1R - 427-374

APPROVALS

YEAR(S):

2012

Hansen, Edward J., EMNRD

From: Hansen, Edward J., EMNRD
Sent: Wednesday, November 28, 2012 2:00 PM
To: Hack Conder (hconder@riceswd.com)
Cc: Leking, Geoffrey R, EMNRD; Laura Pena (lpena@riceswd.com); Katie Jones <kjones@riceswd.com> (kjones@riceswd.com); Scott Curtis (scurtis@riceswd.com)
Subject: Remediation Plan (1R427-374) Termination - ROC EME G-9 EOL Site

RE: Termination Request
for the Rice Operating Company's
EME G-9 EOL Site
Unit Letter G, Section 9, T20S, R36E, NMPM, Lea County, New Mexico
Remediation Plan (1R427-374) Termination

Dear Mr. Conder:

The New Mexico Oil Conservation Division (OCD) has received Rice Operating Company's report and request to close the above-referenced site, dated May 1, 2012 (received May 1, 2012) and additional information of November 26, 2012. The report is acceptable to the OCD.

The above-referenced report, submitted in accordance with 19.15.29 NMAC (Rule 29; formally, Rule 116), indicates that Rice Operating Company has met the requirements of 19.15.29 NMAC; therefore, the OCD approves the report and hereby notifies you that the remediation plan (1R427-374) is terminated in accordance with 19.15.29 NMAC.

Please be advised that OCD approval of this report does not relieve the owner/operator of responsibility should operations pose a threat to ground water, surface water, human health or the environment. In addition, OCD approval does not relieve the owner/operator of responsibility for compliance with any OCD, federal, state, or local laws and/or regulations.

If you have any questions regarding this matter, please contact me at 505-476-3489.

Edward J. Hansen
Hydrologist
Environmental Bureau

Hansen, Edward J., EMNRD

From: Laura Pena <lpena@riceswd.com>
Sent: Monday, November 26, 2012 2:15 PM
To: Hansen, Edward J., EMNRD
Cc: Hack Conder; Katie Jones
Subject: EME G-9 EOL (1R427-374) Laboratory Analysis and Multimed File
Attachments: EME G-9 EOL (1R427-374) Soil Data.xlsx.xlsx; EME G-9 EOL (1R427-327) Multimed.pdf; EME G-9 EOL (1R427-374) Multimed Input.inp; EME G-9 EOL (1R427-327) Chloride Graph.pdf; H202653 RICE.pdf.pdf; Reveg Form 11.13.12.pdf; EME G-9 EOL (1R427-327) Additional Delineation.pdf; EME G-9 EOL.jpg

Mr. Hansen,

Attached is the additional information for EME G-9 EOL (1R427-374), as requested.

Further investigation of this site began on October 25, 2012. The site was delineated using a backhoe to collect soil samples at regular intervals, creating a 3x7x15-ft deep excavation. Beginning at 7 ft below ground surface (bgs), each sample was field titrated for chlorides and field screened for hydrocarbon using a PID. The 15-ft sample was sent to a commercial laboratory for analysis of chloride and TPH, resulting in a chloride concentration of 496 mg/kg. The excavated soil was returned to the excavation and contoured to the surrounding area. To further investigate depth of chloride presence, a soil boring was initiated on October 31, 2012. The bore was advanced to a depth of 27 ft bgs, while soil samples were collected at regular intervals and field screened for chloride and hydrocarbon. Concentrations of each decreased with depth. The 26 ft and 27 ft samples were sent to a commercial laboratory for analysis of chloride and TPH, resulting in a chloride concentration of 80 mg/kg at 26 ft and 96 mg/kg at 27 ft. TPH concentrations were below detectable limits, except for in SB-1 at 26-ft where the diesel range organic (DRO) result was 10.4 mg/kg. The entire bore hole was plugged with bentonite to the ground surface. On November 13, 2012, the site was seeded with a blend of native vegetation and is expected to return to a productive capacity at a normal rate. The laboratory analysis report, revegetation form, plat, and photos are attached.

To determine if residual chlorides pose a threat to groundwater quality, ROC ran the U.S. EPA Exposure Assessment Multimedia Model (Multimed Version 1.5, 2005). The following details the attached Multimed file for the site.

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

- Initial Concentration: 455 mg/kg (an average of all vertical and soil bore soil data).
- Layer Thickness: the soil bore depth were chlorides were below NMOCD guidelines (<250 mg/kg) subtracted from the depth to groundwater (35 ft – 26 ft) to yield 9 ft or 2.7 meters.
- An estimated area of 30 ft x 30 ft (900 ft^2 or 83.6 m^2).
- An aquifer thickness of 20 ft (6.10 meters).
- A source infiltration rate of 1.2 in/year (0.0305 m/yr).

The result of this model indicates that the maximum chloride concentration is approximately 187 mg/L at 30.1 years, falling below the WQCC standard of 250 mg/L. Attached you will find the input and output files, a graph depicting chloride concentration over time, and an excel spreadsheet summarizing soil data.

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

Thank you,

Laura Peña
Environmental Project Scientist
RICE Operating Company

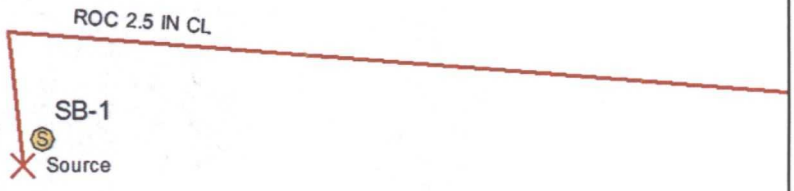
EME G-9 EOL (1R427-374)

Unit Letter G, Section 9, T20S, R36E
Depth to GW: 35 ft

	SB-1	
2	52	
3	80	
4	258	
5	243	
6	211	432
7	477	
8	703	
9	416	
10	516	
11	509	
12	495	
13	363	
14	504	
15	454	496
16	591	
17	670	
18	635	
19	891	
20	767	
21	811	
22	714	
23	618	
2	351	
24	330	
25	330	
26	149	80
27	145	96

Average Chloride Concentration	455
Average SB Depth	26
Average SB Depth minus Depth to GW	9

Depth	Cl-	PID	Source Lab Cl-	GRO	DRO
2	52				
3	80				
4	258				
5	243				
6	211	0.4	432	<10	<10
7	477				
8	703				
9	416				
10	516				
11	509				
12	495				
13	363				
14	504				
15	454		496		
16	591				
17	670				
18	635				
19	891				
20	767				
21	811				
22	714				
23	618				
24	351				
25	330				
26	149	1.8	80	<10	<10
27	145	2.7	96	<10	<10



DGW = 35 ft

RICE ENVIRONMENTAL RECS CONSULTING & SAFETY, LLC

EME G-9 EOL

LEGALS: UL/G sec. 9
T-20-S R-36-E
LEA COUNTY, NM

N
W E
S

0 20 40
Feet

Drawing date: 10/30/12
Drafted by: L. Weinheimer

CARDINAL Laboratories

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

November 05, 2012

Hack Conder

Rice Operating Company

112 W. Taylor

Hobbs, NM 88240

RE: EME G-9 EOL

Enclosed are the results of analyses for samples received by the laboratory on 10/31/12 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
Hack Conder
112 W. Taylor
Hobbs NM, 88240
Fax To: (575) 397-1471

Received:	10/31/2012	Sampling Date:	10/31/2012
Reported:	11/05/2012	Sampling Type:	Soil
Project Name:	EME G-9 EOL	Sampling Condition:	Cool & Intact
Project Number:	NONE GIVEN	Sample Received By:	Jodi Henson
Project Location:	NOT GIVEN		

Sample ID: SB-1 @ 26' (H202653-01)

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

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	**80.0**	16.0	11/01/2012	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	11/02/2012	ND	179	89.7	200	5.10	
DRO >C10-C28	**10.4**	10.0	11/02/2012	ND	170	85.1	200	15.4	

Surrogate: 1-Chlorooctane	*88.2 %*	*65.2-140*
Surrogate: 1-Chlorooctadecane	*97.5 %*	*63.6-154*

Sample ID: SB-1 @ 27' (H202653-02)

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	11/01/2012	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	11/02/2012	ND	179	89.7	200	5.10	
DRO >C10-C28	<10.0	10.0	11/02/2012	ND	170	85.1	200	15.4	

Surrogate: 1-Chlorooctane	*91.7 %*	*65.2-140*
Surrogate: 1-Chlorooctadecane	*100 %*	*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

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	**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: BME 6-9 FOL	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					
H202653																									
1	SB-1 @ 26'	C	1			✓					✓		10-3-12	3:00	✓	✓									
2	SB-1 @ 27'	C	1			✓					✓		10-3-12	3:05	✓	✓									

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 Norman	Date: 10-3-12	Received By: Jodi Henson	Phone Result: ☐ Yes ☑ No Add'l Phone #:
	Time: 3:30		Fax Result: ☐ Yes ☑ No Add'l Fax #:
Relinquished By:	Date:	Received By:	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
	Time:		

Delivered By: (Circle One)	Sample Condition	CHECKED BY:
Sampler - UPS - Bus - Other: 4° C	Cool: ☐ Yes ☐ No Intact: ☑ Yes ☐ No	(Initials) CM

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

#26

MULTIMED V1.01 DATE OF CALCULATIONS: 20-NOV-2012 TIME: 10:32:46

U. S. ENVIRONMENTAL PROTECTION AGENCY

EXPOSURE ASSESSMENT

MULTIMEDIA MODEL

MULTIMED (Version 1.50, 2005)

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

EME G-9 EOL

1R427-374
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	2.70	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	2.70	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	2.70	-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	0.305E-01	-999.	-999.	-999.
Area of waste disposal unit	m^2	DERIVED	83.6	-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	455.	-999.	-999.	-999.
Length scale of facility	m	CONSTANT	9.14	-999.	-999.	-999.
Width scale of facility	m	CONSTANT	9.14	-999.	-999.	-999.
Near field dilution		DERIVED	1.00	0.000	0.000	1.00

1

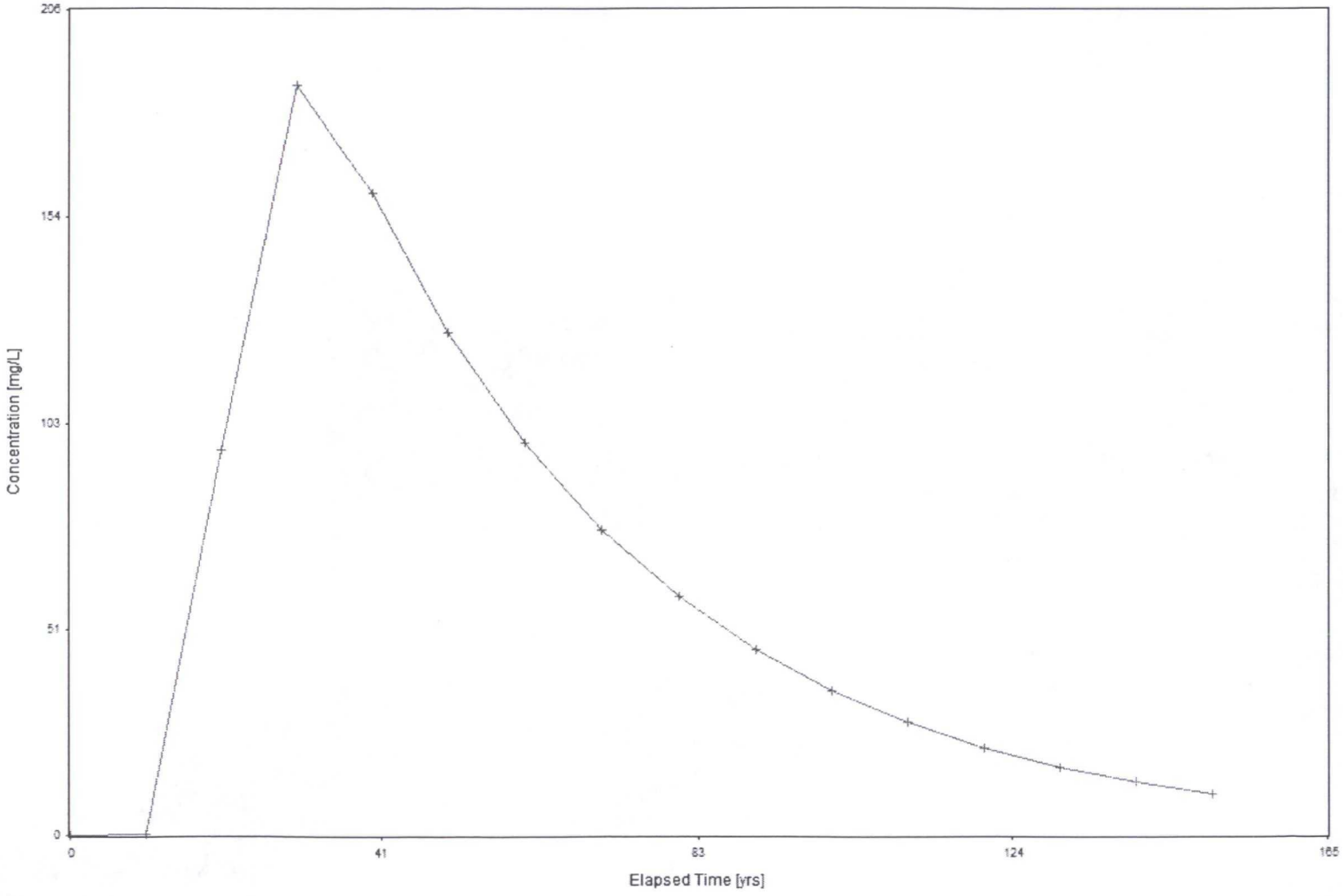
AQUIFER SPECIFIC VARIABLES

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
0.100E+02	0.20223E+00
0.200E+02	0.96313E+02
0.300E+02	0.18701E+03
0.400E+02	0.16000E+03
0.500E+02	0.12525E+03
0.600E+02	0.97796E+02
0.700E+02	0.76185E+02
0.800E+02	0.59635E+02
0.900E+02	0.46172E+02
0.100E+03	0.35991E+02
0.110E+03	0.28041E+02
0.120E+03	0.21793E+02
0.130E+03	0.17000E+02
0.140E+03	0.13236E+02
0.150E+03	0.10284E+02

Chloride Concentration At The Receptor Well
EME G-9 EOL



PO Box 5630
Hobbs, NM 88241
Phone: (575) 393-4411
Fax: (575) 393-0293

REVEGETATION FORM

1. General Information

Site name: EME G-9 EOL						
U/L G	Section 9	Township T20S	Range R36E	County LEA	Latitude 32* 35. 270'	Longitude 103* 21.342'
Contact Name: ZACHARY CONDER						
Email:zconder@rice-ecs.com						
Site size: 30'x30' Square feet: 900			Map detail of site attached ☒			
Additional information:						

2. Soils **Do not rip caliches subsoils; caliche rocks brought to the surface by ripping shall be removed.*

Salvaged from site ☐	Bioremediated ☐	Imported ☒	Blended ☐	Depth (in):
Texture:	Describe soil & subsoil:			
Soil prep methods:	Rip ☐ Depth(in):	Disc ☒ Depth (in):	Roller pack ☐	
Date completed: 10-25-2012				

3. Bioremediation

Fertilizer ☐	Hay ☐	Other ☒
Type:		Describe:
Lbs/acre:		

4. Seeding **Attach seed bag tags to this form. Seed bag tags shall contain the site name and S-T-R.*

Custom seed mix ☒	Prescribed mix ☐	Seed mix name: 1 LBS. WINTER RYE, 1LBS BLUE GRAMA Seeding date: 11-13-2012
Broadcast ☒ Method:		
Soil conditions during seeding: Dry ☒ Damp ☐ Wet ☐		
Photos attached ☒ Number of photos:	Observations:	

5. Certification I hereby certify that the information in this form and attachments is true and complete to the best of my knowledge and belief.

Name: EDUARDO GARCIA	Title: Environmental Tech	Date: 11-15-12
Signature: Eduardo Garcia		