1R - 427-65

WORKPLANS

Date:

8-6-13

Rice Environmental Consulting & Safety
P.O. Box 2948, Hobbs, NM 88241
Phone 575.393.2967

CERTIFIED MAIL
RETURN RECEIPT NO. 7007 2560 0000 4569 8210

August 6th, 2013

Mr. Edward Hansen
New Mexico Energy, Minerals, & Natural Resources
Oil Conservation Division, Environmental Bureau
1220 S. St. Francis Drive
Santa Fe, New Mexico 87505

RE: **Investigation and Characterization Plan (ICP)**
Rice Operating Company – EME SWD System
EME L-25 (1R427-65): UL/L sec. 25 T19S R36E

Mr. Hansen:

RICE Operating Company (ROC) has retained Rice Environmental Consulting and Safety (RECS) to address potential environmental concerns at the above-referenced site in the EME Salt Water Disposal (SWD) system. ROC is the service provider (agent) for the EME SWD System and has no ownership of any portion of the pipeline, well, or facility. The system is owned by a consortium of oil producers, System Parties, who provide all operating capital on a percentage ownership/usage basis.

For all such environmental projects, ROC will choose the path forward that:

- Protects public health,
- Provides the greatest net environmental benefit,
- Complies with NMOCD Rules, and
- Is supported by good science.

Each site shall generally have three submissions:

1. This Investigation and Characterization Plan (ICP) is proposed for gathering data and site characterization and assessment.

2. Upon evaluating the data and results from the ICP, a recommended remedy will be submitted in a Corrective Action Plan (CAP), if warranted.

3. Finally, after implementing the remedy, a Termination Request with final documentation will be submitted.

Background and Previous Work

The site is located approximately 3 miles west of Monument, New Mexico at UL/L sec. 25 T19S R37E as shown on the Site Location Map and Geographical Location Map

(Figure 1 and 2). NM OSE records indicate that groundwater would likely be encountered at a depth of approximately 63 +/- feet. However, a soil bore drilled at the site found groundwater to be located at 14 +/- feet.

In 2002, ROC initiated work on the former EME L-25 junction box. After the former junction box was removed, the site was delineated using a backhoe to collect soil samples at regular intervals, creating a 20 x 20 x 5 ft deep excavation. Each sample was field titrated for chlorides and field screened using a PID for hydrocarbons. Representative samples were collected from the excavation walls and excavation bottom and sent to a commercial laboratory for analysis. The sidewall sample resulted in a chloride concentration of 1,760 mg/kg and concentrations of gasoline range organics (GRO), diesel range organics (DRO) and BTEX below detectable limits. The bottom composite sample resulted in a chloride concentration of 3,830 mg/kg, GRO and BTEX concentrations below detectable limits and a DRO concentration of 24 mg/kg. The excavation was backfilled with the excavated soil to 5 ft below ground surface (BGS). From 5 – 4 ft BGS, a 1 foot thick clay barrier was installed. The remaining excavation was backfilled using the remaining backfill to ground surface and contoured to the surrounding area. The clay layer will provide a barrier that will inhibit the downward migration of chlorides to groundwater. A new, watertight junction was installed at the site. A Junction Box Closure Report was submitted to NMOCD with all the 2002 junction box closures and disclosures (Appendix A).

To further investigate the depth of chloride concentrations, a soil bore was initiated on February 11th, 2013, at 12 ft northeast of the former junction box site (Figure 3). The boring was advanced to a depth of 10 ft bgs with soil samples collected every 5 ft. Each sample was field titrated for chlorides and field screened using a PID for hydrocarbons. The 5 ft and 10 ft samples were sent to a commercial laboratory for analysis. The 5 ft sample resulted in a chloride concentration of 2,160 mg/kg and GRO and DRO concentrations below detectable limits. The 10 ft sample resulted in a chloride concentration of 2,800 mg/kg and GRO and DRO concentrations below detectable limits (Appendix B). The entire bore hole was plugged in total with bentonite to ground surface.

On April 11th, 2013, ROC submitted an Update Report to NMOCD outlining the activities conducted at the site. NMOCD approved the Update Report on May 2nd, 2013 and stipulated that ROC submit an Investigation and Characterization Plan to NMOCD within 180 days.

ROC proposes additional investigative work at the site to determine if there is potential for groundwater degradation from residual chlorides at the site.

Proposed Work Elements

1. Conduct vertical and lateral delineation of residual chlorides and hydrocarbons from samples taken using a drill rig, hand augur and/or backhoe (see Appendix C for Quality Procedures).
    a. Vertical sampling will be conducted until of the following criteria are met in the field.

i. Three samples in which the chloride concentration decreases and the third sample has a chloride concentration of ≤ 250 ppm; and,
ii. Three samples in which PID readings decrease and the third sample has a PID reading of ≤ 100 ppm; or,
iii. The sampling reaches the capillary fringe.

b. Lateral sampling will be conducted until the following criteria are met in the field.
i. A decrease is observed in chloride concentrations between lateral bores at similar depths; and,
ii. A chloride concentration of ≤ 250 ppm is observed in a lateral surface sample; or,
iii. Safety concerns impede further lateral delineation

2. If warranted, install monitor wells to provide direct measurement of the potential groundwater impact at the site. (All monitor wells will be installed by EPA, NMOCD, and industry standards.)
3. Evaluate the risk of groundwater impact based on the information obtained.

Once the data from these actions have been evaluated, ROC will submit a report with recommendations of a path forward for the site.

RECS appreciates the opportunity to work with you on this project. Please call Hack Conder at (575) 393-2967 or me if you have any questions or wish to discuss the site.

Sincerely,

Lara Weinheimer
Project Scientist
RECS
(575) 441-0431

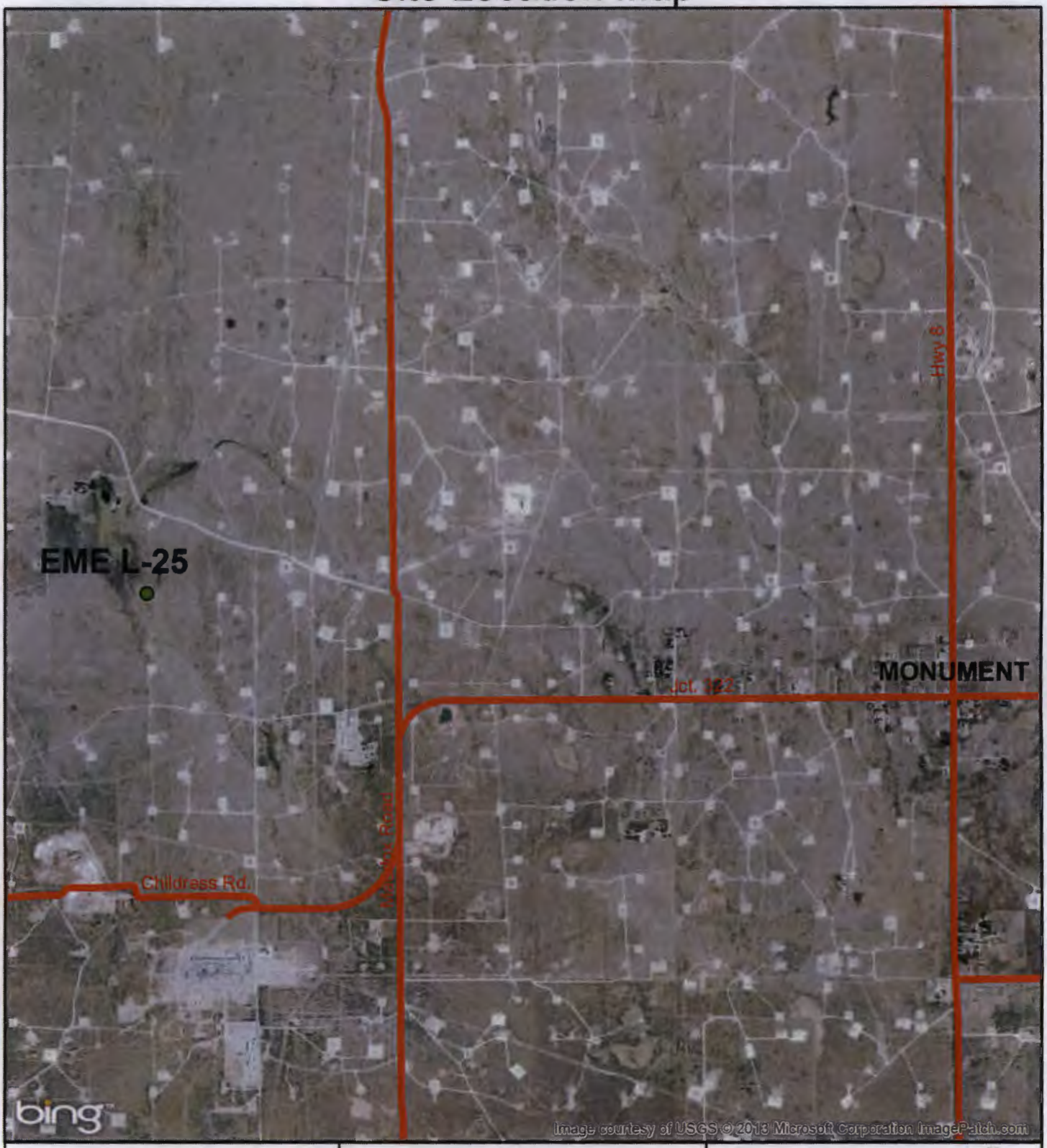
Attachments:

Figure 1 – Site Location Map
Appendix A – Junction Box Disclosure Report
Appendix B – Soil Bore Installation Documentation
Appendix B – Quality Procedures

Figures

RICE Environmental Consulting and Safety (RECS)
P.O. Box 2948, Hobbs, NM 88241
Phone 575.393.2967

Site Location Map



RICE ENVIRONMENTAL RECS CONSULTING & SAFETY, LLC

EME L-25

Legals: UL/L sec. 25
T-19-S R-36-E
LEA COUNTY, NM

NMOCD Case #: 1R427-65

Figure 1

N W E S

0 1,900 3,800

Feet

Drawing date: 7/31/13
Drafted by: L. Weinheimer

Geographical Location Map

RICE ENVIRONMENTAL RECS CONSULTING & SAFETY, LLC

EME L-25

Legals: UL/L sec. 25
T-19-S R-36-E
LEA COUNTY, NM

NMOCD Case #: 1R427-65

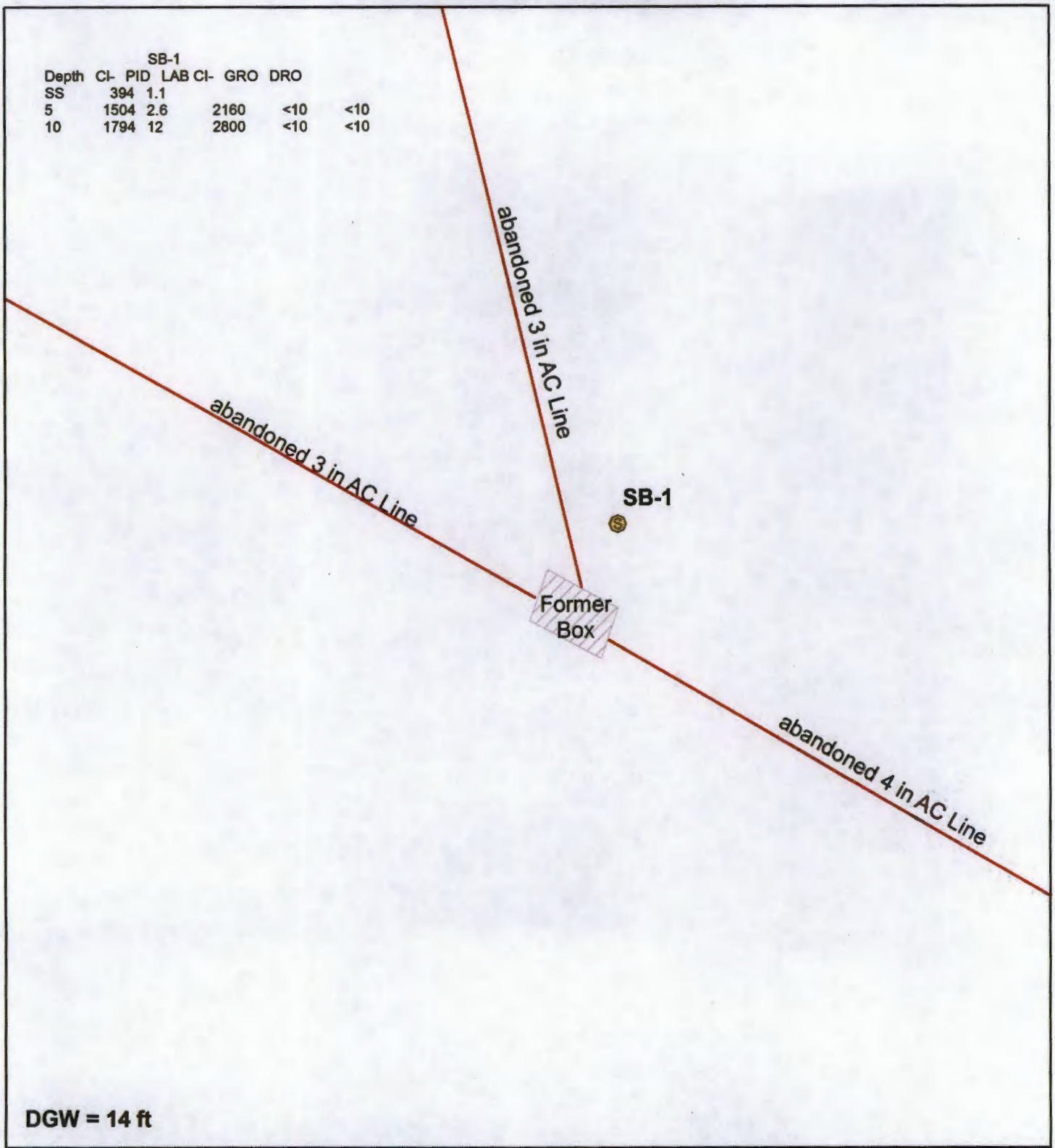
Figure 2

N W E S

0 710 1,420
Feet

Drawing date: 8/5/13
Drafted by: L. Weinheimer

Soil Bore Installation



RICE ENVIRONMENTAL RECS CONSULTING & SAFETY, LLC

EME L-25

UP/L sec. 25
T-19-S R-36-E
LEA COUNTY, NM

NMOCD Case #: 1R427-65

Figure 3

N W E S

0 10 20 Feet

Drawing date: 2/19/2013
Drafted by: LS

Appendix A

Junction Box Disclosure Report

RICE Environmental Consulting and Safety (RECS)
P.O. Box 2948 Hobbs, NM 88241
Phone 575.393.2967

RICE OPERATING COMPANY
JUNCTION BOX FINAL REPORT

BOX LOCATION

SWD SYSTEM	JUNCTION	UNIT	SECTION	TOWNSHIP	RANGE	COUNTY	BOX DIMENSIONS - FEET		
							Length	Width	Depth
EME	L-25	L	25	19S	36E	LEA	10	8	5

LAND TYPE: BLM _____ STATE _____ FEE LANDOWNER JIMMIE T COOPER OTHER _____

Depth to Groundwater 63 feet NMOCD SITE ASSESSMENT RANKING SCORE: 10

Date Started 2/14/2002 Date Completed 2/18/2002 OCD Witness NO

Soil Excavated 70 cubic yards Excavation Length 20 Width 20 Depth 5 feet

Soil Disposed 50 cubic yards Offsite Facility C&C LANDFARM Location MONUMENT, NM

FINAL ANALYTICAL RESULTS: **Sample Date** 2/15/2002 **Sample Depth** 5'

Procure 5-point composite sample of bottom and 4-point composite sample of sidewalls. TPH, BTEX and Chloride laboratory test results completed by using an approved lab and testing procedures pursuant to NMOCD guidelines.

Sample Location	Benzene mg/kg	Toluene mg/kg	Ethyl Benzene mg/kg	Total Xylenes mg/kg	GRO mg/kg	DRO mg/kg	Chlorides mg/kg
SIDEWALLS	<0.025	<0.025	<0.025	<0.025	<10	<10	1760
BOTTOM	<0.025	<0.025	<0.025	<0.025	<10	24	3830

General Description of Remedial Action: Delineated vertical and lateral extent.

Vertical delineation found a decline in TPH from 2480 ppm at 4' bgs to 10 ppm at 8'bgs and chloride dropped from 4000 ppm at 4' to 600 ppm at 8'. These results indicate impact probably did not reach groundwater. A compacted clay barrier to vertical transmissivity and water tight junction box was installed and backfilled.

CHLORIDE FIELD TESTS

LOCATION	DEPTH	mg/kg
SIDEWALLS	4'	1500
BOTTOM	5'	3100
Vertical Trench	4'	4000
	6'	1000
	8'	600

I HEREBY CERTIFY THAT THE INFORMATION ABOVE IS TRUE AND COMPLETE TO THE BEST OF MY KNOWLEDGE AND BELIEF.

DATE March 5, 2002 PRINTED NAME D. E. Anderson

SIGNATURE D E Anderson TITLE Project Leader - Environmental

ENVIRONMENTAL LAB OF I, LTD.

"Don't Treat Your Soil Like Dirt!"

RE ENVIRONMENTAL
ATTN: DEREK ROBINSON
P.O. BOX 13418
ODESSA, TEXAS 79768-3418
FAX: 366-0804
FAX: 505-397-1471 (Donnie Anderson)

Sample Type: Soil
Sample Condition: Intact/ Iced/ 1.5 deg C
Project Name: Rice Operating
Project #: L-25
Project Location: Monument

Sampling Date: See Below
Receiving Date: 02/15/02
Analysis Date: 02/18/02

ELT#	FIELD CODE	GRO C6-C10 mg/kg	DRO >C10-C28 mg/kg	SAMPLE DATE
0202613-01	4 pt Wall Comp. @ 4'	<10	<10	02/14/02
0202613-02	5 pt Bottom Comp. @ 5'	<10	24	02/15/02

QUALITY CONTROL	477	550
TRUE VALUE	500	500
% INSTRUMENT ACCURACY	95	110
SPIKED AMOUNT	476	476
ORIGINAL SAMPLE	<10	<10
SPIKE	593	644
SPIKE DUP	563	598
% EXTRACTION ACCURACY	118	126
BLANK	<10	<10
RPD	5.19	7.41

Methods: SW 846-8015M

Celey D. Keene
Raland K. Tuttle

2-20-02
Date

ENVIRONMENTAL LAB OF I, LTD.

"Don't Treat Your Soil Like Dirt!"

RE ENVIRONMENTAL
ATTN: DEREK ROBINSON
P.O. BOX 13418
ODESSA, TEXAS 79768-3418
FAX: 366-0804
FAX: 505-397-1471 (Donnie Anderson)

Sample Type: Soil
Sample Condition: Intact/ Iced/ 1.5 deg C
Project Name: Rice Operating
Project #: L-25
Project Location: Monument

Sampling Date: See Below
Receiving Date: 02/15/02
Analysis Date: 02/18/02

ELT#	FIELD CODE	BENZENE mg/kg	TOLUENE mg/kg	ETHYLBENZENE mg/kg	m,p-XYLENE mg/kg	o-XYLENE mg/kg	SAMPLE DATE
0202613-01	4 pt Wall Comp. 4'	<0.025	<0.025	<0.025	<0.025	<0.025	02/14/02
0202613-02	5 pt Bottom Comp. @ 5'	<0.025	<0.025	<0.025	<0.025	<0.025	02/15/02
	QUALITY CONTROL	0.091	0.094	0.086	0.186	0.086	
	TRUE VALUE	0.100	0.100	0.100	0.200	0.100	
	% INSTRUMENT ACCURACY	91	94	86	93	86	
	SPIKED AMOUNT	0.100	0.100	0.100	0.200	0.100	
	ORIGINAL SAMPLE	<0.025	<0.025	<0.025	<0.025	<0.025	
	SPIKE	0.092	0.096	0.093	0.201	0.091	
	SPIKE DUP	0.088	0.092	0.089	0.192	0.088	
	% EXTRACTION ACCURACY	92	96	93	100	91	
	BLANK	<0.025	<0.025	<0.025	<0.025	<0.025	
	RPD	4.44	4.26	4.40	4.58	3.35	

METHODS: EPA SW 846-8021B ,5030

Raland K Tuttle

Celey D. Keene
Raland K. Tuttle

2-20-02
Date

ENVIRONMENTAL LAB OF I, LTD.

"Don't Treat Your Soil Like Dirt!"

RE ENVIRONMENTAL
ATTN: DEREK ROBINSON
P.O. BOX 13418
ODESSA, TEXAS 79768-3418
FAX: 366-0804
FAX: 505-397-1471 (Donnie Anderson)

Sample Type: Soil
Sample Condition: Intact/ Iced/ 1.5 deg C
Project Name: Rice Operating
Project #: L-25
Project Location: Monument

Sampling Date: See Below
Receiving Date: 02/15/02
Analysis Date: 02/19/02

ELT#	FIELD CODE	Chloride mg/kg	SAMPLE DATE
0202613-01	4 pt Wall Comp. @ 4'	1760	02/14/02
0202613-02	5 pt Bottom Comp. @ 5'	3830	02/15/02

QUALITY CONTROL	5050
TRUE VALUE	5000
% INSTRUMENT ACCURACY	101
SPIKED AMOUNT	588
ORIGINAL SAMPLE	1760
SPIKE	2430
SPIKE DUP	2390
% EXTRACTION ACCURACY	106
BLANK	<5.00
RPD	1.07

Methods: SW 846-9253

Raland K Tuttle

Celey D. Keene
Raland K. Tuttle

2-20-02
Date

Environmental Lab of Texas, Inc.

12600 West I-20 East
Odessa, Texas 79763
Phone: 915-563-1800
Fax: 915-563-1713

CHAIN OF CUSTODY RECORD AND ANALYSIS REQUEST

Project Manager: Derek Robinson
Company Name: R.E. ENVIRONMENTAL
Company Address:
City/State/Zip:
Telephone No: Fax No:
Sampler Signature: Derek Robinson

Project Name: Rice Operating
Project #: L-25
Project Loc: MONUMENT
PO #:

LAB # (lab use only)	FIELD CODE	Date Sampled	Time Sampled	No. of Containers	Preservative: Ice	HNO3	HCl	NaOH	H2SO4	None	Other (Specify)	Matrix: Water	Sludge	Soil	Other (specify)	Analyze For: TCLP: TOTAL: TDS (Cl) SAR / EC	TPH 418.1	TPH TX 1005/1006	TPH 8015M GRO/DRO	Metals: As Ag Ba Cd Cr Pb Hg Se	Volatiles	Semivolatiles	BTEX 8021B/5030								RUSH TAT (Pre-Schedule)	Standard TAT
0202613-01	4PT WALL Comp @ 4'	2-14	1:30 pm	1	✓									1		✓			✓				✓									
02	5PT Bottom Comp @ 5'	2-15	2:00 pm	1	✓									1		✓			✓				✓									

Special Instructions:
FAX Copy TO DONNIE W/ Rice

Sample Containers Intact? (Y) N
Temperature Upon Receipt:
Laboratory Comments: 1.5°C

Relinquished by:	Date	Time	Received by:	Date	Time
Derek Robinson	2-15-02	5:10pm			
Relinquished by:	Date	Time	Received by ELOT:	Date	Time
			Cindy Keene	2/15/02	17:10

C & C LANDFARM, INC.

BOX 55
MONUMENT, NEW MEXICO 88265
PHONE: (505) 397-2045
(505) 397-2860
(505) 392-2236

1200

002051

COMPANY NAME Rice Oper. Co.

COMPANY REPRESENTATIVE NAME Denise Anderson

LEASE NAME L - 25

SEC. TOWNSHIP RANGE

TRUCKING COMPANY NAME R-E- Enmis

DRIVERS SIGNATURE Denise Robinson

TYPE OF MATERIAL BEING HAULED AND QUANTITY 50 yds Cont Soil.

COPY OF ANALYSIS ATTACHED, IF REQUIRED Less than 10,000 Ppms Tpc Non Hazz

TPHC

BENZENE

TOLUENE

ETHYL BENZENE

PARA XYLENE

ATTENDANT ON DUTY

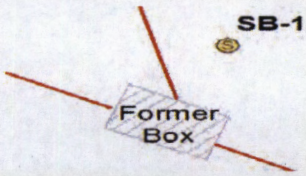
DATE 2 - 19 - 002

02-97-5pt.-500-bk25-#1701

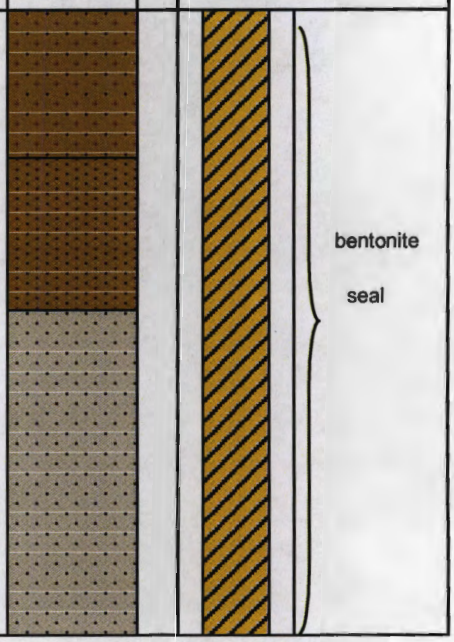
Appendix B

Soil Bore Installation Documentation

RICE Environmental Consulting and Safety (RECS)
P.O. Box 2948 Hobbs, NM 88241
Phone 575.393.2967

Logger:	Kyle Norman		RICE ENVIRONMENTAL RECS CONSULTING & SAFETY, LLC
Driller:	Harrison & Cooper, Inc.		
Drilling Method:	Air Rotary		**Project Name:** EME L-25 **Well ID:** SB-1
Start Date:	2/11/2013		**Location:** UL/L sec. 25 T19S R36E
Comments: Located 12 ft northeast of former junction box. All samples are from cuttings. **DRAFTED BY: T. Jennings** TD = 10 ft GW = 14 ft			**Lat:** 32°37'47"N **Long:** 103°18'52"W **County:** Lea **State:** NM

Depth (feet)	Chloride field tests	LAB	PID	Description
				Brown Sand
SS	394		1.1	
				Brown moist sand with some Caliche
5 ft	1504	Cl- 2160	2.6	
		GRO <10		Tan sand with some Caliche
		DRO <10		
10 ft	1794	Cl- 2800	12.0	
		GRO <10		
		DRO <10		



CARDINAL Laboratories

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

February 15, 2013

Hack Conder

Rice Operating Company

112 W. Taylor

Hobbs, NM 88240

RE: EME L-25

Enclosed are the results of analyses for samples received by the laboratory on 02/11/13 16:20.

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:

Rice Operating Company
Hack Conder
112 W. Taylor
Hobbs NM, 88240
Fax To: (575) 397-1471

Received:	02/11/2013	Sampling Date:	02/11/2013
Reported:	02/15/2013	Sampling Type:	Soil
Project Name:	EME L-25	Sampling Condition:	Cool & Intact
Project Number:	NONE GIVEN	Sample Received By:	Jodi Henson
Project Location:	NOT GIVEN		

Sample ID: SB-1 @ 5' (H300388-01)

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

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	**2160**	16.0	02/14/2013	ND	416	104	400	3.77	

TPH 8015M mg/kg **Analyzed By: MS**

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10	<10.0	10.0	02/14/2013	ND	210	105	200	2.24	
DRO >C10-C28	<10.0	10.0	02/14/2013	ND	194	96.8	200	5.26	

Surrogate: 1-Chlorooctane	*81.4 %*	*65.2-140*
Surrogate: 1-Chlorooctadecane	*94.8 %*	*63.6-154*

Sample ID: SB-1 @ 10' (H300388-02)

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

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	**2800**	16.0	02/14/2013	ND	416	104	400	3.77	

TPH 8015M mg/kg **Analyzed By: MS**

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10	<10.0	10.0	02/14/2013	ND	210	105	200	2.24	
DRO >C10-C28	<10.0	10.0	02/14/2013	ND	194	96.8	200	5.26	

Surrogate: 1-Chlorooctane	*76.0 %*	*65.2-140*
Surrogate: 1-Chlorooctadecane	*96.4 %*	*63.6-154*

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

CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

CARDINAL LABORATORIES

101 East Marland, Hobbs, NM 88240 2111 Beechwood, Abilene, TX 79603
(505) 393-2326 FAX (505) 393-2476 (325) 673-7001 FAX (325)673-7020

Company Name: Ame		BILL TO	
Project Manager: Hack Conder		P.O. #:	
Address:		Company:	
City: Hobbs	State: NM Zip: 88240	Attn:	
Phone #:	Fax #:	Address:	
Project #:	Project Owner:	City:	
Project Name:		State: Zip:	
Project Location: EME L-25		Phone #:	
Sampler Name: Kyle Norman		Fax #:	

FOR LAB USE ONLY				MATRIX						PRESERV.			SAMPLING		ANALYSIS REQUEST									
Lab I.D.	Sample I.D.	(G)RAB OR (C)OMP.	# CONTAINERS	GROUNDWATER	WASTEWATER	SOIL	OIL	SLUDGE	OTHER :	ACID/BASE:	ICE / COOL	OTHER :	DATE	TIME	Chlorides	TPH 8015 M	BTEX	Texas TPH	Complete Cations/Anions	TDS				
H300388																								
1	SB-1 @ 5'	G	1			✓					✓		2-1-13	8:30	✓	✓								
2	SB-1 @ 10'	G	1			✓					✓		2-1-13	8:45	✓	✓								

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: Kyle N	Date: 2-1-13 Time: 9:20	Received By: Jodi Henson	
Relinquished By:	Date: Time:	Received By:	
Delivered By: (Circle One) Sampler - UPS - Bus - Other:	Sample Condition Cool: Yes / No Intact: Yes / No	CHECKED BY: (Initials)	

Phone Result: ☐ Yes ☑ No Add'l Phone #:
Fax Result: ☐ Yes ☑ No Add'l Fax #:
REMARKS:

email results: zconder@rice-ecs.com
Knorman@rice-ecs.com; lpena@riceswd.com
Kjones@riceswd.com; Bbaker@rice-ecs.com;
hconder@rice-ecs.com; Lweinheimer@rice-ecs.com

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

#426

Appendix C
Quality Procedures

RICE Environmental Consulting and Safety (RECS)
P.O. Box 2948 Hobbs, NM 88241
Phone 575.393.2967

Rice Environmental Consulting and Safety

Quality Procedures

Table of Contents

Rice Environmental Consulting and Safety

Quality Procedure
Soil Samples for Transportation to a Laboratory

1.0 Purpose

This procedure outlines the methods to be employed when obtaining soil samples to be taken to a laboratory for analysis.

2.0 Scope

This procedure is to be used when collecting soil samples intended for ultimate transfer to a testing laboratory.

3.0 Preliminary

3.1 Obtain sterile sampling containers from the testing laboratory designated to conduct analyses of the soil.

3.2 If collecting TPH, BTEX, RCRA 8 metals, cation /anions or O&G, the sample jar may be a clear 4 oz. container with Teflon lid. If collecting PAH's, use an amber 4 oz. container.

4.0 Chain of Custody

4.1 Prepare a Sample Plan. The plan will list the number, location and designation of each planned sample and the individual tests to be performed on the sample. The sampler will check the list against the available inventory of appropriate sample collection bottles to insure against shortage.

4.2 Transfer the data to the Laboratory Chain of Custody Form. Complete all sections of the form except those that relate to the time of delivery of the samples to the laboratory.

4.3 Pre-label the sample collection jars. Include all requested information except time of collection. (Use a fine point Sharpie to insure that the ink remains on the label.) Affix the labels to the jars.

5.0 Sampling Procedure

5.1 Do not touch the soil with your bare hands. Use new nitrile gloves to help minimize any contamination.

5.2 Go to the sampling point with the sample container. If not analyzing for ions or metals, use a trowel to obtain the soil.

5.3 Pack the soil tightly into the container leaving the top slightly domed. Screw the lid down tightly. Enter the time of collection onto the sample collection jar label.

5.4 Place the sample directly on ice for transport to the laboratory if required.

5.5 Complete the Chain of Custody form to include the collection times for each sample. Deliver all samples to the laboratory.

6.0 Documentation

6.1 The testing laboratory shall provide the following minimum information:

a. Project and sample name.
b. Signed copy of the original Chain of Custody Form including the time the sample was received by the lab.
c. Results of the requested analyses
d. Test Methods employed
e. Quality Control methods and results

Rice Environmental Consulting and Safety

QUALITY PROCEDURE
Chloride Titration Using
0.282 Normal Silver Nitrate Solution

1.0 Purpose

This procedure is to be used to determine the concentration of chloride in soil.

2.0 Scope

This procedure is to be used as the standard field measurement for soil chloride concentrations.

3.0 Sample Collection and Preparation

3.1 Collect at least 80 grams of soil from the sample collection point. Take care to insure that the sample is representative of the general background to include visible concentrations of hydrocarbons and soil types. If necessary, prepare a composite sample for soils obtained at several points in the sample area. Take care to insure that no loose vegetation, rocks or liquids are included in the sample(s).

3.2 The soil sample(s) shall be immediately inserted into a one-quart or larger polyethylene freezer bag. Care should be taken to insure that no cross-contamination occurs between the soil sample and the collection tools or sample processing equipment.

3.3 The sealed sample bag should be massaged to break up any clods.

4.0 Sample Preparation

4.1 Tare a clean glass vial having a minimum 40 ml capacity. Add at least 10 grams of the soil sample and record the weight.

4.2 Add at least 20 grams of reverse osmosis water to the soil sample and shake well.

4.3 Allow the sample to set for a period of 5 minutes or until the separation of soil and water.

5.0 Titration Procedure

5.1 Using a graduated pipette, remove 10 ml extract and dispense into a clean plastic cup.

5.2 Add 2-3 drops potassium chromate (K_2CrO_4) to mixture if necessary.

5.3 Using a 1 ml pipette, carefully add .282 normal silver nitrate (one drop at a time) to the sample while constantly agitating it. Stop adding silver nitrate when the solution begins to change from yellow to red. Be consistent with endpoint recognition.

5.4 Record the ml of silver nitrate used.

6.0 Calculation

To obtain the chloride concentration, insert measured data into the following formula:

$$\frac{.282 \times 35{,}450 \times \text{ml } AgNO_3}{\text{ml water extract}} \times \frac{\text{grams of water in mixture}}{\text{grams of soil in mixture}}$$

Using Step 5.0, determine the chloride concentration of the RO water used to mix with the soil sample. Record this concentration and subtract it from the formula results to find the net chloride in the soil sample.

Record all results on the delineation form.

Rice Environmental Consulting and Safety

Quality Procedure
Development of Cased Water-Monitoring Wells

1.0 Purpose

This procedure outlines the methods to be employed to develop cased monitoring wells.

2.0 Scope

This procedure shall be used for developed, cased water monitoring wells. It is not to be used for standing water samples such as ponds or streams.

3.0 Sample Collection and Preparation

3.1 Prior to development, the static water level and height of the water column within the well casing will be measured with the use of an electric D.C. probe.

3.2 All measurements will be recorded within a field log notebook.

3.3 All equipment used to measure the static water level will be decontaminated after each use by means of Liquinox, a phosphate free laboratory detergent, and water to reduce the possibility of cross-contamination. The volume of water in each well casing will be calculated.

4.0 Purging

4.1 Wells will be purged by using a 2" decontaminated submersible pump or dedicated one liter Teflon bailer. Wells should be purged until the pH and conductivity are stabilized and the turbidity has been reduced to the greatest extent possible.

4.2 If a submersible is used the pump will be decontaminated prior to use by scrubbing the outside surface of tubing and wiring with a Liquinox water mixture, pumping a Liquinox-water mixture through the pump, and a final flush with fresh water.

5.0 Water Disposal

5.1 All purge and decontamination water will be temporarily stored within a portable tank to be later disposed of in an appropriate manner.

6.0 Records

6.1 Rice Environmental Consulting and Safety will record the amount of water removed from the well during development procedures. The purge volume will be reported to the appropriate regulatory authority when filing the closure report.

Rice Environmental Consulting and Safety

Quality Procedure
Sampling of Cased Water-Monitoring Well

1.0 Purpose

This procedure outlines the methods to be employed in obtaining water samples from cased monitoring wells.

2.0 Scope

This procedure shall be used for developed, cased water monitoring wells. It is not to be used for standing water samples such as ponds or streams.

3.0 Preliminary

3.1 Obtain sterile sampling containers from the testing laboratory designated to conduct analyses of the water.

3.2 The following table shall be used to select the appropriate sampling container, preservative method and holding times for the various elements and compounds to be analyzed.

Compound to be Analyzed	Sample Container Size	Sample Container Description	Cap Requirements	Preservative	Maximum Hold Time
BTEX	40 ml	VOA Container	Teflon Lined	HCL	14 days
TPH (8015 Extended)	40 ounces	(2) 40ml VOA vials	Teflon Lined	HCL and Ice	14 days
PAH	1 liter	amber glass	Teflon Lined	Ice	7 days
Cation/Anion	1 liter	HD polyethylene	Any Plastic	None	48 Hrs
Metals	1 liter	HD polyethylene	Any Plastic	Ice/HNO_3	28 Days
TDS	300 ml	clear glass or 250 ml HD polyethylene	Any Plastic	Ice	7 Days
Cl-	500 ml	HD polyethylene	Any Plastic	None	28 Days

4.0 Chain of Custody

4.1 Prepare a Sample Plan. The plan will list the well identification and the individual tests to be performed at that location. The sampler will check the list against the available inventory of appropriate sample collection bottles to insure against shortage.

4.2 Transfer the data to the Laboratory Chain of Custody Form. Complete all sections of the form except those that relate to the time of delivery of the samples to the laboratory.

4.3 Pre-label the sample collection jars. Include all requested information except time of collection. (Use a fine point Sharpie to insure that the ink remains on the label). Affix the labels to the jars.

5.0 Bailing Procedure

5.1 Identify the well from the sites schematics. Place pre-labeled jar(s) next to the well. Remove the plastic cap from the well bore by first lifting the metal lever and then unscrewing the entire assembly.

5.2 Using a dedicated one liter Teflon bailer or submersible pump, purge a minimum of three well volumes. Place the water in storage container for transport to a ROC disposal facility.

5.3 If using a bailer, take care to insure that the bailing device and string does not become cross-contaminated. A clean pair of nitrile gloves should be used when handling either the retrieval string or bailer. The retrieval string should not be allowed to come into contact with the ground.

6.0 Sampling Procedure

6.1 Once the well has been bailed in accordance with 5.2 of this procedure, a sample may be decanted into the appropriate sample collection jar directly from the bailer or submersible pump.

6.2 Note the time of collection on the sample jar with a fine Sharpie.

6.3 Place the sample directly on ice for transport to the laboratory. The preceding table shows the maximum hold times between collection and testing for the various analyses.

6.4 Complete the Chain of Custody form to include the collection times for each sample. Deliver all samples to the laboratory.

7.0 Documentation

7.1 The testing laboratory shall provide the following minimum information:

A. Project and sample name.
B. Signed copy of the original Chain of Custody Form including the time the sample was received by the lab.
C. Results of the requested analyses
D. Test Methods employed
E. Quality Control methods and results

Calculation for Determining the Minimum Bailing Volume for Monitor Wells
Formula V= ($\pi r^2 h$)
2" well [V/231=gal] X 3 = Purge Volume

V=Volume
π=pi
r=inside radius of the well bore
h=maximum height of well bore in water table

Example:

π	r^2	h(in)	V(cu.in)	V(gal)	X 3 Volumes	Actual
3.1416	1	180	565.488	2.448	7.34 gal	>10 gal

Rice Environmental Consulting and Safety

Quality Procedure
Composite Sampling of Excavation Sidewalls and Bottoms For TPH and Chloride Analysis

1.0 Purpose

This procedure outlines the methods to be employed when obtaining final composite soil samples for TPH and Chloride analysis.

2.0 Scope

This procedure is to be used in conjunction with ***Quality Procedure – 02: Soil Samples for Transportation to a Laboratory*** and will be inserted at subparagraph 5.2 of Section 5.0: Sampling Procedure.

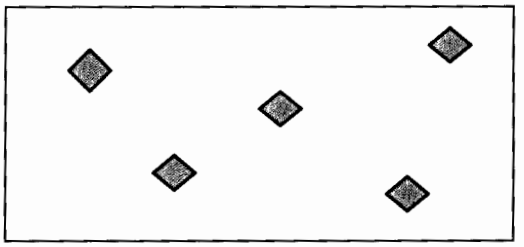
3.0 Sampling Procedure

Follow ***Quality Procedure – 02: Soil Samples for Transportation to a Laboratory*** for all Sections and subparagraphs until subparagraph 5.2 of Section 5.0: Sampling Procedure. Instead of 5.2 instructions, perform the composite sample collection procedure as follows:

3.1 Go to the excavation with a new plastic baggie. If not analyzing for ions or metals, use a trowel to obtain the soil. If the excavation is deeper than 6' BGS, do not enter the pit, but use a backhoe to assist in procurement of the sample. (If a backhoe is used, the backhoe will obtain an amount of soil from each composite point; bring the purchase to the surface staging area where a sample-portion of soil will be extracted from the backhoe purchase. The remainder of the backhoe purchase will be staged on the surface with other staged soils.)

3.2 Sidewall samples

3.2.1 On each sidewall, procure a 5oz sample from each of five distinct points on the sidewall with distinct points resembling the "W" pattern:



3.2.2 Thoroughly blend these five samples in a labeled baggie.
3.2.3 Repeat steps 3.2.1 through 3.2.4 for each remaining sidewall.
3.2.4 From each labeled baggie, procure a 5 oz portion and pour into a baggie labeled "Sidewall Composite". Blend this soil mixture completely.
3.2.5 Obtain proper laboratory sample container for "Sidewall Composite" and continue with subparagraph 5.3 of QP – 01.

3.3 Bottom Sample
3.3.1 From bottom of excavation, procure a 5oz sample from each of five distinct points with distinct points resembling the "W" pattern as illustrated above.
3.3.2 Thoroughly blend these five samples in a clean baggie.
3.3.3 Obtain proper laboratory sample container for "Bottom Composite" and continue with subparagraph 5.3 of QP – 01.

Rice Environmental Consulting and Safety

QUALITY PROCEDURE
Sampling and Testing Protocol for VOC in Soil

1.0 Purpose

This procedure is to be used to determine the concentrations of Volatile Organic Compounds in soils.

2.0 Scope

This procedure is to be used as the standard field measurement for soil VOC concentrations. It is not to be used as a substitute for full spectrographic speciation of organic compounds.

3.0 Procedure

3.1 Sample Collection and Preparation

3.1.1 Collect at least 500 g. of soil from the sample collection point. Take care to insure that the sample is representative of the general background to include visible concentrations of hydrocarbons and soil types. If necessary, prepare a composite sample of soils obtained at several points in the sample area. Take care to insure that no loose vegetation, rocks or liquids are included in the sample(s).

3.1.2 The soil sample(s) shall be immediately inserted into a one-quart or larger polyethylene freezer bag and sealed. When sealed, the bag should contain a nearly equal space between the soil sample and trapped air. Record the sample name and the time that the sample was collected on the Field Analytical Report Form.

3.1.3 The sealed samples shall be allowed to set for a minimum of five minutes at a temperature of between 10-15 Celsius, (59-77 ^{0}F). The sample temperatures may be adjusted by cooling the sample in ice, or by heating the sample within a generally controlled environment such as the inside of a vehicle. The samples should not be placed directly on heated surfaces or placed in direct heat sources such as lamps or heater vents.

3.1.4 The sealed sample bag should be massaged to break up any clods, and to provide the soil sample with as much exposed surface area as practically possible.

3.2 Sampling Procedure

3.2.1 The instrument to be used in conducting VOC concentration testing shall be a RAE Systems Photoionization device. (Device will be identified on VOC Field Test Report Form.) Prior to use, the instrument shall be zeroed-out in accordance with the appropriate maintenance and calibration procedure outlined in the instrument operation manual. The PID device will be calibrated each day it's used.

3.2.2 Carefully open one end of the collection bag and insert the probe tip into the bag taking care that the probe tip not touch the soil sample or the sidewalls of the bag.

3.2.3 Set the instrument to retain the highest result reading value. Record the reading onto the Field Test Report Form.

3.2.4 **If the instrument provides a reading exceeding 100 ppm, proceed to QP-7. If the reading is 100 ppm or less, NMOCD BTEX guideline has been met and no further testing for BTEX is necessary. File the Field Test Report Form in the project file.**

4.0 Clean-up

After testing, the soil samples shall be returned to the sampling location, and the bags collected for off-site disposal. **IN NO CASE SHALL THE SAME BAG BE USED TWICE. EACH SAMPLE CONTAINER MUST BE DISCARDED AFTER EACH USE.**

Rice Environmental Consulting and Safety

Quality Procedure
Composite Sampling of Excavation Sidewalls and Bottoms For BTEX

1.0 Purpose

This procedure outlines the methods to be employed when obtaining final composite soil samples for BTEX analysis.

2.0 Scope

This procedure is to be used when collecting soil samples intended for ultimate transfer to a testing laboratory for BTEX analysis. This procedure is to be used only when the PID field-test results for OVM exceeds 100 ppm.

3.0 Preliminary

3.1 Obtain sterile, clear, 2 oz. glass containers with Teflon lid from a laboratory supply company or the testing laboratory designated to conduct analyses of the soil.

4.0 Chain of Custody

4.1 Prepare a Sample Plan. The plan will list the number, location and designation of each planned sample and the individual tests to be performed on the sample. The sampler will check the list against the available inventory of appropriate sample collection bottles to insure against shortage.

4.2 Transfer the data to the Laboratory Chain of Custody Form. Complete all sections of the form except those that relate to the time of delivery of the samples to the laboratory.

4.3 Pre-label the sample collection jars. Include all requested information except time of collection. (Use a fine point Sharpie to insure that the ink remains on the label.) Affix the labels to the jars.

5.0 Sampling Procedure

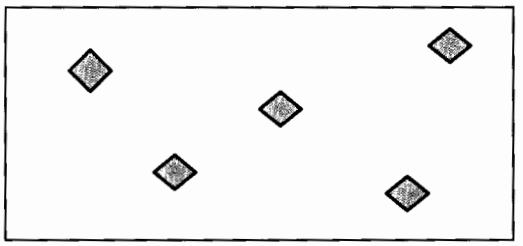
5.1. Do not touch the soil with your bare hands. Use new nitrile gloves to help minimize any cross-contamination.

5.2. If safe and within OSHA regulations, go to the sampling point with the sample container. If not analyzing for ions or metals, use a trowel to

obtain the soil. If the excavation is deeper than 6' BGS, do not enter the pit, but use a backhoe to assist in procurement of the sample. (If a backhoe is used, the backhoe will obtain an amount of soil from each composite point; bring the purchase to the surface staging area where a sample-portion of soil will be extracted from the backhoe purchase. The remainder of the backhoe purchase will be staged on the surface with other staged soils.)

5.3. Sidewall Samples

5.3.1. On each sidewall, procure a 2oz sample from each of five distinct points on the sidewall with distinct points resembling the "W" pattern:



5.4. Pack the soil tightly into the container leaving the top slightly domed. Screw the lid down tightly. Enter the time of collection onto the sample collection jar label. Repeat for each sampling point.

5.5. Place the samples directly on ice for transport to the laboratory if required.

5.6. Complete the Chain of Custody form to include the collection times for each sample. Deliver all samples to the laboratory.

6.0 Documentation

6.1 The testing laboratory shall provide the following minimum information:

a. Project and sample name.
b. Signed copy of the original Chain of Custody Form including the time the sample was received by the lab.
c. Results of the requested analyses
d. Test Methods employed
e. Quality Control methods and results

Rice Environmental Consulting and Safety

Procedure for Plugging & Abandonment of Cased Water Monitoring Wells

1.0 Purpose

This procedure outlines the methods to be employed to plug and abandon cased monitoring wells.

2.0 Scope

This procedure shall be used for developed, cased water monitoring wells located in the State of New Mexico

3.0 Preliminary

3.1 No well may be drilled, modified or plugged without NMOCD approval. Additional approvals may be required if the well is situated in a sensitive area, within municipal jurisdictions or on federal or tribal lands.

4.0 Plugging

4.1 Each bore will be filled with a 1% - 3% bentonite/concrete slurry to three feet bgs. The remaining three feet will be capped with concrete only.

4.2 All wellheads will be removed to below ground surface.

5.0 Records

5.1 The company plugging the well shall prepare a report on their company letter head listing the site name and describing general well construction including total depth of the well, the diameter of casing, material used to plug the well (e.g. bentonite/cement slurry), and date of the plugging operation.

5.2 It is recommended but not required that photographs of the final surface restoration be taken and included within the records.

5.3 Copies of the plugging report shall be submitted to all appropriate agencies and retained by the well operator for a minimum period of ten years.