

1R - 425-63

REPORTS

DATE:

8-1-13

Rice Environmental Consulting & Safety

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

CERTIFIED MAIL
RETURN RECEIPT NO. 7007 2560 0000 4569 9538

August 1st, 2013

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: ICP Report and Termination Request
Rice Operating Company – Vacuum SWD System
Vacuum G-33 EOL (1R425-63): UL/G sec. 33 T17S R35E**

Mr. Hansen:

RICE Operating Company (ROC) has retained Rice Environmental Consulting and Safety (RECS) to address potential environmental concerns at the above-referenced site in the abandoned Vacuum Salt Water Disposal (SWD) system.

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

Background and Previous Work

The site is located approximately 2 miles east of Buckeye, New Mexico at UL/G sec. 33 T17S R35E as shown on the Site Location Map (Figure 1). NM OSE records indicate that groundwater will likely be encountered at a depth of approximately 80 +/- feet.

In 2007, ROC initiated work on the former Vacuum G-33 EOL junction box as part of the system abandonment. The site was delineated using a backhoe to form an excavation 30 x 25 x 12 feet deep and soil samples were screened at regular intervals for both hydrocarbons and chlorides. Laboratory tests of the site showed a gasoline range organics (GRO) and a diesel range organics (DRO) reading of non-detect. However, chloride concentrations from the excavation did not relent with depth. The 4-wall composite yielded a chloride reading of 1,390 mg/kg. The bottom composite yielded a chloride reading of 912 mg/kg, and the backfill composite yielded a chloride reading of 1,150 mg/kg. The excavated soil was returned to the excavation to 4 feet below ground surface (bgs). At 4 feet bgs, a geo-synthetic clay liner, padded above and below with clean, imported blow sand, was installed to inhibit chloride migration to groundwater. The remaining soil was placed in the excavation and contoured to the surrounding landscape. An identification plate was placed on the surface of the site to mark its

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location for future environmental considerations. NMOCD was notified of potential groundwater impact on December 8th, 2008 and a junction box disclosure report was submitted to NMOCD with all the 2008 junction box closures and disclosures.

Investigation and Characterization Plan Report

As part of the Investigation and Characterization Plan (ICP) submitted to NMOCD on September 20th, 2010 and approved on September 23rd, 2010, ROC personnel were on site to conduct a soil bore investigation. Four soil bores were advanced on October 28th, 2010 and the soil was field tested for both chlorides and hydrocarbons (Figure 2).

Representative samples from the bores were taken to a commercial laboratory for confirmation of field numbers. SB-1 returned chloride values of 1,090 mg/kg at 15 ft bgs which decreased to 32 mg/kg at 35 ft bgs. SB-2 returned chloride values of 848 mg/kg at 10 ft bgs which decreased to 64 mg/kg at 30 ft bgs. SB-3 returned chloride values of 352 mg/kg at 10 ft bgs which decreased to 112 mg/kg at 25 ft bgs and SB-4 returned chloride values of 592 mg/kg at 15 ft bgs which decreased to 48 mg/kg at 35 ft bgs. GRO and DRO readings in all bores at all depths were non-detect (Appendix A).

Surface samples were taken 5 ft south of the SB-1 and 5 ft north of SB-2 on June 13th, 2013 and taken to a commercial laboratory for analysis (Figure 2). The 5 ft south of SB-1 sample returned chloride laboratory results of 64 mg/kg and the 5 ft north of SB-2 sample returned chloride laboratory results of 32 mg/kg. GRO and DRO readings for both samples were non-detect (Appendix A).

In order to determine what affect the residual chlorides in the vadose zone would have on the groundwater beneath the site, ROC personnel ran the U.S. Environmental Protection Agency Exposure Assessment Multimedia Model – Multimed (Version 1.50, 2005). Based on the model parameters from the soil data at the site, the residual chlorides will peak at 83.83 mg/kg in the groundwater in 150 years (Appendix B). Given that this chloride level is below WQCC standards, no action is warranted for the vadose zone or for groundwater at the site.

Based on the Multimedia Model analysis, it is evident that the residual chlorides in the vadose zone will not impair groundwater beneath the site. The existing 30 x 25 x 12 ft deep geo-synthetic clay layer installed at the site will inhibit further migration of constituents to groundwater. The site has returned to normal vegetative capacity, which will also inhibit the further migration of constituents at the site (Appendix C). Vegetation above the liner will also provide a natural infiltration barrier for the site since plants capture water through their roots thereby reducing the volume of water moving through the vadose zone to groundwater.

Therefore, ROC respectfully requests ‘remediation termination’ or similar closure status of the site.

RECS appreciates the opportunity to work with you on this project. Please call Hack Conder at (575) 393-2967 or me if you have any questions or wish to discuss the site.

Sincerely,

A handwritten signature in black ink, appearing to read 'Lara Weinheimer', with a stylized, flowing script.

Lara Weinheimer
Project Scientist
RECS
(575) 441-0431

Attachments:

- Figure 1 – Site Location Map
- Figure 2 – Soil Bore Installation Map
- Appendix A – Soil Bore Logs and Lab Confirmation and Surface Sample Lab Confirmation
- Appendix B – Multimed Model
- Appendix C – Site Photos

Figures

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



**Legals: UL/G sec. 33
T17S R35E
LEA COUNTY, NM
Case #: 1R-425-63**

0 0.175 0.35 0.7

Miles

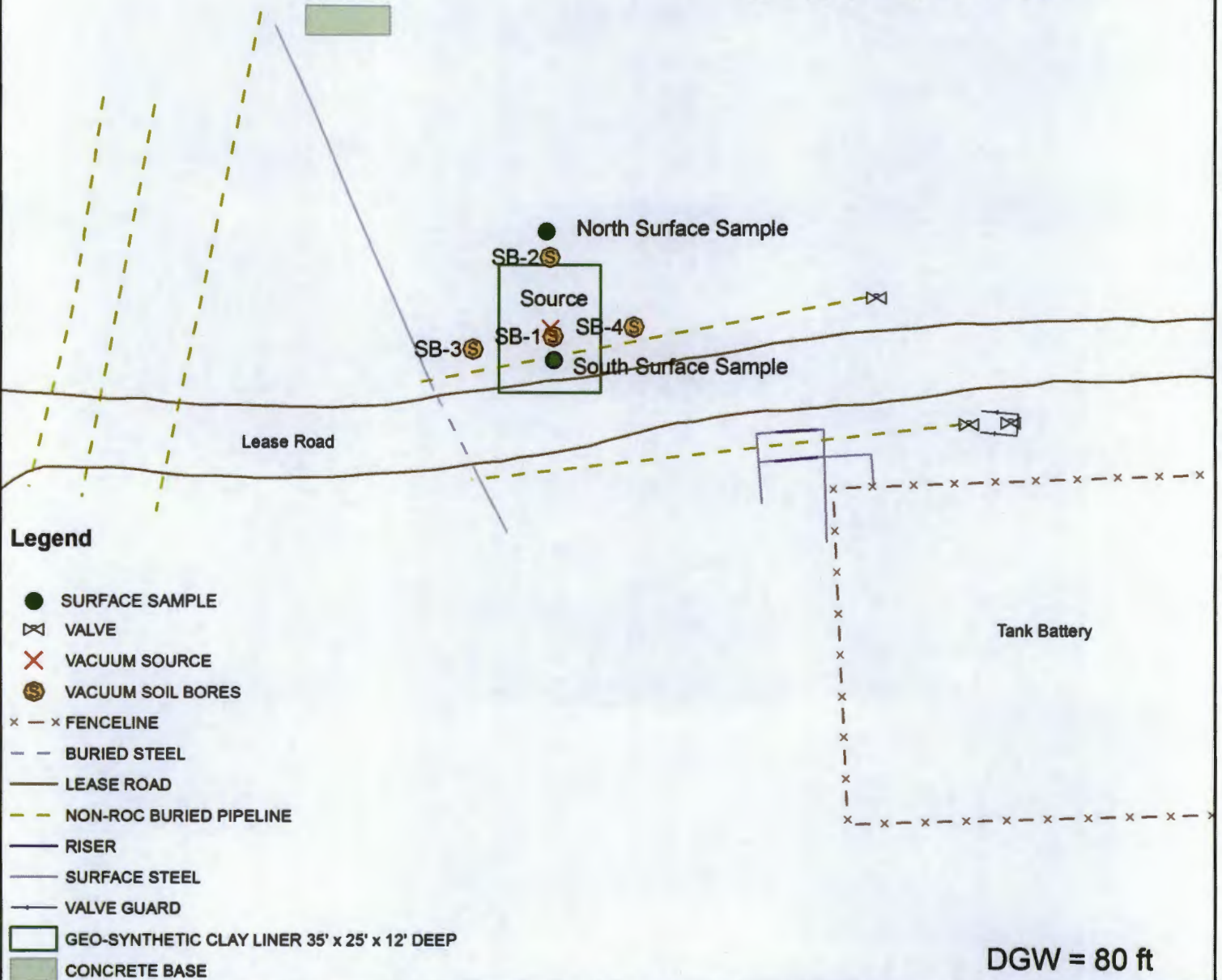
Drawing date: 7-25-12
Drafted by: L. Weinheimer

Soil Bore Installation

SB-1						SB-2						SB-3					
Depth	CI-	PID	LAB CI-	GRO	DRO	Depth	CI-	PID	LAB CI-	GRO	DRO	Depth	CI-	PID	LAB CI-	GRO	DRO
15	1121	0.2	1090	<10	<10	5	630	0				5	352	0			
20	1042	0				10	725	0	848	<10	<10	10	450	0	352	<10	<10
25	403	0				15	425	0				15	320	0			
30	211	0				20	363	0				20	252	0			
35	147	0	32	<10	<10	25	316	0				25	176	0	112	<10	<10
						30	171	0	64	<10	<10						

SB-4					
Depth	CI-	PID	LAB CI-	GRO	DRO
5	413	0.1			
10	358	0			
15	604	0	592	<10	<10
20	513	0			
25	287	0			
30	176	0			
35	150	0	48	<10	<10

SURFACE SAMPLE					
CI-	PID	LAB CI-	GRO	DRO	
5 ft N of SB-2	176	0.5	32	<10	<10
5 ft S of SB-1	207	0.1	64	<10	<10



**Vacuum
G-33 EOL**

Legals: UL/G sec. 33
T17S R35E
LEA COUNTY, NM
Case #: 1R-425-63

Figure 2



0 12.5 25 50
Feet

Drawing date: 7-25-13
Drafted by: L. Weinheimer

Appendix A

Soil Bore Logs and Lab Confirmation
Surface Sample Lab Confirmation

RICE Environmental Consulting and Safety (RECS)

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

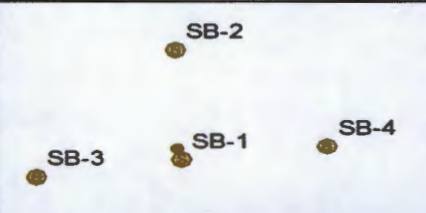

Logger:	Jordan Woodfin				
Driller:	Harrison & Cooper, Inc.			Project Name:	Well ID:
Drilling Method:	Air rotary			Vacuum G-33 EOL	SB -1
Start Date:	10/28/2010			Project Consultant: RECS	
End Date:	10/28/2010			Location: UL/G sec. 33 T17S R35E	
Comments: Located at the source of the former junction box site. All samples were from cuttings. DRAFTED BY: L. Weinheimer TD = 35 ft GW = 80 ft				Lat: 32°47'34.877" Long: 103°27'31.74" County: LEA State: NM	

Depth (feet)	chloride field tests	LAB	PID	Description	Lithology	Well Construction
				Tan fine sand and medium caliche fragments.		
15 ft	1121	CI-1090	0.2			
		GRO <10				
		DRO <10		Tan fine sand.		
20 ft	1042		0			
				Light brown very fine sand.		bentonite seal
25 ft	403		0			
30 ft	211		0			
35 ft	147	CI-32	0			
		GRO <10				
		DRO <10				

Logger:	Jordan Woodfin			
Driller:	Harrison & Cooper, Inc.			
Drilling Method:	Air rotary			
Start Date:	10/28/2010			
End Date:	10/28/2010		Project Name: Vacuum G-33 EOL Project Consultant: RECS	Well ID: SB - 2
Comments: Located 17 ft north of the former junction box site. All samples were from cuttings. DRAFTED BY: L. Weinheimer TD = 30 ft GW = 80 ft			Location: UL/G sec. 33 T17S R35E Lat: 32°47'35.068" County: LEA Long: 103°27'31.747" State: NM	

Depth (feet)	chloride field tests	LAB	PID	Description	Lithology	Well Construction
				Light brown coarse sand and caliche mix.		
5 ft	630		0			
10 ft	725	CI-848	0	Caliche and sandstone mix (hard drilling).		
		GRO <10				
		DRO <10				
15 ft	425		0			
20 ft	363		0			
25 ft	316		0	Tan very fine sand.		
30 ft	171	CI-64	0			
		GRO <10				
		DRO <10				

Logger:	Jordan Woodfin					
Driller:	Harrison & Cooper, Inc.			Project Name:	Well ID:	
Drilling Method:	Air rotary			Vacuum G-33 EOL	SB - 3	
Start Date:	10/28/2010			Project Consultant: RECS		
End Date:	10/28/2010			Location: UL/G sec. 33 T17S R35E		
Comments: Located 20 ft west of the former junction box site. All samples were from cuttings. DRAFTED BY: L. Weinheimer TD = 25 ft GW = 80 ft				Lat: 32°47'34.849" County: LEA Long: 103°27'31.971" State: NM		
Depth (feet)	chloride field tests	LAB	PID	Description	Lithology	Well Construction
5 ft	352		0	Tan fine sand with caliche fragments.		
10 ft	450	CI-352	0			
		GRO <10				
		DRO <10				
15 ft	320		0			
20 ft	252		0			
25 ft	176	CI-112	0	Light brown fine sand with caliche fragments.		
		GRO <10				
		DRO <10				

Logger:	Jordan Woodfin					
Driller:	Harrison & Cooper, Inc.					
Drilling Method:	Air rotary					
Start Date:	10/28/2010					
End Date:	10/28/2010	Project Name: Vacuum G-33 EOL Project Consultant: RECS		Well ID: SB - 4		
Comments: Located 20 ft east of the former junction box site. All samples were from cuttings. DRAFTED BY: L. Weinheimer TD = 35 ft GW = 80 ft				Location: UL/G sec. 33 T17S R35E Lat: 32°47'34.899" County: LEA Long: 103°27'31.509" State: NM		
Depth (feet)	chloride field tests	LAB	PID	Description	Lithology	Well Construction
5 ft	413		0.1	Tan fine sand with caliche fragments.		
10 ft	358		0	Tan fine sand with caliche fragments.		
15 ft	604	CI-592	0	Tan fine sand with caliche fragments.		
20 ft	513	GRO <10 DRO <10	0	Tan very fine sand.		bentonite seal
25 ft	287		0	Tan very fine sand.		
30 ft	176		0	Tan very fine sand.		
35 ft	150	CI-48	0	Tan very fine sand.		
		GRO <10 DRO <10				



November 02, 2010

Hack Conder
Rice Operating Company
112 W. Taylor
Hobbs, NM 88240

RE: VACUUM G-33 EOL

Enclosed are the results of analyses for samples received by the laboratory on 10/28/10 16:52.

Cardinal Laboratories is accredited through Texas NELAP for:

Method SW-846 8021	Benzene, Toluene, Ethyl Benzene, and Total Xylenes
Method SW-846 8260	Benzene, Toluene, Ethyl Benzene, and Total Xylenes
Method TX 1005	Total Petroleum Hydrocarbons

Certificate number T104704398-08-TX. Accreditation applies to solid and chemical materials and non-potable water matrices.

Cardinal Laboratories is accredited through the State of Colorado Department of Public Health and Environment for:

Method EPA 552.2	Haloacetic Acids (HAA-5)
Method EPA 524.2	Total Trihalomethanes (TTHM)
Method EPA 524.4	Regulated VOCs (V2, V3)

Accreditation applies to public drinking water matrices.

This report meets NELAP requirements and is made up of a cover page, analytical results, and a copy of the original chain-of-custody. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Celey D. Keene
Lab Director/Quality Manager

Analytical Results For:

Rice Operating Company
Hack Conder
112 W. Taylor
Hobbs NM, 88240
Fax To: (575) 397-1471

Received: 10/28/2010
Reported: 11/02/2010
Project Name: VACUUM G-33 EOL
Project Number: NONE GIVEN
Project Location: VACUUM G-33 EOL

Sampling Date: 10/28/2010
Sampling Type: Soil
Sampling Condition: Cool & Intact
Sample Received By: Jodi Henson

Sample ID: SB #1 @ 15 FT (H021178-01)

Chloride, SM4500Cl-B			mg/kg							Analyzed By: HM
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier	
Chloride	1090	16.0	10/29/2010	ND	464	116	400	3.51		
TPH 8015M			mg/kg							Analyzed By: AB
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier	
GRO C6-C10	<10.0	10.0	10/30/2010	ND	178	88.9	200	7.41		
DRO >C10-C28	<10.0	10.0	10/30/2010	ND	178	88.9	200	7.46		
<i>Surrogate: 1-Chlorooctane</i>										
	90.2 %	70-130								
<i>Surrogate: 1-Chlorooctadecane</i>										
	89.9 %	70-130								

Sample ID: SB #1 @ 35 FT (H021178-02)

Chloride, SM4500Cl-B			mg/kg							Analyzed By: HM
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier	
Chloride	32.0	16.0	10/29/2010	ND	464	116	400	3.51		
TPH 8015M			mg/kg							Analyzed By: AB
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier	
GRO C6-C10	<10.0	10.0	10/31/2010	ND	178	88.9	200	7.41		
DRO >C10-C28	<10.0	10.0	10/31/2010	ND	178	88.9	200	7.46		
<i>Surrogate: 1-Chlorooctane</i>										
	102 %	70-130								
<i>Surrogate: 1-Chlorooctadecane</i>										
	102 %	70-130								

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*=Accredited Analyte

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Celey D. Keene, Lab Director/Quality Manager

Analytical Results For:

Rice Operating Company
Hack Conder
112 W. Taylor
Hobbs NM, 88240
Fax To: (575) 397-1471

Received: 10/28/2010
Reported: 11/02/2010
Project Name: VACUUM G-33 EOL
Project Number: NONE GIVEN
Project Location: VACUUM G-33 EOL

Sampling Date: 10/28/2010
Sampling Type: Soil
Sampling Condition: Cool & Intact
Sample Received By: Jodi Henson

Sample ID: SB #2 @ 10 FT (H021178-03)

Chloride, SM4500Cl-B			mg/kg							Analyzed By: HM
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier	
Chloride	848	16.0	10/29/2010	ND	464	116	400	3.51		
TPH 8015M			mg/kg							Analyzed By: AB
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier	
GRO C6-C10	<10.0	10.0	10/31/2010	ND	178	88.9	200	7.41		
DRO >C10-C28	<10.0	10.0	10/31/2010	ND	178	88.9	200	7.46		
Surrogate: 1-Chlorooctane			87.9 %	70-130						
Surrogate: 1-Chlorooctadecane			86.3 %	70-130						

Sample ID: SB #2 @ 30 FT (H021178-04)

Chloride, SM4500Cl-B			mg/kg							Analyzed By: HM
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier	
Chloride	64.0	16.0	10/29/2010	ND	464	116	400	3.51		
TPH 8015M			mg/kg							Analyzed By: AB
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier	
GRO C6-C10	<10.0	10.0	10/31/2010	ND	178	88.9	200	7.41		
DRO >C10-C28	<10.0	10.0	10/31/2010	ND	178	88.9	200	7.46		
Surrogate: 1-Chlorooctane			92.9 %	70-130						
Surrogate: 1-Chlorooctadecane			93.7 %	70-130						

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Celey D. Keene, Lab Director/Quality Manager

Analytical Results For:

Rice Operating Company
Hack Conder
112 W. Taylor
Hobbs NM, 88240
Fax To: (575) 397-1471

Received: 10/28/2010
Reported: 11/02/2010
Project Name: VACUUM G-33 EOL
Project Number: NONE GIVEN
Project Location: VACUUM G-33 EOL

Sampling Date: 10/28/2010
Sampling Type: Soil
Sampling Condition: Cool & Intact
Sample Received By: Jodi Henson

Sample ID: SB #3 @ 10 FT (H021178-05)

Chloride, SM4500Cl-B			mg/kg Analyzed By: HM							
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier	
Chloride	352	16.0	10/29/2010	ND	464	116	400	3.51		
TPH 8015M			mg/kg Analyzed By: AB							
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier	
GRO C6-C10	<10.0	10.0	10/31/2010	ND	178	88.9	200	7.41		
DRO >C10-C28	<10.0	10.0	10/31/2010	ND	178	88.9	200	7.46		

Surrogate: 1-Chlorooctane 89.1 % 70-130

Surrogate: 1-Chlorooctadecane 90.7 % 70-130

Sample ID: SB #3 @ 25 FT (H021178-06)

Chloride, SM4500Cl-B			mg/kg Analyzed By: HM							
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier	
Chloride	112	16.0	10/29/2010	ND	464	116	400	3.51		
TPH 8015M			mg/kg Analyzed By: AB							
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier	
GRO C6-C10	<10.0	10.0	10/31/2010	ND	178	88.9	200	7.41		
DRO >C10-C28	<10.0	10.0	10/31/2010	ND	178	88.9	200	7.46		

Surrogate: 1-Chlorooctane 176 % 70-130

Surrogate: 1-Chlorooctadecane 173 % 70-130

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Celey D. Keene, Lab Director/Quality Manager

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112 W. Taylor
Hobbs NM, 88240
Fax To: (575) 397-1471

Received: 10/28/2010
Reported: 11/02/2010
Project Name: VACUUM G-33 EOL
Project Number: NONE GIVEN
Project Location: VACUUM G-33 EOL

Sampling Date: 10/28/2010
Sampling Type: Soil
Sampling Condition: Cool & Intact
Sample Received By: Jodi Henson

Sample ID: SB #4 @ 15 FT (H021178-07)

Chloride, SM4500Cl-B			mg/kg		Analyzed By: HM				
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	592	16.0	10/29/2010	ND	464	116	400	3.51	
TPH 8015M			mg/kg		Analyzed By: AB				
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10	<10.0	10.0	10/31/2010	ND	178	88.9	200	7.41	
DRO >C10-C28	<10.0	10.0	10/31/2010	ND	178	88.9	200	7.46	
Surrogate: 1-Chlorooctane	102 %	70-130							
Surrogate: 1-Chlorooctadecane	102 %	70-130							


Sample ID: SB #4 @ 35 FT (H021178-08)

Chloride, SM4500Cl-B		mg/kg		Analyzed By: HM					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	48.0	16.0	10/29/2010	ND	464	116	400	3.51	
TPH 8015M		mg/kg		Analyzed By: AB					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10	<10.0	10.0	10/31/2010	ND	178	88.9	200	7.41	
DRO >C10-C28	<10.0	10.0	10/31/2010	ND	178	88.9	200	7.46	
Surrogate: 1-Chlorooctane		92.6 %	70-130						
Surrogate: 1-Chlorooctadecane		94.5 %	70-130						

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*=Accredited Analyte

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Celey D. Keene, Lab Director/Quality Manager

Notes and Definitions

ND	Analyte NOT DETECTED at or above the reporting limit
RPD	Relative Percent Difference
**	Samples not received at proper temperature of 6°C or below.
***	Insufficient time to reach temperature.
-	Chloride by SM4500Cl-B does not require samples be received at or below 6°C Samples reported on an as received basis (wet) unless otherwise noted on report

Cardinal Laboratories***=Accredited Analyte**

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Celestine D. Keene, Lab Director/Quality Manager

CARDINAL LABORATORIES

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

CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

Company Name: Rice Operating Company				BILL TO				ANALYSIS REQUEST												
Project Manager: Hack Conder				P.O. #:				<div style="display: flex; flex-direction: column; align-items: center;"> <div>Chlorides</div> <div>TPH 8015 M</div> <div>BTEX</div> <div>Texas TPH</div> <div>Complete Cations/Anions</div> </div>												
Address: 122 West Taylor				Company:																
City: Hobbs State: NM Zip: 88240				Attn:																
Phone #: 575-393-9174 Fax #: 575-397-1471				Address:																
Project #: Project Owner:				City:																
Project Name: Vacuum G-33 EOL				State: Zip:																
Project Location: Vacuum G-33 EOL				Phone #:																
Sampler Name: Jordan Woodfin				Fax #:																
FOR LAB USE ONLY																				
Lab I.D.	Sample I.D.	(G)RAB OR (C)OMP.	# CONTAINERS	MATRIX				PRESERV.		SAMPLING										
				GROUNDWATER	WASTEWATER	SOIL	OIL	SLUDGE	OTHER:	ACID/BASE:	ICE / COOL	OTHER:	DATE	TIME						
H21178-1	SB # 1 @ 15ft		1			✓				✓			10/28/10	09:00	✓	✓				
2	SB # 1 @ 35ft		1			✓				✓			10/28/10	09:30	✓	✓				
3	SB # 2 @ 10ft		1			✓				✓			10/28/10	10:00	✓	✓				
4	SB # 2 @ 30ft		1			✓				✓			10/28/10	10:25	✓	✓				
5	SB # 3 @ 10ft		1			✓				✓			10/28/10	10:50	✓	✓				
6	SB # 3 @ 25ft		1			✓				✓			10/28/10	11:15	✓	✓				
7	SB # 4 @ 15ft		1			✓				✓			10/28/10	11:30	✓	✓				
8	SB # 4 @ 35ft		1			✓				✓			10/28/10	11:50	✓	✓				

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 analysis. 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:	Received By:	Phone Result: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Add'l Phone #:
Jordan Woodfin	Time:		Fax Result: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Add'l Fax #:
Relinquished By:	Date: 10/28/10	Received By: Jodi Benson	REMARKS:	
Delivered By: (Circle One)	Time: 4:52		email results	
Sampler - UPS - Bus - Other:		Sample Condition	Hconder@riceswd.com; jwoodfin@riceswd.com;	
		Cool Intact	Lweinheimer@riceswd.com kjones@riceswd.com	
		<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		
		<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		

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

#26

NEED SAMPLES BACK, PLEASE

June 18, 2013

Hack Conder
Rice Operating Company
112 W. Taylor
Hobbs, NM 88240

RE: VACUUM G-33 EOL

Enclosed are the results of analyses for samples received by the laboratory on 06/14/13 8:00.

Cardinal Laboratories is accredited through Texas NELAP under certificate number T104704398-11-3. Accreditation applies to drinking water, non-potable water and solid and chemical materials. All accredited analytes are denoted by an asterisk (*). For a complete list of accredited analytes and matrices visit the TCEQ website at www.tceq.texas.gov/field/qa/lab_accred_certif.html.

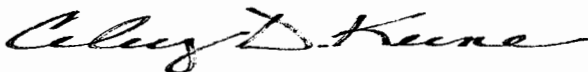
Cardinal Laboratories is accredited through the State of Colorado Department of Public Health and Environment for:

Method EPA 552.2	Haloacetic Acids (HAA-5)
Method EPA 524.2	Total Trihalomethanes (TTHM)
Method EPA 524.4	Regulated VOCs (V1, V2, V3)

Accreditation applies to public drinking water matrices.

This report meets NELAP requirements and is made up of a cover page, analytical results, and a copy of the original chain-of-custody. If you have any questions concerning this report, please feel free to contact me.

Sincerely,



Celey D. Keene
Lab Director/Quality Manager

Analytical Results For:

 Rice Operating Company
 Hack Conder
 112 W. Taylor
 Hobbs NM, 88240
 Fax To: (575) 397-1471

 Received: 06/14/2013
 Reported: 06/18/2013
 Project Name: VACUUM G-33 EOL
 Project Number: NONE GIVEN
 Project Location: VACUUM G-33 EOL

 Sampling Date: 06/13/2013
 Sampling Type: Soil
 Sampling Condition: Cool & Intact
 Sample Received By: Jodi Henson

Sample ID: SURFACE SAMPLE - S OF SOIL BORE #1 (H301366-01)

Chloride, SM4500CI-B		mg/kg	Analyzed By: DW						
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	64.0	16.0	06/18/2013	ND	432	108	400	3.77	
TPH 8015M		mg/kg	Analyzed By: MS						
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10	<10.0	10.0	06/17/2013	ND	213	106	200	0.409	
DRO >C10-C28	<10.0	10.0	06/17/2013	ND	212	106	200	4.05	
Surrogate: 1-Chlorooctane	94.5 %	65.2-140							
Surrogate: 1-Chlorooctadecane	89.7 %	63.6-154							

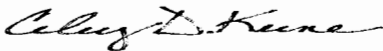
Sample ID: SURFACE SAMPLE - N OF SOIL BORE #2 (H301366-02)

Chloride, SM4500CI-B		mg/kg	Analyzed By: DW						
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	32.0	16.0	06/18/2013	ND	432	108	400	3.77	
TPH 8015M		mg/kg	Analyzed By: MS						
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10	<10.0	10.0	06/17/2013	ND	213	106	200	0.409	
DRO >C10-C28	<10.0	10.0	06/17/2013	ND	212	106	200	4.05	
Surrogate: 1-Chlorooctane	84.0 %	65.2-140							
Surrogate: 1-Chlorooctadecane	81.1 %	63.6-154							

Cardinal Laboratories

*=Accredited Analyte


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Celey D. Keene, Lab Director/Quality Manager

Notes and Definitions

ND	Analyte NOT DETECTED at or above the reporting limit
RPD	Relative Percent Difference
**	Samples not received at proper temperature of 6°C or below.
***	Insufficient time to reach temperature.
-	Chloride by SM4500Cl-B does not require samples be received at or below 6°C Samples reported on an as received basis (wet) unless otherwise noted on report



Celey D. Keene, Lab Director/Quality Manager



CARDINAL LABORATORIES

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

CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

Company Name: RICE Operating				BILL TO												ANALYSIS REQUEST											
Project Manager: Katie Jones				P.O. #:												<div>Chlorides</div> <div>TPH 8015 M</div> <div>BTEX</div> <div>Texas TPH</div> <div>Complete Cations/Anions</div> <div>TDS</div>											
Address: 112 W. Taylor				Company:																							
City: Hobbs State: NM Zip: 88240				Attn:																							
Phone #: Fax #:				Address:																							
Project #: Project Owner:				City:																							
Project Name:				State: Zip:																							
Project Location: VACCUM / G-33 E.O.L				Phone #:																							
Sampler Name: Edward Cesareo				Fax #:																							
FOR LAB USE ONLY		Lab I.D.		Sample I.D.		(G)RAB OR (C)OMP. # CONTAINERS		MATRIX				PRESERV.		SAMPLING													
								GROUNDWATER WASTEWATER SOIL OIL SLUDGE OTHER:				ACID/BASE: ICE / COOL OTHER:		DATE TIME													
H3013616		VACCUM / G-33 E.O.L																									
		Surface Sample 5ft																									
1		South from Soil Bore #1		G 1								6-13-13 9:30		✓ ✓													
		Surface Sample 5ft																									
2		North from Soil Bore #2		G 1								6-13-13 9:35		✓ ✓													

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: <i>Edward Cesareo</i>		Date: <i>6-13-13</i>		Received By: <i>Jodi Henson</i>		Phone Result: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		Add'l Phone #:	
Time: <i>8:00</i>		Date:		Received By:		Fax Result: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		Add'l Fax #:	
Relinquished By:		Time:				REMARKS:			
Delivered By: (Circle One)		Sample Condition		CHECKED BY: <i>[Signature]</i>		email results hconder@rice-ecs.com; Lweinheimer@rice-ecs.com; kjones@riceswd.com; Lpena@riceswd.com; knorman@rice-ecs.com; ecesareo@rice-ecs.com			
Sampler - UPS - Bus - Other:		Cool <input checked="" type="checkbox"/> Intact <input checked="" type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>		(Initials)					

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

#54



Appendix B

Multimed Model

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

U. S. ENVIRONMENTAL PROTECTION AGENCY

EXPOSURE ASSESSMENT

MULTIMEDIA MODEL

MULTIMED (Version 1.50, 2005)

n options
- -----

cuum G-33 EOL

emical simulated is Chloride

tion Chosen Saturated and unsaturated zone models
n was DETERMIN
filtration Specified By User: 3.048E-02 m/yr
n was transient
ll Times: Entered Explicitly
ject runs if Y coordinate outside plume
ject runs if Z coordinate outside plume
ussian source used in saturated zone model

SATURATED ZONE FLOW MODEL PARAMETERS
nput parameter description and value)
- Total number of nodal points 240
AT - Number of different porous materials 1
ROP - Van Genuchten or Brooks and Corey 1
SHGN - Spatial discretization option 1
FLAYR - Number of layers in flow model 1

TIONS CHOSEN

n Genuchten functional coefficients
er defined coordinate system

yer information

YER NO.	LAYER THICKNESS	MATERIAL PROPERTY
-----	-----	-----
1	15.54	1

VADOSE ZONE MATERIAL VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS		LIMITS	
			MEAN	STD DEV	MIN	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	15.5	0.000	0.000	0.000

DATA FOR MATERIAL 1

VADOSE ZONE FUNCTION VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS		LIMITS	
			MEAN	STD DEV	MIN	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.

SATURATED ZONE TRANSPORT MODEL PARAMETERS

LAY - Number of different layers used 1
 NSTPS - Number of time values concentration calc 40
 NMMY - Not presently used 1
 NOL - Type of scheme used in unsaturated zone 2
 - Stehfest terms or number of increments 18
 NEL - Points in Lagrangian interpolation 3
 NPTS - Number of Gauss points 104
 NT - Convolution integral segments 2
 NBOUND - Type of boundary condition 3
 NGEN - Time values generated or input 1
 NMAX - Max simulation time -- 0.0
 NFUN - Weighting factor -- 1.2

FUNCTIONS CHOSEN

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

DATA FOR LAYER 1

VADOSE TRANSPORT VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS		LIMITS	
			MEAN	STD DEV	MIN	MAX
Thickness of layer	m	CONSTANT	15.5	-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.

CHEMICAL SPECIFIC VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS		LIMITS	
			MEAN	STD DEV	MIN	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	1/M-yr	CONSTANT	0.000	-999.	-999.	-999.
Neutral hydrolysis rate constant	1/yr	CONSTANT	0.000	-999.	-999.	-999.
Base catalyzed hydrolysis rate	1/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	cm ² /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

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	DERIVED	133.	-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	418.	-999.	-999.	-999.
Length scale of facility	m	CONSTANT	9.45	-999.	-999.	-999.
Width scale of facility	m	CONSTANT	14.0	-999.	-999.	-999.
Near field dilution		DERIVED	1.00	0.000	0.000	1.00

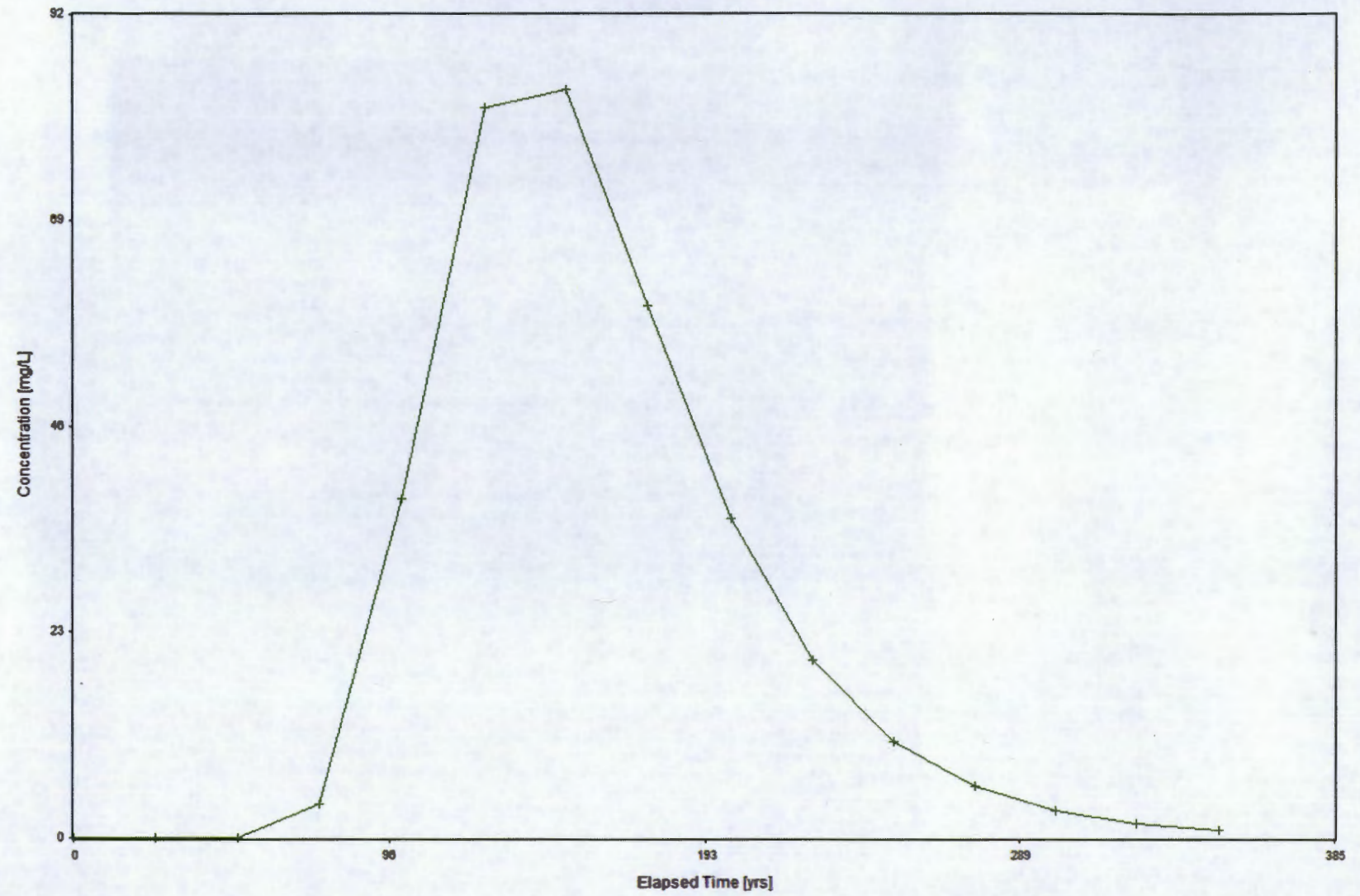
AQUIFER SPECIFIC VARIABLES

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	-999.	-999.	-999.	-999.
Conductivity (hydraulic)	m/yr	CONSTANT	315.	-999.	-999.	-999.
Gradient (hydraulic)		CONSTANT	0.300E-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.

TIME CONCENTRATION

0.000E+00 0.00000E+00
0.250E+02 0.00000E+00
0.500E+02 0.10635E-01
0.750E+02 0.37660E+01
0.100E+03 0.37853E+02
0.125E+03 0.81729E+02
0.150E+03 0.83831E+02
0.175E+03 0.59605E+02
0.200E+03 0.35689E+02
0.225E+03 0.19824E+02
0.250E+03 0.10772E+02
0.275E+03 0.57928E+01
0.300E+03 0.31041E+01
0.325E+03 0.16592E+01
0.350E+03 0.88487E+00

Chloride Concentration At The Receptor Well
Vacuum G-33 EOL





Appendix C

Site Photos

RICE Environmental Consulting and Safety (RECS)
P.O. Box 2948 Hobbs, NM 88241
Phone 575.393.2967

Vacuum G-33 EOL (1R425-63)
Unit Letter G, Section 33, T17S, R35E



Facing north

6/24/2013



Facing south

6/24/2013