1R - 427-361

WORKPLANS

Date:

9-30-13

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

CERTIFIED MAIL
RETURN RECEIPT NO. 7008 1140 0001 3072 4710

September 30th, 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 Corrective Action Plan (CAP)**
Rice Operating Company – EME SWD System
EME H-24 EOL (1R427-361): UL/H sec. 24 T19S R36E
Formerly EME A-24 EOL

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 A-24 EOL. However, GIS mapping shows the site to be located within unit letter H (Figure 1). To reflect the geographical location of the site, the name has been changed to the EME H-24 EOL.

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 2.5 miles northwest of Monument, New Mexico at UL/H sec. 24 T19S R36E as shown on the Site Location Map (Figure 2). Soil bore installation at the site determined groundwater to be located at a depth of 55 +/- feet.

In 2011, ROC initiated work on the former EME H-24 EOL junction box. The site was delineated using a backhoe to form a 20 ft x 15 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, 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 656 mg/kg, a gasoline range organics (GRO) reading of 115 mg/kg and a diesel range organics (DRO) reading of 1,900 mg/kg. The bottom composite showed a chloride laboratory reading of 976 mg/kg, a GRO reading of non-detect and a DRO reading of 396 mg/kg. The blended backfill showed a chloride

laboratory reading of 208 mg/kg, a GRO reading 98.2 mg/kg and a DRO reading of 1,200. Because the DRO reading on the blended backfill was above 1,000 mg/kg, the blended backfill was taken to a NMOCD approved facility for disposal.

The excavation was backfilled with clean, imported soil to 5 ft bgs. At 5-4 ft bgs, a 1 ft thick clay layer was installed and a compaction test was performed on April 7th, 2011. The excavation was then backfilled with clean, imported soil to ground surface and contoured to the surrounding location. The site was seeded with a blend of native vegetation on November 10th, 2011. NMOCD was notified of potential groundwater impact on April 9th, 2012 and a junction box disclosure report was submitted to NMOCD with all the 2011 junction box closures and disclosures.

On June 20th, 2013, an Investigation and Characterization Plan (ICP) was submitted to NMOCD, which was approved on July 2nd, 2013. As part of the ICP, 5 soil bores were installed at the site (Figure 3). As the bores were advanced, 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 readings of 1,070 mg/kg at 30 ft bgs, which decreased to 144 mg/kg at 50 ft bgs. SB-2 returned laboratory chloride readings of 432 mg/kg at 10 ft bgs, which decreased to 96 mg/kg at 25 ft bgs. SB-3 returned laboratory chloride readings of 992 mg/kg at 20 ft bgs, which decreased to144 mg/kg at 45 ft bgs. SB-4 returned laboratory chloride readings of 912 mg/kg at 10 ft bgs, which decreased to 64 mg/kg at 25 ft bgs. SB-5 returned laboratory chloride readings of 1,170 mg/kg at 20 ft bgs, which decreased to 96 mg/kg at 45 ft bgs. GRO and DRO readings were non-detect in all bores at all depths except for SB-4 at 25 ft bgs, which returned a DRO value of 31.5 mg/kg. It is evident from the soil bore date that groundwater beneath the site has not been affected by the constituents from the former junction box site.

Corrective Action Plan

As the bores were advanced through the vadose zone, the chloride readings dropped precipitously. To determine if the residual chlorides in the vadose zone will pose a threat to groundwater quality, ROC ran the U.S. Environmental Protection Agency Exposure Assessment Multimedia Model (MULTIMED Version 1.5, 2005). Data inputs and model outputs are included in Appendix B. The model output concludes that the peak concentration of chlorides in groundwater contributed by the vadose zone soils would be approximately 43.4 mg/L in 66 years. Since the estimated increase in chloride concentrations in groundwater from residual chloride migration is below the WQCC standard of 250 mg/L, no further action will be warranted for the groundwater at this site.

In order to mitigate the impact the residual chlorides will have on the vadose zone and prevent the chlorides from reaching groundwater, RECS recommends that ROC excavate the site to 40 ft x 38 ft to the depth of 4 ft bgs (Figure 3) and install a 20-mil reinforced liner. The liner will cover the previously installed 20 ft x 15 ft clay liner at 5-4 ft bgs, and will extend approximately 10 feet beyond SB-3 and SB-5. The highest chloride concentrations were observed in those soil bores. The soils placed above the liner will

have a laboratory chloride reading no greater than 500 mg/kg and a field PID reading below 100 ppm. Excavated soil will be evaluated for use as backfill and any soils requiring disposal will be properly disposed of at a NMOCD approved facility. Upon completion of backfilling, the site will be seeded with a native vegetative mix and soil amendments will be added as necessary. 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.

Once the CAP activities have been completed, ROC will submit a report detailing the CAP activities and a request for 'remediation termination' or similar closure status of the regulatory file.

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

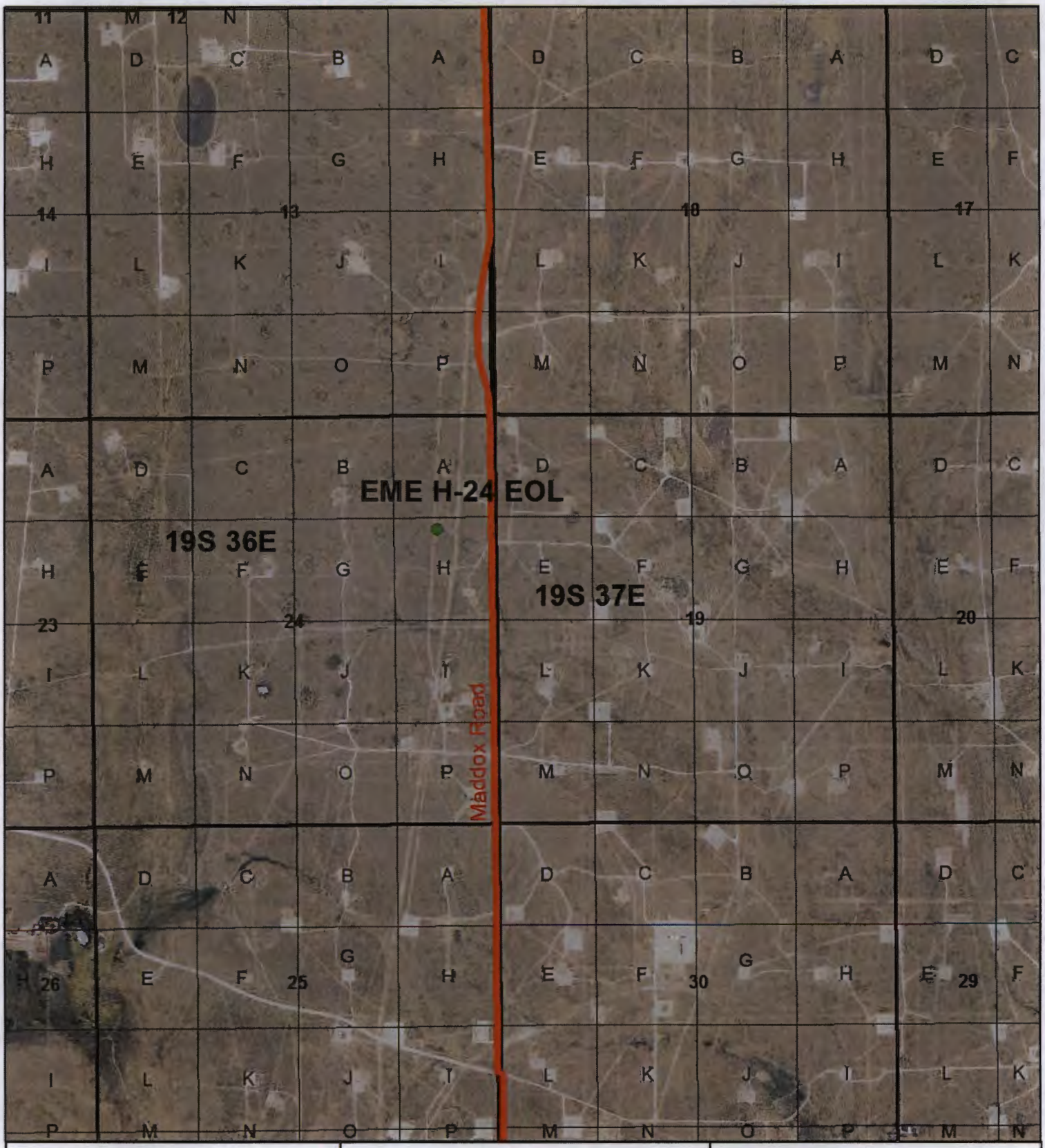
Attachments:

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

Figures

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

Geographical Location Map



RICE ENVIRONMENTAL
RECS
CONSULTING & SAFETY, LLC

EME H-24 EOL

Legals: UL/H sec. 24
T-19-S R-36-E
LEA COUNTY, NM

NMOCD CASE #: 1R427-361

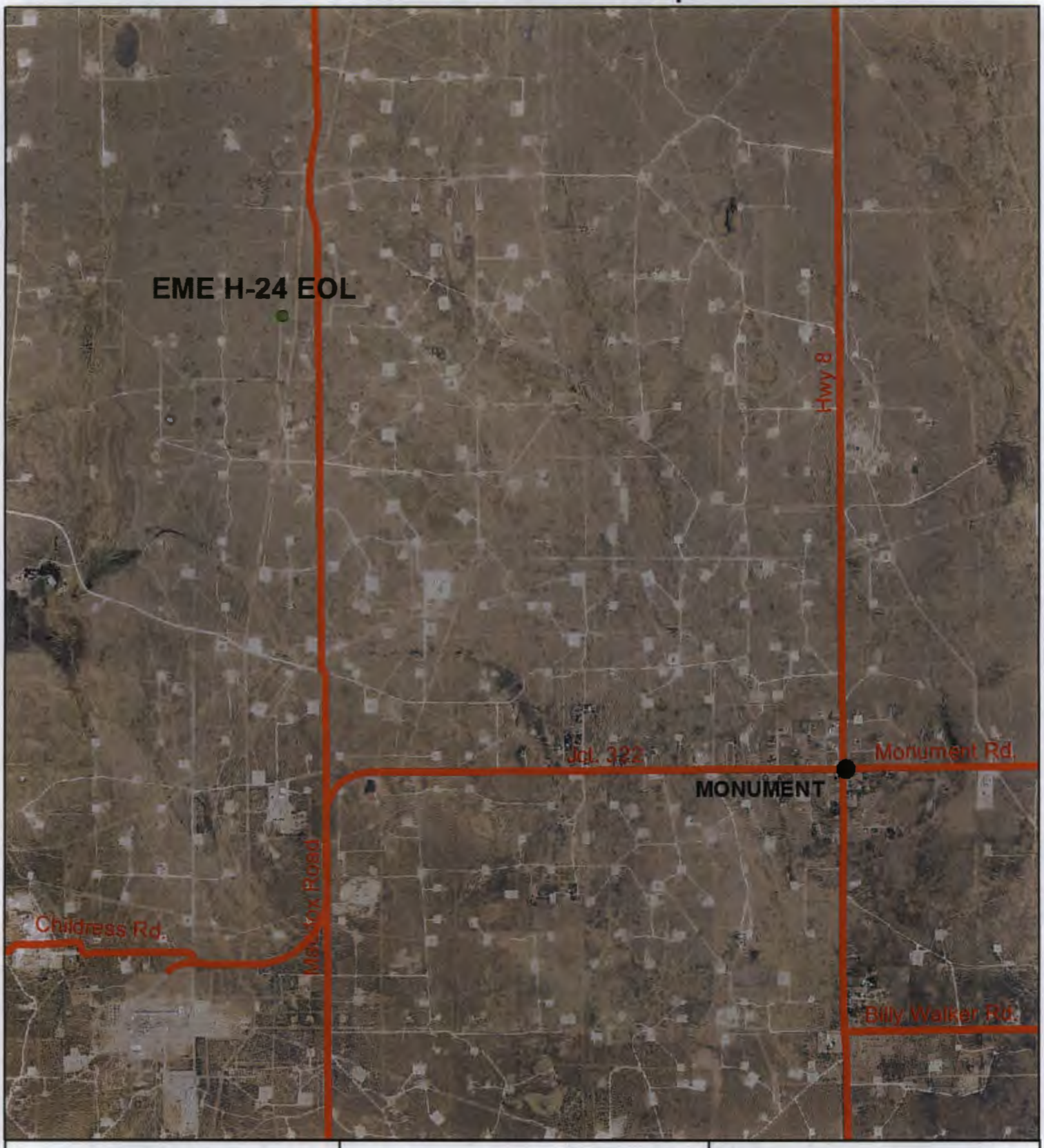
Figure 1

N
W E
S

0 0.15 0.3 0.6
Miles

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

Site Location Map



RICE ENVIRONMENTAL CONSULTING & SAFETY, LLC
RECS

EME H-24 EOL

Legals: UL/H sec. 24
T-19-S R-36-E
LEA COUNTY, NM

NMOCD CASE #: 1R427-361

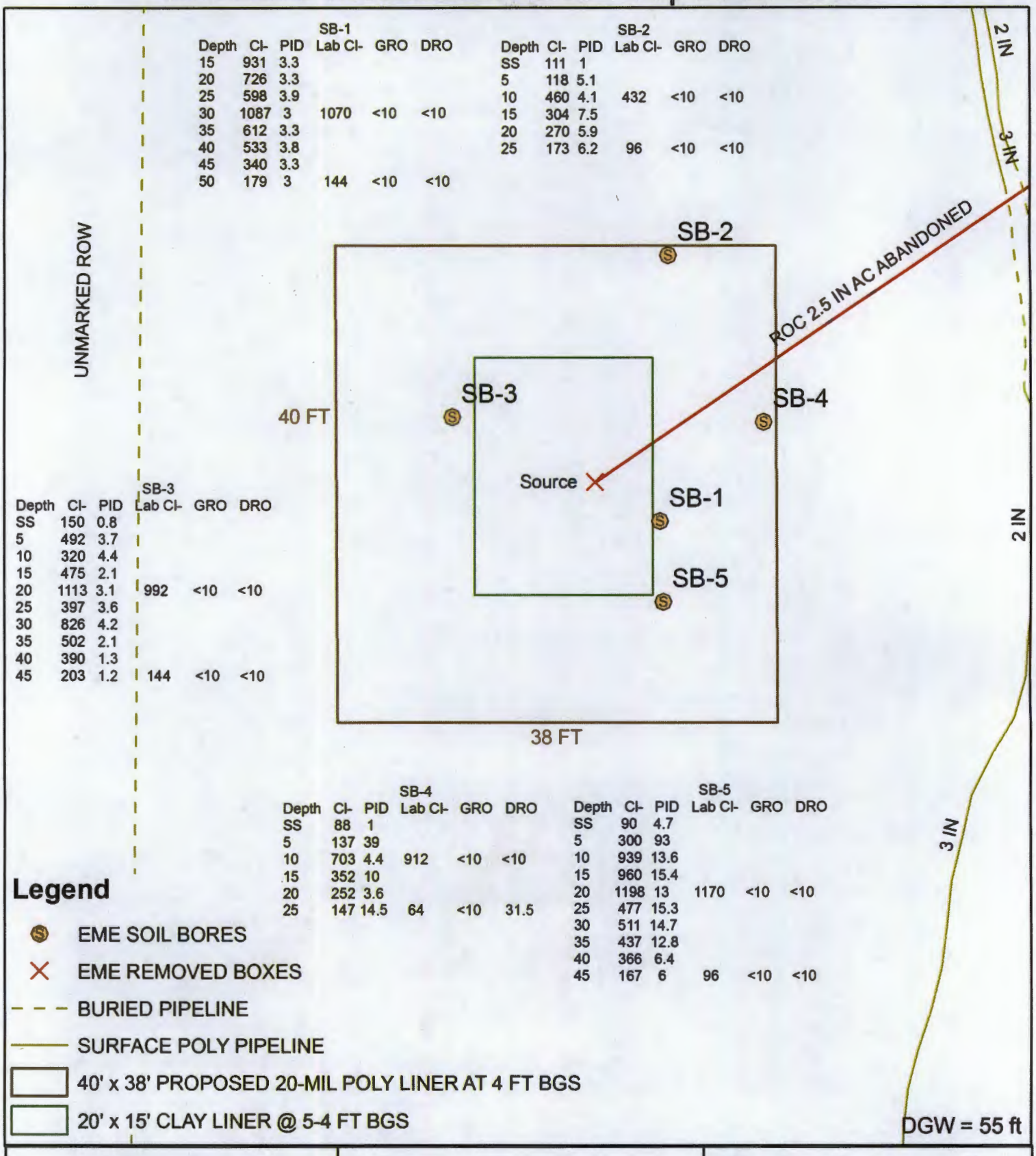
Figure 2

N
W E
S

0 0.225 0.45 0.9
Miles

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

Soil Bore Installation and Proposed Liner



SB-1

Depth	Cl-	PID	Lab Cl-	GRO	DRO
15	931	3.3			
20	726	3.3			
25	598	3.9			
30	1087	3	1070	<10	<10
35	612	3.3			
40	533	3.8			
45	340	3.3			
50	179	3	144	<10	<10

SB-2

Depth	Cl-	PID	Lab Cl-	GRO	DRO
SS	111	1			
5	118	5.1			
10	460	4.1	432	<10	<10
15	304	7.5			
20	270	5.9			
25	173	6.2	96	<10	<10

SB-3

Depth	Cl-	PID	Lab Cl-	GRO	DRO
SS	150	0.8			
5	492	3.7			
10	320	4.4			
15	475	2.1			
20	1113	3.1	992	<10	<10
25	397	3.6			
30	826	4.2			
35	502	2.1			
40	390	1.3			
45	203	1.2	144	<10	<10

SB-4

Depth	Cl-	PID	Lab Cl-	GRO	DRO
SS	88	1			
5	137	39			
10	703	4.4	912	<10	<10
15	352	10			
20	252	3.6			
25	147	14.5	64	<10	31.5

SB-5

Depth	Cl-	PID	Lab Cl-	GRO	DRO
SS	90	4.7			
5	300	93			
10	939	13.6			
15	960	15.4			
20	1198	13	1170	<10	<10
25	477	15.3			
30	511	14.7			
35	437	12.8			
40	366	6.4			
45	167	6	96	<10	<10

Legend

- EME SOIL BORES
- EME REMOVED BOXES
- BURIED PIPELINE
- SURFACE POLY PIPELINE
- 40' x 38' PROPOSED 20-MIL POLY LINER AT 4 FT BGS
- 20' x 15' CLAY LINER @ 5-4 FT BGS

RICE ENVIRONMENTAL CONSULTING & SAFETY, LLC

EME H-24 EOL

Legals: UL/H sec. 24
T-19-S R-36-E
LEA COUNTY, NM

NMOCD CASE #: 1R427-361

Figure 3

N W E S

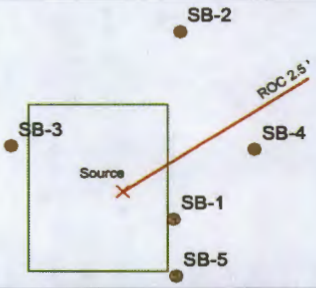
0 5 10 20 Feet

Drawing date: 9/17/13
Drafted by: L. Weinheimer

Appendix A

Soil Bore Documentation

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

Logger:	Edward Cesareo		RICE ENVIRONMENTAL RECS CONSULTING & SAFETY, LLC
Driller:	Harrison & Cooper, Inc.		**Project Name:** EME H-24 EOL **Well ID:** SB-1
Drilling Method:	Air Rotary		**Project Consultant:** RECS
Start Date:	8/28/2013		
End Date:	8/28/2013		

Comments: SB-1 is located 6.5 ft southeast of the former junction box site. All samples were from cuttings.

DRAFTED BY: L. Weinheimer

TD = 50 ft GW = 55 ft

Location: UL/H sec. 24 T19S R36E

Lat: 32°38'57.965"N **Long:** 103°18'4.832"W **County:** Lea **State:** NM

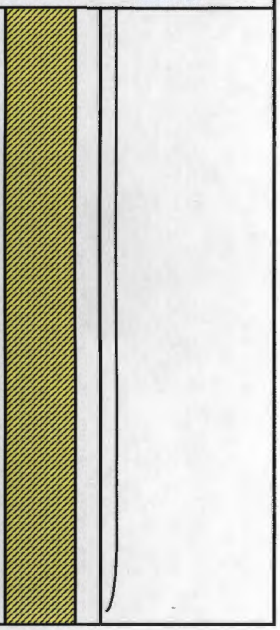
Depth (feet)	Chloride field tests	LAB	PID	Description
				BROWN SAND
SS				
				BROWN SAND WITH SOME ROCK
5 ft				
10 ft				
				TAN SAND
15 ft	931		3.3	
20 ft	726		3.3	
25 ft	598		3.9	
				BROWN SAND
30 ft	1087	Cl- 1070	3.0	
		GRO <10		
		DRO <10		
35 ft	612		3.3	

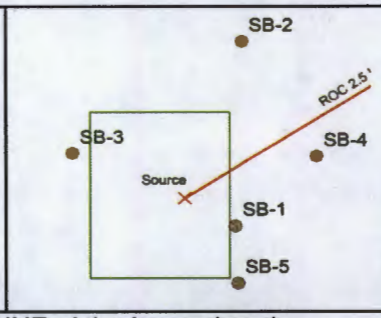
Lithology

Well Construction

bentonite seal

Depth (feet)	Chloride field tests	LAB	PID	Description	Lithology	Well Construction
40 ft	533		3.8			
45 ft	340		3.3	BROWN SAND		
50 ft	179	Cl- 144	3.0			
		GRO <10				
		DRO <10				



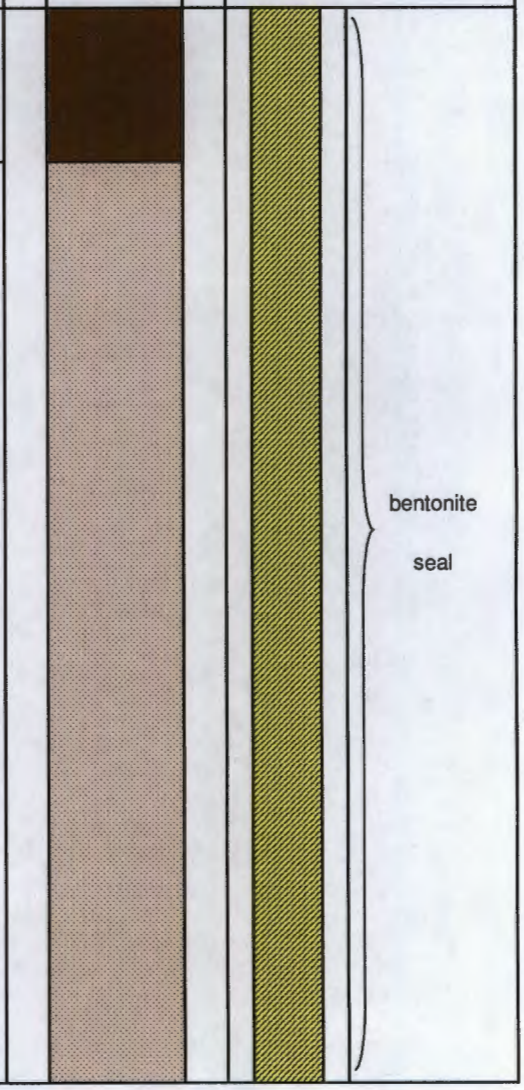
Logger:	Edward Cesareo		**Project Name:** EME H-24 EOL **Well ID:** SB-2
Driller:	Harrison & Cooper, Inc.		**Project Consultant:** RECS
Drilling Method:	Air Rotary		**Location:** UL/H sec. 24 T19S R36E
Start Date:	8/28/2013		**Lat:** 32°38'58.188"N **County:** Lea
End Date:	8/28/2013		**Long:** 103°18'4.82"W **State:** NM

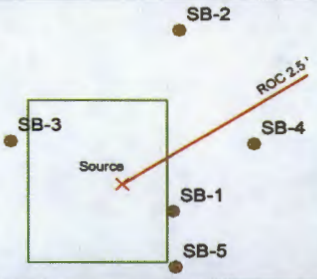
Comments: SB-2 is located 20 ft NNE of the former junction box site. All samples were from cuttings.

DRAFTED BY: L. Weinheimer

TD = 25 ft GW = 55 ft

Depth (feet)	Chloride field tests	LAB	PID	Description
				BROWN SAND WITH SOME ROCK
SS	111		1.0	
				TAN SAND
5 ft	118		5.1	
10 ft	460	Cl- 432	4.1	
		GRO <10		
		DRO <10		
15 ft	304		7.5	
20 ft	270		5.9	
25 ft	173	Cl- 96	6.2	
		GRO <10		
		DRO <10		



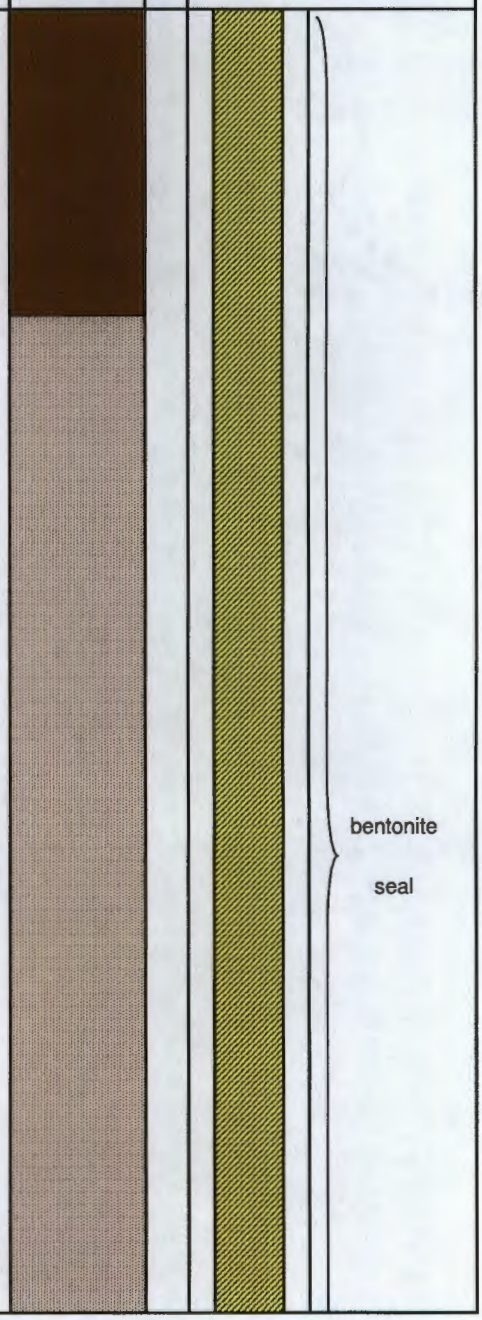
Logger:	Edward Cesareo		RICE ENVIRONMENTAL RECS CONSULTING & SAFETY, LLC
Driller:	Harrison & Cooper, Inc.		**Project Name:** EME H-24 EOL **Well ID:** SB-3
Drilling Method:	Air Rotary		**Project Consultant:** RECS
Start Date:	8/28/2013		**Location:** UL/H sec. 24 T19S R36E
End Date:	8/28/2013		**Lat:** 32°38'58.054"N **County:** Lea **Long:** 103°18'5.041"W **State:** NM

Comments: SB-3 is located 13 ft WNW of the former junction box site. All samples were from cuttings.

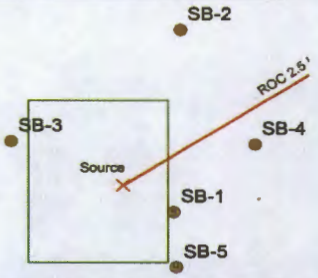
DRAFTED BY: L. Weinheimer

TD = 45 ft GW = 55 ft

Depth (feet)	Chloride field tests	LAB	PID	Description
				BROWN SAND
SS	150		0.8	
5 ft	492		3.7	
				TAN SAND WITH SOME CALICHE
10 ft	320		4.4	
15 ft	475		2.1	
20 ft	1113	Cl- 992	3.1	
		GRO <10		
		DRO <10		
25 ft	397		3.6	
30 ft	826		4.2	
35 ft	502		2.1	



Depth (feet)	Chloride field tests	LAB	PID	Description	Lithology	Well Construction
				TAN SAND WITH SOME CALICHE		
40 ft	390		1.3			
45 ft	203	Cl-144	1.2			
		GRO <10				
		DRO <10				

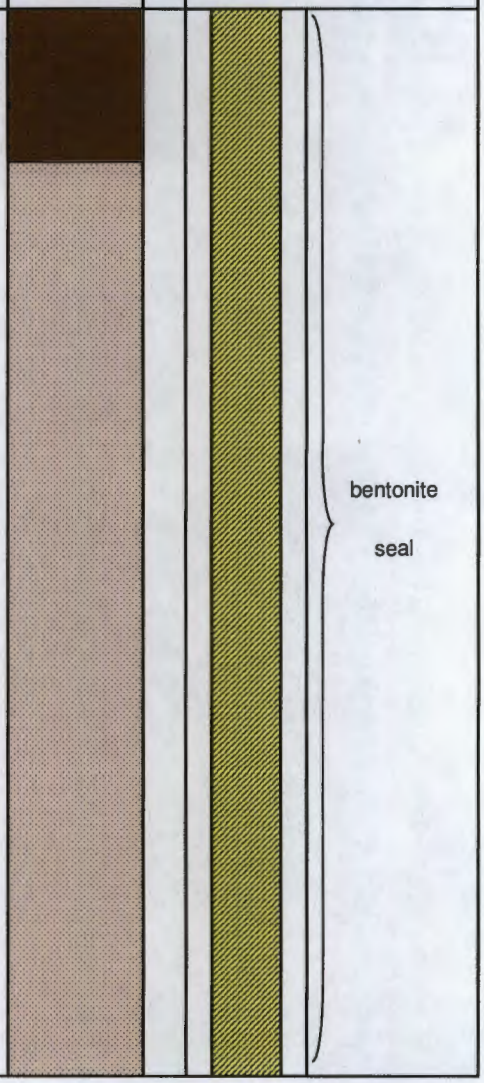
Logger:	Edward Cesareo		RICE ENVIRONMENTAL RECS CONSULTING & SAFETY, LLC
Driller:	Harrison & Cooper, Inc.		**Project Name:** EME H-24 EOL **Well ID:** SB-4
Drilling Method:	Air Rotary		**Project Consultant:** RECS
Start Date:	8/28/2013		**Location:** UL/H sec. 24 T19S R36E
End Date:	8/28/2013		**Lat:** 32°38'58.046"N **Long:** 103°18'4.724"W **County:** Lea **State:** NM

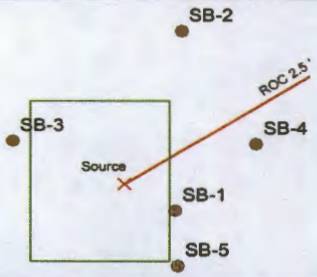
Comments: SB-4 is located 15 ft NE of the former junction box site. All samples were from cuttings.

DRAFTED BY: L. Weinheimer

TD = 25 ft GW = 55 ft

Depth (feet)	Chloride field tests	LAB	PID	Description
				BROWN SAND WITH SOME ROCK
SS	88		1	
				TAND SAND
5 ft	137		39	
10 ft	703	Cl- 912	4.4	
		GRO <10		
		DRO <10		
15 ft	352		10	
20 ft	252		3.6	
25 ft	147	Cl- 64	14.5	
		GRO <10		
		DRO 31.5		



Logger:	Edward Cesareo		
Driller:	Harrison & Cooper, Inc.		
Drilling Method:	Air Rotary		
Start Date:	8/28/2013		
End Date:	8/28/2013		

RICE ENVIRONMENTAL CONSULTING & SAFETY, LLC — RECS

Project Name: EME H-24 EOL **Well ID:** SB-5

Project Consultant: RECS

Comments: SB-5 is located 12 ft SE of the former junction box site. All samples were from cuttings.

DRAFTED BY: L. Weinheimer

TD = 45 ft GW = 55 ft

Location: UL/H sec. 24 T19S R36E

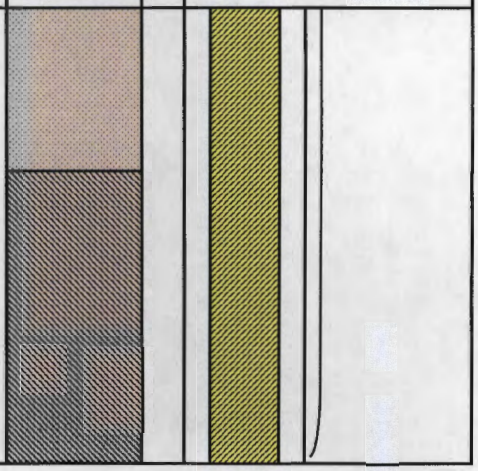
Lat: 32°38'57.897"N **County**: Lea

Long: 103°18'4.828"W **State**: NM

Depth (feet)	Chloride field tests	LAB	PID	Description
				BROWN SAND WITH SOME ROCK
SS	90		4.7	
				CALICHE WITH SOME ROCK
5 ft	300		93	
10 ft	939		13.6	TAN SAND
15 ft	960		15.4	
20 ft	1198	Cl- 1170	13	
		GRO <10		
		DRO <10		
25 ft	477		15.3	
30 ft	511		14.7	
35 ft	437		12.8	

Lithology

Well Construction: bentonite seal

Depth (feet)	Chloride field tests	LAB	PID	Description	Lithology	Well Construction
				TAN SAND		
40 ft	366		6.4			
				TAN SAND WITH SOME SANDSTONE		
45 ft	167	CI-96	6			
		GRO <10				
		DRO <10				

CARDINAL Laboratories

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

September 03, 2013

KATIE JONES

Rice Operating Company

112 W. Taylor

Hobbs, NM 88240

RE: EME H-24 EOL

Enclosed are the results of analyses for samples received by the laboratory on 08/28/13 15:30.

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

Received:	08/28/2013	Sampling Date:	08/28/2013
Reported:	09/03/2013	Sampling Type:	Soil
Project Name:	EME H-24 EOL	Sampling Condition:	Cool & Intact
Project Number:	NONE GIVEN	Sample Received By:	Jodi Henson
Project Location:	T-19S/R-36-E		

Sample ID: SB #1 30' (H302074-01)

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

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	**1070**	16.0	09/03/2013	ND	400	100	400	3.92	

TPH 8015M mg/kg **Analyzed By: AR/**

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10	<10.0	10.0	08/31/2013	ND	192	96.0	200	3.28	
DRO >C10-C28	<10.0	10.0	08/31/2013	ND	187	93.5	200	2.26	

Surrogate: 1-Chlorooctane	*101 %*	*65.2-140*
Surrogate: 1-Chlorooctadecane	*106 %*	*63.6-154*

Sample ID: SB #1 50' (H302074-02)

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

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	**144**	16.0	09/03/2013	ND	400	100	400	3.92	

TPH 8015M mg/kg **Analyzed By: AR/**

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10	<10.0	10.0	08/31/2013	ND	192	96.0	200	3.28	
DRO >C10-C28	<10.0	10.0	08/31/2013	ND	187	93.5	200	2.26	

Surrogate: 1-Chlorooctane	*102 %*	*65.2-140*
Surrogate: 1-Chlorooctadecane	*106 %*	*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
KATIE JONES
112 W. Taylor
Hobbs NM, 88240
Fax To: (575) 397-1471

Received:	08/28/2013	Sampling Date:	08/28/2013
Reported:	09/03/2013	Sampling Type:	Soil
Project Name:	EME H-24 EOL	Sampling Condition:	Cool & Intact
Project Number:	NONE GIVEN	Sample Received By:	Jodi Henson
Project Location:	T-19S/R-36-E		

Sample ID: SB #2 10' (H302074-03)

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

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	**432**	16.0	09/03/2013	ND	400	100	400	3.92	

TPH 8015M mg/kg **Analyzed By: AR/**

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10	<10.0	10.0	08/31/2013	ND	192	96.0	200	3.28	
DRO >C10-C28	<10.0	10.0	08/31/2013	ND	187	93.5	200	2.26	

Surrogate: 1-Chlorooctane	*84.4 %*	*65.2-140*
Surrogate: 1-Chlorooctadecane	*86.8 %*	*63.6-154*

Sample ID: SB #2 25' (H302074-04)

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

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	**96.0**	16.0	09/03/2013	ND	400	100	400	3.92	

TPH 8015M mg/kg **Analyzed By: AR/**

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10	<10.0	10.0	08/31/2013	ND	192	96.0	200	3.28	
DRO >C10-C28	<10.0	10.0	08/31/2013	ND	187	93.5	200	2.26	

Surrogate: 1-Chlorooctane	*100 %*	*65.2-140*
Surrogate: 1-Chlorooctadecane	*108 %*	*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
KATIE JONES
112 W. Taylor
Hobbs NM, 88240
Fax To: (575) 397-1471

Received:	08/28/2013	Sampling Date:	08/28/2013
Reported:	09/03/2013	Sampling Type:	Soil
Project Name:	EME H-24 EOL	Sampling Condition:	Cool & Intact
Project Number:	NONE GIVEN	Sample Received By:	Jodi Henson
Project Location:	T-19S/R-36-E		

Sample ID: SB #3 20' (H302074-05)

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

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	**992**	16.0	09/03/2013	ND	400	100	400	3.92	

TPH 8015M mg/kg **Analyzed By: AR/**

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10	<10.0	10.0	08/31/2013	ND	192	96.0	200	3.28	
DRO >C10-C28	<10.0	10.0	08/31/2013	ND	187	93.5	200	2.26	

Surrogate: 1-Chlorooctane	*88.2 %*	*65.2-140*
Surrogate: 1-Chlorooctadecane	*92.4 %*	*63.6-154*

Sample ID: SB #3 45' (H302074-06)

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

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	**144**	16.0	09/03/2013	ND	400	100	400	0.00	

TPH 8015M mg/kg **Analyzed By: AR/**

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10	<10.0	10.0	09/01/2013	ND	192	96.0	200	3.28	
DRO >C10-C28	<10.0	10.0	09/01/2013	ND	187	93.5	200	2.26	

Surrogate: 1-Chlorooctane	*100 %*	*65.2-140*
Surrogate: 1-Chlorooctadecane	*106 %*	*63.6-154*

Cardinal Laboratories

*=Accredited Analyte

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

Received:	08/28/2013	Sampling Date:	08/28/2013
Reported:	09/03/2013	Sampling Type:	Soil
Project Name:	EME H-24 EOL	Sampling Condition:	Cool & Intact
Project Number:	NONE GIVEN	Sample Received By:	Jodi Henson
Project Location:	T-19S/R-36-E		

Sample ID: SB #4 10' (H302074-07)

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

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	**912**	16.0	09/03/2013	ND	400	100	400	0.00	

TPH 8015M mg/kg **Analyzed By: AR/**

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10	<10.0	10.0	09/01/2013	ND	192	96.0	200	3.28	
DRO >C10-C28	<10.0	10.0	09/01/2013	ND	187	93.5	200	2.26	

Surrogate: 1-Chlorooctane	*82.5 %*	*65.2-140*
Surrogate: 1-Chlorooctadecane	*86.2 %*	*63.6-154*

Sample ID: SB #4 25' (H302074-08)

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

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	**64.0**	16.0	09/03/2013	ND	400	100	400	0.00	

TPH 8015M mg/kg **Analyzed By: AR/**

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10	<10.0	10.0	09/01/2013	ND	192	96.0	200	3.28	
DRO >C10-C28	**31.5**	10.0	09/01/2013	ND	187	93.5	200	2.26	

Surrogate: 1-Chlorooctane	*106 %*	*65.2-140*
Surrogate: 1-Chlorooctadecane	*109 %*	*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
KATIE JONES
112 W. Taylor
Hobbs NM, 88240
Fax To: (575) 397-1471

Received:	08/28/2013	Sampling Date:	08/28/2013
Reported:	09/03/2013	Sampling Type:	Soil
Project Name:	EME H-24 EOL	Sampling Condition:	Cool & Intact
Project Number:	NONE GIVEN	Sample Received By:	Jodi Henson
Project Location:	T-19S/R-36-E		

Sample ID: SB #5 20' (H302074-09)

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

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	**1170**	16.0	09/03/2013	ND	400	100	400	0.00	

TPH 8015M mg/kg **Analyzed By: AR/**

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10	<10.0	10.0	09/01/2013	ND	192	96.0	200	3.28	
DRO >C10-C28	<10.0	10.0	09/01/2013	ND	187	93.5	200	2.26	

Surrogate: 1-Chlorooctane	*82.6 %*	*65.2-140*
Surrogate: 1-Chlorooctadecane	*88.2 %*	*63.6-154*

Sample ID: SB #5 45' (H302074-10)

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

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	**96.0**	16.0	09/03/2013	ND	400	100	400	0.00	

TPH 8015M mg/kg **Analyzed By: AR/**

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10	<10.0	10.0	09/01/2013	ND	192	96.0	200	3.28	
DRO >C10-C28	<10.0	10.0	09/01/2013	ND	187	93.5	200	2.26	

Surrogate: 1-Chlorooctane	*101 %*	*65.2-140*
Surrogate: 1-Chlorooctadecane	*107 %*	*63.6-154*

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Celey D. Keene

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

Celey D. Keene, Lab Director/Quality Manager

CARDINAL LABORATORIES

CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

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

Company Name:	RICE Operating	**BILL TO**	
Project Manager:	Katie Jones	**P.O. #:**	
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:	EME H-24 E.O.L T-19-S / R-36-E	**Phone #:**	
Sampler Name:	Edward Cesareo	**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
H302074	EME H-24 E.O.L T-19-S/R-36-E																			
1	SB#1 30'	C	1			X					X		8-28-13	9:35	X	X				
2	SB#1 50'	C	1			X					X			9:30	X	X				
3	SB#2 10'	C	1			X					X			10:20	X	X				
4	SB#2 25'	C	1			X					X			10:25	X	X				
5	SB#3 20'	C	1			X					X			11:30	X	X				
6	SB#3 45'	C	1			X					X			11:35	X	X				
7	SB#4 10'	C	1			X					X			12:18	X	X				
8	SB#4 25'	C	1			X					X			12:20	X	X				
9	SB#5 20'	C	1			X					X			2:30	X	X				
10	SB#5 45'	C	1			X					X			2:35	X	X				

Relinquished By:	Date: 8-28-13	**Received By:**	Phone Result: ☐ Yes ☑ No Add'l Phone #:
Edward Cesareo	Time: 3:30	Jodie Henson	Fax Result: ☐ Yes ☑ No Add'l Fax #:
Relinquished By:	Date:	**Received By:**	**REMARKS:** email results hconder@rice-ecs.com; Lweinheimer@rice-ecs.com; kjones@riceswd.com; Lpena@riceswd.com; knorman@rice-ecs.com; ecesareo@rice-ecs.com
	Time:		

Delivered By: (Circle One) Sampler - UPS - Bus - Other:

Sample Condition: Cool ☑ Yes ☐ No; Intact ☑ Yes ☐ No

CHECKED BY: (Initials) CM

† 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: 24-SEP-2013 TIME: 20:47:15

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 H-24 EOL

(1R427-361)
Chemical simulated is Chloride

Option Chosen Saturated and unsaturated zone models
Run was DETERMIN
Infiltration Specified By User: 7.620E-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	1.52	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	1.52	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	1.52	-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	0.762E-02	-999.	-999.	-999.
Area of waste disposal unit	m^2	CONSTANT	141.	-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	461.	-999.	-999.	-999.
Length scale of facility	m	DERIVED	12.2	-999.	-999.	-999.
Width scale of facility	m	DERIVED	11.6	-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
0.000E+00	0.00000E+00
0.330E+02	0.55132E+01
0.660E+02	0.43457E+02
0.990E+02	0.23708E+02
0.132E+03	0.10426E+02
0.165E+03	0.45873E+01
0.198E+03	0.20230E+01
0.231E+03	0.88203E+00
0.264E+03	0.38458E+00
0.297E+03	0.17009E+00
0.330E+03	0.74470E-01
0.363E+03	0.32178E-01

Chloride Concentration At The Receptor Well

EME H-24 EOL