midland

Analysis:

Chloride (Titration)

Analytical Method:

SM 4500-Cl B

Prep Method: N/A

QC Batch:

102556

Date Analyzed:

2013-06-24

Analyzed By: ARAR.

Prep Batch:

86840

Sample Preparation:

Prepared By:

2013-06-21

RLParameter Result Units Dilution RLFlag Cert Chloride 2440 mg/Kg 10 4.00

Sample: 332540 - SB-1 @ AH-1 79-80'

Laboratory:

Midland

Analysis:

Chloride (Titration)

Analytical Method:

SM 4500-Cl B

Prep Method: N/A

QC Batch: Prep Batch:

Parameter

 $\overline{\text{Chloride}}$ 

102556 86840

Date Analyzed: Sample Preparation: 2013-06-24 2013-06-21 Analyzed By: ARPrepared By: AR

RLFlag Cert Result Units Dilution RL6150 mg/Kg 10 4.00

114-6401364

Work Order: 13061821 COG/Jenkins B Federal Water Flood Page Number: 11 of 28

Eddy Co., NM

Sample: 332541 - SB-1 @ AH-1 89-90'

Laboratory:

Midland

Analysis: Chloride (Titration)

QC Batch: 102556 Analytical Method:

SM 4500-Cl B Date Analyzed: 2013-06-24

Prep Method: N/A

Analyzed By: AR. AR

Prep Batch:

86840

Sample Preparation: 2013-06-21

Prepared By:

RL

Parameter Flag Chloride

Cert

Result 2000

Units mg/Kg Dilution 10

RL4.00

Sample: 332542 - SB-1 @ AH-1 99-100'

Laboratory:

Midland

Analysis:

Chloride (Titration)

QC Batch: 102556Prep Batch: 86840

Analytical Method:

Date Analyzed: Sample Preparation: 2013-06-21

SM 4500-Cl B 2013-06-24

Prep Method: Analyzed By: Prepared By:

N/A AR. AR.

RL

Parameter Flag Cert Result Dilution Units RLChloride 1060 mg/Kg 5 4.00

Sample: 332543 - SB-1 @ AH-1 104-105'

Laboratory:

Midland

Analysis: Chloride (Titration) QC Batch: 102556

Analytical Method: Date Analyzed:

SM 4500-Cl B 2013-06-24

Prep Method: N/A Analyzed By: ARAR

Prep Batch:

86840

Sample Preparation:

2013-06-21

Prepared By:

RL

Parameter Flag Cert Result Units Dilution RLChloride 92.5 mg/Kg 5 4.00

Work Order: 13061821 COG/Jenkins B Federal Water Flood Page Number: 12 of 28 Eddy Co., NM

## Method Blanks

Method Blank (1)

QC Batch: 102539

QC Batch: 102539 Prep Batch: 86863 Date Analyzed: 2013-06-21 QC Preparation: 2013-06-21 Analyzed By: JS Prepared By: JS

MDL Cert Units RLParameter Flag Result Benzene < 0.00473 mg/Kg  $\overline{0.02}$ mg/Kg Toluene 0.02< 0.00416 1 mg/Kg Ethylbenzene < 0.00511 0.02mg/Kg 0.02Xylene 0.00770

						$\operatorname{Spike}$	Percent	Recovery
Surrogate	Flag	$\operatorname{Cert}$	Result	$\mathbf{U}$ nits	Dilution	Amount	Recovery	Limits
Trifluorotoluene (TFT)			1.72	mg/Kg	1	2.00	86	69.6 - 120
4-Bromofluorobenzene (4-BFB)			1.81	${ m mg/Kg}$	1	2.00	90	69.2 - 120

Method Blank (1)

QC Batch: 102540

QC Batch: 102540 Prep Batch: 86863 Date Analyzed: 2013-06-21 QC Preparation: 2013-06-21

Analyzed By: JS Prepared By: JS

						$\operatorname{Spike}$	Percent	Recovery
Surrogate	$\operatorname{Flag}$	$\operatorname{Cert}$	Result	$\operatorname{Units}$	Dilution	${f Amount}$	Recovery	Limits
Trifluorotoluene (TFT)			2.00	mg/Kg	1	2.00	100	69.6 - 124
4-Bromofluorobenzene (4-BFB)			2.02	mg/Kg	1	2.00	101	77.7 - 120

Method Blank (1)

QC Batch: 102549

QC Batch: 102549 Prep Batch: 86869 Date Analyzed: 2013-06-24 QC Preparation: 2013-06-23

Analyzed By: CW Prepared By: CW

114-6401364

Work Order: 13061821 COG/Jenkins B Federal Water Flood Page Number: 13 of 28

Eddy Co., NM

Parameter		F	lag	Cert		MDL Result	Units	RL
DRO				2		13.9	m mg/Kg	50
Surrogate	Flag	Cert	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
n-Tricosane			87.1	mg/Kg	1	100	87	55.1 - 135.7

Method Blank (1)

QC Batch: 102555

QC Batch: 102555 Date Analyzed: 2013-06-24 Analyzed By: AR

Prep Batch: 86840

QC Preparation: 2013-06-21

Prepared By: AR

			$\mathrm{MDL}$		
Parameter	Flag	$\operatorname{Cert}$	Result	Units	m R.L
Chloride			< 3.85	mg/Kg	4

Method Blank (1)

QC Batch: 102556

QC Batch: 102556Prep Batch: 86840

Date Analyzed: 2013-06-24 QC Preparation: 2013-06-21 Analyzed By: AR Prepared By: AR.

			MDL		
Parameter	Flag	Cert	Result	Units	RL
Chloride			< 3.85	mø/Kø	4

Method Blank (1)

QC Batch: 102642

QC Batch: 102642 Prep Batch: 86950

Date Analyzed: QC Preparation: 2013-06-26

2013-06-26 Analyzed By: MT Prepared By: MT

			$\mathrm{MDL}$		
Parameter	Flag	Cert	Result	Units	RL
Benzene		j	< 0.00473	ıng/Kg	0.02
Toluene		1	< 0.00416	mg/Kg	0.02
Ethylbenzene		ì	< 0.00511	mg/Kg	0.02
Xylene		1	0.00940	$\mathrm{mg}/\mathrm{Kg}$	0.02

Work Order: 13061821 COG/Jenkins B Federal Water Flood Page Number: 14 of 28

Eddy Co., NM

Surrogate	Flag	Cert	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)	1 108		1.65	mg/Kg	1	2.00	82	69.6 - 120
4-Bromofluorobenzene (4-BFB)			1.81	mg/Kg	1	2.00	90	69.2 - 120

Method Blank (1)

QC Batch: 102643

QC Batch: 102643 Date Analyzed:

Analyzed By: MT

Prep Batch: 86950

2013-06-26 QC Preparation: 2013-06-26

Prepared By: MT

MDLUnits Parameter Flag Cert Result RLmg/Kg GRO < 0.230 4

						$\operatorname{Spike}$	Percent	Recovery
Surrogate	$\operatorname{Flag}$	$\operatorname{Cert}$	Result	$\mathbf{U}\mathbf{nits}$	Dilution	${f Amount}$	Recovery	Limits
Trifluorotoluene (TFT)			1.98	mg/Kg	1	2.00	99	69.6 - 124
4-Bromofluorobenzene (4-BFB)			2.05	$_{ m mg/Kg}$	1	2.00	102	77.7 - 120

114-6401364

Work Order: 13061821 COG/Jenkins B Federal Water Flood Page Number: 15 of 28 Eddy Co., NM

# Laboratory Control Spikes

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

QC Batch:

102539

Date Analyzed:

2013-06-21

Analyzed By: JS

Prep Batch: 86863

QC Preparation: 2013-06-21

Prepared By: JS

Param		F	C	LCS Result	Units	Dil.	$egin{aligned} \mathbf{Spike} \\ \mathbf{Amount} \end{aligned}$	Matrix · Result	Rec.	Rec. Limit
Benzene	Qs	Qs	1	1.48	mg/Kg	1	2.00	< 0.00473	74	74.6 - 120
Toluene	Qa	Qs	ı	1.52	mg/Kg	1	2.00	< 0.00416	76	77.1 - 120
Ethylbenzene			1	1.60	mg/Kg	1	2.00	< 0.00511	80	75 - 120
Xylene			1	4.72	mg/Kg	1	6.00	0.0077	79	77 - 120

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

			LCSD			Spike	Matrix		Rec.		RPD
Param	. F	$\mathbf{C}$	Result	Units	Dil.	Amount	Result	Rec.	${f Limit}$	RPD	$\operatorname{Limit}$
Benzene		1	1.54	mg/Kg	1	2.00	< 0.00473	77	74.6 - 120	4	20
Toluene		1	1.59	mg/Kg	1	2.00	< 0.00416	80	77.1 - 120	4	20
Ethylbenzene		1	1.68	mg/Kg	1	2.00	< 0.00511	84	75 - 120	5	20
Xylene		1	4.99	mg/Kg	1	6.00	0.0077	83	77 - 120	6	20

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

	LCS	LCSD			$\operatorname{Spike}$	LCS	LCSD	Rec.
Surrogate	Result	Result	Units	Dil.	Amount	Rec.	Rec.	${f Limit}$
Trifluorotoluene (TFT)	1.55	1.63	mg/Kg	1	2.00	78	82	69.6 - 120
4-Bromofluorobenzene (4-BFB)	1.66	1.73	mg/Kg	1	2.00	83	86	69.2 - 120

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

QC Batch:

102540

Date Analyzed:

2013-06-21

Analyzed By: JS

Prep Batch: 86863

QC Preparation:

2013-06-21

Prepared By: JS

			LCS			Spike	Matrix		Rec.
Param	F	$\mathbf{C}$	Result	Units	Dil.	${f A}{f mount}$	Result	Rec.	$\operatorname{Limit}$
GRO		1	14.8	mg/Kg	1	20.0	< 0.230	74	66.9 - 120

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

 $continued \dots$ 

114-6401364

Work Order: 13061821 COG/Jenkins B Federal Water Flood Page Number: 16 of 28

Eddy Co., NM

control spikes continued	control	spikes	continued			
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Param	F	С	LCSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	$egin{array}{c} { m Rec.} \\ { m Limit} \end{array}$	RPD	RPD Limit
Param	F	C	LCSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	Rec. Limit	RPD	RPD Limit
GRO		1	15.4	mg/Kg	1	20.0	< 0.230	77	66.9 - 120	4	20

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

Surrogate	$egin{array}{c}  ext{LCS} \  ext{Result} \end{array}$	LCSD Result	Units	Dil.	$\begin{array}{c} {\rm Spike} \\ {\rm Amount} \end{array}$	LCS Rec.	LCSD Rec.	${ m Rec.} \ { m Limit}$
Trifluorotoluene (TFT)	1.80	1.85	mg/Kg	1	2.00	90	92	69.6 - 124
4-Bromoffuorobenzene (4-BFB)	1.93	2.04	$\mathrm{mg}/\mathrm{Kg}$	1	2.00	96	102	77.7 - 120

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

QC Batch:

102549

Date Analyzed:

2013-06-24

Analyzed By: CW

Prep Batch: 86869

QC Preparation: 2013-06-23

Prepared By: CW

			LCS			$\operatorname{Spike}$	Matrix		${ m Rec.}$
Param	$\mathbf{F}$	$^{\rm C}$	Result	Units	Dil.	Amount	Result	Rec.	Limit
DRO		2	216	mg/Kg	1	250	13.9	81	66.9 - 119.9

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

			LCSD			Spike	Matrix		Rec.		RPD
Param	F	$\mathbf{C}$	Result	Units	Dil.	Amount	Result	Rec.	Limit	RPD	Limit
DRO		2	210	mg/Kg	1	250	13.9	78	66.9 - 119.9	3	20

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

	LCS	LCSD			$\operatorname{Spike}$	LCS	LCSD	Rec.
Surrogate	Result	Result	Units	Dil.	Amount	Rec.	Rec.	$\operatorname{Limit}$
n-Tricosane	90.9	88.1	mg/Kg	1	100	91	88	76.8 - 140.2

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

QC Batch:

102555

Date Analyzed:

2013-06-24

Analyzed By: AR

Prep Batch: 86840

QC Preparation: 2013-06-21

Prepared By: AR.

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

Work Order: 13061821 COG/Jenkins B Federal Water Flood Page Number: 17 of 28 Eddy Co., NM

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

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

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

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

QC Batch:

102556

Date Analyzed:

2013-06-24

Analyzed By: AR.

Prep Batch: 86840

QC Preparation: 2013-06-21 Prepared By: AR.

			LCS			Spike	Matrix		Rec.
Param	$\mathbf{F}$	$\mathbf{C}$	Result	Units	Dil.	Amount	Result	Rec.	$\operatorname{Limit}$
Chloride			2720	mg/Kg	1	2500	< 3.85	109	85 - 115

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

			LCSD			$_{ m Spike}$	Matrix		Rec.		RPD
Param	$\mathbf{F}$	$^{\rm C}$	Result	Units	Dil.	Amount	Result	Rec.	$\operatorname{Limit}$	RPD	Limit
Chloride			2630	mg/Kg	1	2500	< 3.85	105	85 - 115	3	20

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

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

QC Batch: Prep Batch: 86950

102642

Date Analyzed:

2013-06-26

QC Preparation: 2013-06-26

Analyzed By: MT Prepared By: MT

LCS Spike Matrix Rec. Param  $\mathbf{F}$ Result Units Dil. Amount Result Limit Rec. Benzene 1.65 2.00 < 0.0047382 74.6 - 120mg/Kg 1 Toluene 1.72 mg/Kg 1 2.00 < 0.00416 86 77.1 - 120Ethylbenzene 75 - 120 1.81 mg/Kg 1 2.00 < 0.00511 90 Xylene 5.37 mg/Kg 6.00 0.009489 77 - 120 1

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

Param	F	$^{\mathrm{C}}$	LCSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	Rec. Limit	RPD	$egin{array}{l}  ext{RPD} \  ext{Limit} \end{array}$
Benzene		ı	1.56	mg/Kg	1	2.00	< 0.00473	78	74.6 - 120	6	20
Toluene		1	1.62	mg/Kg	1	2.00	< 0.00416	81	77.1 - 120	6	20
Ethylbenzene		1	1.71	mg/Kg	1	2.00	< 0.00511	86	75 - 120	6	20
Xylene		1	5.07	mg/Kg	1	6.00	0.0094	84	77 - 120	6	20

Work Order: 13061821 COG/Jenkins B Federal Water Flood Page Number: 18 of 28 Eddy Co., NM

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

	LCS	LCSD			Spike	LCS	LCSD	Rec.
Surrogate	Result	Result	Units	Dil.	Amount	Rec.	Rec.	$\operatorname{Limit}$
Trifluorotoluene (TFT)	1.73	1.64	mg/Kg	1	2.00	86	82	69.6 - 120
4-Bromofluorobenzene (4-BFB)	1.90	1.78	mg/Kg	1	2.00	95	89	69.2 - 120

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

QC Batch: 102643 Date Analyzed: 2013-06-26 Analyzed By: MT

Prep Batch: 86950

QC Preparation: 2013-06-26

Prepared By: MT

			LCS			Spike	Matrix		Rec.
Param	$\mathbf{F}$	$^{\rm C}$	Result	Units	Dil.	Amount	Result	Rec.	$\mathbf{Limit}$
GRO		1	13.6	ıng/Kg	1	20.0	< 0.230	68	66.9 - 120

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

			LCSD			$_{ m Spike}$	Matrix		Rec.		RPD
Param	F	$^{\rm C}$	Result	Units	Dil.	Amount	Result	Rec.	Limit	RPD	$_{ m Limit}$
GRO		i	13.5	mg/Kg	1	20.0	< 0.230	68	66.9 - 120	1	20

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

Surrogate	LCS Result	LCSD Result	Units	Dil.	${ m Spike} \ { m Amount}$	LCS Rec.	LCSD Rec.	${ m Rec.} \ { m Limit}$
Trifluorotoluene (TFT)	1.80	1.59	mg/Kg	1	2.00	90	80	69.6 - 124
4-Bromofluorobenzene (4-BFB)	1.96	1.98	mg/Kg	1	2.00	98	99	77.7 - 120

Matrix Spike (MS-1) Spiked Sample: 332407

QC Batch:

102539

Date Analyzed:

2013-06-21

Analyzed By: JS

Prep Batch: 86863

QC Preparation: 2013-06-21

Prepared By:

			MS			$\mathbf{Spike}$	Matrix		Rec.
Param	$\mathbf{F}$	$^{\rm C}$	Result	Units	Dil.	Amount	Result	Rec.	$\operatorname{Limit}$
Benzene		)	1.74	mg/Kg	1	2.00	< 0.00473	87	68.8 - 120
Toluene		1	1.80	${ m mg/Kg}$	1	2.00	< 0.00416	90	71.8 - 122
Ethylbenzene		1	1.91	mg/Kg	1	2.00	< 0.00511	96	75 - 130
Xylene		ı	5.66	mg/Kg	1	6.00	0.0128	94	75.4 - 129

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

Work Order: 13061821 COG/Jenkins B Federal Water Flood Page Number: 19 of 28

Eddy Co., NM

RPD MSD Spike Matrix Rec. RPD Param F  $\mathbf{C}$ Result Units Dil. Amount Result Rec. Limit Limit 20 Benzene 1.80 mg/Kg 2.00 < 0.00473 90 68.8 - 1203 1 20 Toluene < 0.00416 93 71.8 - 1223 1.86 mg/Kg 1 2.00 mg/KgEthylbenzene 1.98 1 2.00 < 0.00511 99 75 - 1304 20 Xylene 5.86 mg/Kg 1 6.00 0.012897 75.4 - 1294 20

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

	MS	MSD			Spike	MS	MSD	${ m Rec.}$
Surrogate	$\operatorname{Result}$	Result	Units	Dil.	${f Amount}$	Rec.	Rec.	Limit
Trifluorotoluene (TFT)	1.82	1.92	mg/Kg	1	2	91	96	69.6 - 120
4-Bromofluorobenzene (4-BFB)	2.01	2.05	mg/Kg	1	2	100	102	69.2 - 120

Matrix Spike (MS-1) Spiked Sample: 332407

QC Batch: 102540 Date Analyzed: 2013-06-21 Analyzed By: JS Prep Batch: 86863 QC Preparation: 2013-06-21 Prepared By: JS

			MS			Spike	Matrix		Rec.
Param	$\mathbf{F}$	$^{\rm C}$	Result	Units	Dil.	Amount	Result	Rec.	$\mathbf{Limit}$
GRO		1	14.0	mg/Kg	1	20.0	0.266	69	38.8 - 120

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

			MSD			Spike	Matrix		Rec.		RPD
Param	$\mathbf{F}$	$\mathbf{C}$	Result	Units	Dil.	Amount	Result	Rec.	$\operatorname{Limit}$	RPD	Limit
GRO		ı	14.4	mg/Kg	1	20.0	0.266	71	38.8 - 120	3	20

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

	MS	MSD			Spike	MS	MSD	Rec.
Surrogate	Result	Result	$\mathbf{Units}$	Dil.	Amount	Rec.	Rec.	Limit
Triffuorotoluene (TFT)	2.26	1.91	mg/Kg	1	2	113	96	69.6 - 124
4-Bromofluorobenzene (4-BFB)	2.40	2.40	mg/Kg	1	2	120	120	77.7 - 120

Matrix Spike (MS-1) Spiked Sample: 332532

QC Batch: 102549 Date Analyzed: 2013-06-24 Analyzed By: CW Prep Batch: 86869 QC Preparation: 2013-06-23 Prepared By: CW

				MS			$\operatorname{Spike}$	Matrix		${ m Rec.}$
Param		$\mathbf{F}$	$\mathbf{C}$	Result	Units	Dil.	Amount	Result	Rec.	Limit
DRO	Qs	Qs	2	7630	mg/Kg	5	250	8530	-360	36.1 - 147.2

Work Order: 13061821 COG/Jenkins B Federal Water Flood Page Number: 20 of 28 Eddy Co., NM

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

				MSD			Spike	Matrix		Rec.		RPD
Param		$\mathbf{F}$	$^{\rm C}$	Result	Units	Dil.	Amount	Result	Rec.	Limit	RPD	Limit
DRO	Qs	Qs	2	7340	mg/Kg	5	250	8530	-476	36.1 - 147.2	4	20

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

			MS	MSD			$_{ m Spike}$	MS	MSD	Rec.
Surrogate			Result	Result	Units	Dil.	${f Amount}$	Rec.	Rec.	${f Limit}$
n-Tricosane	Qar	Qar	464	484	mg/Kg	5	100	464	484	78.3 - 131.6

Matrix Spike (MS-1) Spiked Sample: 332535

QC Batch: Prep Batch:

102555 86840 Date Analyzed:

2013-06-24

Analyzed By: AR

QC Preparation: 2013-06-21

Prepared By: AR.

	•		MS			Spike	Matrix		Rec.
Param	$\mathbf{F}$	$^{\rm C}$	Result	Units	Dil.	${f Amount}$	Result	Rec.	Limit
<u>Chloride</u>			3540	mg/Kg	10	2500	1220	93	78.9 - 121

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

			MSD			$\operatorname{Spike}$	Matrix		Rec.		RPD
Param	$\mathbf{F}$	$\mathbf{C}$	Result	Units	Dil.	Amount	Result	Rec.	Limit	RPD	$\operatorname{Limit}$
Chloride			3900	mg/Kg	10	2500	1220	107	78.9 - 121	10	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: 332624

QC Batch: Prep Batch:

102556 86840 Date Analyzed:

2013-06-24

QC Preparation: 2013-06-21

Analyzed By: AR Prepared By: AR

MS Spike Matrix Rec. F Param  $\mathbf{C}$ Result Units Dil. Amount Result Rec. Limit Chloride 3920 mg/Kg 5 2500 1380. 102 78.9 - 121

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

			MSD			$_{ m Spike}$	Matrix		Rec.		RPD
Param	F	$\mathbf{C}$	Result	Units	Dil.	Amount	Result	Rec.	$\operatorname{Limit}$	RPD	$\operatorname{Limit}$
Chloride			3790	mg/Kg	5	2500	1380	96	78.9 - 121	3	20

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

114-6401364

Work Order: 13061821 COG/Jenkins B Federal Water Flood Page Number: 21 of 28 Eddy Co., NM

Matrix Spike (MS-1) Spiked Sample: 332533

QC Batch: Prep Batch: 86950

102642

Date Analyzed:

2013-06-26

QC Preparation: 2013-06-26

Analyzed By: MT

Prepared By:

			MS			Spike	Matrix		Rec.
Param	$\mathbf{F}$	$^{\rm C}$	Result	$\operatorname{Units}$	Dil.	${f Amount}$	$\operatorname{Result}$	Rec.	Limit
Benzene		ı	1.74	mg/Kg	1	2.00	< 0.00473	87	68.8 - 120
Toluene		1	1.82	${ m mg/Kg}$	1	2.00	0.0069	91	71.8 - 122
Ethylbenzene		1	1.91	$_{ m mg/Kg}$	1	2.00	< 0.00511	96	75 - 130
Xylene		1	5.63	${ m mg/Kg}$	1	6.00	0.0148	94	75.4 - 129

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

			MSD			Spike	Matrix		Rec.		RPD
Param	F	$^{\rm C}$	Result	Units	Dil.	Amount	Result	Rec.	${f Limit}$	RPD	Limit
Benzene		ı	1.69	mg/Kg	1	2.00	< 0.00473	84	68.8 - 120	3	20
Toluene		1	1.76	mg/Kg	1	2.00	0.0069	88	71.8 - 122	3	20
Ethylbenzene		1	1.86	mg/Kg	1	2.00	< 0.00511	93	75 - 130	3	20
Xylene		1	5.48	mg/Kg	1	6.00	0.0148	91	75.4 - 129	3	20

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

	MS	MSD			Spike	MS	MSD	Rec.
Surrogate	Result	Result	Units	Dil.	Amount	Rec.	Rec.	${f Limit}$
Trifluorotoluene (TFT)	1.75	1.79	mg/Kg	1	2	88	90	69.6 - 120
4-Bromofluorobenzene (4-BFB)	1.95	1.92	mg/Kg	1	2	98	96	69.2 - 120

Matrix Spike (MS-1) Spiked Sample: 332533

QC Batch: Prep Batch: 86950

102643

Date Analyzed: QC Preparation:

2013-06-26 2013-06-26 Analyzed By: MT

Prepared By: MT

			MS			$\mathbf{Spike}$	Matrix		Rec.
Param	F	С	Result	Units	Dil.	Amount	Result	Rec.	Limit
GRO		1	15.8	mg/Kg	1	20.0	< 0.230	79	38.8 - 120

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

			MSD			$_{ m Spike}$	Matrix		Rec.		RPD
Param	$\mathbf{F}$	$\mathbf{C}$	Result	Units	Dil.	Amount	Result	Rec.	Limit	RPD	Limit
GRO		1	15.8	mg/Kg	1	20.0	< 0.230	79	38.8 - 120	0	20

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

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Work Order: 13061821

Page Number: 22 of 28 Eddy Co., NM

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COG/Jenkins B Federal Water Flood	Į
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matrix spikes continued								
•	MS	MSD	** .		$_{ m Spike}$	MS	MSD	Rec.
Surrogate	Result	Result	Units	Dil.	Amount	Rec.	Rec.	Limit
	MS	MSD			Spike	MS	MSD	Rec.
Surrogate	Result	Result	Units	Dil.	$\mathbf{A}\mathbf{mount}$	Rec.	Rec.	${f Limit}$
Trifluorotoluene (TFT)	1.78	1.68	mg/Kg	1	2	89	84	69.6 - 124
4-Bromofluorobenzene (4-BFB)	2.21	2.20	mg/Kg	1	2	110	110	77.7 - 120

Work Order: 13061821 COG/Jenkins B Federal Water Flood Page Number: 23 of 28 Eddy Co., NM

## Calibration Standards

Standard (CCV-1)

QC Batch: 102539

Date Analyzed: 2013-06-21

Analyzed By: JS

				$\mathrm{CCVs}$	$\mathrm{CCVs}$	$\mathrm{CCVs}$	Percent	
				True	Found	Percent	Recovery	Date
Param	Flag	$\operatorname{Cert}$	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Benzene		1	mg/kg	0.100	0.0858	86	80 - 120	2013-06-21
Toluene		1	$_{ m mg/kg}$	0.100	0.0803	80	80 - 120	2013-06-21
Ethylbenzene		1	mg/kg	0.100	0.0811	81	80 - 120	2013-06-21
Xylene		1	mg/kg	0.300	0.239	80	80 - 120	2013-06-21

Standard (CCV-2)

QC Batch: 102539

Date Analyzed: 2013-06-21

Analyzed By: JS

				CCVs	CCVs	CCVs	Percent	
				$\operatorname{True}$	Found	Percent	Recovery	Date
Param	Flag	$\operatorname{Cert}$	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Benzene		1	mg/kg	0.100	0.0877	88	80 - 120	2013-06-21
Toluene		1	mg/kg	0.100	0.0835	84	80 - 120	2013-06-21
Ethylbenzene		1	mg/kg	0.100	0.0838	84	80 - 120	2013-06-21
Xylene		1	mg/kg	0.300	0.247	82	80 - 120	2013-06-21

Standard (CCV-1)

QC Batch: 102540

Date Analyzed: 2013-06-21

Analyzed By: JS

				CCVs	$\mathrm{CCVs}$	CCVs	Percent	
				True	Found	Percent	Recovery	Date
Param	Flag	Cert	Units	Conc.	Conc.	Recovery	Limits	Analyzed
GRO		1	mg/Kg	1.00	0.922	92	80 - 120	2013-06-21

Standard (CCV-2)

QC Batch: 102540 Date Analyzed: 2013-06-21 Analyzed By: JS

Work Order: 13061821 COG/Jenkins B Federal Water Flood Page Number: 24 of 28 Eddy Co., NM

114-6401364

			•	CCVs	CCVs	$\mathrm{CCVs}$	Percent	
				True	Found	Percent	Recovery	Date
Param	Flag	$\operatorname{Cert}$	Units	Conc.	Conc.	Recovery	Limits	Analyzed
GRO		1	mg/Kg	1.00	0.940	94	80 - 120	2013-06-21

#### Standard (CCV-1)

QC Batch: 102549

Date Analyzed: 2013-06-24

Analyzed By: CW

				CCVs	CCVs	CCVs	Percent	ъ.
				True	Found	Percent	Recovery	$\operatorname{Date}$
Param	Flag	Cert	Units	Conc.	Conc.	Recovery	Limits	Analyzed
DRO		2	mg/Kg	250	204	82	80 - 120	2013-06-24

#### Standard (CCV-2)

QC Batch: 102549

Date Analyzed: 2013-06-24

Analyzed By: CW

				CCVs	CCVs	CCVs	Percent	
				True	Found	Percent	Recovery	$\operatorname{Date}$
Param	$\operatorname{Flag}$	$\operatorname{Cert}$	Units	Conc.	Conc.	Recovery	Limits	Analyzed
DRO		2	mg/Kg	250	209	84	80 - 120	2013-06-24

#### Standard (CCV-1)

QC Batch: 102555

Date Analyzed: 2013-06-24

Analyzed By: AR

				CCVs	CCVs	CCVs	Percent	
				True	Found	Percent	Recovery	Date
Param	$\operatorname{Flag}$	$\operatorname{Cert}$	$\operatorname{Units}$	Conc.	Conc.	Recovery	Limits	Analyzed
Chloride			mg/Kg	100	100	100	85 - 115	2013-06-24

#### Standard (CCV-2)

QC Batch: 102555

Date Analyzed: 2013-06-24

Analyzed By: AR

Work Order: 13061821 COG/Jenkins B Federal Water Flood Page Number: 25 of 28 Eddy Co., NM

				CCVs True	${ m CCVs} \ { m Found}$	$rac{ ext{CCVs}}{ ext{Percent}}$	Percent Recovery	Date
Param	Flag	Cert	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Chloride			mg/Kg	100	99.9	100	85 - 115	2013-06-24

#### Standard (CCV-1)

QC Batch: 102556

Date Analyzed: 2013-06-24

Analyzed By: AR

				CCVs	CCVs	CCVs	Percent	
				True	Found	Percent	Recovery	Date
Param	Flag	$\operatorname{Cert}$	${ m Units}$	Conc.	Conc.	Recovery	Limits	Analyzed
Chloride			mg/Kg	100	99.3	99	85 - 115	2013-06-24

#### Standard (CCV-2)

QC Batch: 102556

Date Analyzed: 2013-06-24

Analyzed By: AR

Damasa	Flor	Cont	Unite	CCVs True	CCVs Found	CCVs Percent	Percent Recovery	Date
Param	Flag	Cert	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Chloride			mg/Kg	100	$1\overline{0}1$	101	85 - 115	2013-06-24

#### Standard (CCV-1)

QC Batch: 102642

Date Analyzed: 2013-06-26

Analyzed By: MT

Param	Flag	Cert	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Benzene		1	mg/kg	0.100	0.0904	90	80 - 120	2013-06-26
Toluene		1	mg/kg	0.100	0.0842	84	80 - 120	2013-06-26
Ethylbenzene		i	mg/kg	0.100	0.0843	84	80 - 120	2013-06-26
Xylene		1	mg/kg	0.300	0.249	83	80 - 120	2013-06-26

#### Standard (CCV-2)

QC Batch: 102642

Date Analyzed: 2013-06-26

Analyzed By: MT

114-6401364

Work Order: 13061821 COG/Jenkins B Federal Water Flood Page Number: 26 of 28 Eddy Co., NM

Param -		Flag	Cert	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Benzene			ı	mg/kg	0.100	0.0865	86	80 - 120	2013-06-26
Toluene			ı	mg/kg	0.100	0.0814	81	80 - 120	2013-06-26
Ethylbenzene			1	mg/kg	0.100	0.0813	81	80 - 120	2013-06-26
Xylene	Qe	Qu	1	mg/kg	0.300	0.238	79	80 - 120	2013-06-26

Standard (CCV-1)

QC Batch: 102643

Date Analyzed: 2013-06-26

Analyzed By: MT

				CCVs	CCVs	CCVs	Percent	•
				True	· Found	Percent	Recovery	$\operatorname{Date}$
Param	Flag	$\operatorname{Cert}$	Units	Conc.	Conc.	Recovery	Limits	Analyzed
GRO		1	mg/Kg	1.00	0.887	89	80 - 120	2013-06-26

Standard (CCV-2)

QC Batch: 102643

Date Analyzed: 2013-06-26

Analyzed By: MT

				CCVs	CCVs	$\mathrm{CCVs}$	Percent	
				True	Found	Percent	Recovery	Date
Param	$\operatorname{Flag}$	$\operatorname{Cert}$	Units	Conc.	Conc.	Recovery	Limits	Analyzed
GRO		1	mg/Kg	1.00	0.871	87	80 - 120	2013-06-26

Work Order: 13061821 COG/Jenkins B Federal Water Flood Page Number: 27 of 28 Eddy Co., NM

# Appendix

### Report Definitions

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

## **Laboratory Certifications**

	Certifying	Certification	Laboratory
С	Authority	Number	Location
_	NCTRCA	WFWB384444Y0909	TraceAnalysis
-	DBE	VN 20657	TraceAnalysis
-	HUB	1752439743100-86536	TraceAnalysis
-	WBE	237019	TraceAnalysis
1	NELAP	T104704219-13-9	Lubbock
2	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

Work Order: 13061821 COG/Jenkins B Federal Water Flood Page Number: 28 of 28 Eddy Co., NM

### Attachments

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

Analysis Request of Chain of Custody Record								PAGE: 1 OF: 2														
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