1R-427-164

WORKPLANS

Date:
7-12-10

Rice Environmental Consulting & Safety
P.O. Box 5630 Hobbs, NM 88241
Phone 575.393.4411 Fax 575.393.0293

CERTIFIED MAIL
RETURN RECIEPT NO. 7009 1680 0001 6619 6200

July 12th, 2010

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 & CHARACTERIZATION PLAN**
RICE OPERATING COMPAY – EME SWD System
EME junction B-7 (1R0427-164), UL/B, Sec. 7, T20S, R37E

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/usage basis. Environmental projects of this nature require System Party AFE approval prior to work commencing at the site. In general, project funding is not forthcoming until NMOCD approves the work plan. Therefore, your timely review of this submission is greatly appreciated.

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 south of Monument, New Mexico at UL/B, Sec. 7, T20S, R37E as shown on the Site Location Map (Figure 1). NM OSE records indicate that groundwater will likely be encountered at a depth of approximately 34 +/- feet.

In 2004 ROC initiated work on the former EME B-7 junction box prior to it being replaced by a new, watertight junction box at the site. The site was delineated using a backhoe and soil samples were screened at regular intervals for both hydrocarbons and chlorides. The excavation reached dimensions of 25 x 35 x 14 feet bgs where composite samples were collected for laboratory verification. Laboratory tests of the site showed negligible gasoline range organics (GRO) while the diesel range organics (DRO) showed 77.6 mg/kg on the side wall composite, 133 mg/kg on the bottom composite and 132 mg/kg in the remediated backfill. Chlorides at the site showed 1540 mg/kg for the sidewall composite, 1200 mg/kg for the bottom composite and 1380 mg/kg in the remediated backfill. At 6 feet bgs, a clay layer was installed to inhibit further chloride migration. The soils were blended on site and then backfilled into the excavation. The area was contoured to the surrounding landscape and an identification plate was placed on the surface of the site to mark its location for future environmental considerations.

On 7-15-2004, a soil bore was drilled 5 feet north of the center of the former junction box to determine the downward extent of chlorides at the site. Laboratory samples taken at 29 feet bgs showed a chloride concentration of 659 mg/kg. NMOCD was notified of potential groundwater impact on April 7, 2004 and a junction box disclosure report (Appendix A) was submitted to NMOCD with all the 2004 junction box closures and disclosures.

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

Proposed Work Elements

1. Conduct vertical and lateral delineation of residual soil hydrocarbons and chlorides (see Appendix B for Quality Procedures).
    a. Vertical sampling will be conducted until either one of the following criteria is met in the field.
        i. Three samples in which the chloride concentration decreases and the third sample has a chloride concentration of $\leq$ 250 ppm.
        ii. Three samples in which PID readings decrease and the third sample has a PID reading of $\leq$ 100 ppm.
        iii. The sampling reaches the capillary fringe.
2. If warranted, install a monitor well 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.

If the evaluation of the site shows no threat to groundwater from residual chlorides and/or hydrocarbons, then only a vadose zone remedy will be undertaken. However, if groundwater shows impact from residual chlorides and/or hydrocarbons, a CAP will be developed to address these concerns.

ROC appreciates the opportunity to work with you on this project. Please call myself or Hack Conder at (575) 393-9174 if you have any questions or wish to discuss the site.

Sincerely,

Lara Weinheimer
Project Scientist
RECS
(575) 441-0431

Attachments:

Figures – Site location map
Appendix A – Junction Box Disclosure Report
Appendix B – Quality Procedures

Figures

RICE Environmental Consulting and Safety (RECS)
P.O. Box 5630 Hobbs, NM 88241
Phone 575.393.4411 Fax 575.393.0293

Site Location

RICE ENVIRONMENTAL RECS CONSULTING & SAFETY, LLC

EME jct. B-7

Legals: UL/B sec. 7 T20S R37E
NMOCD Case #: 1R0427-164

FIGURE 1

N
W E
S

0 0.25 0.5 1
Miles

Drawing date: 6/30/2010
Drafted by: L. Weinheimer

Appendix A

Junction Box Disclosure Report

RICE Environmental Consulting and Safety (RECS)
P.O. Box 5630 Hobbs, NM 88241
Phone 575.393.4411 Fax 575.393.0293

RICE OPERATING COMPANY
JUNCTION BOX DISCLOSURE* REPORT

BOX LOCATION

SWD SYSTEM	JUNCTION	UNIT	SECTION	TOWNSHIP	RANGE	COUNTY	BOX DIMENSIONS - FEET		
							Length	Width	Depth
EME	B-7	B	7	20S	37E	Lea	12	7	6

LAND TYPE: BLM _____ STATE _____ FEE LANDOWNER Jimmy Cooper OTHER _____

Depth to Groundwater 34 feet NMOCD SITE ASSESSMENT RANKING SCORE: 20

Date Started 3/23/2004 Date Completed 7/15/2004 OCD Witness No

Soil Excavated 194 cubic yards Excavation Length 25 Width 35 Depth 6 feet

Soil Disposed 0 cubic yards Offsite Facility n/a Location n/a

FINAL ANALYTICAL RESULTS: **Sample Date** 3/26/2004, 7/15/2004 **Sample Depth** 6, 29 ft

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

Sample Location	PID ppm	GRO mg/kg	DRO mg/kg	Chloride mg/kg
4-WALL COMP.	0.0	<10.0	77.6	1540
BOTTOM COMP.	0.0	<10.0	133	1200
REMED. BACKFILL	0.0	<10.0	132	1380
SOIL BORE @ 29 ft	0.8	<10.0	<10.0	659

CHLORIDE FIELD TESTS

LOCATION	DEPTH (ft)	ppm
20 ft north	5	2687
	6	2022
	7	1736
	8	989
	11	1865
	12	2535
	13	2399
	14	2811
soil bore 5 ft north	15	205
	20	211
	25	755
	29	694
4-wall comp.	1-5	1163
bottom comp.	6	1005
remed. backfill	n/a	1205

General Description of Remedial Action: This junction box was delineated using a backhoe while PID screenings and chloride field tests were performed at regular intervals. In some areas, samples from delineation trenches were collected at a maximum depth of 14 ft BGS (see plat). Although PID readings were minimal, chloride concentrations were elevated and did not decline vertically or laterally. TPH concentrations in the bottom composite and backfill composite samples were just above NMOCD guidelines. At 6 ft, a 25 x 35 x 1-ft-deep compacted clay barrier was installed to inhibit further downward chloride migration (see diagram). On 7/15/2004, a soil bore was initiated to further investigate the depth of chloride impact. No conclusive chloride trend was observed. The bore hole was plugged with bentonite clay (see log). NMOCD has been notified of potential groundwater impact at this site. An identification plate has been placed on the surface of this site for reference in future considerations.

ADDITIONAL EVALUATION IS *HIGH* PRIORITY

enclosures: chloride graphs, photos, lab results, PID readings, clay test, bore log, plat map, cross-section

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

SITE SUPERVISOR Joe Gatts SIGNATURE Joe Gatts COMPANY RICE Operating Company

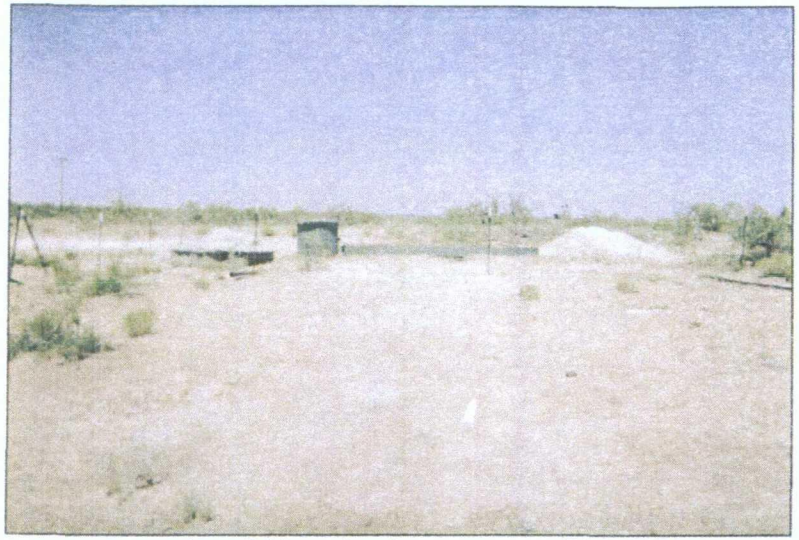
REPORT ASSEMBLED BY Kristin Farris Pope SIGNATURE Kristin Farris Pope

DATE 10/4/2004 TITLE Project Scientist

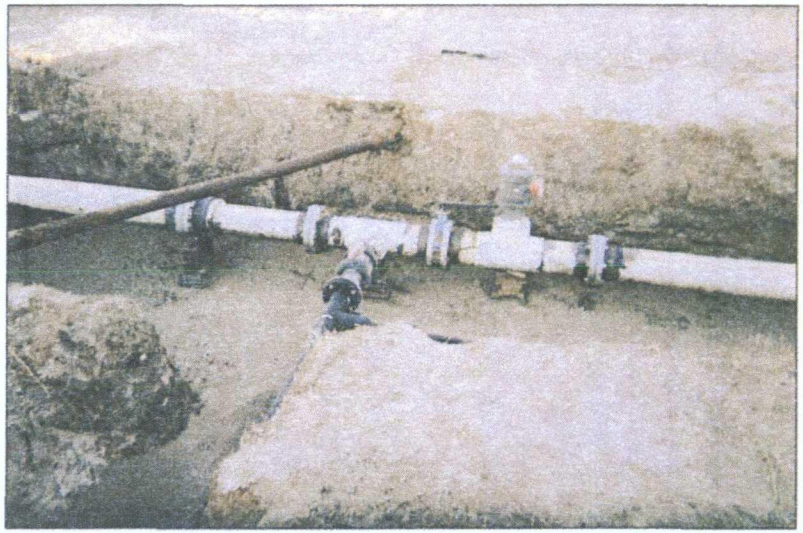
This site is a "DISCLOSURE." It will be placed on a prioritized list of similar sites for further consideration.

EME jct. B-7

unit 'B', Sec. 7, T20S, R37E

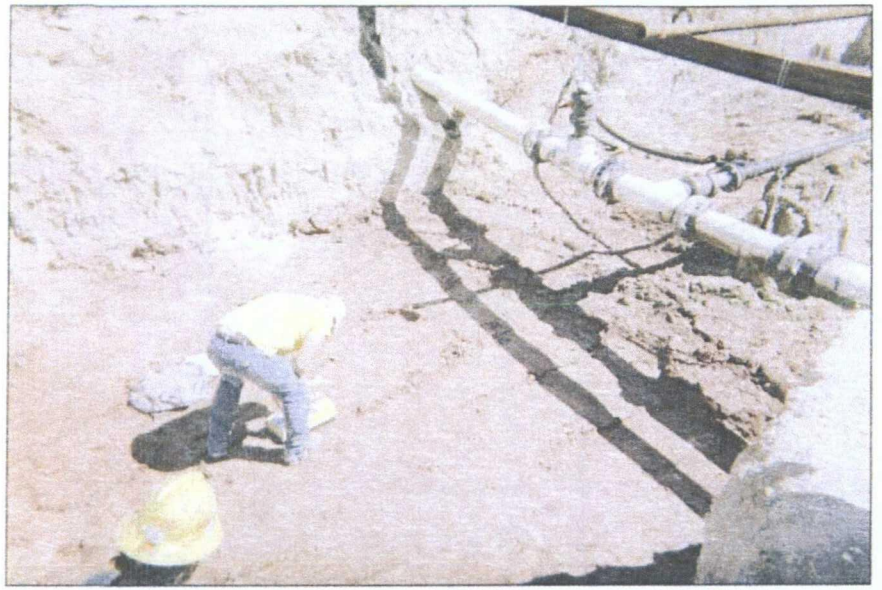


removing old junction box 7/25/2003

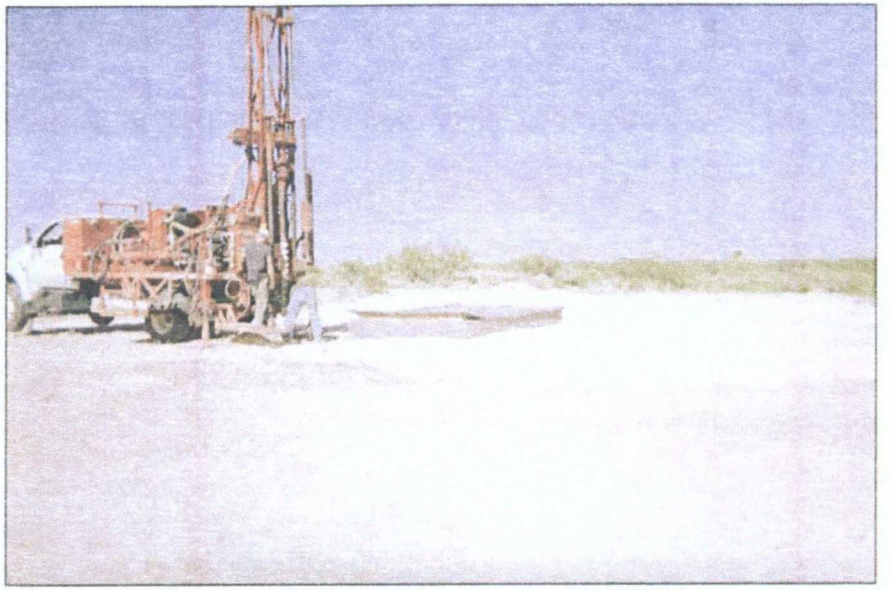


new junction plumbing

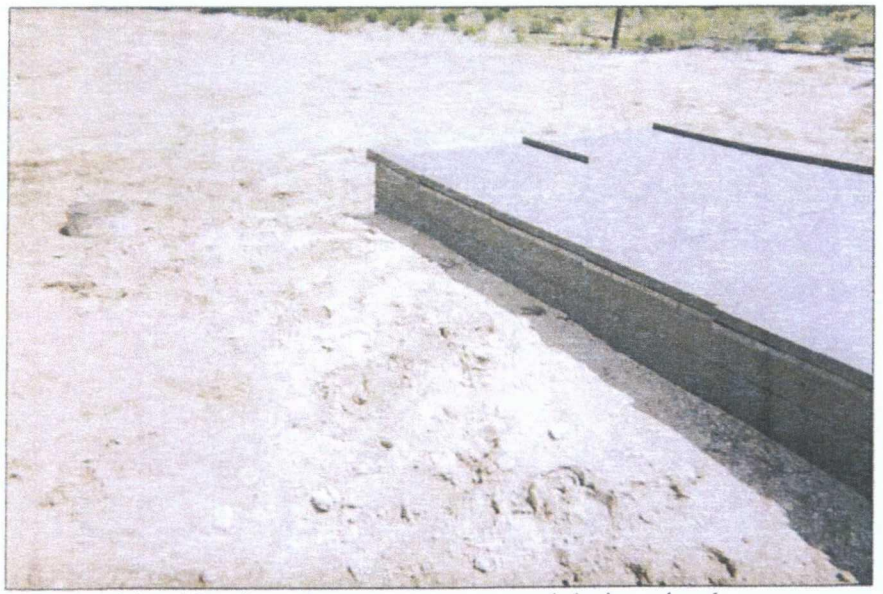
delineation and excavation at junction March 2004



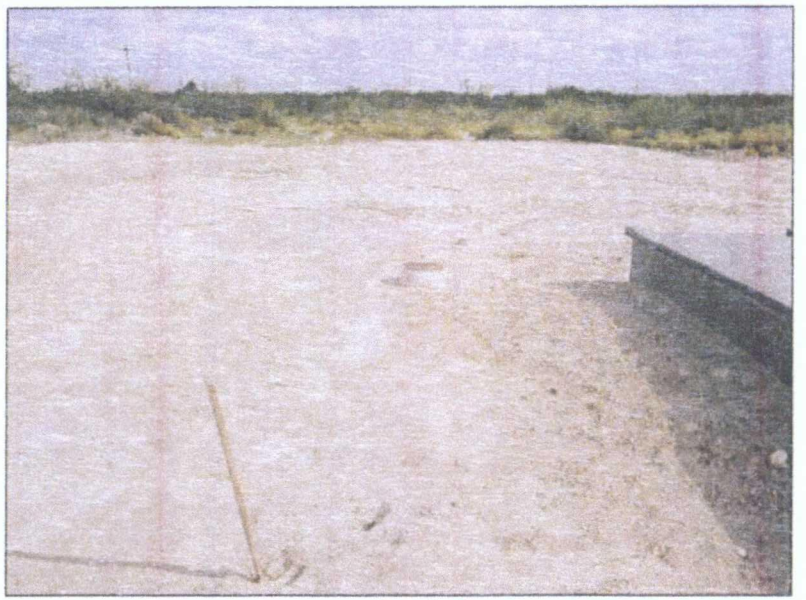
testing compacted clay at 6 ft BGS 4/21/2004



delineation soil bore 7/15/2004



identification plate near new watertight junction box



completed site

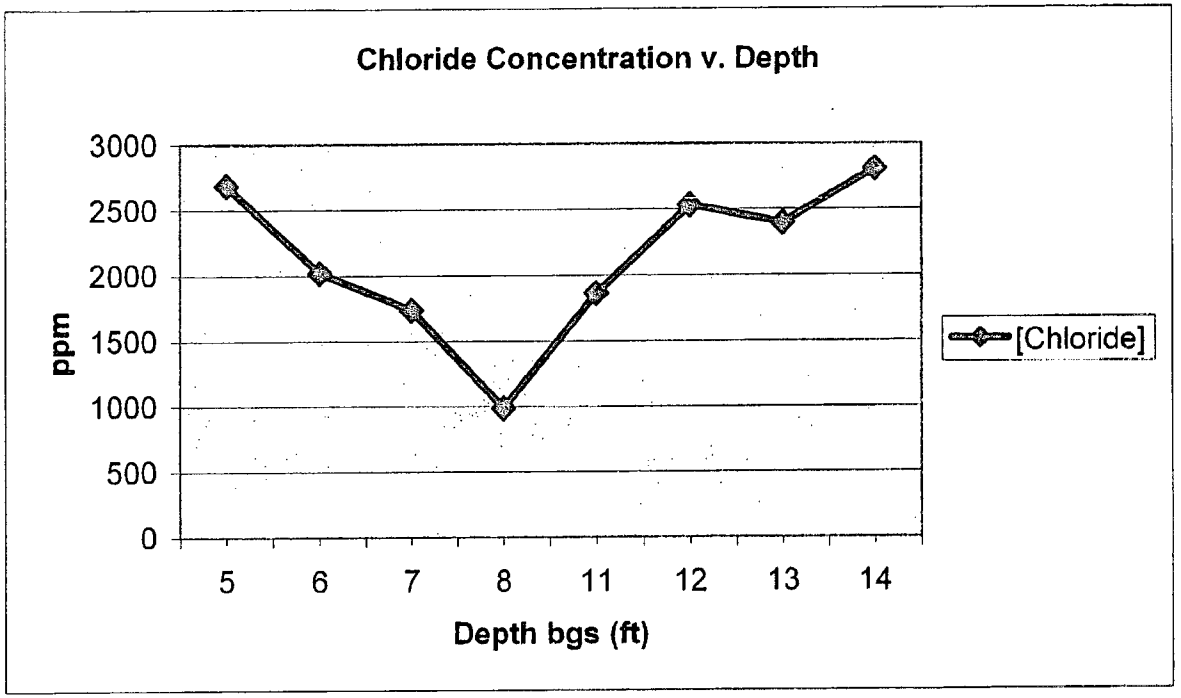
EME jct. B-7

TS20, R37E

20 ft south of junction

Depth bgs (ft)	[Cl⁻] ppm
5	2687
6	2022
7	1736
8	989
11	1865
12	2535
13	2399
14	2811

Groundwater = 34 ft



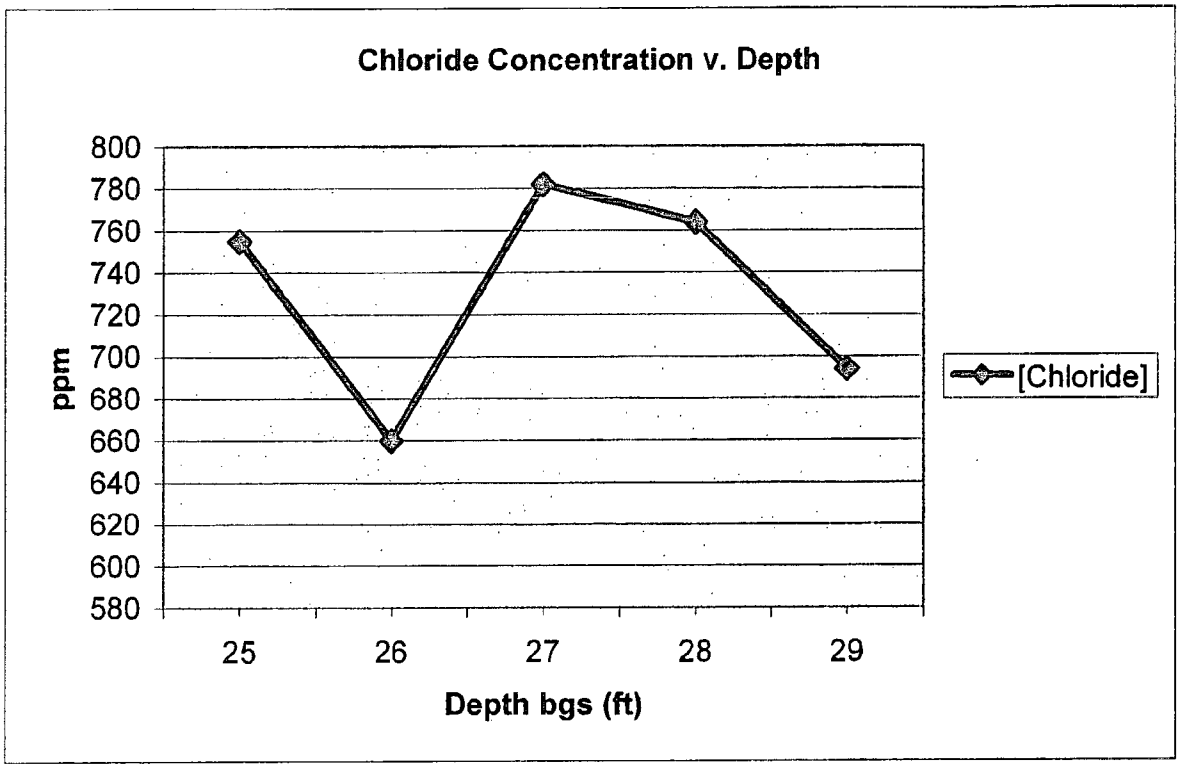
EME jct. B-7

TS20, R37E

Soil bore 5 ft North of junction

Depth bgs (ft)	[Cl⁻] ppm
25	755
26	660
27	782
28	764
29	694

Groundwater = 34 ft



LOG OF SOIL BORE
Kristin Farris Pope
RICE Operating Company

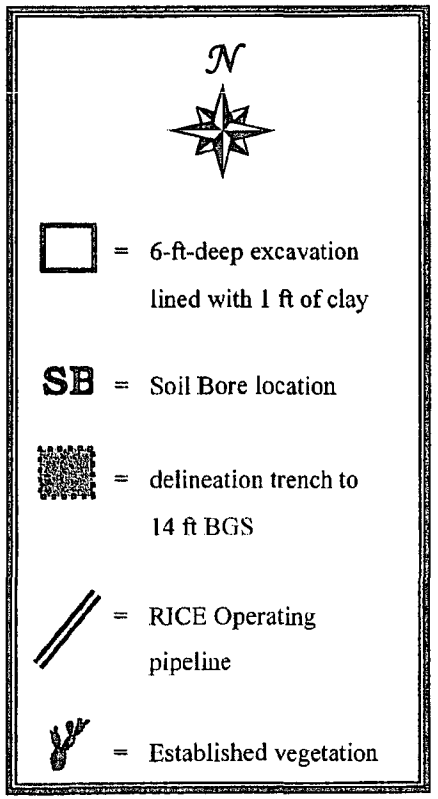
Logger:	Drew Parker; Mort Bates	Client:	Well ID:
Driller:	Atkins Engineering Associates, Inc.	RICE Operating Company	
Drilling Method:	Hollow Stem Auger	Project Name:	
Start Date:	7/15/2004	jct. B-7	SB-1
End Date:	7/15/2004	Location:	
Notes:	5 ft north of junction box site	EME SWD System	
	TD = 34 ft Groundwater = 33.8 ft	Sec. 7, T20S, R37E	
		Lea County, NM	

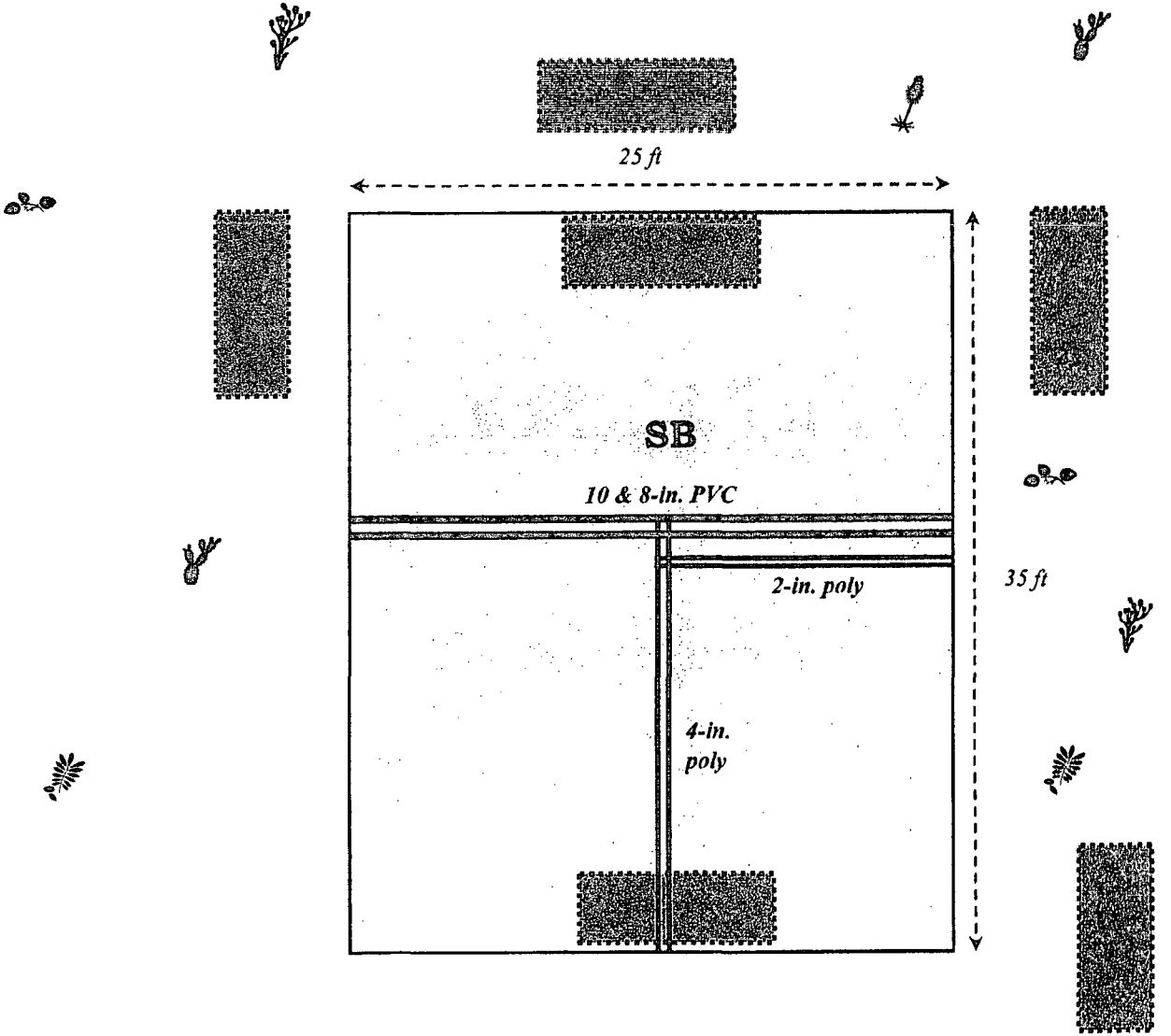
Depth (feet)	Split Spoon chloride	Split Spoon PID	Description	Lithology	bore hole	Additional Notes
0.0			0 - 15 ft SILTY SAND with CALICHE loose, tan & white, dry		remainder of bore hole backfilled with drill cuttings	
1.0						
2.0						
3.0						
4.0						
5.0						
6.0						
7.0						
8.0						
9.0						
10.0						
11.0						
12.0						
13.0						
14.0						
15.0	205	10.8				
16.0			15 - 27 ft SILTY GRAVEL with CALICHE loose, white-gray, dry			
17.0						
18.0						
19.0						
20.0	211	5.6				
21.0						
22.0						
23.0						
24.0						
25.0	755	0.8				
26.0	660	1.2				
27.0	782	1.3				
28.0	764	4.2	27 - 34 ft CLAYEY SAND with CALICHE tan to brown, moist			
29.0	694	0.8				lab = 659 ppm Cl
30.0						
31.0						
32.0						← bentonite clay seal
33.0						
34.0						

EME jct. B-7

T202S, R37E

25 x 35 x 6 ft Excavation





CARDINAL LABORATORIES

PHONE (325) 673-7001 • 2111 BEECHWOOD • ABILENE, TX 79603
PHONE (505) 393-2326 • 101 E. MARLAND • HOBBS, NM 88240

ANALYTICAL RESULTS FOR
RICE OPERATING CO.
ATTN: KRISTIN FARRIS
122 W. TAYLOR
HOBBS, NM 88240
FAX TO: (505) 397-1471

Receiving Date: 03/26/04
Reporting Date: 03/29/04
Project Number: NOT GIVEN
Project Name: JCT. B-7
Project Location: EME

Sampling Date: 03/26/04
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		03/26/04	03/26/04	03/29/04
H8568-1	4 WALL COMP.	<10.0	77.6	1540
H8568-2	BOTT. COMP. 6'BGS	<10.0	133	1200
H8568-3	REMD. BACKFILL	<10.0	132	1380
Quality Control		843	835	1010
True Value QC		800	800	1000
% Recovery		105	104	101
Relative Percent Difference		1.1	5.6	3.0

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

Chemist

3/29/04
Date

H8568.XLS

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

Page____ of____

Company Name: RICE Operating	BILL TO
Project Manager: Kristin Farris	P.O. #:
Address: 122 W. Taylor	Company:
City: Hobbs State: NM Zip: 88240	Attn:
Phone #: (505) 393-9174 Fax #: (505) 397-1471	Address:
Project #: Project Owner:	City:
Project Name: Jct. B-7	State: Zip:
Project Location: EME	Phone #:
Sampler Name: K. Farris	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	CRUDE OIL	SLUDGE	OTHER :	ACID/BASE:	ICE / COOL	OTHER :	DATE	TIME	Cl.	TPH 8015											
H8566-1	4 WALL Comp	C				X							3/26/04	1015	X	X											
-2	Batt. Comp 6'bgs					X							3/26/04	1030	X	X											
-3	Remed. Backfill					X							3/26/04	1045	X	X											

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 collection, including attorney's fees.

Sampler Relinquished: Kristin Farris	Date:	Received By:	Phone Result: ☐ Yes ☐ No	Add'l Phone #:	
	Time:		Fax Result: ☐ Yes ☐ No	Add'l Fax #:	
Relinquished By: Joe Batt	Date: 3/26/04	Received By: (Lab Staff) Brenda Clark	REMARKS:		
	Time: 4:00				
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 505-393-2476.

ENVIRONMENTAL LAB OF

12600 West I-20 East - Odessa, Texas 79765

Analytical Report

Prepared for:

Roy Rascon
Rice Operating Co.
122 W. Taylor
Hobbs, NM 88240

Project: B-7 Soil Bore
Project Number: None Given
Location: EME

Lab Order Number: 4G20007

Report Date: 07/23/04

Rice Operating Co.	Project: B-7 Soil Bore	Fax: (505) 397-1471
122 W. Taylor	Project Number: None Given	Reported:
Hobbs NM, 88240	Project Manager: Roy Rascon	07/23/04 10:17

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
5' North Grab @ 29' Bgs	4G20007-01	Soil	07/15/04 16:30	07/20/04 08:00

12600 West I-20 East - Odessa, Texas 79705 - (432) 563-1800 - Fax (432) 563-1713

Rice Operating Co.	Project: B-7 Soil Bore	Fax: (505) 397-1471
122 W. Taylor	Project Number: None Given	Reported:
Hobbs NM, 88240	Project Manager: Roy Rascon	07/23/04 10:17

General Chemistry Parameters by EPA / Standard Methods
Environmental Lab of Texas

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
5' North Grab @ 29' Bgs (4G20007-01) Soil									
Chloride	659	20.0	mg/kg Wet	2	EG42111	07/20/04	07/21/04	SW 846 9253	
% Solids	86.0		%	1	EG42011	07/20/04	07/20/04	% calculation	

12600 West I-20 East - Odessa, Texas 79705 - (432) 563-1800 - Fax (432) 563-1713

General Chemistry Parameters by EPA / Standard Methods - Quality Control

Environmental Lab of Texas

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch EG42011 - General Preparation (Prep)										
Blank (EG42011-BLK1)				Prepared & Analyzed: 07/20/04						
% Solids	100		%							
Duplicate (EG42011-DUP1)	Source: 4G16012-01			Prepared & Analyzed: 07/20/04						
% Solids	99.0		%		98.0			1.02	20	
Batch EG42111 - Water Extraction										
Blank (EG42111-BLK1)				Prepared: 07/20/04 Analyzed: 07/21/04						
Chloride	ND	20.0	mg/kg Wet							
Matrix Spike (EG42111-MS1)	Source: 4G20003-01			Prepared: 07/20/04 Analyzed: 07/21/04						
Chloride	2200	20.0	mg/kg Wet	500	1720	96.0	80-120			
Matrix Spike Dup (EG42111-MSD1)	Source: 4G20003-01			Prepared: 07/20/04 Analyzed: 07/21/04						
Chloride	2210	20.0	mg/kg Wet	500	1720	98.0	80-120	0.454	20	
Reference (EG42111-SRM1)				Prepared: 07/20/04 Analyzed: 07/21/04						
Chloride	5000		mg/kg	5000		100	80-120			

12600 West I-20 East - Odessa, Texas 79765 - (432) 563-1800 - Fax (432) 563-1713

Rice Operating Co.	Project: B-7 Soil Bore	Fax: (505) 397-1471
122 W. Taylor	Project Number: None Given	Reported:
Hobbs NM, 88240	Project Manager: Roy Rascon	07/23/04 10:17

Notes and Definitions

DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference
LCS	Laboratory Control Spike
MS	Matrix Spike
Dup	Duplicate

Report Approved By: Raland K Tuttle Date: 7-23-04

Raland K. Tuttle, QA Officer
Celey D. Keene, Lab Director, Org. Tech Director
Jeanne Mc Murrey, Inorg. Tech Director
James L. Hawkins, Chemist/Geologist
Sara Molina, Chemist
Sandra Biezugbe, Lab Tech.

12600 West I-20 East - Odessa, Texas 79705 - (432) 563-1800 - Fax (432) 563-1713

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: Ray Rascon
Company Name: RICE Operating
Company Address: 122 W. Taylor
City/State/Zip: Hobbs, NM 88240
Telephone No: (505) 393-9174
Fax No: (505) 397-1471
Sampler Signature: David Rascon

Project Name: B-7 Soil Bore
Project #:
Project Loc: EME
PO #: 785

4G20007

LAB # (lab use only)	FIELD CODE	Date Sampled	Time Sampled	No. of Containers 4oz glass	Preservative: Ice	HNO3	HCl	NaOH	H2SO4	None	Other (specify)	Matrix: Water	Sludge	Soil	Other (specify)	Analyze For: TCLP: VOC	TCLP: SVOC	TCLP: Metals Ag As Ba Cd Cr Pb Hg Se	TCLP: Volatiles	TCLP: Semivolatiles	TCLP: Pesticides	TCLP: Herbicides	TCLP: RCI	TCLP: GCMS Vol.	TCLP: GCMS Semi. Vol.	TCLP: PCB's	TOTAL: TPH 418.1	TOTAL: TPH TX1005/1005	TOTAL: TPH 8015M (GRO/DRO)	TOTAL: Metals As Ag Ba Cd Cr Pb Hg Se	TOTAL: Volatiles	TOTAL: Semivolatiles	TOTAL: BTEX 8021B/5030	TOTAL:	TOTAL:	TOTAL:	TOTAL:	TOTAL:	TOTAL:	RUSH TAT (Pre-Schedule)	Standard TAT
-01	5' N of conc grab @ 29' bgs	7/15/04	4:30	1	X									X		X												X		X											

Special Instructions:

Sample Containers Intact? Y
Temperature Upon Receipt: 3.0°C
Laboratory Comments: Rec 3.0°C

Relinquished by:	Date	Time	Received by:	Date	Time
David Rascon	7/19/04	3:00		7/19	15:0
Relinquished by:	Date	Time	Received by ELOT:	Date	Time
	7/20	8 am		7-20-04	0800

Environmental Lab of Texas
Variance / Corrective Action Report – Sample Log-In

Client: Rice Operating Co.

Date/Time: 07-20-04 @ 08:45

Order #: 4G20007

Initials: JMM

Sample Receipt Checklist

Temperature of container/cooler?	(Yes)	No	3.0 C
Shipping container/cooler in good condition?	(Yes)	No	
Custody Seals intact on shipping container/cooler?	Yes	No	(Not present)
Custody Seals intact on sample bottles?	Yes	No	(Not present)
Chain of custody present?	(Yes)	No	
Sample Instructions complete on Chain of Custody?	(Yes)	No	
Chain of Custody signed when relinquished and received?	(Yes)	No	
Chain of custody agrees with sample label(s)	(Yes)	No	
Container labels legible and intact?	(Yes)	No	
Sample Matrix and properties same as on chain of custody?	(Yes)	No	
Samples in proper container/bottle?	(Yes)	No	
Samples properly preserved?	(Yes)	No	
Sample bottles intact?	(Yes)	No	
Preservations documented on Chain of Custody?	(Yes)	No	
Containers documented on Chain of Custody?	(Yes)	No	
Sufficient sample amount for indicated test?	(Yes)	No	
All samples received within sufficient hold time?	(Yes)	No	
VOC samples have zero headspace?	(Yes)	No	Not Applicable

Other observations:

_____

_____

_____

Variance Documentation:

Contact Person: - _____ Date/Time: _____ Contacted by: _____

Regarding:

_____

_____

_____

Corrective Action Taken:

_____

_____

_____

_____

_____

_____

_____

_____

Appendix B
Quality Procedures

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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.

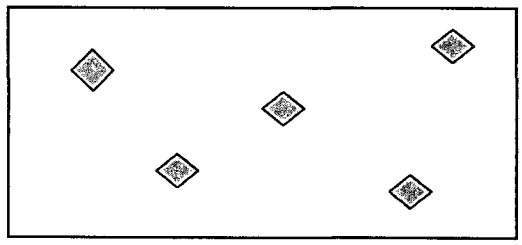
3.0 Sampling Procedure

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.
3.2.3 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

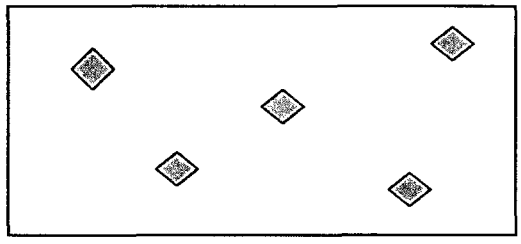
5.1. Do not touch the soil with your bare hands. Use new nitrile gloves to help minimize any cross-contamination.

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.

6.0 Records

6.1 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.

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

6.3 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.