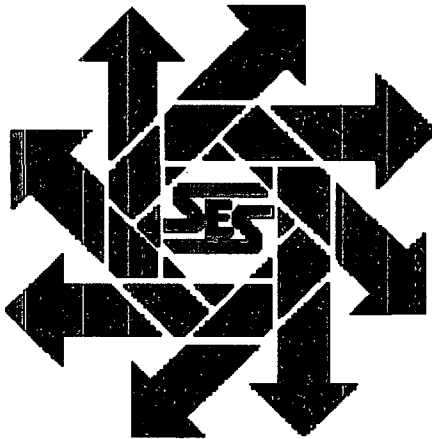


**Saga Petroleum LLC  
State AE Battery  
Site Investigation  
Section 36, Township 16S, Range 36E  
Lea County, New Mexico**

**January 29, 2004**

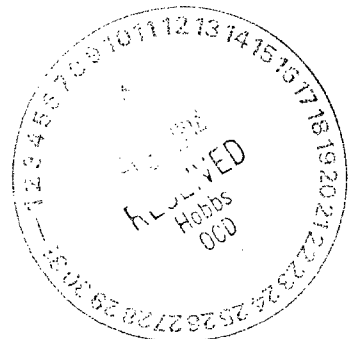


***Prepared for:***

**Saga Petroleum LLC  
415 W. Wall, Suite 1900  
Midland, Texas 79701**

***By:***

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



*Saga - 148967  
facility - FPAC0603928369  
appl. - FPAC0603928486*

## TABLE OF CONTENTS

I.	Background .....	1
II	Surface and Ground Water .....	1
III.	Soils .....	1
IV.	Work Performed.....	1
V.	Conclusions.....	1
VI.	Figures & Appendices.....	2
	Figure 1 – Vicinity Map.....	3
	Figure 2 – Site Plan .....	4
	Figure 3 – Log of Boring.....	5
	Appendix A – Analytical Results.....	6
	Appendix B – Site Photos.....	7

## I. Background

Safety & Environmental Solutions, Inc. (SESI) was contracted by Saga Petroleum LLC to perform a site investigation of the State AE Battery. The subject area is located in Section 36, Township 16S, Range 36E in Lea County, New Mexico. (See Figure 1) This site was used as a produced fluid storage area. The site has been abandoned and the storage tanks and vessels have been removed.

## II. Surface and Ground Water

According to the database provided by the New Mexico State Engineer's Office there is no groundwater of record in Section 36, Township 16S, Range 36E. The nearest groundwater of record is in Section 1, Township 17S, Range 36 E, in Lea County, New Mexico the depth of water is approximately 83 feet in depth. This measurement was taken May 5, 1992. On January 28, 2004, SESI installed a groundwater monitor well at the Apollo Salt Water Disposal Facility which is located approximately 1/2 to 3/4 of a mile to the south of this location. Groundwater was encountered in this well at approximately 95'. A City of Lovington water well is located approximately 430' southeast of this location.

## III. Soils

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

## IV. Work Performed

### Drilling of Boreholes

On December 29, 2003 SESI drilled 4 boreholes at the State AE Battery Site. See Figure 2 for location of boreholes. All boreholes were drilled to a depth of 10 feet. Grab samples were retrieved from each borehole at the bottom depth. The samples were properly preserved and transported under chain of Custody to Cardinal Laboratories of Hobbs, New Mexico for analysis. All samples were analyzed for Chlorides (EPA methods 4500-Cl<sup>-</sup>B), TPH (EPA method 418.1), and BTEX (EPA Method SW-846 8260). The results of the analysis are as follows:

ID	Cl <sup>-</sup>	TPH	Benzene	Toluene	Ethyl Benzene	Total Xylenes
BH-1 10"	432	<10	<0.005	<0.005	<0.005	<0.015
BH-2 10'	288	<10	<0.005	<0.005	<0.005	<0.015
BH-3 10'	336	<10	<0.005	<0.005	<0.005	<0.015
BH-4 10'	336	<10	<0.005	<0.005	<0.005	<0.015

## V. Conclusions and Recommendations

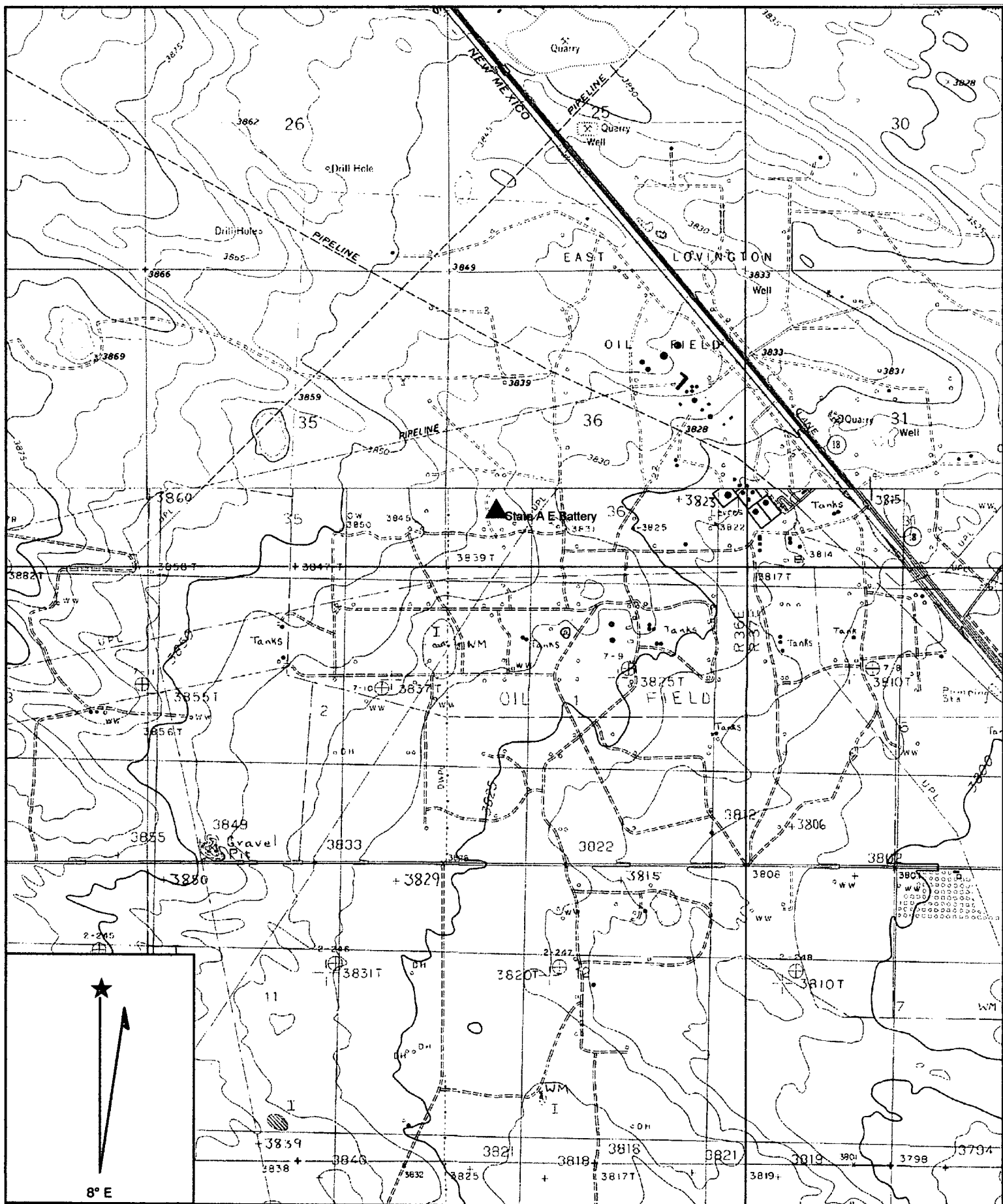
The results of the analysis indicate that the vertical extent of TPH or chloride contamination does not exceed 10' in depth. It is recommended that all highly contaminated and/or saturated soils be removed and transported to an approved NMOCD disposal facility. The remaining soils with TPH levels above 1000 ppm will be excavated and blended on site with clean soils from off site. In order to protect the City

of Lovington water well to the southeast, the horizontal extent of contamination will be determined by excavation and all soils with TPH levels above 100 ppm will be removed horizontally to the depth of the excavation stated above. The soils will be blended to a TPH level no greater than 1000 ppm. The excavation will be backfilled with the blended soils and returned to normal grade.

**VI. Figures & Appendices**

Figure 1 - Vicinity Map  
Figure 2 - Site Plan  
Figure 3 - Log of Boring  
Appendix A - Analytical Results  
Appendix B - Site Photos

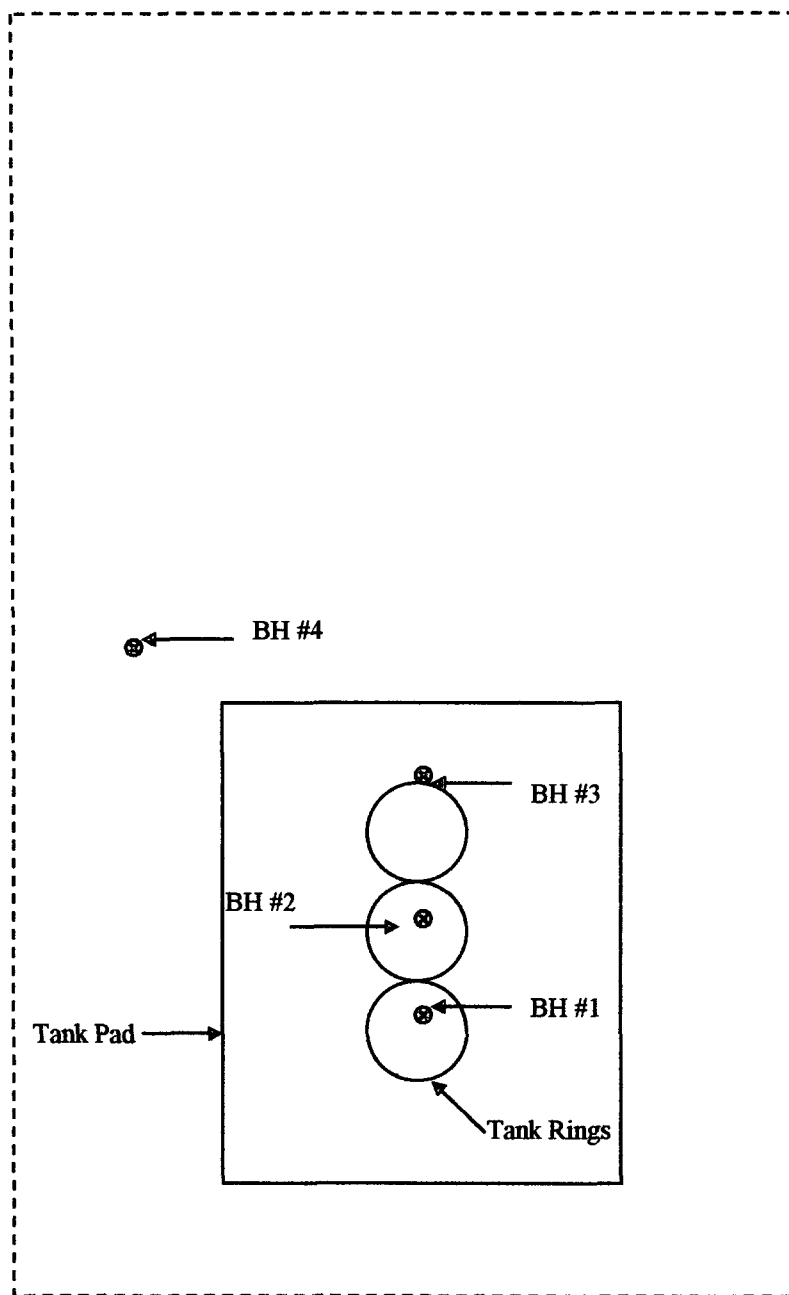
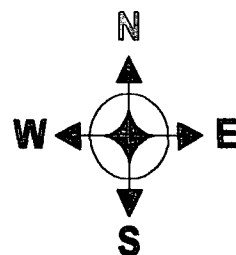
**Figure 1**  
**Vicinity Map**



Name: LOVINGTON SE  
 Date: 1/29/2004  
 Scale: 1 inch equals 2222 feet

Location: 032° 52' 09.2" N 103° 18' 45.9" W  
 Caption: Saga Petroleum LLC  
 State AE Battery  
 S 36, T16S, R36E  
 Lea County, New Mexico

**Figure 2**  
**Site Plan**



**Not To Scale**

**Saga Petroleum  
LLC**

**State AE Battery  
Section 36, T16S, R36E  
Lea County, New Mexico**

**Safety & Environmental  
Solutions, Inc.**





**Figure 3**  
**Log of Boring**



**Safety & Environmental  
Solutions, Inc.**

## LOG OF BORING BH-1

(Page 1 of 1)

Saga Petroleum LLC  
State AE Battery  
S36, T16S, R36E  
Lea County, New Mexico

Date Started : 12/29/03  
Date Completed : 12/29/03  
Hole Diameter : 8 1/4 in.  
Drilling Method : Hollow Stem Auger  
Drilling Equipment : CME-75

Sampling Method : Cuttings, core barrel  
Drilled By : Eco Drilling  
Logged By : Bob Allen  
Company Rep. : Bruce Woodard

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											
1											
2	SP/CA		Tank Pad Material Stained Black								
3											
4	CA		Caliche Gray Streaked Black								
5											
6	CA		Caliche								
7											
8	SP		Pink Sand								
9											
10				H8305-1	—	<10	<0.005	<0.005	<0.005	<0.015	432

**Notes:**

Plugged back to surface with bentonite upon completion



**Safety & Environmental  
Solutions, Inc.**

## LOG OF BORING BH-2

(Page 1 of 1)

Saga Petroleum LLC  
State AE Battery  
S36, T16S, R36E  
Lea County, New Mexico

Date Started : 12/29/03  
Date Completed : 12/29/03  
Hole Diameter : 8 1/4 in.  
Drilling Method : Hollow Stem Auger  
Drilling Equipment : CME-75

Sampling Method : Cuttings, core barrel  
Drilled By : Eco Drilling  
Logged By : Bob Allen  
Company Rep. : Bruce Woodard

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											
1											
2											
3	SP/CA		Tank Pad Material Heavy Stains & Odor								
4											
5	CA		Caliche								
6											
7											
8	SP		Pink Sand								
9											
10				H8305-2	—	<10	<0.005	<0.005	<0.005	<0.015	288

**Notes:**

Plugged back to surface with bentonite upon completion



**Safety & Environmental  
Solutions, Inc.**

## LOG OF BORING BH-3

(Page 1 of 1)

Saga Petroleum LLC  
State AE Battery  
S36, T16S, R36E  
Lea County, New Mexico

Date Started : 12/29/03  
Date Completed : 12/29/03  
Hole Diameter : 8 1/4 in.  
Drilling Method : Hollow Stem Auger  
Drilling Equipment : CME-75

Sampling Method : Cuttings, core barrel  
Drilled By : Eco Drilling  
Logged By : Bob Allen  
Company Rep. : Bruce Woodard

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											
1											
2	SP/CA		Tank Pad Material Heavey Stains & Odor								
3											
4	CA		Caliche Dark Streaks & Odor								
5											
6	CA		Caliche								
7											
8	SP		Pink Sand								
9											
10				H8305-3	—	<10	<0.005	<0.005	<0.005	<0.015	336

**Notes:**

Plugged back to surface with bentonite upon completion



**Safety & Environmental  
Solutions, Inc.**

## LOG OF BORING BH-4

(Page 1 of 1)

Saga Petroleum LLC  
State AE Battery  
S36, T16S, R36E  
Lea County, New Mexico

Date Started : 12/29/03  
Date Completed : 12/29/03  
Hole Diameter : 8 1/4 in.  
Drilling Method : Hollow Stem Auger  
Drilling Equipment : CME-75

Sampling Method : Cuttings, core barrel  
Drilled By : Eco Drilling  
Logged By : Bob Allen  
Company Rep. : Bruce Woodard

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											
1											
2	SP/CA		Hard Pad Top Soil Odor								
3											
4	CA		Caliche Dark Stains								
5											
6											
7											
8	SP		Pink Sand								
9											
10				H8305-4	—	<10	<0.005	<0.005	<0.005	<0.015	336

**Notes:**

Plugged back to surface with bentonite upon completion

## **Appendix A**

# **Analytical Results**



# ARDINAL LABORATORIES

PHONE (325) 673-7001 • 2111 BEECHWOOD • ABILENE, TX 79603

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

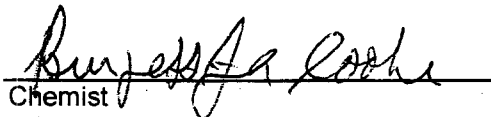
ANALYTICAL RESULTS FOR  
SAFETY & ENVIRONMENTAL SOLUTIONS, INC.  
ATTN: BOB ALLEN  
703 E. CLINTON, #103  
HOBBS, NM 88240  
FAX TO: (505) 393-4388

Receiving Date: 12/30/03  
Reporting Date: 01/05/04  
Project Number: SAG-03-002  
Project Name: STATE AE  
Project Location: LOVINGTON, NM

Sampling Date: 12/29/03  
Sample Type: SOIL  
Sample Condition: COOL & INTACT  
Sample Received By: AH  
Analyzed By: BC

LAB NUMBER	SAMPLE ID	BENZENE (mg/Kg)	TOLUENE (mg/Kg)	ETHYL BENZENE (mg/Kg)	TOTAL XYLENES (mg/Kg)
ANALYSIS DATE		01/02/04	01/02/04	01/02/04	01/02/04
H8305-1	B.H. #1 10'	<0.005	<0.005	<0.005	<0.015
H8305-2	B.H. #2 10'	<0.005	<0.005	<0.005	<0.015
H8305-3	B.H. #3 10'	<0.005	<0.005	<0.005	<0.015
H8305-4	B.H. #4 10'	<0.005	<0.005	<0.005	<0.015
Quality Control		0.098	0.101	0.100	0.311
True Value QC		0.100	0.100	0.100	0.300
% Recovery		98.4	101	99.5	104.0
Relative Percent Difference		5.9	2.9	4.8	2.1

METHOD: EPA SW-846 8260

  
Chemist

1/5/04  
Date

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 client for 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 thirty (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.

H8305B.XLS



# ARDINAL LABORATORIES

PHONE (325) 673-7001 • 2111 BEECHWOOD • ABILENE, TX 79603

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

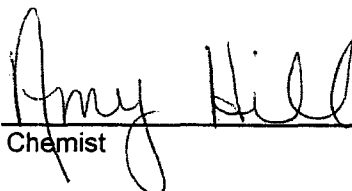
ANALYTICAL RESULTS FOR  
SAFETY & ENVIRONMENTAL SOLUTIONS, INC.  
ATTN: BOB ALLEN  
703 E. CLINTON  
HOBBS, NM 88240  
FAX TO: (505) 393-4388

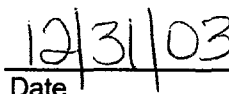
Receiving Date: 12/30/03  
Reporting Date: 12/31/03  
Project Number: SAG03002  
Project Name: STATE AE  
Project Location: LOVINGTON, NM

Sampling Date: 12/29/03  
Sample Type: SOIL  
Sample Condition: COOL & INTACT  
Sample Received By: AH  
Analyzed By: AH/HM

LAB NUMBER	SAMPLE ID	TPH (ppm)	CI (ppm)
ANALYSIS DATE:		12/30/03	12/30/03
H8305-1	B.H. #1 10'	<10	432
H8305-2	B.H. #2 10'	<10	288
H8305-3	B.H. #3 10'	<10	336
H8305-4	B.H. #4 10'	<10	336
Quality Control		243	940
True Value QC		240	1000
% Recovery		101	94.0
Relative Percent Difference		4.6	1.4

METHODS: EPA 600/4-79-02	418.1	SM 4500 Cl <sup>-</sup> B
--------------------------	-------	---------------------------

  
Chemist

  
Date

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 client for 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 thirty (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.

H8304





**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**

Page 1 of 1

# CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

Company Name: <b>SEI</b>		P.O. #: <b>SAME</b>		<b>BILL TO</b>		<b>ANALYSIS REQUEST</b>	
Project Manager: <b>Bob Allen</b>		Company: <b>SAME</b>					
Address: <b>703 E. Clinton STE 101</b>		Attn: <b></b>					
City: <b>Heflos</b>		State: <b>NM</b> Zip: <b>88240</b>					
Phone #: <b>505-847-0510</b>		Fax #: <b>505-393-4388</b>					
Project #: <b>SAG03-002</b>		Project Owner: <b></b>					
Project Name: <b>STATE AE</b>		City: <b></b>					
Project Location: <b>Lovington NM.</b>		State: <b></b> Zip: <b></b>					
Sampler Name: <b>Bob Allen</b>		Phone #: <b></b>					
Fax #: <b></b>							

Lab I.D.	Sample I.D.	(G)RAB OR (C)OMP.	# CONTAINERS	MATRIX						PRESERV.	SAMPLING	DATE	TIME	BTX	TPH	Chlorides
				GROUNDWATER	WASTEWATER	SOIL	CRUDE OIL	SLUDGE	OTHER :							
H8305-1	B.H. #1 10'	G 1	1									29 Dec	11:20p	✓	✓	✓
-2	B.H. #2 10'	G 1	1									29 Dec	11:55p	✓	✓	✓
-3	B.H. #3 10'	G 1	1									29 Dec	12:50p	✓	✓	✓
-4	B.H. #4 10'	G 1	1									29 Dec	2:00p	✓	✓	✓

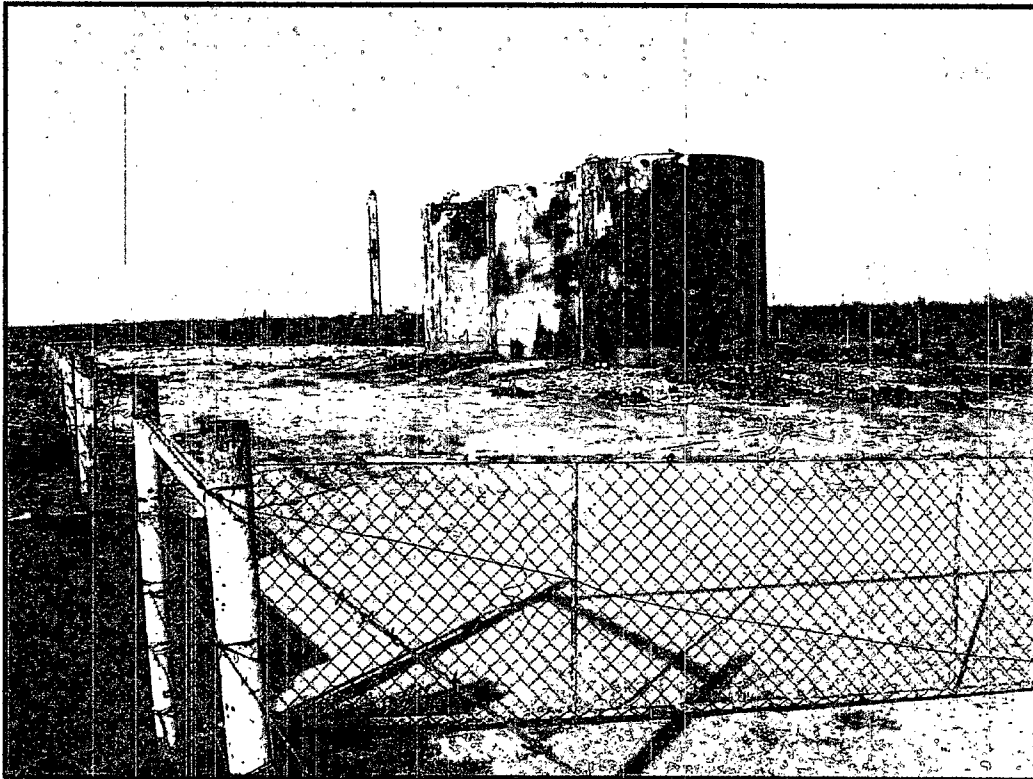
  

PLEASE NOTE: Liability and Insurance. Cardholder's liability and security available readily for any claim arising against bonded in contract or bond, shall be limited to the amount paid by the client for the service. All claims including those for negligence and any other cause whatsoever shall be deemed waived unless made in writing and received by Cardholder within 30 days after completion of the applicable service. In no event shall Cardholder be liable for incidental or consequential damages, including without limitation, business interruptions, loss of data, or loss of profits incurred by client, its subsidiaries, affiliates or successors arising out of or related to the performance of services hereunder by Cardholder, regardless of whether such claim is based upon any of the above stated reasons or otherwise.	
Relinquished By: <b>James R. Allen</b> Date: <b>30 Dec 03</b> Time: <b></b>	Received By: (Lab Staff) <b>mmk hill</b> Date: <b></b> Time: <b></b>
Delivered By: (Circle One) Sampler - UPS - Bus - Other: <b>Other</b>	Sample Condition <input checked="" type="checkbox"/> Cool <input checked="" type="checkbox"/> Intact <input type="checkbox"/> No <input type="checkbox"/> Yes
Checked By: (Initials) <b></b>	Phone Result: <input type="checkbox"/> Yes <input type="checkbox"/> No Add'l Phone #: <b></b> Fax Result: <input type="checkbox"/> Yes <input type="checkbox"/> No Add'l Fax #: <b></b>
REMARKS:	

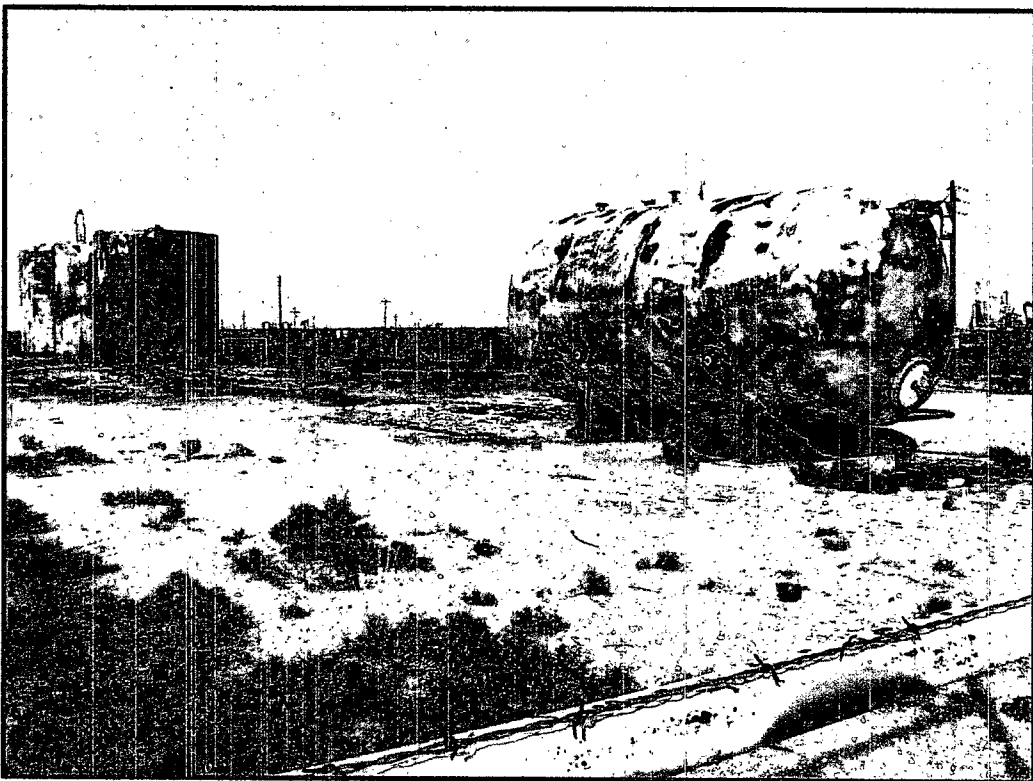
**† Cardinal cannot accept verbal changes. Please fax written changes to 505-393-2476.**

## **Appendix B**

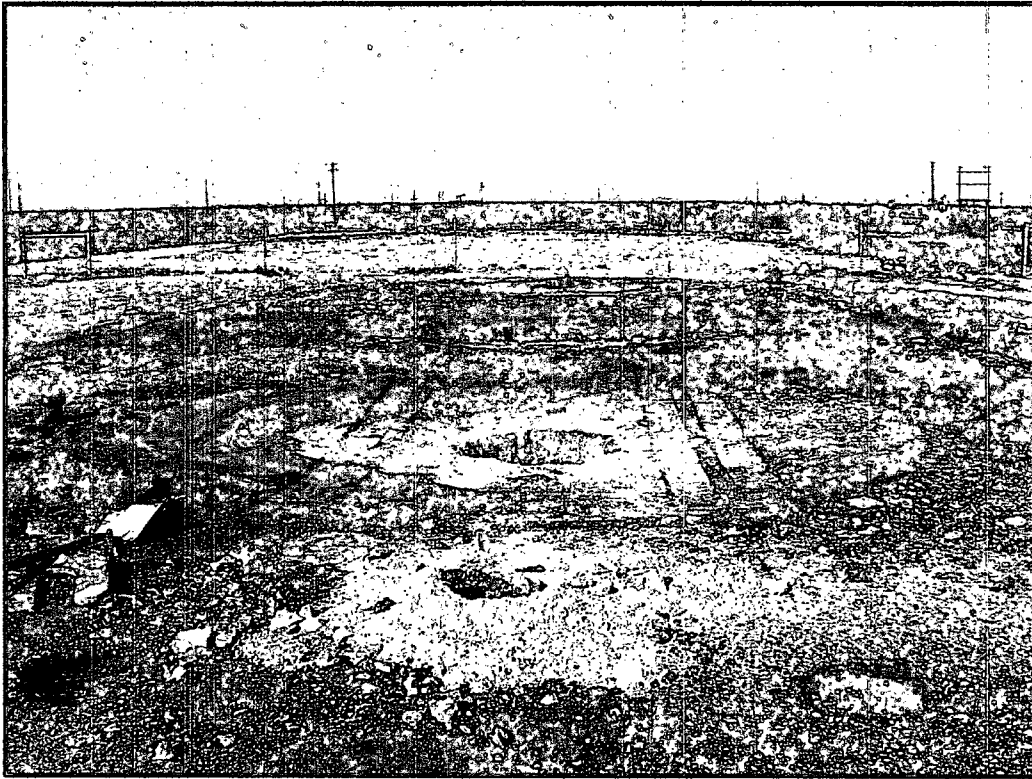
### **Site Photos**



Storage Tanks Prior to Removal



Horizontal Water Knockout Prior to Removal



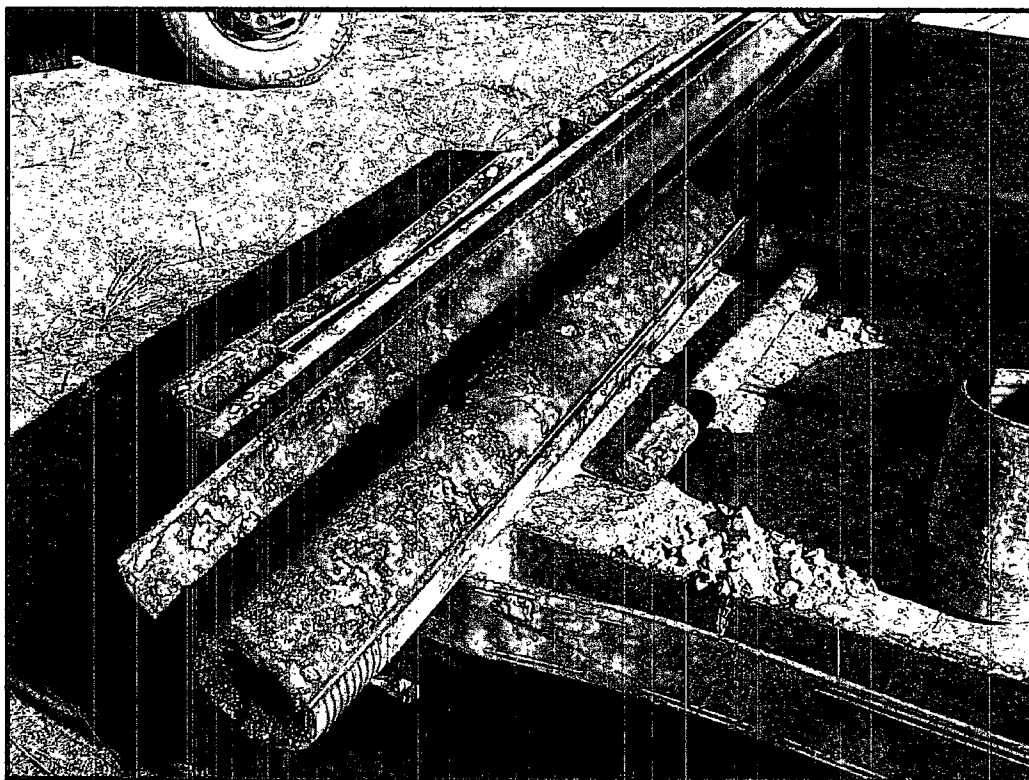
Tank Pad & Boreholes



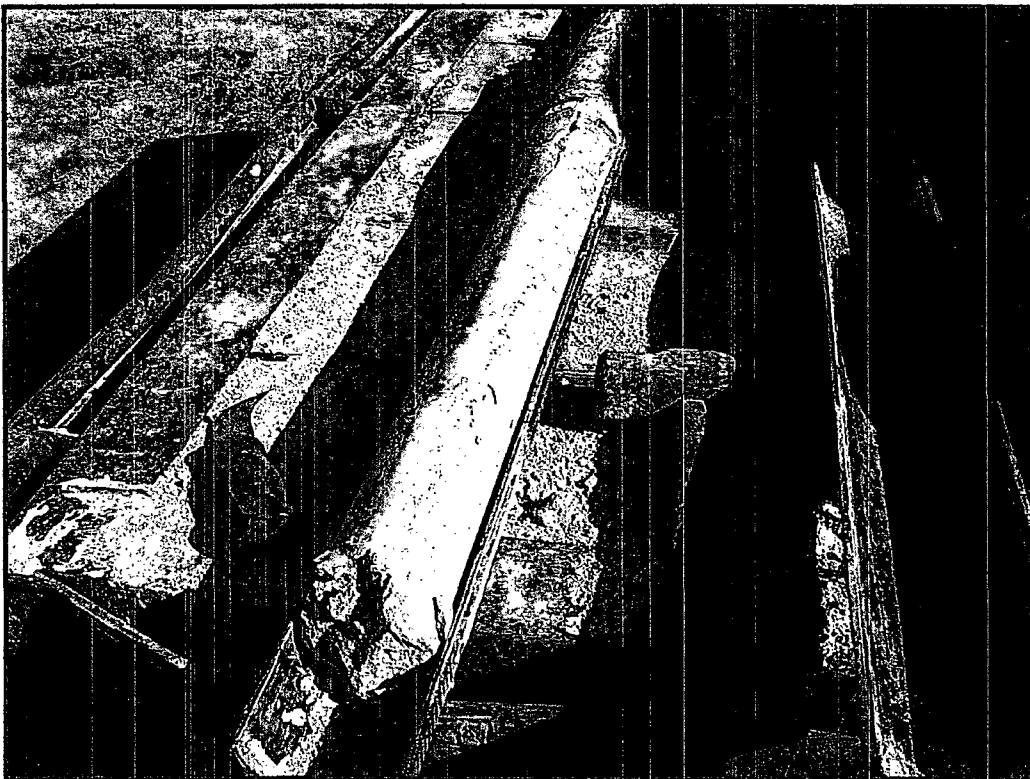
Borehole #1 10' Core



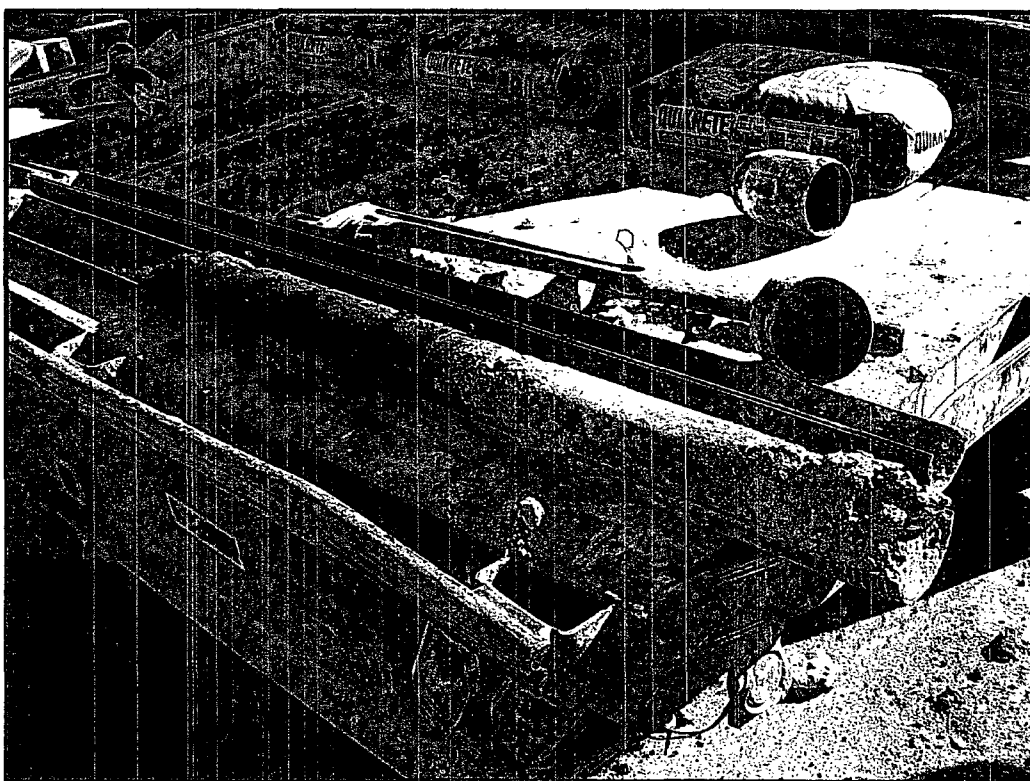
**Borehole #1 10' Core End**



**Borehole #2 5' Core**



Borehole #2 10' Core



Borehole #3 5' Core



Borehole #3 10' Core



Borehole #4 10' Core



**Bob Allen**

---

**From:** Price, Wayne [WPrice@state.nm.us]  
**Sent:** Monday, February 02, 2004 1:33 PM  
**To:** 'Bob Allen'; Price, Wayne  
**Cc:** B. Husband; Bruce Woodard; Williams, Chris; Johnson, Larry; Pat Wise  
**Subject:** RE: Saga State AE Battery

Dr. Mr. Allen: Representative for Saga Petroleum.

The Saga AE Battery is located within the City of Lovington's fresh water well field and located approximately 400-500 feet from one of the city wells. The OCD will require that Saga clean-up to the most stringent clean-up standards due to the location of this site. The attached clean-up plan is hereby approved subject to the following additional conditions:

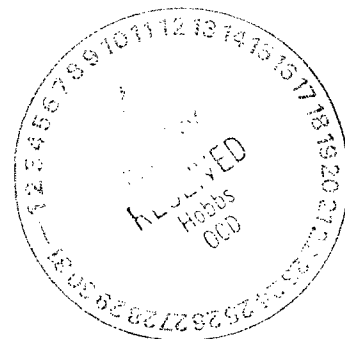
1. The City of Lovington must be notified before activities start and have ample opportunity to review and comment on the plan including witnessing all significant activities. Saga shall provide proof that the City of Lovington agrees with the plan.
2. All soils exceeding 100 ppm TPH and 250 ppm chlorides shall be excavated and removed. If the contamination exceeds 15 feet in depth, then Saga may propose an alternate closure plan subject to OCD approval.
3. All waste shall be disposed of off-site at an OCD approved site.
4. All back fill shall be clean soil and properly compacted. The surface shall be restored for native plant growth.

Saga shall provide a closure report by February 20, 2004 for OCD approval. The report shall contain the results of the bottom hole and sidewall analytical results photos etc. Soil samples shall be collected for TPH, BTEX and Chlorides.

Please be advised that NMOCD approval of this plan does not relieve Saga Petroleum of liability should their operations fail to adequately investigate and remediate contamination that pose a threat to ground water, surface water, human health or the environment. In addition, NMOCD approval does not relieve Sage Petroleum of responsibility for compliance with any other federal, state, or local laws and/or regulations.

-----Original Message-----

**From:** Bob Allen [mailto:ballen@sesi-nm.com]  
**Sent:** Monday, February 02, 2004 9:14 AM  
**To:** 'Bob Allen'; Wayne Price  
**Cc:** B. Husband; Bruce Woodard; Chris Williams; Larry Johnson; Pat Wise  
**Subject:** RE: Saga State AE Battery



Wayne...please accept this amended copy of the Site Investigation for your review. Please note the addition of the language regarding the excavation of the horizontal extent to 100 ppm to insure no migration to the City of Lovington water well.

Bob Allen

2/3/2004



Safety & Environmental Solutions, Inc.  
505-397-0510  
505-390-7063 Cell

2/3/2004