

1R - 427-03

WORKPLANS

Date:

8-9-10

Rice Environmental Consulting & Safety

P.O. Box 5630 Hobbs, NM 88241

Phone 575.393.4411 Fax 575.393.0293

RECEIVED OCD

2010 AUG 10 P 1:14

CERTIFIED MAIL

RETURN RECEIPT NO. 7009 1680 0001 6619 6248

August 9th, 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 – EME SWD System

EME Jct. G-11 (1R427-03): UL/G sec. 11 T20S 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/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 4 miles south-west of Monument, New Mexico at UL/G sec. 11 T20S R36E as shown on the Site Location Map (Figure 1). NM OSE records indicate that groundwater will likely be encountered at a depth of approximately 31 +/- feet.

In 2003, ROC initiated work on the former EME G-11 junction box. 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 30 x 30 x 18 feet bgs where composite samples were collected for laboratory verification. Laboratory tests of the site showed negligible gasoline range organics (GRO) readings in the 4-wall composite and bottom composite while the remediated backfill read 10.2 mg/kg. Diesel range organics (DRO) showed negligible readings from the 4-wall composite, while the bottom composite read 36.6 mg/kg, and the remediated backfill read 131 mg/kg. Chlorides at the site ranged from 656 mg/kg for the 4-wall composite, 1,440 mg/kg for the bottom composite at 18 ft bgs, and 372 for the remediated backfill. At 18 feet bgs and continuing up the sidewalls, a 20 mil poly liner 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, seeded, and an identification plate was placed on the surface of the site to mark its location for future environmental considerations. A new junction box was not required at the site.

NMOCD was notified of potential groundwater impact on February 24, 2003, and a junction box disclosure report (Appendix A) was submitted to NMOCD with all the 2003 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

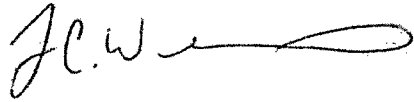
1. Conduct vertical and lateral delineation of residual soil hydrocarbons and chlorides (see Appendix B for Quality Procedures).
 - a. Vertical sampling will be conducted until either one of the following criteria is met in the field.
 - i. Three samples in which the chloride concentration decreases and the third sample has a chloride concentration of ≤ 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 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 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 'J.C.W.' followed by a long, horizontal, wavy line.

Lara Weinheimer
Project Scientist
RECS
(575) 441-0431

Attachments:

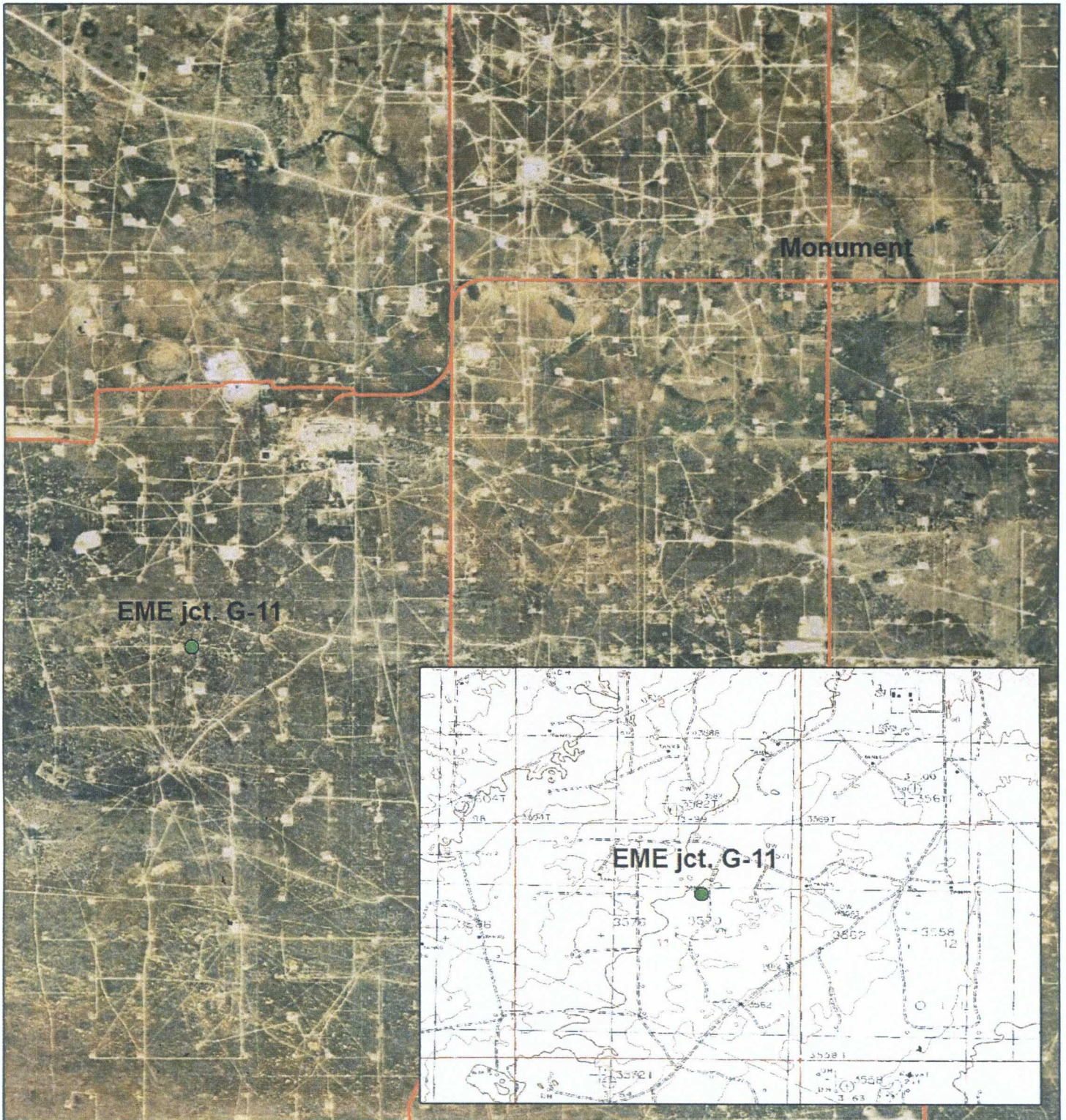
- Figures – Site location map
- Appendix A – Junction Box Disclosure Report
- Appendix B – Quality Procedures



Figures

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

Site Location



EME jct. G-11

Legals: UL/G sec. 11
T20S R36E
NMOCD Case #: 1R427-03

FIGURE 1



0 1,750 3,500 7,000
Feet

Drawing date: 7-13-10
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		
EME	G-11	G	11	20S	36E	Lea	Length	Width	Depth
							No Box		

LAND TYPE: BLM _____ STATE _____ FEE LANDOWNER Faye, George, & Harry Klein OTHER _____

Depth to Groundwater 31 feet NMOC SITE ASSESSMENT RANKING SCORE: 20

Date Started 1/30/2003 Date Completed 2/25/2003 OCD Witness No

Soil Excavated 600 cubic yards Excavation Length 30 Width 30 Depth 18 feet

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

FINAL ANALYTICAL RESULTS: Sample Date 2/21/2003 Sample Depth 18'

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 NMOC 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	<10.0	<10.0	656
BOTTOM	<0.025	<0.025	<0.025	<0.025	<10.0	36.6	1440
BACKFILL	0.027	0.039	0.031	0.125	10.2	131	372

General Description of Remedial Action: ROC discovered that this junction box was located directly south of an abandoned production facility that was never remediated.

The area north of the box was overlain by hardpan and littered with pieces of concrete and steel pipe. A 30' x 30' area was excavated to 18' bgs. The vertical extent of chloride impact at the junction box was not found. Since chloride did not decline with depth, a 20 mil poly liner was installed at the bottom of the excavation and extended up the walls. The liner was then backfilled with the excavated soil and contoured to the surrounding landscape. This site is no longer a junction so a box is not required here. The location will be re-seeded with native vegetation and monitored for growth.

cc: photos, lab results, diagrams

CHLORIDE FIELD TESTS

LOCATION	DEPTH (ft)	ppm
Vertical	4	285
	6	1390
	10	531
	12	883
wall comp.	15	838
bottom comp.	18	1044

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

DATE 3/10/2003 PRINTED NAME Kristin Farris

SIGNATURE Kristin Farris TITLE Projects Scientist

EME jct. G-11

30'x 30'x 18' Impact Excavation

— = 2 FT

HARDBAN

slope

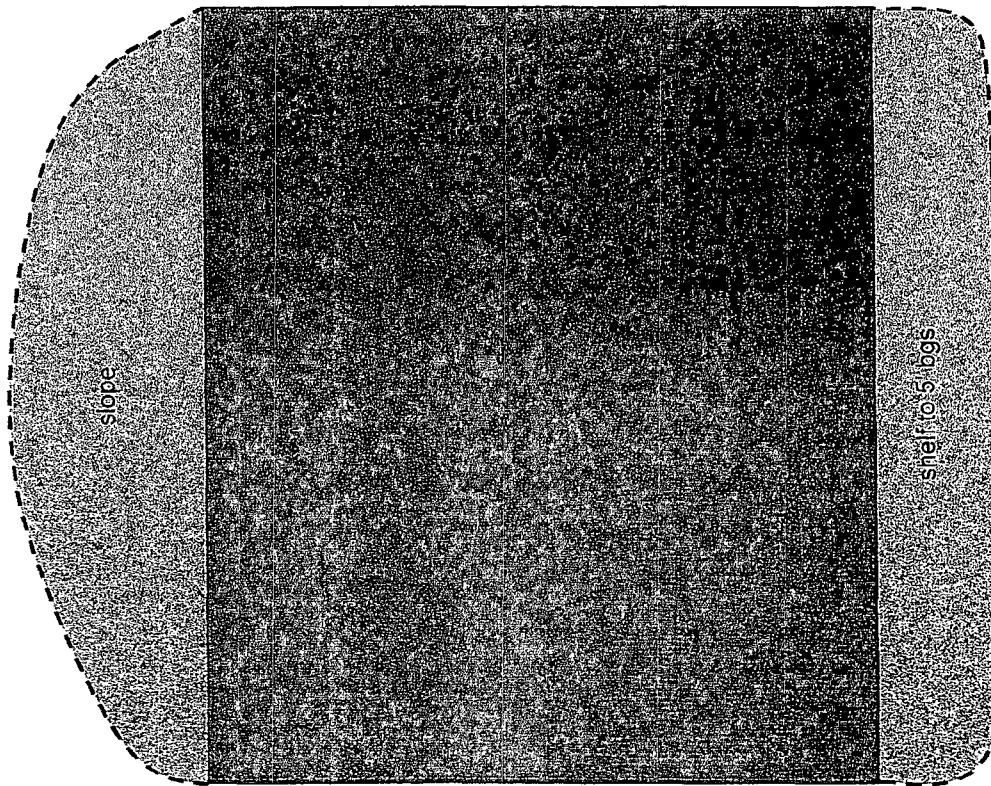
shelf to 5' bgs

VEGETATION

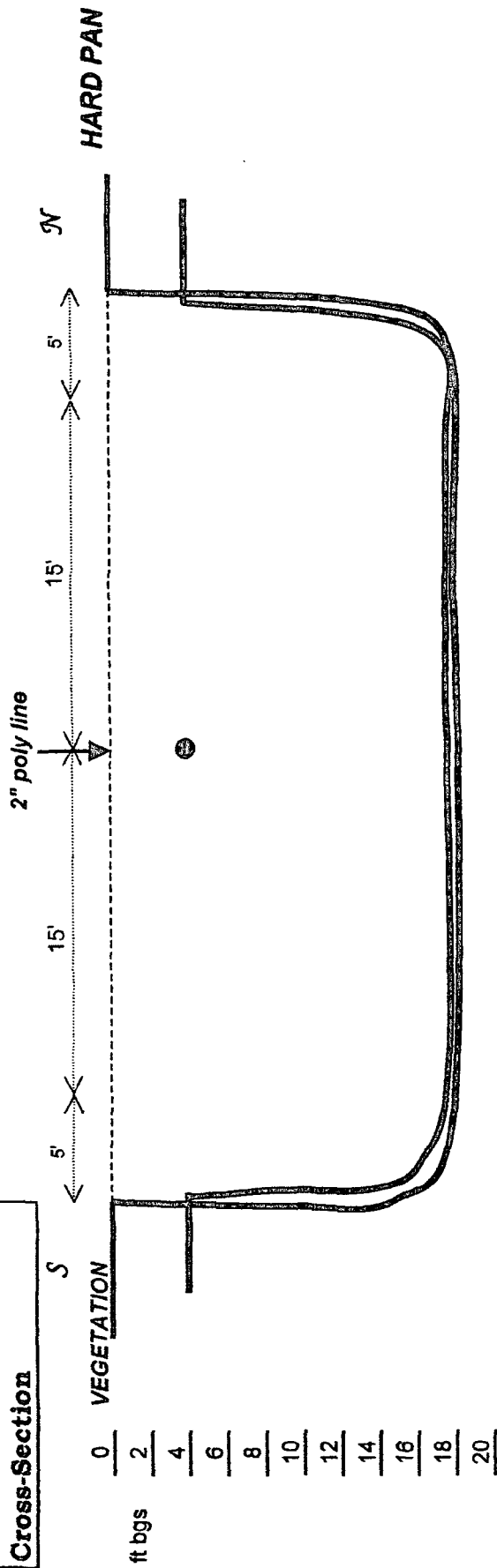
30'

VEGETATION

R O A D



EME jct. G-11
Impact Excavation
Cross-Section



	Excavation Boundary
	Poly Liner

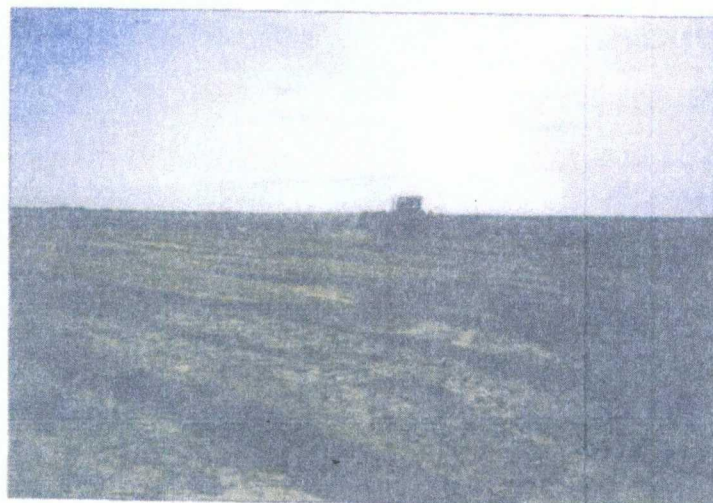
EME jet. G-11



Impact Excavation



Poly Liner



Backfilled (looking south)

CHLORIDE CONCENTRATION CURVE

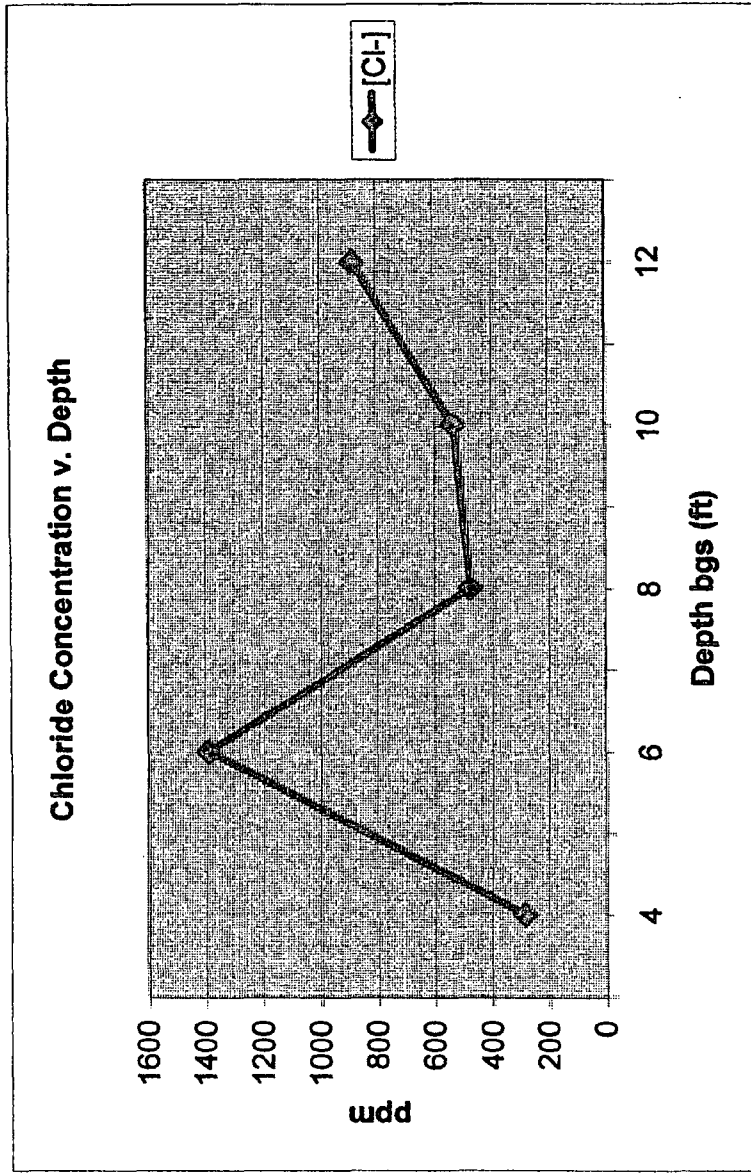
RICE Operating Company

EME jet. G-11

T20S, R36E

Depth bgs (ft)	[Cl ⁻] ppm
4	285
6	1390
8	472
10	531
12	883

Groundwater = 31 ft



ANALYTICAL REPORT

Prepared for:

Kristin Farris
Rice Operating
122 W. Taylor
Hobbs, NM 88240

Project: Jct. G-11
PO#: 749
Order#: G0305810
Report Date: 03/03/2003

Certificates

US EPA Laboratory Code TX00158

ENVIRONMENTAL LAB OF TEXAS

SAMPLE WORK LIST

Rice Operating
122 W. Taylor
Hobbs, NM 88240
505-397-1471

Order#: G0305810
Project:
Project Name: Jct. G-11
Location: EME

The samples listed below were submitted to Environmental Lab of Texas and were received under chain of custody. Environmental Lab of Texas makes no representation or certification as to the method of sample collection, sample identification, or transportation/handling procedures used prior to the receipt of samples by Environmental Lab of Texas, unless otherwise noted.

<u>Lab ID:</u>	<u>Sample :</u>	<u>Matrix:</u>	<u>Date / Time</u> <u>Collected</u>	<u>Date / Time</u> <u>Received</u>	<u>Container</u>	<u>Preservative</u>
0305810-01	Btm. Comp. @ 18'	SOIL	2/21/03	2/26/03 7:10	4 oz glass	Ice
	<u>Lab Testing:</u>	Rejected: No		Temp: 3.0 C		
	8015M					
	8021B/5030 BTEX					
	Chloride					
0305810-02	Wall Comp.	SOIL	2/21/03	2/26/03 7:10	4 oz glass	Ice
	<u>Lab Testing:</u>	Rejected: No		Temp: 3.0 C		
	8015M					
	8021B/5030 BTEX					
	Chloride					
0305810-03	Backfill	SOIL	2/25/03	2/26/03 7:10	4 oz glass	Ice
	<u>Lab Testing:</u>	Rejected: No		Temp: 3.0 C		
	8015M					
	8021B/5030 BTEX					
	Chloride					

ENVIRONMENTAL LAB OF TEXAS

ANALYTICAL REPORT

Kristin Farris
Rice Operating
122 W. Taylor
Hobbs, NM 88240

Order#: G0305810
Project:
Project Name: Jet. G-11
Location: EME

Lab ID: 0305810-01
Sample ID: Bm. Comp. @ 18'

8015M

Method Blank	Date Prepared	Date Analyzed	Sample Amount	Dilution Factor	Analyst	Method
		2/26/03	1	1	RKT	8015M

Parameter	Result mg/kg	RL
GRO, C6-C12	<10.0	10.0
DRO, >C12-C35	36.6	10.0
TOTAL, C6-C35	36.6	10.0

Surrogates	% Recovered	QC Limits (%)	
1-Chlorooctane	96%	70	130
1-Chlorooctadecane	85%	70	130

8021B/5030 BTEX

Method Blank	Date Prepared	Date Analyzed	Sample Amount	Dilution Factor	Analyst	Method
0004811-02		2/26/03 15:52	1	25	CK	8021B

Parameter	Result mg/kg	RL
Benzene	<0.025	0.025
Toluene	<0.025	0.025
Ethylbenzene	<0.025	0.025
p/m-Xylene	<0.025	0.025
o-Xylene	<0.025	0.025

Surrogates	% Recovered	QC Limits (%)	
aaa-Toluene	105%	80	120
Bromofluorobenzene	101%	80	120

DL = Diluted out N/A = Not Applicable RL = Reporting Limit

Page 1 of 3

ENVIRONMENTAL LAB OF TEXAS

ANALYTICAL REPORT

Kristin Farris
Rice Operating
122 W. Taylor
Hobbs, NM 88240

Order#: G0305810
Project:
Project Name: Jct. G-11
Location: EME

Lab ID: 0305810-02
Sample ID: Wall Comp.

8015M

Method Blank	Date Prepared	Date Analyzed	Sample Amount	Dilution Factor	Analyst	Method
		2/16/03	1	1	RKT	8015M

Parameter	Result mg/kg	RL
GRO, C6-C12	<10.0	10.0
DRO, >C12-C35	<10.0	10.0
TOTAL, C6-C35	<10.0	10.0

Surrogates	% Recovered	QC Limits (%)	
1-Chlorooctane	90%	70	130
1-Chlorooctadecane	78%	70	130

8021B/5030 BTEX

Method Blank	Date Prepared	Date Analyzed	Sample Amount	Dilution Factor	Analyst	Method
0004811-02		2/26/03 23:36	1	25	CK	8021B

Parameter	Result mg/kg	RL
Benzene	<0.025	0.025
Toluene	<0.025	0.025
Ethylbenzene	<0.025	0.025
p/m-Xylene	<0.025	0.025
o-Xylene	<0.025	0.025

Surrogates	% Recovered	QC Limits (%)	
aaa-Toluene	111%	80	120
Bromofluorobenzene	100%	80	120

DL = Diluted out N/A = Not Applicable RL = Reporting Limit

Page 2 of 3

ENVIRONMENTAL LAB OF TEXAS

ANALYTICAL REPORT

Kristin Farris
Rice Operating
122 W. Taylor
Hobbs, NM 88240

Order#: G0305810
Project:
Project Name: Jct. G-11
Location: EME

Lab ID: 0305810-03
Sample ID: Backfill

8015M

Method Blank	Date Prepared	Date Analyzed	Sample Amount	Dilution Factor	Analyst	Method
		2/26/03	1	1	RKT	8015M

Parameter	Result mg/kg	RL
GRO, C6-C12	10.2	10.0
DRO, >C12-C35	131	10.0
TOTAL, C6-C35	141	10.0

Surrogates	% Recovered	QC Limits (%)	
1-Chlorooctane	107%	70	130
1-Chlorooctadecane	98%	70	130

8021B/5030 BTEX

Method Blank	Date Prepared	Date Analyzed	Sample Amount	Dilution Factor	Analyst	Method
0004811-02		2/26/03 23:54	1	25	CK	8021B

Parameter	Result mg/kg	RL
Benzene	0.027	0.025
Toluene	0.039	0.025
Ethylbenzene	0.031	0.025
p/m-Xylene	0.100	0.025
o-Xylene	<0.025	0.025

Surrogates	% Recovered	QC Limits (%)	
aaa-Toluene	107%	80	120
Bromofluorobenzene	106%	80	120

Approval: Rand K. Tuttle 3-03-03
 Rand K. Tuttle, Lab Director, QA Officer
 Celey D. Keene, Org. Tech. Director
 Jeanne McMurrey, Inorg. Tech. Director
 Sandra Biezugbe, Lab Tech.
 Sara Molina, Lab Tech.

DL = Diluted out N/A = Not Applicable RL = Reporting Limit

Page 3 of 3

ENVIRONMENTAL LAB OF TEXAS

ANALYTICAL REPORT

Kristin Farris
Rice Operating
122 W. Taylor
Hobbs, NM 88240

Order#: G0305810
Project:
Project Name: Jct. G-11
Location: EME

Lab ID: 0305810-01
Sample ID: Btn. Comp. @ 18'

Test Parameters

<u>Parameter</u>	<u>Result</u>	<u>Units</u>	<u>Dilution Factor</u>	<u>RL</u>	<u>Method</u>	<u>Date Analyzed</u>	<u>Analyst</u>
Chloride	1440	mg/kg	1	20	9253	2/27/03	SB

Lab ID: 0305810-02
Sample ID: Wall Comp.

Test Parameters

<u>Parameter</u>	<u>Result</u>	<u>Units</u>	<u>Dilution Factor</u>	<u>RL</u>	<u>Method</u>	<u>Date Analyzed</u>	<u>Analyst</u>
Chloride	656	mg/kg	1	20	9253	2/27/03	SB

Lab ID: 0305810-03
Sample ID: Backfill

Test Parameters

<u>Parameter</u>	<u>Result</u>	<u>Units</u>	<u>Dilution Factor</u>	<u>RL</u>	<u>Method</u>	<u>Date Analyzed</u>	<u>Analyst</u>
Chloride	372	mg/kg	1	20	9253	2/27/03	SB

Approval: Raland K. Tuttle 3-03-03
 Raland K. Tuttle, Lab Director, QA Officer Date
 Celey D. Keene, Org. Tech. Director
 Jeanne McMurrey, Inorg. Tech. Director
 Sandra Biezugbe, Lab Tech.
 Sara Molina, Lab Tech.

ENVIRONMENTAL LAB OF TEXAS

QUALITY CONTROL REPORT

8015M

Order#: G0305810

BLANK	SOIL	LAB-ID #	Sample Concentr.	Spike Concentr.	QC Test Result	Pct (%) Recovery	RPD
TOTAL, C6-C35-mg/kg		0004759-02			<10.0		
MS	SOIL	LAB-ID #	Sample Concentr.	Spike Concentr.	QC Test Result	Pct (%) Recovery	RPD
TOTAL, C6-C35-mg/kg		0305810-02	0	952	906	95.2%	
MSD	SOIL	LAB-ID #	Sample Concentr.	Spike Concentr.	QC Test Result	Pct (%) Recovery	RPD
TOTAL, C6-C35-mg/kg		0305810-02	0	952	747	78.5%	19.2%
SRM	SOIL	LAB-ID #	Sample Concentr.	Spike Concentr.	QC Test Result	Pct (%) Recovery	RPD
TOTAL, C6-C35-mg/kg		0004759-05		1000	759	75.9%	

ENVIRONMENTAL LAB OF TEXAS**QUALITY CONTROL REPORT****8021B/5030 BTEX****Order#: G0305810**

BLANK	SOIL	LAB-ID #	Sample Concentr.	Spike Concentr.	QC Test Result	Pct (%) Recovery	RPD
Benzene-mg/kg		0004811-02			<0.025		
Toluene-mg/kg		0004811-02			<0.025		
Ethylbenzene-mg/kg		0004811-02			<0.025		
p/m-Xylene-mg/kg		0004811-02			<0.025		
o-Xylene-mg/kg		0004811-02			<0.025		
CONTROL	SOIL	LAB-ID #	Sample Concentr.	Spike Concentr.	QC Test Result	Pct (%) Recovery	RPD
Benzene-mg/kg		0004811-03		0.1	0.097	97.%	
Toluene-mg/kg		0004811-03		0.1	0.100	100.%	
Ethylbenzene-mg/kg		0004811-03		0.1	0.101	101.%	
p/m-Xylene-mg/kg		0004811-03		0.2	0.208	104.%	
o-Xylene-mg/kg		0004811-03		0.1	0.100	100.%	
CONTROL DUP	SOIL	LAB-ID #	Sample Concentr.	Spike Concentr.	QC Test Result	Pct (%) Recovery	RPD
Benzene-mg/kg		0004811-04		0.1	0.097	97.%	0.%
Toluene-mg/kg		0004811-04		0.1	0.100	100.%	0.%
Ethylbenzene-mg/kg		0004811-04		0.1	0.101	101.%	0.%
p/m-Xylene-mg/kg		0004811-04		0.2	0.207	103.5%	0.5%
o-Xylene-mg/kg		0004811-04		0.1	0.100	100.%	0.%
SRM	SOIL	LAB-ID #	Sample Concentr.	Spike Concentr.	QC Test Result	Pct (%) Recovery	RPD
Benzene-mg/kg		0004811-05		0.1	0.096	96.%	
Toluene-mg/kg		0004811-05		0.1	0.098	98.%	
Ethylbenzene-mg/kg		0004811-05		0.1	0.098	98.%	
p/m-Xylene-mg/kg		0004811-05		0.2	0.200	100.%	
o-Xylene-mg/kg		0004811-05		0.1	0.098	98.%	

ENVIRONMENTAL LAB OF TEXAS

QUALITY CONTROL REPORT

Test Parameters

Order#: G0305810

BLANK	SOIL	LAB-ID #	Sample Concentr.	Spike Concentr.	QC Test Result	Pct (%) Recovery	RPD
Chloride-mg/kg		0004774-01			<20.0		
MS	SOIL	LAB-ID #	Sample Concentr.	Spike Concentr.	QC Test Result	Pct (%) Recovery	RPD
Chloride-mg/kg		0305808-01	1700	1000	2690	99.3%	
MSD	SOIL	LAB-ID #	Sample Concentr.	Spike Concentr.	QC Test Result	Pct (%) Recovery	RPD
Chloride-mg/kg		0305808-01	1700	1000	2680	98.3%	0.4%
SRM	SOIL	LAB-ID #	Sample Concentr.	Spike Concentr.	QC Test Result	Pct (%) Recovery	RPD
Chloride-mg/kg		0004774-04		5000	4960	99.2%	

12600 West 170 East
Odessa, Texas 79763

Phone: 915-563-1800
Fax: 915-563-1713

CHAIN OF CUSTODY RECORD AND ANALYSIS REQUEST

Project Manager:

Kristin Farris

Project Name:

ict. G-11

Company Name

Company Name RICE Operating

Project #:

Company Address:

Company Address: 122 W. Taylor

Project Loc:

W
B
E

City/State/Zip:

City/State/Zip: Holts, NM 88240

PO #:

749

Telephone No. ()

(505) 393-9174

Fax No: (505) 397-1471

Sampler Signature:

Christofari

[illegible]



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:

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

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

$$\text{Formula } V = (\pi r^2 h)$$

$$2'' \text{ well } [V/2.31 = \text{gal}] \times 3 = \text{Purge Volume}$$

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.

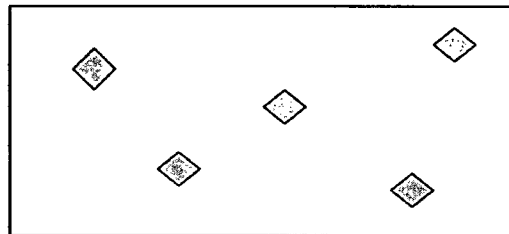
3.0 Sampling Procedure

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, (59-77⁰ 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.

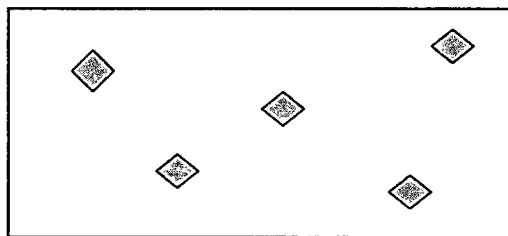
5.0 Sampling Procedure

- 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.