1R - 427-05

REPORTS

DATE:

7-19-13

Rice Environmental Consulting & Safety
P.O. Box 2948, Hobbs, NM 88241
Phone 575.393.2967

CERTIFIED MAIL
RETURN RECEIPT NO. 7008 1140 0001 3072 4680

July 19th, 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 – EME SWD System
EME G-10 (1R427-05): UL/G sec. 10 T20S R36E
Formerly EME J-10

Mr. Hansen:

RICE Operating Company (ROC) has retained Rice Environmental Consulting and Safety (RECS) to address potential environmental concerns at the above-referenced site in the EME Salt Water Disposal (SWD) system. The site was previously referred to as the EME J-10 at T20S, R36E. However, GIS mapping shows the site to be located within unit letter G (Figure 1). To reflect the geographical location of the site, the name has been changed to the EME G-10 at T20S, R36E. All correspondence reference EME G-10.

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

Background and Previous Work

The site is located approximately 5 miles southwest of Monument, New Mexico at UL/G sec. 10 T20S R36E as shown on the Site Location Map (Figure 2). An updated groundwater study of NM OSE records, conducted in 2013, indicate that groundwater will likely be encountered at a depth of approximately 34 +/- feet.

In 2003, ROC initiated work on the former EME G-10 junction box. The site was delineated using a backhoe to form a 30 ft x 30 ft x 12 ft deep excavation and soil samples were screened at regular intervals for chlorides. From the excavation, the four-wall composite, the bottom composite and the blended backfill were taken to a commercial laboratory for analysis. Laboratory tests of the four-wall composite showed a chloride reading of 1,060 mg/kg and a gasoline range organics (GRO) and diesel range organics (DRO) of non-detect. The bottom composite showed a chloride laboratory reading of 815 mg/kg and a GRO and DRO reading of non-detect. The backfill

composite had a chloride, GRO and DRO reading of non-detect. BTEX readings for all three samples were non-detect. A 20-mil poly liner was installed and properly seated at the base of the excavation and extended up the walls. The site was backfilled with the blended soil and the area was contoured to the surrounding landscape. A new junction box was built over the location. NMOCD was notified of potential groundwater impact on February 24th, 2003 and a junction box disclosure report was submitted to NMOCD with all the 2003 junction box closures and disclosures.

An Investigation and Characterization Plan (ICP) was submitted to NMOCD on March 25th, 2013 and approved on April 22nd, 2013. As part of the ICP, RECS personnel were on site to conduct soil bores on June 17th, 2013 (Figure 3). Five soil bores were installed at the site. Samples were taken at regular intervals and field tested for chlorides and hydrocarbons. Representative samples were taken to a commercial laboratory for analysis (Appendix A). SB-1 returned laboratory chloride results of 784 mg/kg at 21 ft bgs, 768 mg/kg at 27 ft bgs and 528 mg/kg at 30 ft bgs. SB-2 returned laboratory chloride results of 464 mg/kg at 12 ft bgs and 256 mg/kg at 18 ft bgs. SB-3 returned laboratory chloride results of 480 mg/kg at 6 ft bgs and 176 mg/kg at 27 ft bgs. SB-4 returned laboratory chloride results of non-detect at both the surface and at 6 ft bgs. SB-5 returned laboratory chloride results of 560 mg/kg at 12 ft bgs and 144 mg/kg at 21 ft bgs. GRO and DRO returned results of non-detect at all depths in all soil bores.

To determine if the residual chlorides in the vadose zone pose a threat to groundwater quality, ROC ran the U.S. Environmental Protection Agency Exposure Assessment Multimedia Model (MULTIMED Version 1.5, 2005). Model outputs and the graph are included in Appendix B. With the impact area of 58 ft x 68 ft, the model output concludes that the peak concentration of chlorides in groundwater contributed by the vadose zone soils would be approximately 128.6 mg/L in 45 years. Since the estimated increase in chloride concentrations in groundwater from residual chloride migration is below the WQCC standard of 250 mg/L, no action is warranted for the vadose zone or for groundwater at this site.

Based on the Multimedia Model analysis it is evident that residual chlorides in the vadose zone will not impair groundwater beneath the site. The 30 ft x 30 ft 20 mil poly liner will also inhibit the downward migration of constituents at the site. The site has returned to normal vegetative capacity (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.

Given that the residual constituents in the vadose zone will not in any way affect groundwater beneath the site and that the poly liner and vegetation will inhibit further migration of constituents to groundwater, 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,

Lara Weinheimer
Project Scientist
RECS
(575) 441-0431

Attachments:

- Figure 1 – Geographical Location Map
- Figure 2 – Site Location Map
- Figure 3 – Soil Bore Installation Map
- Appendix A – Soil Bore Installation Documentation
- Appendix B – Multimed Documentation
- 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

Geographical Location Map

RICE ENVIRONMENTAL RECS CONSULTING & SAFETY, LLC

EME G-10

Legals: UL/G sec. 10
T-20-S R-36-E
LEA COUNTY, NM

NMOCD CASE #: 1R427-05

Figure 1

N W E S

0 0.125 0.25 0.5 Miles

Drawing date: 2-28-13
Drafted by: L. Weinheimer

Site Location Map

RICE ENVIRONMENTAL CONSULTING & SAFETY, LLC
RECS

EME G-10

Legals: UL/G sec. 10
T-20-S R-36-E
LEA COUNTY, NM

NMOCD CASE #: 1R427-05

Figure 2

N
W E
S

0 0.275 0.55 1.1
Miles

Drawing date: 2-27-13
Drafted by: LS

Soil Bore Installation

SB-1

Depth	Cl-	PID	LAB Cl-	GRO	DRO
15	628	2.8			
18	574	6.2			
21	677	6.6	784	<10	<10
24	786	2.8			
27	810	2.1	768	<10	<10
30	579	8.1	528	<10	<10

SB-2

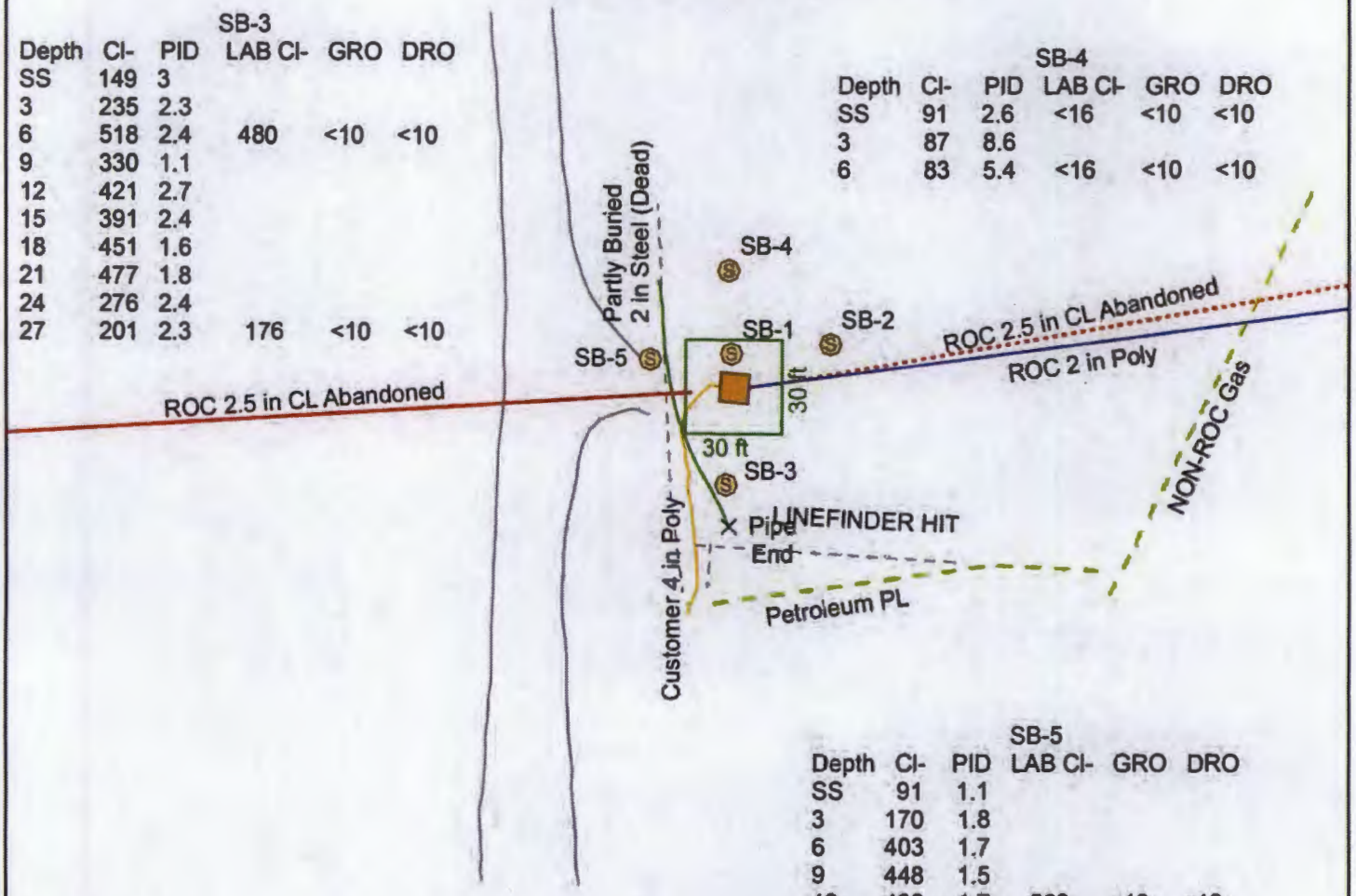
Depth	Cl-	PID	LAB Cl-	GRO	DRO
SS	208	3.5			
3	116	4.1			
6	250	11.1			
9	353	3.2			
12	421	3	464	<10	<10
15	316	5.1			
18	239	3.8	256	<10	<10

SB-3

Depth	Cl-	PID	LAB Cl-	GRO	DRO
SS	149	3			
3	235	2.3			
6	518	2.4	480	<10	<10
9	330	1.1			
12	421	2.7			
15	391	2.4			
18	451	1.6			
21	477	1.8			
24	276	2.4			
27	201	2.3	176	<10	<10

SB-4

Depth	Cl-	PID	LAB Cl-	GRO	DRO
SS	91	2.6	<16	<10	<10
3	87	8.6			
6	83	5.4	<16	<10	<10



SB-5

Depth	Cl-	PID	LAB Cl-	GRO	DRO
SS	91	1.1			
3	170	1.8			
6	403	1.7			
9	448	1.5			
12	492	1.7	560	<10	<10
15	313	1.8			
18	263	2.4			
21	231	1.9	144	<10	<10

Legend

- SOIL BORES
- LEASE ROAD
- 20-mil POLY LINER @ 12 FT BGS
- ACTIVE, CONCRETE JUNCTION BOX

DGW = 34 ft

RICE ENVIRONMENTAL CONSULTING & SAFETY, LLC

EME G-10

Legals: UL/G sec. 10
T-20-S R-36-E
LEA COUNTY, NM

NMOCD CASE #: 1R427-05

Figure 3

N W E S

0 40 80 Feet

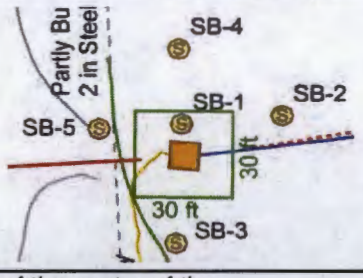
Drawing date: 7/2/13
Drafted by: L. Weinheimer

Appendix A

Soil Bore Installation Documentation

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

Logger:	Kyle Norman & Edward Cesareo
Driller:	Harrison & Cooper, Inc.
Drilling Method:	Air Rotary
Start Date:	6/17/2013
End Date:	6/17/2013



Project Name: EME G-10 **Well ID:** SB-1

Project Consultant: RECS

Comments: SB-1 is located 10 ft north of the center of the current junction box. All samples were from cuttings.

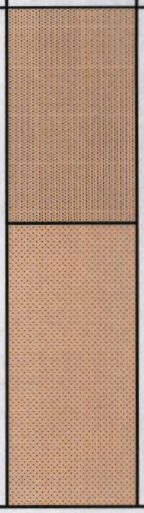
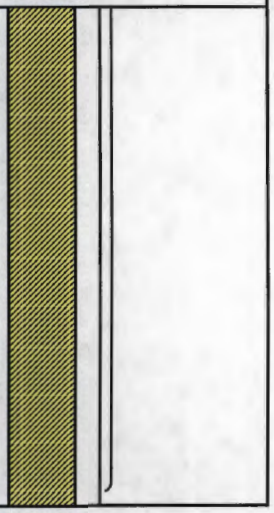
DRAFTED BY: L. Weinheimer

TD = 30 ft GW = 34 ft

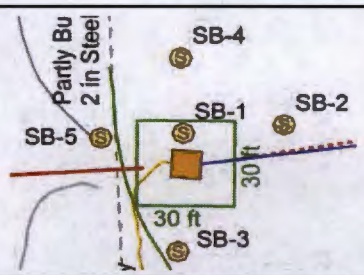
Location: UL/G sec.10 T20S, R36E

Lat: 32°35'16.602"N **Long:** 103°20'21.152" W **County:** Lea **State:** NM

Depth (feet)	Chloride field tests	LAB	PID	Description	Lithology	Well Construction
SS				Regolith		
3 ft						
6 ft						
9 ft						
12 ft						
15 ft	628		2.8			bentonite seal
				Regolith with 20 mil liner		
18 ft	574		6.2			
				Tan Sand With Some Caliche		
21 ft	677	Cl- 784	6.6			
		GRO <10				
		DRO <10				

Depth (feet)	Chloride field tests	LAB	PID	Description	Lithology	Well Construction
24 ft	786		2.8	Tan Sand With Some Caliche		
27 ft	810	Cl- 768	2.1			
		GRO <10		Tan Sand		
		DRO <10				
30 ft	579	Cl- 528	8.1			
		GRO <10				
		DRO <10				

Logger:	Kyle Norman & Edward Cesareo
Driller:	Harrison and Cooper, Inc.
Drilling Method:	Air Rotary
Start Date:	6/17/2013
End Date:	6/17/2013



Project Name: EME G-10 **Well ID:** SB-2

Project Consultant: RECS

Comments: SB-2 is located 31 ft northeast of the center of the current junction box. All samples were from cuttings.

DRAFTED BY: L. Weinheimer

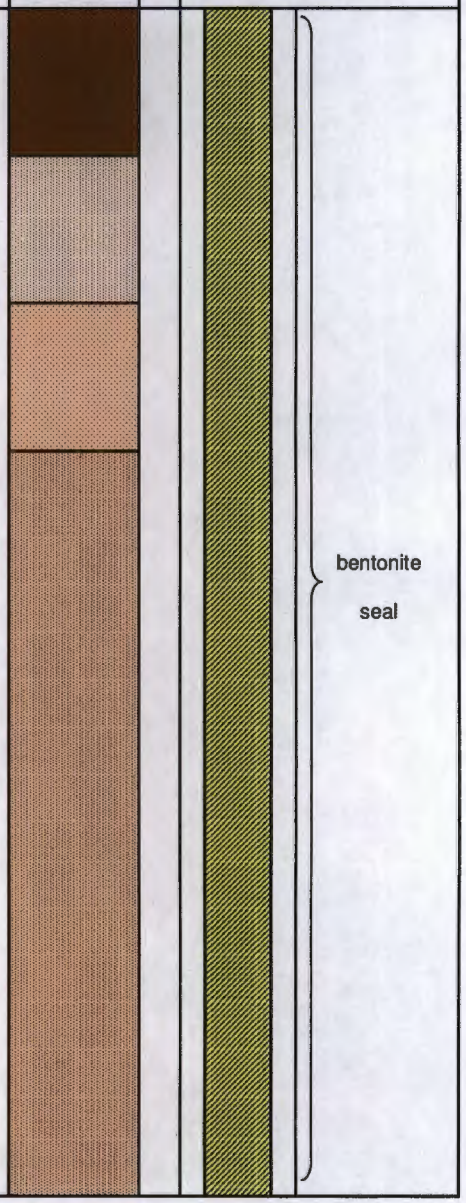
TD = 18 ft GW = 34 ft

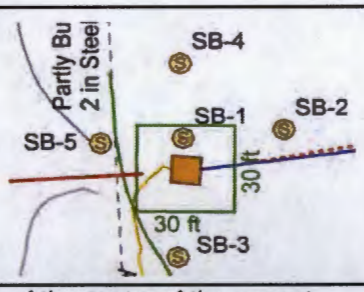
Location: UL/G sec. 10 T20S R36E

Lat: 32°35'16.615"N **County**: Lea

Long: 103°20'20.866"W **State:** NM

Depth (feet)	Chloride field tests	LAB	PID	Description
				Brown Sand
SS	208		3.5	
				Caliche
3 ft	116		4.1	
				Tan Sand
6 ft	250		11.1	
				Tan Sand With Caliche
9 ft	353		3.2	
12 ft	421	Cl- 464	3.0	
		GRO <10		
		DRO <10		
15 ft	316		5.1	
18 ft	239	Cl- 256	3.8	
		GRO <10		
		DRO <10		



Logger:	Kyle Norman & Edward Cesareo		
Driller:	Harrison and Cooper, Inc.		
Drilling Method:	Air Rotary		
Start Date:	6/17/2013		
End Date:	6/17/2013		

Project Name: EME G-10 **Well ID:** SB-3

Project Consultant: RECS

Comments: SB-3 is located 28 ft south of the center of the current junction box. All samples were from cuttings.

DRAFTED BY: L. Weinheimer

TD = 27 ft GW = 34 ft

Location: UL/G sec.10 T20S, R36E

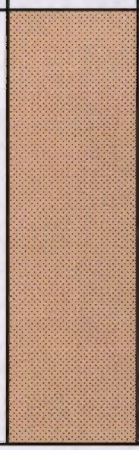
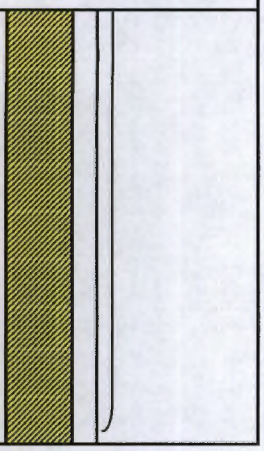
Lat: 32°35'16.292"N **County**: Lea

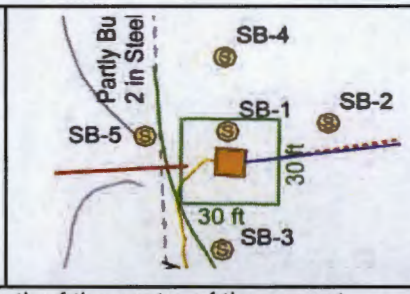
Long: 103°20'21.173"W **State:**NM

Depth (feet)	Chloride field tests	LAB	PID	Description
				Brown Sand
SS	149		3.0	
				Tan Sand With Some Caliche
3 ft	235		2.3	
6 ft	518	Cl- 480	2.4	
		GRO <10		Caliche
		DRO <10		
9 ft	330		1.1	
12 ft	421		2.7	
15 ft	391		2.4	
				Tan Sand
18 ft	451		1.6	
21 ft	477		1.8	

Lithology

Well Construction: bentonite seal

Depth (feet)	Chloride field tests	LAB	PID	Description	Lithology	Well Construction
				Tan Sand		
24 ft	276		2.4			
27 ft	201	Cl- 176	2.3			
		GRO <10				
		DRO <10				

Logger:	Kyle Norman & Edward Cesareo		
Driller:	Harrison and Cooper, Inc.		**Project Name:** EME G-10 **Well ID:** SB-4
Drilling Method:	Air Rotary		**Project Consultant:** RECS
Start Date:	6/17/2013		
End Date:	6/17/2013		

Comments: SB-4 is located 33 ft north of the center of the current junction box. All samples were from cuttings.

DRAFTED BY: L. Weinheimer

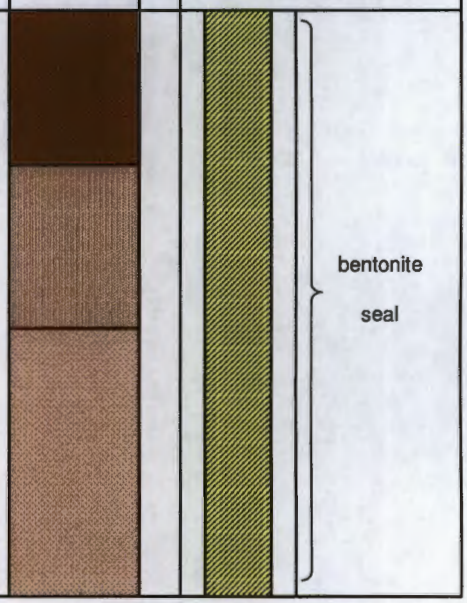
TD = 6 ft GW = 34 ft

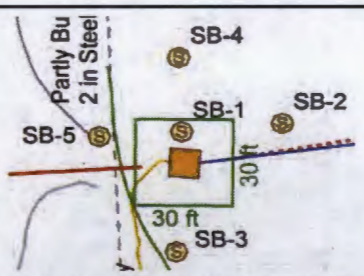
Location: UL/G sec. 10 T20S, R36E

Lat: 32°35'16.804"N **County:** Lea

Long: 103°20'21.157"W **State:** NM

Depth (feet)	Chloride field tests	LAB	PID	Description
				Brown Sand
SS	91	Cl- <16	2.6	
		GRO <10		Tan Sand With Some Caliche
		DRO <10		
3 ft	87		8.6	
				Tan Sand
6 ft	83	Cl- <16	5.4	
		GRO <10		
		DRO <10		



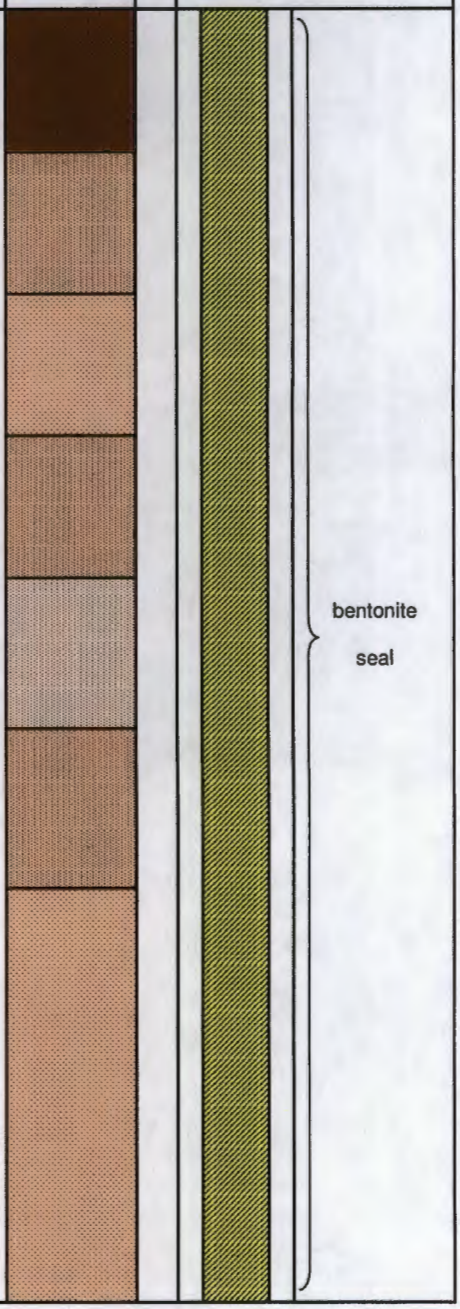
Logger:	Kyle Norman & Edward Cesareo		**Project Name:** EME G-10 **Well ID:** SB-5
Driller:	Harrison and Cooper, Inc.		**Project Consultant:** RECS
Drilling Method:	Air Rotary		**Location:** UL/G sec. 10, T20S, R37E
Start Date:	6/17/2013		**Lat:** 32°35'16.593"N **County:** Lea
End Date:	6/17/2013		**Long:** 103°20'21.382"W **State:** NM

Comments: SB-5 is located 26 ft northwest of the center of the current junction box. All samples were from cuttings.

DRAFTED BY: L. Weinheimer

TD = 21 ft GW = 34 ft

Depth (feet)	Chloride field tests	LAB	PID	Description
				Brown Sand
SS	91		1.1	
				Tan Sand With Some Caliche
3 ft	170		1.8	
				Tan Sand
6 ft	403		1.7	
				Tan Sand With Some Caliche
9 ft	448		1.5	
				Caliche
12 ft	492	Cl- 560	1.7	
		GRO <10		Tan Sand With Some Caliche
		DRO <10		
15 ft	313		1.8	
				Tan Sand
18 ft	263		2.4	
21 ft	231	Cl- 144	1.9	
		GRO <10		
		DRO <10		



CARDINAL Laboratories

PHONE (575) 393-2326 ° 101 E. MARLAND ° HOBBS, NM 88240

June 21, 2013

Hack Conder

Rice Operating Company

112 W. Taylor

Hobbs, NM 88240

RE: EME G-10 20S/36E

Enclosed are the results of analyses for samples received by the laboratory on 06/17/13 15:55.

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 accreditated 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

Celey D. Keene

Lab Director/Quality Manager

CARDINAL Laboratories

PHONE (575) 393-2326 ° 101 E. MARLAND ° HOBBS, NM 88240

Analytical Results For:

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

Received:	06/17/2013	Sampling Date:	06/17/2013
Reported:	06/21/2013	Sampling Type:	Soil
Project Name:	EME G-10 20S/36E	Sampling Condition:	Cool & Intact
Project Number:	NONE GIVEN	Sample Received By:	Jodi Henson
Project Location:	NOT GIVEN		

Sample ID: SB 1 @ 21' (H301393-01)

Chloride, SM4500Cl-B mg/kg **Analyzed By: DW**

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	**784**	16.0	06/20/2013	ND	400	100	400	0.00	

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	06/20/2013	ND	196	98.2	200	5.62	
DRO >C10-C28	<10.0	10.0	06/20/2013	ND	209	105	200	2.41	

Surrogate: 1-Chlorooctane	*93.6 %*	*65.2-140*
Surrogate: 1-Chlorooctadecane	*96.1 %*	*63.6-154*

Sample ID: SB 1 @ 27' (H301393-02)

Chloride, SM4500Cl-B mg/kg **Analyzed By: DW**

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	**768**	16.0	06/20/2013	ND	400	100	400	0.00	

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	06/20/2013	ND	196	98.2	200	5.62	
DRO >C10-C28	<10.0	10.0	06/20/2013	ND	209	105	200	2.41	

Surrogate: 1-Chlorooctane	*95.5 %*	*65.2-140*
Surrogate: 1-Chlorooctadecane	*96.4 %*	*63.6-154*

Cardinal Laboratories

*=Accredited Analyte

Celey D. Keene, Lab Director/Quality Manager

CARDINAL Laboratories

PHONE (575) 393-2326 ° 101 E. MARLAND ° HOBBS, NM 88240

Analytical Results For:

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

Received:	06/17/2013	Sampling Date:	06/17/2013
Reported:	06/21/2013	Sampling Type:	Soil
Project Name:	EME G-10 20S/36E	Sampling Condition:	Cool & Intact
Project Number:	NONE GIVEN	Sample Received By:	Jodi Henson
Project Location:	NOT GIVEN		

Sample ID: SB 1 @ 30' (H301393-03)

Chloride, SM4500Cl-B mg/kg **Analyzed By: DW**

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	**528**	16.0	06/20/2013	ND	400	100	400	0.00	

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	06/20/2013	ND	196	98.2	200	5.62	
DRO >C10-C28	<10.0	10.0	06/20/2013	ND	209	105	200	2.41	

Surrogate: 1-Chlorooctane	*89.0 %*	*65.2-140*
Surrogate: 1-Chlorooctadecane	*93.7 %*	*63.6-154*

Sample ID: SB 2 @ 12' (H301393-04)

Chloride, SM4500Cl-B mg/kg **Analyzed By: DW**

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	**464**	16.0	06/20/2013	ND	400	100	400	0.00	

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	06/20/2013	ND	196	98.2	200	5.62	
DRO >C10-C28	<10.0	10.0	06/20/2013	ND	209	105	200	2.41	

Surrogate: 1-Chlorooctane	*82.9 %*	*65.2-140*
Surrogate: 1-Chlorooctadecane	*87.8 %*	*63.6-154*

Cardinal Laboratories

*=Accredited Analyte

Celey D. Keene, Lab Director/Quality Manager

CARDINAL Laboratories

PHONE (575) 393-2326 ° 101 E. MARLAND ° HOBBS, NM 88240

Analytical Results For:

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

Received:	06/17/2013	Sampling Date:	06/17/2013
Reported:	06/21/2013	Sampling Type:	Soil
Project Name:	EME G-10 20S/36E	Sampling Condition:	Cool & Intact
Project Number:	NONE GIVEN	Sample Received By:	Jodi Henson
Project Location:	NOT GIVEN		

Sample ID: SB 2 @ 18' (H301393-05)

Chloride, SM4500Cl-B mg/kg **Analyzed By: DW**

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	**256**	16.0	06/20/2013	ND	400	100	400	0.00	

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	06/20/2013	ND	196	98.2	200	5.62	
DRO >C10-C28	<10.0	10.0	06/20/2013	ND	209	105	200	2.41	

Surrogate: 1-Chlorooctane	*87.4 %*	*65.2-140*
Surrogate: 1-Chlorooctadecane	*90.1 %*	*63.6-154*

Sample ID: SB 3 @ 6' (H301393-06)

Chloride, SM4500Cl-B mg/kg **Analyzed By: DW**

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	**480**	16.0	06/20/2013	ND	400	100	400	0.00	

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	06/20/2013	ND	196	98.2	200	5.62	
DRO >C10-C28	<10.0	10.0	06/20/2013	ND	209	105	200	2.41	

Surrogate: 1-Chlorooctane	*92.9 %*	*65.2-140*
Surrogate: 1-Chlorooctadecane	*96.1 %*	*63.6-154*

Cardinal Laboratories *=Accredited Analyte

Celey D. Keene, Lab Director/Quality Manager

CARDINAL Laboratories

PHONE (575) 393-2326 ° 101 E. MARLAND ° HOBBS, NM 88240

Analytical Results For:

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

Received:	06/17/2013	Sampling Date:	06/17/2013
Reported:	06/21/2013	Sampling Type:	Soil
Project Name:	EME G-10 20S/36E	Sampling Condition:	Cool & Intact
Project Number:	NONE GIVEN	Sample Received By:	Jodi Henson
Project Location:	NOT GIVEN		

Sample ID: SB 3 @ 27' (H301393-07)

Chloride, SM4500Cl-B mg/kg **Analyzed By: DW**

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	**176**	16.0	06/20/2013	ND	400	100	400	0.00	

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	06/20/2013	ND	196	98.2	200	5.62	
DRO >C10-C28	<10.0	10.0	06/20/2013	ND	209	105	200	2.41	

Surrogate: 1-Chlorooctane	*88.4 %*	*65.2-140*
Surrogate: 1-Chlorooctadecane	*94.5 %*	*63.6-154*

Sample ID: SB 4 @ SURFACE (H301393-08)

Chloride, SM4500Cl-B mg/kg **Analyzed By: DW**

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	<16.0	16.0	06/20/2013	ND	400	100	400	0.00	

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	06/20/2013	ND	196	98.2	200	5.62	
DRO >C10-C28	<10.0	10.0	06/20/2013	ND	209	105	200	2.41	

Surrogate: 1-Chlorooctane	*89.3 %*	*65.2-140*
Surrogate: 1-Chlorooctadecane	*92.9 %*	*63.6-154*

Cardinal Laboratories

*=Accredited Analyte

Celey D. Keene, Lab Director/Quality Manager

CARDINAL Laboratories

PHONE (575) 393-2326 ° 101 E. MARLAND ° HOBBS, NM 88240

Analytical Results For:

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

Received:	06/17/2013	Sampling Date:	06/17/2013
Reported:	06/21/2013	Sampling Type:	Soil
Project Name:	EME G-10 20S/36E	Sampling Condition:	Cool & Intact
Project Number:	NONE GIVEN	Sample Received By:	Jodi Henson
Project Location:	NOT GIVEN		

Sample ID: SB 4 @ 6' (H301393-09)

Chloride, SM4500Cl-B mg/kg **Analyzed By: DW**

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	<16.0	16.0	06/20/2013	ND	400	100	400	0.00	

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	06/20/2013	ND	196	98.2	200	5.62	
DRO >C10-C28	<10.0	10.0	06/20/2013	ND	209	105	200	2.41	

Surrogate: 1-Chlorooctane	*83.3 %*	*65.2-140*
Surrogate: 1-Chlorooctadecane	*85.7 %*	*63.6-154*

Sample ID: SB 5 @ 12' (H301393-10)

Chloride, SM4500Cl-B mg/kg **Analyzed By: DW**

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	**560**	16.0	06/20/2013	ND	400	100	400	0.00	

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	06/20/2013	ND	196	98.2	200	5.62	
DRO >C10-C28	<10.0	10.0	06/20/2013	ND	209	105	200	2.41	

Surrogate: 1-Chlorooctane	*95.3 %*	*65.2-140*
Surrogate: 1-Chlorooctadecane	*99.7 %*	*63.6-154*

Cardinal Laboratories

*=Accredited Analyte

Celey D. Keene, Lab Director/Quality Manager

CARDINAL Laboratories

PHONE (575) 393-2326 ° 101 E. MARLAND ° HOBBS, NM 88240

Analytical Results For:

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

Received:	06/17/2013	Sampling Date:	06/17/2013
Reported:	06/21/2013	Sampling Type:	Soil
Project Name:	EME G-10 20S/36E	Sampling Condition:	Cool & Intact
Project Number:	NONE GIVEN	Sample Received By:	Jodi Henson
Project Location:	NOT GIVEN		

Sample ID: SB 5 @ 21' (H301393-11)

Chloride, SM4500Cl-B mg/kg **Analyzed By: DW**

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	**144**	16.0	06/20/2013	ND	400	100	400	0.00	

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	06/20/2013	ND	196	98.2	200	5.62	
DRO >C10-C28	<10.0	10.0	06/20/2013	ND	209	105	200	2.41	

Surrogate: 1-Chlorooctane	*87.5 %*	*65.2-140*
Surrogate: 1-Chlorooctadecane	*92.5 %*	*63.6-154*

Cardinal Laboratories *=Accredited Analyte

Celey D. Keene, Lab Director/Quality Manager

CARDINAL Laboratories

PHONE (575) 393-2326 ° 101 E. MARLAND ° HOBBS, NM 88240

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

Celey D. Keene, Lab Director/Quality Manager

1 of 2

CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

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

Company Name:	Rice Operating Company	BILL TO	
Project Manager:	Hack Conder	P.O. #:	
Address:		Company:	
City: Hobbs	State: NM Zip: 88240	Attn:	
Phone #:	Fax #:	Address:	
Project #:	Project Owner:	City:	
Project Name:		State: Zip:	
Project Location:	EME G-10 20S-36E	Phone #:	
Sampler Name:	Kyle Norman	Fax #:	

ANALYSIS REQUEST

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	Chlorides	TPH 8015 M	BTEX	Texas TPH	Complete Cations/Anions	TDS
H301393																				
1	SB1@ 21'	G	1			✓					✓		6-17-13	9:00	✓	✓				
2	SB1@ 27'	G	1			✓					✓		"	9:15	✓	✓				
3	SB1@ 30'	G	1			✓					✓		"	9:30	✓	✓				
4	SB2@ 12'	G	1			✓					✓		"	10:00	✓	✓				
5	SB2@ 18'	G	1			✓					✓		"	10:15	✓	✓				
6	SB3@ 6'	G	1			✓					✓		"	11:00	✓	✓				
7	SB3@ 27'	G	1			✓					✓		"	11:30	✓	✓				
8	SB4@ Surface	G	1			✓					✓		"	1:30	✓	✓				
9	SB4@ 6'	G	1			✓					✓		"	2:00	✓	✓				

Relinquished By: Kyle No	Date: 6-17-13 Time: 3:55	Received By: Jodi Henson	
Relinquished By:	Date: Time:	Received By:	
Delivered By: (Circle One) Sampler - UPS - Bus - Other:	Sample Condition: Cool ☐ Yes ☐ No; Intact ☑ Yes ☐ No	CHECKED BY: (Initials)	

Phone Result: ☐ Yes ☑ No Add'l Phone #:
Fax Result: ☐ Yes ☑ No Add'l Fax #:
REMARKS:

email results: zconder@rice-ecs.com
Knorman@rice-ecs.com; lpena@riceswd.com
Kjones@riceswd.com; Bbaker@rice-ecs.com;
hconder@rice-ecs.com; Lweinheimer@rice-ecs.com

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

#54

2 of 2

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 Company		BILL TO	
Project Manager: Hack Conder		P.O. #:	
Address:		Company:	
City: Hobbs	State: NM Zip: 88240	Attn:	
Phone #:	Fax #:	Address:	
Project #:	Project Owner:	City:	
Project Name:		State: Zip:	
Project Location: EME G-10 20S-36E		Phone #:	
Sampler Name: Kyle Norman		Fax #:	

FOR LAB USE ONLY				MATRIX						PRESERV.			SAMPLING		ANALYSIS REQUEST										
Lab I.D.	Sample I.D.	(G)RAB OR (C)OMP.	# CONTAINERS	GROUNDWATER	WASTEWATER	SOIL	OIL	SLUDGE	OTHER :	ACID/BASE:	ICE / COOL	OTHER :	DATE	TIME	Chlorides	TPH 8015 M	BTEX	Texas TPH	Complete Cations/Anions	TDS					
H301393																									
10	SB5@ 12'	G	1			✓					✓		6-7-13	3:00	✓	✓									
11	SB5@ 21'	G	1			✓					✓		11	3:15	✓	✓									

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: Kyle N.	Date: 6-17-13 Time: 3:55	Received By: Jodi Henson	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: zconder@rice-ecs.com Knorman@rice-ecs.com; lpena@riceswd.com Kjones@riceswd.com; Bbaker@rice-ecs.com; hconder@rice-ecs.com; Lweinheimer@rice-ecs.com

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

#54

Appendix B

Multimed Documentation

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

MULTIMED V1.01 DATE OF CALCULATIONS: 11-JUL-2013 TIME: 14: 1:56

U. S. E N V I R O N M E N T A L P R O T E C T I O N A G E N C Y

E X P O S U R E A S S E S S M E N T

M U L T I M E D I A M O D E L

MULTIMED (Version 1.50, 2005)

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

EME G-10

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	4.45	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	4.45	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.

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

DATA FOR LAYER 1

VADOSE TRANSPORT VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS		LIMITS	
			MEAN	STD DEV	MIN	MAX
Thickness of layer	m	CONSTANT	4.45	-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	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

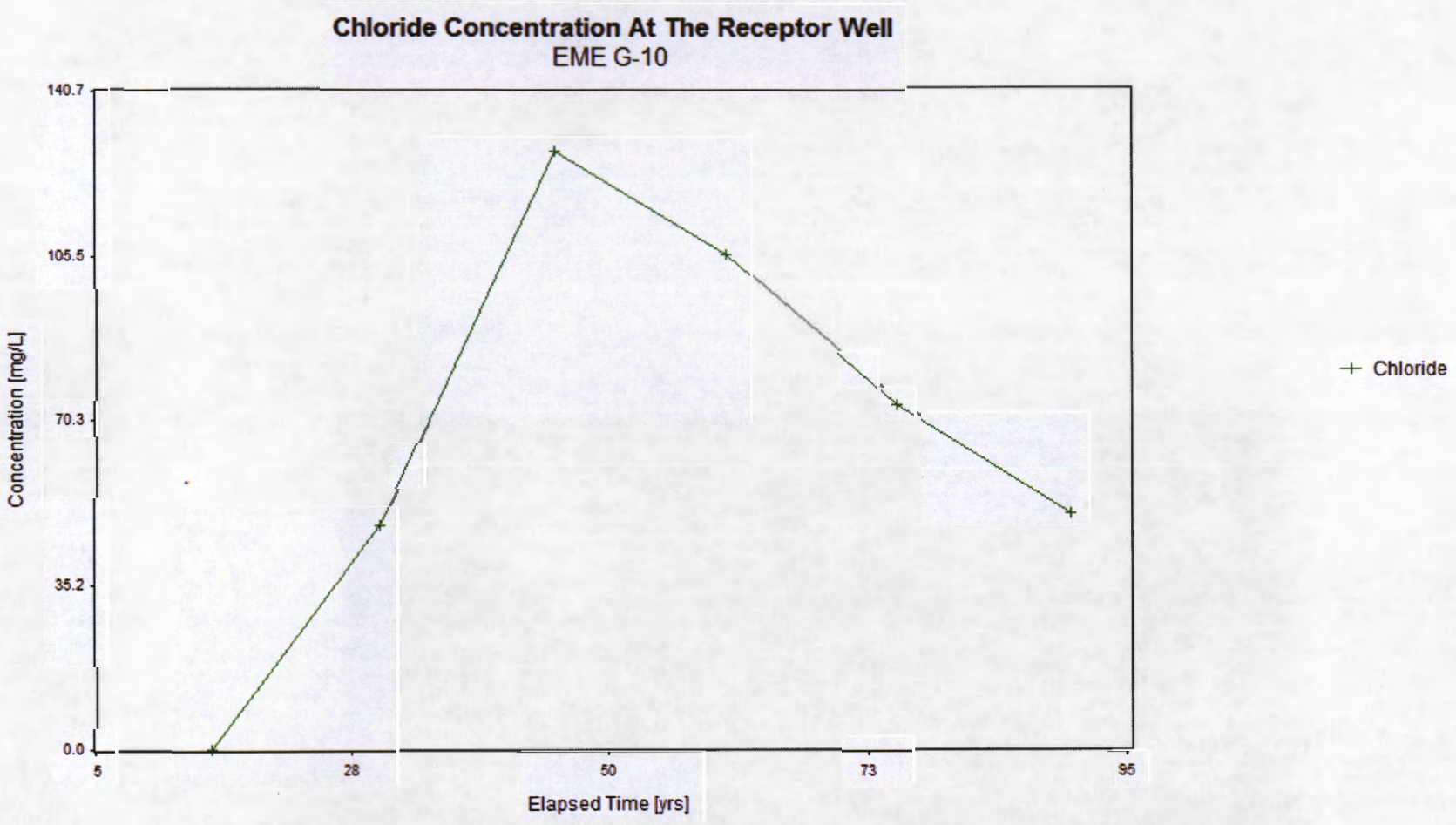
SOURCE SPECIFIC VARIABLES

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	367.	-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	355.	-999.	-999.	-999.
Length scale of facility	m	CONSTANT	17.7	-999.	-999.	-999.
Width scale of facility	m	CONSTANT	20.7	-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
0.150E+02	0.14326E-01
0.300E+02	0.47680E+02
0.450E+02	0.12788E+03
0.600E+02	0.10560E+03
0.750E+02	0.73683E+02
0.900E+02	0.50773E+02


Chloride Concentration At The Receptor Well
EME G-10
140.7
105.5
70.3
35.2
0.0
Concentration [mg/L]
5
28
50
73
95
Elapsed Time [yrs]
Chloride

Appendix C

Site Photos

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

EME G-10 (1R427-05)

UL/G sec. 10 T20S R36E

Site photo, facing south 6-18-13

Site photo, facing west 6-18-13

MULTIMED V1.01 DATE OF CALCULATIONS: 5-AUG-2013 TIME: 11: 3:58

U. S. E N V I R O N M E N T A L P R O T E C T I O N A G E N C Y

E X P O S U R E A S S E S S M E N T

M U L T I M E D I A M O D E L

MULTIMED (Version 1.50, 2005)

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

EME G-10

Chemical simulated is Chloride

Option Chosen Saturated and unsaturated zone models
Run was DETERMIN
Infiltration Specified By User: 4.800E-03 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	1.00	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	1.00	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.

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
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Convolution integral approach
Exponentially decaying continuous source
Computer generated times for computing concentrations
1

DATA FOR LAYER 1
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VADOSE TRANSPORT VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS		LIMITS	
			MEAN	STD DEV	MIN	MAX
Thickness of layer	m	CONSTANT	1.00	-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	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		LIMITS	
			MEAN	STD DEV	MIN	MAX
Infiltration rate	m/yr	CONSTANT	0.480E-02	-999.	-999.	-999.
Area of waste disposal unit	m^2	DERIVED	367.	-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	528.	-999.	-999.	-999.
Length scale of facility	m	CONSTANT	17.7	-999.	-999.	-999.
Width scale of facility	m	CONSTANT	20.7	-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	-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.				

1

TIME	CONCENTRATION
0.150E+02	0.19922E-02
0.300E+02	0.21798E+01
0.450E+02	0.16983E+02
0.600E+02	0.28896E+02
0.750E+02	0.27972E+02
0.900E+02	0.21811E+02