1R – 428-58

CLOSURE REPORT

DATE: JAN 17, 2008

1R428-58
Closure Report

RECEIVED
JAN 22 2008
Environmental Bureau
Oil Conservation Division

January 17, 2008

F-33 Vent, NMOCD Case #1R0428-58

Rice Operating Company
Closure Report

R.T. Hicks Consultants, Ltd.
901 Rio Grande Blvd. NW, Suite F-142
Albuquerque, NM 87104

R. T. HICKS CONSULTANTS, LTD.
901 Rio Grande Blvd NW ▲ Suite F-142 ▲ Albuquerque, NM 87104 ▲ 505.266.5004 ▲ Fax: 505.266-0745

January 17, 2008

Mr. Ed Hansen
New Mexico Oil Conservation Division
1220 South St. Francis Drive
Santa Fe, New Mexico 87505

RE: NMOCD Case # 1R0428-58, F-33 Vent
Hobbs SWD System Abandonment
Closure Report

Dear Mr. Hansen:

This letter and Appendices are the final Closure Report for the F-33 Vent site. The NMOCD approved Corrective Action Plan (Section 6.0, pages 11-12) proposed remedy included excavation of soils in the upper vadose zone to the dimensions of 10 x 10 x 12 feet deep, installation of a clay layer, native soil was mixed with clean, imported soil, as shown in Figure 1, below. The surface was re-seeded on August 29th, 2007 with native grass seed, creating an infiltration barrier by re-vegetation of the ground surface.

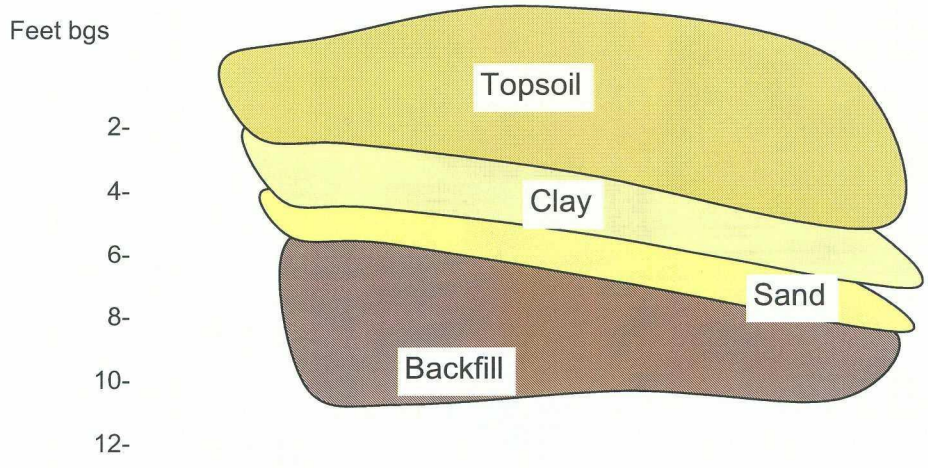

Figure 1. *Schematic diagram of ET Infiltration Barrier*

Appendix A includes the junction box closure form as well as the clay density test, disposal manifest for the 18 ft^3 of off-hauled soil, laboratory results and PID measurements on backfill, and photographs documenting work at the site. Appendix B includes copies of previous submissions and the NMOCD approval email.

We respectfully request NMOCD approve site closure in writing. Thank you for your attention to this matter.

Sincerely,
R.T. Hicks Consultants, Ltd.

Katie Lee

Katie Lee
Staff Scientist

Copy: Rice Operating Company
Hobbs NMOCD Office

Appendix A

RICE OPERATING COMPANY
JUNCTION BOX FINAL REPORT

BOX LOCATION

SWD SYSTEM	JUNCTION	UNIT	SECTION	TOWNSHIP	RANGE	COUNTY	NEW BOX DIMENSIONS - FEET		
							Length	Width	Depth
Hobbs	F-33 vent (#1R428-58)	F	33	18S	38E	Lea	no box--System Abandonment		

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

Depth to Groundwater 65 feet NMOCD SITE ASSESSMENT RANKING SCORE: 10

Date Started 5/22/2006 Date Completed 8/29/2007 NMOCD Witness no

Soil Excavated 44 cubic yards Excavation Length 10 Width 10 Depth 12 feet

Soil Disposed 18 cubic yards Offsite Facility Sundance Location Eunice, New Mexico

FINAL ANALYTICAL RESULTS: **Sample Date** 8/29/2007 **Sample Depth** n/a

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

Sample Location	PID (field) ppm	Chloride mg/kg
BACKFILL composite (2:1 blend)	28.1 (pile 1)	128
	49.7 (pile 2)	

General Description of Remedial Action:

This junction box site was delineated during the summer of 2006 using soil borings and backhoe trenches in accordance with the Investigation & Characterization Plan submitted by R.T. Hicks Consultants (Jan. 2006). The Corrective Action Plan (CAP) for this site was verbally approved by NMOCD on 7/18/2007 and confirmed via email on 8/8/2007. As prescribed in the CAP, the former box site was excavated to the dimensions of 10 x 10 x 12-ft-deep during Aug. 28-29, 2007. A clay barrier was installed below the surface and after the site was backfilled with native soil mixed with clean, imported soil. The surface was seeded with a blend of native vegetation and is expected to return to productive capacity at a normal rate. The enclosed Closure Report (Dec. 2007) by Hicks documents these activities and requests regulatory closure of this site.

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

REPORT ASSEMBLED BY Kristin Farris Pope SIGNATURE Kristin Farris Pope

DATE 12/5/2007 TITLE Project Scientist

LABORATORY TEST REPORT

PETTIGREW & ASSOCIATES, P.A.
1110 N. GRIMES
HOBBS, NM 88240
(505) 393-9827

AASHTO R18
DEBRA P. HICKS, P.E./L.S.I.
WILLIAM M. HICKS. III, P.E./P.S.

To: Rice Operating
Attn: Hack Conder
122 W. Taylor
Hobbs, NM 88240

Material: Red Clay (Wallach)

Test Method: ASTM: D 2922

Project: General Information
Project No. 2007.1007

Date of Test: August 29, 2007

Depth: 4' Below Finished Subgrade

Depth of Probe: 10"

Test No.	Location	Dry Density % Maximum	% Moisture	Depth
SG 9	Hobbs F-33 Vent	95.0	10.7	

Control Density: 104.4
ASTM: D 698

Optimum Moisture: 20.3%

Required Compaction: 85% - 95%

Densometer ID: 2505

Lab No.: 07 7811

Copies To: Rice

PETTIGREW & ASSOCIATES

BY: _____

BY: _____ **P.E.**

Sundance Services, Inc.

P.O. Box 1737 ★ Eunice, New Mexico 88231

(505) 394-2511

Ticket # 59611

Lease Operator/Shipper/Company: Rice

Lease Name: Hobbs F 33 Vent

Transporter Company: Wotts Time 9:40 AM/PM

Date: 8-29-07 Vehicle No. 313 Driver No. 313

Charge To: Rice

TYPE OF MATERIAL

☐ Produced Water	☐ Drilling Fluids	☐ Completion Fluids
☐ Tank Bottoms	☑ Contaminated Soil	☐ C-117 No.:
☐ Other Materials	☐ BS&W Content:	

Description: Oil

☐ JETOUT
☐ CALLOUT

VOLUME OF MATERIAL BBLS. 6 YARDS

AS A CONDITION TO SUNDANCE SERVICES, INC.'S ACCEPTANCE OF THE MATERIALS SHIPPED WITH THIS JOB TICKET, OPERATOR/SHIPPER REPRESENTS AND WARRANTS THAT THE WASTE MATERIAL SHIPPED HEREWITH IS MATERIAL EXEMPT FROM THE RESOURCE CONSERVATION AND RECOVERY ACT OF 1976, AS AMENDED FROM TIME TO TIME, 40 U.S.C. 6901, ET SEQ., THE NM HEALTH AND SAF. CODE 361.001 ET SEQ., AND REGULATIONS RELATED THERETO, BY VIRTUE OF THE EXEMPTION AFFORDED DRILLING FLUIDS, PRODUCED WATERS, AND OTHER WASTE ASSOCIATED WITH THE EXPLORATION, DEVELOPMENT OR PRODUCTION OF CRUDE OIL OR NATURAL GAS OR GEOTHERMAL ENERGY.

ALSO AS A CONDITION TO SUNDANCE SERVICES, INC.'S ACCEPTANCE OF THE MATERIALS SHIPPED WITH THIS JOB TICKET, TRANSPORTER REPRESENTS AND WARRANTS THAT ONLY THE MATERIAL DELIVERED BY OPERATOR/SHIPPER TO TRANSPORTER IS NOW DELIVERED BY TRANSPORTER TO SUNDANCE SERVICES, INC.'S FACILITY FOR DISPOSAL.

THIS WILL CERTIFY that the above Transporter loaded the material represented by this Transporter Statement at the above described location, and that it was tendered by the above described shipper. This will certify that no additional materials were added to this load, and that the material was delivered without incident.

DRIVER: [signature]

FACILITY REPRESENTATIVE: [signature]

Sundance Services, Inc.

P.O. Box 1737 ★ Eunice, New Mexico 88231

(505) 394-2511

Ticket # 59578

Lease Operator/Shipper/Company: [illegible]

Lease Name: Nowlin E 33 [illegible]

Transporter Company: [illegible] Time 2:12 AM/PM

Date: 4-20-07 Vehicle No. 313 Driver No. 313

Charge To: [illegible]

TYPE OF MATERIAL

- ☐ Produced Water
- ☐ Drilling Fluids
- ☐ Completion Fluids
- ☐ Tank Bottoms
- ☐ Contaminated Soil
- ☐ C-117 No.:
- ☐ Other Materials
- ☐ BS&W Content:

Description: [illegible]

- ☐ JETOUT
- ☐ CALLOUT

VOLUME OF MATERIAL BBLS. [illegible] YARDS

AS A CONDITION TO SUNDANCE SERVICES, INC.'S ACCEPTANCE OF THE MATERIALS SHIPPED WITH THIS JOB TICKET, OPERATOR/SHIPPER REPRESENTS AND WARRANTS THAT THE WASTE MATERIAL SHIPPED HEREWITH IS MATERIAL EXEMPT FROM THE RESOURCE, CONSERVATION AND RECOVERY ACT OF 1976, AS AMENDED FROM TIME TO TIME, 40 U.S.C. 6901, ET SEQ., THE NM HEALTH AND SAF. CODE 361.001 ET SEQ., AND REGULATIONS RELATED THERETO, BY VIRTUE OF THE EXEMPTION AFFORDED DRILLING FLUIDS, PRODUCED WATERS, AND OTHER WASTE ASSOCIATED WITH THE EXPLORATION, DEVELOPMENT OR PRODUCTION OF CRUDE OIL OR NATURAL GAS OR GEOTHERMAL ENERGY.

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DRIVER: [illegible]

FACILITY REPRESENTATIVE: [illegible]

CARDINAL LABORATORIES

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

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

Receiving Date: 08/30/07
Reporting Date: 08/30/07
Project Owner: NOT GIVEN
Project Name: HOBBS F-33 VENT
Project Location: HOBBS F-33 VENT

Analysis Date: 08/30/07
Sampling Date: 08/29/07
Sample Type: SOIL
Sample Condition: COOL & INTACT
Sample Received By: CK
Analyzed By: HM

LAB NO.	SAMPLE ID	Cl^- (mg/Kg)
H13198-1	2:1 MIXED BACKFILL COMPOSITE	128
Quality Control		480
True Value QC		500
% Recovery		96
Relative Percent Difference		2.1

METHOD: Standard Methods	4500-Cl⁻B

Note: Analysis performed on a 1:4 w:v aqueous extract.

Chemist

08-31-07
Date

H13198 RICE

CARDINAL LABORATORIES

CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

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

Company Name:	Rice Operating	**BILL TO**	
Project Manager:	Kristi Pope	P.O. #:	
Address:	122 W. Taylor	Company:	
City:	Hobbs	State: NM Zip: 88240	Attn:
Phone #:	505-393-9175	Fax #: 505-397-1471	Address:
Project #:		Project Owner:	City:
Project Name:	Hobbs F-33 vent		State: Zip:
Project Location:	Hobbs, F-33 vent		Phone #:
Sampler Name:	Lara Weinheimer		Fax #:

FOR LAB USE ONLY Lab I.D.	Sample I.D.	(G)RAB OR (C)OMP.	# CONTAINERS	MATRIX: GROUNDWATER	WASTEWATER	SOIL	OIL	SLUDGE	OTHER :	PRESERV.: ACID/BASE:	ICE / COOL	OTHER :	SAMPLING: DATE	TIME	ANALYSIS REQUEST: Chlorides
H13198-1	2:1 Mixed backfill composite	C	1			X					X		8-29-07	11:19 a.m.	X

PLEASE NOTE: Liability and Damages. Cardinal's liability and client's exclusive remedy for any claim arising whether based in contract or tort, shall be limited to the amount paid by the client for the analyses. All claims including those for negligence and any other cause whatsoever shall be deemed waived unless made in writing and received by Cardinal within 30 days after completion of the applicable service. In no event shall Cardinal be liable for incidental or consequential damages, including without limitation, business interruptions, loss of use, or loss of profits incurred by client, its subsidiaries, affiliates or successors arising out of or related to the performance of services hereunder by Cardinal, regardless of whether such claim is based upon any of the above stated reasons or otherwise.

Relinquished By:	Date: 8-30-07 Time: 7:57 a.m.	Received By:	Phone Result: ☐ Yes ☐ No Add'l Phone #:
Relinquished By:	Date: Time:	Received By:	Fax Result: ☒ Yes ☐ No Add'l Fax #:
Delivered By: (Circle One) Sampler - UPS - Bus - Other:	Sample Condition Cool: ☐ Yes ☐ No Intact: ☐ Yes ☐ No	CHECKED BY: (Initials)	REMARKS: email results Kpope@riceswd.com Lweinheimer@riceswd.com

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

RICE OPERATING COMPANY

122 West Taylor, Hobbs, NM 88240
Phone: (505) 393-9174 Fax: (505) 397-1471

VOC FIELD TEST REPORT FORM

PID METER READING AND CALIBRATION

CHECK MODEL NUMBER			
		MODEL: PGM 761S	SERIAL NO.: 104412
	×	MODEL: PGM 7600	SERIAL NO.: 110-013744
		MODEL: PGM 7600	SERIAL NO.: 110-12383
		MODEL: PGM 7600	SERIAL NO.: 110-012920

LOT NO.: 07-3264
FILL DATE: 8/17/2007
ACCURACY +/- 2%

GAS COMPOSITION: ISOBUTYLENE 100PPM / AIR: BALANCE
EXPIRATION DATE: 2/17/2009
METER READING ACCURACY: 102 ppm

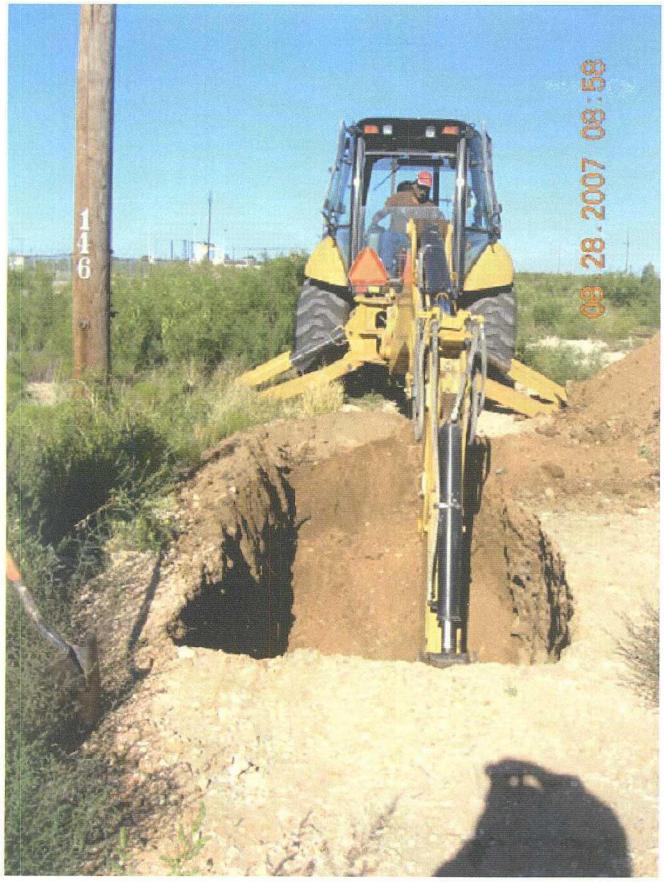
SYSTEM	JUNCTION	UNIT	SECTION	TOWNSHIP	RANGE
Hobbs	F-33 vent	F	33	18S	38E

SITE:

SAMPLE	PID READING	SAMPLE	PID READING
2:1 mixed backfill comp.			
pile #1	28.1		
2:1 mixed backfill comp.			
pile #2	49.7		

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

SIGNATURE: Lara Weinheimer DATE: 8/29/2007



Hobbs F-33 vent
Excavating 10' x 10' x 12' hole

Hobbs F-33 vent
Laying Clay Layer @ 4'

Hobbs F-33 vent
Compaction Layer Test

Hobbs F-33 vent
Seeding disturbed area

Appendix B

Katie Lee

From: Kristin Pope [kpope@riceswd.com]
Sent: Wednesday, October 31, 2007 3:30 PM
To: Katie Lee
Subject: Fw: Summary of July 18 meeting

----- Original Message -----
From: Hansen, Edward J., EMNRD
To: Kristin Pope
Cc: Carolyn Haynes ; Scott Curtis ; Sanchez, Daniel J., EMNRD ; Price, Wayne, EMNRD
Sent: Wednesday, August 08, 2007 11:26 AM
Subject: RE: Summary of July 18 meeting

Kristin,
Your summary appears to be accurate and complete.
Attached is the summary that you sent with comments from me [OCD case #s and formal (email) approval dates].
I'll be sending more formal (via email) approvals for the closures and some of the CAPs soon.
Also, I will review and comment on the other CAPs and the APs a.s.a.p.

Thanks for the summary.
Let me know if you have any questions regarding my comments.

Edward J. Hansen
Hydrologist
Environmental Bureau
505-476-3489

From: Kristin Pope [mailto:kpope@riceswd.com]
Sent: Wednesday, August 08, 2007 10:34 AM
To: Sanchez, Daniel J., EMNRD; Price, Wayne, EMNRD; Hansen, Edward J., EMNRD
Cc: Carolyn Haynes; Scott Curtis
Subject: Summary of July 18 meeting

Gentlemen,

Please review the attached summary of our July 18 meeting. Please let me know if anything needs to be changed. OCD and ROC have already moved forward with several of the projects listed but I would like written confirmation for our files. Thanks again for your time.

Kristin Farris Pope
Project Scientist
RICE Operating Company
Hobbs, New Mexico
(505) 393-9174

OCD/ROC MEETING SUMMARY July 18, 2007

CLOSURES

1. Abatement Completion Report for BD Zachary Hinton EOL submitted by R.T. Hicks Consultants on 3/15/2007. AP-50

2. Abatement Completion Report for EME Marathon Barber (jct. E-5) submitted by R.T. Hicks Consultants on 5/16/2007. 1R0427-91 *Approved soil work completed Dec. 2006*

3. Closure Report for Hobbs I-29 EOL boot submitted by R.T. Hicks Consultants on 5/23/2007. Approved soil work completed in 2006. 1R428-42

4. Closure Request for BD jct. N-29 submitted by R.T. Hicks Consultants on 2/10/2007. #1R0426-37

APPROVALS

1. Stage 1&2 Abatement Plan for Vacuum F/G-35 SWD submitted by R.T. Hicks Consultants; proof of public notice submitted Feb. 2006; AP-59
   Vadose zone remedy complete; reclaiming surface; groundwater treatment ongoing at F-35; evaluating treatment potential at G-35

2. INVESTIGATION & CHARACTERIZATION PLANS (ICP)
   NMOCD Approved (1 – 14) via email August 6, 2007

   1. Hobbs O-5 Historical Release by Hicks on 4/11/2007 #1R428-69
   2. EME State 'H' EOL by P. Galusky on 5/1/2007 #1R427-15
   3. Justis E-1 vent by Highlander on 11/29/2006. #1R0432-06
   4. Vacuum State 'P' EOL by Galusky on 4/20/07 #1R425-26
   5. Vacuum jct. F-31-1 by Hicks on 4/17/07. #1R425-27
   6. BD P-26-1 vent by Trident on 2/12/2007. #1R0426-106
   7. BD jct. P-26-2 by Trident on 2/12/2007. #1R0426-107
   8. Hobbs jct. E-4, M-4 vent, & N-4 vent (1 plan) by Hicks on 4/17/07 #1R428-71, #1R428-76, #1R428-68, respectively
   9. EME L-6 boot by Trident on 12/1/2006. #1R0427-09
   10. EME B-8 leak by Trident on 12/1/2006. #1R0480
   11. EME jct. F-18 by Arcadis on 7/6/2007 #1R427-16
   12. BD jct. F-25-1 by Arcadis on 7/12/2007 #1R426-10
   13. EME L-15-1 vent by Galusky on 7/16/2007 #1R427-173
   14. EME State 'Q' EOL boot by Galusky on 7/16/2007 #1R427-174

3. Corrective Action Plan (CAP) for Hobbs E-15 SWD submitted on 11/28/2006 by Arcadis G&M. *Approved with clay or GCL condition* #1R428-40
   NMOCD Approved with conditions via email July 27. 2007

4. CAP for Hobbs F-29-1b boot submitted by R.T. Hicks Consultants on 4/2/2007. #1R428-45

5. CAP for Hobbs O-29 vent submitted by R.T. Hicks Consultants on 4/2/2007. #1R428-43

6. CAP for Hobbs I-29 vent submitted by R.T. Hicks Consultants on 4/13/2007. #1R428-41

7. CAP for Hobbs jct. E-33-1 submitted by R.T. Hicks Consultants on 1/2/2007. #1R428-67

8. CAP for Hobbs B-32 boot submitted by R.T. Hicks Consultants on 1/22/2007. #1R428-57

9. CAP for Hobbs jct. E-32-1 submitted by R.T. Hicks Consultants on 1/22/2007. #1R428-65

10. CAP for Hobbs F-33 vent submitted by R.T. Hicks Consultants on 1/22/2007. #1R428-58

11. CAP for EME A-2 leak submitted by Highlander on 5/23/2007. # 1R0427-62 *condition: install clay at 4 ft instead of 3 ft as proposed*

12. CAP for jct. A-2-1 submitted by Highlander on 5/23/2007. # 1R0427-177 *condition: install clay at 4 ft instead of 3 ft as proposed*

13. CAP for EME I-1 off-site encroachment submitted by Trident on 2/27/07. #1R0464

Rule 19 ABATEMENT PLANS
OCD granted approval to install monitoring wells as proposed while reviewing plans for administrative completeness:

1. Stage 1 & 2 Abatement Plan for Hobbs F-29 SWD submitted on 10/27/2006 by R.T. Hicks Consultants. *Public notice ready to submit upon approval.* AP-64

2. Stage 1 Abatement Plan for EME C-16(1) leak submitted on 5/25/2007 by L. Peter Galusky; #1R0476 *Public notice ready to submit upon approval.*

3. Stage 1 Abatement Plan for EME C-16(2) leak submitted on 5/25/2007 by L. Peter Galusky; #1R0477 *Public notice ready to submit upon approval.*

4. Stage 1&2 Abatement Plan for BD Santa Rita release site submitted on 12/11/2006 by Trident. AP-58 *want to drill more MWs*

5. Stage 1&2 Abatement Plan for EME jct. M-16-1 submitted on 1/29/2007 by Arcadis G&M. AP-42

6. Stage 1&2 Abatement Plan for EME jct. A-20 submitted on 1/29/2007 by Arcadis G&M. AP-43

7. Stage 1 Abatement Plan for BD H-35 pit submitted by Arcadis G&M on 3/23/2007. #1R0216

8. Stage 1 & 2 Abatement Plan for Justis jct. L-1 boot submitted by Highlander on 1/17/07. AP-48

OCD WILL REVIEW

1. Stage 1 Final Report & Closure Request for EME jct. K-33-1 submitted by Whole Earth on 12/28/2006. AP-60
OCD requests confirmation of regional gradient/impact

2. CAP for EME M-5 SWD submitted by Hicks on 9/10/2004. #1R424

3. Rule 19 Release and CAP for soil for BD jct. F-17 submitted by Highlander on 8/30/06. *Additional information requested by OCD was submitted on 12/29/06 and presented at meeting on 2/21/2007.* AP-47

4. Request for Release from Rule 19 for EME H-13 release submitted on 8/30/2006 by Highlander Environmental. AP-44
Additional information requested by OCD was submitted on 12/29/06 and presented at meeting on 2/21/2007. Showed current site photos.

5. Final Investigation Report & CAP for EME jct. K-6 submitted by Trident on 3/7/2007. AP-46.

OTHER

1. CAP for BD K-4 leak submitted by Highlander on 4/23/2007. #1R0459
APPROVAL to begin pumping from MW-1 as proposed;
OCD will evaluate CAP (soil work)

2. CAP for BD O-17-1 vent submitted by Highlander on 5/11/2007. #1R426-12
No groundwater impact; soil work only
ROC WILL REVISE AND RE-SUBMIT FOR CLARIFICATION

3. GEOSYNTHETIC CLAY LINER (GCL) option for Junction Box Upgrade Program
Modification request required; can be emailed.
NMOCD Approved with conditions via email July 27, 2007

January 15, 2007

Corrective Action Plan for F-33

Vent Junction Box Site

Hobbs Salt Water Disposal System

NMOCD Case #:1R0428-58

R.T. Hicks Consultants, LTD

901 Rio Grande Blvd. NW, Suite F-142, Albuquerque, NM 87104

Table of Contents

List of Figures, Tables & Plates

1.0 EXECUTIVE SUMMARY

This Corrective Action Plan presents the results of the characterization activities performed by R.T. Hicks Consultants (Hicks Consultants) and Rice Operating Company (ROC) at the F-33 Vent Junction Box site located in the Hobbs Salt Water Disposal System (SWD) and proposes closure of the site after implementation of the selected remedy.

The selected remedy includes excavation and blending of the upper 16 feet of hydrocarbon-impacted soil, placing a clay barrier beneath the root zone, creation of an infiltration barrier through surface restoration and re-vegetation of the site, and natural biodegradation of the small mass of hydrocarbons that may reside in the vadose zone below the practical reach of a backhoe. Excavation and disposal of high concentration areas will be performed as required to facilitate. This remedy is protective of ground water quality, human health and the environment. After re-vegetation of the site, ROC will submit a final closure report.

Data Summary

1. Hicks Consultants supervised field activities at the F-33 Vent site in May 2006. This involved general reconnaissance as well as supervision of backhoe sampling of the upper vadose zone.

2. Due to safety concerns with the high voltage powerline immediately above the former vent, a backhoe was used to collect samples instead of a drilling rig, as originally proposed in the NMOCD-approved workplan. Samples were collected at 2 ft sample intervals from ground surface to a depth of 12 ft at points located approximately 10 feet east, west, north, and south of the former vent. In addition, samples were collected at 1 ft intervals to a depth of 16 ft at the former vent. Samples were field-tested for chloride content and screened with a photoionization detector (PID) for indications of hydrocarbons. Soil samples were also submitted to a laboratory for more detailed hydrocarbon analysis.

3. Chloride concentration data show concentrations in the vadose zone are less than 1,000 ppm. At the vent site, chloride concentrations were highest (848 mg/kg) at a depth of 6 feet bgs directly beneath the vent location and declined below 6 feet bgs to a concentration of 230 ppm at 16 feet. In all sampling excavations 10 feet east,

north, south and west, chloride concentrations were less than 500 ppm. Chloride levels showed a consistent decline with depth.

4. Hydrocarbon impact is confined to the close vicinity of the vent and within the upper portion of the vadose zone. Although some samples from excavations detected hydrocarbon vapors in excess of 100 ppm, laboratory analyses detected neither benzene nor toluene. At the vent site, concentrations of ethylybenzene and xylene were 37.7 and 65.3 mg/kg respectively at a depth of 12 feet below land surface. At 16 feet below land surface in this same sampling excavation, the ethylybenzene concentrations was 27.7 mg/kg and the xylene concentration was 0.3 mg/kg. At sampling sites north, south, east and west of the vent, ethylbenzene and xylene concentrations are less than 1 ppm.

5. On July 20, 2006, an air rotary drilling rig was used to advance two soil borings as close to the former vent as possible, in an attempt to provide more certainty that hydrocarbon impact did not extend laterally into the deep vadose zone. These borings confirmed no chloride or hydrocarbon impact to the vadose zone at these two locations 22 feet east and 30 feet west of the vent, respectively. The borings were terminated at a depth of 50 feet bgs.

6. Based on data from other nearby sites, particularly the E-33-1 junction box site, depth to groundwater at the F-33 vent site is estimated at approximately 65 feet bgs.

Conclusions

1. At the vent site, concentrations of hydrocarbons decline with depth, based upon PID readings. Laboratory analyses show that neither benzene nor toluene were detected in any samples. Xylene declines from 65.3 mg/kg at 14 feet bgs to 0.3 mg/kg at 16 feet bgs and ethylbenzene declines form 37.7 mg/kg to 27.7 mg/kg in this same depth interval. From these data we conclude that the mass of subsurface hydrocarbons is small and limited to the upper vadose zone.

2. We conclude that the mass of subsurface chloride release at this site was not large enough to necessitate detailed simulation modeling of constituent fate and transport.

3. Re-vegetation of the site will reduce the infiltration of precipitation and minimize the potential for any constituents of concern to migrate downward to ground water.

Recommendations

1. Excavation of a 10-foot by 10-foot area at the former vent site to a depth of 12 feet and blending of material in the upper 12-feet of the vadose zone until field tests of the excavated soil mixture do not exceed 100 ppm of total organic vapors using a calibrated photo-ionization meter with the appropriate lamp (headspace method) and chloride concentrations in the backfill will not exceed 1,000 ppm. Disposal of high concentration zones of hydrocarbons may be necessary to meet the prescribed concentrations.

2. A minimum 10-12 inch thick clay layer will be installed at the base of the root zone, about 4 feet below ground surface. The clay layer will be sloped to the southeast, will extend laterally to deflect any potential infiltrating water from the surface and will be compacted according to protocols applied to backfill in new pipeline trenches.

3. Restoration and re-vegetation of the ground surface.

4. Upon documentation of these actions ROC will submit a closure report for the F-33 Vent Junction Box site and request closure of the regulatory file.

2.0 BACKGROUND

The Hobbs Salt Water Disposal System (SWD), which managed produced water from the late 1950s to the present, is now closed. Future releases from the system infrastructure are not possible. With the abandonment of the system in 2002, Rice Operating Company (ROC) excavated and removed the F-33 Vent. Closure of facilities like the F-33 Vent site within Hobbs SWD followed the July 16, 2003 NMOCD approved junction box investigation plan. This plan calls for delineation of any impact from these sites during the closure process and states:

> *If 12 feet vertical delineation at the source reveals Target Concentrations for TPH or BTEX will not meet NMOCD guidelines or TPH and BTEX will meet guidelines but there is not a significant decline vs. depth in chloride concentration, the site-impact is judged to be outside the scope of this work plan and will become a risk-based corrective action (RBCA) project-site.*

The investigation and characterization used the same protocols as described in the NMOCD-approved work plan for the Section 29 sites and the field protocols were consistent with the Investigation Characterization Plan (ICP) submitted for the site (see Appendix A). However, the presence of electrical lines over the site prevented the use of a drill rig for deep vadose zone sampling, as originally proposed. Instead, a backhoe collected samples from the former vent site and nearby locations to the maximum reach of the backhoe, which is 14-16 feet. To determine if operation of the site caused lateral migration of chloride or hydrocarbons at depth, two soil borings were advanced as close as possible to the site.

2.1 Location

Plate 1 is an aerial photograph of the site when it was active, taken between 1996 and 1998 that shows the location of the boring and nearby roads.

The site is within unit letter F, Section 33, Township 18S Range 38E.

2.2 Characterization Activities

The investigation and characterization used the same protocols as described in the NMOCD-approved work plan for the Section 29 sites and was as consistent as possible with the Investigation Characterization Plan (ICP)

submitted for the site (see Appendix A) as possible given the site limitations noted in section 2.0 and below. In order to permit comparison of the results from site borings with the ambient chloride concentrations in the vadose zone, collection of samples from a background soil boring was a critical element of the ICP. Appendix B shows the results of field chloride measurements from the background soil boringlocated about 500 feet north of F-29-1b.

Due to safety concerns with the high voltage powerline immediately above the former vent, a backhoe under ROC supervision was used on May 22, 2006, to collect samples instead of a drilling rig. Samples were collected at 2 ft sample intervals from ground surface to a depth of 12 ft at points located approximately 10 feet east, west, north, and south of the former vent (figure 1). In addition, samples were collected at 1ft intervals to a depth of 16 ft at the former vent. Samples were field-tested for chloride content and screened with a PID for indications of hydrocarbons.

On July 20, 2006, an air rotary drilling rig was used to advance two soil borings as close to the former vent as possible, in an attempt to delineate the hydrocarbon impact vertically identified by the previous backhoe sampling activities. The first boring (B-1) was advanced at a point 22 ft east of the vent. The second (B-2) was placed 30 ft west of the vent.

Based on the results from the backhoe and soil boring sampling activities hydrocarbon-impact was confirmed in the upper vadose zone and is confined within the near vicinity of the F-33 vent. All data shows that there is negligible chloride impact to the vadose zone. Appendix B presents the results of the field program.

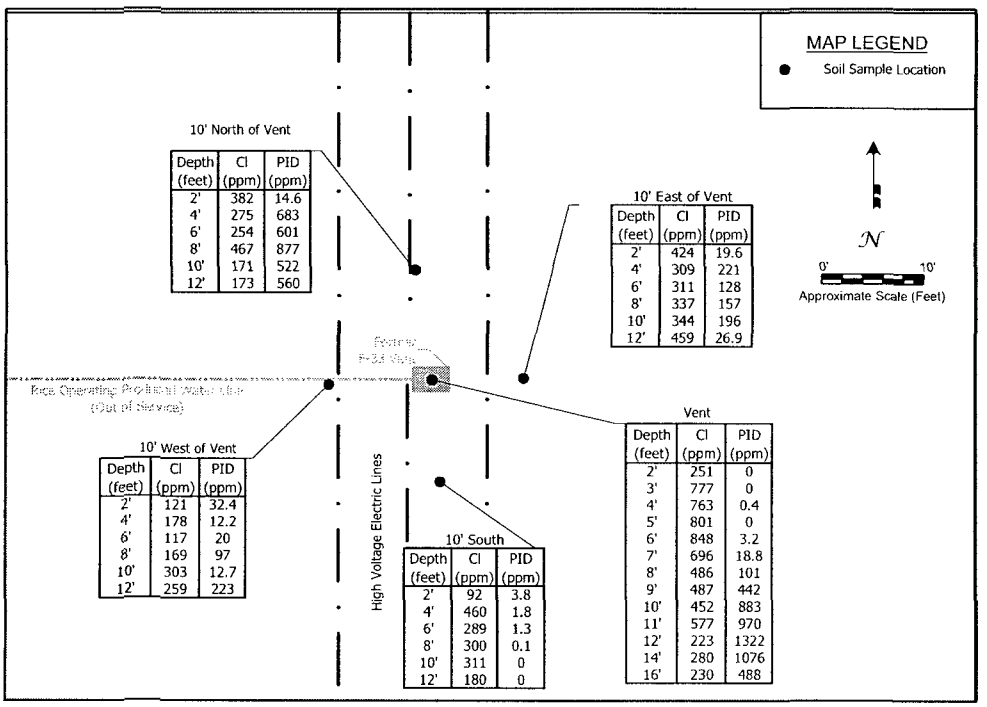


Figure 1 is a map depicting the preliminary field screening results at the site.

3.0 CHARACTERISTICS OF THE VADOSE ZONE

As the boring logs in Appendix B show, the upper 2 feet of the vadose zone at the site is composed a highly indurated caliche layer. Beneath the caliche is an 18 foot thick layer of calcic very fine-grained sand. An 8 foot thick layer of very fine to fine-grained sand with less calcic content lies below fine sand described earlier and this unit is underlain by calcic very-fine to fine-grained sand which continued to a depth of 50 feet bgs in boring B-2. A fine-grained sand with little or no calcium carbonate content was observed from 50 feet to the bottom of boring B-2 at 52 feet bgs. The lithologic logs for the two borings are included in Appendix B.

Chloride concentrations ranged from a maximum of 848 ppm at a point 6 ft below the vent source to a concentration of 92 ppm at a point 2 ft below a spot located 10 ft south of the former vent (see figure). The chloride concentration vs. depth profile is displayed in Figure 2.

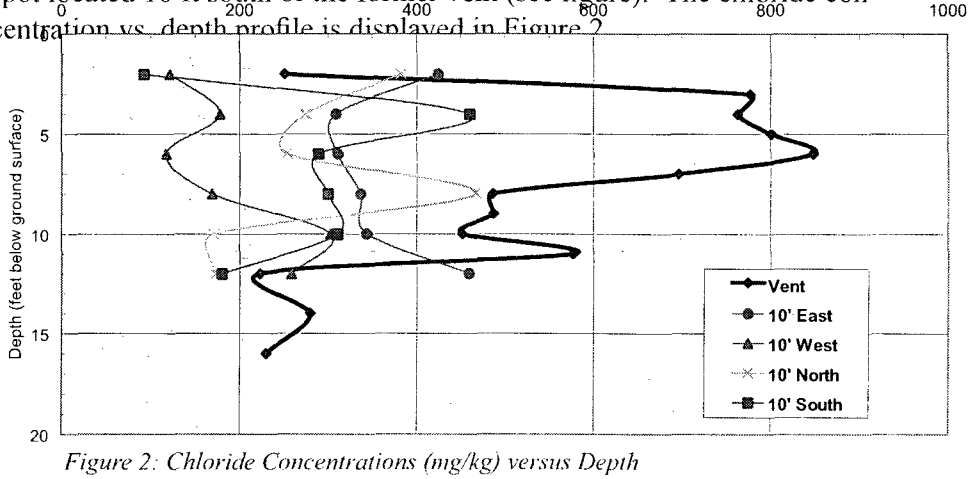


Figure 2: Chloride Concentrations (mg/kg) versus Depth

Soil samples with the highest PID readings and the deepest intervals were submitted to the laboratory for detailed hydrocarbon analysis using Methods 8260 for BTEX constituents and Method 1006 (a modified 8015 gas chromatography) for gas and diesel range organics (GRO and DRO) and carbon fractionation. The laboratory analytical reports and chain of custody documentation are included in Appendix C. The PID readings vs. depth profile is displayed in Figure 3.

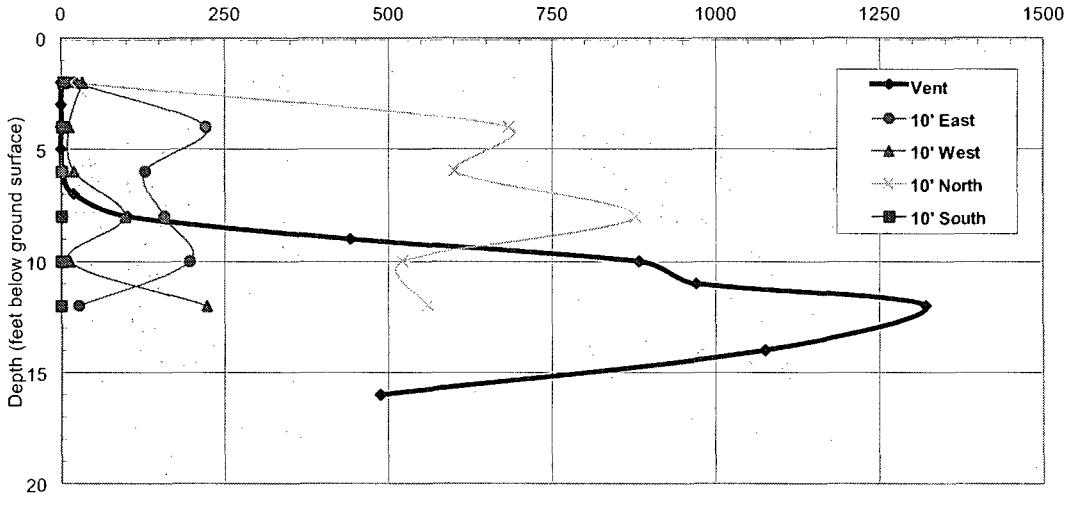


Figure 3: PID Readings (ppm) versus Depth

Based on the backhoe sampling results hydrocarbon-impact exists in the upper 16 feet of vadose zone and is confined within the near vicinity of the F-33 vent (less than 10-foot radius from the vent). Results of the laboratory analyses for regulated hydrocarbons are summarized in Table 1 below.

Location	Depth (Ft bgs)	Regulated Hydrocarbons (mg/kg)			
		B	T	E	X
Vent Source	12'	<0.025	<0.025	37.7	65.3
	16'	<0.025	<0.025	27.7	0.3
10 ft east of Vent	4'	<0.025	<0.025	0.513	0.429
	12'	<0.025	<0.025	0.516	<0.025
10 ft west of Vent	12'	<0.025	<0.025	0.117	0.058
10 ft north of vent	8'	<0.025	<0.025	0.094	0.590
	12'	<0.025	<0.025	0.073	0.293

Table 1: Summary of Regulated Hydrocarbons in the Vadose Zone

PID readings measured 0 ppm for each 2 ft interval sampled from 4 ft bgs to 20 ft bgs and then at 5 ft intervals from 20 ft bgs to 40 ft bgs in each boring. Chloride field-testing measurements varied from a minimum of 28 ppm in the 20-22 ft interval in boring B-2 to a maximum of 410 ppm in the 16-18 ft and 20-22 ft intervals of boring B-1. Results of the soil borings confirmed that any chloride and hydrocarbon impact to the vadose zone is confined to the near vicinity of the F-33 vent.

4.0 EVALUATION OF VERTICAL CHLORIDE FLUX

The chloride concentrations at the site are consistently well below 1,000 mg/kg. Moreover, chloride concentrations decrease with increasing depth, suggesting that saturated or near-saturated flow did not exist in the upper vadose zone. With the construction of the simple ET infiltration barrier described in section 6.0, unsaturated flow will decrease to near zero.

5.0 EVALUATION OF VERTICAL HYDROCARBON FLUX

With the construction of the simple ET infiltration barrier, unsaturated flow will decrease to near zero and any hydrocarbons in the upper vadose zone will not represent a threat to fresh water. Because of the low concentrations and attendant small mass of hydrocarbons neither unsaturated zone modeling or additional characterization is necessary at this site.

6.0 PROPOSED REMEDY

The proposed corrective action for this site is excavation of soils in the upper vadose zone to a depth of about 12 feet, which is the maximum reach of a standard backhoe, or to a shallower depth if field testing of soils shows that total organic vapors are less than 100 ppm. Field testing of soils employs the headspace method and a properly calibrated PID with a appropriate lamp. Soil with total organic vapor concentrations above 100 ppm as determined by field testing of soils will be hauled to an NMOCD-approved facility unless the volume of soil can be blended with clean soil and remediated on site. Upon completion of excavation activities, closure samples will be collected to verify hydrocarbon vapors do not exceed 100 ppm. Chloride concentrations in the back fill will not exceed 1,000 ppm.

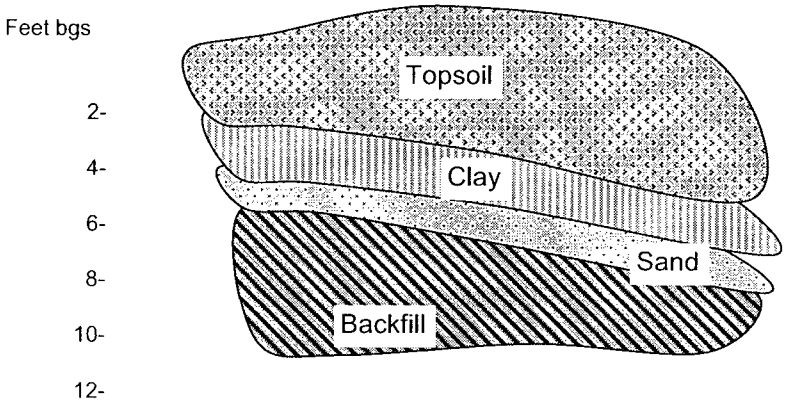


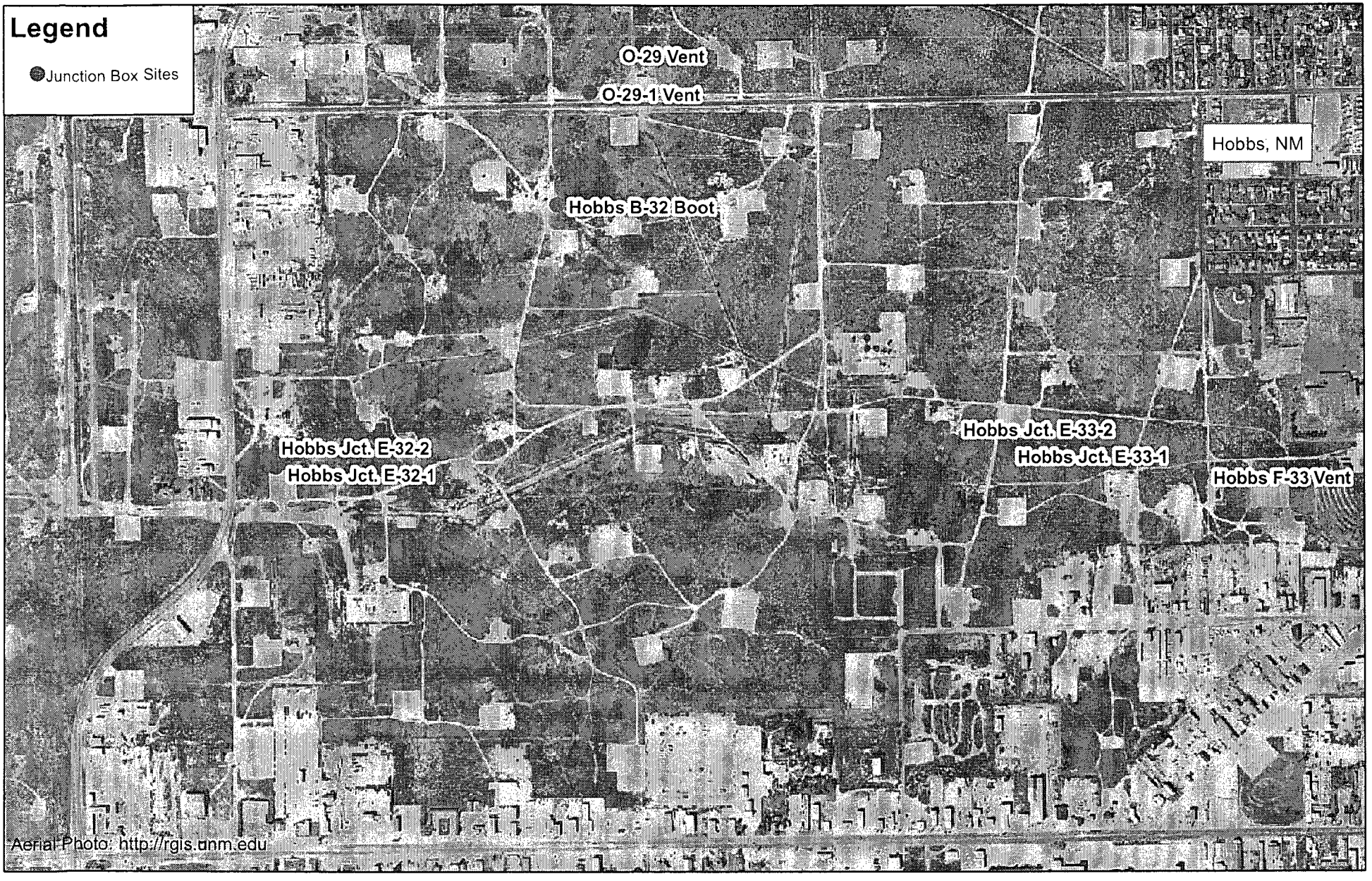
Figure 4: Schematic diagram of ET Infiltration Barrier

As shown in Figure 4, a minimum 10-12 inch thick clay layer will be installed at the base of the root zone, about 4-feet below ground surface. The clay layer will be sloped to the southeast and will extend laterally to insure sufficient deflection of any potential infiltrating water originating from the surface. The clay layer will be compacted using the same protocols employed to compact backfill in new pipeline trenches. Any excavated material that is not suitable as topsoil will be placed below the clay layer. If possible, a thin layer of coarse sand or caliche gravel excavated from the site will be placed immediately below the clay layer. The backfill (above the clay layer) will be composed of blended or remediated soil and will be placed up to a depth no higher than 2 feet bgs. This topsoil will also be compacted according to the same protocols employed for backfilling new pipeline trenches.

We propose incorporating clay and organic matter into the reserved topsoil and some sand/silt (as necessary) to create a 2-foot silt/loam topsoil surface layer, which will form an evapotranspiration (ET) barrier. HYDRUS-1D simulations of an ET infiltration barrier at other sites in the area and Sandia National Laboratory research of ET landfill covers demonstrate that vegetation on about 2-feet of fine-grained silt-loam effectively prevent measurable deep percolation of infiltration. This silt/loam soil combined with a vegetative cover will effectively sequester any residual hydrocarbons in the vadose zone. The surface will be contoured and reseeded with native vegetation to eliminate any ponding of precipitation and promote evapotranspiration, thereby minimizing natural infiltration. Over time, residual hydrocarbons will naturally biodegrade. Furthermore, the reduction of the deep percolation rate to essentially zero will prevent vertical migration of hydrocarbon constituents to ground water.

7.0 CRITERIA FOR CLOSURE

After completion of the proposed remedy, ROC will submit a final report documenting the work elements identified herein and request closure of the regulatory file.



R.T. Hicks Consultants, Ltd 901 Rio Grande Blvd NW Suite F-142 Albuquerque, NM 87104 Ph: 505.266.5004	Junction Box Site Location Map	Plate 1
	Rice Operating Company	January 2007

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Appendix A Investigation Characterization Plan

R. T. HICKS CONSULTANTS, LTD.

1909 Brunson Ave ▲ Midland TX 79701 ▲ 432.638.8740 ▲ Fax: 413.403.9968

CERTIFIED MAIL - RETURN RECIEPT NO. 7099 3400 0017 1737 2367

January 20, 2006

Mr. Wayne Price
New Mexico Oil Conservation Division
1220 South St. Francis Drive
Santa Fe, New Mexico 87505

RE: Investigation Characterization Plan: T18S R38E: E-33-1 Junction Box, B-32 Boot, E-32-1 Junction Box, E-32-2 Junction Box, F-33 Vent

Hobbs Salt Water Disposal System

Dear Mr. Price:

On behalf of Rice Operating Company, please accept this submission as our Initial Characterization Plan (ICP) for the five (5) sites referenced above within the Hobbs Salt Water Disposal System (Plate 1).

Rice Operating Company (ROC) is the service provider (operator) for the Hobbs Saltwater Disposal System and has no ownership of any portion of pipeline, well, or facility. A consortium of oil producers who own the Hobbs System (System Partners); provide all operating capital on a percentage ownership/usage basis. Major projects require System Partner authorization for expenditures (AFE) approval and work begins as funds are received. We will implement the work outlined herein after NMOCD approval and subsequent authorization from the System Partners.

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

1. protects public health,
2. provides the greatest net environmental benefit,
3. complies with NMOCD Rules, and
4. is supported by good science.

The last criteria employed when evaluating any proposed remedy or investigative work is confirming that there is a reasonable relationship between the benefits created by the proposed remedy or assessment and the economic and social costs.

Each site shall have three submissions or a combination of:

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

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

3. Finally, after implementing the remedy, a closure report with final documentation will be submitted.

Task 1 Evaluate Chloride and BTEXN Concentrations in Soil at Five Sites, Evaluate Ground Water Quality if Necessary

We will follow the same protocol for characterization of the unsaturated zone at the five new ROC sites listed below.

- E-33-1 Junction Box
- B-32 Boot
- E-32-1 Junction Box
- E-32-2 Junction Box
- F-33 Vent

At each of the above-referenced sites, we will locate the sampling borehole as close as practical to the suspected release source. Earlier, we inspected each of the five sites nominated in this ICP and identified the boring location before the sites were backfilled and re-graded. Due to our recent experience with difficulties encountered in the installation of well clusters in this area, we plan to employ hollow-stem auger drilling techniques for sampling.

We will screen each sample in the field for chlorides and volatile organic compounds using the methods described in QP-03 and QP-07 (attached), respectively. Soil lithology and the presence of any observed staining or odor will be recorded. For any site, if we detect evidence of leakage within 15 feet of the water table (e.g. field chloride greater than 250 ppm in soil samples) we will complete the boring as a monitoring well in accordance with NMOCD Guidance. If three soil samples taken at 5-foot intervals test below 250 ppm chloride and below 100 ppm total volatile organic compounds, we will terminate the boring. However, all borings will penetrate at least 30 feet of the vadose zone.

Task 2 Evaluate Chloride and Hydrocarbon Flux from the Vadose Zone to Ground Water

We anticipate that one or all of the five sites selected for borehole investigation will show evidence of seepage from the source to a depth of more than 15-feet. For these sites, excavation and disposal of released material can cause more environmental damage than it cures. For such sites, we propose to employ HYDRUS-1D and a simple ground water mixing model to evaluate the potential of any residual chloride and hydrocarbon mass in the vadose zone to impair ground water quality above WQCC Standards. We have selected these two constituents for simulation modeling because each of these constituents is typically found in produced water and each is specifically regulated by New Mexico ground water regulations (WQCC). We will also employ vadose zone hydrocarbon migration predictive tools commonly employed by NMED in their PST program.

Task 3 Provide Investigative Results and/or Corrective Action Plan

Because the Hobbs SWD System no longer carries produced water, additional releases of produced water to ground water are highly unlikely. If modeling shows that the residual chloride and hydrocarbon mass in the vadose zone poses a no threat to ground water quality, we will prepare a report that makes this demonstration and request site closure.

If simulation experiments suggest that residual constituents pose a threat to ground water quality or if the field program demonstrates impairment, we will expand upon the HYDRUS-1D model predictions described above to develop a remedy for the vadose zone. If necessary, we will simulate:

1. Excavation, disposal and replacement of clean soil to remove the chloride and hydrocarbon mass,
2. Installation of a low permeability barrier to minimize natural infiltration,
3. Surface grading and seeding to eliminate any ponding of precipitation and promote evapotranspiration, thereby minimizing natural infiltration, and
4. A combination of the above potential remedies.

We will select the vadose zone remedy that offers the greatest environmental benefit while causing the least environmental damage. If data suggest that the site has contributed chloride or hydrocarbons to ground water and caused ground water impairment, we will notify NMOCD and work collaboratively to determine the appropriate path forward.

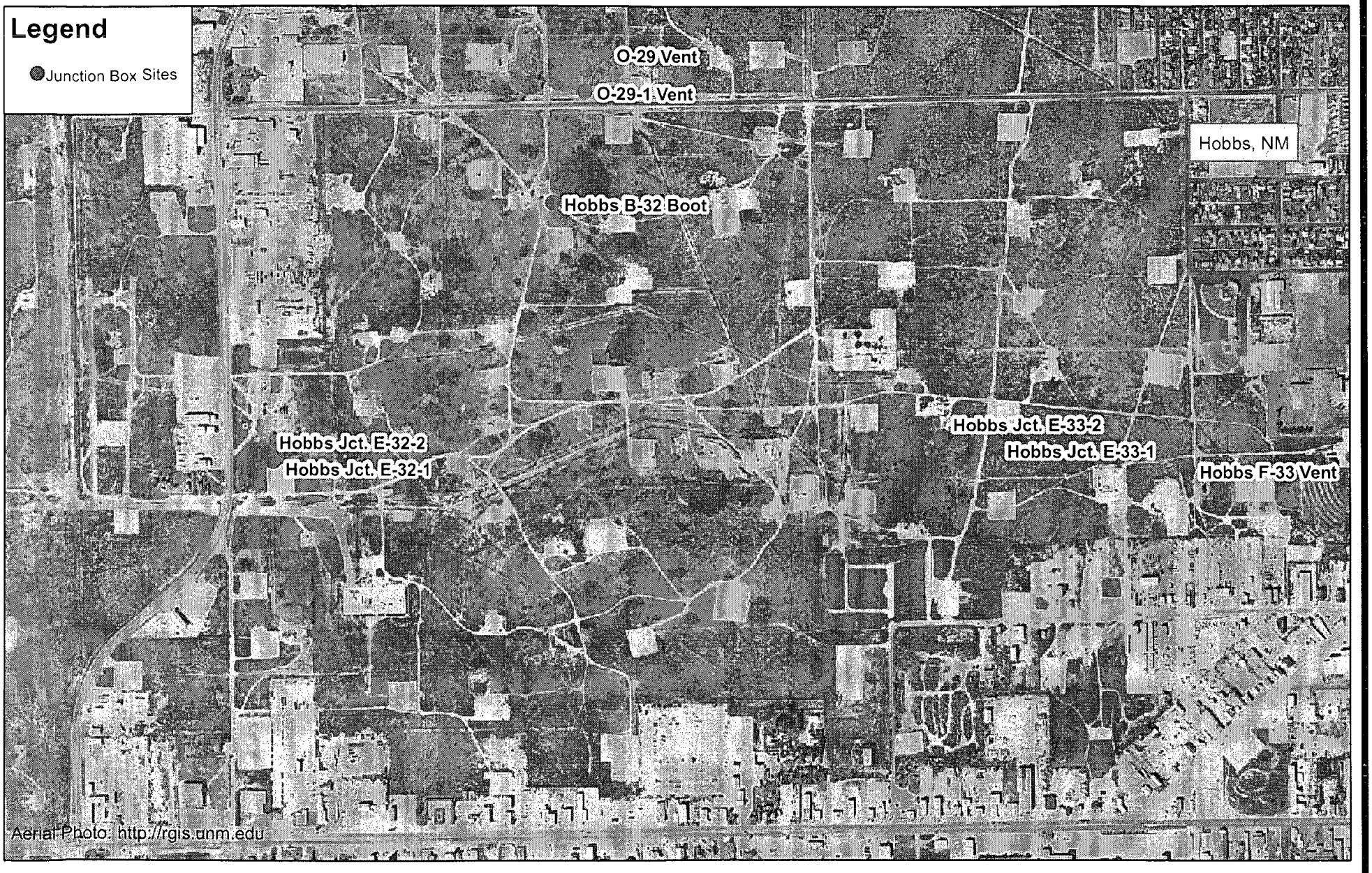
Proposed Schedule

With NMOCD's approval of this work plan, we can perform the field activities at these sites in February or March. In late April or May, we plan to deliver any individual Correction Action Plans to address residual constituents in the vadose zone and any reports requesting site closure. If data suggest ground water impairment we plan to conduct two quarters of ground water monitoring to confirm any initial result then meet with NMOCD to develop an appropriate path forward. Your approval to move forward with this work plan will facilitate approval of expenditures by the System Partners.

Sincerely,
R.T. Hicks Consultants, Ltd.

Gilbert Van Deventer
Project Manager

cc: Chris Williams, NMOCD Hobbs District Office
Carolyn Haynes, Rice Operating Company - Hobbs
Kristin Pope, Rice Operating Company – Hobbs
Randy Hicks, R. T. Hicks Consultants, Ltd. - Albuquerque



R.T. Hicks Consultants, Ltd 901 Rio Grande Blvd NW Suite F-142 Albuquerque, NM 87104 Ph: 505.266.5004	Junction Box Site Location Map	Plate 1
	Rice Operating Company	December 2006

Rice Operating Company

QUALITY PROCEDURE - 03
Sampling and Testing Protocol - Chloride Titration Using .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. Ifnecessary, prepare a composite san1ple 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 large 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 10 grams of reverse osmosis water to the soil sample and shake for 20 seconds.

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

4.4 Carefully pour the free liquid extract from the sample through a paper filter into a clean plastic cup if necessary.

5.0 Titration Procedure

5.1 Using a graduated pipette, remove 10 m1 extract and dispense into a clean plastic cup.

5.2 Add 2-3 drops potassium chromate (K:zcrO4) to mixture.

5.3 If the sample contains any sulfides (hydrogen or iron sulfides are common to oilfield soil samples) add 2-3 drops of hydrogen peroxide (HZO2) to mixture.

5.4 Using a 10 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.

5.5 Record the ml of silver nitrate used.

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

$$\frac{0.282 \times 35{,}450 \times \text{ml } AgNO_3}{\text{ml water extract}} \times \frac{\text{grams of water in mixture}}{\text{grams of soil in mixture}}$$

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 Operating Company

QUALITY PROCEDURE -07
Sampling and Testing Protocol for VOC in Soil

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

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

3.0 Procedure

3.1 Sample Collection and Preparation

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

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

3.1.3 The sealed samples shall be allowed to set for a minimum of five minutes at a temperature of between 10-15 Celsius, (59-77° 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 an Environmental Instruments 13471 OVM / Datalogger or a similar pro-type instrument. (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.

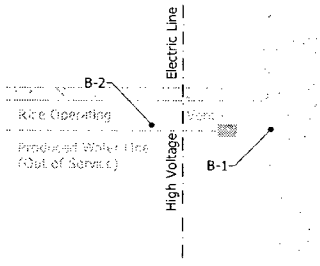
3.2.4 If the instrument provides a reading exceeding 100 ppm, proceed to conduct BTEX Speciation in accordance with QP-O2 and QP-O6. If the reading is 100 ppm or less, NMOCD BTEX guideline has been met and no further testing fur BTEX is necessary. File the Field Test Report Form in the project file.

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.

Appendix B Results of Field Measurements

LITHOLOGIC LOG

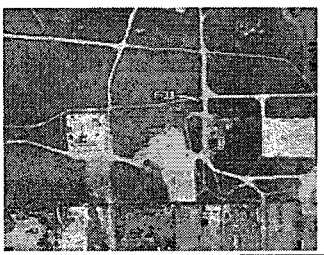


MONITOR WELL NO.: **B-1**
SITE ID: Hobbs F-33 Vent
CONTRACTOR: Harrison & Cooper Drilling Inc.
DRILLING METHOD: Air Rotary
START DATE: 07/20/06
COMPLETION DATE: 07/20/06
COMMENTS: Located 22 ft east and 3 ft north of former vent location.
Presence of high voltage powerline prevented safe drilling directly above vent location.

TOTAL DEPTH: 51 Feet
CLIENT: RICE Operating Company
COUNTY: Lea
STATE: New Mexico
LOCATION: T18S-R38E-Sec 33-Unit F
FIELD REP.: G. Van Deventer / M. Franks

USCS	Sample Depth	Sample Time	Sample Type	Recovery (inches)	Chloride (ppm)	PID (ppm)	LITHOLOGIC DESCRIPTION: LITHOLOGY, COLOR, GRAIN SIZE, SORTING, ROUNDING, CONSOLIDATION, DISTINGUISHING FEATURES
	5	0900	Split Spoon	24"	178	0	Calcic very fine and fine-grained sand. Sand component is grayish orange (10 YR 7/4), fine-grained, subangular, moderately well sorted, dry. Calcic matrix is very pale orange (10 YR 8/2).
	10	0903	Split Spoon	24"	144	0	Calcic very fine and fine-grained sand. Sand component is grayish orange (10 YR 7/4), fine-grained, subangular, moderately well sorted, dry. Calcic matrix is very pale orange (10 YR 8/2).
		0906	Split Spoon	12"	292	0	Calcic very fine and fine-grained sand. Sand component is grayish orange (10 YR 7/4), fine-grained, subangular, moderately well sorted, dry. Calcic matrix is very pale orange (10 YR 8/2).
	15						
		0912	Split Spoon	4"	410	0	Calcic very fine and fine-grained sand. Sand component is grayish orange (10 YR 7/4), fine-grained, subangular, moderately well sorted, dry. Calcic matrix is very pale orange (10 YR 8/2). Much harder
	20						
		0916	Split Spoon	4"	410	0	Calcic very fine and fine-grained sand. Sand component is grayish orange (10 YR 7/4), fine-grained, subangular, moderately well sorted, dry. Calcic matrix is very pale orange (10 YR 8/2). Much harder
SM/CAL	25						
		0928	Split Spoon	0.5"	313	0	Calcic very fine and fine-grained sand. Sand component is grayish orange (10 YR 7/4), fine-grained, subangular, moderately well sorted, dry. Calcic matrix is very pale orange (10 YR 8/2). Very hard.
	30	0930	Cuttings	NA	223	0	Calcic very fine and fine-grained sand. Sand component is grayish orange (10 YR 7/4), fine-grained, subangular, moderately well sorted, dry. Calcic matrix is very pale orange (10 YR 8/2). Very hard.
	35	0933	Cuttings	NA	119	0	Calcic very fine and fine-grained sand. Sand component is grayish orange (10 YR 7/4), fine-grained, subangular, moderately well sorted, dry. Calcic matrix is very pale orange (10 YR 8/2). Very hard.
		0940	Split Spoon	1"	89	0	Calcic very fine and fine-grained sand. Sand component is grayish orange (10 YR 7/4), fine-grained, subangular, moderately well sorted, dry. Calcic matrix is very pale orange (10 YR 8/2). Very hard.
	40						
	45	0945	Cuttings	NA	89	0	Calcic very fine and fine-grained sand. Sand component is grayish orange (10 YR 7/4), fine-grained, subangular, moderately well sorted, dry. Calcic matrix is very pale orange (10 YR 8/2). Very hard.
	50						
SW		0955	Split Spoon	12"		0	Light brown sand (5 YR 6/4) and grayish orange (10 YR 7/4) fine sand, subrounded, moderately well sorted.
	55						Bottom of boring at 52 feet below ground surface.
	60						

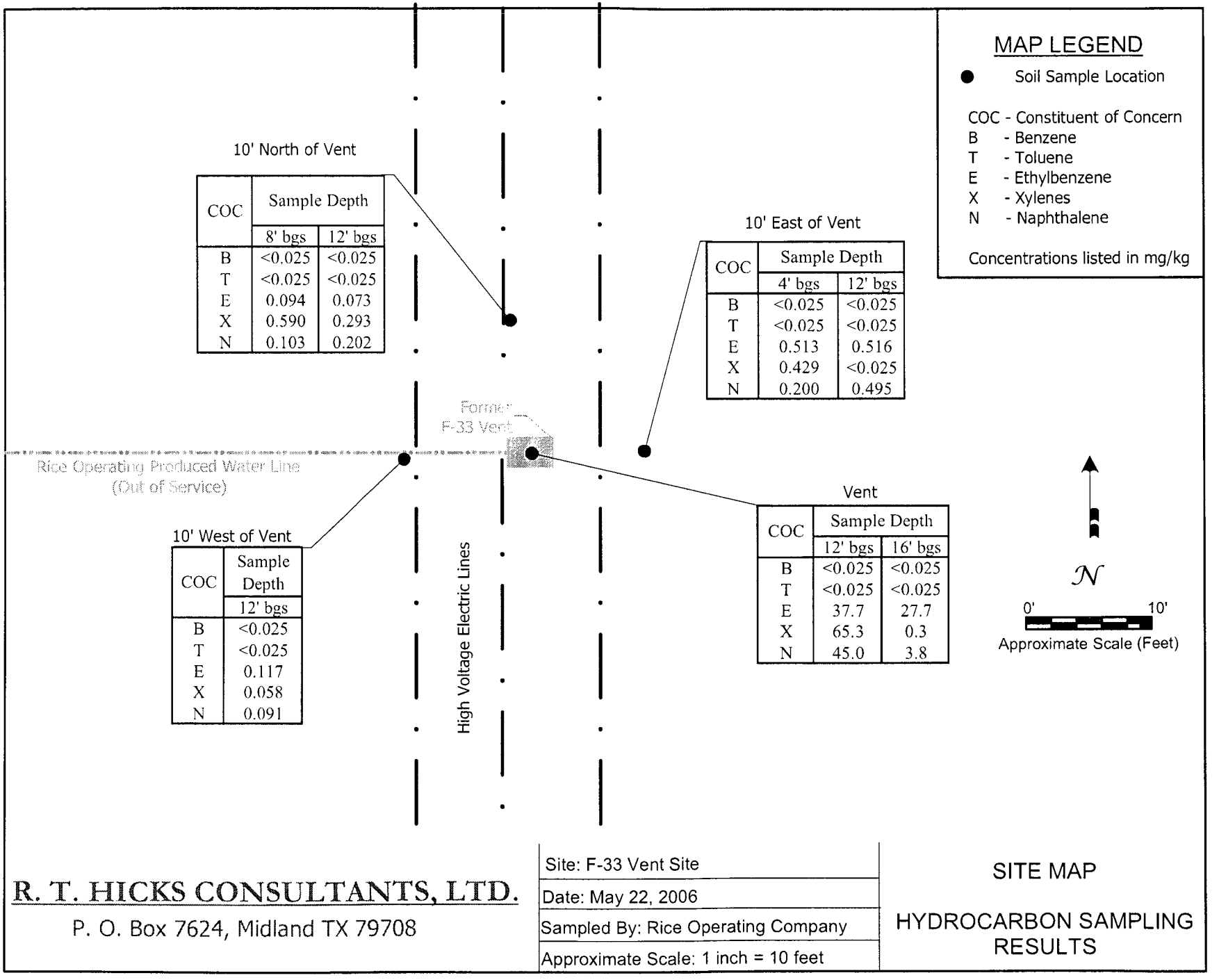
LITHOLOGIC LOG



MONITOR WELL NO.: **B-2**
SITE ID: Hobbs F-33 Vent
CONTRACTOR: Harrison & Cooper Drilling Inc.
DRILLING METHOD: Air Rotary
START DATE: 07/20/06
COMPLETION DATE: 07/20/06
COMMENTS: Located 30 ft west of former vent location.
Presence of high voltage powerline prevented safe drilling directly above vent location.

TOTAL DEPTH: 40 Feet
CLIENT: RICE Operating Company
COUNTY: Lea
STATE: New Mexico
LOCATION: T18S-R38E-Sec 33-Unit F
FIELD REP.: G. Van Deventer / M. Franks

USCS	Sample Depth	Sample Time	Sample Type	Recovery (inches)	Chloride (ppm)	PID (ppm)	LITHOLOGIC DESCRIPTION: LITHOLOGY, COLOR, GRAIN SIZE, SORTING, ROUNDING, CONSOLIDATION, DISTINGUISHING FEATURES
CAL							Caliche
SM/CAL	5	1030	Split Spoon	24"	144	0	Calcic very fine and fine-grained sand. Moderately hard to hard. Sand component is grayish orange (10 YR 7/4), fine-grained, subangular, moderately well sorted, dry. Calcic matrix is very pale orange (10 YR 8/2).
	10	1032	Split Spoon	24"	113	0	Calcic very fine and fine-grained sand. Moderately hard to hard. Sand component is grayish orange (10 YR 7/4), fine-grained, subangular, moderately well sorted, dry. Calcic matrix is very pale orange (10 YR 8/2).
		1035	Split Spoon	24"	86	0	Calcic very fine and fine-grained sand. Moderately hard to hard. Sand component is grayish orange (10 YR 7/4), fine-grained, subangular, moderately well sorted, dry. Calcic matrix is very pale orange (10 YR 8/2).
	15	1038	Split Spoon	12"	60	0	Calcic very fine and fine-grained sand. Moderately hard to hard. Sand component is grayish orange (10 YR 7/4), fine-grained, subangular, moderately well sorted, dry. Calcic matrix is very pale orange (10 YR 8/2).
	20	1040	Split Spoon	12"	28	0	Very fine and fine-grained sand with less calcium carbonate. Light brown (5YR 6/4), subrounded, moderately sorted.
SW/SM	25	1051	Cuttings	NA	58	0	Very fine and fine-grained sand with less calcium carbonate. Light brown (5YR 6/4), subrounded, moderately sorted.
	30	1053	Cuttings	NA	60	0	Calcic very fine and fine-grained sand. Sand component is grayish orange (10 YR 7/4), fine-grained, subangular, moderately well sorted, dry. Calcic matrix is very pale orange (10 YR 8/2).
SM/CAL	35	1057	Cuttings	NA	57	0	Calcic very fine and fine-grained sand. Sand component is grayish orange (10 YR 7/4), fine-grained, subangular, moderately well sorted, dry. Calcic matrix is very pale orange (10 YR 8/2).
	40	1100	Split Spoon			0	Calcic very fine and fine-grained sand. Sand component is grayish orange (10 YR 7/4), fine-grained, subangular, moderately well sorted, dry. Calcic matrix is very pale orange (10 YR 8/2).
							Bottom of boring at 40 feet below ground surface.
	45						
	50						
	55						
	60						



R. T. HICKS CONSULTANTS, LTD.

P. O. Box 7624, Midland TX 79708

Site: F-33 Vent Site

Date: May 22, 2006

Sampled By: Rice Operating Company

Approximate Scale: 1 inch = 10 feet

SITE MAP

HYDROCARBON SAMPLING RESULTS

Appendix C Analytical Reports

Hobbs F-33 Vent Site
T18S-R38E-Section 33, Unit Letter F

Summary Table

Sample Location: Source

Analysis	Analyical Method	Compounds	Sample Depth	
			12' bgs	16' bgs
BTEX	8021B	Benzene	<0.025	<0.025
		Toluene	<0.025	<0.025
		Ethylbenzene	37.7	27.7
		Xylene	65.3	0.3
		Naphthalene	45.0	3.8
		Total BTEXN	148	32
TPH	8015M	GRO	2250	1120
		DRO	10470	11300
		Total TPH	12720	12420
Aliphatics	TX1006	>C6-C8	50.8	<10
		>C8-C10	421	110
		>C10-C12	892	345
		>C12-C16	2460	1540
		>C16-C21	2300	1830
		>C21-C35	1690	1440
Aromatics	TX1006	>C6-C8	6.44	5.77
		>C8-C10	69.5	46.7
		>C10-C12	290	146
		>C12-C16	1340	769
		>C16-C21	1760	1340
		>C21-C35	1670	1390

Sample Location: 10 Feet East of Source

Analysis	Analyical Method	Compounds	Sample Depth	
			4' bgs	12' bgs
BTEX	8021B	Benzene	<0.025	<0.025
		Toluene	<0.025	<0.025
		Ethylbenzene	0.513	0.516
		Xylene	0.429	<0.025
		Naphthalene	0.200	0.495
		Total BTEXN	1.142	1.011
TPH	8015M	GRO	596	25
		DRO	10480	1180
		Total TPH	11076	1205
Aliphatics	TX1006	>C6-C8	<10	---
		>C8-C10	45.4	---
		>C10-C12	383	---
		>C12-C16	1800	---
		>C16-C21	2300	---
		>C21-C35	2660	---
Aromatics	TX1006	>C6-C8	5.79	---
		>C8-C10	45.8	---
		>C10-C12	55.7	---
		>C12-C16	669	---
		>C16-C21	1850	---
		>C21-C35	2880	---

Hobbs F-33 Vent Site
T18S-R38E-Section 33, Unit Letter F

Sample Location: 10 Feet North of Source

Analysis	Analyical Method	Compounds	Sample Depth	
			8' bgs	12' bgs
BTEX	8021B	Benzene	<0.025	<0.025
		Toluene	<0.025	<0.025
		Ethylbenzene	0.094	0.073
		Xylene	0.590	0.293
		Naphthalene	0.103	0.202
		Total BTEXN	0.787	0.568
TPH	8015M	GRO	1540	1450
		DRO	7462	7535
		Total TPH	9002	8985
Aliphatics	TX1006	>C6-C8	<10	<10
		>C8-C10	268	126
		>C10-C12	941	611
		>C12-C16	2650	1840
		>C16-C21	2470	1710
		>C21-C35	1840	1210
Aromatics	TX1006	>C6-C8	5.13	4.16
		>C8-C10	62.1	49.2
		>C10-C12	302	229
		>C12-C16	1070	882
		>C16-C21	1520	1120
		>C21-C35	1230	984

Sample Location: 10 Feet West of Source

Analysis	Analyical Method	Compounds	Sample Depth
			12' bgs
BTEX	8021B	Benzene	<0.025
		Toluene	<0.025
		Ethylbenzene	0.117
		Xylene	0.058
		Naphthalene	0.091
		Total BTEXN	0.267
TPH	8015M	GRO	877
		DRO	7353
		Total	8230
Aliphatics	TX1006	>C6-C8	---
		>C8-C10	---
		>C10-C12	---
		>C12-C16	---
		>C16-C21	---
		>C21-C35	---
Aromatics	TX1006	>C6-C8	---
		>C8-C10	---
		>C10-C12	---
		>C12-C16	---
		>C16-C21	---
		>C21-C35	---

All concentrations listed in units of milligrams per kilogram (mg/kg)

TRACEANALYSIS, INC.

6701 Aberdeen Avenue, Suite 9 Lubbock, Texas 79424 800•378•1296 806•794•1296 FAX 806•794•1298
155 McCutcheon, Suite H El Paso, Texas 79932 888•588•3443 915•585•3443 FAX 915•585•4944
E-Mail lab@traceanalysis.com

Analytical and Quality Control Report

Kristen Farris-Pope
Rice Operating Company
122 W Taylor Street
Hobbs, NM, 88240

Report Date: August 1, 2006

Work Order: 6072111

Project Location: Sec 33/F T185 R 38E,Hobbs,NM
Project Name: Hobbs F-33 Vent
Project Number: Hobbs F-33 Vent

Enclosed are the Analytical Report and Quality Control Report for the following sample(s) submitted to TraceAnalysis, Inc.

Sample	Description	Matrix	Date Taken	Time Taken	Date Received
96002	B-1 (20'-22')	soil	2006-07-20	09:16	2006-07-20

These results represent only the samples received in the laboratory. The Quality Control Report is generated on a batch basis. All information contained in this report is for the analytical batch(es) in which your sample(s) were analyzed.

Dr. Blair Leftwich, Director

Analytical Report

Sample: 96002 - B-1 (20'-22')

Analysis:	Chloride (IC)	Analytical Method:	E 300.0	Prep Method:	N/A
QC Batch:	28528 [a]	Date Analyzed:	2006-07-30	Analyzed By:	WB
Prep Batch:	24944	Sample Preparation:	2006-07-29	Prepared By:	WB

[a]Matrix spike not reported %IA is 105 and RPD is 1.

Parameter	Flag	RL Result	Units	Dilution	RL
Chloride		**280**	mg/Kg	10	1.00

Matrix Blank (1) QC Batch: 28528

QC Batch:	28528	Date Analyzed:	2006-07-30	Analyzed By:	WB
Prep Batch:	24944	QC Preparation:	2006-07-29	Prepared By:	WB

Parameter	Flag	MDL Result	Units	RL
Chloride		<0.0222	mg/Kg	1

Laboratory Control Spike (LCS-1)

QC Batch:	28528	Date Analyzed:	2006-07-30	Analyzed By:	WB
Prep Batch:	24944	QC Preparation:	2006-07-29	Prepared By:	WB

Param	LCS Result	LCSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	RPD	Rec. Limit	RPD Limit
Chloride	13.2	13.3	mg/Kg	1	12.5	<0.0222	106	0	90 - 110	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Standard (ICV-1)

QC Batch: 28528 Date Analyzed: 2006-07-30 Analyzed By: WB

Param	Flag	Units	ICVs True Conc.	ICVs Found Conc.	ICVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Chloride		mg/Kg	12.5	12.1	97	90 - 110	2006-07-30

Standard (CCV-1)

QC Batch: 28528 Date Analyzed: 2006-07-30 Analyzed By: WB

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Chloride		mg/Kg	12.5	12.0	96	90 - 110	2006-07-30

1061

6701 Aberdeen Avenue, Ste. 9
Lubbock, Texas 79424
Tel (806) 794-1296
Fax (806) 794-1298
1 (800) 378-1296
email: lab@traceanalysis.com

TraceAnalysis, Inc.

155 McCutcheon, Suite H
El Paso, Texas 79932
Tel (915) 585-3443
Fax (915) 585-4944
1 (888) 588-3443

CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

LAB Order ID # 6072111

Company Name: Rice Operating Co.
Phone #: (505) 393-9174
Address: (Street, City, Zip) 122 W. Taylor Hobbs, NM 88240
Fax #: (505) 397-1471
Contact Person: Kristin Pope/Melanie Franks
E-mail: Kpope@riceswd.com/mfranks@riceswd.com
Invoice to: (If different from above) gilbert@thicksconsult.com
Project #: Hobbs F-33 Vent
Project Name: Hobbs F-33 Vent
Project Location (including state): Sec 33/F T18S R 38E Hobbs NM
Sampler Signature: Robert Vanlandt

LAB # (LAB USE ONLY)	FIELD CODE	# CONTAINERS	Volume / Amount	MATRIX: WATER	SOIL	AIR	SLUDGE	PRESERVATIVE METHOD: HCl	HNO_3	H_2SO_4	NaOH	ICE	NONE	SAMPLING: DATE	TIME
96002	B-1 (20'-22')	1	402		✓							✓		7/20/06	0916

ANALYSIS REQUEST (Circle or Specify Method No.)

MTBE 8021B / 602 / 8260B / 624	BTEX 8021B / 602 / 8260B / 624	TPH 418.1 / TX1005 / TX1005 Ext(C35)	TPH 8015 GRO / DRO / TVHC	PAH 8270C / 625	Total Metals Ag As Ba Cd Cr Pb Se Hg 6010B/200.7	TCLP Metals Ag As Ba Cd Cr Pb Se Hg	TCLP Volatiles	TCLP Semi Volatiles	TCLP Pesticides	RCI	GC/MS Vol. 8260B / 624	GC/MS Semi. Vol. 8270C / 625	PCB's 8082 / 608	Pesticides 8081A / 608	BOD, TSS, pH	Moisture Content	Chloride					Turn Around Time if different from standard	Hold
																	✓						

Relinquished by:	Date:	Time:	Received by:	Date:	Time:
[signature]	7/20	3:15	Helen Shelton	7/20/06	1520
Relinquished by:	Date:	Time:	Received by:	Date:	Time:
Helen Shelton	7/20/06	1700			
Relinquished by:	Date:	Time:	Received at Laboratory by:	Date:	Time:
			[signature]	7-21-06	10:00

Submittal of samples constitutes agreement to Terms and Conditions listed on reverse side of C. O. C. 1 - HS

ORIGINAL COPY

LAB USE ONLY

Intact Y / N
Headspace Y / N
Temp 4 °
Log-in-Review MT

REMARKS:

- ☐ Dry Weight Basis Required
- ☐ TRRP Report Required
- ☐ Check If Special Reporting Limits Are Needed

37147814

Carrier # Courier / Lone Star

ENVIRONMENTAL LAB OF

12600 West I-20 East - Odessa, Texas 79765

Analytical Report

Prepared for:

Kristin Farris-Pope

Rice Operating Co.

122 W. Taylor

Hobbs, NM 88240

Project: F-33 Vent (UN0080)

Project Number: Hobbs Abandonment

Location: T18S, R38E, Sec. 33, Unit Letter F

Lab Order Number: 6E25001

Report Date: 06/07/06

Rice Operating Co.	Project: F-33 Vent (UN0080)	Fax: (505) 397-1471
122 W. Taylor	Project Number: Hobbs Abandonment	**Reported:**
Hobbs NM, 88240	Project Manager: Kristin Farris-Pope	06/07/06 10:45

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
Source 12'	6E25001-01	Soil	05/22/06 10:30	05/25/06 08:00
Source 16'	6E25001-02	Soil	05/22/06 11:10	05/25/06 08:00
10' east 4'	6E25001-03	Soil	05/22/06 11:55	05/25/06 08:00
10' east 12'	6E25001-04	Soil	05/22/06 14:04	05/25/06 08:00
10' north 8'	6E25001-05	Soil	05/22/06 14:10	05/25/06 08:00
10' north 12'	6E25001-06	Soil	05/22/06 14:25	05/25/06 08:00
10' west 12'	6E25001-07	Soil	05/22/06 14:50	05/25/06 08:00

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

Rice Operating Co.	Project: F-33 Vent (UN0080)	Fax: (505) 397-1471
122 W. Taylor	Project Number: Hobbs Abandonment	**Reported:**
Hobbs NM, 88240	Project Manager: Kristin Farris-Pope	06/07/06 10:45

Organics by GC

Environmental Lab of Texas

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Source 12' (6E25001-01) Soil									
Carbon Ranges C6-C12	**2250**	20.0	mg/kg dry	2	EF60219	06/02/06	06/05/06	EPA 8015M	
Carbon Ranges C12-C28	**9470**	20.0	"	"	"	"	"	"	
Carbon Ranges C28-C35	**1000**	20.0	"	"	"	"	"	"	
Total Hydrocarbon nC6-nC35	**12700**	20.0	"	"	"	"	"	"	
Surrogate: 1-Chlorooctane		*67.4 %*	*70-130*		"	"	"	"	*S-06*
Surrogate: 1-Chlorooctadecane		*59.6 %*	*70-130*		"	"	"	"	*S-06*
Source 16' (6E25001-02) Soil									
Carbon Ranges C6-C12	**1120**	20.0	mg/kg dry	2	EF60219	06/02/06	06/05/06	EPA 8015M	
Carbon Ranges C12-C28	**9970**	20.0	"	"	"	"	"	"	
Carbon Ranges C28-C35	**1330**	20.0	"	"	"	"	"	"	
Total Hydrocarbon nC6-nC35	**12400**	20.0	"	"	"	"	"	"	
Surrogate: 1-Chlorooctane		*58.4 %*	*70-130*		"	"	"	"	*S-06*
Surrogate: 1-Chlorooctadecane		*58.2 %*	*70-130*		"	"	"	"	*S-06*
10' east 4' (6E25001-03) Soil									
Carbon Ranges C6-C12	**596**	20.0	mg/kg dry	2	EF60219	06/02/06	06/05/06	EPA 8015M	
Carbon Ranges C12-C28	**8900**	20.0	"	"	"	"	"	"	
Carbon Ranges C28-C35	**1580**	20.0	"	"	"	"	"	"	
Total Hydrocarbon nC6-nC35	**11100**	20.0	"	"	"	"	"	"	
Surrogate: 1-Chlorooctane		*52.8 %*	*70-130*		"	"	"	"	*S-06*
Surrogate: 1-Chlorooctadecane		*54.2 %*	*70-130*		"	"	"	"	*S-06*
10' east 12' (6E25001-04) Soil									
Carbon Ranges C6-C12	**24.8**	20.0	mg/kg dry	2	EE62507	05/25/06	05/26/06	EPA 8015M	
Carbon Ranges C12-C28	**978**	20.0	"	"	"	"	"	"	
Carbon Ranges C28-C35	**202**	20.0	"	"	"	"	"	"	
Total Hydrocarbon nC6-nC35	**1200**	20.0	"	"	"	"	"	"	
Surrogate: 1-Chlorooctane		*52.6 %*	*70-130*		"	"	"	"	*S-06*
Surrogate: 1-Chlorooctadecane		*55.2 %*	*70-130*		"	"	"	"	*S-06*

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Rice Operating Co.	Project: F-33 Vent (UN0080)	Fax: (505) 397-1471
122 W. Taylor	Project Number: Hobbs Abandonment	**Reported:**
Hobbs NM, 88240	Project Manager: Kristin Farris-Pope	06/07/06 10:45

Organics by GC

Environmental Lab of Texas

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
10' north 8' (6E25001-05) Soil									
Carbon Ranges C6-C12	**1540**	20.0	mg/kg dry	2	EF60219	06/02/06	06/05/06	EPA 8015M	
Carbon Ranges C12-C28	**6860**	20.0	"	"	"	"	"	"	
Carbon Ranges C28-C35	**602**	20.0	"	"	"	"	"	"	
Total Hydrocarbon nC6-nC35	**9000**	20.0	"	"	"	"	"	"	
Surrogate: 1-Chlorooctane		*69.6 %*	*70-130*		"	"	"	"	*S-06*
Surrogate: 1-Chlorooctadecane		*68.2 %*	*70-130*		"	"	"	"	*S-06*
10' north 12' (6E25001-06) Soil									
Carbon Ranges C6-C12	**1450**	20.0	mg/kg dry	2	EF60219	06/02/06	06/05/06	EPA 8015M	
Carbon Ranges C12-C28	**6910**	20.0	"	"	"	"	"	"	
Carbon Ranges C28-C35	**625**	20.0	"	"	"	"	"	"	
Total Hydrocarbon nC6-nC35	**8980**	20.0	"	"	"	"	"	"	
Surrogate: 1-Chlorooctane		*66.8 %*	*70-130*		"	"	"	"	*S-06*
Surrogate: 1-Chlorooctadecane		*69.8 %*	*70-130*		"	"	"	"	*S-06*
10' west 12' (6E25001-07) Soil									
Carbon Ranges C6-C12	**877**	20.0	mg/kg dry	2	EE62507	05/25/06	05/28/06	EPA 8015M	
Carbon Ranges C12-C28	**6750**	20.0	"	"	"	"	"	"	
Carbon Ranges C28-C35	**603**	20.0	"	"	"	"	"	"	
Total Hydrocarbon nC6-nC35	**8230**	20.0	"	"	"	"	"	"	
Surrogate: 1-Chlorooctane		*57.4 %*	*70-130*		"	"	"	"	*S-06*
Surrogate: 1-Chlorooctadecane		*59.4 %*	*70-130*		"	"	"	"	*S-06*

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Rice Operating Co.	Project: F-33 Vent (UN0080)	Fax: (505) 397-1471
122 W. Taylor	Project Number: Hobbs Abandonment	**Reported:**
Hobbs NM, 88240	Project Manager: Kristin Farris-Pope	06/07/06 10:45

Fractionation of Aliphatics by TNRCC Method 1006

Environmental Lab of Texas

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Source 12' (6E25001-01) Soil									
C6-C8	**50.8**	10.0	mg/kg dry	1	EF60608	06/02/06	06/06/06	TX 1006	
>C8-C10	**421**	10.0	"	"	"	"	"	"	
>C10-C12	**892**	10.0	"	"	"	"	"	"	
>C12-C16	**2460**	10.0	"	"	"	"	"	"	
>C16-C21	**2300**	10.0	"	"	"	"	"	"	
>C21-C35	**1690**	10.0	"	"	"	"	"	"	
Total Hydrocarbon nC6-nC35	**7810**	10.0	"	"	"	"	"	"	
Source 16' (6E25001-02) Soil									
C6-C8	ND	10.0	mg/kg dry	1	EF60608	06/02/06	06/06/06	TX 1006	
>C8-C10	**110**	10.0	"	"	"	"	"	"	
>C10-C12	**345**	10.0	"	"	"	"	"	"	
>C12-C16	**1540**	10.0	"	"	"	"	"	"	
>C16-C21	**1830**	10.0	"	"	"	"	"	"	
>C21-C35	**1440**	10.0	"	"	"	"	"	"	
Total Hydrocarbon nC6-nC35	**5260**	10.0	"	"	"	"	"	"	
10' east 4' (6E25001-03) Soil									
C6-C8	ND	10.0	mg/kg dry	1	EF60608	06/02/06	06/06/06	TX 1006	
>C8-C10	**45.4**	10.0	"	"	"	"	"	"	
>C10-C12	**383**	10.0	"	"	"	"	"	"	
>C12-C16	**1800**	10.0	"	"	"	"	"	"	
>C16-C21	**2300**	10.0	"	"	"	"	"	"	
>C21-C35	**2660**	10.0	"	"	"	"	"	"	
Total Hydrocarbon nC6-nC35	**7190**	10.0	"	"	"	"	"	"	
10' north 8' (6E25001-05) Soil									
C6-C8	ND	10.0	mg/kg dry	1	EF60608	06/02/06	06/06/06	TX 1006	
>C8-C10	**268**	10.0	"	"	"	"	"	"	
>C10-C12	**941**	10.0	"	"	"	"	"	"	
>C12-C16	**2650**	10.0	"	"	"	"	"	"	
>C16-C21	**2470**	10.0	"	"	"	"	"	"	
>C21-C35	**1840**	10.0	"	"	"	"	"	"	
Total Hydrocarbon nC6-nC35	**8170**	10.0	"	"	"	"	"	"	

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

Rice Operating Co.	Project: F-33 Vent (UN0080)	Fax: (505) 397-1471
122 W. Taylor	Project Number: Hobbs Abandonment	**Reported:**
Hobbs NM, 88240	Project Manager: Kristin Farris-Pope	06/07/06 10:45

Fractionation of Aliphatics by TNRCC Method 1006

Environmental Lab of Texas

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
10' north 12' (6E25001-06) Soil									
C6-C8	ND	10.0	mg/kg dry	1	EF60608	06/02/06	06/06/06	TX 1006	
>C8-C10	**126**	10.0	"	"	"	"	"	"	
>C10-C12	**611**	10.0	"	"	"	"	"	"	
>C12-C16	**1840**	10.0	"	"	"	"	"	"	
>C16-C21	**1710**	10.0	"	"	"	"	"	"	
>C21-C35	**1210**	10.0	"	"	"	"	"	"	
Total Hydrocarbon nC6-nC35	**5500**	10.0	"	"	"	"	"	"	

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Rice Operating Co.	Project: F-33 Vent (UN0080)	Fax: (505) 397-1471
122 W. Taylor	Project Number: Hobbs Abandonment	**Reported:**
Hobbs NM, 88240	Project Manager: Kristin Farris-Pope	06/07/06 10:45

Fractionation of Aromatics by TNRCC Method 1006

Environmental Lab of Texas

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Source 12' (6E25001-01) Soil									
C7-C8	**J [6.44]**	10.0	mg/kg dry	1	EF60608	06/02/06	06/06/06	TX 1006	J
>C8-C10	**69.5**	10.0	"	"	"	"	"	"	
>C10-C12	**290**	10.0	"	"	"	"	"	"	
>C12-C16	**1340**	10.0	"	"	"	"	"	"	
>C16-C21	**1760**	10.0	"	"	"	"	"	"	
>C21-C35	**1670**	10.0	"	"	"	"	"	"	
Total Hydrocarbon nC6-nC35	**5130**	10.0	"	"	"	"	"	"	
Source 16' (6E25001-02) Soil									
C7-C8	**J [5.77]**	10.0	mg/kg dry	1	EF60608	06/02/06	06/06/06	TX 1006	J
>C8-C10	**46.7**	10.0	"	"	"	"	"	"	
>C10-C12	**146**	10.0	"	"	"	"	"	"	
>C12-C16	**769**	10.0	"	"	"	"	"	"	
>C16-C21	**1340**	10.0	"	"	"	"	"	"	
>C21-C35	**1390**	10.0	"	"	"	"	"	"	
Total Hydrocarbon nC6-nC35	**3690**	10.0	"	"	"	"	"	"	
10' east 4' (6E25001-03) Soil									
C7-C8	**J [5.79]**	10.0	mg/kg dry	1	EF60608	06/02/06	06/06/06	TX 1006	J
>C8-C10	**45.8**	10.0	"	"	"	"	"	"	
>C10-C12	**55.7**	10.0	"	"	"	"	"	"	
>C12-C16	**669**	10.0	"	"	"	"	"	"	
>C16-C21	**1850**	10.0	"	"	"	"	"	"	
>C21-C35	**2880**	10.0	"	"	"	"	"	"	
Total Hydrocarbon nC6-nC35	**5500**	10.0	"	"	"	"	"	"	
10' north 8' (6E25001-05) Soil									
C7-C8	**J [5.13]**	10.0	mg/kg dry	1	EF60608	06/02/06	06/06/06	TX 1006	J
>C8-C10	**62.1**	10.0	"	"	"	"	"	"	
>C10-C12	**302**	10.0	"	"	"	"	"	"	
>C12-C16	**1070**	10.0	"	"	"	"	"	"	
>C16-C21	**1520**	10.0	"	"	"	"	"	"	
>C21-C35	**1230**	10.0	"	"	"	"	"	"	
Total Hydrocarbon nC6-nC35	**4180**	10.0	"	"	"	"	"	"	

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Rice Operating Co.	Project: F-33 Vent (UN0080)	Fax: (505) 397-1471
122 W. Taylor	Project Number: Hobbs Abandonment	**Reported:**
Hobbs NM, 88240	Project Manager: Kristin Farris-Pope	06/07/06 10:45

Fractionation of Aromatics by TNRCC Method 1006

Environmental Lab of Texas

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
10' north 12' (6E25001-06) Soil									
C7-C8	**J [4.16]**	10.0	mg/kg dry	1	EF60608	06/02/06	06/06/06	TX 1006	J
>C8-C10	**49.2**	10.0	"	"	"	"	"	"	
>C10-C12	**229**	10.0	"	"	"	"	"	"	
>C12-C16	**882**	10.0	"	"	"	"	"	"	
>C16-C21	**1120**	10.0	"	"	"	"	"	"	
>C21-C35	**984**	10.0	"	"	"	"	"	"	
Total Hydrocarbon nC6-nC35	**3260**	10.0	"	"	"	"	"	"	

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Rice Operating Co.	Project: F-33 Vent (UN0080)	Fax: (505) 397-1471
122 W. Taylor	Project Number: Hobbs Abandonment	**Reported:**
Hobbs NM, 88240	Project Manager: Kristin Farris-Pope	06/07/06 10:45

General Chemistry Parameters by EPA / Standard Methods

Environmental Lab of Texas

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Source 12' (6E25001-01) Soil									
% Moisture	**11.1**	0.1	%	1	EE62607	05/25/06	05/26/06	% calculation	
Source 16' (6E25001-02) Soil									
Chloride	**143**	10.0	mg/kg	20	EE63005	05/29/06	05/29/06	EPA 300.0	
% Moisture	**14.0**	0.1	%	1	EE62607	05/25/06	05/26/06	% calculation	
10' east 4' (6E25001-03) Soil									
Chloride	**341**	10.0	mg/kg	20	EE63005	05/29/06	05/29/06	EPA 300.0	
% Moisture	**9.8**	0.1	%	1	EE62607	05/25/06	05/26/06	% calculation	
10' east 12' (6E25001-04) Soil									
% Moisture	**8.7**	0.1	%	1	EE62607	05/25/06	05/26/06	% calculation	
10' north 8' (6E25001-05) Soil									
% Moisture	**4.3**	0.1	%	1	EE62607	05/25/06	05/26/06	% calculation	
10' north 12' (6E25001-06) Soil									
% Moisture	**3.7**	0.1	%	1	EE62607	05/25/06	05/26/06	% calculation	
10' west 12' (6E25001-07) Soil									
% Moisture	**4.6**	0.1	%	1	EE62607	05/25/06	05/26/06	% calculation	

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Rice Operating Co.	Project: F-33 Vent (UN0080)	Fax: (505) 397-1471
122 W. Taylor	Project Number: Hobbs Abandonment	**Reported:**
Hobbs NM, 88240	Project Manager: Kristin Farris-Pope	06/07/06 10:45

Volatile Organic Compounds by EPA Method 8260B

Environmental Lab of Texas

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Source 12' (6E25001-01) Soil									
Benzene	ND	50.0	ug/kg dry	50	EE62606	05/26/06	05/31/06	EPA 8260B	
Toluene	ND	50.0	"	"	"	"	"	"	
Ethylbenzene	**3770**	50.0	"	"	"	"	"	"	
Xylene (p/m)	**171**	50.0	"	"	"	"	"	"	
Xylene (o)	**J [48.2]**	50.0	"	"	"	"	"	"	J
Naphthalene	**4500**	50.0	"	"	"	"	"	"	
Surrogate: Dibromofluoromethane		*107 %*	*70-139*		"	"	"	"	
Surrogate: 1,2-Dichloroethane-d4		*87.6 %*	*52-149*		"	"	"	"	
Surrogate: Toluene-d8		*84.2 %*	*76-125*		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		*87.6 %*	*66-145*		"	"	"	"	
Source 16' (6E25001-02) Soil									
Benzene	ND	25.0	ug/kg dry	25	EE62606	05/26/06	05/31/06	EPA 8260B	
Toluene	ND	25.0	"	"	"	"	"	"	
Ethylbenzene	**277**	25.0	"	"	"	"	"	"	
Xylene (p/m)	**28.2**	25.0	"	"	"	"	"	"	
Xylene (o)	ND	25.0	"	"	"	"	"	"	
Naphthalene	**378**	25.0	"	"	"	"	"	"	
Surrogate: Dibromofluoromethane		*100 %*	*70-139*		"	"	"	"	
Surrogate: 1,2-Dichloroethane-d4		*79.2 %*	*52-149*		"	"	"	"	
Surrogate: Toluene-d8		*83.2 %*	*76-125*		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		*100 %*	*66-145*		"	"	"	"	
10' east 4' (6E25001-03) Soil									
Benzene	ND	25.0	ug/kg dry	25	EE62606	05/26/06	05/31/06	EPA 8260B	
Toluene	ND	25.0	"	"	"	"	"	"	
Ethylbenzene	**51.3**	25.0	"	"	"	"	"	"	
Xylene (p/m)	**J [24.1]**	25.0	"	"	"	"	"	"	J
Xylene (o)	**J [18.8]**	25.0	"	"	"	"	"	"	J
Naphthalene	**200**	25.0	"	"	"	"	"	"	
Surrogate: Dibromofluoromethane		*104 %*	*70-139*		"	"	"	"	
Surrogate: 1,2-Dichloroethane-d4		*86.2 %*	*52-149*		"	"	"	"	
Surrogate: Toluene-d8		*87.6 %*	*76-125*		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		*94.4 %*	*66-145*		"	"	"	"	

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Rice Operating Co.	Project: F-33 Vent (UN0080)	Fax: (505) 397-1471
122 W. Taylor	Project Number: Hobbs Abandonment	**Reported:**
Hobbs NM, 88240	Project Manager: Kristin Farris-Pope	06/07/06 10:45

Volatile Organic Compounds by EPA Method 8260B

Environmental Lab of Texas

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
10' east 12' (6E25001-04) Soil									
Benzene	ND	25.0	ug/kg dry	25	EE62606	05/26/06	05/31/06	EPA 8260B	
Toluene	ND	25.0	"	"	"	"	"	"	
Ethylbenzene	**51.6**	25.0	"	"	"	"	"	"	
Xylene (p/m)	**ND**	25.0	"	"	"	"	"	"	
Xylene (o)	ND	25.0	"	"	"	"	"	"	
Naphthalene	**49.5**	25.0	"	"	"	"	"	"	
Surrogate: Dibromofluoromethane		*100 %*	*70-139*		"	"	"	"	
Surrogate: 1,2-Dichloroethane-d4		*81.6 %*	*52-149*		"	"	"	"	
Surrogate: Toluene-d8		*87.4 %*	*76-125*		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		*82.6 %*	*66-145*		"	"	"	"	
10' north 8' (6E25001-05) Soil									
Benzene	ND	25.0	ug/kg dry	25	EE62606	05/26/06	05/31/06	EPA 8260B	
Toluene	ND	25.0	"	"	"	"	"	"	
Ethylbenzene	**93.8**	25.0	"	"	"	"	"	"	
Xylene (p/m)	**254**	25.0	"	"	"	"	"	"	
Xylene (o)	**336**	25.0	"	"	"	"	"	"	
Naphthalene	**103**	25.0	"	"	"	"	"	"	
Surrogate: Dibromofluoromethane		*98.0 %*	*70-139*		"	"	"	"	
Surrogate: 1,2-Dichloroethane-d4		*78.6 %*	*52-149*		"	"	"	"	
Surrogate: Toluene-d8		*82.6 %*	*76-125*		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		*123 %*	*66-145*		"	"	"	"	
10' north 12' (6E25001-06) Soil									
Benzene	ND	25.0	ug/kg dry	25	EE62606	05/26/06	05/31/06	EPA 8260B	
Toluene	ND	25.0	"	"	"	"	"	"	
Ethylbenzene	**72.8**	25.0	"	"	"	"	"	"	
Xylene (p/m)	**101**	25.0	"	"	"	"	"	"	
Xylene (o)	**192**	25.0	"	"	"	"	"	"	
Naphthalene	**202**	25.0	"	"	"	"	"	"	
Surrogate: Dibromofluoromethane		*101 %*	*70-139*		"	"	"	"	
Surrogate: 1,2-Dichloroethane-d4		*80.0 %*	*52-149*		"	"	"	"	
Surrogate: Toluene-d8		*84.4 %*	*76-125*		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		*116 %*	*66-145*		"	"	"	"	

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Rice Operating Co.	Project: F-33 Vent (UN0080)	Fax: (505) 397-1471
122 W. Taylor	Project Number: Hobbs Abandonment	**Reported:**
Hobbs NM, 88240	Project Manager: Kristin Farris-Pope	06/07/06 10:45

Volatile Organic Compounds by EPA Method 8260B

Environmental Lab of Texas

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
10' west 12' (6E25001-07) Soil									
Benzene	ND	25.0	ug/kg dry	25	EE62606	05/26/06	05/31/06	EPA 8260B	
Toluene	ND	25.0	"	"	"	"	"	"	
Ethylbenzene	**117**	25.0	"	"	"	"	"	"	
Xylene (p/m)	**25.1**	25.0	"	"	"	"	"	"	
Xylene (o)	**33.0**	25.0	"	"	"	"	"	"	
Naphthalene	**91.4**	25.0	"	"	"	"	"	"	
Surrogate: Dibromofluoromethane		*99.8 %*		*70-139*		"	"	"	"
Surrogate: 1,2-Dichloroethane-d4		*80.4 %*		*52-149*		"	"	"	"
Surrogate: Toluene-d8		*86.2 %*		*76-125*		"	"	"	"
Surrogate: 4-Bromofluorobenzene		*102 %*		*66-145*		"	"	"	"

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Rice Operating Co.	Project: F-33 Vent (UN0080)	Fax: (505) 397-1471
122 W. Taylor	Project Number: Hobbs Abandonment	**Reported:**
Hobbs NM, 88240	Project Manager: Kristin Farris-Pope	06/07/06 10:45

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 EE62507 - Solvent Extraction (GC)										
Blank (EE62507-BLK1)				Prepared: 05/25/06 Analyzed: 05/26/06						
Carbon Ranges C6-C12	ND	10.0	mg/kg wet							
Carbon Ranges C12-C28	ND	10.0	"							
Carbon Ranges C28-C35	ND	10.0	"							
Total Hydrocarbon nC6-nC35	ND	10.0	"							
Surrogate: 1-Chlorooctane	*43.6*		*mg/kg*	*50.0*		*87.2*	*70-130*			
Surrogate: 1-Chlorooctadecane	*45.3*		*"*	*50.0*		*90.6*	*70-130*			
LCS (EE62507-BS1)				Prepared: 05/25/06 Analyzed: 05/26/06						
Carbon Ranges C6-C12	546	10.0	mg/kg wet	500		109	75-125			
Carbon Ranges C12-C28	561	10.0	"	500		112	75-125			
Total Hydrocarbon nC6-nC35	1110	10.0	"	1000		111	75-125			
Surrogate: 1-Chlorooctane	*57.6*		*mg/kg*	*50.0*		*115*	*70-130*			
Surrogate: 1-Chlorooctadecane	*49.2*		*"*	*50.0*		*98.4*	*70-130*			
Calibration Check (EE62507-CCV1)				Prepared: 05/25/06 Analyzed: 05/30/06						
Carbon Ranges C6-C12	268		mg/kg	250		107	80-120			
Carbon Ranges C12-C28	286		"	250		114	80-120			
Total Hydrocarbon nC6-nC35	554		"	500		111	80-120			
Surrogate: 1-Chlorooctane	*64.4*		*"*	*50.0*		*129*	*70-130*			
Surrogate: 1-Chlorooctadecane	*62.4*		*"*	*50.0*		*125*	*70-130*			
Matrix Spike (EE62507-MS1)	**Source: 6E24006-01**			Prepared: 05/25/06 Analyzed: 05/26/06						
Carbon Ranges C6-C12	573	10.0	mg/kg dry	520	ND	110	75-125			
Carbon Ranges C12-C28	576	10.0	"	520	ND	111	75-125			
Total Hydrocarbon nC6-nC35	1150	10.0	"	1040	ND	111	75-125			
Surrogate: 1-Chlorooctane	*55.5*		*mg/kg*	*50.0*		*111*	*70-130*			
Surrogate: 1-Chlorooctadecane	*50.2*		*"*	*50.0*		*100*	*70-130*			

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Rice Operating Co.	Project: F-33 Vent (UN0080)	Fax: (505) 397-1471
122 W. Taylor	Project Number: Hobbs Abandonment	**Reported:**
Hobbs NM, 88240	Project Manager: Kristin Farris-Pope	06/07/06 10:45

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 EE62507 - Solvent Extraction (GC)										
Matrix Spike Dup (EE62507-MSD1)	**Source: 6E24006-01**			Prepared: 05/25/06 Analyzed: 05/31/06						
Carbon Ranges C6-C12	575	10.0	mg/kg dry	520	ND	111	75-125	0.348	20	
Carbon Ranges C12-C28	579	10.0	"	520	ND	111	75-125	0.519	20	
Total Hydrocarbon nC6-nC35	1150	10.0	"	1040	ND	111	75-125	0.00	20	
Surrogate: 1-Chlorooctane	*56.1*		*mg/kg*	*50.0*		*112*	*70-130*			
Surrogate: 1-Chlorooctadecane	*49.8*		*"*	*50.0*		*99.6*	*70-130*			
Batch EF60219 - Solvent Extraction (GC)										
Blank (EF60219-BLK1)				Prepared: 06/02/06 Analyzed: 06/05/06						
Carbon Ranges C6-C12	ND	10.0	mg/kg wet							
Carbon Ranges C12-C28	ND	10.0	"							
Carbon Ranges C28-C35	ND	10.0	"							
Total Hydrocarbon nC6-nC35	ND	10.0	"							
Surrogate: 1-Chlorooctane	*45.4*		*mg/kg*	*50.0*		*90.8*	*70-130*			
Surrogate: 1-Chlorooctadecane	*46.5*		*"*	*50.0*		*93.0*	*70-130*			
LCS (EF60219-BS1)				Prepared: 06/02/06 Analyzed: 06/05/06						
Carbon Ranges C6-C12	567	10.0	mg/kg wet	500		113	75-125			
Carbon Ranges C12-C28	554	10.0	"	500		111	75-125			
Total Hydrocarbon nC6-nC35	1120	10.0	"	1000		112	75-125			
Surrogate: 1-Chlorooctane	*58.5*		*mg/kg*	*50.0*		*117*	*70-130*			
Surrogate: 1-Chlorooctadecane	*52.7*		*"*	*50.0*		*105*	*70-130*			
Calibration Check (EF60219-CCV1)				Prepared: 06/02/06 Analyzed: 06/05/06						
Carbon Ranges C6-C12	290		mg/kg	250		116	80-120			
Carbon Ranges C12-C28	294		"	250		118	80-120			
Total Hydrocarbon nC6-nC35	584		"	500		117	80-120			
Surrogate: 1-Chlorooctane	*57.9*		*"*	*50.0*		*116*	*70-130*			
Surrogate: 1-Chlorooctadecane	*58.2*		*"*	*50.0*		*116*	*70-130*			

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Rice Operating Co.	Project: F-33 Vent (UN0080)	Fax: (505) 397-1471
122 W. Taylor	Project Number: Hobbs Abandonment	**Reported:**
Hobbs NM, 88240	Project Manager: Kristin Farris-Pope	06/07/06 10:45

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 EF60219 - Solvent Extraction (GC)										
Matrix Spike (EF60219-MS1)	**Source: 6F02008-01**			Prepared: 06/02/06 Analyzed: 06/05/06						
Carbon Ranges C6-C12	734	10.0	mg/kg dry	696	ND	105	75-125			
Carbon Ranges C12-C28	728	10.0	"	696	42.5	98.5	75-125			
Total Hydrocarbon nC6-nC35	1460	10.0	"	1390	42.5	102	75-125			
Surrogate: 1-Chlorooctane	*55.6*		*mg/kg*	*50.0*		*111*	*70-130*			
Surrogate: 1-Chlorooctadecane	*47.3*		*"*	*50.0*		*94.6*	*70-130*			
Matrix Spike Dup (EF60219-MSD1)	**Source: 6F02008-01**			Prepared: 06/02/06 Analyzed: 06/05/06						
Carbon Ranges C6-C12	724	10.0	mg/kg dry	696	ND	104	75-125	1.37	20	
Carbon Ranges C12-C28	734	10.0	"	696	42.5	99.4	75-125	0.821	20	
Total Hydrocarbon nC6-nC35	1460	10.0	"	1390	42.5	102	75-125	0.00	20	
Surrogate: 1-Chlorooctane	*55.0*		*mg/kg*	*50.0*		*110*	*70-130*			
Surrogate: 1-Chlorooctadecane	*46.4*		*"*	*50.0*		*92.8*	*70-130*			

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Rice Operating Co.	Project: F-33 Vent (UN0080)	Fax: (505) 397-1471
122 W. Taylor	Project Number: Hobbs Abandonment	**Reported:**
Hobbs NM, 88240	Project Manager: Kristin Farris-Pope	06/07/06 10:45

Fractionation of Aliphatics by TNRCC Method 1006 - Quality Control

Environmental Lab of Texas

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch EF60608 - Solvent Extraction (GC)										
Blank (EF60608-BLK1)				Prepared: 06/02/06 Analyzed: 06/06/06						
C6-C8	ND	10.0	mg/kg wet							
>C8-C10	ND	10.0	"							
>C10-C12	ND	10.0	"							
>C12-C16	ND	10.0	"							
>C16-C21	ND	10.0	"							
>C21-C35	ND	10.0	"							
Total Hydrocarbon nC6-nC35	ND	10.0	"							
LCS (EF60608-BS1)				Prepared: 06/02/06 Analyzed: 06/06/06						
Total Hydrocarbon nC6-nC35	1730	10.0	mg/kg wet	2000		86.5	60-140			
Calibration Check (EF60608-CCV1)				Prepared & Analyzed: 06/06/06						
Total Hydrocarbon nC6-nC35	568		mg/kg	500		114	80-120			
Duplicate (EF60608-DUP1)		**Source: 6E25001-01**		Prepared & Analyzed: 06/06/06						
C6-C8	48.7	10.0	mg/kg dry		50.8			4.22	20	
>C8-C10	415	10.0	"		421			1.44	20	
>C10-C12	891	10.0	"		892			0.112	20	
>C12-C16	2500	10.0	"		2460			1.61	20	
>C16-C21	2340	10.0	"		2300			1.72	20	
>C21-C35	1730	10.0	"		1690			2.34	20	
Total Hydrocarbon nC6-nC35	7920	10.0	"		7810			1.40	20	

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Rice Operating Co.	Project: F-33 Vent (UN0080)	Fax: (505) 397-1471
122 W. Taylor	Project Number: Hobbs Abandonment	**Reported:**
Hobbs NM, 88240	Project Manager: Kristin Farris-Pope	06/07/06 10:45

Fractionation of Aromatics by TNRCC Method 1006 - Quality Control

Environmental Lab of Texas

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch EF60608 - Solvent Extraction (GC)										
Blank (EF60608-BLK1)				Prepared: 06/02/06 Analyzed: 06/06/06						
C7-C8	ND	10.0	mg/kg wet							
>C8-C10	ND	10.0	"							
>C10-C12	ND	10.0	"							
>C12-C16	ND	10.0	"							
>C16-C21	ND	10.0	"							
>C21-C35	ND	10.0	"							
Total Hydrocarbon nC6-nC35	ND	10.0	"							
LCS (EF60608-BS1)				Prepared: 06/02/06 Analyzed: 06/06/06						
Total Hydrocarbon nC6-nC35	1730	10.0	mg/kg wet	2000		86.5	60-140			
Calibration Check (EF60608-CCV1)				Prepared & Analyzed: 06/06/06						
Total Hydrocarbon nC6-nC35	568		mg/kg	500		114	80-120			
Duplicate (EF60608-DUP1)		**Source: 6E25001-01**		Prepared & Analyzed: 06/06/06						
C7-C8	6.25	10.0	mg/kg dry		6.44			2.99	20	J
>C8-C10	73.4	10.0	"		69.5			5.46	20	
>C10-C12	283	10.0	"		290			2.44	20	
>C12-C16	1360	10.0	"		1340			1.48	20	
>C16-C21	1790	10.0	"		1760			1.69	20	
>C21-C35	1680	10.0	"		1670			0.597	20	
Total Hydrocarbon nC6-nC35	5200	10.0	"		5130			1.36	20	

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Rice Operating Co.	Project: F-33 Vent (UN0080)	Fax: (505) 397-1471
122 W. Taylor	Project Number: Hobbs Abandonment	**Reported:**
Hobbs NM, 88240	Project Manager: Kristin Farris-Pope	06/07/06 10:45

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 EE62607 - General Preparation (Prep)										
Blank (EE62607-BLK1)				Prepared: 05/25/06 Analyzed: 05/26/06						
% Solids	100		%							
Duplicate (EE62607-DUP1)	**Source: 6E24016-01**			Prepared: 05/25/06 Analyzed: 05/26/06						
% Solids	96.6		%		96.8			0.207	20	
Duplicate (EE62607-DUP2)	**Source: 6E24016-21**			Prepared: 05/25/06 Analyzed: 05/26/06						
% Solids	99.6		%		99.9			0.301	20	
Duplicate (EE62607-DUP3)	**Source: 6E24016-41**			Prepared: 05/25/06 Analyzed: 05/26/06						
% Solids	99.7		%		99.5			0.201	20	
Duplicate (EE62607-DUP4)	**Source: 6E25007-02**			Prepared: 05/25/06 Analyzed: 05/26/06						
% Solids	90.8		%		89.7			1.22	20	
Batch EE63005 - Water Extraction										
Blank (EE63005-BLK1)				Prepared & Analyzed: 05/29/06						
Chloride	ND	0.500	mg/kg							
LCS (EE63005-BS1)				Prepared & Analyzed: 05/29/06						
Chloride	10.2	0.500	mg/kg	10.0		102	80-120			
Calibration Check (EE63005-CCV1)				Prepared & Analyzed: 05/29/06						
Chloride	10.3		mg/L	10.0		103	80-120			
Duplicate (EE63005-DUP1)	**Source: 6E24016-41**			Prepared & Analyzed: 05/29/06						
Chloride	12.2	5.00	mg/kg		12.8			4.80	20	

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Rice Operating Co.	Project: F-33 Vent (UN0080)	Fax: (505) 397-1471
122 W. Taylor	Project Number: Hobbs Abandonment	**Reported:**
Hobbs NM, 88240	Project Manager: Kristin Farris-Pope	06/07/06 10:45

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 EE63005 - Water Extraction										
Duplicate (EE63005-DUP2)		**Source: 6E25008-02**		Prepared & Analyzed: 05/29/06						
Chloride	181	20.0	mg/kg		179			1.11	20	
Matrix Spike (EE63005-MS1)		**Source: 6E24016-41**		Prepared & Analyzed: 05/29/06						
Chloride	102	5.00	mg/kg	100	12.8	89.2	80-120			
Matrix Spike (EE63005-MS2)		**Source: 6E25008-02**		Prepared & Analyzed: 05/29/06						
Chloride	571	20.0	mg/kg	400	179	98.0	80-120			

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Rice Operating Co.	Project: F-33 Vent (UN0080)	Fax: (505) 397-1471
122 W. Taylor	Project Number: Hobbs Abandonment	**Reported:**
Hobbs NM, 88240	Project Manager: Kristin Farris-Pope	06/07/06 10:45

Volatile Organic Compounds by EPA Method 8260B - Quality Control

Environmental Lab of Texas

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch EE62606 - EPA 5030C (GCMS)										
Blank (EE62606-BLK1)				Prepared & Analyzed: 05/26/06						
Benzene	ND	25.0	ug/kg wet							
Toluene	ND	25.0	"							
Ethylbenzene	ND	25.0	"							
Xylene (p/m)	ND	25.0	"							
Xylene (o)	ND	25.0	"							
Naphthalene	ND	25.0	"							
Surrogate: Dibromofluoromethane	*53.0*		*ug/l*	*50.0*		*106*	*70-139*			
Surrogate: 1,2-Dichloroethane-d4	*43.7*		*"*	*50.0*		*87.4*	*52-149*			
Surrogate: Toluene-d8	*41.3*		*"*	*50.0*		*82.6*	*76-125*			
Surrogate: 4-Bromofluorobenzene	*37.5*		*"*	*50.0*		*75.0*	*66-145*			
LCS (EE62606-BS1)				Prepared & Analyzed: 05/26/06						
Benzene	568	25.0	ug/kg wet	625		90.9	70-130			
Toluene	589	25.0	"	625		94.2	70-130			
Ethylbenzene	627	25.0	"	625		100	70-130			
Xylene (p/m)	1200	25.0	"	1250		96.0	70-130			
Xylene (o)	640	25.0	"	625		102	70-130			
Naphthalene	534	25.0	"	625		85.4	70-130			
Surrogate: Dibromofluoromethane	*47.5*		*ug/l*	*50.0*		*95.0*	*70-139*			
Surrogate: 1,2-Dichloroethane-d4	*41.7*		*"*	*50.0*		*83.4*	*52-149*			
Surrogate: Toluene-d8	*42.8*		*"*	*50.0*		*85.6*	*76-125*			
Surrogate: 4-Bromofluorobenzene	*40.7*		*"*	*50.0*		*81.4*	*66-145*			
Calibration Check (EE62606-CCV1)				Prepared & Analyzed: 05/26/06						
Toluene	42.9		ug/l	50.0		85.8	70-130			
Ethylbenzene	40.5		"	50.0		81.0	70-130			
Surrogate: Dibromofluoromethane	*50.6*		*"*	*50.0*		*101*	*70-139*			
Surrogate: 1,2-Dichloroethane-d4	*43.9*		*"*	*50.0*		*87.8*	*52-149*			
Surrogate: Toluene-d8	*45.7*		*"*	*50.0*		*91.4*	*76-125*			
Surrogate: 4-Bromofluorobenzene	*43.9*		*"*	*50.0*		*87.8*	*66-145*			

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Rice Operating Co.	Project: F-33 Vent (UN0080)	Fax: (505) 397-1471
122 W. Taylor	Project Number: Hobbs Abandonment	**Reported:**
Hobbs NM, 88240	Project Manager: Kristin Farris-Pope	06/07/06 10:45

Volatile Organic Compounds by EPA Method 8260B - Quality Control

Environmental Lab of Texas

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch EE62606 - EPA 5030C (GCMS)										
Matrix Spike (EE62606-MS1)	**Source: 6E25028-02**		Prepared & Analyzed: 05/26/06							
Benzene	642	25.0	ug/kg dry	666	ND	96.4	70-130			
Toluene	670	25.0	"	666	ND	101	70-130			
Ethylbenzene	699	25.0	"	666	ND	105	70-130			
Xylene (p/m)	1330	25.0	"	1330	ND	100	70-130			
Xylene (o)	713	25.0	"	666	ND	107	70-130			
Naphthalene	547	25.0	"	666	32.7	77.2	70-130			
Surrogate: Dibromofluoromethane	*46.8*		*ug/l*	*50.0*		*93.6*	*70-139*			
Surrogate: 1,2-Dichloroethane-d4	*41.6*		*"*	*50.0*		*83.2*	*52-149*			
Surrogate: Toluene-d8	*41.1*		*"*	*50.0*		*82.2*	*76-125*			
Surrogate: 4-Bromofluorobenzene	*39.4*		*"*	*50.0*		*78.8*	*66-145*			
Matrix Spike Dup (EE62606-MSD1)	**Source: 6E25028-02**		Prepared & Analyzed: 05/26/06							
Benzene	631	25.0	ug/kg dry	666	ND	94.7	70-130	1.78	20	
Toluene	655	25.0	"	666	ND	98.3	70-130	2.71	20	
Ethylbenzene	613	25.0	"	666	ND	92.0	70-130	13.2	20	
Xylene (p/m)	1220	25.0	"	1330	ND	91.7	70-130	8.66	20	
Xylene (o)	654	25.0	"	666	ND	98.2	70-130	8.58	20	
Naphthalene	628	25.0	"	666	32.7	89.4	70-130	14.6	20	
Surrogate: Dibromofluoromethane	*49.8*		*ug/l*	*50.0*		*99.6*	*70-139*			
Surrogate: 1,2-Dichloroethane-d4	*48.8*		*"*	*50.0*		*97.6*	*52-149*			
Surrogate: Toluene-d8	*42.7*		*"*	*50.0*		*85.4*	*76-125*			
Surrogate: 4-Bromofluorobenzene	*39.8*		*"*	*50.0*		*79.6*	*66-145*			

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Rice Operating Co.	Project: F-33 Vent (UN0080)	Fax: (505) 397-1471
122 W. Taylor	Project Number: Hobbs Abandonment	**Reported:**
Hobbs NM, 88240	Project Manager: Kristin Farris-Pope	06/07/06 10:45

Notes and Definitions

S-06	The recovery of this surrogate is outside control limits due to sample dilution required from high analyte concentration and/or matrix interference's.
J	Detected but below the Reporting Limit; therefore, result is an estimated concentration (CLP J-Flag).
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: 6/7/2006

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.

Environmental Lab of Texas

12600 West I-20 East
Odessa, Texas 79765
Phone: 432-563-1800
Fax: 432-563-1713

CHAIN OF CUSTODY RECORD AND ANALYSIS REQUEST

Project Manager: Kristin Pope
Company Name: Rice Operating Company
Company Address: 122 West Taylor
City/State/Zip: Hobbs, New Mexico 88240
Telephone No: 505-393-9174 Fax No: 505-397-1471
Email results to: gil@rthicksconsult.com, mfranks@riceswd.com, kpope@riceswd.com, & andrew@rthicksconsult.com
Sampler Signature: Melanie Franks

Project Name: F-33 Vent (UN0080)
Project #: Hobbs Abandonment
Project Location: T18S, R38E, Sec 33, Unit Letter F
ROC Billing Code

Analyze For:
TCLP:
TOTAL:

LAB # (lab use only)	GIS CODE	FIELD CODE	Sample Depth (soils only) Begin (ft)	End (ft)	Date Sampled	Time Sampled	No. of Containers	Preservative: Ice	HNO_3	HCl	NaOH	H_2SO_4	None	Other (Specify)	Matrix: Water	Sludge	Soil	Other (specify)	TPH: 418.1 8015M 1005 1006	Cations (Ca, Mg, Na, K)	Anions (Cl, SO4, CO3, HCO3)	SAR / ESP / CEC	Metals: As Ag Ba Cd Cr Pb Hg Se	Volatiles	Semivolatiles	BTEXN 8260	RCI	N.O.R.M.	Total Dissolved Solids	TPH: 8015M	TPH: 1006	Chloride	RUSH TAT (Pre-Schedule)	Standard TAT
WE7500																																	
-01	414	Source (12')	12	12	5/12/10	10:30	1	X									X									X					X			X
-02	414	Source (16')	16	16	"	11:10	1	X									X									X					X	X		X
-03	415	10' east (4')	4	4	"	11:55	1	X									X									X					X	X		X
-04	415	10' east (12')	12	12	"	2:04	1	X									X									X				X				X
-05	416	10' north (8')	8	8	"	2:10	1	X									X									X					X			X
-06	416	10' north (12')	12	12	"	2:25	1	X									X									X					X			X
-07	417	10' west (12')	12	12	"	2:50	1	X									X									X				X				X

Special Instruction

Sample Containers Intact? Y N
Temperature Upon Receipt:
Laboratory Comments: 4oz glass 2.0

Relinquished by:	Date	Time	Received by:	Date	Time
Melanie Franks	5/24/10	7:31		5/24	1750
Relinquished by:	Date	Time	Received by ELOT:	Date	Time
	5/25	8:02		5/25/10	8:00

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

Client: Rice OP.

Date/Time: 5/25/06 8:00

Order #: 06E25001

Initials: CK

Sample Receipt Checklist

Temperature of container/cooler?	Yes	No	2.0 C
Shipping container/cooler in good condition?	~~Yes~~	No	
Custody Seals intact on shipping container/cooler?	~~Yes~~	No	Not present
Custody Seals intact on sample bottles?	~~Yes~~	No	Not present
Chain of custody present?	~~Yes~~	No	
Sample Instructions complete on Chain of Custody?	~~Yes~~	No	
Chain of Custody signed when relinquished and received?	~~Yes~~	No	
Chain of custody agrees with sample label(s)	~~Yes~~	No	
Container labels legible and intact?	~~Yes~~	No	
Sample Matrix and properties same as on chain of custody?	~~Yes~~	No	
Samples in proper container/bottle?	~~Yes~~	No	
Samples properly preserved?	~~Yes~~	No	
Sample bottles intact?	~~Yes~~	No	
Preservations documented on Chain of Custody?	~~Yes~~	No	
Containers documented on Chain of Custody?	~~Yes~~	No	
Sufficient sample amount for indicated test?	~~Yes~~	No	
All samples received within sufficient hold time?	~~Yes~~	No	
VOC samples have zero headspace?	~~Yes~~	No	Not Applicable

Other observations:

Variance Documentation:

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

Regarding:

Corrective Action Taken:

R. T. HICKS CONSULTANTS, LTD.

1909 Brunson Ave ▲ Midland TX 79701 ▲ 432.638.8740 ▲ Fax: 413.403.9968

CERTIFIED MAIL - RETURN RECIEPT NO. 7099 3400 0017 1737 2367

January 20, 2006

Mr. Wayne Price
New Mexico Oil Conservation Division
1220 South St. Francis Drive
Santa Fe, New Mexico 87505

RE: Investigation Characterization Plan: T18S R38E: E-33-1 Junction Box, B-32 Boot, E-32-1 Junction Box, E-32-2 Junction Box, F-33 Vent

Hobbs Salt Water Disposal System

Dear Mr. Price:

On behalf of Rice Operating Company, please accept this submission as our Initial Characterization Plan (ICP) for the five (5) sites referenced above within the Hobbs Salt Water Disposal System (Plate 1).

Rice Operating Company (ROC) is the service provider (operator) for the Hobbs Saltwater Disposal System and has no ownership of any portion of pipeline, well, or facility. A consortium of oil producers who own the Hobbs System (System Partners); provide all operating capital on a percentage ownership/usage basis. Major projects require System Partner authorization for expenditures (AFE) approval and work begins as funds are received. We will implement the work outlined herein after NMOCD approval and subsequent authorization from the System Partners.

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

1. protects public health,
2. provides the greatest net environmental benefit,
3. complies with NMOCD Rules, and
4. is supported by good science.

The last criteria employed when evaluating any proposed remedy or investigative work is confirming that there is a reasonable relationship between the benefits created by the proposed remedy or assessment and the economic and social costs.

Each site shall have three submissions or a combination of:

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

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

3. Finally, after implementing the remedy, a closure report with final documentation will be submitted.

Task 1 Evaluate Chloride and BTEXN Concentrations in Soil at Five Sites, Evaluate Ground Water Quality if Necessary

We will follow the same protocol for characterization of the unsaturated zone at the five new ROC sites listed below.

- E-33-1 Junction Box
- B-32 Boot
- E-32-1 Junction Box
- E-32-2 Junction Box
- F-33 Vent

At each of the above-referenced sites, we will locate the sampling borehole as close as practical to the suspected release source. Earlier, we inspected each of the five sites nominated in this ICP and identified the boring location before the sites were backfilled and re-graded. Due to our recent experience with difficulties encountered in the installation of well clusters in this area, we plan to employ hollow-stem auger drilling techniques for sampling.

We will screen each sample in the field for chlorides and volatile organic compounds using the methods described in QP-03 and QP-07 (attached), respectively. Soil lithology and the presence of any observed staining or odor will be recorded. For any site, if we detect evidence of leakage within 15 feet of the water table (e.g. field chloride greater than 250 ppm in soil samples) we will complete the boring as a monitoring well in accordance with NMOCD Guidance. If three soil samples taken at 5-foot intervals test below 250 ppm chloride and below 100 ppm total volatile organic compounds, we will terminate the boring. However, all borings will penetrate at least 30 feet of the vadose zone.

Task 2 Evaluate Chloride and Hydrocarbon Flux from the Vadose Zone to Ground Water

We anticipate that one or all of the five sites selected for borehole investigation will show evidence of seepage from the source to a depth of more than 15-feet. For these sites, excavation and disposal of released material can cause more environmental damage than it cures. For such sites, we propose to employ HYDRUS-1D and a simple ground water mixing model to evaluate the potential of any residual chloride and hydrocarbon mass in the vadose zone to impair ground water quality above WQCC Standards. We have selected these two constituents for simulation modeling because each of these constituents is typically found in produced water and each is specifically regulated by New Mexico ground water regulations (WQCC). We will also employ vadose zone hydrocarbon migration predictive tools commonly employed by NMED in their PST program.

Task 3 Provide Investigative Results and/or Corrective Action Plan

Because the Hobbs SWD System no longer carries produced water, additional releases of produced water to ground water are highly unlikely. If modeling shows that the residual chloride and hydrocarbon mass in the vadose zone poses a no threat to ground water quality, we will prepare a report that makes this demonstration and request site closure.

If simulation experiments suggest that residual constituents pose a threat to ground water quality or if the field program demonstrates impairment, we will expand upon the HYDRUS-1D model predictions described above to develop a remedy for the vadose zone. If necessary, we will simulate:

1. Excavation, disposal and replacement of clean soil to remove the chloride and hydrocarbon mass,
2. Installation of a low permeability barrier to minimize natural infiltration,
3. Surface grading and seeding to eliminate any ponding of precipitation and promote evapotranspiration, thereby minimizing natural infiltration, and
4. A combination of the above potential remedies.

We will select the vadose zone remedy that offers the greatest environmental benefit while causing the least environmental damage. If data suggest that the site has contributed chloride or hydrocarbons to ground water and caused ground water impairment, we will notify NMOCD and work collaboratively to determine the appropriate path forward.

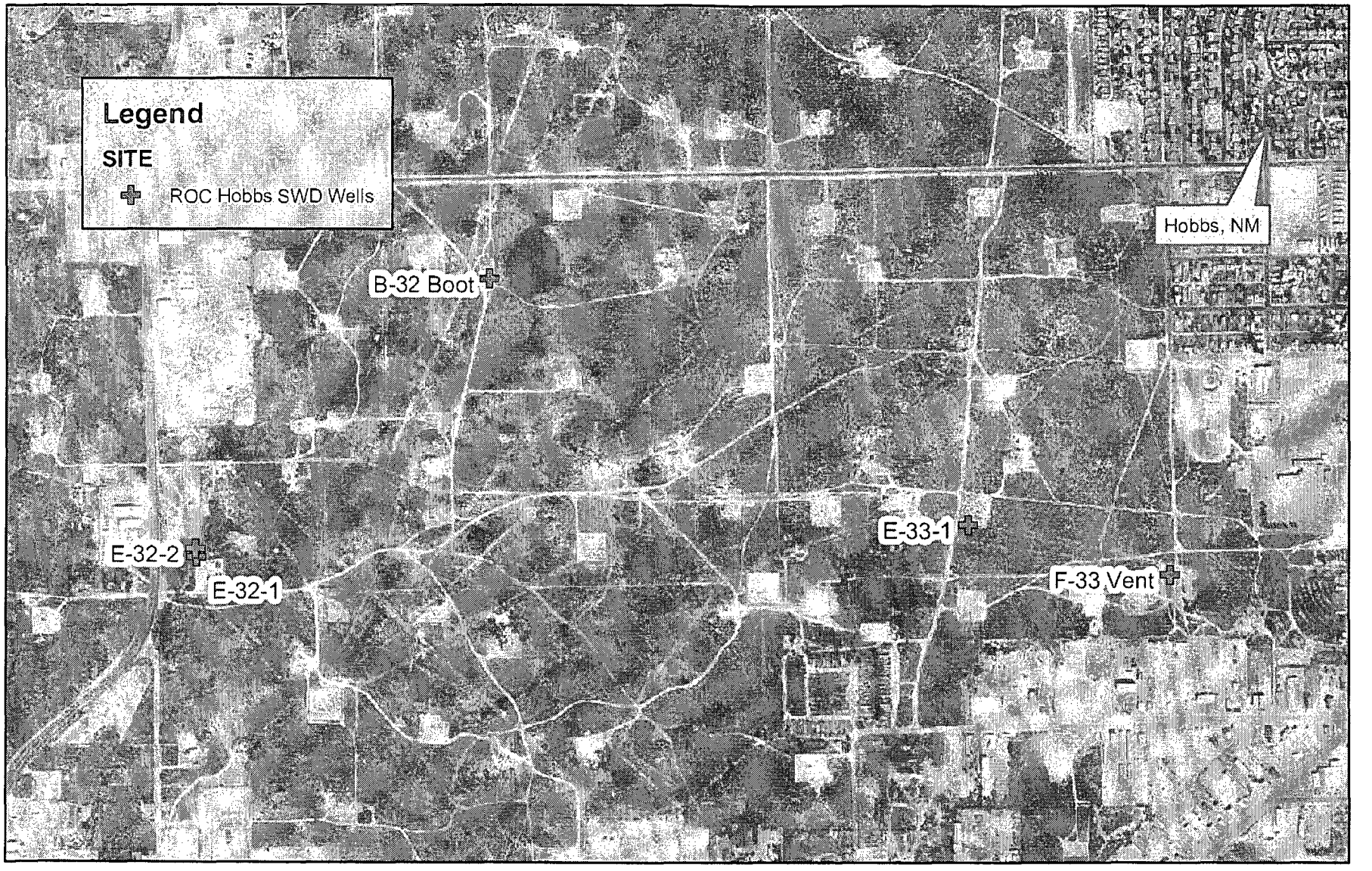
Proposed Schedule

With NMOCD's approval of this work plan, we can perform the field activities at these sites in February or March. In late April or May, we plan to deliver any individual Correction Action Plans to address residual constituents in the vadose zone and any reports requesting site closure. If data suggest ground water impairment we plan to conduct two quarters of ground water monitoring to confirm any initial result then meet with NMOCD to develop an appropriate path forward. Your approval to move forward with this work plan will facilitate approval of expenditures by the System Partners.

Sincerely,
R.T. Hicks Consultants, Ltd.

Gilbert Van Deventer
Project Manager

cc: Chris Williams, NMOCD Hobbs District Office
Carolyn Haynes, Rice Operating Company - Hobbs
Kristin Pope, Rice Operating Company – Hobbs
Randy Hicks, R. T. Hicks Consultants, Ltd. - Albuquerque



Source Map: USGS 7.5' Quad; Hobbs West

0 1,000 2,000 4,000 Feet

R.T. Hicks Consultants, Ltd 901 Rio Grande Blvd NW Suite F-142 Albuquerque, NM 87104 Ph: 505.266.5004	Site Location Map	Plate 1
	Rice Operating Company: Investigation Characterization Plan	July 07, 2005

N

Rice Operating Company

QUALITY PROCEDURE

Sampling and Testing Protocol Chloride Titration Using .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 10 grams of reverse osmosis water to the soil sample and shake for 20 seconds.

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

4.4 Carefully pour the free liquid extract from the sample through a paper filter into a clean plastic cup if necessary.

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.

5.3 If the sample contains any sulfides (hydrogen or iron sulfides are common to oilfield soil samples) add 2-3 drops of hydrogen peroxide (H_2O_2) to mixture.

5.4 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.

5.5 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 Operating Company

QUALITY PROCEDURE
Sampling and Testing Protocol for VOC in Soil

1.0 Purpose

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

2.0 Scope

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

3.0 Procedure

3.1 Sample Collection and Preparation

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

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

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

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

3.2 Sampling Procedure

3.2.1 The instrument to be used in conducting VOC concentration testing shall be an Environmental Instruments 13471 OVM / Datalogger or a similar PID-type instrument. (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 conduct BTEX Speciation in accordance with **QP-02 and QP-06. 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.**