

1R - 427-07

WORKPLANS

Date:

8-2-10

Rice Environmental Consulting & Safety

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

RECEIVED OCD

2010 AUG -2 P 1: 22

CERTIFIED MAIL

RETURN RECEIPT NO. 7009 1680 0001 6619 6224

August 2nd, 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. O-24 (1R427-07): UL/O sec. 24 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 5 miles south-west of Monument, New Mexico at UL/O sec. 24 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 36 - 117 +/- feet depending on its location relative to the hydrogeologic boundary line which shows depth to groundwater reading of around 36 feet north of the boundary line to 117 feet south of the boundary line.

In 2002 ROC initiated work on the former EME O-24 junction box after the box was eliminated. 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 35 x 35 x 12 feet bgs where composite samples were collected for laboratory verification. Laboratory tests of the site showed negligible gasoline range organics (GRO) and the diesel range organics (DRO) showed negligible readings from the excavation's walls and bottom composite samples while the remediated backfill was 65.3 mg/kg. Chlorides at the site ranged from 780 mg/kg from the 4-wall composite, 798 mg/kg for the bottom composite at 12 ft bgs and 368 mg/kg in the remediated backfill. 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.

NMOCD was notified of potential groundwater impact on January 31, 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 stylized flourish.

Lara Weinheimer
Project Scientist
RECS
(575) 441-0431

Attachments:

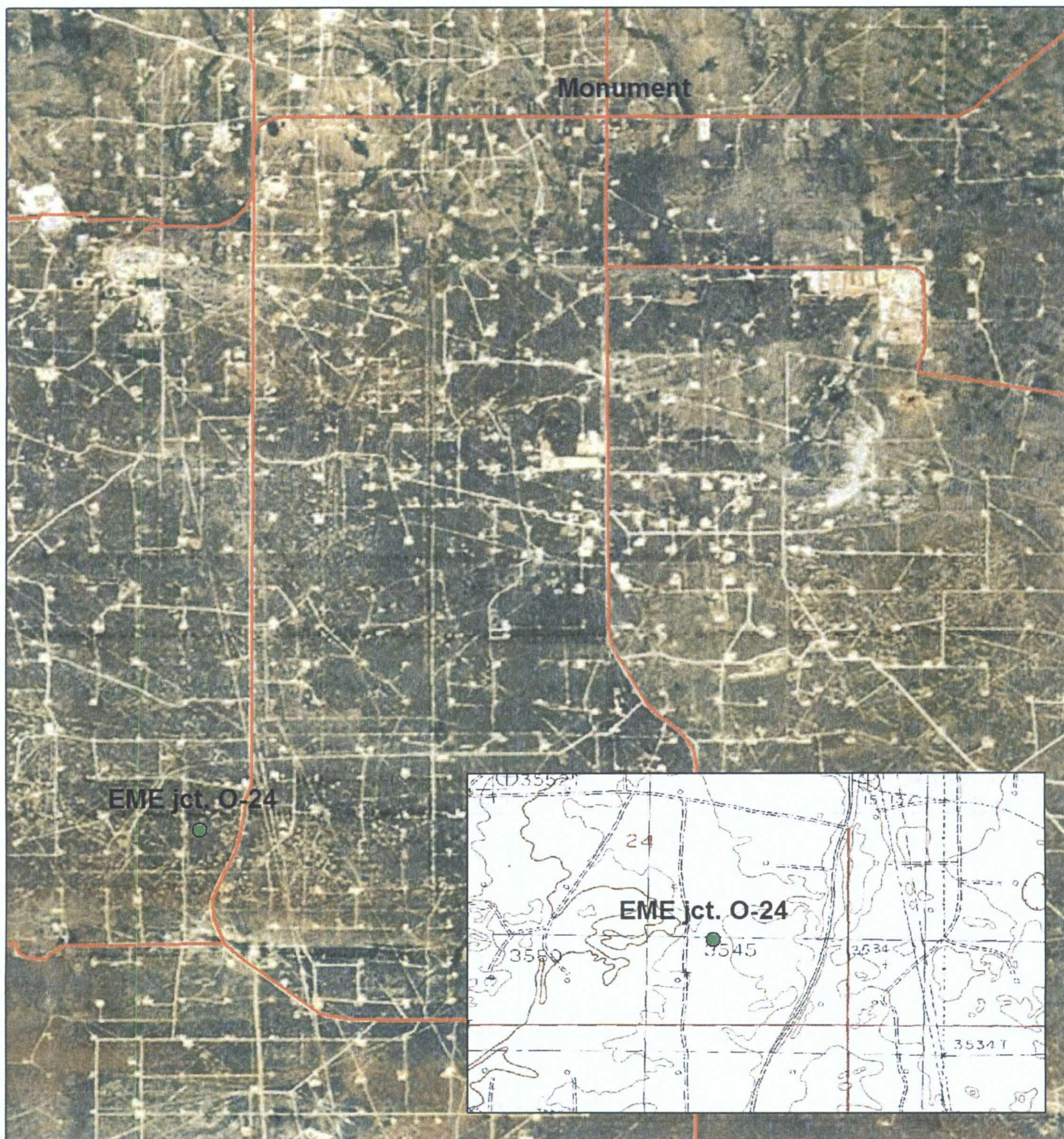
- Figures – Site location map
- Appendix A – Junction Box Disclosure Report
- Appendix B – Quality Procedures



Figures

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

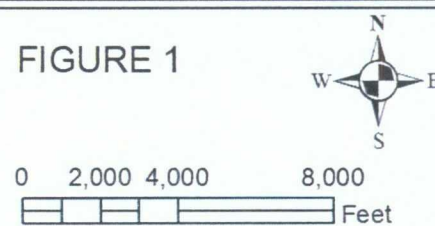
Monitor Well Soil Data



EME jct. O-24

Legals: UL/O sec. 24
T20S R36E
NMOCD Case #: 1R427-07

FIGURE 1



Drawing date:
Revision date:
Drafted by:



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	O-24	O	24	20 S	36 E	Lea	Length	Width	Depth
							No Box		

LAND TYPE: BLM STATE FEE LANDOWNER: Tuffy Cooper OTHER:

Depth to Groundwater 36-117? feet NMOC SITE ASSESSMENT RANKING SCORE: ? *

Date Started 12/12/2002 Date Completed 12/19/2002 OCD Witness No

Soil Excavated 540 cubic yards Excavation Length 35 Width 35 Depth 12 feet

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

FINAL ANALYTICAL RESULTS: Sample Date 12/17/2002 Sample Depth 12'

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
BOTTOM	<0.005	<0.005	<0.005	<0.015	<10.0	<10.0	798
WALLS	<0.005	<0.005	<0.005	<0.015	<10.0	<10.0	780
REMEDIED	<0.005	<0.005	<0.005	<0.015	<10.0	65.3	368

General Description of Remedial Action: This junction box location was visibly impacted with TPH prior to excavating. Vertically, the visual TPH ceased at 11' bgs. The walls were then extended until visual TPH virtually diminished, creating a 35'x 35' x 12' excavation. The excavated soil was landfarmed on-site and then backfilled into the excavation. The backfill was contoured to mimic the surrounding landscape and the surface is expected to experience a re-growth a vegetation. The bottom and wall composite samples were tested for chlorides at two different labs. Cardinal Laboratory's results have been significantly inconsistent with field tests, as was the case when these results were received. The samples were then sent to Environmental Lab of Texas whose results were congruent with field tests and those results are reported above.

* Depth to groundwater here is ambiguous. USGS maps indicate that the site is located on a hydrogeologic boundary line to the north of which groundwater is around 36' and 117' to the south.

cc: lab results, photos

CHLORIDE FIELD TESTS

LOCATION	DEPTH	ppm
Vertical	8'	1107
	12'	986
	14'	951
17' E	6'	489
17'W	8'	1102
	12'	507
17'N	12'	1073
17'S	8'	476
	12'	910

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

DATE 1/13/2003 PRINTED NAME Kristin Farris

SIGNATURE *Kristin Farris* TITLE Projects Scientist

EME jct. O-24



NORM Excavation

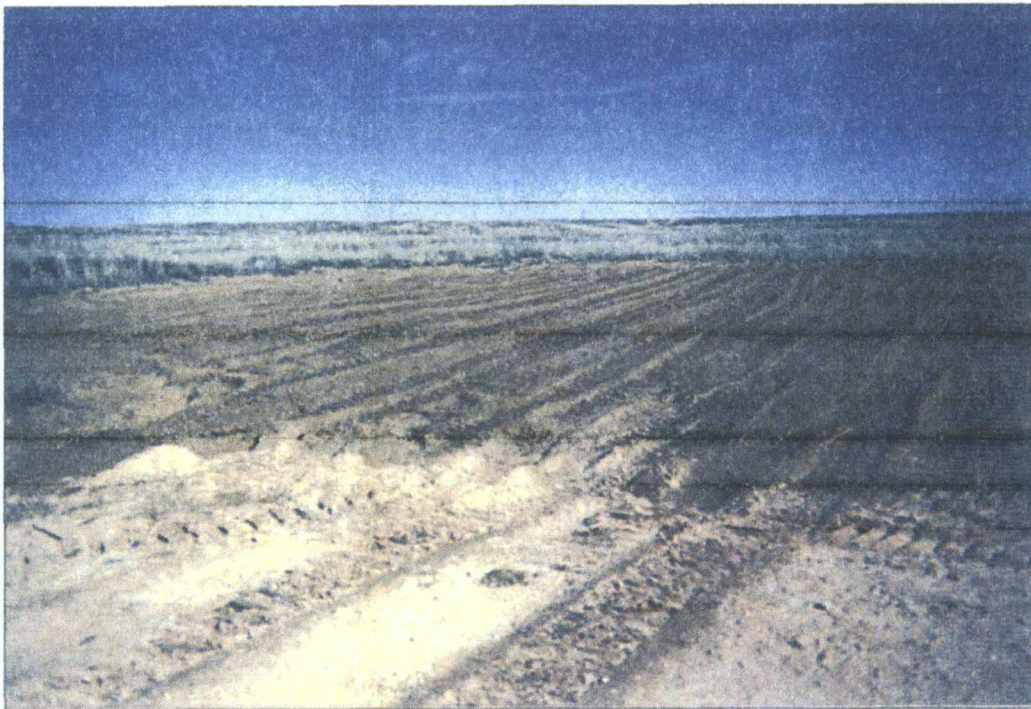


Beginning Excavation

EME jct. O-24



Bottom of Excavation



Backfilled

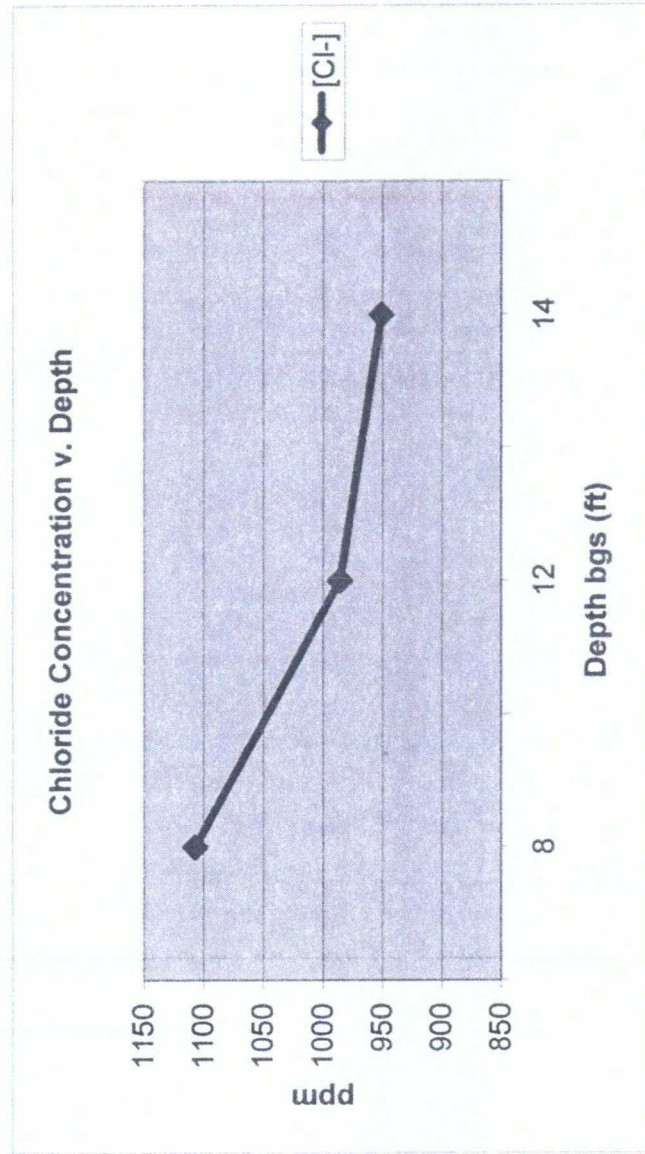
CHLORIDE CONCENTRATION CURVE

RICE Operating Company

EME jct. O-24

T20S, R36E

Depth bgs (ft)	[Cl-] ppm
8	1107
12	986
14	951



Groundwater = 36-117 ft???

ANALYTICAL REPORT

Prepared for:

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

New
CL

Project: 0-24 Jct.
PO#: 749
Order#: G0205356
Report Date: 12/31/2002

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#: G0205356
Project: None Given
Project Name: 0-24 Jct.
Location: EME SWD

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>
0205356-01	Bottom Comp. @ 12'	SOIL	12/17/02	12/30/02 19:46	Plastic Bag	None
	<u>Lab Testing:</u> Chloride	Rejected: No		Temp: n/a		
0205356-02	Wall Comp.	SOIL	12/17/02	12/30/02 19:46	Plastic Bag	None
	<u>Lab Testing:</u> Chloride	Rejected: No		Temp: n/a		

ENVIRONMENTAL LAB OF TEXAS

ANALYTICAL REPORT

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

Order#: G0205356
Project: None Given
Project Name: 0-24 Jet.
Location: EME SWD

Lab ID: 0205356-01
Sample ID: Bottom Comp. @12'

Test Parameters

Parameter	Result	Units	Dilution Factor	RL	Method	Date Analyzed	Analyst
Chloride	798	mg/kg	1	20	9253	12/31/02	SB

Lab ID: 0205356-02
Sample ID: Wall Comp.

Test Parameters

Parameter	Result	Units	Dilution Factor	RL	Method	Date Analyzed	Analyst
Chloride	780	mg/kg	1	20	9253	12/31/02	SB

Approval: Raland K. Tuttle 12-31-02
Raland K. Tuttle, Lab Director, QA Officer Date
Celey D. Keene, Org. Tech. Director
Jeanne McMurrey, Inorg. Tech. Director
Sandra Biezugbo, Lab Tech.
Sara Molina, Lab Tech.

ENVIRONMENTAL LAB OF TEXAS

QUALITY CONTROL REPORT

Test Parameters

Order#: G0205356

BLANK	SOIL	LAB-ID #	Sample Concentr.	Spike Concentr.	QC Test Result	Pct (%) Recovery	RPD
Chloride-mg/kg		0004213-01			<20.0		
MS	SOIL	LAB-ID #	Sample Concentr.	Spike Concentr.	QC Test Result	Pct (%) Recovery	RPD
Chloride-mg/kg		0205356-01	798	1000	1790	99.2%	
MSD	SOIL	LAB-ID #	Sample Concentr.	Spike Concentr.	QC Test Result	Pct (%) Recovery	RPD
Chloride-mg/kg		0205356-01	798	1000	1810	101.2%	1.1%
SRM	SOIL	LAB-ID #	Sample Concentr.	Spike Concentr.	QC Test Result	Pct (%) Recovery	RPD
Chloride-mg/kg		0004213-04		5000	4960	99.2%	

12600 West 120 East
Odessa, Texas 79763

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

CHAIN OF CUSTODY RECORD AND ANALYSIS REQUEST

Kristina Farris

Project Name: _____

0-24 ct.

RICE Operating

Project #:

Taylor

Project Loc: EME SW

40 bbs, NM 88240

749

(505) 393-9174

Fax No: (505) 397-1471

Колосов Л.И.

[illegible]



ARDINAL LABORATORIES

PHONE (915) 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

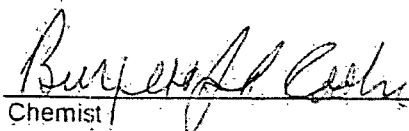
Receiving Date: 12/20/02
Reporting Date: 12/26/02
Project Number: NOT GIVEN
Project Name: NOT GIVEN
Project Location: EME

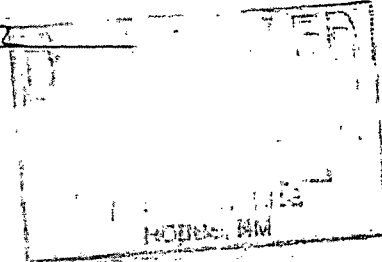
Sampling Date: 12/19/02
Sample Type: SOIL
Sample Condition: COOL & INTACT
Sample Received By: AH
Analyzed By: BC/AH

LAB NUMBER	SAMPLE ID	GRO (C ₆ -C ₁₀) (mg/Kg)	DRO (>C ₁₀ -C ₂₈) (mg/Kg)	Cl ⁻ (mg/Kg)
ANALYSIS DATE		12/23/02	12/23/02	12/23/02
H7340-1	Q-24 REMEDIATED	<10.0	65.3	368
H7340-2	A-26 10' W @ 6'	391	3050	1248
Quality Control		759	825	1000
True Value QC		800	800	1000
% Recovery		94.9	103	100
Relative Percent Difference		3.1	1.3	3.0

METHODS: TPH GRO & DRO: EPA SW-846 8015 M; Cl⁻: Std. Methods 4500-Cl⁻B

*Analyses performed on 1:4 w/v aqueous extracts.


Chemist

12/26/02
Date


H7340A.XLS

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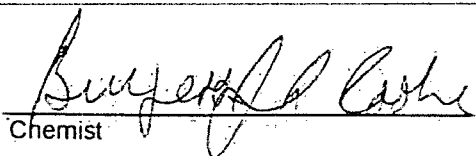
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122 W. TAYLOR
HOBBS, NM 88240
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Receiving Date: 12/20/02
Reporting Date: 12/26/02
Project Number: NOT GIVEN
Project Name: NOT GIVEN
Project Location: EME

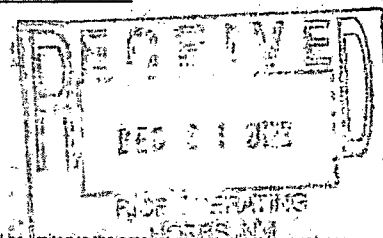
Sampling Date: 12/19/02
Sample Type: SOIL
Sample Condition: COOL & INTACT
Sample Received By: AH
Analyzed By: BC

LAB NUMBER	SAMPLE ID	BENZENE (mg/Kg)	TOLUENE (mg/Kg)	ETHYL BENZENE (mg/Kg)	TOTAL XYLENES (mg/Kg)
ANALYSIS DATE		12/23/02	12/23/02	12/23/02	12/23/02
H7340-1	0-24 REMEDIATED	<0.005	<0.005	<0.005	<0.015
H7340-2	A-26 10' W @ 6"	<0.005	<0.005	<0.005	<0.015
Quality Control		0.108	0.100	0.104	0.306
True Value QC		0.100	0.100	0.100	0.300
% Recovery		108	100	104	102.0
Relative Percent Difference		6.1	1.9	5.5	5.7

METHOD: EPA SW-846 8260


Chemist

12/24/02
Date



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H7340B.XLS

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

Company Name: RICE Operating		P.O. #:		BILL TO		ANALYSIS REQUEST	
Project Manager: Klistof Farris		Company:					
Address: 122 W. Taylor		Attn:					
City: Hobbs		State: NM					
Phone #: (505) 393-9174		Zip: 88240					
Fax #: (505) 393-9174		Address:					
Project #:		City:					
Project Owner:		State:					
Project Name:		Zip:					
Project Location: EME		Phone #:					
Sampler Name: K. Farris		Fax #:					
Lab I.D.:		FOR LAB USE ONLY		PRESERV		SAMPLING	
Sample I.D.:		MATRIX		OTHER:		DATE	
						TIME	
17340-1 0-24 Remediated		GROUNDWATER		ACID/BASE:		12/19/02	
						12/19/02	
-2 A-26 10' W @ 6'		WASTEWATER		CE/COOL			
		# CONTAINERS		OTHER:			
		(G) RAB OR (C) OMP		SLUDGE			
		CRUDE OIL		OTHER:			
		SOL		ACID/BASE:			
		WASTEWATER		CE/COOL			
		# CONTAINERS		OTHER:			
		(G) RAB OR (C) OMP		ACID/BASE:			
		WASTEWATER		CE/COOL			
		# CONTAINERS		OTHER:			
		(G) RAB OR (C) OMP		ACID/BASE:			
		WASTEWATER		CE/COOL			
		# CONTAINERS		OTHER:			
		(G) RAB OR (C) OMP		ACID/BASE:			
		WASTEWATER		CE/COOL			
		# CONTAINERS		OTHER:			
		(G) RAB OR (C) OMP		ACID/BASE:			
		WASTEWATER		CE/COOL			
		# CONTAINERS		OTHER:			
		(G) RAB OR (C) OMP		ACID/BASE:			
		WASTEWATER		CE/COOL			
		# CONTAINERS		OTHER:			
		(G) RAB OR (C) OMP		ACID/BASE:			
		WASTEWATER		CE/COOL			
		# CONTAINERS		OTHER:			
		(G) RAB OR (C) OMP		ACID/BASE:			
		WASTEWATER		CE/COOL			
		# CONTAINERS		OTHER:			
		(G) RAB OR (C) OMP		ACID/BASE:			
		WASTEWATER		CE/COOL			
		# CONTAINERS		OTHER:			
		(G) RAB OR (C) OMP		ACID/BASE:			
		WASTEWATER		CE/COOL			
		# CONTAINERS		OTHER:			
		(G) RAB OR (C) OMP		ACID/BASE:			
		WASTEWATER		CE/COOL			
		# CONTAINERS		OTHER:			
		(G) RAB OR (C) OMP		ACID/BASE:			

[illegible]

Sampler Relinquished:		Date: 122002		Time: 0900		Date: 122002		Time: 0900		Phone Result: <input type="checkbox"/> Yes <input type="checkbox"/> No		Add'l Phone #:	
Relinquished By: <i>Karin Davis</i>		Date: 122002		Time: 0900		Date: 122002		Time: 0900		Fax Result: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		Add'l Fax #:	
Delivered By: (Circle One)		Date: 122002		Time: 0900		Date: 122002		Time: 0900		REMARKS:			
Sampler: UPS - Bus - Other:		Date: 122002		Time: 0900		Date: 122002		Time: 0900					

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



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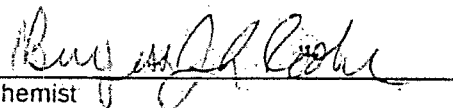
Receiving Date: 12/17/02
Reporting Date: 12/18/02
Project Number: NOT GIVEN
Project Name: O-24
Project Location: EME

Sampling Date: 12/17/02
Sample Type: SOIL
Sample Condition: COOL & INTACT
Sample Received By: AH
Analyzed By: BC/AH

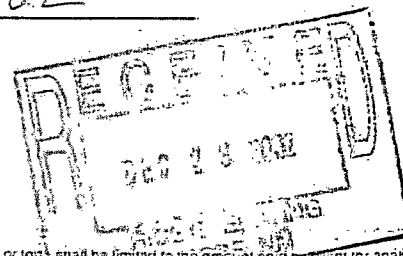
LAB NUMBER	SAMPLE ID	GRO (C ₆ -C ₁₀) (mg/Kg)	DRO (>C ₁₀ -C ₂₈) (mg/Kg)	Cl* (mg/Kg)
		12/17/02	12/17/02	12/18/02
H7325-1	BTM COMP. @ 12"	<10.0	<10.0	1150
H7325-2	WALL COMP.	<10.0	<10.0	1060
Quality Control		831	806	970
True Value QC		800	800	1000
% Recovery		104	101	97.0
Relative Percent Difference		1.6	2.2	1.0

METHODS: TPH GRO & DRO: EPA SW-846 8015 M; Cl: Std. Methods 4500-ClB

*Analyses performed on 1:4 w:v aqueous extracts.


Chemist

12/18/02
Date



H7325A.XLS

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Project Name: O-24
Project Location: EME

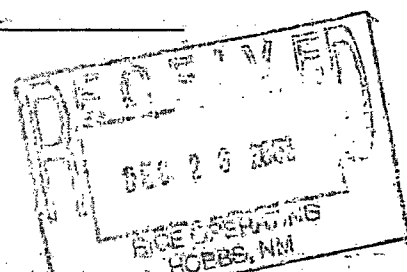
Sampling Date: 12/17/02
Sample Type: SOIL
Sample Condition: COOL & INTACT
Sample Received By: AH
Analyzed By: BC

LAB NUMBER	SAMPLE ID	BENZENE (mg/Kg)	TOLUENE (mg/Kg)	ETHYL BENZENE (mg/Kg)	TOTAL XYLENES (mg/Kg)
ANALYSIS DATE		12/17/02	12/17/02	12/17/02	12/17/02
H7325-1	BTM COMP. @ 12'	<0.005	<0.005	<0.005	<0.015
H7325-2	WALL COMP.	<0.005	<0.005	<0.005	<0.015
Quality Control		0.100	0.094	0.094	0.273
True Value QC		0.100	0.100	0.100	0.300
% Recovery		99.5	94.2	93.7	91.1
Relative Percent Difference		12.3	12.2	10.7	8.2

METHOD: EPA SW-846 8260

Burgett A. Cashe
Chemist

12/18/02
Date



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Date: 12/17/02 Time: 15:00 Date: 12/17/02 Time:		Received By: [Signature] Received By: (Lab Staff)		Checked By: (Initials) Sample Condition Cool Intact: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No	
Delivered By: (Circle One) Driver UPS - Bus - Other: Driver		Acquired By: [Signature]		Remarks:	

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Appendix B

Quality Procedures

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Rice Environmental Consulting and Safety

Quality Procedures

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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" 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.

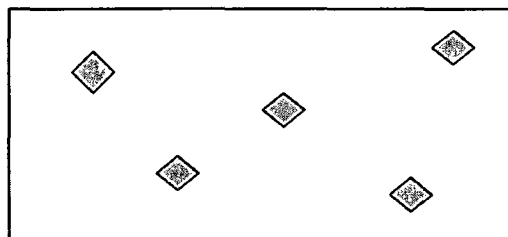
3.0 Sampling Procedure

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.

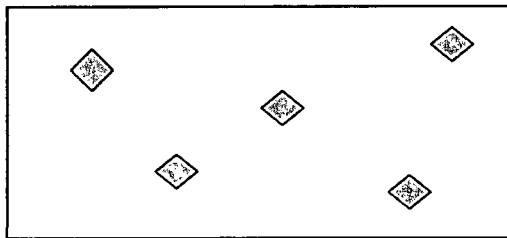
5.0 Sampling Procedure

- 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.