1R - 425-31

REPORTS

DATE:

7-5-12

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2012 JUL -9 P 12:51

RICE *Operating Company*
122 West Taylor • Hobbs, New Mexico 88240
Phone: (575) 393-9174 • Fax: (575) 397-1471

CERTIFIED MAIL
RETURN RECEIPT NO. 7007 2560 0000 4569 8623

July 5, 2012

Mr. Edward Hansen
New Mexico Energy, Minerals, & Natural Resources
Oil Conservation Division, Environmental Bureau
1220 S. St. Francis Drive
Santa Fe, New Mexico 87505

RE: Update Report and Termination Request
Rice Operating Company – BD SWD System
Vacuum Jct. K-6 (1R425-31): UL/K sec. 6 T18S R35E

Mr. Hansen:

Rice Operating Company (ROC) is the service provider (agent) for the abandoned Vacuum Saltwater Disposal (SWD) System and has no ownership of any portion of the pipeline, well, or facility. The System is owned by a consortium of oil producers, System Parties, who provide all operating capital on a percentage ownership/usage basis.

Background and Previous Work
The site is located approximately 3 miles south of Buckeye, New Mexico at UL/K, Sec. 6, T18S, R35E as shown on the Site Location Map (Figure 1). Groundwater at this site is located approximately 95 +/- feet below ground surface (bgs).

In 2005, ROC initiated work on the former Vacuum K-6 junction box. The site was delineated using a backhoe to form a 10 ft x 10 ft x 12 ft deep excavation and soil samples were screened at regular intervals for both hydrocarbons and chlorides. From the excavation, the four-wall composite and the bottom composite were taken to a commercial laboratory for analysis. Laboratory tests of the four-wall composite showed a chloride reading of 1,820 mg/kg and concentrations of gasoline range organics (GRO) and diesel range organics (DRO) below detectable limits. The bottom composite showed a chloride laboratory reading of 435 mg/kg and concentrations of GRO and DRO below detectable limits. The excavated soil was blended on site and returned to 8 ft bgs. The remaining excavation was backfilled with clean, imported soil to ground surface. Laboratory analysis of the blended backfill showed a chloride reading of 1,050 mg/kg and concentrations of GRO and DRO below detectable limits. The area was contoured to the surrounding landscape.

On May 23rd, 2006, one soil bore was advanced through the former junction box site to a depth of 45 ft bgs. Soil samples were field tested at regular intervals to a depth of 45 ft bgs for chlorides and screened in the field with a photo-ionization detector for hydrocarbons. A representative sample from the bore was taken to a commercial laboratory for confirmation of chloride and hydrocarbon field numbers. Laboratory tests resulted in a chloride concentration of 178 mg/kg at 45 ft bgs and concentrations of GRO and DRO below detectable limits.

A junction box closure report (Appendix A) was submitted to NMOCD with all the 2006 junction box closures and disclosures.

Further Evaluation

On March 1st, 2012, NMOCD requested ROC provide additional demonstration that groundwater will not be impacted beyond WQCC standards. The MultiMed model was used to determine if residual soil chlorides pose an on-going threat to groundwater quality. Data inputs and model outputs are included in Appendix B. With no subsurface liner, the model output concludes that the peak concentration of chlorides in the groundwater contributed by the vadose zone soils would be approximately 35.43 mg/kg at 229 years. Since the estimated increase in chloride concentrations in groundwater from residual chloride migration is below the WQCC standard of 250 mg/L and vegetation has rebounded at the site (Figure 2), no further action is warranted for the vadose zone at this site.

Recommendations

Site investigation demonstrates that residual chloride and hydrocarbons in the vadose zone will not with reasonable probability contaminate groundwater in excess of NMOCD standards. This site meets the requirements of the NMOCD-approved Revised Junction Box Upgrade Work Plan (July 16, 2003). As such, ROC request termination of the regulatory file, or similar closure status.

Please contact me at (575)393-9174 if you have any questions or wish to discuss this site. Thank you for your time and consideration.

Sincerely,
RICE Operating Company

Hack Conder
Environmental Manager

Figure 1 – Site Location Map
Figure 2 – Recent Photo-documentation of Site
Appendix A – Junction Box Closure Report
Appendix B – MultiMed Output File, Graph

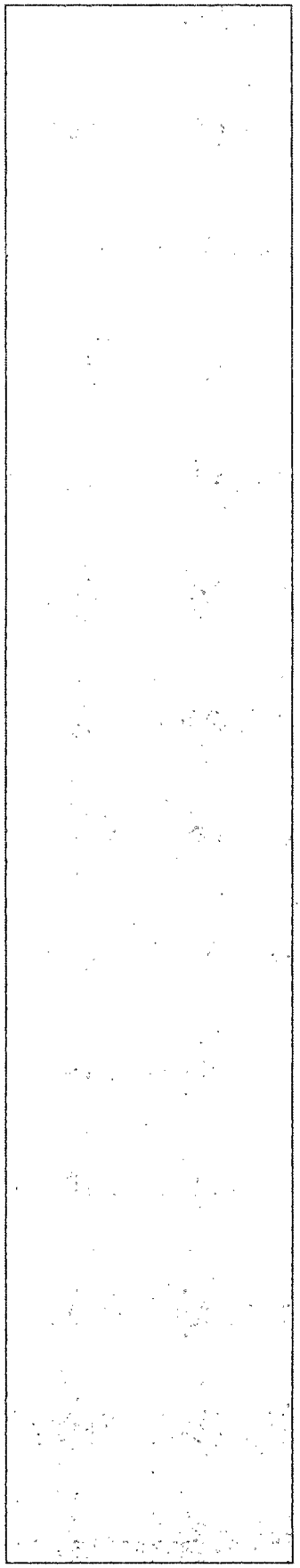
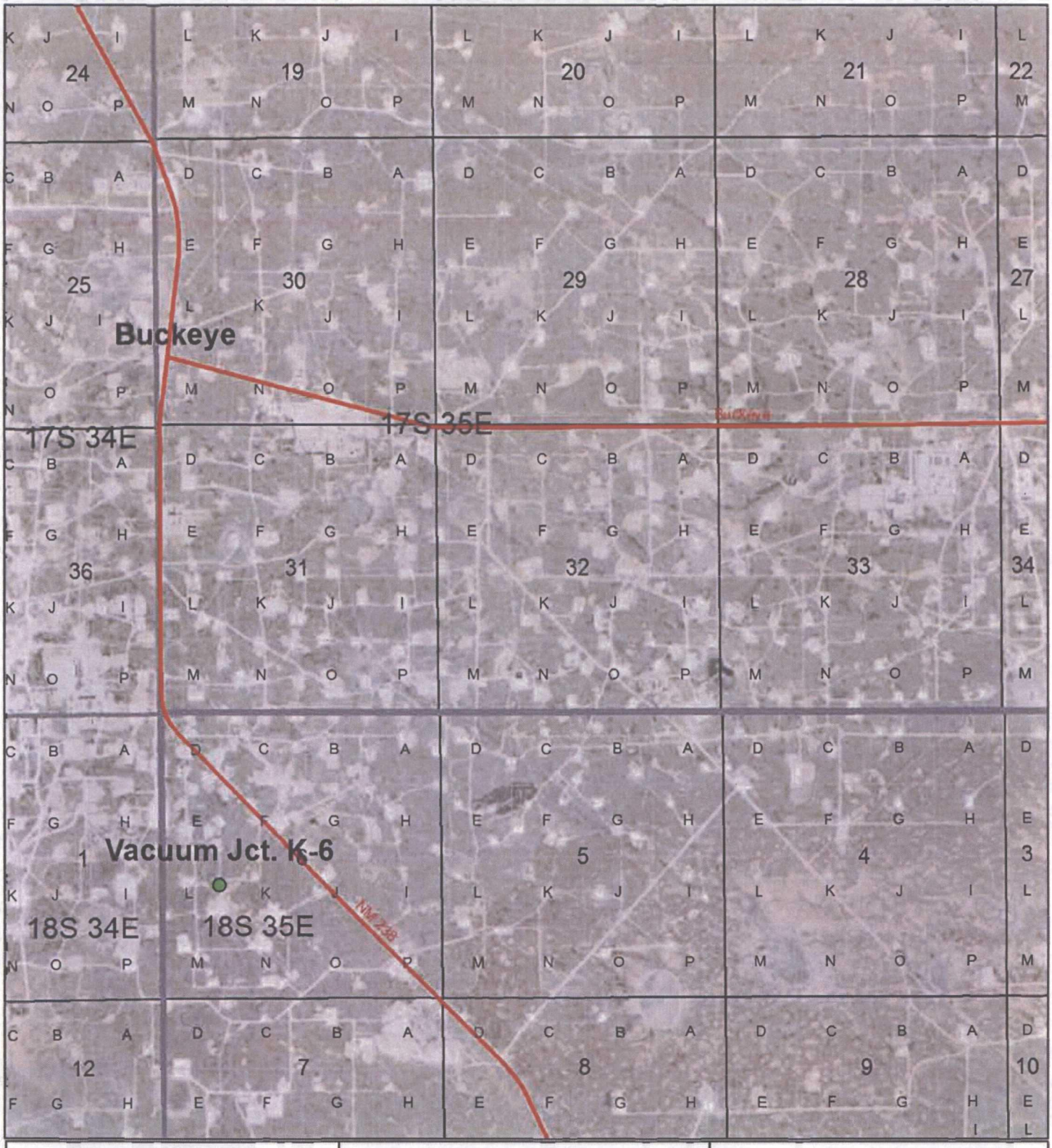


Figure 1
Site Location Map

Site Location Map



RICE ENVIRONMENTAL RECS CONSULTING & SAFETY, LLC

Vacuum Jct. K-6

Case #: 1R425-31

Legals: UL/K sec. 6
T-18-S R-35-E
LEA COUNTY, NM

N
W E
S

0 0.4 0.8
Miles

Drawing date: 6-8-12
Drafted by: L. Weinheimer

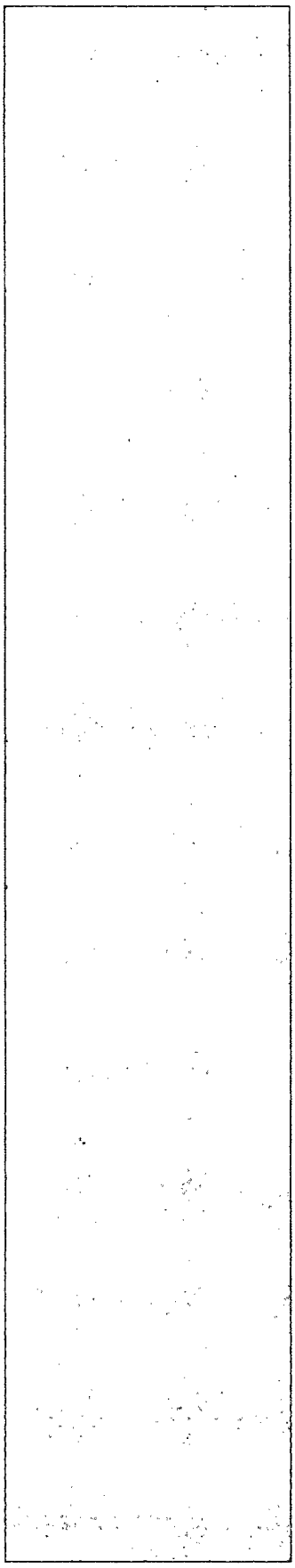


Figure 2
Recent
Photo-documentation
of Site

Vacuum Jct. K-6 (1R425-31)
Unit K, Section 6, T18S, R35E

Facing north 6/26/2012

Facing southeast 6/26/2012

Appendix A
Junction Box Closure Report

RICE OPERATING COMPANY
JUNCTION BOX FINAL REPORT

BOX LOCATION

SWD SYSTEM	JUNCTION	UNIT	SECTION	TOWNSHIP	RANGE	COUNTY	BOX DIMENSIONS - FEET		
							Length	Width	Depth
Vacuum	jct. K-6	K	6	18S	35E	Lea	no box--System abandonment		

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

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

Date Started 8/23/2005 Date Completed 5/23/2006 NMOCD Witness no

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

Soil Disposed 36 cubic yards Offsite Facility Sundance Location Eunice, NM

FINAL ANALYTICAL RESULTS:

Sample Date 9/21/2005, 5/23/2006 **Sample Depth** 12, 45 ft

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

Sample Location	PID ppm	GRO mg/kg	DRO mg/kg	Chloride mg/kg
4-WALL COMP.	0.0	<10.0	<10.0	1820
BOTTOM COMP.	0.0	<10.0	<10.0	435
BACKFILL	0.0	<10.0	<10.0	1050
SOIL BORE @ 45 ft	0.0	<10.0	<10.0	178

CHLORIDE FIELD TESTS

LOCATION	DEPTH (ft)	ppm
4-wall comp.	n/a	1367
bottom comp.	12	275
backfill comp.	n/a	806
soil bore	25	579
	30	375
	35	209
	40	220
	45	169

General Description of Remedial Action: This junction box was addressed as part of the Vacuum SWD System Abandonment. After the box was removed, delineation trenches were made at and around the former junction using a trackhoe. The excavation was extended to 10 x 10 x 12-ft (to the grass line) where composite samples were collected for lab confirmation. Hydrocarbon was not present within the lab's detection limits, meeting NMOCD guidelines. Chloride concentrations were consistent to 12 ft BGS. The excavated soil was blended on site and then backfilled into the excavation to approx. 8 ft BGS. The remaining excavated soil was disposed of off-site and clean, imported topsoil was brought in as replacement. The remainder of the excavation was backfilled with the clean, imported fill and contoured to the surrounding surface. On 5/23/06, a soil bore was conducted to further investigate chloride concerns. Chloride concentrations declined throughout the bore and drilling was stopped at 45 ft BGS where chloride was <250 ppm and the hole was plugged with bentonite. The disturbed surface was seeded with a blend of native vegetation and is expected to return to productive capacity at a normal rate.

enclosures: photos, lab results, PID screenings, chloride graph, disposal manifests, soil bore log, cross-section

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

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

REPORT ASSEMBLED BY Kristin Farris Pope SIGNATURE Kristin Farris Pope

DATE 7/31/2006 TITLE Project Scientist

Sundance Services, Inc.

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

(505) 394-2511

COPY

Ticket # 2495

Lease Operator/Shipper/Company: Rice

Lease Name: ~~EMC SWD~~ VAC JCT K-6

Transporter Company: RWI Time _____ AM/PM

Date: 2/15/06 Vehicle No. # 79 Driver No. _____

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: O/D

☐ JETOUT
☐ CALLOUT

VOLUME OF MATERIAL BBLS. 12 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: _____

FACILITY REPRESENTATIVE: _____

Sundance Services, Inc.

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

(505) 394-2511

Ticket # 2541

Lease Operator/Shipper/Company: Rice

Lease Name: ~~EUNICE~~ VAC K-6 JCT

Transporter Company: RWI Time _____ AM/PM

Date: 2/15/04 Vehicle No. # 79 Driver No. _____

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: O/O

☐ JETOUT
☐ CALLOUT

VOLUME OF MATERIAL BBLS. 12 YARDS

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DRIVER: Leon

FACILITY REPRESENTATIVE: Kelly Roach

Sundance Services, Inc.

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

(505) 394-2511

Ticket # 2587

Lease Operator/Shipper/Company: Rice

Lease Name: ~~EMC~~ VAC K-6 JCT

Transporter Company: RWT **Time** _____ **AM/PM**

Date: 2/15/06 **Vehicle No.** # 79 **Driver No.** _____

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: O/D

☐ JETOUT
☐ CALLOUT

VOLUME OF MATERIAL BBLS. 12 YARDS

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DRIVER: _____

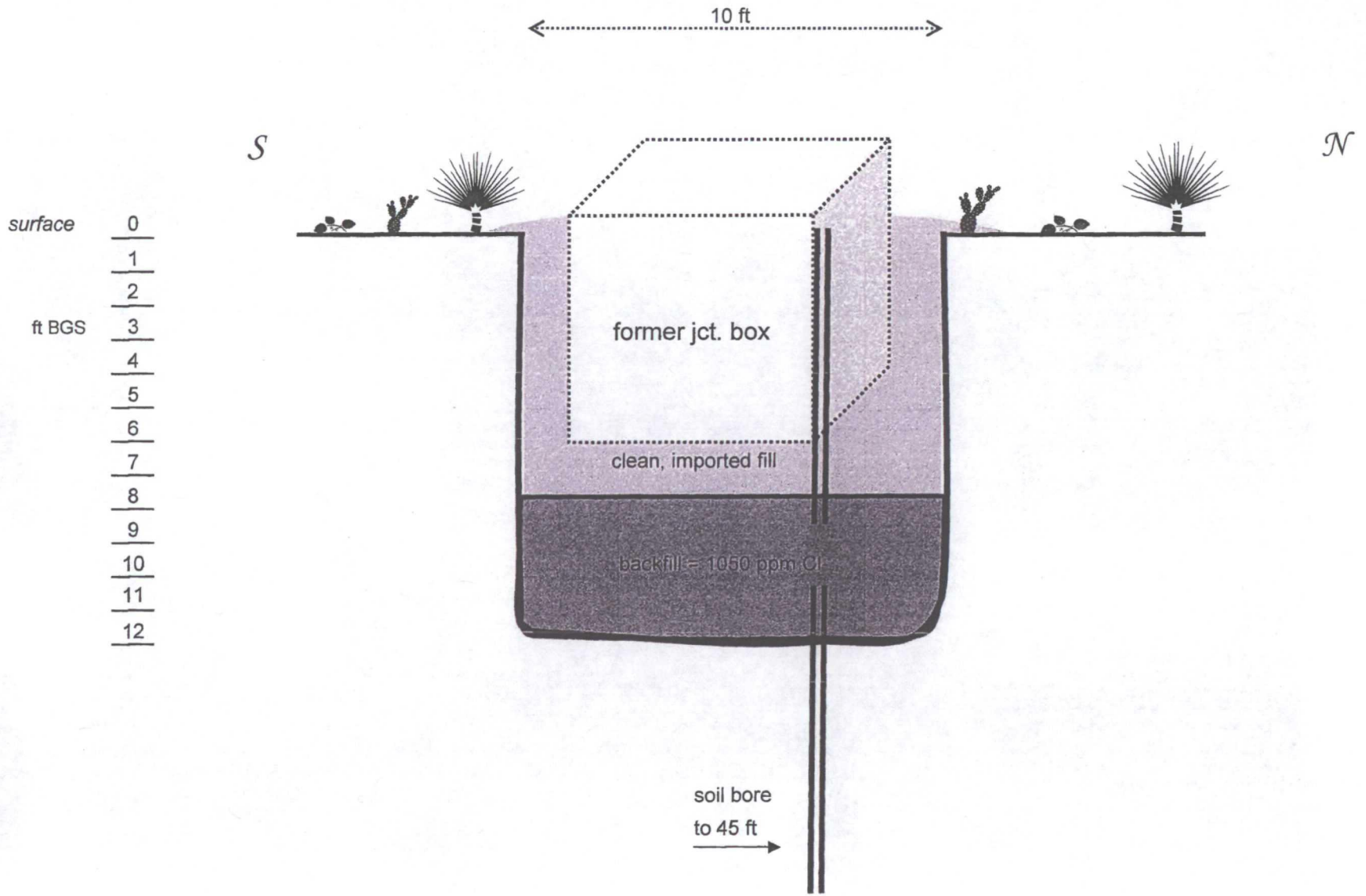
FACILITY REPRESENTATIVE: Kelly Roach

Vacuum jct. K-6

10 x 10 x 12 ft

Excavation Cross-Section

*** not to scale ***



Vacuum jct. K-6

jct. box site with box removed; before excavation 6/27/05

delineation and excavation with trackhoe 8/23/05

10 x 10 x 12-ft-deep excavation 9/21/05

compacting backfill 2/15/06

completing backfill; spreading topsoil 2/16/06

soil bore delineation 5/23/06

raking seed at backfilled site 2/22/06

plugging soil bore with bentonite 5/23/06

RICE OPERATING COMPANY

122 WEST TAYLOR
HOBBS, NEW MEXICO 88240
PHONE: (505) 393-9174 FAX: (505) 397-1471

VOC FIELD TEST REPORT FORM

MINI RAE PLUS CLASSIC PHOTOIONIZATION GAS DETECTOR

MODEL NO: PGM 761S
SERIAL NO: 104412
CALIBRATION GAS
GAS COMPOSITION: ISOBUTYLENE 100 PPM
AIR BALANCE
LOT NO: 04-2747
FILL DATE: 2-1-05
EXP. DATE: 8-1-06
ACCURACY: +/- 2%
METER READING
ACCURACY: 100.0

SYSTEM	JUNCTION	UNIT	SECTION	TOWNSHIP	RANGE
VAC	JCT K-6	K	6	18S	35E

SAMPLE	PID RESULT	SAMPLE	PID RESULT
4-Wall Comp. 10'X10'X12'			
	0.0		
BTTM 5 PT Comp @ 12'			
	0.0		
Blended Soil	Backfill		
	0.0		

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

Roy R. Rascon
Signature

9-21-05
Date

ENVIRONMENTAL LAB OF

12600 West I-20 East - Odessa, Texas 79765

Analytical Report

Prepared for:

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

Project: Vacuum Jct. K-6
Project Number: None Given
Location: None Given

Lab Order Number: 5I22001

Report Date: 09/27/05

Rice Operating Co.	Project: Vacuum Jct. K-6	Fax: (505) 397-1471
122 W. Taylor	Project Number: None Given	Reported:
Hobbs NM, 88240	Project Manager: Roy Rascon	09/27/05 08:51

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
10'X10' 4 Wall Comp.	5I22001-01	Soil	09/21/05 10:45	09/22/05 08:00
Blended Soil	5I22001-02	Soil	09/21/05 10:48	09/22/05 08:00
Bottom 5 PT 10'X10'X12'@ 12'	5I22001-03	Soil	09/21/05 10:12	09/22/05 08:00

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

Rice Operating Co.	Project: Vacuum Jct. K-6	Fax: (505) 397-1471
122 W. Taylor	Project Number: None Given	Reported:
Hobbs NM, 88240	Project Manager: Roy Rascon	09/27/05 08:51

Organics by GC
Environmental Lab of Texas

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
10'X10' 4 Wall Comp. (5I22001-01) Soil									
Gasoline Range Organics C6-C12	ND	10.0	mg/kg dry	1	EI52304	09/23/05	09/26/05	EPA 8015M	
Diesel Range Organics >C12-C35	ND	10.0	"	"	"	"	"	"	
Total Hydrocarbon C6-C35	ND	10.0	"	"	"	"	"	"	
Surrogate: 1-Chlorooctane		*75.0 %*	*70-130*		"	"	"	"	
Surrogate: 1-Chlorooctadecane		*89.4 %*	*70-130*		"	"	"	"	
Blended Soil (5I22001-02) Soil									
Gasoline Range Organics C6-C12	ND	10.0	mg/kg dry	1	EI52304	09/23/05	09/23/05	EPA 8015M	
Diesel Range Organics >C12-C35	ND	10.0	"	"	"	"	"	"	
Total Hydrocarbon C6-C35	ND	10.0	"	"	"	"	"	"	
Surrogate: 1-Chlorooctane		*80.0 %*	*70-130*		"	"	"	"	
Surrogate: 1-Chlorooctadecane		*105 %*	*70-130*		"	"	"	"	
Bottom 5 PT 10'X10'X12'@ 12' (5I22001-03) Soil									
Gasoline Range Organics C6-C12	ND	10.0	mg/kg dry	1	EI52304	09/23/05	09/23/05	EPA 8015M	
Diesel Range Organics >C12-C35	ND	10.0	"	"	"	"	"	"	
Total Hydrocarbon C6-C35	ND	10.0	"	"	"	"	"	"	
Surrogate: 1-Chlorooctane		*95.2 %*	*70-130*		"	"	"	"	
Surrogate: 1-Chlorooctadecane		*103 %*	*70-130*		"	"	"	"	

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

Rice Operating Co.	Project: Vacuum Jct. K-6	Fax: (505) 397-1471
122 W. Taylor	Project Number: None Given	**Reported:**
Hobbs NM, 88240	Project Manager: Roy Rascon	09/27/05 08:51

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

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
10'X10' 4 Wall Comp. (5I22001-01) Soil									
Chloride	**1820**	25.0	mg/kg	50	EI52305	09/22/05	09/23/05	EPA 300.0	
% Moisture	**4.2**	0.1	%	1	EI52301	09/22/05	09/23/05	% calculation	
Blended Soil (5I22001-02) Soil									
Chloride	**1050**	20.0	mg/kg	40	EI52305	09/22/05	09/23/05	EPA 300.0	
% Moisture	**4.5**	0.1	%	1	EI52301	09/22/05	09/23/05	% calculation	
Bottom 5 PT 10'X10'X12'@ 12' (5I22001-03) Soil									
Chloride	**435**	10.0	mg/kg	20	EI52305	09/22/05	09/23/05	EPA 300.0	
% Moisture	**5.9**	0.1	%	1	EI52301	09/22/05	09/23/05	% calculation	

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

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 EI52304 - Solvent Extraction (GC)										
Blank (EI52304-BLK1)				Prepared & Analyzed: 09/23/05						
Gasoline Range Organics C6-C12	ND	10.0	mg/kg wet							
Diesel Range Organics >C12-C35	ND	10.0	"							
Total Hydrocarbon C6-C35	ND	10.0	"							
Surrogate: 1-Chlorooctane	*44.0*		*mg/kg*	*50.0*		*88.0*	*70-130*			
Surrogate: 1-Chlorooctadecane	*37.7*		*"*	*50.0*		*75.4*	*70-130*			
LCS (EI52304-BS1)				Prepared & Analyzed: 09/23/05						
Gasoline Range Organics C6-C12	404	10.0	mg/kg wet	500		80.8	75-125			
Diesel Range Organics >C12-C35	489	10.0	"	500		97.8	75-125			
Total Hydrocarbon C6-C35	893	10.0	"	1000		89.3	75-125			
Surrogate: 1-Chlorooctane	*44.8*		*mg/kg*	*50.0*		*89.6*	*70-130*			
Surrogate: 1-Chlorooctadecane	*48.3*		*"*	*50.0*		*96.6*	*70-130*			
Calibration Check (EI52304-CCV1)				Prepared: 09/23/05 Analyzed: 09/24/05						
Gasoline Range Organics C6-C12	413		mg/kg	500		82.6	80-120			
Diesel Range Organics >C12-C35	443		"	500		88.6	80-120			
Total Hydrocarbon C6-C35	856		"	1000		85.6	80-120			
Surrogate: 1-Chlorooctane	*45.3*		*"*	*50.0*		*90.6*	*0-200*			
Surrogate: 1-Chlorooctadecane	*44.1*		*"*	*50.0*		*88.2*	*0-200*			
Matrix Spike (EI52304-MS1)	**Source: 5I22001-01**			Prepared: 09/23/05 Analyzed: 09/24/05						
Gasoline Range Organics C6-C12	457	10.0	mg/kg dry	522	ND	87.5	75-125			
Diesel Range Organics >C12-C35	494	10.0	"	522	ND	94.6	75-125			
Total Hydrocarbon C6-C35	951	10.0	"	1040	ND	91.4	75-125			
Surrogate: 1-Chlorooctane	*55.3*		*mg/kg*	*50.0*		*111*	*70-130*			
Surrogate: 1-Chlorooctadecane	*51.8*		*"*	*50.0*		*104*	*70-130*			
Matrix Spike Dup (EI52304-MSD1)	**Source: 5I22001-01**			Prepared: 09/23/05 Analyzed: 09/24/05						
Gasoline Range Organics C6-C12	463	10.0	mg/kg dry	522	ND	88.7	75-125	1.30	20	
Diesel Range Organics >C12-C35	500	10.0	"	522	ND	95.8	75-125	1.21	20	
Total Hydrocarbon C6-C35	963	10.0	"	1040	ND	92.6	75-125	1.25	20	
Surrogate: 1-Chlorooctane	*54.9*		*mg/kg*	*50.0*		*110*	*70-130*			
Surrogate: 1-Chlorooctadecane	*50.3*		*"*	*50.0*		*101*	*70-130*			

Rice Operating Co.	Project: Vacuum Jct. K-6	Fax: (505) 397-1471
122 W. Taylor	Project Number: None Given	Reported:
Hobbs NM, 88240	Project Manager: Roy Rascon	09/27/05 08:51

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 EI52301 - General Preparation (Prep)										
Blank (EI52301-BLK1)				Prepared: 09/22/05 Analyzed: 09/23/05						
% Solids	100		%							
Duplicate (EI52301-DUP1)	Source: 5I21013-01			Prepared: 09/22/05 Analyzed: 09/23/05						
% Solids	86.5		%		86.1			0.464	20	
Duplicate (EI52301-DUP2)	Source: 5I22008-07			Prepared: 09/22/05 Analyzed: 09/23/05						
% Solids	99.4		%		98.9			0.504	20	
Duplicate (EI52301-DUP3)	Source: 5I22019-03			Prepared: 09/22/05 Analyzed: 09/23/05						
% Solids	97.6		%		97.8			0.205	20	
Duplicate (EI52301-DUP4)	Source: 5I22021-18			Prepared: 09/22/05 Analyzed: 09/23/05						
% Solids	90.8		%		90.6			0.221	20	
Batch EI52305 - Water Extraction										
Blank (EI52305-BLK1)				Prepared: 09/22/05 Analyzed: 09/23/05						
Chloride	ND	0.500	mg/kg							
LCS (EI52305-BS1)				Prepared: 09/22/05 Analyzed: 09/23/05						
Chloride	9.07		mg/L	10.0		90.7	80-120			
Calibration Check (EI52305-CCV1)				Prepared: 09/22/05 Analyzed: 09/23/05						
Chloride	9.29		mg/L	10.0		92.9	80-120			
Duplicate (EI52305-DUP1)	Source: 5I21013-01			Prepared: 09/22/05 Analyzed: 09/23/05						
Chloride	90.7	0.500	mg/kg		91.3			0.659	20	

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Rice Operating Co.	Project: Vacuum Jct. K-6	Fax: (505) 397-1471
122 W. Taylor	Project Number: None Given	**Reported:**
Hobbs NM, 88240	Project Manager: Roy Rascon	09/27/05 08:51

Notes and Definitions

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

Report Approved By: Raland K Tuttle Date: 9-27-05

Raland K. Tuttle, Lab Manager
Celey D. Keene, Lab Director, Org. Tech Director
Peggy Allen, QA Officer
Jeanne Mc Murrey, Inorg. Tech Director
LaTasha Cornish, Chemist
Sandra Sanchez, Lab Tech.

Environmental Lab of Texas, Inc.

12600 West I-20 East
Odessa, Texas 79763
Phone: 915-563-1800
Fax: 915-563-1713

CHAIN OF CUSTODY RECORD AND ANALYSIS REQUEST

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

Project Name: VAC JCT K-6
Project #:
Project Loc:
PO #:

LAB # (lab use only)	FIELD CODE	Date Sampled	Time Sampled	No. of Containers	Preservative: Ice	Preservative: HNO_3	Preservative: HCl	Preservative: NaOH	Preservative: H_2SO_4	Preservative: None	Preservative: Other (Specify)	Matrix: Water	Matrix: Sludge	Matrix: Soil	Matrix: Other (specify)	Analyze For: TCLP: TDS (C) SAR / EC	TCLP: TPH 418.1	TCLP: TPH TX 1005/1005	TOTAL: TPH 8015M GRO/DRO	TOTAL: Metals: As Ag Ba Cd Cr Pb Hg Se	TOTAL: Volatiles	TOTAL: Semivolatiles	TOTAL: BTEX 8021B/5030	RUSH TAT (Pre-Schedule)
-01	10X10' 4 WALL Comp.	9-21-05	1045A	1	✓									✓		✓			✓					
-02	Blended Soil	9-21-05	1048 A	1	✓									✓		✓			✓					
-03	BTm S PT 10X10X12 @ 12'	9-21-05	1012 A	1	✓									✓		✓			✓					

Special Instructions:

Sample Containers Intact? (Y) N
Temperature Upon Receipt:
Laboratory Comments: labels/seals -1.0

Relinquished by:	Date	Time	Received by:	Date	Time
Roy R. Rascon	9-21-05	1220		9/21	18:00
Relinquished by:	Date	Time	Received by ELOT:	Date	Time
	9/22	8100	Correct Keez	9/22/05	8:00

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

Client: Rice Op.

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

Order #: ELE22001

Initials: CK

Sample Receipt Checklist

Temperature of container/cooler?	Yes	No	-1.0 C
Shipping container/cooler in good condition?	Yes	No	
Custody Seals intact on shipping container/cooler?	Yes	No	Not present
Custody Seals intact on sample bottles?	Yes	No	Not present
Chain of custody present?	Yes	No	
Sample Instructions complete on Chain of Custody?	Yes	No	
Chain of Custody signed when relinquished and received?	Yes	No	
Chain of custody agrees with sample label(s)	Yes	No	
Container labels legible and intact?	Yes	No	
Sample Matrix and properties same as on chain of custody?	Yes	No	
Samples in proper container/bottle?	Yes	No	
Samples properly preserved?	Yes	No	
Sample bottles intact?	Yes	No	
Preservations documented on Chain of Custody?	Yes	No	
Containers documented on Chain of Custody?	Yes	No	
Sufficient sample amount for indicated test?	Yes	No	
All samples received within sufficient hold time?	Yes	No	
VOC samples have zero headspace?	Yes	No	Not Applicable

Other observations:

Variance Documentation:

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

Regarding:

Corrective Action Taken:

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 & CALIBRATION

CK.	☐	MODEL: PGM 761S	SERIAL NO: 104412
MODEL	☐	MODEL: PGM 761S	SERIAL NO: 104490
NO.	☐	MODEL: PGM 7600	SERIAL NO: 110-12383

LOT NO:_____
FILL DATE:_____
ACCURACY: +/- 2%

GAS COMPOSITION: ISOBUTYLENE 100PPM / AIR: BALANCE
EXP. DATE:
METER READING ACCURACY: 99.9

SYSTEM	JUNCTION	UNIT	SECTION	TOWNSHIP	RANGE
Vac	Jct K-6	K	6	18S	35E

Bore #1 NE of ROC marker 5'

SAMPLE	PID RESULTS	SAMPLE	PID RESULTS
5' bgs	0		
10' bgs	0		
15' bgs	0		
20' bgs	0		
25' bgs	0		
30' bgs	0		
35' bgs	0		
40' bgs	0		
45' bgs	0		

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

SIGNATURE: Melanie Franko DATE: 5/23/06

Soil Bore

ENVIRONMENTAL LAB OF

12600 West I-20 East - Odessa, Texas 79765

COPY

Analytical Report

Prepared for:

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

Project: Vac. K-6
Project Number: None Given
Location: None Given

Lab Order Number: 6E25003

Report Date: 05/30/06

Rice Operating Co.	Project: Vac. K-6	Fax: (505) 397-1471
122 W. Taylor	Project Number: None Given	**Reported:**
Hobbs NM, 88240	Project Manager: Kristin Farris-Pope	05/30/06 14:27

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
45' bgs	6E25003-01	Soil	05/23/06 11:46	05/25/06 08:00

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Rice Operating Co.	Project: Vac. K-6	Fax: (505) 397-1471
122 W. Taylor	Project Number: None Given	**Reported:**
Hobbs NM, 88240	Project Manager: Kristin Farris-Pope	05/30/06 14:27

Organics by GC
Environmental Lab of Texas

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
45' bgs (6E25003-01) Soil									
Carbon Ranges C6-C12	ND	10.0	mg/kg dry	1	EE62508	05/25/06	05/26/06	EPA 8015M	
Carbon Ranges C12-C28	ND	10.0	"	"	"	"	"	"	
Carbon Ranges C28-C35	ND	10.0	"	"	"	"	"	"	
Total Hydrocarbon nC6-nC35	ND	10.0	"	"	"	"	"	"	
Surrogate: 1-Chlorooctane		*98.8 %*	*70-130*		"	"	"	"	
Surrogate: 1-Chlorooctadecane		*102 %*	*70-130*		"	"	"	"	

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

Rice Operating Co.	Project: Vac. K-6	Fax: (505) 397-1471
122 W. Taylor	Project Number: None Given	**Reported:**
Hobbs NM, 88240	Project Manager: Kristin Farris-Pope	05/30/06 14:27

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

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
45' bgs (6E25003-01) Soil									
Chloride	**178**	10.0	mg/kg	20	EE62605	05/26/06	05/26/06	EPA 300.0	
% Moisture	**1.6**	0.1	%	1	EE62607	05/25/06	05/26/06	% calculation	

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

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 EE62508 - Solvent Extraction (GC)										
Blank (EE62508-BLK1)				Prepared & Analyzed: 05/25/06						
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	*44.0*		*mg/kg*	*50.0*		*88.0*	*70-130*			
Surrogate: 1-Chlorooctadecane	*46.1*		*"*	*50.0*		*92.2*	*70-130*			
LCS (EE62508-BS1)				Prepared & Analyzed: 05/25/06						
Carbon Ranges C6-C12	539	10.0	mg/kg wet	500		108	75-125			
Carbon Ranges C12-C28	481	10.0	"	500		96.2	75-125			
Total Hydrocarbon nC6-nC35	1020	10.0	"	1000		102	75-125			
Surrogate: 1-Chlorooctane	*47.6*		*mg/kg*	*50.0*		*95.2*	*70-130*			
Surrogate: 1-Chlorooctadecane	*44.0*		*"*	*50.0*		*88.0*	*70-130*			
Calibration Check (EE62508-CCV1)				Prepared: 05/25/06 Analyzed: 05/26/06						
Carbon Ranges C6-C12	283		mg/kg	250		113	80-120			
Carbon Ranges C12-C28	295		"	250		118	80-120			
Total Hydrocarbon nC6-nC35	578		"	500		116	80-120			
Surrogate: 1-Chlorooctane	*48.0*		*"*	*50.0*		*96.0*	*70-130*			
Surrogate: 1-Chlorooctadecane	*47.6*		*"*	*50.0*		*95.2*	*70-130*			
Matrix Spike (EE62508-MS1)		**Source: 6E24001-07**		Prepared & Analyzed: 05/25/06						
Carbon Ranges C6-C12	578	10.0	mg/kg dry	538	ND	107	75-125			
Carbon Ranges C12-C28	462	10.0	"	538	ND	85.9	75-125			
Total Hydrocarbon nC6-nC35	1040	10.0	"	1080	ND	96.3	75-125			
Surrogate: 1-Chlorooctane	*51.6*		*mg/kg*	*50.0*		*103*	*70-130*			
Surrogate: 1-Chlorooctadecane	*48.3*		*"*	*50.0*		*96.6*	*70-130*			

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 EE62508 - Solvent Extraction (GC)										
Matrix Spike Dup (EE62508-MSD1)	**Source: 6E24001-07**			Prepared & Analyzed: 05/25/06						
Carbon Ranges C6-C12	586	10.0	mg/kg dry	538	ND	109	75-125	1.37	20	
Carbon Ranges C12-C28	471	10.0	"	538	ND	87.5	75-125	1.93	20	
Total Hydrocarbon nC6-nC35	1060	10.0	"	1080	ND	98.1	75-125	1.90	20	
Surrogate: 1-Chlorooctane	*52.3*		*mg/kg*	*50.0*		*105*	*70-130*			
Surrogate: 1-Chlorooctadecane	*48.7*		*"*	*50.0*		*97.4*	*70-130*			

Rice Operating Co.	Project: Vac. K-6	Fax: (505) 397-1471
122 W. Taylor	Project Number: None Given	**Reported:**
Hobbs NM, 88240	Project Manager: Kristin Farris-Pope	05/30/06 14:27

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 EE62605 - Water Extraction										
Blank (EE62605-BLK1)				Prepared & Analyzed: 05/26/06						
Chloride	ND	0.500	mg/kg							
LCS (EE62605-BS1)				Prepared & Analyzed: 05/26/06						
Chloride	10.0	0.500	mg/kg	10.0		100	80-120			
Calibration Check (EE62605-CCV1)				Prepared & Analyzed: 05/26/06						
Chloride	10.2		mg/kg	10.0		102	80-120			
Duplicate (EE62605-DUP1)		Source: 6E22004-32		Prepared & Analyzed: 05/26/06						
Chloride	13.3	5.00	mg/kg		14.6			9.32	20	
Duplicate (EE62605-DUP2)		Source: 6E23010-02		Prepared & Analyzed: 05/26/06						
Chloride	70.3	10.0	mg/kg		66.8			5.11	20	
Matrix Spike (EE62605-MS1)		Source: 6E22004-32		Prepared & Analyzed: 05/26/06						
Chloride	103	5.00	mg/kg	100	14.6	88.4	80-120			
Matrix Spike (EE62605-MS2)		Source: 6E23010-02		Prepared & Analyzed: 05/26/06						
Chloride	257	10.0	mg/kg	200	66.8	95.1	80-120			
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	

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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)										
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	

Rice Operating Co.	Project: Vac. K-6	Fax: (505) 397-1471
122 W. Taylor	Project Number: None Given	**Reported:**
Hobbs NM, 88240	Project Manager: Kristin Farris-Pope	05/30/06 14:27

Notes and Definitions

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

Report Approved By: Raland K Tuttle Date: 5-30-06

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, Inc.

12600 West I-20 East
Odessa, Texas 79763

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

CHAIN OF CUSTODY RECORD AND ANALYSIS REQUEST

Project Manager: Kristin Farris Pope

Company Name: Rice Operating Company

Company Address: 122 W. Taylor

City/State/Zip: Hobbs NM 88240

Telephone No: (505) 393-9174

Fax No:

Sampler Signature: Melanie Franks

Project Name: [illegible]

Project #:

Project Loc:

PO #:

LAB # (lab use only)	FIELD CODE	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)	Analyze For: TDS / CL / SAR / EC	TPH 418.1	TPH TX 1005/1006	TPH 8015M GRO/DRO	Metals: As Ag Ba Cd Cr Pb Hg Se	Volatiles	Semivolatiles	BTEX 8021B/5030	RUSH TAT (Pre-Schedule)
[illegible] -1	45' Dg's	5/23/[illegible]	11:40	1	X									X		X			X					

Analyze For: TCLP: / TOTAL:

Special Instructions:

Sample Containers Intact? Y N
Temperature Upon Receipt: [illegible]
Laboratory Comments: [illegible]

Relinquished by:	Date	Time	Received by:	Date	Time
Melanie Franks	5/24/[illegible]	8:00	[signature]	5/24	17:30

Relinquished by:	Date	Time	Received by ELOT:	Date	Time
[signature]	5/25	8:00	[signature]	5/25/[illegible]	8:00

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

lient: Pike OP.

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

rder #: UE25023

nitials: CK

Sample Receipt Checklist

emperature of container/cooler?	Yes	No	2.0 C
hipping container/cooler in good condition?	Yes	No	
ustody Seals intact on shipping container/cooler?	Yes	No	Not present
ustody Seals intact on sample bottles?	Yes	No	Not present
hain of custody present?	Yes	No	
ample Instructions complete on Chain of Custody?	Yes	No	
hain of Custody signed when relinquished and received?	Yes	No	
hain of custody agrees with sample label(s)	Yes	No	
ontainer labels legible and intact?	Yes	No	
ample Matrix and properties same as on chain of custody?	Yes	No	
amples in proper container/bottle?	Yes	No	
amples properly preserved?	Yes	No	
ample bottles intact?	Yes	No	
reservations documented on Chain of Custody?	Yes	No	
ontainers documented on Chain of Custody?	Yes	No	
ufficient sample amount for indicated test?	Yes	No	
ll samples received within sufficient hold time?	Yes	No	
/OC samples have zero headspace?	Yes	No	Not Applicable

)ther observations:

Variance Documentation:

ontact Person: - Date/Time: Contacted by:

egarding:

orrective Action Taken:

Soil Bore

System: Vac Location: Jct. K-6 GW:95 Landowner:State Lease to Giles M Lee

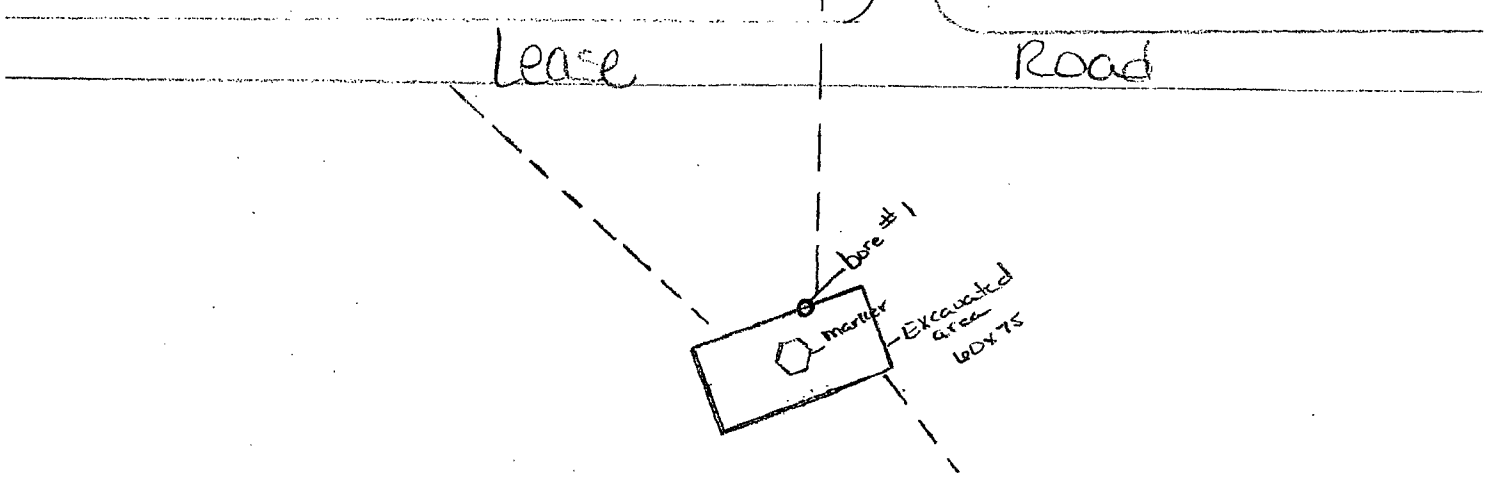
Soil Bore: Bore # 1 5' NE of Marker GPS Coord. System UTM

UL/ K Sec.6 T18S R 35E Nad 27 Lat. & Long. 32*46.537N 103* 30.101 W

Depth	Cl.		PID		Color	Time
5'	687		0			11:22
10'	581		0			11:25
15'	285		0			11:28
20'	428		0			11:31
25'	579		0			11:34
30'	375		0			11:37
35'	209		0			11:40
40'	220		0			11:43
45'	169	LAB 178	0			11:46

Notes: Sent 45' sample to the lab for Cl and TPH. Location cleaned up at 45' stopped drilling and plugged hole with bentonite plug.

Signature Melanie Franco Date 5/23/06



Appendix B
MultiMed Output File, Graph

MULTIMED V1.01 DATE OF CALCULATIONS: 5-JUL-2012 TIME: 14:35:11

U. S. ENVIRONMENTAL PROTECTION AGENCY

EXPOSURE ASSESSMENT

MULTIMEDIA MODEL

MULTIMED (Version 1.50, 2005)

1

Run options

--- -------

Vacuum Jct. K-6

Chemical simulated is Chloride

Option Chosen	Saturated and unsaturated zone models
Run was	DETERMIN

Infiltration Specified By User: 3.048E-02 m/yr
Run was transient
Well Times: Entered Explicitly
Reject runs if Y coordinate outside plume
Reject runs if Z coordinate outside plume
Gaussian source used in saturated zone model

1

1

UNSATURATED ZONE FLOW MODEL PARAMETERS
(input parameter description and value)

NP	- Total number of nodal points	240
NMAT	- Number of different porous materials	1
KPROP	- Van Genuchten or Brooks and Corey	1
IMSHGN	- Spatial discretization option	1
NVFLAYR	- Number of layers in flow model	1

OPTIONS CHOSEN

------- ------

Van Genuchten functional coefficients
User defined coordinate system

1

Layer information

LAYER NO.	LAYER THICKNESS	MATERIAL PROPERTY
1	28.00	1

DATA FOR MATERIAL 1

VADOSE ZONE MATERIAL VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Saturated hydraulic conductivity	cm/hr	CONSTANT	3.60	-999.	-999.	-999.
Unsaturated zone porosity	--	CONSTANT	0.250	-999.	-999.	-999.
Air entry pressure head	m	CONSTANT	0.700	-999.	-999.	-999.
Depth of the unsaturated zone	m	CONSTANT	28.0	0.000	0.000	0.000

DATA FOR MATERIAL 1

VADOSE ZONE FUNCTION VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Residual water content	--	CONSTANT	0.116	-999.	-999.	-999.
Brook and Corey exponent,EN	--	CONSTANT	-999.	-999.	-999.	-999.
ALFA coefficient	1/cm	CONSTANT	0.500E-02	-999.	-999.	-999.
Van Genuchten exponent, ENN	--	CONSTANT	1.09	-999.	-999.	-999.

1

UNSATURATED ZONE TRANSPORT MODEL PARAMETERS

NLAY	- Number of different layers used		1
NTSTPS	- Number of time values concentration calc		40
DUMMY	- Not presently used		1
ISOL	- Type of scheme used in unsaturated zone		2
N	- Stehfest terms or number of increments		18
NTEL	- Points in Lagrangian interpolation		3
NGPTS	- Number of Gauss points		104
NIT	- Convolution integral segments		2
IBOUND	- Type of boundary condition		3
ITSGEN	- Time values generated or input		1
TMAX	- Max simulation time	--	0.0
WTFUN	- Weighting factor	--	1.2

OPTIONS CHOSEN

Convolution integral approach
Exponentially decaying continuous source
Computer generated times for computing concentrations

1

DATA FOR LAYER 1

VADOSE TRANSPORT VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS		LIMITS	
			MEAN	STD DEV	MIN	MAX
Thickness of layer	m	CONSTANT	28.0	-999.	-999.	-999.
Longitudinal dispersivity of layer	m	DERIVED	-999.	-999.	-999.	-999.
Percent organic matter	--	CONSTANT	0.000	-999.	-999.	-999.
Bulk density of soil for layer	g/cc	CONSTANT	1.99	-999.	-999.	-999.
Biological decay coefficient	1/yr	CONSTANT	0.000	-999.	-999.	-999.

1

CHEMICAL SPECIFIC VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS		LIMITS	
			MEAN	STD DEV	MIN	MAX
Solid phase decay coefficient	1/yr	CONSTANT	0.000	-999.	-999.	-999.
Dissolved phase decay coefficient	1/yr	CONSTANT	0.000	-999.	-999.	-999.
Overall chemical decay coefficient	1/yr	CONSTANT	0.000	-999.	-999.	-999.
Acid catalyzed hydrolysis rate	l/M-yr	CONSTANT	0.000	-999.	-999.	-999.
Neutral hydrolysis rate constant	1/yr	CONSTANT	0.000	-999.	-999.	-999.
Base catalyzed hydrolysis rate	l/M-yr	CONSTANT	0.000	-999.	-999.	-999.
Reference temperature	C	CONSTANT	25.0	-999.	-999.	-999.
Normalized distribution coefficient	ml/g	CONSTANT	0.000	-999.	-999.	-999.
Distribution coefficient	--	DERIVED	-999.	-999.	-999.	-999.
Biodegradation coefficient (sat. zone)	1/yr	CONSTANT	0.000	-999.	-999.	-999.
Air diffusion coefficient	cm2/s	CONSTANT	-999.	-999.	-999.	-999.
Reference temperature for air diffusion	C	CONSTANT	-999.	-999.	-999.	-999.
Molecular weight	g/M	CONSTANT	-999.	-999.	-999.	-999.
Mole fraction of solute	--	CONSTANT	-999.	-999.	-999.	-999.
Vapor pressure of solute	mm Hg	CONSTANT	-999.	-999.	-999.	-999.
Henry`s law constant	atm-m^3/M	CONSTANT	-999.	-999.	-999.	-999.
Overall 1st order decay sat. zone	1/yr	DERIVED	0.000	0.000	0.000	1.00
Not currently used		CONSTANT	0.000	0.000	0.000	0.000
Not currently used		CONSTANT	0.000	0.000	0.000	0.000

1

SOURCE SPECIFIC VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS		LIMITS	
			MEAN	STD DEV	MIN	MAX
Infiltration rate	m/yr	CONSTANT	0.305E-01	-999.	-999.	-999.
Area of waste disposal unit	m^2	CONSTANT	9.20	-999.	-999.	-999.
Duration of pulse	yr	DERIVED	50.0	-999.	-999.	-999.
Spread of contaminant source	m	DERIVED	-999.	-999.	-999.	-999.
Recharge rate	m/yr	CONSTANT	0.000	-999.	-999.	-999.
Source decay constant	1/yr	CONSTANT	0.250E-01	0.000	0.000	0.000
Initial concentration at landfill	mg/l	CONSTANT	310.	-999.	-999.	-999.
Length scale of facility	m	DERIVED	3.05	-999.	-999.	-999.
Width scale of facility	m	DERIVED	3.05	-999.	-999.	-999.
Near field dilution		DERIVED	1.00	0.000	0.000	1.00

1

AQUIFER SPECIFIC VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS		LIMITS	
			MEAN	STD DEV	MIN	MAX
Particle diameter	cm	CONSTANT	-999.	-999.	-999.	-999.
Aquifer porosity	--	CONSTANT	0.300	-999.	-999.	-999.
Bulk density	g/cc	CONSTANT	1.86	-999.	-999.	-999.
Aquifer thickness	m	CONSTANT	6.10	-999.	-999.	-999.
Source thickness (mixing zone depth)	m	DERIVED	3.00	-999.	-999.	-999.
Conductivity (hydraulic)	m/yr	CONSTANT	315.	-999.	-999.	-999.
Gradient (hydraulic)		CONSTANT	0.400E-02	-999.	-999.	-999.
Groundwater seepage velocity	m/yr	DERIVED	-999.	-999.	-999.	-999.
Retardation coefficient	--	DERIVED	-999.	-999.	-999.	-999.
Longitudinal dispersivity	m	FUNCTION OF X	-999.	-999.	-999.	-999.
Transverse dispersivity	m	FUNCTION OF X	-999.	-999.	-999.	-999.
Vertical dispersivity	m	FUNCTION OF X	-999.	-999.	-999.	-999.
Temperature of aquifer	C	CONSTANT	20.0	-999.	-999.	-999.
pH	--	CONSTANT	7.00	-999.	-999.	-999.
Organic carbon content (fraction)		CONSTANT	0.000	-999.	-999.	-999.
Well distance from site	m	CONSTANT	1.00	-999.	-999.	-999.
Angle off center	degree	CONSTANT	0.000	-999.	-999.	-999.
Well vertical distance	m	CONSTANT	0.000	-999.	-999.	-999.

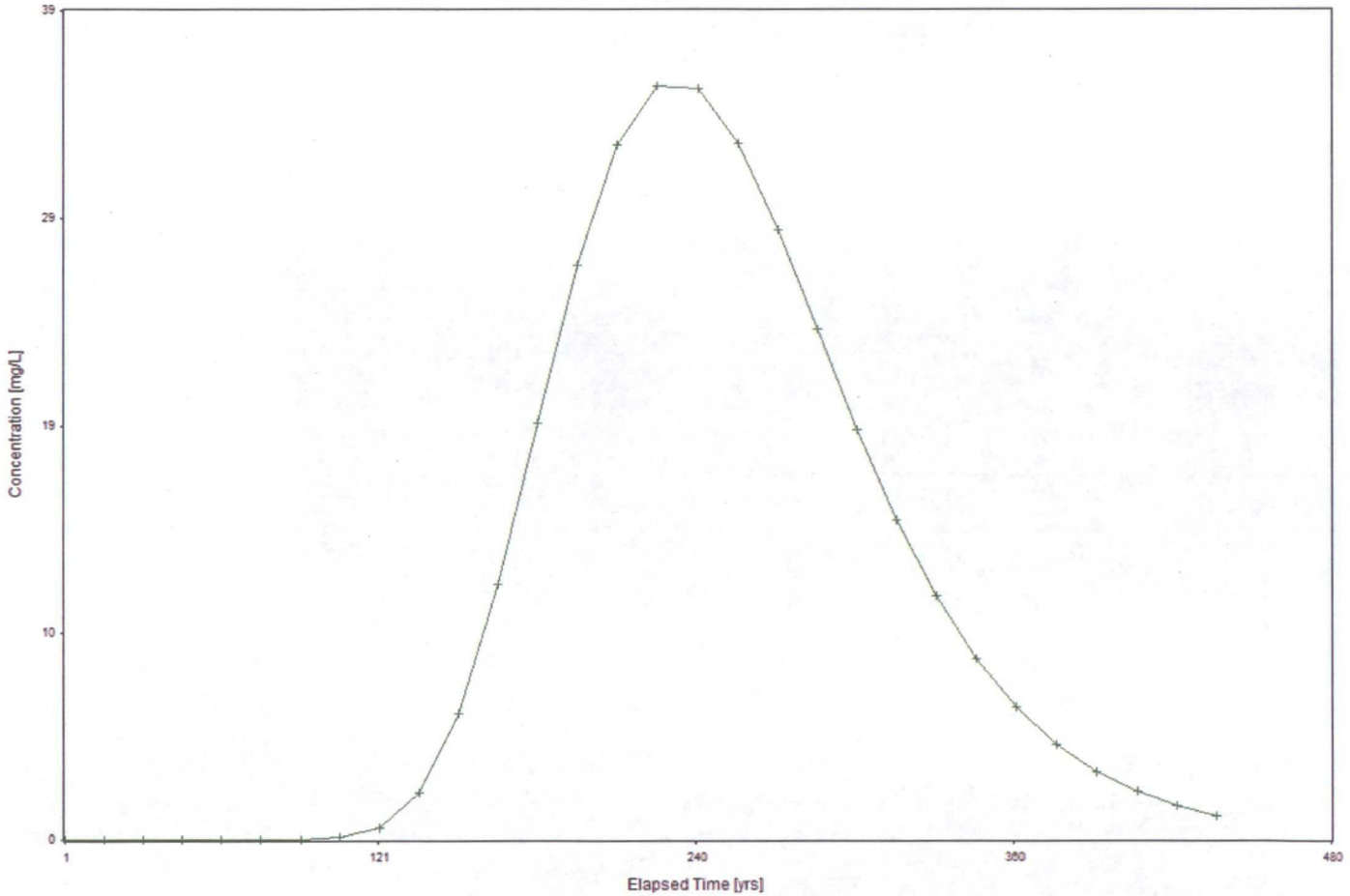
1

TIME	CONCENTRATION
0.100E+01	0.00000E+00
0.160E+02	0.00000E+00
0.310E+02	0.00000E+00
0.460E+02	0.00000E+00
0.610E+02	0.00000E+00
0.760E+02	0.00000E+00
0.910E+02	0.68470E-02
0.106E+03	0.91298E-01
0.121E+03	0.57439E+00
0.136E+03	0.22058E+01
0.151E+03	0.58819E+01
0.166E+03	0.11888E+02
0.181E+03	0.19397E+02
0.196E+03	0.26758E+02
0.211E+03	0.32312E+02
0.226E+03	0.35069E+02
0.241E+03	0.34914E+02
0.256E+03	0.32400E+02
0.271E+03	0.28384E+02
0.286E+03	0.23744E+02
0.301E+03	0.19102E+02
0.316E+03	0.14891E+02
0.331E+03	0.11333E+02
0.346E+03	0.84505E+01
0.361E+03	0.61741E+01

0.376E+03 0.44538E+01
0.391E+03 0.31755E+01
0.406E+03 0.22550E+01
0.421E+03 0.15877E+01
0.436E+03 0.11098E+01

Chloride Concentration At The Receptor Well

Vacuum Jct. K-6



Hansen, Edward J., EMNRD

From: Laura Pena <lpena@riceswd.com>
Sent: Thursday, August 23, 2012 2:15 PM
To: Hansen, Edward J., EMNRD
Cc: Hack Conder; Katie Jones
Subject: ROC - Vacuum Jct. K-6 (1R425-31) Update Report and Termination Request Addendum
Attachments: Vacuum Jct. K-6 (1R425-31) Soil Data Notes.xlsx; Vacuum Jct. K-6 (1R425-31) Multimed.inp; Vacuum Jct. K-6 (1R425-31) Multimed.pdf; Vacuum Jct. K-6 (1R425-31) Chloride Graph.pdf

Mr. Hansen,

The following is an Addendum to the Vacuum Jct. K-6 (1R425-31) Update Report and Termination Request submitted to the NMOCD on July 5, 2012. The attached multimed file, as requested, will replace Appendix B.

This file uses the parameters submitted to NMOCD in the Multimed Study report. Site specific parameters are as follows:

- Initial Concentration: an average of all vertical and soil bore data of 862 mg/L. An average concentration of 393 mg/L was used in the previous multimed file, which was based on the chloride concentrations in SB-1 only.
- Layer Thickness: an average of all soil bore depths subtracted from the depth to groundwater (95 ft – 35 ft) to yield 60 ft or 18 meters.
- An estimated area of 10 ft x 10 ft (100 ft^2 or 9.29 m^2).
- An aquifer thickness of 20 ft (6.10 meters).

The result of this model indicates that the maximum chloride concentration is 130 mg/L at 158 years, falling below the WQCC standard of 250 mg/L. A graph depicting chloride concentration over time is attached.

Let Hack Conder, Katie Jones or me know if you have any questions or require any additional information.

Thank you,

Laura Peña
Environmental Project Scientist
RICE Operating Company

MULTIMED V1.01 DATE OF CALCULATIONS: 23-AUG-2012 TIME: 13:51:26

U. S. ENVIRONMENTAL PROTECTION AGENCY

EXPOSURE ASSESSMENT

MULTIMEDIA MODEL

MULTIMED (Version 1.50, 2005)

1
Run options
--- -------

Vacuum Jct. K-6

Chemical simulated is Chloride

Option Chosen Saturated and unsaturated zone models
Run was DETERMIN
Infiltration Specified By User: 3.048E-02 m/yr
Run was transient
Well Times: Entered Explicitly
Reject runs if Y coordinate outside plume
Reject runs if Z coordinate outside plume
Gaussian source used in saturated zone model
1
1
UNSATURATED ZONE FLOW MODEL PARAMETERS
(input parameter description and value)

NP	- Total number of nodal points	240
NMAT	- Number of different porous materials	1
KPROP	- Van Genuchten or Brooks and Corey	1
IMSHGN	- Spatial discretization option	1
NVFLAYR	- Number of layers in flow model	1

OPTIONS CHOSEN
------- ------
Van Genuchten functional coefficients
User defined coordinate system
1

Layer information

LAYER NO.	LAYER THICKNESS	MATERIAL PROPERTY
1	18.00	1

DATA FOR MATERIAL 1
---- --- --------
VADOSE ZONE MATERIAL VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Saturated hydraulic conductivity	cm/hr	CONSTANT	3.60	-999.	-999.	-999.
Unsaturated zone porosity	--	CONSTANT	0.250	-999.	-999.	-999.
Air entry pressure head	m	CONSTANT	0.700	-999.	-999.	-999.
Depth of the unsaturated zone	m	CONSTANT	18.0	0.000	0.000	0.000

DATA FOR MATERIAL 1

VADOSE ZONE FUNCTION VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Residual water content	--	CONSTANT	0.116	-999.	-999.	-999.
Brook and Corey exponent,EN	--	CONSTANT	-999.	-999.	-999.	-999.
ALFA coefficient	1/cm	CONSTANT	0.500E-02	-999.	-999.	-999.
Van Genuchten exponent, ENN	--	CONSTANT	1.09	-999.	-999.	-999.

1

UNSATURATED ZONE TRANSPORT MODEL PARAMETERS

NLAY	- Number of different layers used		1
NTSTPS	- Number of time values concentration calc		40
DUMMY	- Not presently used		1
ISOL	- Type of scheme used in unsaturated zone		2
N	- Stehfest terms or number of increments		18
NTEL	- Points in Lagrangian interpolation		3
NGPTS	- Number of Gauss points		104
NIT	- Convolution integral segments		2
IBOUND	- Type of boundary condition		3
ITSGEN	- Time values generated or input		1
TMAX	- Max simulation time	--	0.0
WTFUN	- Weighting factor	--	1.2

OPTIONS CHOSEN

Convolution integral approach
Exponentially decaying continuous source
Computer generated times for computing concentrations

1

DATA FOR LAYER 1

VADOSE TRANSPORT VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Thickness of layer	m	CONSTANT	18.0	-999.	-999.	-999.
Longitudinal dispersivity of layer	m	DERIVED	-999.	-999.	-999.	-999.
Percent organic matter	--	CONSTANT	0.000	-999.	-999.	-999.
Bulk density of soil for layer	g/cc	CONSTANT	1.99	-999.	-999.	-999.

Biological decay coefficient	1/yr	CONSTANT	0.000	-999.	-999.	-999.

1

CHEMICAL SPECIFIC VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Solid phase decay coefficient	1/yr	DERIVED	-999.	-999.	-999.	-999.
Dissolved phase decay coefficient	1/yr	DERIVED	-999.	-999.	-999.	-999.
Overall chemical decay coefficient	1/yr	DERIVED	-999.	-999.	-999.	-999.
Acid catalyzed hydrolysis rate	l/M-yr	CONSTANT	0.000	-999.	-999.	-999.
Neutral hydrolysis rate constant	1/yr	CONSTANT	0.000	-999.	-999.	-999.
Base catalyzed hydrolysis rate	l/M-yr	CONSTANT	0.000	-999.	-999.	-999.
Reference temperature	C	CONSTANT	25.0	-999.	-999.	-999.
Normalized distribution coefficient	ml/g	CONSTANT	0.000	-999.	-999.	-999.
Distribution coefficient	--	DERIVED	-999.	-999.	-999.	-999.
Biodegradation coefficient (sat. zone)	1/yr	CONSTANT	0.000	-999.	-999.	-999.
Air diffusion coefficient	cm2/s	CONSTANT	-999.	-999.	-999.	-999.
Reference temperature for air diffusion	C	CONSTANT	-999.	-999.	-999.	-999.
Molecular weight	g/M	CONSTANT	-999.	-999.	-999.	-999.
Mole fraction of solute	--	CONSTANT	-999.	-999.	-999.	-999.
Vapor pressure of solute	mm Hg	CONSTANT	-999.	-999.	-999.	-999.
Henry's law constant	atm-m^3/M	CONSTANT	-999.	-999.	-999.	-999.
Overall 1st order decay sat. zone	1/yr	DERIVED	0.000	0.000	0.000	1.00
Not currently used		CONSTANT	0.000	0.000	0.000	0.000
Not currently used		CONSTANT	0.000	0.000	0.000	0.000

1

SOURCE SPECIFIC VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Infiltration rate	m/yr	CONSTANT	0.305E-01	-999.	-999.	-999.
Area of waste disposal unit	m^2	CONSTANT	9.29	-999.	-999.	-999.
Duration of pulse	yr	DERIVED	100.	-999.	-999.	-999.
Spread of contaminant source	m	DERIVED	-999.	-999.	-999.	-999.
Recharge rate	m/yr	CONSTANT	0.000	-999.	-999.	-999.
Source decay constant	1/yr	CONSTANT	0.250E-01	0.000	0.000	0.000
Initial concentration at landfill	mg/l	CONSTANT	862.	-999.	-999.	-999.
Length scale of facility	m	DERIVED	-999.	-999.	-999.	-999.
Width scale of facility	m	DERIVED	-999.	-999.	-999.	-999.
Near field dilution		DERIVED	1.00	0.000	0.000	1.00

1

AQUIFER SPECIFIC VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Particle diameter	cm	CONSTANT	-999.	-999.	-999.	-999.
Aquifer porosity	--	CONSTANT	0.300	-999.	-999.	-999.
Bulk density	g/cc	CONSTANT	1.86	-999.	-999.	-999.
Aquifer thickness	m	CONSTANT	6.10	-999.	-999.	-999.
Source thickness (mixing zone depth)	m	DERIVED	-999.	-999.	-999.	-999.
Conductivity (hydraulic)	m/yr	CONSTANT	315.	-999.	-999.	-999.
Gradient (hydraulic)		CONSTANT	0.400E-02	-999.	-999.	-999.

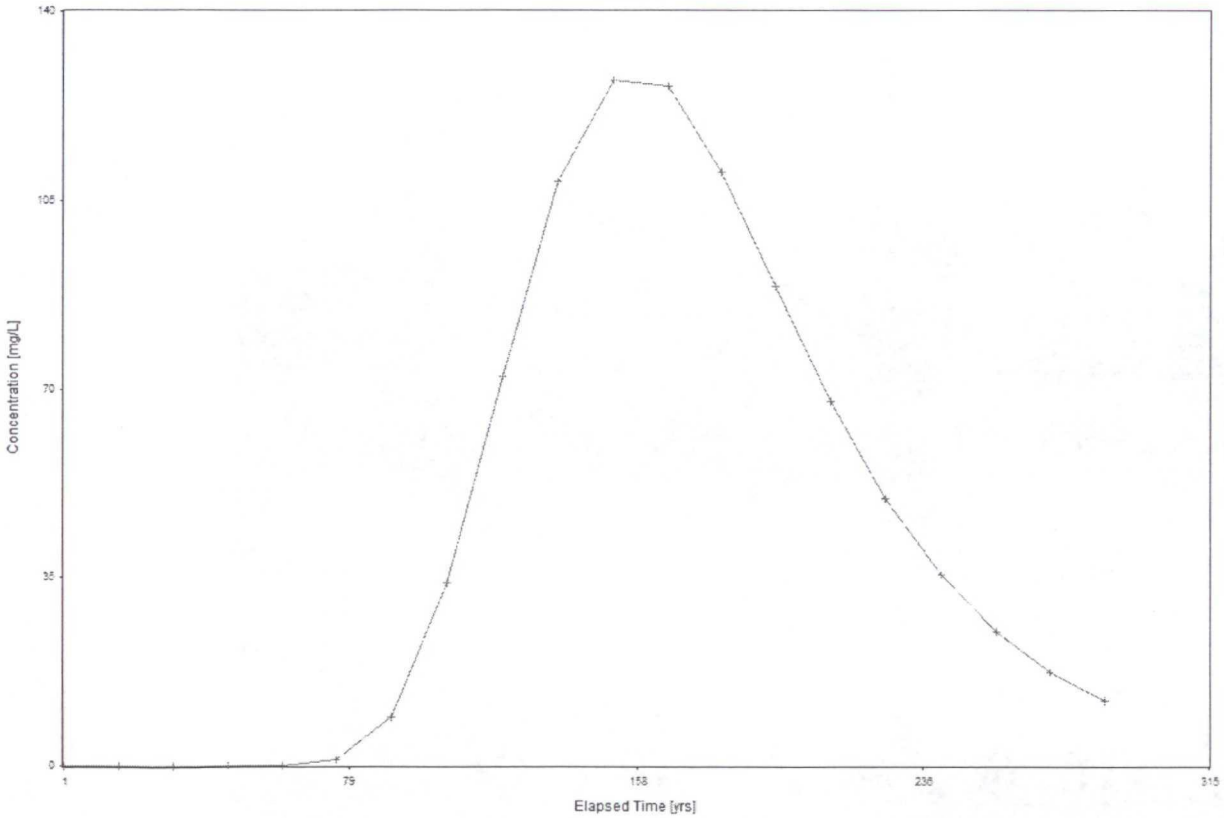
Groundwater seepage velocity	m/yr	DERIVED	-999.	-999.	-999.	-999.
Retardation coefficient	--	DERIVED	-999.	-999.	-999.	-999.
Longitudinal dispersivity	m	FUNCTION OF X	-999.	-999.	-999.	-999.
Transverse dispersivity	m	FUNCTION OF X	-999.	-999.	-999.	-999.
Vertical dispersivity	m	FUNCTION OF X	-999.	-999.	-999.	-999.
Temperature of aquifer	C	CONSTANT	20.0	-999.	-999.	-999.
pH	--	CONSTANT	7.00	-999.	-999.	-999.
Organic carbon content (fraction)		CONSTANT	0.000	-999.	-999.	-999.
Well distance from site	m	CONSTANT	1.00	-999.	-999.	-999.
Angle off center	degree	CONSTANT	0.000	-999.	-999.	-999.
Well vertical distance	m	CONSTANT	0.000	-999.	-999.	-999.

1

TIME	CONCENTRATION
0.100E+01	0.00000E+00
0.160E+02	0.00000E+00
0.310E+02	0.00000E+00
0.460E+02	0.00000E+00
0.610E+02	0.31346E-01
0.760E+02	0.11964E+01
0.910E+02	0.89562E+01
0.106E+03	0.34135E+02
0.121E+03	0.72570E+02
0.136E+03	0.10886E+03
0.151E+03	0.12764E+03
0.166E+03	0.12641E+03
0.181E+03	0.11052E+03
0.196E+03	0.89222E+02
0.211E+03	0.67896E+02
0.226E+03	0.49756E+02
0.241E+03	0.35515E+02
0.256E+03	0.25037E+02
0.271E+03	0.17375E+02
0.286E+03	0.12080E+02

Chloride Concentration At The Receptor Well

Vacuum Jct. K-6



Vacuum Jct. K-6 (1R425-31)

Unit K, Section 6, T18S, R35E
Depth to GW: 95 ft

	Source		5' E		5' W		SB-1
1	154	**1**	752	**1**	333		
2	156	**2**	946	**2**	661		
3	110	**3**	712	**3**	525		
4	262	**4**	911	**4**	587		
5	550	**5**	990	**5**	875	**5**	687
6	536	**6**	1,640	**6**	749		
7	707	**7**	930	**7**	2,396		
8	599	**8**	2,076	**8**	1,151		
9	717	**9**	2,510	**9**	1,109		
10	929	**10**	2,498	**10**	968	**10**	581
11	1,474	**11**	1,367	**11**	1,107		
12	1,155	**12**	1,494	**12**	607		
						15	285
						20	428
						25	579
						30	375
						35	209
						40	220
						45	169
Average	612		1,402		922		393

Average Chloride Concentration 862

Average SB Depth 18
Average SB Depth minus Depth to GW 77

Deepest SB Depth 35
Deepest SB Depth minus Depth to GW 60