Cimarex Energy Company
Cottonwood Draw 22 Federal Com #1
Delineation Report and Work Plan

Eddy County, New Mexico

May 15, 2012

Prepared for:

Cimarex Energy Company
600 North Marienfeld, Suite 600
Midland, Texas 79701

By:

Safety & Environmental Solutions, Inc.
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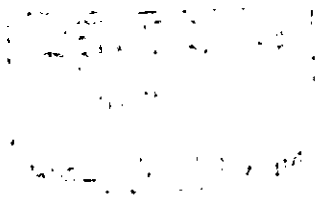
Hobbs, New Mexico 88240
(575) 397-0510



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I. Company Contacts

Representative	Company	Telephone	E-mail
Terry Ainsworth	Cimarex Energy Co.	575-390-1388	tainsworth@cimarex.com
Bob Allen	SESI	575-397-0510	ballen@sesi-nm.com
David Boyer	SESI	575-390-7067	dgboyer@sesi-nm.com

II. Background

Safety and Environmental Solutions, Inc. (SESI) was engaged by Cimarex Energy to perform site assessment of a release area at the Cottonwood Draw 22 Federal Com #1. The release from the wellhead occurred on July 7, 2011 and consisted of an estimated volume of 20 barrels of produced water, one barrel of oil and one barrel of condensate. The production site is located in the southeast ¼ of Section 22 of Township 25 South, Range 26 East, Eddy County, New Mexico. The surface elevation of the production location is approximately 3,295 feet above MSL.

III. Soils

The surface soils in the area are from the Reeves Series. These soils consist of light colored, well drained, calcareous soils that are shallow to moderately deep over gypsiferous rocks. The Reeves Gypsum land complex 0-3 percent slope occurs on plains throughout the central part of the survey area. This complex is used for native pasture and wildlife habitat. The soils are not easily eroded. Good range management is needed to maintain a cover of desirable forage. Reestablishment of the native vegetation is difficult because temperatures are high and rainfall is undependable.

IV. Surface and Ground Water

Surface water is not present in the area and in general groundwater is hard to locate and, in places, is of poor quality. According to data provided by the New Mexico Office of State Engineer's online database, the closest water well to the Cottonwood Draw site is in the NW/4 NW/4 of Section 22 at a distance of just under one mile with a depth to water of 118 feet measured in 1967. The surface elevation at this location is approximately 3,375 feet with the result that groundwater in this well is at an elevation of about 3,257 feet above MSL. If the water table was flat and groundwater continuous, water would be expected to be present at a depth of 38 feet below the production location.

Typically the groundwater gradient is not flat and follows the surface or topographic gradient which would mean it would be at a depth greater than 38 feet. The topographic map shows a well identified as the "Bailey Well" south of the location at a distance of 0.3 miles. This well is located adjacent to the dry Cottonwood Draw drainage. There is no readily available information on this well including depth to water. However the surface elevation of the well is at 3,245 feet, 50 feet lower than the Cottonwood production site. The well is not flowing artesian water therefore water is lower than the surface elevation. The difference between the surface elevation at the Cottonwood production site and the water well is 50 feet so water at the Cottonwood site is at a minimum depth of 50 feet. As the groundwater surface is sloping to follow the surface gradient, depth to groundwater is more likely to be in the 80 to 100 foot range at the Cottonwood production location.

V. Work Performed

Cimarex Energy requested that Safety and Environmental Solutions, Inc. (SESI) perform on-site chloride delineation at the location. On September 23 and again on October 18, 2011, SESI met Backhoe Services Inc. on site to excavate exploratory trenches at the location of the reported release, test field samples for chloride and submit samples to the analytical laboratory for chloride verification.

Three test trenches in the release area were dug on October 18 (CTT-1, CTT-2, CTT-3); previously two trenches (TT-1 and TT-2) adjacent to the release area were dug on September 23. Trenches were dug to 4 feet or bedrock if less than four feet. The locations of the test trenches are shown on the attached figure. Samples were taken at depths of 2 feet and 4 feet (if necessary) and tested in the field for the approximate concentration of chlorides. If the upper sample was less than 250 ppm it was sent to the laboratory for confirmation analysis. If the sample was greater than 250 ppm the deeper sample was tested.

Samples obtained from the test trenches were properly preserved and transported under chain of custody to Cardinal Laboratories in Hobbs, New Mexico and analyzed for Chlorides (EPA Method SM4500Cl-B). The results of the laboratory analyses are shown in the below table.

Sample ID	Sample Date	Sample Distance and Direction from well	Sample Depth (feet below land surface)	Chlorides (mg/kg)	418.1 TPH (mg/kg)
TT-1, SP-1	09/23/11	94 ft. SE	2 ft.	48.0	280
TT-2, SP-2	09/23/11	116 ft. SSE	2 ft.	64.0	368
CTT-1	10/18/11	52 ft. ESE	2 ft.	16.0	<100
CTT-2	10/18/11	48 ft. SSW, shallow depression	2 ft.	2,360	<100
CTT-2	10/18/11	48 ft. SSW, shallow depression	3' 7" (bedrock)	800	<100
CTT-3	10/18/11	104 ft. SE	2 ft.	160	<100

The only location where elevated chloride concentrations were found is a shallow depression in the pad at a distance of approximately 48 feet south-southwest of the well head. The analysis of the 2 foot sample from this location (CTT-2) resulted in a chloride concentration of 2,360 mg/Kg. The next deeper sample was taken at 3 feet 7 inches depth which was the top of the bedrock. The chloride concentration at this depth was 800 mg/Kg. Deeper excavation was not possible without breaking through bedrock which is not desirable for initial delineation as it would provide a pathway for downward chloride migration.

On March 22, 2012, Mr. Sergio Contreras, SESI representative, arrived at the Cottonwood Draw 22 Federal Com #1 at 0845 for field chloride testing on the surface of the location pad, as requested by Bureau of Land Management (BLM) representative Ms. Terry Gregston, in her email dated February 28, 2012. A 50 ft. grid was mapped and chloride field testing was conducted onsite to delineate chlorides on the location pad. As stipulated by Ms. Gregston, all samples less than 250 ppm chlorides were to be properly preserved and transported to Cardinal Labs for confirmation. Ms. Gregston was not onsite for the sampling procedure, but was notified 48 hrs prior to sampling by Mr.

Contreras; he was directed to sample without a BLM witness. The weather was 90 degrees with clear skies 5-10 mph winds. Mr. Contreras contacted Ms. Gregston via cell to advise her that SESI had started sampling on location on March 22, 2012.

On March 23, 2012, Mr. Contreras, SESI supervisor, was onsite at 0800 to complete surface chloride testing on the location pad. The weather was 80 degrees with the wind blowing 5-10 mph with clear skies.

A total of 28 surface samples were obtained from the location pad. As a result of the field chloride testing Surface Sample # 12 was the only sample less than 250 ppm and was properly preserved and transported to Cardinal Labs for confirmation as presented in the table below.

Date	Time	Surface Sample	Field Results Chlorides (ppm)	Analytical Results Chlorides (mg/kg)
03/22/12	0948	SS #1	>25,340	-
03/22/12	1007	SS #2	16,444	-
03/22/12	1025	SS #3	22,484	-
03/22/12	1039	SS #4	4,188	-
03/22/12	1105	SS #5	25,340	-
03/22/12	1124	SS #6	1,260	-
03/22/12	1140	SS #7	1,880	-
03/22/12	1208	SS #8	688	-
03/22/12	1225	SS #9	8,660	-
03/22/12	1237	SS #10	688	-
03/22/12	1253	SS #11	388	-
03/22/12	1312	SS #12	184	192
03/22/12	1328	SS #13	1,344	-
03/22/12	1345	SS #14	9,432	-
03/22/12	1358	SS #15	3,020	-
03/22/12	1401	SS #16	312	-
03/22/12	1420	SS #17	6,752	-
03/22/12	1435	SS #18	1,640	-
03/22/12	1514	SS #19	4,908	-
03/22/12	1527	SS #20	2,004	-
03/22/12	1544	SS #21	1,752	-
03/23/12	0834	SS #22	1,016	-
03/23/12	0845	SS #23	2,144	-
03/23/12	0907	SS #24	3,864	-
03/23/12	0916	SS #25	5,752	-
03/23/12	0930	SS #26	5,752	-
03/23/12	0945	SS #27	7,328	-
03/23/12	1010	SS #28	12,340	-

The results of the sampling reported above indicate almost the entire location pad currently exhibits elevated levels of chlorides.

VI. Conclusion

In order to determine the volume of chloride contaminated soil on the location, Cimarex proposes to install test trenches at sites where the surface sampling has indicated chloride concentrations at or near 5,000 ppm. The 13 sites are highlighted in red in the table above. The trenches will be installed to the depth where the chloride contamination

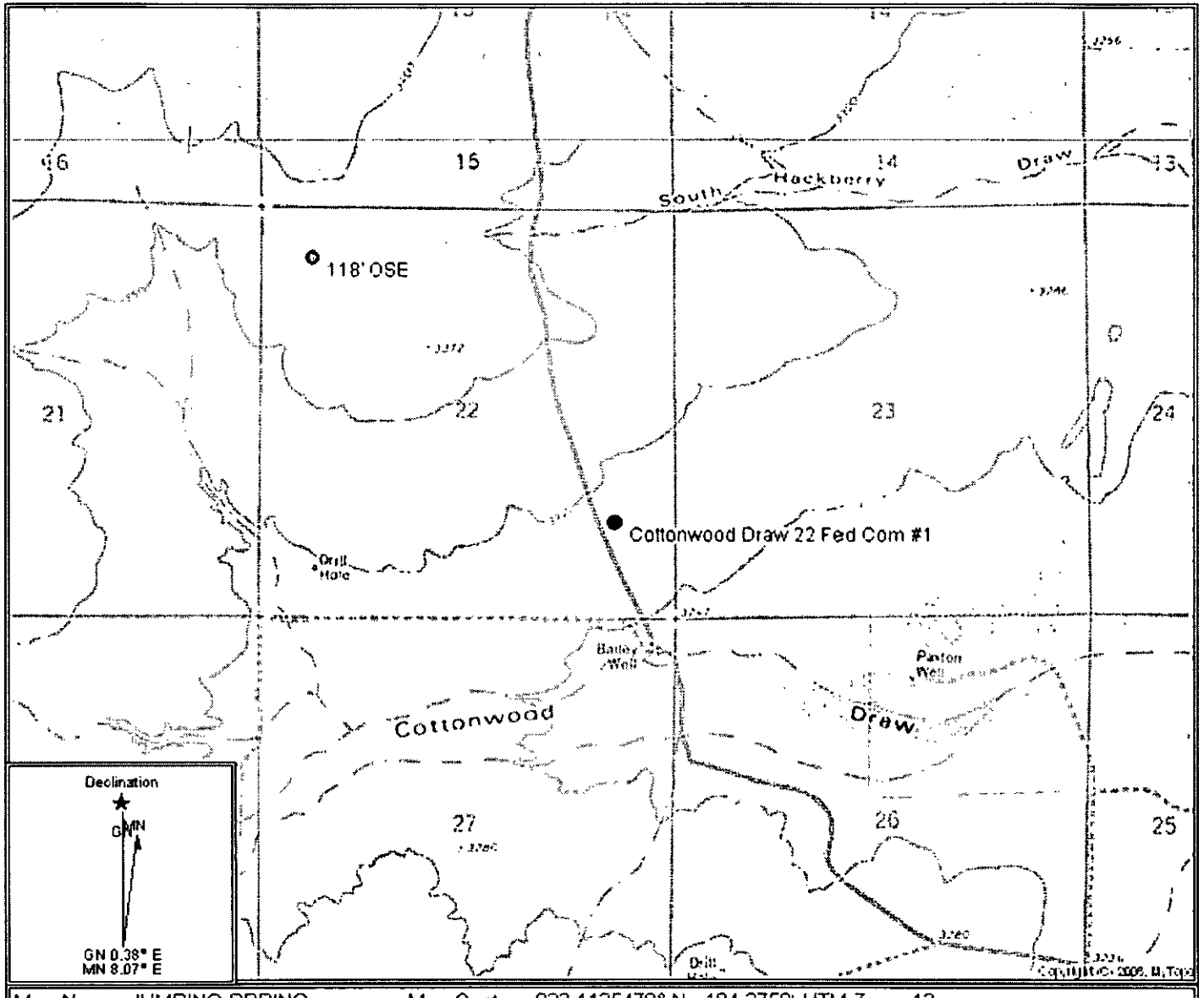
is 250 ppm or to the depth that the excavator reaches refusal. In the case that the excavator reaches refusal before the chloride contamination level is 250 ppm, an auger rig will be engaged to complete the delineation. Samples will be retrieved at 1 ft. intervals. Field test will be conducted on the samples and only samples field tested at or under 250 ppm will be properly packaged and transported under chain of custody to a third party laboratory for analysis.

Upon completion of this delineation, an appropriate work plan for the remediation of the location will be submitted.

VII. Figures & Appendices

Figure 1 – Vicinity Map
Figure 2 – Site Plan: Location of Chloride Samples
Appendix A – Analytical Results
Appendix B – Site Photographs

Figure 1
Vicinity Map



Map Name: JUMPING SPRING,
Scale: 1 inch = 2,000 ft.

Map Center: 032.1125478° N 104.2750I UTM Zone: 13
Horizontal Datum: WGS84

Map Type: Topographic

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

(A CLW##### in the POD suffix indicates the POD has been replaced & no longer serves a water right file.)

(R=POD has been replaced, O=orphaned, C=the file is closed)

(quarters are 1=NW 2=NE 3=SW 4=SE)

(quarters are smallest to largest)

(NAD83 UTM in meters)

(In feet)

POD Number	POD Code	Subbasin	County	Q 64	Q 16	Q 4	Sec	Twn	Rng	X	Y	Depth Well	Depth Water	Water Column
C 01368	C	ED		1	1	22	25S	26E		567261	3554059*	143	118	25

Average Depth to Water: **118 feet**

Minimum Depth: **118 feet**

Maximum Depth: **118 feet**

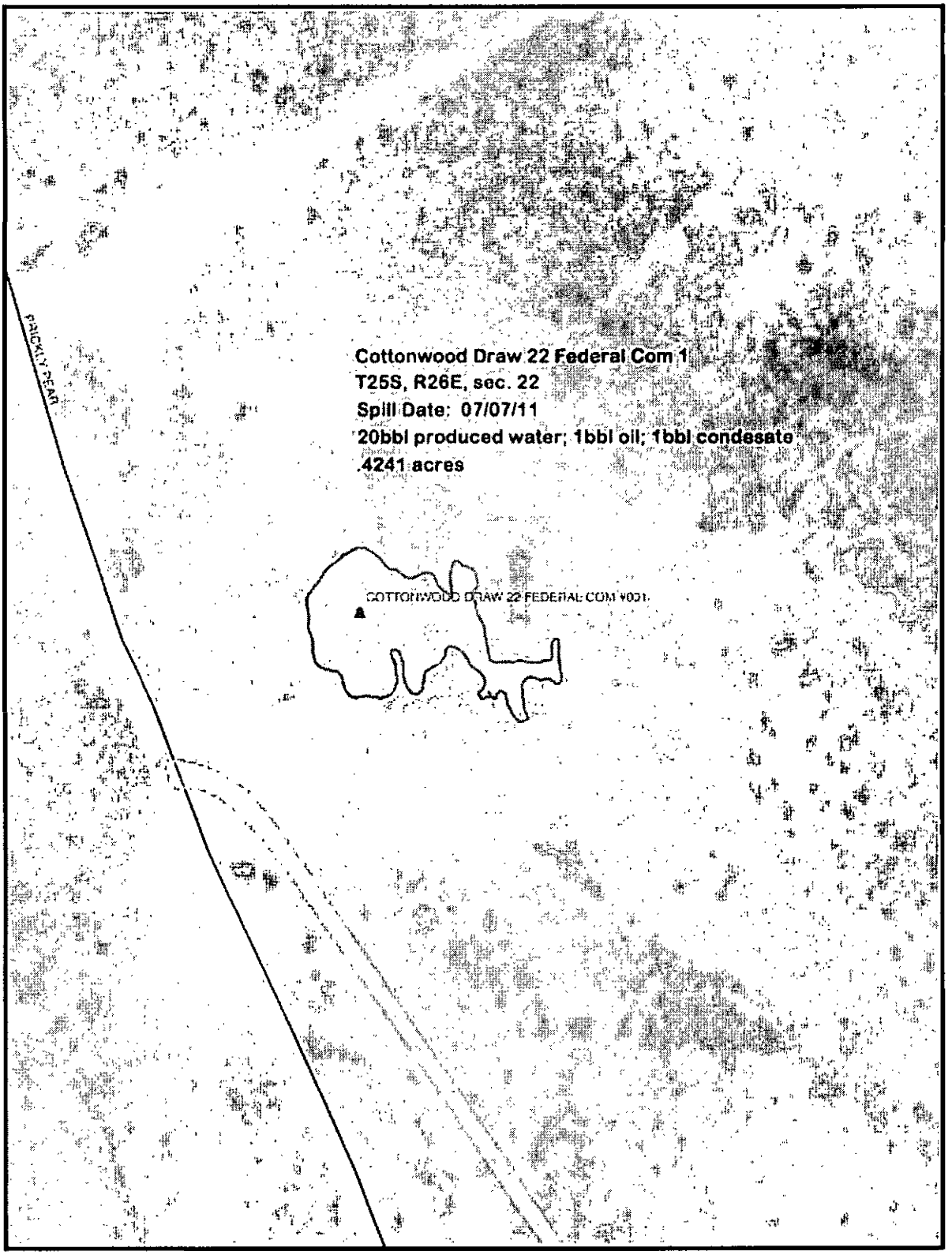
Record Count: 1

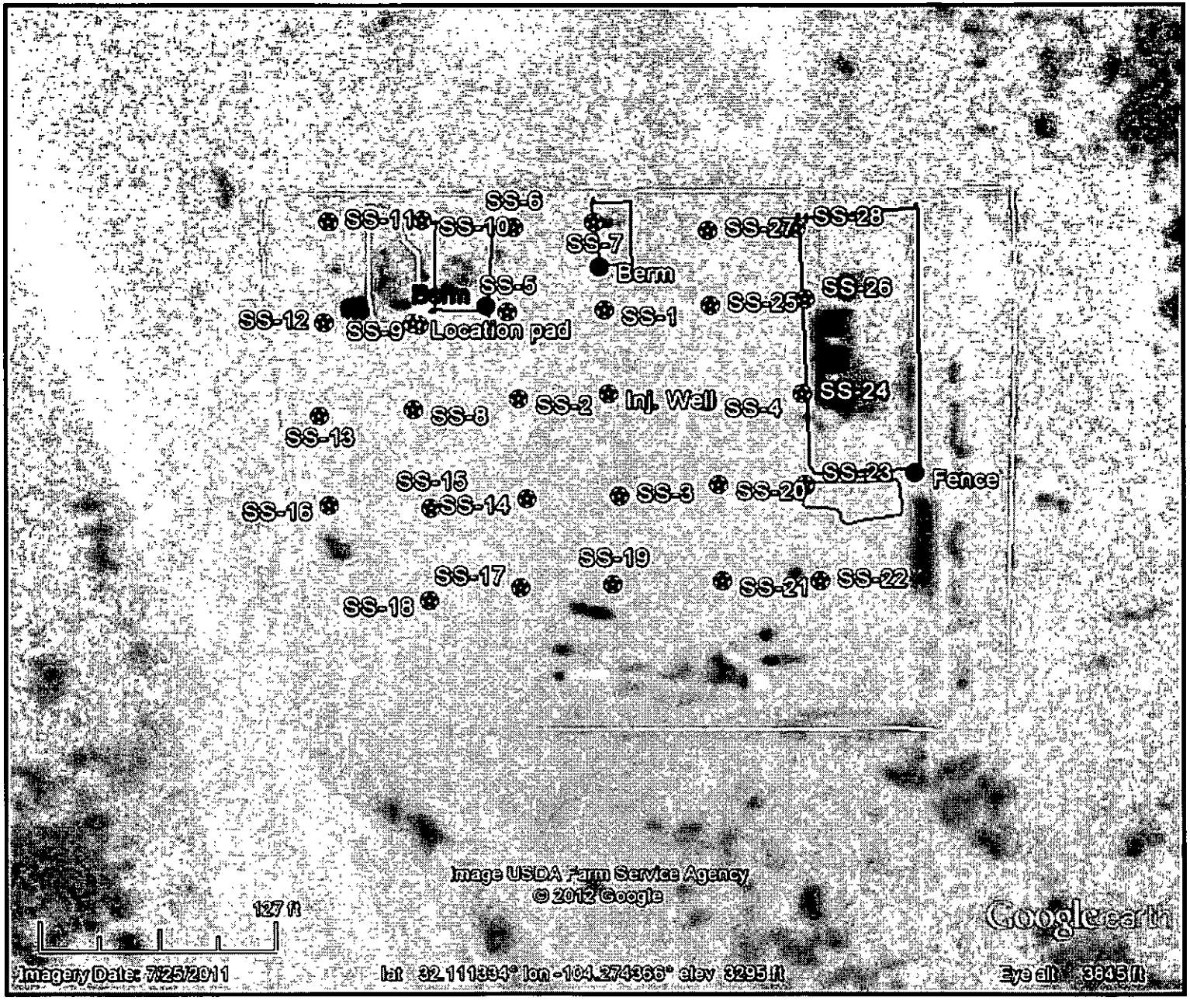
PLSS Search:

Section(s): 22 Township: 25S Range: 26E

*UTM location was derived from PLSS - see Help

Figure 2
Site Plan

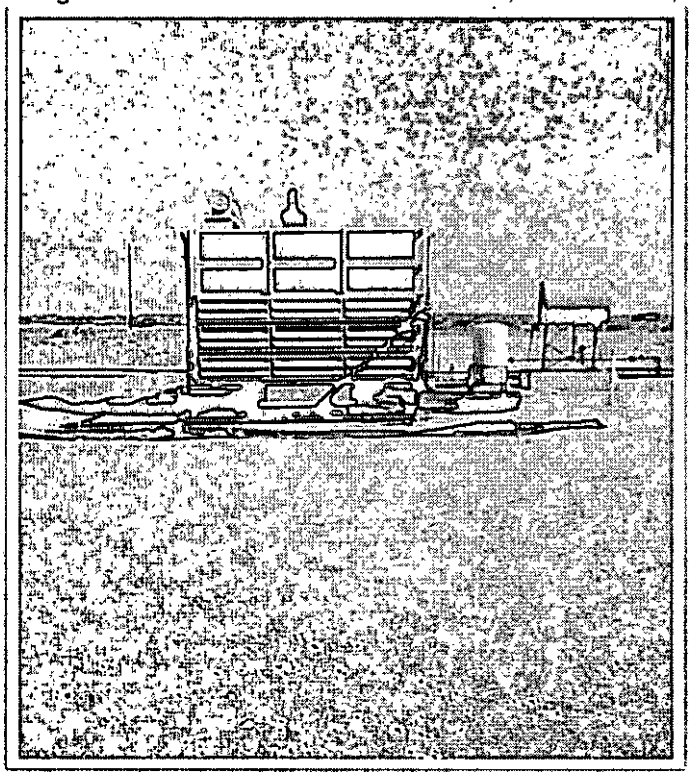

PRICKLY PEAR
Cottonwood Draw 22 Federal Com 1
T25S, R26E, sec. 22
Spill Date: 07/07/11
20bbl produced water; 1bbl oil; 1bbl condesate
4241 acres
COTTONWOOD DRAW 22 FEDERAL COM #001


SS-6
SS-11
SS-10
SS-7
SS-27
SS-28
Berm
SS-5
SS-26
SS-12
SS-9
Location pad
SS-1
SS-25
SS-24
Inj. Well
SS-2
SS-4
SS-8
SS-13
SS-23
Fence
SS-15
SS-3
SS-20
SS-16
SS-14
SS-19
SS-17
SS-21
SS-22
SS-18
Image USDA Farm Service Agency
© 2012 Google
127 ft
Imagery Date: 7/25/2011
lat 32.111334° lon -104.274366° elev 3295 ft
Eye alt 3845 ft

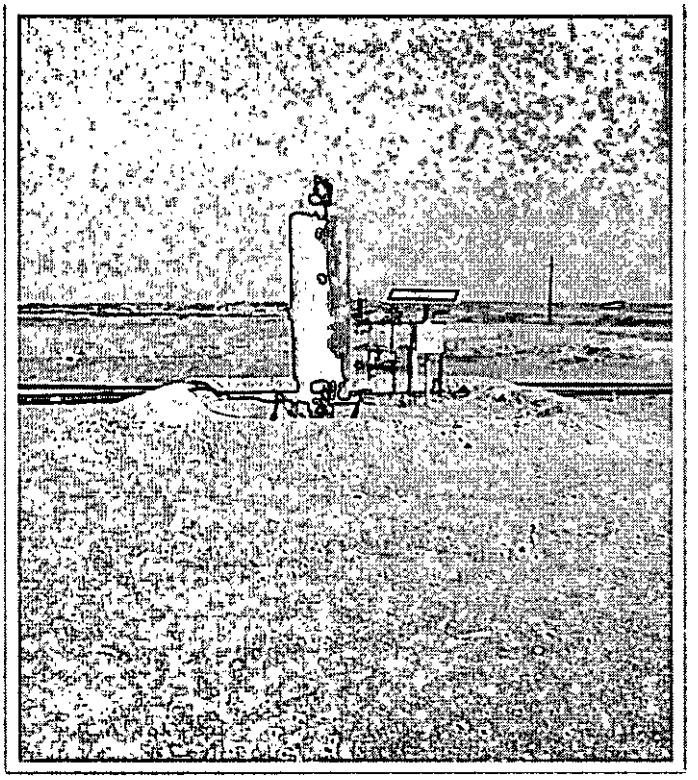
Appendix A
Analytical Results

Appendix B
Site Photographs

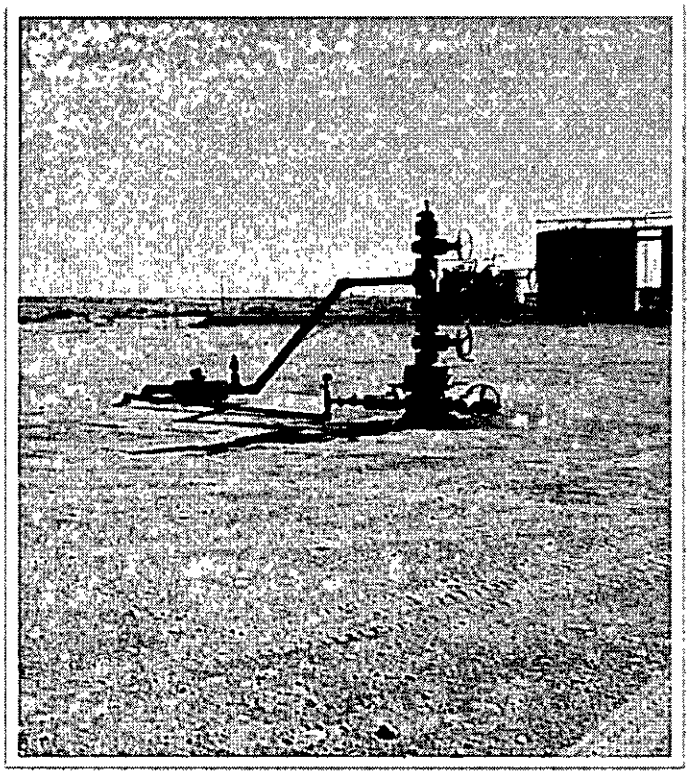
Photolog – Cottonwood Draw 22 Fed. Com #1, March 22-23,2012



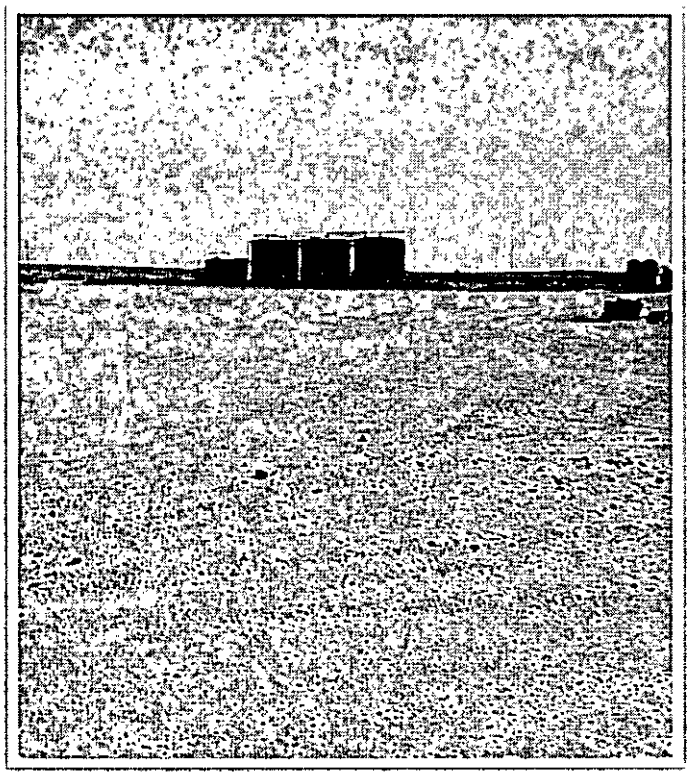
Compressor north area of location facing north



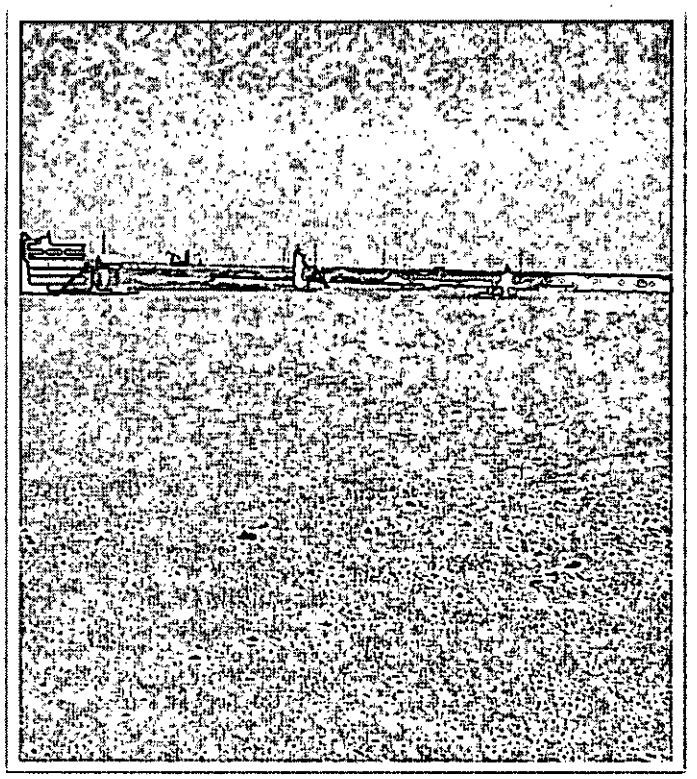
East of compressor north are of location facing north



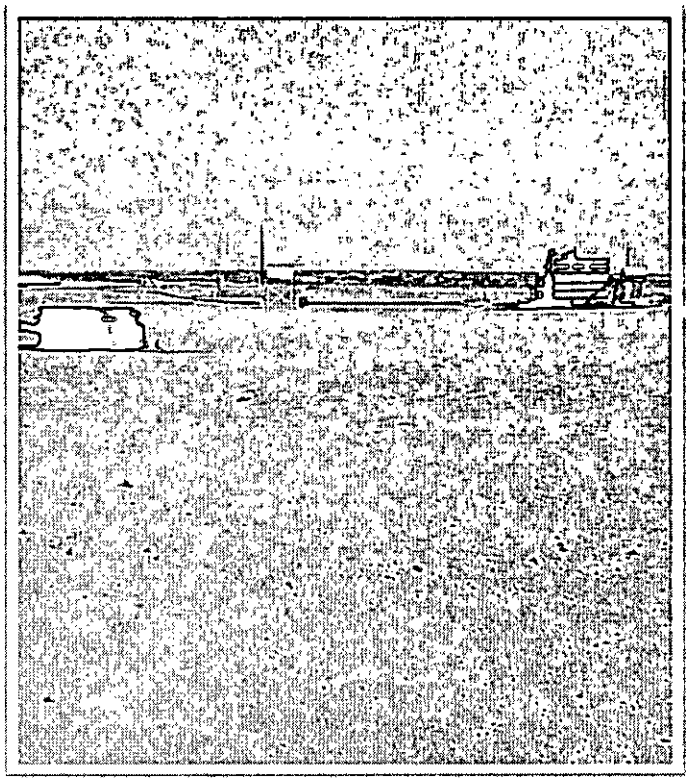
Injection well facing northeast



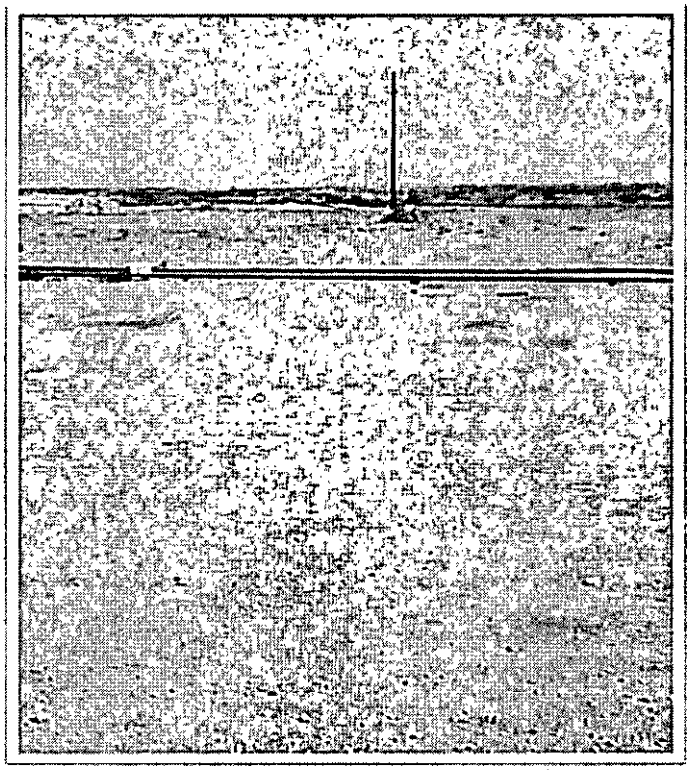
Location facing east



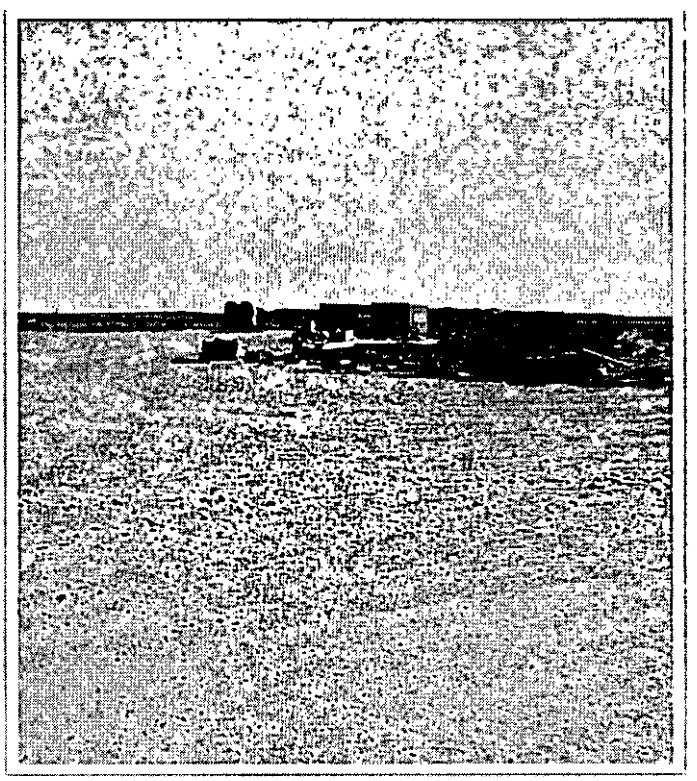
Location facing northeast



Northwest corner of location facing north



Pad west of compressor facing north

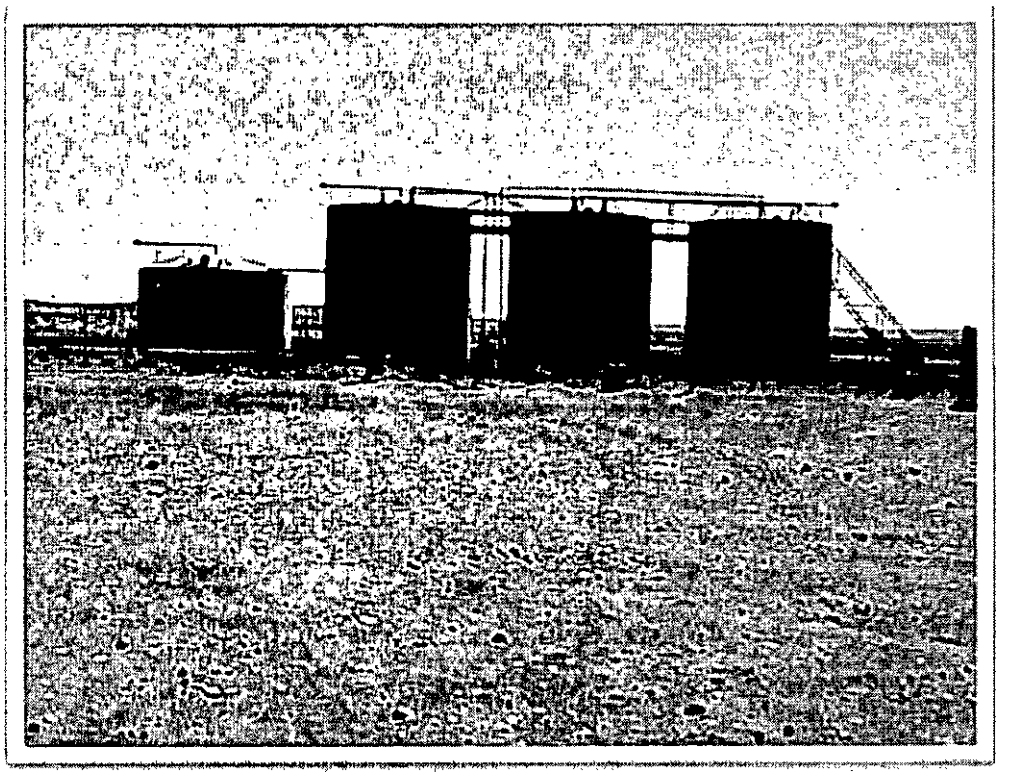


South area of location facing east

Spoils pile on liner south of tanks facing east

Staged supplies south of location facing south

Staged supplies south of location facing south



Tanks east of location facing east

CARDINAL Laboratories

PHONE (575) 393-2326 ° 101 E. MARLAND ° HOBBS, NM 88240

March 23, 2012

Bob Allen

Safety & Environmental Solutions

703 East Clinton

Hobbs, NM 88240

RE: CIM-11-027

Enclosed are the results of analyses for samples received by the laboratory on 03/23/12 12:30.

Cardinal Laboratories is accredited through Texas NELAP under certificate number T104704398-11-3. Accreditation applies to drinking water, non-potable water and solid and chemical materials. All accredited analytes are denoted by an asterisk (*). For a complete list of accredited analytes and matrices visit the TCEQ website at www.tceq.texas.gov/field/qa/lab_accred_certif.html.

Cardinal Laboratories is accreditated through the State of Colorado Department of Public Health and Environment for:

Method EPA 552.2	Haloacetic Acids (HAA-5)
Method EPA 524.2	Total Trihalomethanes (TTHM)
Method EPA 524.4	Regulated VOCs (V1, V2, V3)

Accreditation applies to public drinking water matrices.

This report meets NELAP requirements and is made up of a cover page, analytical results, and a copy of the original chain-of-custody. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Celey D. Keene

Celey D. Keene

Lab Director/Quality Manager

CARDINAL Laboratories

PHONE (575) 393-2326 ° 101 E. MARLAND ° HOBBS, NM 88240

Analytical Results For:

Safety & Environmental Solutions
Bob Allen
703 East Clinton
Hobbs NM, 88240
Fax To: (575) 393-4388

Received:	03/23/2012	Sampling Date:	03/22/2012
Reported:	03/23/2012	Sampling Type:	Soil
Project Name:	CIM-11-027	Sampling Condition:	** (See Notes)
Project Number:	COTTONWOOD DRAW 22 FED COM #1	Sample Received By:	Jodi Henson
Project Location:	SW OF CARLSBAD, NM		

Sample ID: SS #12 (H200710-01)

Chloride, SM4500Cl-B **mg/kg** **Analyzed By: HM**

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	**192**	16.0	03/23/2012	ND	400	100	400	0.00	

Cardinal Laboratories *=Accredited Analyte

Celey D. Keene, Lab Director/Quality Manager

CARDINAL Laboratories

PHONE (575) 393-2326 ° 101 E. MARLAND ° HOBBS, NM 88240

Notes and Definitions

ND	Analyte NOT DETECTED at or above the reporting limit
RPD	Relative Percent Difference
**	Samples not received at proper temperature of 6°C or below.
***	Insufficient time to reach temperature.
-	Chloride by SM4500Cl-B does not require samples be received at or below 6°C
	Samples reported on an as received basis (wet) unless otherwise noted on report

Celey D. Keene, Lab Director/Quality Manager

CARDINAL Laboratories

CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

101 East Marland, Hobbs, NM 88240
(575) 393-2326 FAX (575) 393-2476

Company Name:	Safety & Environmental Solutions	BILL TO	
Project Manager:	Bob Allen	P.O. #:	SAME
Address:	703 E. Clinton	Company:	
City:	Hobbs State: NM Zip: 88240	Attn:	
Phone #:	575-397-0510 Fax #: 575-393-4388	Address:	
Project #:	CIM.0027 Project Owner: Cimarex	City:	
Project Name:	Cotton Draw Fed #1	State: Zip:	
Project Location:	Carlsbad, NM	Phone #:	
Sampler Name:	Sample Customer	Fax #:	

ANALYSIS REQUEST: Cl, Chlorides

FOR LAB USE ONLY Lab I.D.	Sample I.D.	(G)RAB OR (C)OMP.	# CONTAINERS	MATRIX: GROUNDWATER	WASTEWATER	SOIL	OIL	SLUDGE	OTHER:	PRESERV: ACID/BASE:	ICE / COOL	OTHER:	SAMPLING: DATE	TIME
H20071C -1	SS#12	G	1			✓							3/22/12	1:32p

PLEASE NOTE: Liability and Damages. Cardinal's liability and client's exclusive remedy for any claim arising, whether based in contract or tort, shall be limited to the amount paid by the client for the analyses. All claims, including those for negligence and any other cause whatsoever shall be deemed waived unless made in writing and received by Cardinal within 30 days after completion of the applicable service. In no event shall Cardinal be liable for incidental or consequential damages, including, without limitation, business interruptions, loss of use, or loss of profits incurred by client, its subsidiaries, affiliates or successors arising out of or related to the performance of services hereunder by Cardinal, regardless of whether such claim is based upon any of the above-stated reasons or otherwise.

Relinquished By:	Date:	Received By:	Phone Result: ☐ Yes ☐ No	Add'l Phone #:
	Time:		Fax Result: ☐ Yes ☐ No	Add'l Fax #:
Relinquished By:	Date: 3/23/12	Received By: Jodi Henson	REMARKS:	
Delivered By: (Circle One)	Time: 12:30			
Sampler - UPS - Bus - Other:	18°C	Sample Condition: Cool ☐ Yes ☐ No, Intact ☑ Yes ☐ No	CHECKED BY: (Initials)	

† Cardinal cannot accept verbal changes. Please fax written changes to 505-393-2476

#26