

1R - 425-46

WORKPLANS

Date:

8-10-10

Rice Environmental Consulting & Safety

P.O. Box 5630 Hobbs, NM 88241
Phone 575.393.4411 Fax 575.393.0293

RECEIVED OCD

2010 AUG 11 P 2: 22

CERTIFIED MAIL

RETURN RECEIPT NO. 7009 1680 0001 6619 6217

August 10th, 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 Company – Vacuum SWD System
Vacuum St. H-35 EOL (1R425-46): UL/G sec. 35 T17S R34E**

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 Abandoned Vacuum Salt Water Disposal (SWD) system. ROC is the service provider (agent) for the Vacuum 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 2 miles south-west of Buckeye, New Mexico at UL/G sec. 35 T17S R34E as shown on the Site Location Map (Figure 1). NM OSE records indicate that groundwater will likely be encountered at a depth of approximately 95 +/- feet.

In 2005, ROC initiated work on the former Vacuum St. H-35 EOL junction as part of the system abandonment. The site was delineated using a backhoe to form a trench and soil samples were screened at regular intervals for both hydrocarbons and chlorides. From the excavation trench, the 12 ft bgs sample was collected for laboratory verification. Laboratory tests of the site showed negligible gasoline range organics (GRO) and diesel range organics (DRO). However, chlorides concentrations from the trench did not relent with depth with the 12 foot sample testing at 5,840 ppm. The area was contoured to the surrounding landscape, seeded, and an identification plate was placed on the surface of the site to mark its location for future environmental considerations. NMOCD was notified of potential groundwater impact on March 7, 2008 and a junction box disclosure report (Appendix A) was submitted to NMOCD with all the 2007 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 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 ≤ 250 ppm.
 - ii. Three samples in which PID readings decrease and the third sample has a PID reading of ≤ 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, then only a vadose zone remedy will be undertaken. However, if groundwater shows impact from residual chlorides, a CAP will be developed to address these concerns.

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

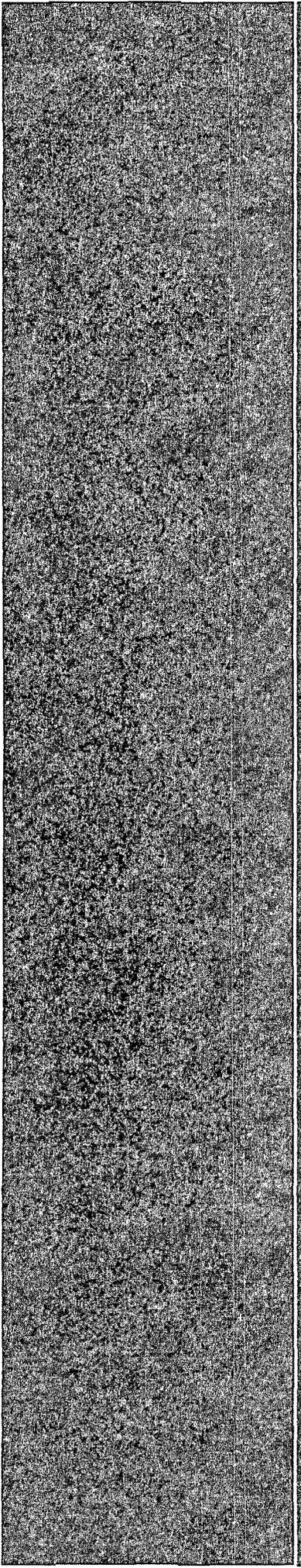
Sincerely,

A handwritten signature in black ink, appearing to read 'L.W.' followed by a long, horizontal flourish.

Lara Weinheimer
Project Scientist
RECS
(575) 441-0431

Attachments:

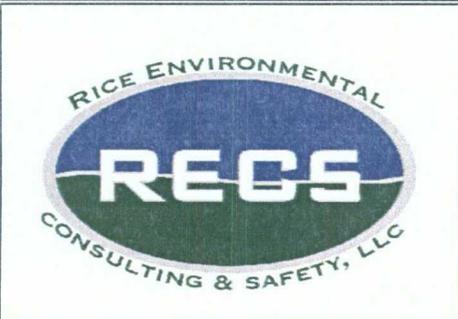
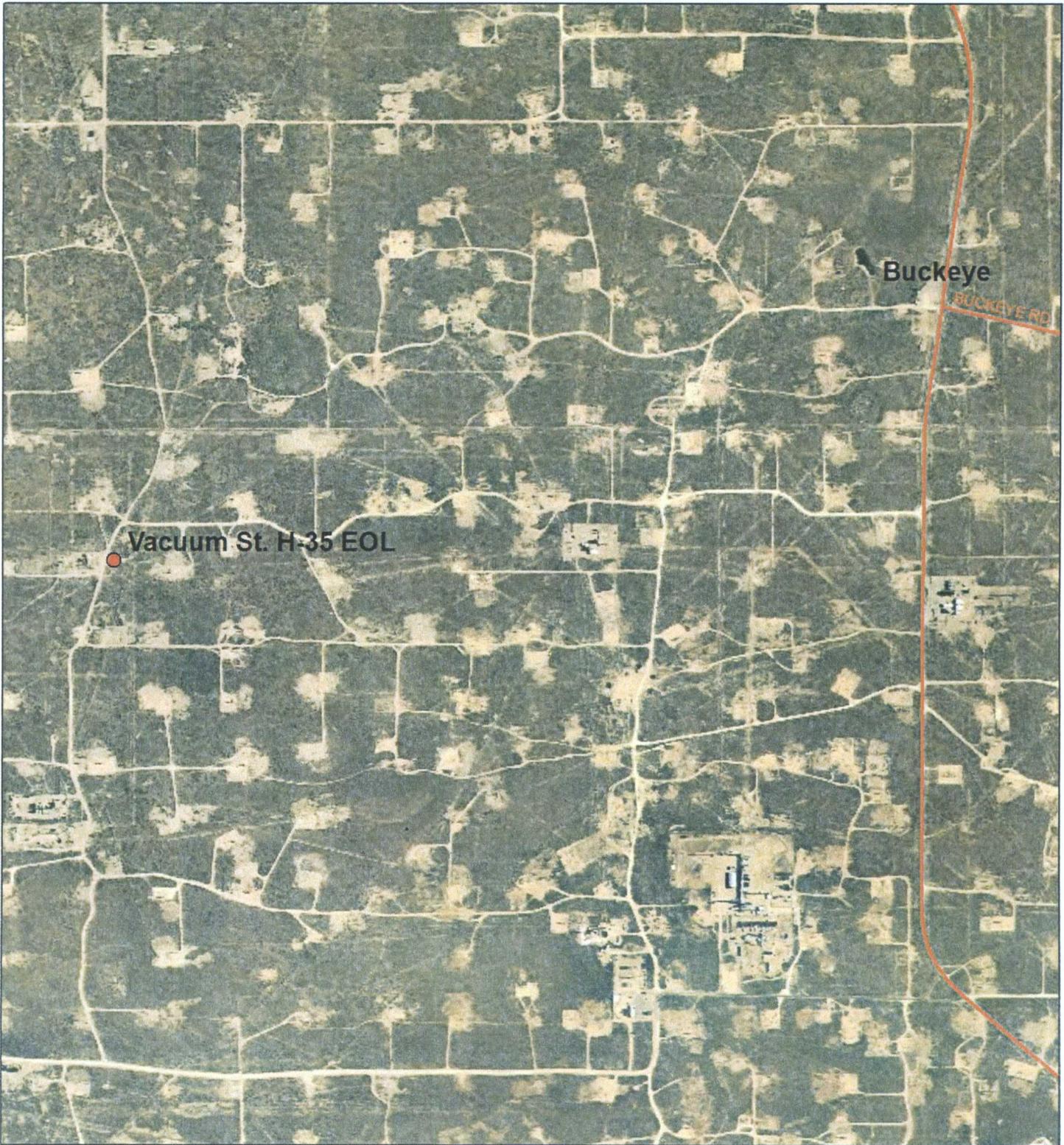
Figures – Site location map
Appendix A – Junction Box Disclosure Report
Appendix B – Quality Procedures



Figures

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

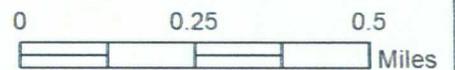
Site location



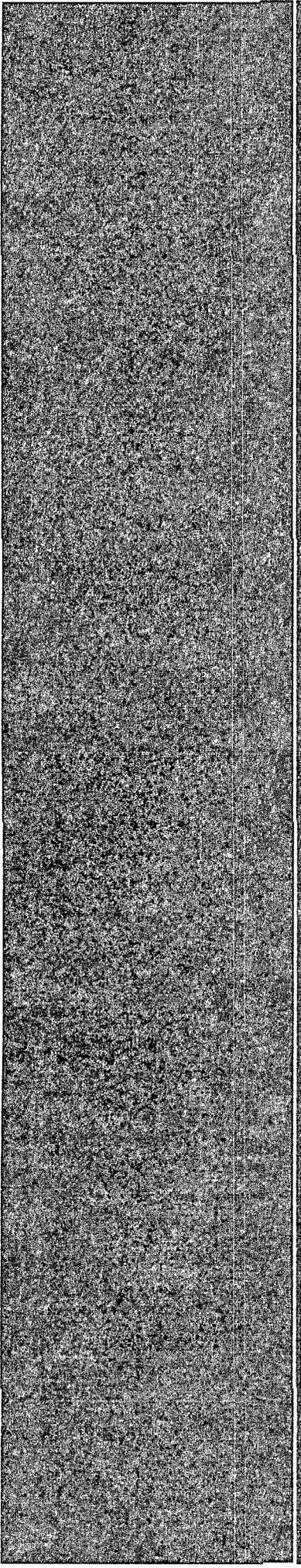
Vacuum St. H-35 EOL

Legals: UL/G sec. 35
T17S R34E
NMOCD Case #: 1R425-46

FIGURE 1



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	NEW BOX DIMENSIONS - FEET		
							Length	Width	Depth
Vacuum	St. H-35 EOL	G	35	17S	34E	Lea			
no box; SWD System abandonment.									

LAND TYPE: BLM _____ STATE X FEE LANDOWNER _____ OTHER _____

Depth to Groundwater 95 feet NMOCD SITE ASSESSMENT RANKING SCORE: 10

Date Started 9/8/2005 Date Completed 2/16/2006 NMOCD Witness no

Soil Excavated 12 cubic yards Excavation Length 9 Width 3 Depth 12 feet

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

FINAL ANALYTICAL RESULTS: Sample Date 9/19/2005 Sample Depth 12 ft

TPH and chloride laboratory test results completed by using an approved laboratory and testing procedures pursuant to NMOCD guidelines.

CHLORIDE FIELD TESTS

Sample Location	PID (field) ppm	GRO mg/kg	DRO mg/kg	Chloride mg/kg
GRAB @ 12ft below jct.	0.1	<10.0	<10.0	5840

LOCATION	DEPTH (ft)	ppm
delineation trench at junction site	4	3177
	5	3554
	6	4378
	7	4374
	8	4117
	9	4874
	10	5552
	11	5366
	12	4584

General Description of Remedial Action:

This junction box was addressed as part of the Vacuum SWD System abandonment. After the box lumber was removed and the pipelines were capped, a delineation trench was made at the site to collect soil samples. Chloride field tests were conducted on the samples and yielded elevated concentrations that did not relent with depth. Organic vapors were measured using a PID and yielded very low concentrations. The grab sample from the deepest part of the trench (12 ft) was sent to a laboratory for confirmation and TPH analysis. TPH concentrations were not detected in the sample, meeting NMOCD guidelines. The excavated soil was returned to the trench and the remainder of the hole was backfilled with clean, imported soil which was also spread on the surface. An identification plate has been placed on the surface to mark the site of the former junction box for future environmental consideration. NMOCD was notified of potential groundwater impact at this site on 3/7/2006.

enclosures: photos, lab results, PID field screenings, chloride graph

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

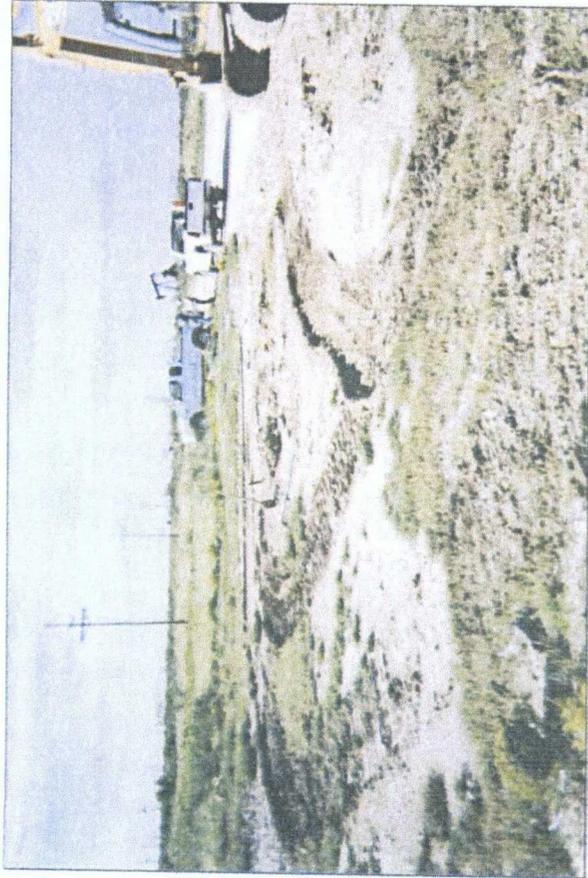
SITE SUPERVISOR Roy Rascon SIGNATURE Roy R. Rascon COMPANY RICE Operating Company

REPORT ASSEMBLED BY Kristin Farris Pope SIGNATURE Kristin Farris Pope
DATE 3/7/2008 TITLE Project Scientist

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

Vacuum St. H-35 EOL

Unit G, Sec. 35, T17S, R34E



former junction site (box removed) marked with shovel 9/19/2005



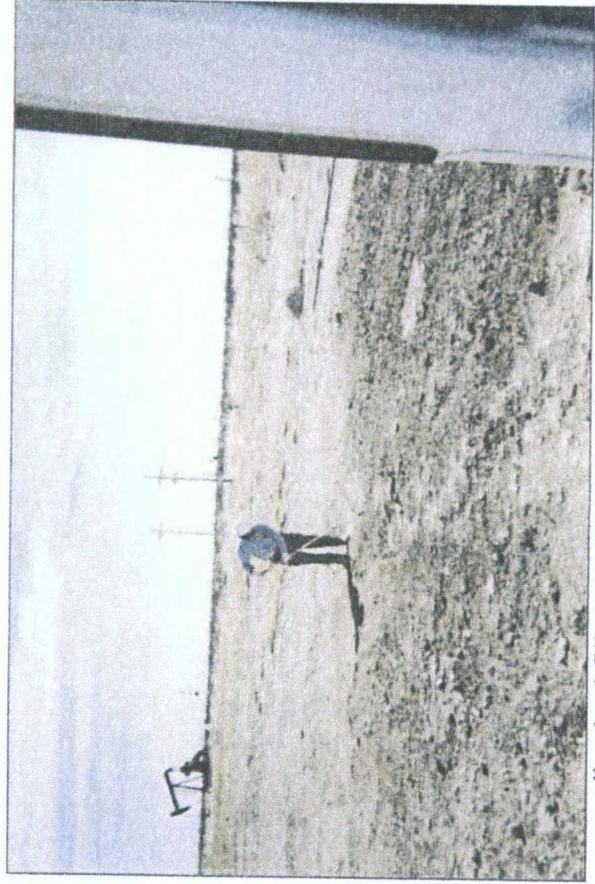
delineation trench

2/16/2006



identification plate at former junction location

2/16/2006



seeding backfilled site

2/22/2006

Vacuum St. H-35 EOL

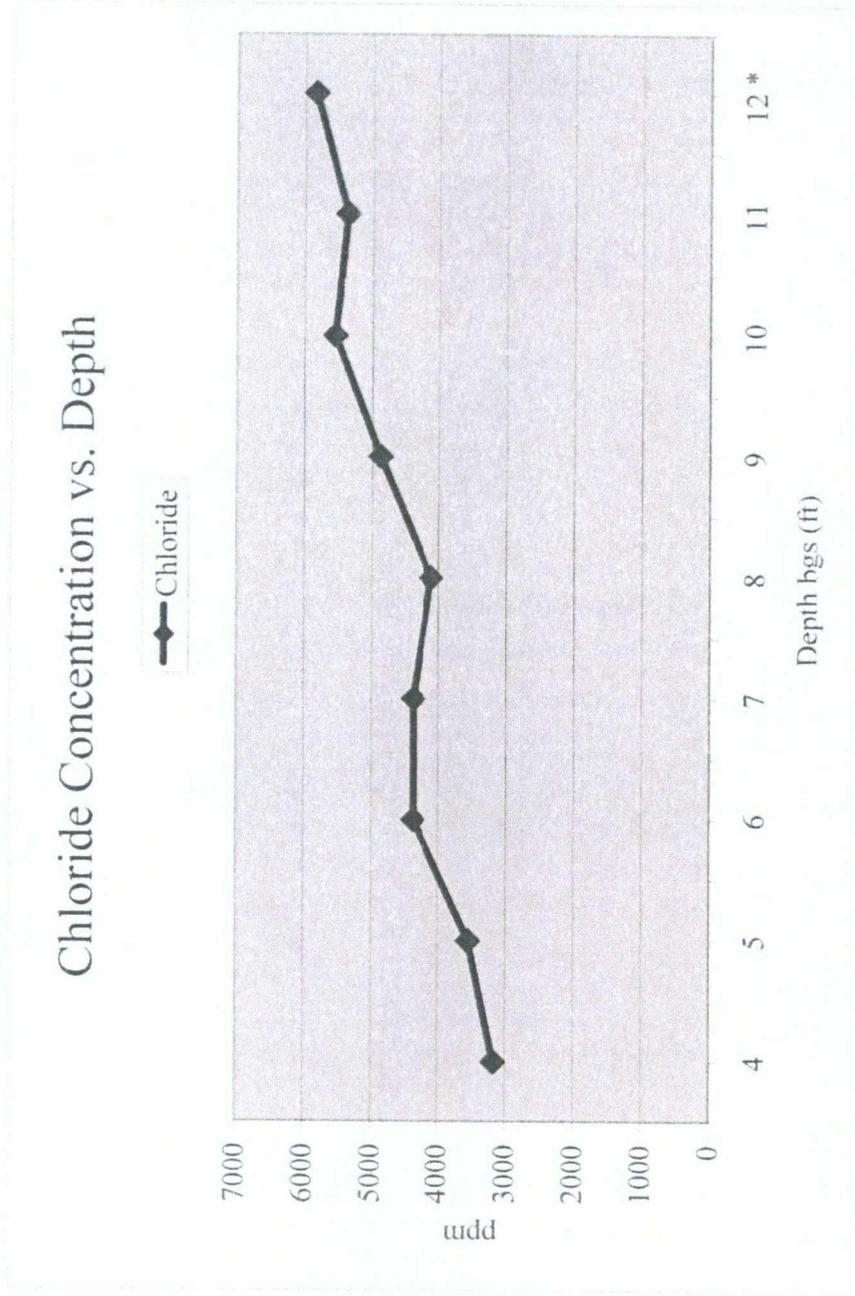
unit 'G', Sec. 35, T17S, R34E

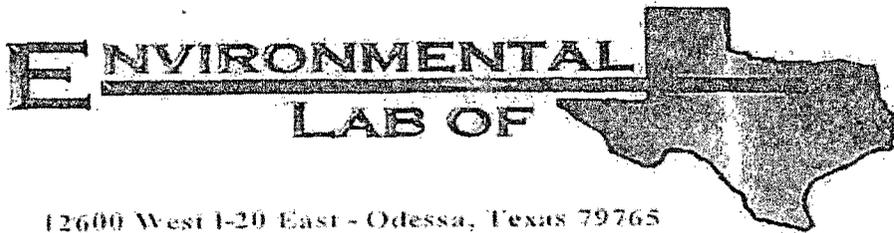
Vertical Delineation at Source

Depth bgs (ft)	[Cl ⁻] ppm
4	3177
5	3554
6	4378
7	4374
8	4117
9	4874
10	5552
11	5366
12 *	5840

Groundwater = 95 ft

* Laboratory analysis





12600 West I-20 East - Odessa, Texas 79765

Analytical Report

Prepared for:

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

COPY

Project: Vac. Phillips St. H-35 EOL

Project Number: None Given

Location: None Given

Lab Order Number: 5122006

Report Date: 09/26/05

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

Project: Vac: Phillips St. H-35 EOL
Project Number: None Given
Project Manager: Roy Rascon

Fax: (505) 397-1471
Reported:
09/26/05 16:59

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
Vert.@ 12' Grab	5122006-01	Soil	09/19/05 14:46	09/22/05 08:00

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

Project: Vac. Phillips St. H-35 EOL.
Project Number: None Given
Project Manager: Roy Rascon.

Fax: (505) 397-1471
Reported:
09/26/05 16:59

Organics by GC
Environmental Lab of Texas

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Vert. @ 12' Grub (S122006-01) Soil									
Gasoline Range Organics C6-C12	ND	10.0	mg/kg dry	1	E152304	09/23/05	09/23/05	EPA 8015M	
Diesel Range Organics >C12-C35	ND	10.0	"	"	"	"	"	"	
Total Hydrocarbon C6-C35	ND	10.0	"	"	"	"	"	"	
Surrogate: 1-Chlorooctane		79.6 %	70-130		"	"	"	"	
Surrogate: 1-Chlorooctadecane		95.0 %	70-130		"	"	"	"	

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

Project: Vac. Phillips St. H-35 EOL
Project Number: None Given
Project Manager: Roy Rascon

Fax: (505) 397-1471
Reported:
09/26/05 16:59

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

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Vert. @ 12' Grab (5122006-01) Soil									
Chloride	5840	100	mg/kg	200	E152305	09/22/05	09/23/05	EPA 3000	
% Moisture	8.5	0.1	%	1	E152301	09/22/05	09/23/05	% calculation	

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

Project: Vac. Phillips St. H-35 EOL
Project Number: None Given
Project Manager: Roy Rascon

Fax: (505) 397-1471

Reported:
09/26/05 16:59

Organics by GC - Quality Control
Environmental Lab of Texas

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch E152304 - Solvent Extraction (GC)										
Blank (E152304-BLK1)				Prepared & Analyzed: 09/23/05						
Gasoline Range Organics C6-C12	ND	10.0	mg/kg wet							
Diesel Range Organics >C12-C35	ND	10.0	"							
Total Hydrocarbon C6-C35	ND	10.0	"							
Surrogate: 1-Chlorooctane	44.0		mg/kg	50.0		88.0	70-130			
Surrogate: 1-Chlorooctadecane	37.7		"	50.0		75.4	70-130			
LCS (E152304-BS1)				Prepared & Analyzed: 09/23/05						
Gasoline Range Organics C6-C12	404	10.0	mg/kg wet	500		80.8	75-125			
Diesel Range Organics >C12-C35	489	10.0	"	500		97.8	75-125			
Total Hydrocarbon C6-C35	893	10.0	"	1000		89.3	75-125			
Surrogate: 1-Chlorooctane	44.8		mg/kg	50.0		89.6	70-130			
Surrogate: 1-Chlorooctadecane	48.3		"	50.0		96.6	70-130			
Calibration Check (E152304-CCV1)				Prepared: 09/23/05 Analyzed: 09/24/05						
Gasoline Range Organics C6-C12	413		mg/kg	500		82.6	80-120			
Diesel Range Organics >C12-C35	443		"	500		88.6	80-120			
Total Hydrocarbon C6-C35	856		"	1000		85.6	80-120			
Surrogate: 1-Chlorooctane	43.3		"	50.0		86.6	0-200			
Surrogate: 1-Chlorooctadecane	44.1		"	50.0		88.2	0-200			
Matrix Spike (E152304-MS1)				Source: 5122001-01		Prepared: 09/23/05 Analyzed: 09/24/05				
Gasoline Range Organics C6-C12	457	10.0	mg/kg dry	522	ND	87.5	75-125			
Diesel Range Organics >C12-C35	494	10.0	"	522	ND	94.6	75-125			
Total Hydrocarbon C6-C35	951	10.0	"	1040	ND	91.4	75-125			
Surrogate: 1-Chlorooctane	55.3		mg/kg	50.0		111	70-130			
Surrogate: 1-Chlorooctadecane	51.8		"	50.0		104	70-130			
Matrix Spike Dup (E152304-MSD1)				Source: 5122001-01		Prepared: 09/23/05 Analyzed: 09/24/05				
Gasoline Range Organics C6-C12	463	10.0	mg/kg dry	522	ND	88.7	75-125	1.30	20	
Diesel Range Organics >C12-C35	500	10.0	"	522	ND	95.8	75-125	1.21	20	
Total Hydrocarbon C6-C35	963	10.0	"	1040	ND	92.6	75-125	1.25	20	
Surrogate: 1-Chlorooctane	54.9		mg/kg	50.0		110	70-130			
Surrogate: 1-Chlorooctadecane	50.3		"	50.0		101	70-130			

Environmental Lab of Texas

The results in this report apply to the samples analyzed in accordance with the samples received in the laboratory. This analytical report must be reproduced in its entirety, with written approval of Environmental Lab of Texas.

Page 4 of 6

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

Project: Vac. Phillips St. H-35 EOL
Project Number: None Given
Project Manager: Roy Rascon

Fax: (505) 397-1471

Reported:
09/26/05 16:59

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 E152301 - General Preparation (Prep)										
Blank (E152301-BLK1)					Prepared: 09/22/05 Analyzed: 09/23/05					
% Solids	100		%							
Duplicate (E152301-DUP1)					Source: 5121013-01 Prepared: 09/22/05 Analyzed: 09/23/05					
% Solids	86.5		%		86.1			0.464	20	
Duplicate (E152301-DUP2)					Source: 5122008-07 Prepared: 09/22/05 Analyzed: 09/23/05					
% Solids	99.4		%		98.9			0.504	20	
Duplicate (E152301-DUP3)					Source: 5122019-03 Prepared: 09/22/05 Analyzed: 09/23/05					
% Solids	97.6		%		97.8			0.205	20	
Duplicate (E152301-DUP4)					Source: 5122021-18 Prepared: 09/22/05 Analyzed: 09/23/05					
% Solids	90.8		%		90.6			0.221	20	
Batch E152305 - Water Extraction										
Blank (E152305-BLK1)					Prepared: 09/22/05 Analyzed: 09/23/05					
Chloride	ND	0.500	mg/kg							
LCS (E152305-BS1)					Prepared: 09/22/05 Analyzed: 09/23/05					
Chloride	9.07		mg/L	10.0	90.7		80-120			
Calibration Check (E152305-CCV1)					Prepared: 09/22/05 Analyzed: 09/23/05					
Chloride	9.29		mg/l	10.0	92.9		80-120			
Duplicate (E152305-DUP1)					Source: 5121013-01 Prepared: 09/22/05 Analyzed: 09/23/05					
Chloride	90.7	0.500	mg/kg		91.3			0.659	20	

Rice Operating Co.
122 W. Taylor
Hobbs-NM, 88340

Project: Vac. Phillips St. H-35 EOL
Project Number: None Given
Project Manager: Roy Rascon

Fax: (505) 397-1471
Reported:
09/26/05 16:59

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:

09-26-05

Raland K. Tuttle, Lab Manager
Celey D. Keene, Lab Director, Org. Tech Director
Peggy Allen, QA Officer

Jeanne Mc Murrey, Inorg. Tech Director
LaTasha Cornish, Chemist
Sandra Sanchez, Lab Tech.

This material is intended only for the use of the individual (s) or entity to whom it is addressed, and may contain information that is privileged and confidential.

If you have received this material in error, please notify us immediately at 432-563-1800.

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

Client: Rice Op.

Date/Time: 9/22/05 8:00

Order #: ET22006

Initials: CR

Sample Receipt Checklist

Temperature of container/cooler?	Yes	No	-1.0 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:

* discrepancy on sample time coc - 2:46 Label - 2:47

Variance Documentation:

Contact Person: Ray Bascon Date/Time: 09-22-05 Contacted by: Jeanne McMurry
 Regarding:

* sample time discrepancy

Corrective Action Taken:

Client wants to reference coc time 2:46 as per attached e-mail

RICE OPERATING COMPANY

122 West Taylor Hobbs, NM 88240
 PHONE: (505) 393-9174 FAX: (505) 397-1471
 PID METER CALIBRATION & FIELD REPORT FORM

CK.	X	MODEL: PGM 761S	SERIAL NO: 104412
MODEL		MODEL: PGM 7600	SERIAL NO: 110-013744
NO.		MODEL: PGM 7600	SERIAL NO: 110-12383
		MODEL: PGM 7600	SERIAL NO: 110-012920

GAS COMPOSITION: ISOBUTYLENE 100PPM / AIR: BALANCE

LOT NO : 04-2474	EXPIRATION DATE: 8-1-06
FILL DATE: 2-1-05	METER READING ACCURACY: 100.6

ACCURACY : +/- 2%

SYSTEM	JUNCTION	UNIT	SECTION	TOWN SHIP	RANGE
Vac	STATE H-35 EOL	G	35	17S	34E

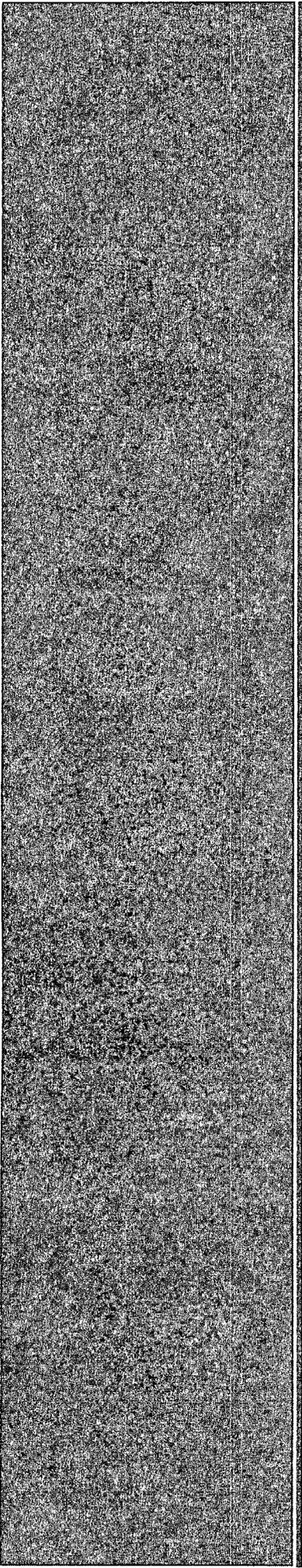
SAMPLE ID	PID	SAMPLE ID	PID
VERT. @ SOURCE @ 1'	0		
2'	0		
3'	51.1		
4'	0.1		
5'	0.1		
6'	0.1		
7'	0.1		
8'	0.1		
9'	0.1		
10'	0.1		
11'	0.1		
12'	0.1		

COPY

I verify that I have calibrated the above instrument in accordance to the manufacture operation manual.

SIGNATURE: *Ray R. Keston*

DATE: 9-19-05



Appendix B

Quality Procedures

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

Rice Environmental Consulting and Safety

Quality Procedures

Table of Contents

- QP-1 Soil Samples for Transportation to a Laboratory
- QP-2 Chloride Titration Using 0.282 Normal Silver Nitrate Solution
- QP-3 Development of Cased Water-Monitoring Wells
- QP-4 Sampling of Cased Water-Monitoring Well
- QP- 5 Composite Sampling of Excavation Sidewalls and Bottoms for TPH and Chloride Analysis
- QP-6 Sampling and Testing Protocol for VOC in soil
- QP-7 Composite Sampling of Excavation Sidewalls and Bottoms for BTEX
- QP-8 Procedure for Plugging and Abandonment of Cased Water-Monitoring wells

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:

$$\frac{.282 \times 35,450 \times \text{ml AgNO}_3}{\text{ml water extract}} \quad \times \quad \frac{\text{grams of water in mixture}}{\text{grams of soil in mixture}}$$

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 $[V/231 = \text{gal}] \times 3 = \text{Purge Volume}$

V=Volume

$\pi = \text{pi}$

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.

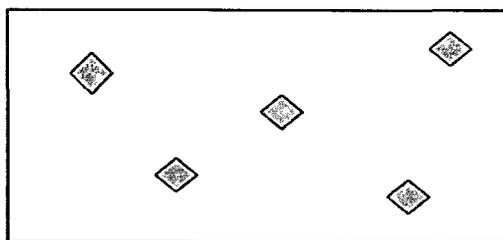
3.0 Sampling Procedure

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, (59-77⁰ 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

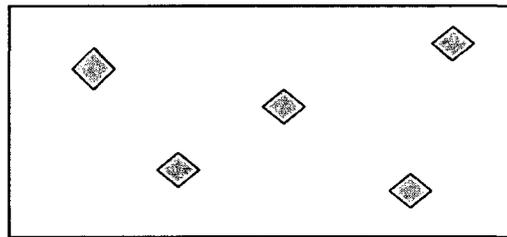
5.1. Do not touch the soil with your bare hands. Use new nitrile gloves to help minimize any cross-contamination.

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.