1R - 389

REPORTS

DATE:

2003

Apache Corporation
State C Tract 13
Section 36, Township 21S, Range 37E
Remediation/Cleanup Work Plan
Lea County, New Mexico

October 24, 2003

Prepared for:

Apache Corporation
2000 Post Oak Boulevard, Suite 100
Houston, Texas 77056-4400

By:

Safety & Environmental Solutions, Inc.
703 E. Clinton Suite 102
Hobbs, New Mexico 88240
(505) 397-0510

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I. Purpose

The purpose of this work plan is to propose a plan for the cleanup of the area identified by the Site Investigation of the State C Tract 13 dated March 10, 2003. The subject area is located in Section 36, Range 37E, Township 21S, in Lea County, New Mexico. This plan will allow closure in a manner that will protect the population, environment and groundwater of the area surrounding the subject location. The site is situated on a relatively level site. (Vicinity Map)

II. Background

The subject site is a suspected pit area which has been used for various purposed by previous owner since the late 1940s.

III. Contaminant and Size of Area

The suspected contaminant is crude oil and produced water associated with the tank battery at the site. The approximate size of the area is 3,600 sq. ft. The crude oil and produced water is considered exempt oilfield waste. No evidence of other contaminants was observed.

IV. Vertical and Horizontal Extent of Contamination

Determination of the vertical and horizontal extent of the contamination has been performed and reported in the March 10, 2003 Site Investigation.

V. Groundwater

The monitor wells installed at the subject site indicate the depth to the static water level to be approximately 43 feet. The actual depth to the water bearing zone was slightly greater than 50 feet.

VI. Action Plan

Closure

The site will be excavated both horizontally and vertically for the removal of the most highly contaminated oily soils (source material). The Site Investigation dated March 10, 2003 identified the depth of the source material varies throughout the site from 0 to approximately 14 feet. The excavated material will be transported to an NMOCD approved disposal facility.

An impermeable liner of 30-millimeter plastic will be installed in the bottom of the excavation in a manner so that any downward infiltrating water will be diverted to the side edges of the liner. This type of installation will prevent ponding of water on top of the liner and minimize any downward migration of water due to inadvertent puncturing of the liner. Any clean soil excavated to facilitate liner installation may be stockpiled on site for later backfill. The liner and placement of clean backfill will greatly minimize if not eliminate human exposure to organic constituents from any of the exposure pathways listed in the Site Investigation.

Clean soil will be backfilled into the excavation above the liner to the surface. The surface will be returned to its natural contour and seeded at the completion of the project.

The bottom and sides of the excavation will be sampled at the final excavation depths. These samples will be tested for TPH, BTEX and Chlorides with a third party laboratory for confirmation and documentation of any contamination levels left in place.

In addition to the excavation and disposal of the highly contaminated soils, a fourth monitor well will be installed south (down-gradient) of the site in an effort to determine the extent of the chloride contamination in the groundwater. If this monitor well does not contain BTEX or Chlorides, an annual monitoring program will commence for a term of two (2) years as a means of monitoring the plume during the natural attenuation of the chlorides. In the event BTEX or chlorides impacts are detected in this well, additional wells would be installed until the extent of the chloride contamination is determined and the same monitoring program will be conducted from the un-impacted well.

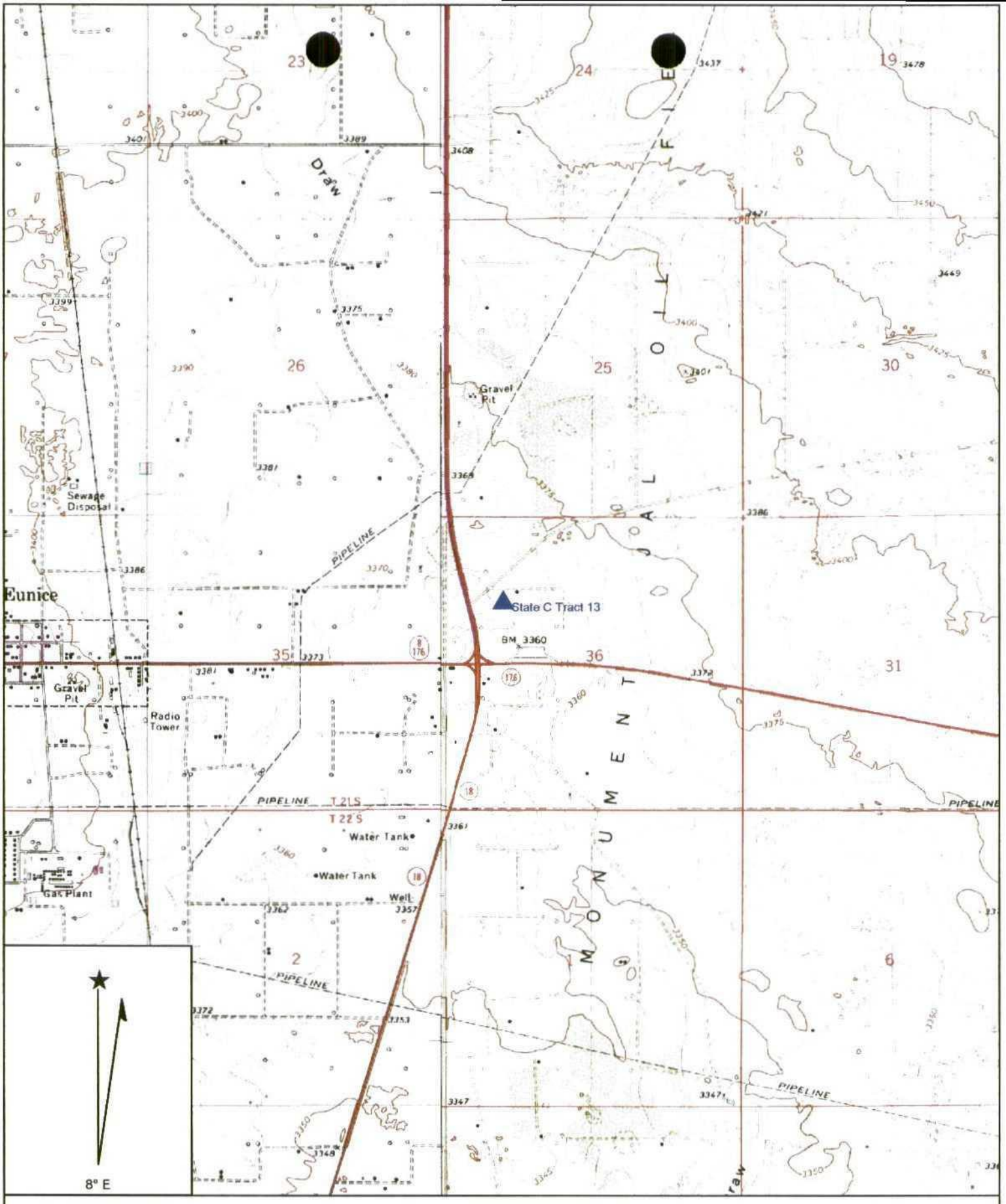
After completion of the project, the appropriate reports will be filed with the NMOCD in the closure report.

This proposed closure plan will be initiated once written approval from the NMOCD has been received by Apache Corporation.

VII. Maps and Figures

Figure 1. Vicinity Map
Figure 2. Site Plan (Location of Boreholes and Monitor Well)

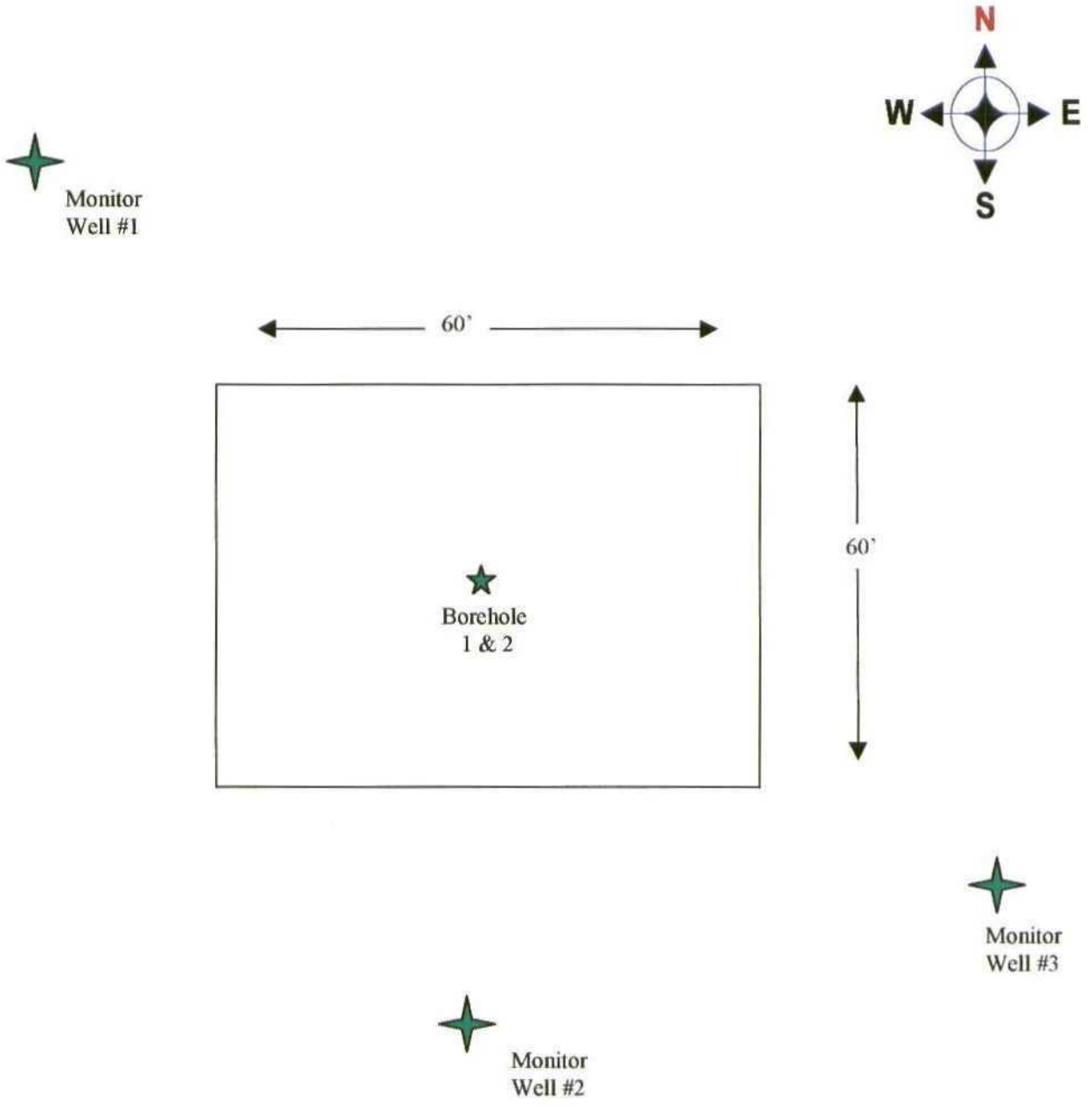
Figure 1
Vicinity Map



Name: EUNICE NE
Date: 10/31/2003
Scale: 1 inch equals 2222 feet

Location: 032° 26' 17.9" N 103° 07' 17.6" W
Caption: Apache Corporation
S13, T21S, R37E
Lea County, New Mexico

Figure 2
Site Plan
(Location of Boreholes and Monitor Wells)

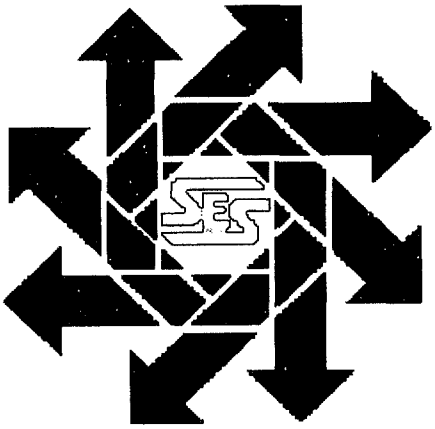


Date 5-01-03
Not To Scale

Apache Corporation	**State C Tract 13** **S36, T21S, R37E**	**Safety & Environmental Solutions, Inc.**

Apache Corporation
State C. Tract 13
Site Investigation
Section 36, Township 21S, Range 37E
Lea County, New Mexico

March 10, 2003



1R 389

Prepared for:

Apache Corporation
2000 Post Oak Boulevard, Suite 100
Houston, Texas 77056-4400

By:

Safety & Environmental Solutions, Inc.
703 E. Clinton Suite 103
Hobbs, New Mexico 88240
(505) 397-0510

TABLE OF CONTENTS

I. Background

Safety & Environmental Solutions, Inc. (SESI) was contracted by Apache Corporation to perform a site investigation of the abandoned pit site located just south of the State C Tract 13 battery. The subject area is located in Section 36, Range 37E, Township 21S, in Lea County, New Mexico.

II. Surface and Ground Water

According to the landowner, Mr. Bobby Wallach, and the information that was gathered from the New Mexico State Engineer, the groundwater depth in the area is approximately 50 feet.

III. Soils

The soils in the area are predominantly sand and sandy loam.

IV. Work Performed

Drilling of Boreholes

On November 11, 2002 SESI drilled a Borehole in the center of the pit area to a depth of 20 feet. A sample was taken at that depth and sent under chain of Custody to Cardinal Laboratories of Hobbs, New Mexico for analysis. The sample was analyzed for TPH (EPA method600/4-79-020 418.1), BTEX (EPA Method SW-846) & Chlorides (EPA methods 4500-Cl^-B), the results of the analysis are as follows:

ID	TPH	Cl^-	Benzene	Toluene	Ethyl Benzene	Total Xylenes
20'	22,200	480	0.144	1.65	2.30	7.13

As a result of what was found in Borehole #1, on November 19, 2002 SESI engaged Eco Drilling of Midland, Texas to drill a second borehole in the same location. The second borehole was drilled to a depth of 40 feet and sampled every five feet. The samples were sent under chain of Custody to Cardinal Laboratories for analysis. The samples were analyzed for TPH (EPA SW 846 8015M), BTEX (EPA Method SW-846) & Chlorides (EPA methods 4500-Cl^-B), the results of the analysis are as follows:

ID	GRO	DRO	Cl^-	Benzene	Toluene	Ethyl Benzene	Total Xylenes
25'	596	6510	96	0.381	1.12	1.09	3.11
30'	82.6	1890	112	0.176	1.46	4.51	14.0
35'	120	1850	224	1.510	2.29	6.20	18.7
40'	77.4	1200	1200	0.075	0.150	1.96	6.65

Sampling of Water Wells

On November 24, 2002 SESI sampled two existing water wells located to the northeast of the subject site. They samples were sent under chain of custody to Cardinal Laboratories

for analysis. The samples were analyzed for BTEX (EPA method SW246 8260) and general chemistry (Cations & Anions). The results of the analysis are as follows:

ID	Benzene	Toluene	Ethyl Benzene	Total Xylenes
Well	<0.002	<0.002	<0.002	<0.006
Hose @ Tank	<0.002	<0.002	<0.002	<0.006

ID	Na (mg/L)	Ca (mg/L)	Mg (mg/L)	K (mg/L)	Conductivity (mS/cm)	T-Alkalinity ($mgCaCo_3/L$)
Well	312	134	63	10.4	1673	150
Hose @ Tank	231	88	55	6.06	1163	225

ID	Cl (mg/L)	SO_4 (mg/L)	CO_3 (mg/L)	HCO_3 (mg/L)	pH (s.u.)	TDS (mg/L)
Well	652	209	0	183	6.99	1924
Hose @ Tank	388	178	0	275	7.20	1418

Installation of Groundwater Wells

On January 22, 2003 SESI engaged Eco Drilling of Midland, Texas to install a groundwater monitor well at the subject site. Monitor Well #1 was installed northwest of the center of the pit area to a depth of 72.21 feet. On January 29, 2002 SESI developed Monitor well #1 and found the depth to water to be 46.33 feet. Samples were taken and sent under chain of custody to Cardinal Laboratories. The samples were analyzed for BTEX (EPA method SW246 8260) and general chemistry (Cations & Anions). The results of the analysis are as follows:

ID	Benzene	Toluene	Ethyl Benzene	Total Xylenes
MW 1	<0.002	<0.002	<0.002	<0.006

ID	Na (mg/L)	Ca (mg/L)	Mg (mg/L)	K (mg/L)	Conductivity (mS/cm)	T-Alkalinity ($mgCaCo_3/L$)
MW1	230	77	42	17	1495	210

ID	Cl (mg/L)	SO_4 (mg/L)	CO_3 (mg/L)	HCO_3 (mg/L)	pH (s.u.)	TDS (mg/L)
MW1	324	212	0	256	7.60	1106

On February 14, 2003 SESI drilled Monitor Well #2. The well was installed south of the center of the pit area to a depth of 57.47 feet. On February 20 2003 SESI developed Monitor Well #2 and found the depth to water to be 46.07 feet. Samples were taken and sent under chain of custody to Cardinal Laboratories. The samples were analyzed for BTEX (EPA method SW246 8260) and general chemistry (Cations & Anions). The results of the analysis are as follows:

ID	Benzene	Toluene	Ethyl Benzene	Total Xylenes
MW 2	0.011	<0.002	0.003	<0.006

ID	Na (mg/L)	Ca (mg/L)	Mg (mg/L)	K (mg/L)	Conductivity (mS/cm)	T-Alkalinity ($mgCaCo_3/L$)
MW2	3160	537	206	42.2	16530	205

ID	Cl (mg/L)	SO_4 (mg/L)	CO_3 (mg/L)	HCO_3 (mg/L)	pH (s.u.)	TDS (mg/L)
MW2	6098	308	0	256	7.06	9748

On February 17, 2003 SESI drilled Monitor Well #3. The well was installed southwest of the center of the pit area to a depth of 54.71 feet. On February 20 2003 SESI developed Monitor Well #3 and found the depth to water to be 45.84 feet. Samples were taken and sent under chain of custody to Cardinal Laboratories. The samples were analyzed for BTEX (EPA method SW246 8260) and general chemistry (Cations & Anions). The results of the analysis are as follows:

ID	Benzene	Toluene	Ethyl Benzene	Total Xylenes
MW 3	<0.002	<0.002	<0.002	<0.006

ID	Na (mg/L)	Ca (mg/L)	Mg (mg/L)	K (mg/L)	Conductivity (mS/cm)	T-Alkalinity ($mgCaCo_3/L$)
MW3	238	116	67	9.07	25380	220

ID	Cl (mg/L)	SO_4 (mg/L)	CO_3 (mg/L)	HCO_3 (mg/L)	pH (s.u.)	TDS (mg/L)
MW3	508	153	0	268	7.33	1526

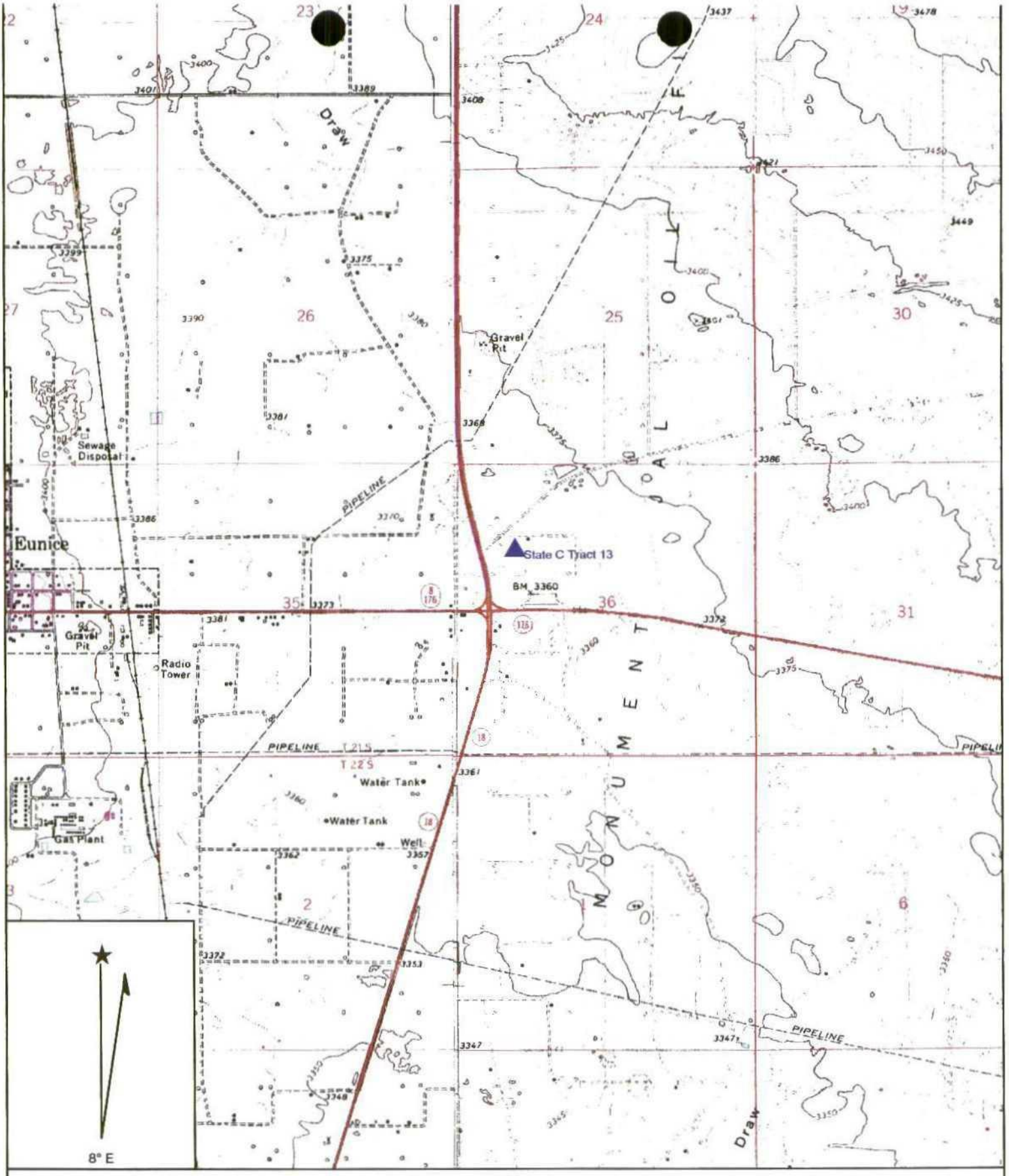
V. Conclusions

The results of Boreholes #1 and #2 indicate that contamination has migrated to a depth of 40 feet. However the material, which was sampled at 40 feet, had no smell, but was obviously well degraded hydrocarbon as verified by the analytical results. The result of the monitor well sampling indicates a much higher level of Chlorides in the downgradient well (MW-2).

VI. Figures & Appendices

Figure 1 - Vicinity Map
Figure 2 - Plat of Location
Figure 3 - Water Level Contour Map
Appendix A - Logs of Borings
Appendix B - Analytical Results
Appendix C - Site Photos

Figure 1
Vicinity Map



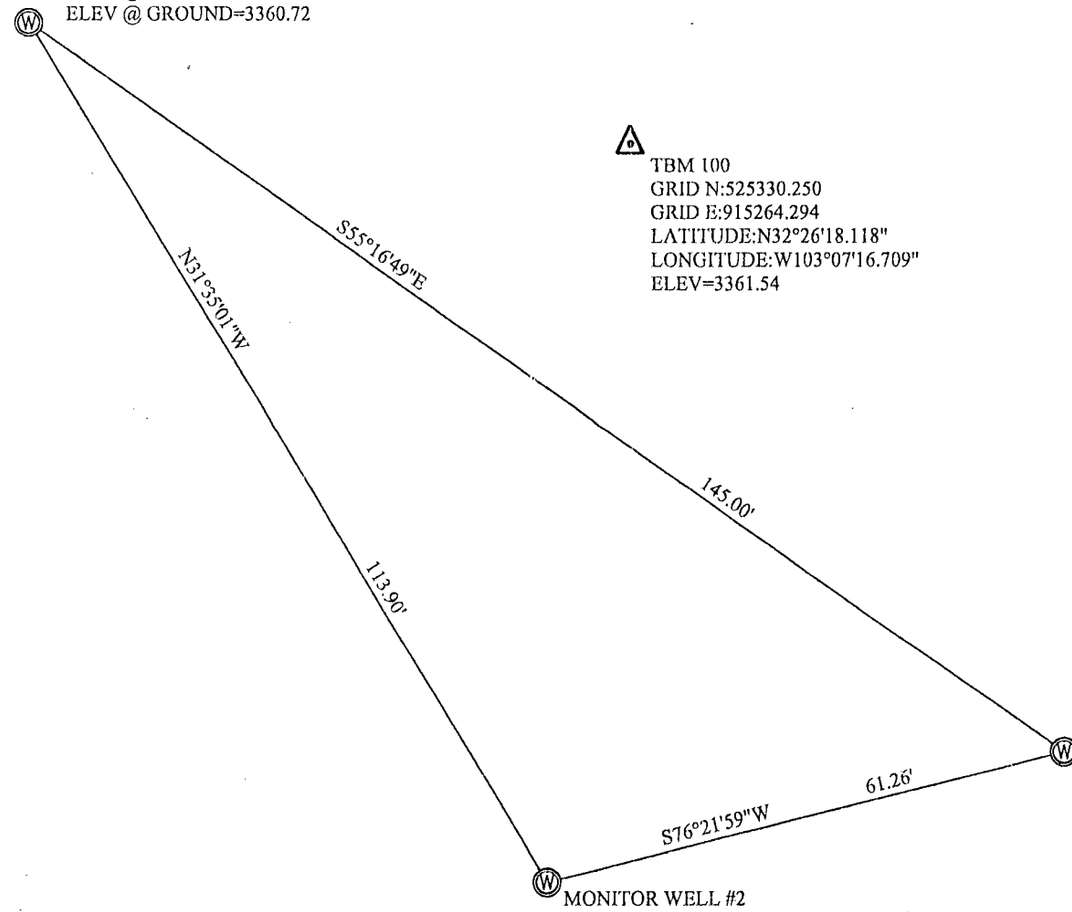
Name: EUNICE NE
Date: 4/23/2003
Scale: 1 inch equals 2222 feet

Location: 032° 26' 12.5" N 103° 07' 19.6" W
Caption: Apache Corporation
S13, T21S, R37E
Lea County, NM

Figure 2
Plat of Location

MONITOR WELL LOCATION SURVEY

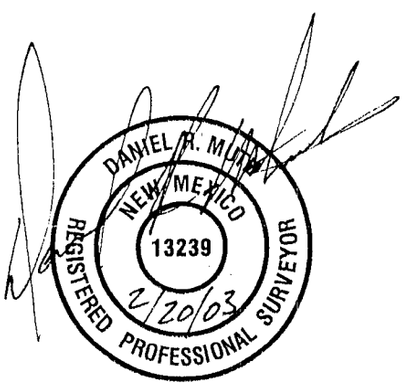
MONITOR WELL #1
GRID N:525343.912
GRID E:915195.069
LATITUDE:N32°26'18.261"
LONGITUDE:W103°07'17.514"
ELEV @ CASING=3363.40
ELEV @ VAULT=3363.41
ELEV @ CONC=3360.90
ELEV @ GROUND=3360.72



TBM 100
GRID N:525330.250
GRID E:915264.294
LATITUDE:N32°26'18.118"
LONGITUDE:W103°07'16.709"
ELEV=3361.54

MONITOR WELL #2
GRID N:525246.884
GRID E:915254.723
LATITUDE:N32°26'17.294"
LONGITUDE:W103°07'16.831"
ELEV @ CASING=3362.80
ELEV @ VAULT=3362.85
ELEV @ CONC=3360.20
ELEV @ GROUND=3360.03

MONITOR WELL #3
GRID N:525261.323
GRID E:915314.256
LATITUDE:N32°26'17.430"
LONGITUDE:W103°07'16.135"
ELEV @ CASING=3362.59
ELEV @ VAULT=3362.62
ELEV @ CONC=3359.84
ELEV @ GROUND=3359.70



SCALE 1" = 20

0' 10 20 40

PETTIGREW AND ASSOCIATES		
1110 N. GRIMES HOBBS, N.M. 88240 (505) 393-9827		
0	02/19/2003	PLOTTED
00	02/19/2003	PRELIMINARY PLAT
02/18/2003		DATE OF SURVEY
REV	DATE	DESCRIPTION

MONITOR WELL LOCATION PLAT

FOR: SAFETY AND ENVIRONMENTAL SOLUTIONS OF HOBBS, NEW MEXICO
LOC: Twp. 21 Sth. Rng. 37 Est. Sec. 36

PLAT OF WELL LOCAIONS SURVEY FOR
SAFETY AND ENVIRONMENTAL SOLUTIONS

PROJ. No.	2003.1017	DRN BY:	A. GARCIA
DWG	AutoCAD SES Mon Well\dwg\SES Mon Wells.dwg		
BOOK	HOBBS LOCAL #8	SHT.	1 of 1

Figure 3
Water Level Contour Map

Cl/TDS

MONITOR WELL LOCATION SURVEY

	Survey	TW	Elev
#1	3363.40	46.32	3317.08
#2	3362.80	46.02	3316.78
#3	3362.59	45.79	3316.80

MONITOR WELL #1
GRID N:525343.912
GRID E:915195.069
LATITUDE:N32°26'18.261"
LONGITUDE:W103°07'17.514"
ELEV @ CASING=3363.40
ELEV @ VAULT=3363.41
ELEV @ CONC=3360.90
ELEV @ GROUND=3360.72

3317.08

324/1106

TBM 100
GRID N:525330.250
GRID E:915264.294
LATITUDE:N32°26'18.118"
LONGITUDE:W103°07'16.709"
ELEV=3361.54

3317.0

N31°35'01"W

S55°16'49"E

145.00'

3317.9

113.90'

508/1526

3316.80

MONITOR WELL #3
GRID N:525261.323
GRID E:915314.256
LATITUDE:N32°26'17.430"
LONGITUDE:W103°07'16.135"
ELEV @ CASING=3362.59
ELEV @ VAULT=3362.62
ELEV @ CONC=3359.84
ELEV @ GROUND=3359.70

61.26'

S76°21'59"W

3317.8

608/1748

3316.78

MONITOR WELL #2
GRID N:525246.884
GRID E:915254.723
LATITUDE:N32°26'17.294"
LONGITUDE:W103°07'16.831"
ELEV @ CASING=3362.80
ELEV @ VAULT=3362.85
ELEV @ CONC=3360.20
ELEV @ GROUND=3360.03

Gradient 0.0029

DANIEL R. MCPHAUL
NEW MEXICO
13239
REGISTERED PROFESSIONAL SURVEYOR
2/20/03

NORTH

SCALE 1" = 20

0' 10 20 40

PETTIGREW AND ASSOCIATES	MONITOR WELL LOCATION PLAT	PLAT OF WELL LOCAIONS SURVEY FOR
1110 N. GRIMES HOBBS, N.M. 88240 (505) 393-9827	FOR: SAFETY AND ENVIRONMENTAL SOLUTIONS OF HOBBS, NEW MEXICO LOC: Twp. 21 Sth. Rng. 37 Est. Sec. 36	*SAFETY AND ENVIRONMENTAL SOLUTIONS*

REV	DATE	DESCRIPTION
0	02/19/2003	PLOTTED
00	02/19/2003	PRELIMINARY PLAT
	02/18/2003	DATE OF SURVEY

PROJ. No.	2003.1017	DRN BY:	A. GARCIA
DWG	AutoCAD SES Mon Well\dwg\SES Mon Wells.dwg		
BOOK	HOBBS LOCAL #8	SHT.	1 of 1

Appendix A
Logs of Borings

Safety & Environmental Solutions, Inc.

LOG OF BORING BH-1

Apache Corporation
State C, Tract 13
Eunice, New Mexico

Date Started	: 11/11/02	Sampling Method	: Split-spoon
Date Completed	: 11/11/02	Drilled By	: SESI
Hole Diameter	: 8 1/4 in.	Logged By	: Bob Allen
Drilling Method	: Hollow Stem Auger	Company Rep.	: David Urbanski
Drilling Equipment	: Giddings HDG-RPST		

Depth in Feet	USCS	GRAPHIC	DESCRIPTION	Lab No.	Samples	TPH (mg/Kg)	Benzene (mg/Kg)	Toluene (mg/Kg)	Ethyl Benzene (mg/Kg)	Total Xylenes (mg/Kg)	Chlorides (mg/Kg)
0–4	SW		0-4 ft. SAND, red								
4–15	SW		4-5 ft. SAND, black, odor 5-10 ft. SAND, black SAND, black SAND, black								
15–20	CA		15-20 ft. CALICHE	H7202-1	1	22,200	0.144	1.65	2.30	7.13	480

Notes:
Plugged back to surface with cuttings upon completion

04-23-2003 C:\Program Files\mtech2002\SESI logs\Apache State C Tract 13 BH-1.bor

Safety & Environmental Solutions, Inc.

LOG OF BORING BH-2

Apache Corporation
State C, Tract 13
Eunice, New Mexico

Date Started	: 11/19/02	Sampling Method	: Cuttings, core barrel
Date Completed	: 11/19/02	Drilled By	: ECO Drilling
Hole Diameter	: 8 1/4 in.	Logged By	: Bob Allen
Drilling Method	: Hollow Stem Auger	Company Rep.	: David Urbanski
Drilling Equipment	: CME-75		

Depth in Feet	USCS	GRAPHIC	DESCRIPTION	Lab No.	Samples	TPH (mg/Kg)	Benzene (mg/Kg)	Toluene (mg/Kg)	Ethyl Benzene (mg/Kg)	Total Xylenes (mg/Kg)	Chlorides (mg/Kg)
0	Fill		0-12 ft. Pit material, highly saturated								
10			Bottom of pit 12 ft.								
	SP/CA		12-15 ft. SAND and CALICHE, dark stained								
15	SP		SAND, black, drier, heavy H/C odor								
20			20-25 ft. SAND, GRAVEL								
25				H7220-1	1	596,6510	0.381	1.12	1.09	3.11	96
			25-30 ft. SAND, GRAVEL, grey color								
			29 ft. Hard chert								
30	SP/GP			H7220-2	2	32.6,1890	0.176	1.46	4.51	14.0	112
			31 ft. Large gravel								
			30-35 ft. SAND, GRAVEL								
			33 ft. Quartz stringer								
35				H7220-3	3	120,1850	1.510	2.29	6.20	18.7	224
			35-40 ft. SAND, GRAVEL								
40			39.5 ft. Saturated, old asphaltines	H7220-4	4	77.4,1200	0.075	0.150	1.96	6.65	1,200

Notes:
Plugged back to surface with 15 bags bentonite, hydrated, and one bag cement as cap.
TPH values are GRO and DRO, repectively, by method 8015 Mod.

04-23-2003 C:\Program Files\mtech2002\SESI logs\Apache State C Tract 13 BH-2.bor

Appendix B
Analytical Results

CARDINAL LABORATORIES

PHONE (915) 673-7001 • 2111 BEECHWOOD • ABILENE, TX 79603
PHONE (505) 393-2326 • 101 E. MARLAND • HOBBS, NM 88240

ANALYTICAL RESULTS FOR
SAFETY & ENVIRONMENTAL SOLUTINS, INC.
ATTN: BOB ALLEN
703 E. CLINTON, #103
HOBBS, NM 88240
FAX TO: (505) 393-4388

Receiving Date: 11/12/02
Reporting Date: 11/14/02
Project Number: NOT GIVEN
Project Name: STATE C TRACT 13
Project Location: NOT GIVEN

Sampling Date: 11/11/02
Sample Type: SOIL
Sample Condition: COOL & INTACT
Sample Received By: BC
Analyzed By: BC/AH

LAB NUMBER	SAMPLE ID	TPH (mg/Kg)	Cl* (mg/Kg)	BENZENE (mg/Kg)	TOLUENE (mg/Kg)	ETHYL BENZENE (mg/Kg)	TOTAL XYLENES (mg/Kg)
ANALYSIS DATE:		11/13/02	11/14/02	11/13/02	11/13/02	11/13/02	11/13/02
H7202-1	BH #1 20'	22200	480	0.144	1.65	2.30	7.13
Quality Control		235	990	0.108	0.102	0.102	0.300
True Value QC		240	1000	0.100	0.100	0.100	0.300
% Recovery		97.8	99.0	108	102	102	100
Relative Percent Difference		4.6	1.0	1.4	7.4	8.2	9.5

METHODS: TRPHC-EPA 600/4-79-020 418.1;Cl-Std. Methods 4500-Cl'B; BTEX-EPA SW-846 8260
*Analysis performed on a 1:4 w:v aqueous extract.

Burgess J. A. Cooke, Ph. D.

11/14/02
Date

CARDINAL LABORATORIES, INC.

2111 Beechwood, Abilene, TX 79603 101 East Marland, Hobbs, NM 88240
(915) 673-7001 Fax (915) 673-7020 (505) 393-2326 Fax (505) 393-2476

CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

Company Name: SESI	BILL TO PO #:
Project Manager:	
Address: 703 E. CLINTON, #103	Company: SAME
City: HOBBS State: NM Zip: 88240	Attn:
Phone #: (505) 397-0510	Address:
Fax #: (505) 393-4388	City:
Project #: Project Owner:	State: Zip:
Project Name: State C TRACT 13	Phone #:
Project Location:	Fax #:

FOR LAB USE ONLY				MATRIX						PRES.			SAMPLING		ANALYSIS REQUEST		
LAB I.D.	Sample I.D.	(G)RAB OR (C)OMP.	# CONTAINERS	GROUNDWATER	WASTEWATER	SOIL	OIL	SLUDGE	OTHER :	ACID:	ICE / COOL	OTHER :	DATE	TIME	TPH 418.1	BTEX	Chlorides
H7202-1	BH #1 20'	G	1			X					X		11/11/02	3:20	✓	✓	✓

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.

Terms and Conditions: Interest will be charged on all accounts more than 30 days past due at the rate of 24% per annum from the original date of invoice, and all costs of collections, including attorney's fees.

Sampler Relinquished:	Date: 11-12-02	Received By:	Phone Result ☐ Yes ☐ No Additional Fax #:
	Time: 3:30		Fax Result: ☒ Yes ☐ No
Relinquished By:	Date: 11-12-02	Received By: (Lab Staff)	REMARKS: need by Thurs.
	Time: 4:30PM		
Delivered By: (Circle One)		Sample Condition Cool ☒ Yes ☐ No Intact ☒ Yes ☐ No	CHECKED BY: (Initials)
Sampler - UPS - Bus - Other:			

† Cardinal cannot accept verbal changes. Please fax written changes to 915-673-7020.

CARDINAL LABORATORIES

PHONE (915) 673-7001 • 2111 BEECHWOOD • ABILENE, TX 79603
PHONE (505) 393-2326 • 101 E. MARLAND • HOBBS, NM 88240

ANALYTICAL RESULTS FOR
SAFETY & ENVIRONMENTAL SOLUTIONS, INC.
ATTN: BOB ALLEN
703 E. CLINTON, #103
HOBBS, NM 88240
FAX TO: (505) 393-4388

Receiving Date: 11/19/02
Reporting Date: 11/22/02
Project Number: NOT GIVEN
Project Name: NOT GIVEN
Project Location: NOT GIVEN

Sampling Date: 11/19/02
Sample Type: SOIL
Sample Condition: COOL & INTACT
Sample Received By: BC
Analyzed By: BC/AH

LAB NUMBER	SAMPLE ID	GRO (C_6-C_{10}) (mg/Kg)	DRO (>C_{10}-C_{28}) (mg/Kg)	Cl* (mg/Kg)
ANALYSIS DATE		11/19/02	11/19/02	11/21/02
H7220-1	BH#2 25'	596	6510	96
H7220-2	BH#2 30'	82.6	1890	112
H7220-3	BH#2 35'	120	1850	224
H7220-4	BH#2 40'	77.4	1200	1200
Quality Control		760	754	970
True Value QC		800	800	1000
% Recovery		95.0	94.3	97.0
Relative Percent Difference		2.3	1.9	2.0

METHODS: TPH GRO & DRO: EPA SW-846 8015 M; Cl^-: Std. Methods 4500-Cl^-B
*Analyses performed on 1:4 w:v aqueous extracts.

Chemist

11/22/02
Date

H7220A.XLS

CARDINAL LABORATORIES

PHONE (915) 673-7001 • 2111 BEECHWOOD • ABILENE, TX 79603
PHONE (505) 393-2326 • 101 E. MARLAND • HOBBS, NM 88240

ANALYTICAL RESULTS FOR
SAFETY & ENVIRONMENTAL SOLUTIONS, INC.
ATTN: BOB ALLEN
703 E. CLINTON, #103
HOBBS, NM 88240
FAX TO: (505) 393-4388

Receiving Date: 11/19/02
Reporting Date: 11/22/02
Project Number: NOT GIVEN
Project Name: NOT GIVEN
Project Location: NOT GIVEN

Sampling Date: 11/19/02
Sample Type: SOIL
Sample Condition: COOL & INTACT
Sample Received By: BC
Analyzed By: BC/AH

LAB NUMBER	SAMPLE ID	BENZENE (mg/Kg)	TOLUENE (mg/Kg)	ETHYL BENZENE (mg/Kg)	TOTAL XYLENES (mg/Kg)
ANALYSIS DATE		11/20/02	11/20/02	11/20/02	11/20/02
H7220-1	BH#2 25'	0.381	1.12	1.09	3.11
H7220-2	BH#2 30'	0.176	1.46	4.51	14.0
H7220-3	BH#2 35'	1.510	2.29	6.20	18.7
H7220-4	BH#2 40'	0.075	0.150	1.96	6.65
Quality Control		0.109	0.98	0.100	0.288
True Value QC		0.100	0.100	0.100	0.300
% Recovery		109	97.8	100	96.3
Relative Percent Difference		1.9	3.6	4.6	3.2

METHOD: EPA SW-846 8260

Chemist

11/22/02
Date

CARDINAL LABORATORIES, INC.

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CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

Page 1 of 1

Company Name: SESI	BILL TO PO #:
Project Manager:	
Address: 703 E. CLINTON, #103	Company: SAME
City: HOBBS State: NM Zip: 88240	Attn:
Phone #: (505) 397-0510	Address:
Fax #: (505) 393-4388	City:
Project #: Project Owner:	State: Zip:
Project Name:	Phone #:
Project Location:	Fax #:

ANALYSIS REQUEST: TPH 8015 | BTEX 8021B | Chlorides

FOR LAB USE ONLY LAB I.D.	Sample I.D.	(G)RAB OR (C)OMP.	# CONTAINERS	MATRIX: GROUNDWATER	WASTEWATER	SOIL	OIL	SLUDGE	OTHER:	PRES.: ACID:	ICE / COOL	OTHER:	SAMPLING: DATE	TIME
H7220-1	BH#2 25'	C	1			✓					✓		11-19	9:20A
-2	BH#2 30'	C	1			✓					✓		11-19	9:50A
-3	BH#2 35'	C	1			✓					✓		11-19	10:20A
-4	BH#2 40'	C	1			✓					✓		11-19	11:05A

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Sampler Relinquished:	Date: 11-19-02 Time: 2:00 P.	Received By:	Phone Result ☐ Yes ☐ No Additional Fax #:
Relinquished By:	Date: 11/19/02 Time: 2:30	Received By: (Lab Staff)	Fax Result: ☐ Yes ☐ No REMARKS:
Delivered By: (Circle One) Sampler - UPS - Bus - Other:		Sample Condition: Cool ☒ Yes ☐ No; Intact ☒ Yes ☐ No	CHECKED BY: (Initials)

† Cardinal cannot accept verbal changes. Please fax written changes to 915-673-7020.

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PHONE (505) 393-2326 • 101 E. MARLAND • HOBBS, NM 88240

ANALYTICAL RESULTS FOR
SAFETY & ENVIRONMENTAL SOLUTIONS, INC.
ATTN: BOB ALLEN
703 E. CLINTON, #103
HOBBS, NM 88240
FAX TO: (505) 393-4388

Receiving Date: 11/25/02
Reporting Date: 11/27/02
Project Number: STATE C TRACT 13
Project Name: APACHE
Project Location: NOT GIVEN

Sampling Date: 11/24/02
Sample Type: GROUNDWATER
Sample Condition: COOL & INTACT
Sample Received By: BC
Analyzed By: BC

LAB NUMBER	SAMPLE ID	BENZENE (mg/L)	TOLUENE (mg/L)	ETHYL BENZENE (mg/L)	TOTAL XYLENES (mg/L)
ANALYSIS DATE		11/25/02	11/25/02	11/25/02	11/25/02
H7248-1	WELL	<0.002	<0.002	<0.002	<0.006
H7248-2	HOSE @ TANK	<0.002	<0.002	<0.002	<0.006
Quality Control		0.095	0.088	0.091	0.266
True Value QC		0.100	0.100	0.100	0.300
% Recovery		94.9	87.9	91.1	88.8
Relative Percent Difference		5.0	4.6	1.3	1.0

METHOD: EPA SW-846 8260

Chemist

11/27/02
Date

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ANALYTICAL RESULTS FOR
SAFETY & ENVIRONMENTAL SOLUTIONS, INC.
ATTN: BOB ALLEN
703 E. CLINTON, STE. 103
HOBBS, NM 88240
FAX TO: (505) 393-4388

Receiving Date: 11/25/02
Reporting Date: 11/26/02
Project Number: STATE C TRACT 13
Project Name: APACHE
Project Location: NOT GIVEN

Sampling Date: 11/24/02
Sample Type: GROUNDWATER
Sample Condition: COOL & INTACT
Sample Received By: BC
Analyzed By: AH

LAB NUMBER	SAMPLE ID	Na (mg/L)	Ca (mg/L)	Mg (mg/L)	K (mg/L)	Conductivity (mS/cm)	T-Alkalinity ($mgCaCO_3/L$)
ANALYSIS DATE:		11/20/02	11/25/02	11/25/02	11/25/02	11/25/02	11/25/02
H7248-1	WELL	312	134	63	10.4	1673	150
H7248-2	HOSE @ TANK	231	88	55	6.06	1163	225
Quality Control		NR	43	48	4.62	1322	NR
True Value QC		NR	50	50	5.00	1413	NR
% Recovery		NR	86.0	96.0	92.4	93.6	NR
Relative Percent Difference		NR	0	0	9.0	0.7	NR
METHODS:			SM3500-Ca-D	3500-Mg E	8049	120.1	310.1

LAB NUMBER	SAMPLE ID	Cl^- (mg/L)	SO_4 (mg/L)	CO_3 (mg/L)	HCO_3 (mg/L)	pH (s.u.)	TDS (mg/L)
ANALYSIS DATE:		11/25/02	11/25/02	11/25/02	11/25/02	11/25/02	11/26/02
H7248-1	WELL	652	209	0	183	6.99	1924
H7248-2	HOSE @ TANK	388	178	0	275	7.20	1418
Quality Control		950	49.87	NR	991	7.01	NR
True Value QC		1000	50.00	NR	1000	7.00	NR
% Recovery		95.0	99.7	NR	99.1	100	NR
Relative Percent Difference		2.0	1.3	NR	0	0.3	8.8
METHODS:		SM4500-Cl-B	375.4	310.1	310.1	150.1	160.1

Amy Hill
Chemist

11-26-02
Date

H7248

CARDINAL LABORATORIES, INC.

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CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

Page 1 of 1

Company Name: SESI	BILL TO PO #:
Project Manager:	
Address: 703 E. CLINTON, #103	Company: SAME
City: HOBBS State: NM Zip: 88240	Attn:
Phone #: (505) 397-0510	Address:
Fax #: (505) 393-4388	City:
Project #: State C Tract 13 Project Owner:	State: Zip:
Project Name: Apache	Phone #:
Project Location:	Fax #:

ANALYSIS REQUEST: BTEX; Major Cations & Ion

FOR LAB USE ONLY LAB I.D.	Sample I.D.	(G)RAB OR (C)OMP.	# CONTAINERS	MATRIX: GROUNDWATER	WASTEWATER	SOIL	OIL	SLUDGE	OTHER:	PRES.: ACID:	ICE / COOL	OTHER:	SAMPLING: DATE	TIME	BTEX	Major Cations & Ion
H7248-1	Well	G	3	X							X		11-24	10:50	X	X
-2	Hose @ Tank	G	3	X							X		11-24	11:00	X	X

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Sampler Relinquished:	Date:	Received By:	Phone Result ☐ Yes ☐ No Additional Fax #:
	Time:		Fax Result: ☐ Yes ☐ No
Relinquished By:	Date: 11/25/02	Received By: (Lab Staff)	REMARKS:
	Time: 11:00		
Delivered By: (Circle One)	Sample Condition: Cool ☒ Yes ☐ No; Intact ☒ Yes ☐ No	CHECKED BY: (Initials)	
Sampler - UPS - Bus - Other:			

† Cardinal cannot accept verbal changes. Please fax written changes to 915-673-7020.

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PHONE (505) 393-2326 • 101 E. MARLAND • HOBBS, NM 88240

ANALYTICAL RESULTS FOR
SAFETY & ENVIRONMENTAL SOLUTIONS, INC.
ATTN: BOB ALLEN
703 E. CLINTON, #103
HOBBS, NM 88240
FAX TO: (505) 393-4388

Receiving Date: 01/30/03
Reporting Date: 01/31/03
Project Number: APA-02-002
Project Name: STATE C TRACT 13
Project Location: LEA COUNTY, NM

Sampling Date: 01/29/03
Sample Type: GROUNDWATER
Sample Condition: COOL & INTACT
Sample Received By: AH
Analyzed By: AH

LAB NUMBER SAMPLE ID	Na (mg/L)	Ca (mg/L)	Mg (mg/L)	K (mg/L)	Conductivity (mS/cm)	T-Alkalinity ($mgCaCO_3/L$)
ANALYSIS DATE:	01/30/03	01/30/03	01/30/03	01/30/03	01/30/03	01/30/03
H7442-1 MW 1	230	77	42	17	1495	210
Quality Control	NR	42	41	4.67	1322	NR
True Value QC	NR	50	50	5.00	1413	NR
% Recovery	NR	84.0	82.0	93.4	93.6	NR
Relative Percent Difference	NR	0.8	1.4	1.0	0.7	NR
METHODS:		SM3500-Ca-D	3500-Mg E	8049	120.1	310.1

	Cl^- (mg/L)	SO_4 (mg/L)	CO_3 (mg/L)	HCO_3 (mg/L)	pH (s.u.)	TDS (mg/L)
ANALYSIS DATE:	01/30/03	01/30/03	01/30/03	01/30/03	01/30/03	01/31/03
H7442-1 MW 1	324	212	0	256	7.60	1106
Quality Control	1000	50.20	NR	1068	6.90	NR
True Value QC	1000	50.00	NR	1000	7.00	NR
% Recovery	100	100	NR	107	98.6	NR
Relative Percent Difference	5.0	0.7	NR	7.7	0	0.4
METHODS:	SM4500-Cl-B	375.4	310.1	310.1	150.1	160.1

Amy Hill
Chemist

1-31-03
Date

CARDINAL LABORATORIES

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PHONE (505) 393-2326 • 101 E. MARLAND • HOBBS, NM 88240

ANALYTICAL RESULTS FOR
SAFETY & ENVIRONMENTAL SOLUTIONS, INC.
ATTN: BOB ALLEN
703 E. CLINTON, #103
HOBBS, NM 88240
FAX TO: (505) 393-4388

Receiving Date: 01/30/03
Reporting Date: 01/31/03
Project Number: APA-02-002
Project Name: STATE C TRACT 13
Project Location: LEA COUNTY, NM

Sampling Date: 01/29/03
Sample Type: GROUNDWATER
Sample Condition: COOL & INTACT
Sample Received By: AH
Analyzed By: BC

LAB NUMBER	SAMPLE ID	BENZENE (mg/L)	TOLUENE (mg/L)	ETHYL BENZENE (mg/L)	TOTAL XYLENES (mg/L)
ANALYSIS DATE		01/30/03	01/30/03	01/30/03	01/30/03
H7442-1	MW 1	<0.002	<0.002	<0.002	<0.006
Quality Control		0.109	0.101	0.103	0.301
True Value QC		0.100	0.100	0.100	0.300
% Recovery		109	101	103	100.0
Relative Percent Difference		4.1	0.9	0.9	1.9

METHOD: EPA SW-846 8260

Chemist

1/31/03
Date

CARDINAL LABORATORIES, INC.

2111 Beechwood, Abilene, TX 79603 101 East Marland, Hobbs, NM 88240
(915) 673-7001 Fax (915) 673-7020 (505) 393-2326 Fax (505) 393-2476

CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

Company Name: SESI	BILL TO PO #:
Project Manager: BOB ALLEN	Company: SAME
Address: 703 E. CLINTON, #103	Attn:
City: HOBBS State: NM Zip: 88240	Address:
Phone #: (505) 397-0510	City:
Fax #: (505) 393-4388	State: Zip:
Project #: APA - 02-002 Project Owner:	Phone #:
Project Name: STATE C TRACT 13	Fax #:
Project Location: LEA County NM	

FOR LAB USE ONLY				MATRIX						PRES.			SAMPLING		ANALYSIS REQUEST		
LAB I.D.	Sample I.D.	(G)RAB OR (C)OMP.	# CONTAINERS	GROUNDWATER	WASTEWATER	SOIL	OIL	SLUDGE	OTHER:	ACID:	ICE / COOL	OTHER:	DATE	TIME	BTEX	CATIONS	ANIONS
H7442-1	MW1	G	3	X							X		1/29	1615	X	X	X

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Sampler Relinquished: Simon Casas	Date: 1/30/03 Time: 0800	Received By:	Phone Result ☐ Yes ☐ No Additional Fax #:
Relinquished By:	Date: Time:	Received By: (Lab Staff)	Fax Result: ☐ Yes ☐ No REMARKS:
Delivered By: (Circle One) Sampler - UPS - Bus - Other:		Sample Condition Cool ☐ Yes ☐ No Intact ☐ Yes ☐ No	CHECKED BY: (Initials)

† Cardinal cannot accept verbal changes. Please fax written changes to 915-673-7020.

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ANALYTICAL RESULTS FOR
SAFETY & ENVIRONMENTAL SOLUTIONS, INC.
ATTN: BOB ALLEN
703 E. CLINTON, STE 103
HOBBS, NM 88240
FAX TO: (505) 393-4388

Receiving Date: 02/21/03
Reporting Date: 02/25/03
Project Number: APA-02-002
Project Name: STATE C TRACT 13
Project Location: EUNICE, NM

Sampling Date: 02/21/03
Sample Type: GROUNDWATER
Sample Condition: COOL & INTACT
Sample Received By: AH
Analyzed By: AH

LAB NUMBER	SAMPLE ID	Na (mg/L)	Ca (mg/L)	Mg (mg/L)	K (mg/L)	Conductivity (u s/cm)	T-Alkalinity ($mgCaCO_3/L$)
ANALYSIS DATE:		02/24/03	02/24/03	02/24/03	02/24/03	02/24/03	02/24/03
H7488-1	MW2	3160	537	206	42.2	16530	205
H7488-2	MW3	238	116	67	9.07	2538	220
Quality Control		NR	43	55	4.67	1322	NR
True Value QC		NR	50	50	5.00	1413	NR
% Recovery		NR	86.0	110	93.4	93.6	NR
Relative Percent Difference		NR	0	0	1.0	0.7	NR
METHODS:			SM3500-Ca-D	3500-Mg E	8049	120.1	310.1

LAB NUMBER	SAMPLE ID	Cl^- (mg/L)	SO_4 (mg/L)	CO_3 (mg/L)	HCO_3 (mg/L)	pH (s.u.)	TDS (mg/L)
ANALYSIS DATE:		02/24/03	02/24/03	02/24/03	02/24/03	02/24/03	02/25/03
H7488-1	MW2	6098	308	0	250	7.06	9748
H7488-2	MW3	508	153	0	268	7.33	1526
Quality Control		1000	50.20	NR	1098	6.98	NR
True Value QC		1000	50.00	NR	1000	7.00	NR
% Recovery		100	100	NR	110	99.7	NR
Relative Percent Difference		3.0	0.7	NR	3.0	0.1	0.4
METHODS:		SM4500-Cl-B	375.4	310.1	310.1	150.1	160.1

Amy Hill
Chemist

2-25-03
Date

H7488

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PHONE (505) 393-2326 • 101 E. MARLAND • HOBBS, NM 88240

ANALYTICAL RESULTS FOR
SAFETY & ENVIRONMENTAL SOLUTIONS, INC.
ATTN: BOB ALLEN
703 E. CLINTON
HOBBS, NM 88240
FAX TO: (505) 393-4388

Receiving Date: 02/21/03
Reporting Date: 02/24/03
Project Number: APA-02-002
Project Name: STATE C TRACT 13
Project Location: EUNICE, NM

Sampling Date: 02/21/03
Sample Type: GROUNDWATER
Sample Condition: COOL & INTACT
Sample Received By: AH
Analyzed By: BC

LAB NUMBER	SAMPLE ID	BENZENE (mg/L)	TOLUENE (mg/L)	ETHYL BENZENE (mg/L)	TOTAL XYLENES (mg/L)
ANALYSIS DATE		02/21/03	02/21/03	02/21/03	02/21/03
H7488-1	MW 2	0.011	<0.002	0.003	<0.006
H7488-2	MW 3	<0.002	<0.002	<0.002	<0.006
Quality Control		0.108	0.105	0.108	0.312
True Value QC		0.100	0.100	0.100	0.300
% Recovery		108	105	108	104.0
Relative Percent Difference		3.3	0.4	2.4	3.6

METHOD: EPA SW-846 8260

Chemist

2/24/03
Date

CARDINAL LABORATORIES, INC.

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(915) 673-7001 Fax (915) 673-7020 (505) 393-2326 Fax (505) 393-2476

CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

Page____ of____

Company Name:	SESI	BILL TO	
Project Manager:	BOB ALLEN	P.O. #:	
Address:	703 E. CLINTON	Company:	
City:	HOBBS State: NM Zip: 88240	Attn:	
Phone #:	(505) 397-0510 Fax #: (505) 393-4388	Address:	
Project #:	APA-02-002 Project Owner:	City:	
Project Name:	STATE C TRACT 13	State: Zip:	
Project Location:	EUNICE	Phone #:	
Sampler Name:	Simon Casas	Fax #:	

FOR LAB USE ONLY Lab I.D.	Sample I.D.	(G)RAB OR (C)OMP.	# CONTAINERS	MATRIX: GROUNDWATER	WASTEWATER	SOIL	CRUDE OIL	SLUDGE	OTHER :	PRESERV.: ACID/BASE:	ICE / COOL	OTHER :	SAMPLING: DATE	TIME	ANALYSIS REQUEST: BTEX	CATIONS	ANIONS
H7488-1	MW 2	G	3	X							X		2/21	1140	X	X	X
-2	MW3	G	3	X							X		2/21	1200	X	X	X

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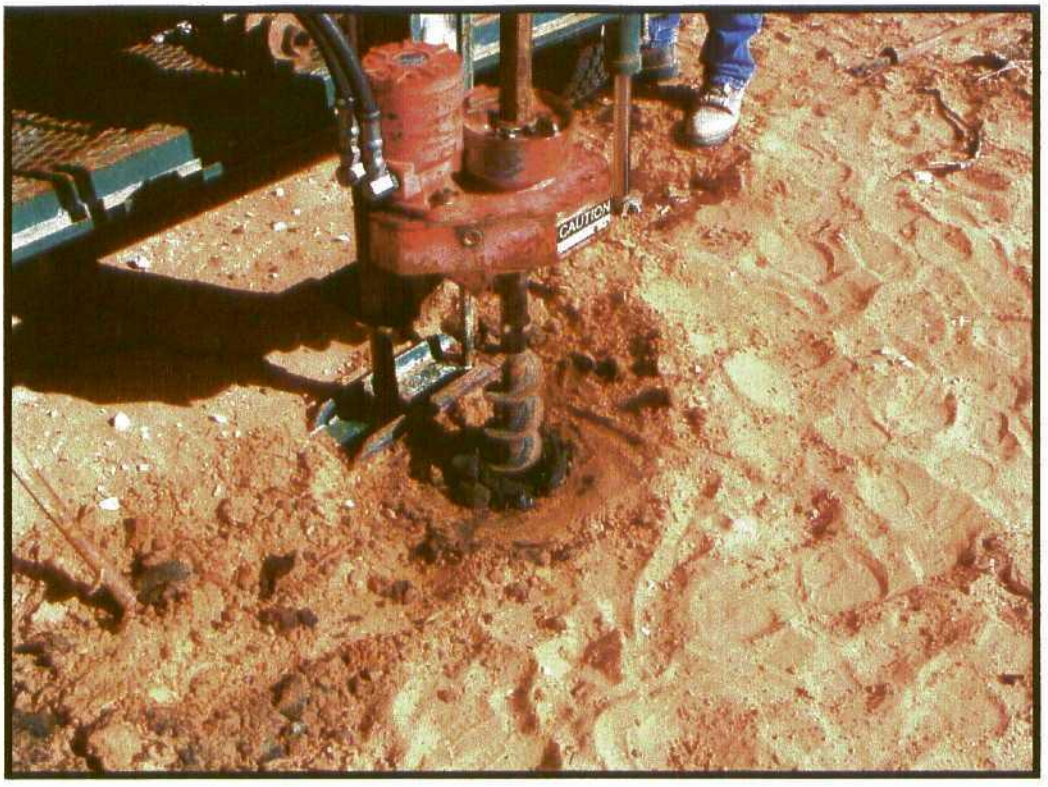
Sampler Relinquished: Simon Casas	Date: 2/21/03 Time: 1125	Received By:	Phone Result: ☐ Yes ☐ No Add'l Phone #:
Relinquished By:	Date: Time:	Received By: (Lab Staff)	Fax Result: ☐ Yes ☐ No Add'l Fax #:
Delivered By: (Circle One) Sampler - UPS - Bus - Other:	Sample Condition Cool: ☑ Yes ☐ No Intact: ☐ Yes ☐ No	CHECKED BY: (Initials)	REMARKS:

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

Appendix C
Site Photos



Bore Hole #1 5' 11-11-02

Bore Hole #1 5' 11-11-02

Borehole #2 Area Before Setup Looking North-East 11/19/02

Borehole #2 Area After Setup Looking South 11/19/02

Borehole #2 Pit Material At Surface 11/19/02

Borehole #2 Auger @ 5' 11/19/02

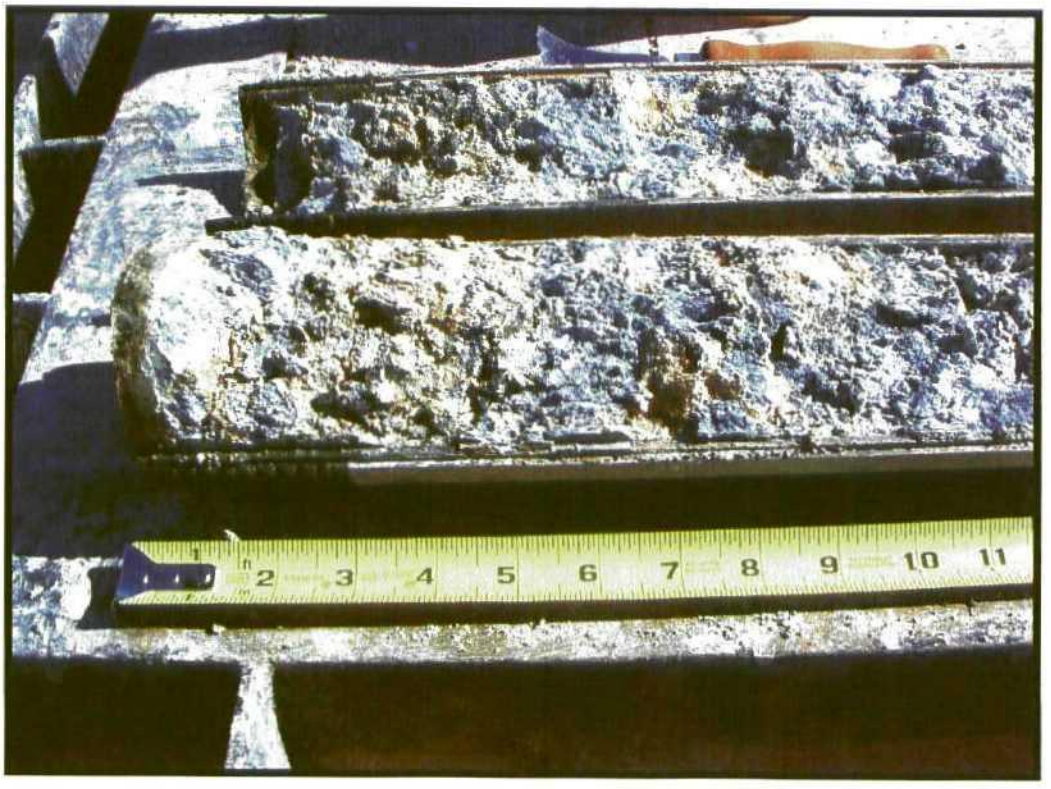
Borehole #2 Core 20-25' 40" Core 11/19/02

Borehole #2 Core 24-25' 11/19/02

Borehole #2 Core 25-30' 11/19/02

Borehole #2 Core 28-30' 11/19/02

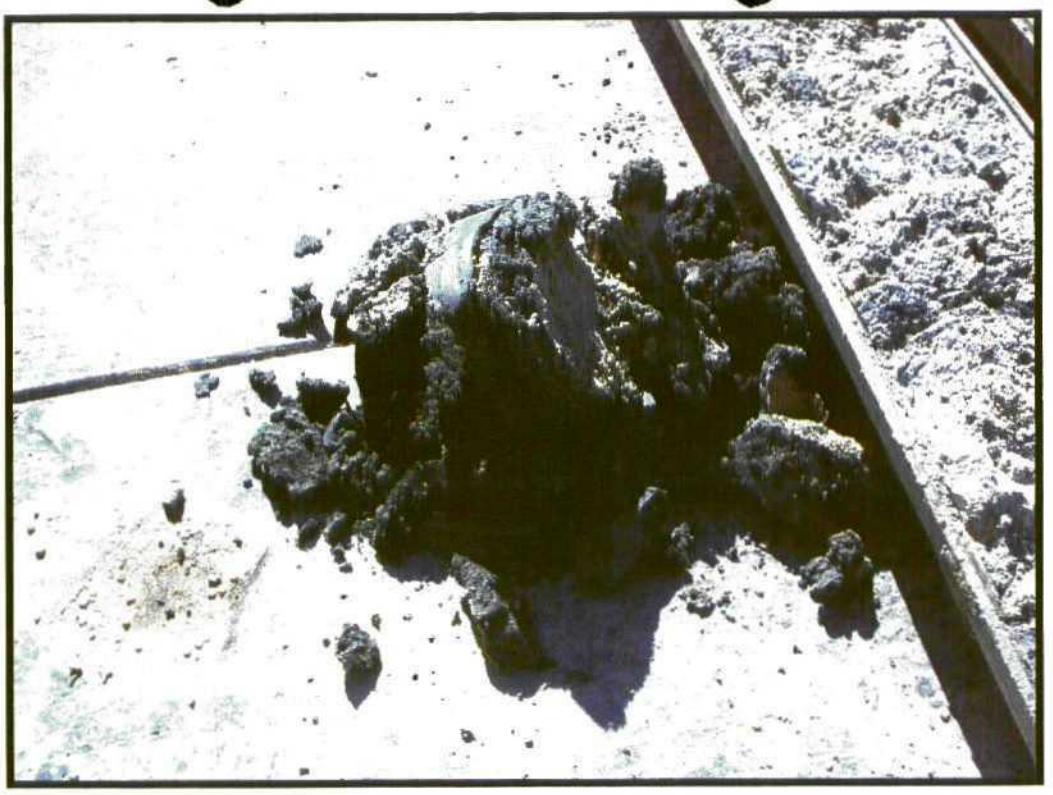
Borehole #2 Core 30-35' 11/19/02



Borehole #2 Core 33-35' 11/19/02

Borehole #2 Core 35-40' 11/19/02

Borehole #2 Core 39-40' 11/19/02



Borehole #2 Core Bottom 11/19/02

Borehole #2 Core Bottom 11/19/02

MW #1 40-45' 1/22/03

MW #1 40-45' 1/22/03

MW #1 40-45' 1/22/03

MW #1 45-50' 1/22/03

MW #1 End Cap 45-50' 1/22/03

MW #1 Cuttings 45-50' 1/22/03

MW #1 50-55' 1/22/03

MW #1 55-60' 1/22/03

MW #1 End Cap 55-60' 1/22/03

MW #1 End Cap 55-60' 1/22/03

MW #1 60-65' 1/22/03

MW #1 60-65' 1/22/03

MW #1 60-65' 1/22/03

MW #1 65-70' 1/22/03

MW #1 65-70' 1/22/03

MW #1 65-70' 1/22/03

MW #1 65-70' 1/22/03

MW #1 65' Cap 1/22/03

MW #1 65' Cap 1/22/03

MW #1 65' Cap & Plug 1/22/03

MW #1 65' Core Overall 1/22/03

MW #1 70' Core 1/22/03

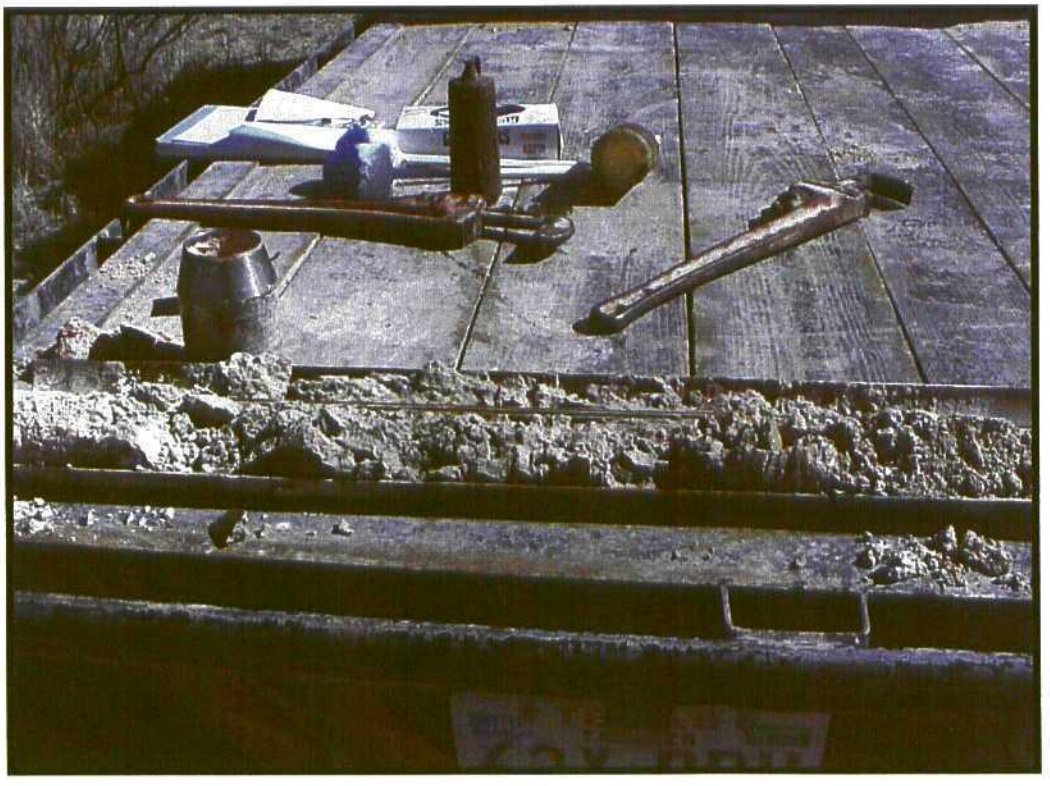
MW #1 70' Core 1/22/03

MW #1 70' Core 1/22/03

MW #1 70' Core 1/22/03

MW #1 70' Cap 1/22/03

MW-2 40-45' 2/14/03



MW-2 40-45' 2/14/03

MW-2 45-50' 2/14/03

MW-2 45-50' 2/14/03

MW-3 43-45' 2/17/03

MW-3 47-50' 2/17/03

MW-3 50-55' 2/17/03