SITE INFORMATION

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Report Type: Work Plan

Date Released: 1/31/2011 Type Release: Oil Source of Contamination: Circulating Pump Fluid Recovered: 24 bbls Fluid Recovered: 23 bbls Official Communication: 23 bbls Name: Pat Ellis Variation: Ike Tavarez Company: COG Operating, LLC Address: 550 W. Texas Ave. Ste. 1300 P.O. Box Image: Pat Ellis City: Midland, Texas Phone number: (432) 686-3023 Fax: (20) 686-3023 Fax: (20) 686-3023 Fax: (20) 686-3023 Soft of Groundwater: Ran				ort Type: w	and the second secon	
Company: COG Operating LLC Section, Township and Range Unit J Sec 3 T25S R28E Image: Comparison of Comparis		ormation				
Section, Township and Range Unit J Sec 3 T25S R28E Interval State Lease Number: API-30-015-33012 County County Eddy County I04.07456° W GPS: 32.15751°N 104.07456° W State State Mineral Owner: State State Mineral Owner: State Directions: Isteing in Malaga on Hwy 285, travel south on Hwy 285 for 4.6 miles site is on west side of the highway. Highway. Release Data: 20.5721 State State Date Released: 1/31/2011 Type Flease GII Source of Contamination: Circulating Pump Fluid Released: 23 bbls Official Communication: Circulating Pump Fluid Release: State State Company: COG Operating, LLC Tetra Tech Address: Address: 500 W. Texas Ave. Ste. 1300 1910 N. Big Spring P.O. Box P.O. Box Stet Data Phone number: (432) 686-3023 (432) 425-3878 State Stet Data Stop fi					у	· · · · · · · · · · · · · · · · · · ·
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	200 ft - 1,000 ft.			10		
Total Ranking Score: 20 Acceptable Soil RRAL (mg/kg) JUL 0.5 2011 JUL 0.5 2011 10 50 100	>1,000 ft.			0		
Benzene Total BTEX TPH 10 50 100	। ३ :-५.२०००२ То ।	tal Ranking Score:			na/ka)	RECEIVED
10 50 100 NMOCD ARTESIA						JUL 03 CON
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				L 50	100	NMOCD ATTE



June 1, 2011

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

Re: Work Plan for the COG Operating LLC., Willow "A" State Tank Battery, Unit J, Section 3, Township 25 South, Range 28 East, Eddy County, New Mexico.

Mr. Bratcher:

Tetra Tech, Inc. (Tetra Tech) was contacted by COG Operating LLC. (COG) to assess a spill from the Willow "A" State Tank Battery located in Unit J, Section 3, Township 25 South, Range 28 East, Eddy County, New Mexico (Site). The spill site coordinates are N 32.15751°, W 104.07456°. The site location is shown on Figures 1 and 2.

Background

According to the State of New Mexico C-141 Initial Report, the leak was discovered on January 31, 2011, and released approximately twenty four (24) barrels of oil from the circulating pump. To alleviate the problem, COG personnel repaired the pump. Twenty three (23) barrels of standing fluids were recovered. The spill was contained inside of the tank battery affecting an area of approximately 45' x 140'. The initial C-141 form is enclosed in Appendix A.

Groundwater

No water wells were listed within Section 3. The New Mexico State Engineer Well Reports showed one well in Section 4, with a groundwater depth of 35' below surface. According to the NMOCD groundwater map, the average depth to groundwater in this area is less than 50' below surface. The average depth to water map is shown in Appendix B.



Regulatory

A risk-based evaluation was performed for the Site in accordance with the New Mexico Oil Conservation Division (NMOCD) Guidelines for Remediation of Leaks, Spills and Releases, dated August 13, 1993. The guidelines require a risk-based evaluation of the site to determine recommended remedial action levels (RRAL) for benzene, toluene, ethylbenzene and xylene (collectively referred to as BTEX) and total petroleum hydrocarbons (TPH) in soil. The proposed RRAL for benzene was determined to be 10 parts per million (ppm) or milligrams per kilogram (mg/kg) and 50 ppm for total BTEX (sum of benzene, toluene, ethylbenzene, and xylene). Based upon the depth to groundwater, the proposed RRAL for TPH is 100 mg/kg.

Soil Assessment and Analytical Results

On February 15, 2011, Tetra Tech personnel inspected and sampled the spill area. A total of five (5) auger holes (AH-1 through AH-4 and a background auger hole) were installed using a stainless steel hand auger to assess the impacted soils. Select 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 results of the sampling are summarized in Table 1. The auger hole locations are shown on Figure 3.

Referring to Table 1, auger holes (AH-1, AH-2 and AH-3) were below the RRAL for TPH and BTEX. Auger hole (AH-4) had a total TPH concentration of 131 mg/kg (0-1') and declined below the RRAL at (1-1.5').

Auger holes (AH-1, AH-2 and AH-3) showed chloride concentrations ranging from 425 mg/kg to 1,650 mg/kg: The chloride concentrations declined with depth and showed bottom samples (auger holes) of AH-1 (<200 mg/kg at 5-5.5'), AH-2 (465 mg/kg at 4-4.5') and AH-3 (878 mg/kg at 2.5'-3.0'). The background auger hole showed a chloride high of 352 mg/kg at 3-3.5' below surface. The remaining auger hole (AH-4) did not show a chloride impact to the area.

2



Work Plan

COG proposes to remove impacted material as highlighted (green) in Table 1. The proposed areas are shown on Figure 4. In the area of auger hole (AH-3), a backhoe trench will be installed to define the vertical extent of the chloride impact. The impacted soil around oil and gas equipment, structures or lines may not be feasible or practicable to be removed due to safely concerns. As such, Tetra Tech will excavate the soils to the maximum extent practicable. Once the areas are excavated to the appropriate depths, the excavation will be backfilled with clean soil.

Once completed, a final report will be submitted to the NMOCD for review. If you have any questions or comments concerning the assessment, please call me at (432) 682-4559.

Respectfully submitted,/

TETARA JEGI

Ike Tavarez Project Manager

cc: Pat Ellis - COG

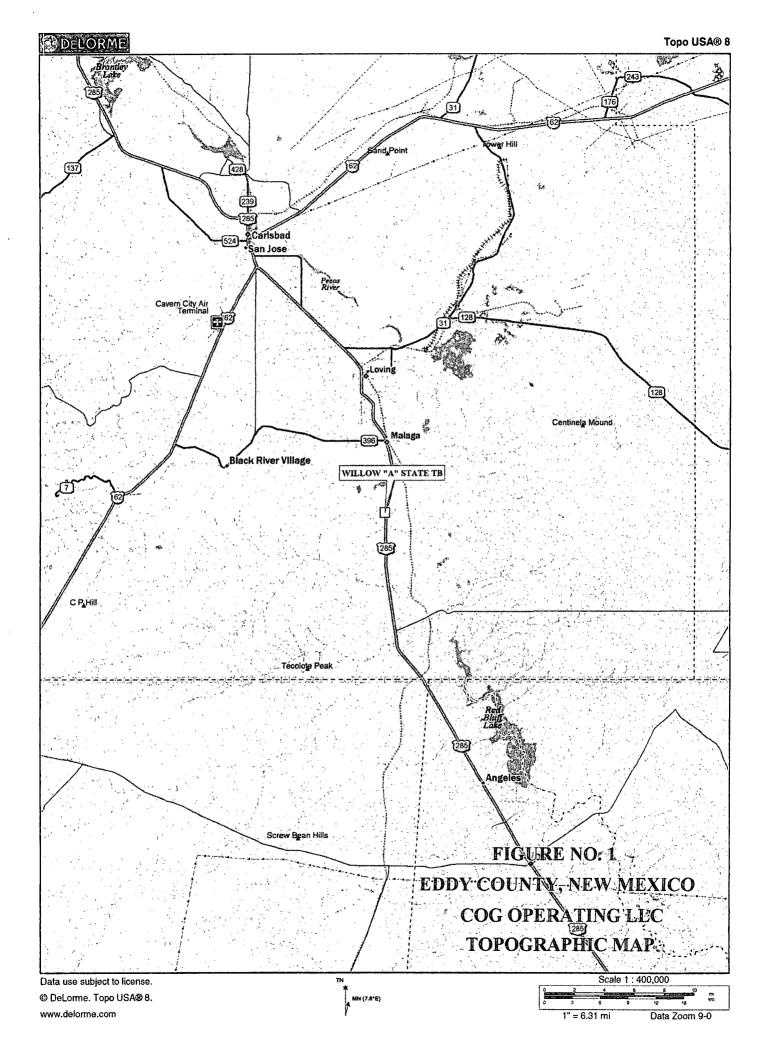
Figures

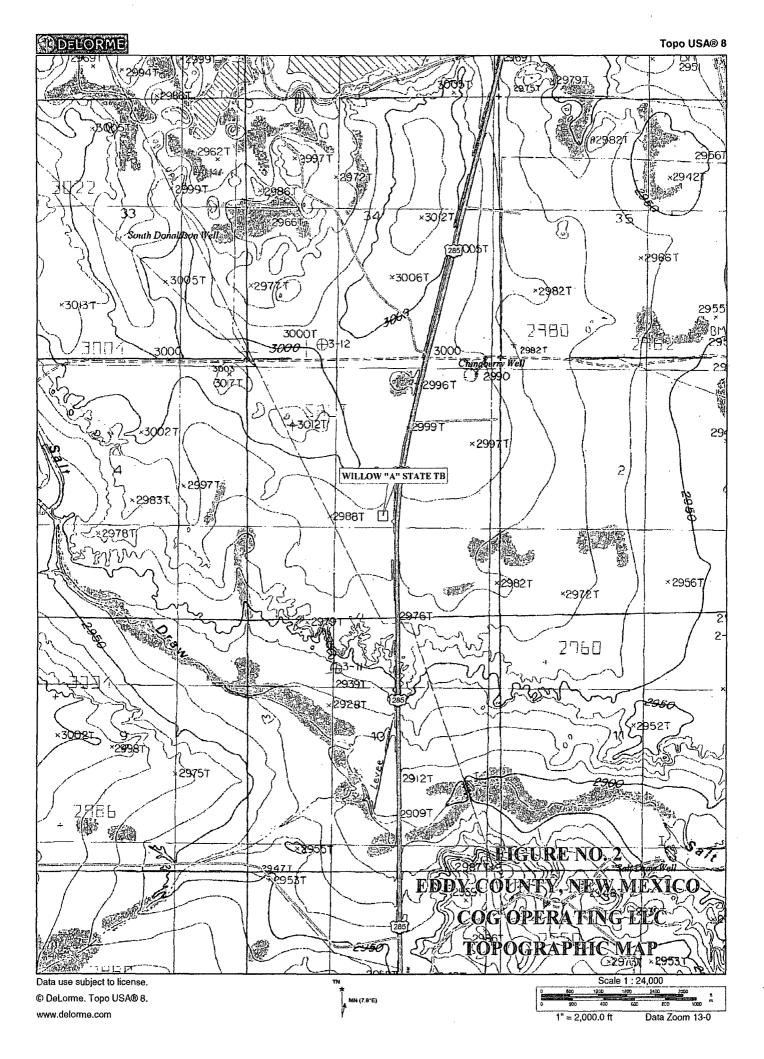
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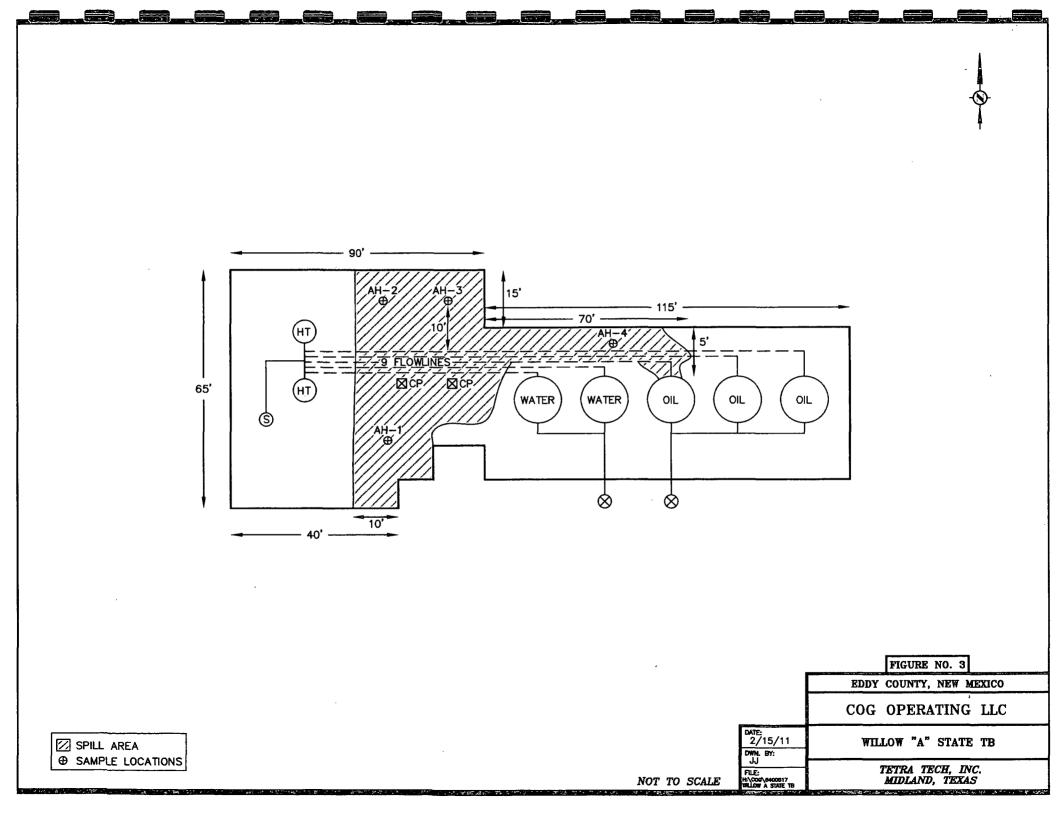
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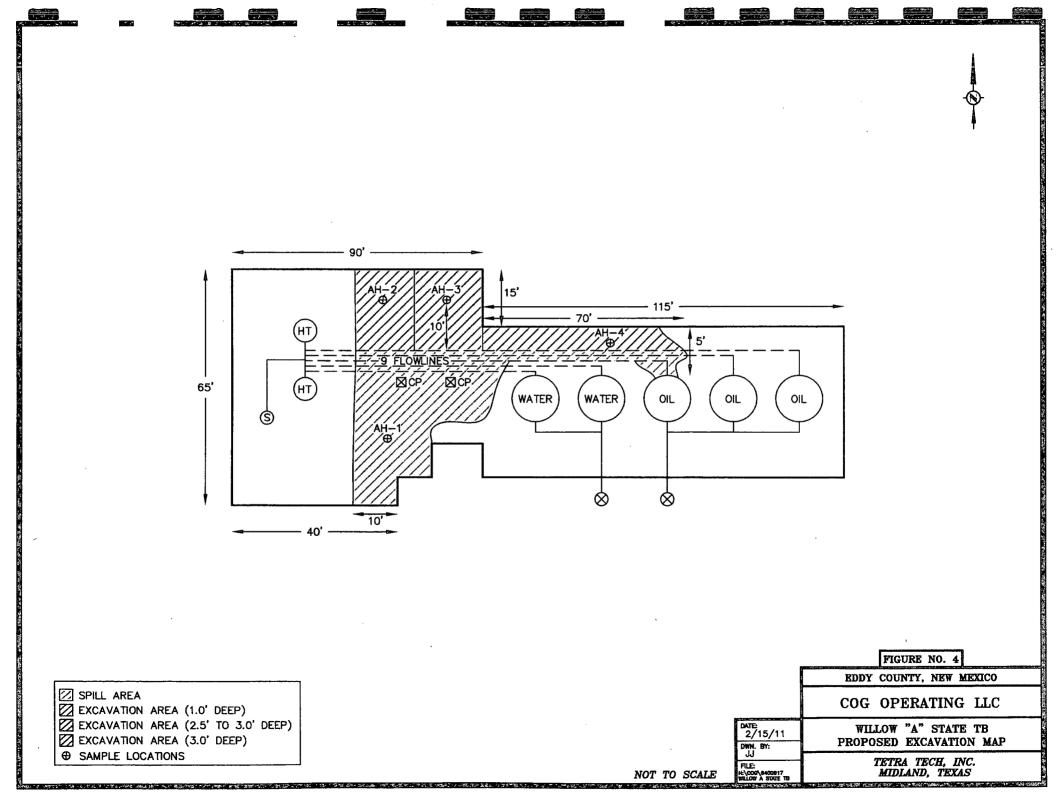
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Photos

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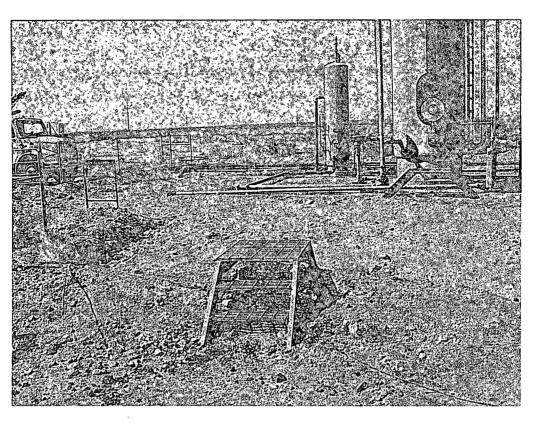
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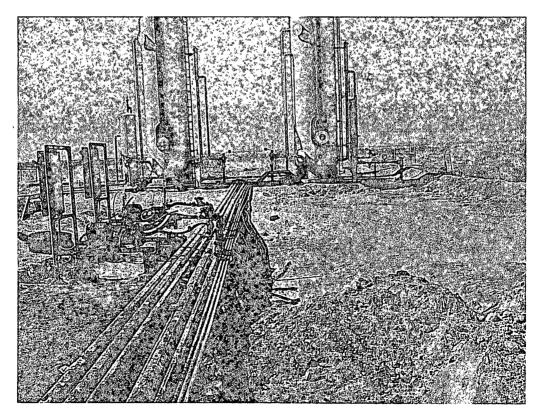
COG Operating LLC Willow "A" State TB Eddy County, New Mexico



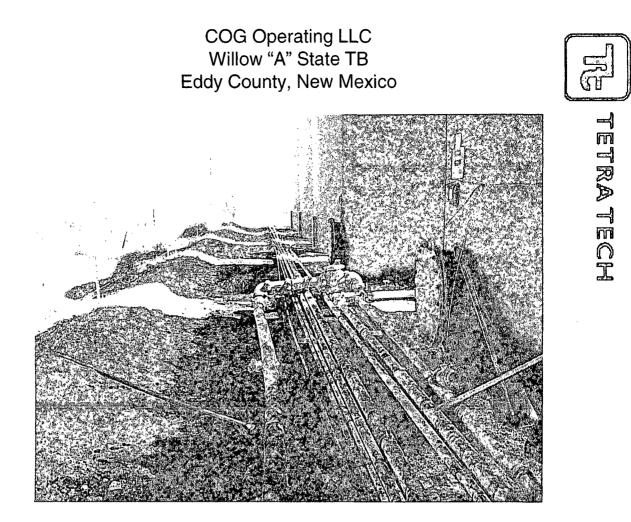


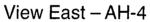


View West – AH-1



View West – AH-2 and 3





Site info and picture details

Tables

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Table 1 COG Operating LLC. WILLOW "A" TANK BATTERY Eddy County, New Mexico

Sample		Sample	Depth	Soil	Status	Т	PH (mg/k	g)	Benzene	Toluene	Ethlybenzene	Xylene	Chloride
ID	Sample Date	Depth (ft)	(BEB)	In-Situ	Removed	GRO	DRO	Total	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)
AH-1	2/15/2011	0-1'	1'	Х		22.7	<50.0	22.7	<0.0200	<0.0200	<0.0200	0.477	518
	11	1-1.5'	1'	Х		-	-	-		_		-	735
	41	2-2.5'	1'	Х		-	-	-	_	_		-	953
	н ,	3-3.5'	1'	Х		-	-	-	-	-	-	-	1,020
	11	4-4.5'	1'	Х		-	-	-	-	-		_	425
	"	5-5.5'	1'	x		-	-		-	_		-	<200
AH-2	2/15/2011	0-1'	1'	X		3.03	<50.0	3.03	<0.0200	<0.0200	<0.0200	0.379	1,130
	H	1-1.5'	1'	X		_	-	-	-	-	-	•	1,350
	u	2-2.5'	1'	X			-						1,650
	u	3-3.5'	1'	X				-	مي ب	-			1,120
	. 11	4-4.5'	1'	Х		<u>-</u>	-		-	-	<u> </u>	-	465

Table 1 COG Operating LLC. WILLOW "A" TANK BATTERY Eddy County, New Mexico

Sample	Comolo Data	Sample	Depth	Soil	Status	T	PH (mg/k	(g)	Benzene	Toluene	Ethlybenzene	Xylene	Chloride
ID	Sample Date	Depth (ft)	(BEB)	In-Situ	Removed	GRO	DRO	Total	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)
AH-3	2/15/2011	0-1'	- 1	X		<2.00	<50.0	<50.0	<0.0200	<0.0200	<0.0200	<0.0200	981
	n	1-1.5'	- 1'	X		•		-		_			1,630
	11	2-2.5'	1'	X			-	-	ng e sa	_		-	1,570
	n	2.5-3'	1'	Х		-	-	-	-	-	-	-	878
AH-4	2/15/2011	0-1'	1'	X		131	<50.0	131	<0.0200	0.236	0.346	1.22	<200
	u .	1-1.5'	1'	Х		<2.00	<50.0	<50.0	-	_	-	-	<200
	11	2-2.5'	1'	Х		-	_	-	-	_		-	<200
	11	3-3.5'	1'	Х		-	-	-	-	-	-	-	<200
BG	4/14/2011	0-1'		х		-	-	-	-		-	-	<200
	11	1-1.5'		Х		-	-	-	-	-	- ·	-	<200
	0	2-2.5'		Х		-	-	-	-	-	-	-	<200
	11	3-3.5'		Х		-	-	-	-	-	-	-	352

BEB Below Excavation Bottom

(--) Not Analyzed

Proposed excavation depths

____ P

Appendix A

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

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		and a second	Rel	ease Notific	atio	on and Co	orrective A	Action	1			
						OPERA				Initial Repor	: D	Final Report
Name of Co	mnanv	COG OP	ERATIN	IGLLC	<u> </u>	Contact		Pat Ellis		minur reepor	·	1 mai report
Address				dland, TX 7970	1	Telephone 1		-230-00				
Facility Nan			w "A" St			Facility Typ		nk Batte				
								· · · · · · · · · · · · · · · · · · ·			- <u>10 00 0</u>	15 22012
Surface Ow	ner State	;		Mineral C	wner		·		Lea	ase No. (AP)	#) 50-0	13-33012
						ON OF RE	LEASE					
Unit Letter J	Section 3	Township 25S	Range 28E	Feet from the	Nort	h/South Line	Feet from the	East/	West L	ine County	Eddy	
				Latitude 32 (•	ide 104 04.456	5				
				NAT	URI	E OF REL		.				
Type of Rele							Release 24bbls			ime Recovered		
Source of Re	lease Circ	ulating pump				Date and F 01/31/2011	lour of Occurren	nce		and Hour of I 1/2011 5)iscovery :00a.m.	y .
Was Immedia	ate Notice (Given?				If YES, To			0113			1
			Yes 🛛	No 🛛 Not Re	quire							EDI
By Whom?						Date and F	lour				FIV	EP-
Was a Water	course Rea						olume Impacting	the Wat	ercour	OF REC	05	2011
		L	Yes 🛛	No						1. "	69	-inl
If a Watercou	irse was Im	pacted, Descr	ibe Fully.	*						1 30	cn f	ARTESIA
Describe Cau	ise of Probl	em and Reme	dial Actio	n Taken.*			·······			NMC		
W" nipple on	circulating	numn started	leaking w	hen the pump was	torne	d on, due to wa	orn out threads.	The nipr	le and			
		en put back in						mpp				
Describe Are	a Affected	and Cleanup A	Action Tal	cen.*					<u></u>			
		-										
Initially 24bb	ide the dike	ased from the second the f	circulating Socility T	g pump and we we he facility will be	re abl	e to recover 23 ed and the cont	bbls with a vacu aminated soil wi	um truck	(, All) posed (released oil wa	s comple	etely Tech will
				le contamination 1								
prior to any s	ignificant r	emediation wo	ork.				•			•		* *
I hereby certi	fy that the	information of	ven above	e is true and comp	ete to	the best of my	knowledge and	undereta	nd that	nursuant to N	MOCD	nies and
				nd/or file certain r								
public health	or the envi	ronment. The	acceptant	ce of a C-141 repo	rt by t	he NMOCD m	arked as "Final I	Report" a	does no	t relieve the o	perator o	f liability
				v investigate and re stance of a C-141								
		ws and/or regu		dance of a C-141	герогі	does not renev	e me operator of	respons	louny	for compliance	; with an	y other
,,		7		> ~		,	OIL CON	ISERV	ATI	ON DIVIS	ION	
Simaturo		(I		$\langle \cdot \rangle$		-	•					
Signature:	<u> </u>					A	District Comercia					
Printed Name	× (Josh	Russo			Approved by	District Supervi	sor: 				·····
Title:		HSE Co	oordinator		-	1 Approval Dat	te:		Expira	tion Date:		
E-mail Addre	SS:	jrusso@conc	horesourc	es.com		Conditions of	Approval:			Attach	a 🗖	
Data: 0	0/04/2011	D4	422.210							Auaci		
Date: 02 Attach Addit	2/04/2011 ional Sher	Phone:	432-212 arzy	-2399						<u> </u>		
A MIGON FLUGH	Jonar Once	TI TACCESS	ury									

Appendix B

Water Well Data Average Depth to Groundwater (ft) COG - Willow "A" State Eddy County, New Mexico

	24 9	South	:	27 East				24 So	outh	:	28 East				24 9	South	:	29 Eas
5	5	4	3	2	1	6	70 5	30	4 3	0 3	2 5	5 1 6	2	6	5	4	3	2
7	8 2	6 9	10	11	12	7	8	50	9	10	11	12	-	7	8	9	10	11
		43			27					17	20	73		160				
18	17	16	15	14	13	18	1	7	16	15	14	13		18	17	16	15	14
34					31		4		29	18	52	34				183		
19	20	21	22	23	24	19	2		21	22	23	24		19	20	121	22	23
			70				4		ļ	_		-l	4			<u> </u>		
30	29	28	27	26	25	30	2	9	28	27	26	25		30	29	28	27	26
31	32	33	34	35	36	31	3	2	33	34	35	36		31	32	33_	-34	35
	25 9	 South		27 East		I		25 Sc	uth		28 East				25 5	South		29 Eas
6	5	4	3	2	1	6	5		4 3	5 3	2	1	٦	6	50	4	3	2
				_						SITE				49-1-		_		
7	8	9	10	11	12	7	8		9	10	11	12		<u> </u>	-18	9	10	11
									L	1			4		1	-	40	-
18	17	16	15	14	13	18	1	7	16	15	14	13	-	لر18	17	16	15	14
19										-		24		19			60 22	-
19	20	21	22	23	24	19	2		21	22	23	24	5	19	20	21	22	23
30	29	28	27	26	25	30	9		28	27	26	25 T	4	30	29	28	27	26
50	29	20	21	20	20	30	2	9	20 90	21	20	23 (30 30	29	20	21	20
31	32	33	34	35	36	31	- 3	2	33	34	35	36	H	31	32	33	34	35
	52	19	34	35	50	51	ľ	2	33	54	00	40		51	52	33	54	100
	_	[13																_
	26 \$	South		27 East				26 So	outh		28 East				26 S	South	2	29 Eas
; —	5	4	3	2	1	6	5		4	3	2	1 5	7	6	5	4	3	2
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	°	9	10	1''	12	ľ	ľ		9	10	1''	12		ľ	كرا	9	10	
18	17	16	15	14	13	18	1	7	16	15	14	13	1	18	17	16	15	14
													4		<u> </u>	_	<u> </u>	
19	20	21	22	23	24	19	2	0	21	22	23	24		19	20	21	22 57	23
			50					_		-	-		4			┶	69	_
0	29	28	27	26	25	30	2	9	28	27	26	25		30 U	29	28	27	26
									33	34	35	36	-	31	32	33	184	35
31	32	33	34	35	36	31	3											

New Mexico State Engineers Well Reports

USGS Well Reports

Geology and Groundwater Conditions in Southern Eddy, County, NM

NMOCD - Groundwater Data

Appendix C

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Summary Report

Tom Franklin Tetra Tech 1910 N. Big Spring Street Midland, TX 79705

Report Date: February 28, 2011

Work Order: 11021807

Project Location:	Eddy Co., NM
Project Name:	COG/Willow A TB
Project Number:	114-6400817

			Date	Time	Date
Sample	Description	Matrix	Taken	Taken	Received
257838	AH-1 0-1' 1' BEB	soil	2011-02-15	00:00	2011-02-17
257839	AH-1 1-1.5' 1' BEB	soil	2011-02-15	00:00	2011-02-17
257840	AH-1 2-2.5' 1' BEB	soil	2011-02-15	00:00	2011-02-17
257841	AH-1 3-3.5' 1' BEB	soil	2011-02-15	00:00	2011-02-17
257842	AH-1 4-4.5' 1' BEB	soil	2011-02-15	00:00	2011-02-17
257843	AH-1 5-5.5' 1' BEB	soil	2011-02-15	00:00	2011-02-17
257844	AH-2 0-1' 1' BEB	soil	2011-02-15	00:00	2011-02-17
257845	AH-2 1-1.5' 1' BEB	soil	2011-02-15	00:00	2011-02-17
257846	AH-2 2-2.5' 1' BEB	soil	2011-02-15	00:00	2011-02-17
257847	AH-2 3-3.5' 1' BEB	soil	2011-02-15	00:00	2011-02-17
257848	AH-2 4-4.5' 1' BEB	soil	2011-02-15	00:00	2011-02-17
257849	AH-3 0-1' 1' BEB	soil	2011-02-15	00:00	2011-02-17
257850	AH-3 1-1.5' 1' BEB	soil	2011-02-15	00:00	2011-02-17
257851	AH-3 2-2.5' 1' BEB	soil	2011-02-15	00:00	2011-02-17
257852	AH-3 2.5-3' 1' BEB	soil	2011-02-15	00:00	2011-02-17
257853	AH-4 0-1' 1' BEB	soil	2011-02-15	00:00	2011-02-17
257854	AH-4 1-1.5' 1' BEB	soil	2011-02-15	00:00	2011-02-17
257855	AH-4 2-2.5' 1' BEB	soil	2011-02-15	00:00	2011-02-17
257856	AH-4 3-3.5' 1' BEB	soil	2011-02-15	00:00	2011-02-17

]	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)
257838 - AH-1 0-1' 1' BEB	< 0.0200	< 0.0200	< 0.0200	0.477	<50.0	22.7
257844 - AH-2 0-1' 1' BEB	< 0.0200	< 0.0200	< 0.0200	0.379	<50.0	3.03
257849 - AH-3 0-1' 1' BEB	< 0.0200	< 0.0200	< 0.0200	< 0.0200	<50.0	$<\!2.00$
257853 - AH-4 0-1' 1' BEB	< 0.0200	0.236	0.346	1.22	<50.0	131
257854 - AH-4 1-1.5' 1' BEB	-				< 50.0	<2.00

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Report Date: Febr	uary 28, 2011	Work Order: 11021807	F	Page Number: 2 of 4
Sample: 257838	- AH-1 0-1' 1' BEB			
Param	Flag	\mathbf{Result}	Units	RL
Chloride	T	518	mg/Kg	4.00
Sample: 257839	- AH-1 1-1.5' 1' BEB			
Param	Flag	\mathbf{Result}	Units	RL
Chloride		735	mg/Kg	4.00
Sample: 257840	- AH-1 2-2.5' 1' BEB			
Param	Flag	Result	Units	RL
Chloride	· · · · · · · · · · · · · · · · · · ·	953	mg/Kg	4.00
Sample: 257841	- AH-1 3-3.5' 1' BEB			
_		Denult	T. : .	DI
Param Chloride	Flag	Result 1020	Units mg/Kg	RL 4.00
Sample: 257842 Param Chloride	- AH-1 4-4.5' 1' BEB Flag	Result 425	Units mg/Kg	RL 4.00
Sample: 257843	- AH-1 5-5.5' 1' BEB			
Param	Flag	Result	Units	RL
Chloride		<200	mg/Kg	4.00
Sample: 257844	- AH-2 0-1' 1' BEB			
Param	Flag	Result	Units	RL
Chloride		1130	mg/Kg	4.00
Sample: 257845	- AH-2 1-1.5' 1' BEB			
	Flag	Result	Units	RL
Param	riag	1005410	Omob	1011

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Sample: 257846 - AH-2 2-2.5' 1' BEB

Param	Flag	Result	Units	RL
Chloride		1650	mg/Kg	4.00

Sample: 257847 - AH-2 3-3.5' 1' BEB

Param	Flag	Result	Units	RL
Chloride		1120	mg/Kg	4.00

Sample: 257848 - AH-2 4-4.5' 1' BEB

Param	Flag	Result	Units	RL
Chloride		465	mg/Kg	4.00

Sample: 257849 - AH-3 0-1' 1' BEB

Param	Flag	Result	Units	RL
Chloride		981	mg/Kg	4.00

Sample: 257850 - AH-3 1-1.5' 1' BEB

Param	Flag	Result	Units	RL
Chloride		1630	mg/Kg	4.00

Sample: 257851 - AH-3 2-2.5' 1' BEB

Param	Flag	Result	Units	RL
Chloride		1570	mg/Kg	4.00

Sample: 257852 - AH-3 2.5-3' 1' BEB

Param	Flag	Result	\mathbf{Units}	RL
Chloride		878	mg/Kg	4.00

Sample: 257853 - AH-4 0-1' 1' BEB

Param	Flag	Result	Units	RL
Chloride		<200	mg/Kg	4.00

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Report Date: Febr	uary 28, 2011	Work Order: 11021807		Page Number: 4 of 4
Sample: 257854	- AH-4 1-1.5' 1' BEB			
Param	Flag	Result	Units	RL
Chloride		<200	mg/Kg	4.00
Sample: 257855	- AH-4 2-2.5' 1' BEB			
Param	Flag	Result	Units	RL
Chloride		<200	mg/Kg	4.00
Sample: 257856	- AH-4 3-3.5' 1' BEB			
Param	Flag	\mathbf{Result}	Units	RL
Chloride		<200	mg/Kg	4.00

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Summary Report

Tom Franklin Tetra Tech 1910 N. Big Spring Street Midland, TX 79705

Report Date: April 27, 2011

Work Order: 11041532

Project Location:Eddy Co, NMProject Name:COG/Willow A State Tank Battery

			Date	Time	Date
Sample	Description	Matrix	Taken	Taken	Received
263933	BG 0-1'	soil	2011-04-14	00:00	2011-04-15
263934	BG 1-1.5'	soil	2011-04-14	00:00	2011-04-15
263935	BG 2-2.5'	soil	2011-04-14	00:00	2011-04-15
263936	BG 3-3.5'	soil	2011-04-14	00:00	2011-04-15

Sample: 263933 - BG 0-1'

Param	Flag	Result	Units	RL
Chloride		<200	mg/Kg	4.00

Sample: 263934 - BG 1-1.5'

Param	Flag	Result	Units	RL
Chloride		<200	mg/Kg	4.00
				~
Sample: 263935	- BG 2-2.5'			
Param	Flag	Result	Units	\mathbf{RL}
Chloride		<200	mg/Kg	4.00

Sample: 263936 - BG 3-3.5'

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Report Date: April 27, 2011		Work Order: 11041532	Page	Page Number: 2 of 2	
Param	Flag	Result	Units	RL	
Chloride		352	mg/Kg	4.00	

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