1R - 425-12

APPROVALS

YEAR(S):

2012

Hansen, Edward J., EMNRD

From: Hansen, Edward J., EMNRD
Sent: Thursday, August 02, 2012 10:49 AM
To: Hack Conder (hconder@riceswd.com)
Cc: Leking, Geoffrey R, EMNRD; Laura Pena (lpena@riceswd.com)
Subject: Remediation Plan (1R425-12) Termination - ROC Vacuum Mack Energy F-7 EOL Site

RE: Update Report and Termination Request
for the Rice Operating Company's
Vacuum Mack Energy F-7 EOL Site
Unit Letter F, Section 7, T18S, R35E, NMPM, Lea County, New Mexico
Remediation Plan (1R425-12) 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 July 5, 2012 (received July 9, 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 (1R425-12) 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

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

RECEIVED OCD
2012 JUL -9 P 12:52

CERTIFIED MAIL
RETURN RECEIPT NO. 7007 2560 0000 4569 9408

July 5, 2012

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

RE: Update Report and Termination Request
Rice Operating Company – BD SWD System
Vacuum Mack Energy F-7 EOL (1R425-12): UL/F sec. 7 T18S R35E

Mr. Hansen:

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

Background and Previous Work
The site is located approximately 2.6 miles south of Buckeye, New Mexico at UL/F, Sec. 7, T18S, R35E as shown on the Site Location Map (Figure 1). Groundwater at this site is located approximately 85 +/- feet below ground surface (bgs).

In 2005, ROC initiated work on the former Vacuum Mack Energy F-7 EOL junction box. The site was delineated using a backhoe to form a 30 ft x 20 ft x 12 ft deep excavation and soil samples were screened at regular intervals for both hydrocarbons and chlorides. From the excavation, the four-wall composite and the bottom composite were taken to a commercial laboratory for analysis. Laboratory tests of the four-wall composite showed a chloride reading of 404 mg/kg and concentrations of gasoline range organics (GRO) and diesel range organics (DRO) below detectable limits. The bottom composite showed a chloride laboratory reading of 343 mg/kg and concentrations of GRO and DRO below detectable limits. The excavated soil was returned to the excavation to ground surface and contoured to the surrounding area. Laboratory analysis of the backfill showed a chloride reading of 830 mg/kg and concentrations of GRO and DRO below detectable limits. On 1/5/2006, the site was seeded with a blend of native vegetation

and is expected to return to a productive capacity at a normal rate.

A junction box closure report (Appendix A) was submitted to NMOCD with all the 2005 junction box closures and disclosures.

Further Evaluation
On March 5th, 2012, NMOCD requested ROC provide additional demonstration that groundwater will not be impacted beyond WQCC standards. The MultiMed model was used to determine if residual soil chlorides pose an on-going threat to groundwater quality. Data inputs and model outputs are included in Appendix B. With no subsurface liner, the model output concludes that the peak concentration of chlorides in the groundwater contributed by the vadose zone soils would be approximately 192 mg/kg at 175 years. Since the estimated increase in chloride concentrations in groundwater from residual chloride migration is below the WQCC standard of 250 mg/L and vegetation has rebounded at the site (Figure 2), no further action is warranted for the vadose zone at this site.

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

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

Sincerely,
RICE Operating Company

Hack Conder
Environmental Manager

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

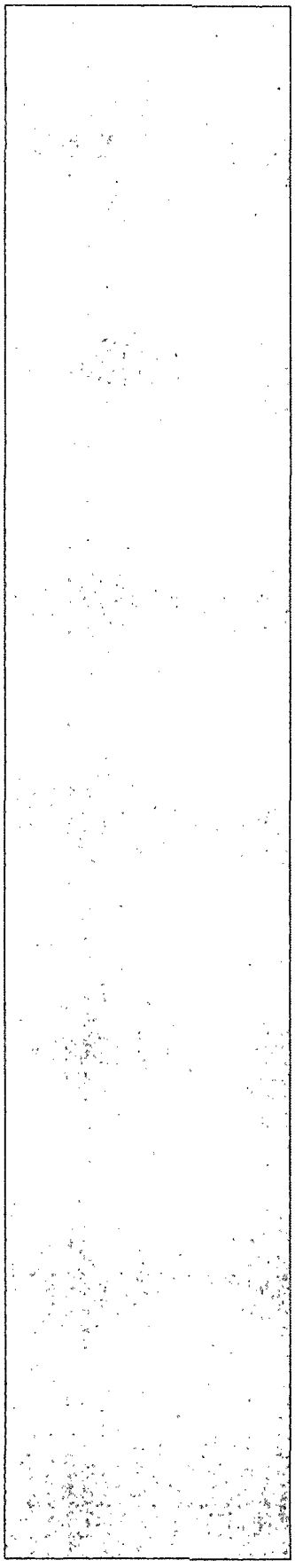
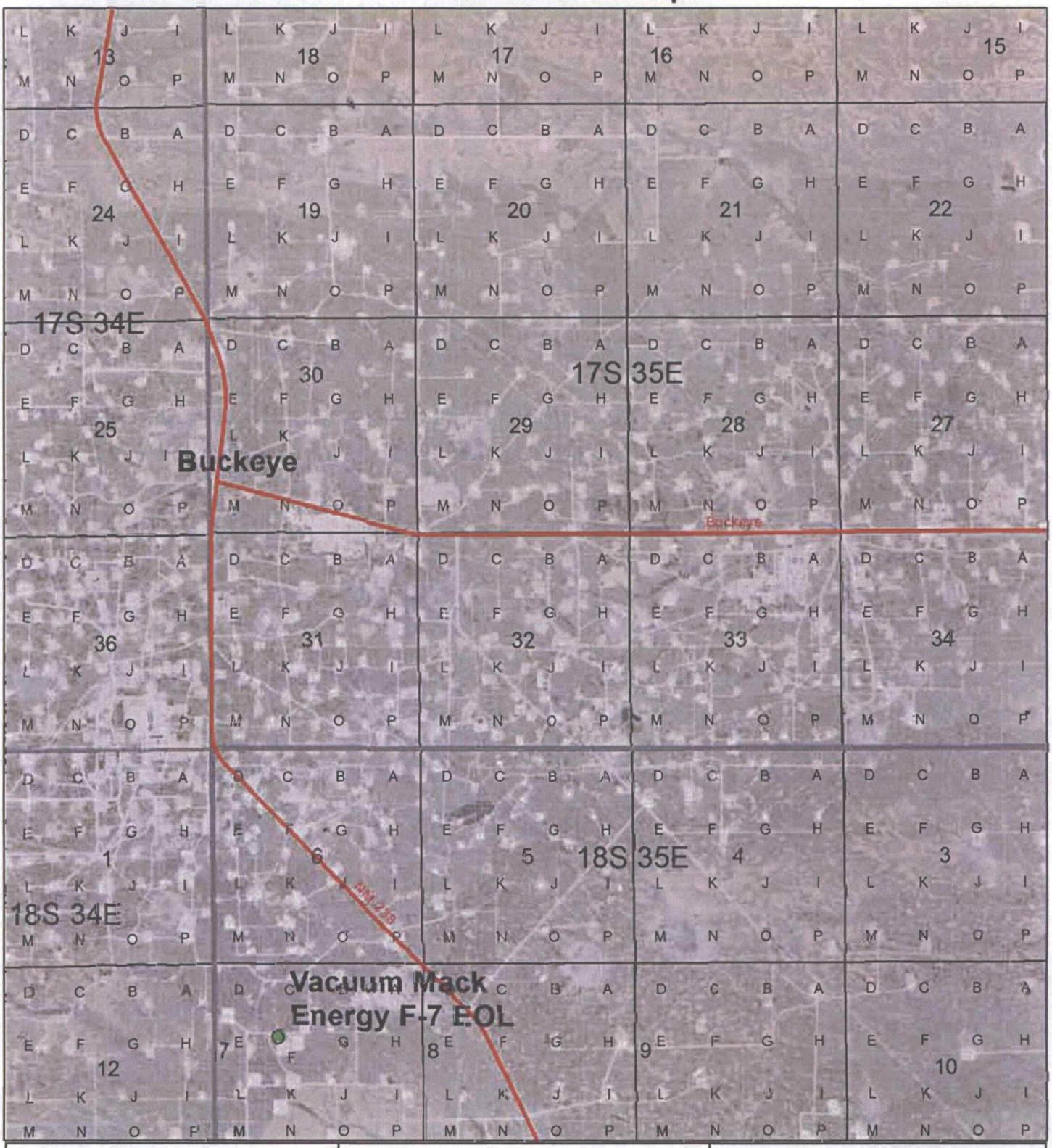


Figure 1
Site Location Map

Site Location Map



RICE ENVIRONMENTAL RECS CONSULTING & SAFETY, LLC

Vacuum Mack Energy F-7 EOL

Case #: 1R425-12

Legals: UL/F sec. 7
T-18-S R-35-E
LEA COUNTY, NM

N
W E
S

0 0.5 1 Miles

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

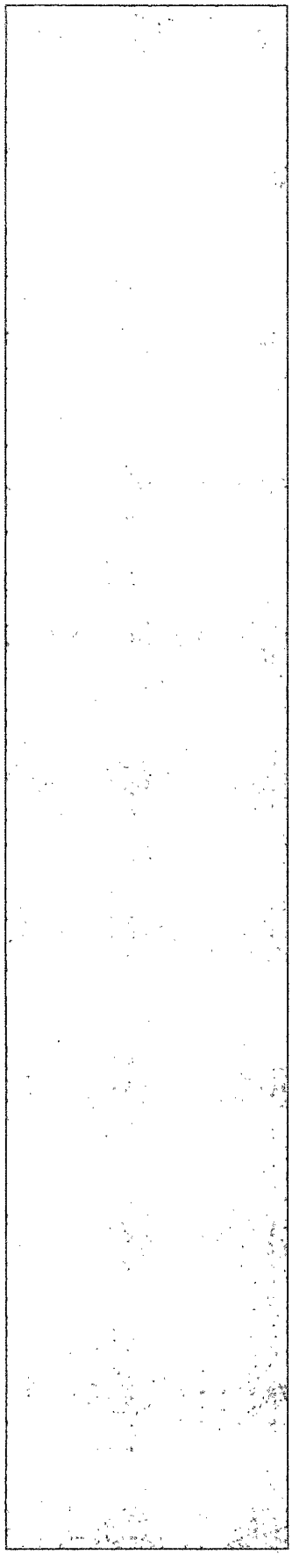


Figure 2
Recent
Photo-documentation
of Site

Vacuum Mack Energy F-7 EOL (1R425-12)
Unit F, Section 7, T18S, R35E

Facing north 6/27/2012

Facing northeast 6/27/2012

Appendix A
Junction Box Closure Report

RICE OPERATING COMPANY
JUNCTION BOX FINAL REPORT

BOX LOCATION

SWD SYSTEM	JUNCTION	UNIT	SECTION	TOWNSHIP	RANGE	COUNTY	BOX DIMENSIONS - FEET		
							Length	Width	Depth
Vacuum	Mack Energy EOL	F	7	18S	35E	Lea	System Abandonment–no box		

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

Depth to Groundwater 85 feet NMOCD SITE ASSESSMENT RANKING SCORE: 10

Date Started 8/16/2005 Date Completed 12/22/2005 NMOCD Witness no

Soil Excavated 267 cubic yards Excavation Length 30 Width 20 Depth 12 feet

Soil Disposed 0 cubic yards Offsite Facility n/a Location n/a

FINAL ANALYTICAL RESULTS:

Sample Date 8/29/2005 **Sample Depth** 12 ft

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

Sample Location	PID ppm	GRO mg/kg	DRO mg/kg	Chloride mg/kg
4-WALL COMP.	0.5	<10.0	<10.0	404
BOTTOM COMP.	0.3	<10.0	<10.0	343
REMED. BACKFILL	1.2	<10.0	<10.0	830

CHLORIDE FIELD TESTS

LOCATION	DEPTH (ft)	ppm
vertical trench at junction	9	2498
	10	2396
	11	1578
	12	751
	13	735
4-wall comp.	n/a	499
bottom comp.	12	398
backfill comp.	n/a	710

General Description of Remedial Action:

This junction box was addressed as part of the Vacuum System Abandonment. The junction site was delineated using a backhoe while soil samples were collected at regular intervals, creating a 30 x 20 x 12-ft-deep excavation. Composite samples were collected from the 12-ft bottom, walls, and backfill of the excavation; laboratory analyses were performed on these samples for confirmation. TPH was not detectable within the laboratory limits (<10.0), meeting NMOCD guidelines. Chloride concentrations were also relatively low and confirmed the field tests. The excavated soil was blended on site and then backfilled into the excavation and contoured to the surrounding surface. The disturbed surface was seeded with a blend of native vegetation and is expected to return to productive capacity at a normal rate. Since the Vacuum SWD System has been abandoned, a junction box is no longer required at this location.

enclosures: chloride graph, photos, lab results, PID field screenings

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

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

REPORT ASSEMBLED BY Kristin Farris Pope SIGNATURE Kristin Farris Pope

DATE 3/1/2006 TITLE Project Scientist

Vacuum Mack Energy EOL

Unit 'F', Sec. 7, T18S, R35E

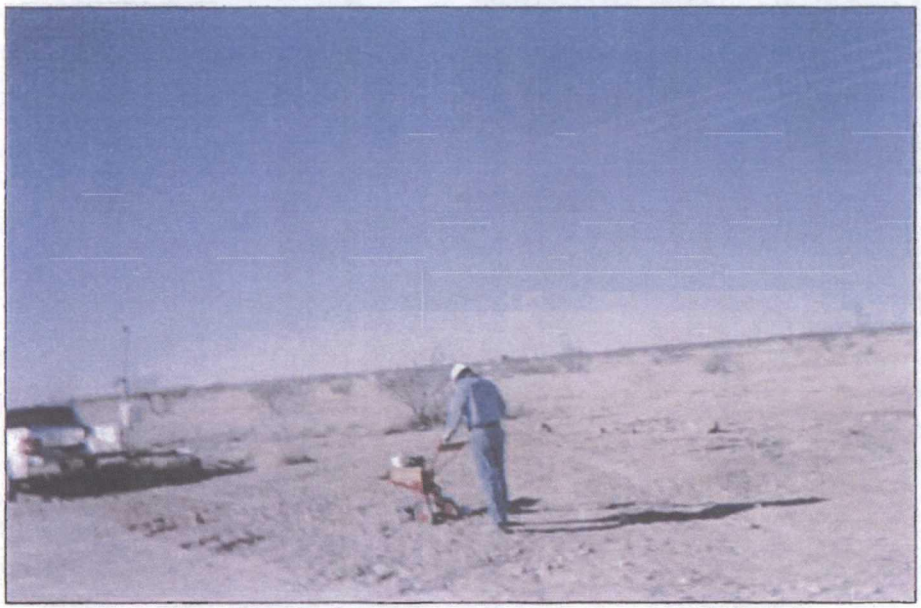
undisturbed junction box 7/11/2005

beginning excavation 8/16/2005

delineation & excavation 8/16/2005

delineation & excavation 8/23/2005

excavation 8/29/2005



seeding disturbed surface 1/5/2006

ENVIRONMENTAL LAB OF

12600 West I-20 East - Odessa, Texas 79765

COPY

Analytical Report

Prepared for:

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

Project: Vacuum- Mack Energy Eol
Project Number: None Given
Location: None Given

Lab Order Number: 5H30002

Report Date: 08/31/05

Rice Operating Co.	Project: Vacuum- Mack Energy Eol	Fax: (505) 397-1471
122 W. Taylor	Project Number: None Given	**Reported:**
Hobbs NM, 88240	Project Manager: Roy Rascon	08/31/05 16:48

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
4-Wall Composite	5H30002-01	Soil	08/29/05 09:40	08/30/05 08:00
Remediate Backfill	5H30002-02	Soil	08/29/05 09:45	08/30/05 08:00
Bottom Composite@ 12'	5H30002-03	Soil	08/29/05 13:00	08/30/05 08:00

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

Rice Operating Co.	Project: Vacuum- Mack Energy Eol	Fax: (505) 397-1471
122 W. Taylor	Project Number: None Given	Reported:
Hobbs NM, 88240	Project Manager: Roy Rascon	08/31/05 16:48

Organics by GC
Environmental Lab of Texas

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
4-Wall Composite (5H30002-01) Soil									
Gasoline Range Organics C6-C12	ND	10.0	mg/kg dry	1	EH53003	08/30/05	08/31/05	EPA 8015M	
Diesel Range Organics >C12-C35	ND	10.0	"	"	"	"	"	"	
Total Hydrocarbon C6-C35	ND	10.0	"	"	"	"	"	"	
Surrogate: 1-Chlorooctane		*83.4 %*	*70-130*		"	"	"	"	
Surrogate: 1-Chlorooctadecane		*104 %*	*70-130*		"	"	"	"	
Remediate Backfill (5H30002-02) Soil									
Gasoline Range Organics C6-C12	ND	10.0	mg/kg dry	1	EH53003	08/30/05	08/31/05	EPA 8015M	
Diesel Range Organics >C12-C35	ND	10.0	"	"	"	"	"	"	
Total Hydrocarbon C6-C35	ND	10.0	"	"	"	"	"	"	
Surrogate: 1-Chlorooctane		*96.4 %*	*70-130*		"	"	"	"	
Surrogate: 1-Chlorooctadecane		*93.0 %*	*70-130*		"	"	"	"	
Bottom Composite@ 12' (5H30002-03) Soil									
Gasoline Range Organics C6-C12	ND	10.0	mg/kg dry	1	EH53003	08/30/05	08/31/05	EPA 8015M	
Diesel Range Organics >C12-C35	ND	10.0	"	"	"	"	"	"	
Total Hydrocarbon C6-C35	ND	10.0	"	"	"	"	"	"	
Surrogate: 1-Chlorooctane		*89.6 %*	*70-130*		"	"	"	"	
Surrogate: 1-Chlorooctadecane		*88.8 %*	*70-130*		"	"	"	"	

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

Rice Operating Co.	Project: Vacuum- Mack Energy Eol	Fax: (505) 397-1471
122 W. Taylor	Project Number: None Given	**Reported:**
Hobbs NM, 88240	Project Manager: Roy Rascon	08/31/05 16:48

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

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
4-Wall Composite (5H30002-01) Soil									
Chloride	**404**	20.0	mg/kg Wet	2	EH53008	08/30/05	08/30/05	SW 846 9253	
% Moisture	**8.6**	0.1	%	1	EH53102	08/31/05	08/31/05	% calculation	
Remediate Backfill (5H30002-02) Soil									
Chloride	**830**	20.0	mg/kg Wet	2	EH53008	08/30/05	08/30/05	SW 846 9253	
% Moisture	**10.7**	0.1	%	1	EH53102	08/31/05	08/31/05	% calculation	
Bottom Composite@ 12' (5H30002-03) Soil									
Chloride	**343**	20.0	mg/kg Wet	2	EH53008	08/30/05	08/30/05	SW 846 9253	
% Moisture	**10.6**	0.1	%	1	EH53102	08/31/05	08/31/05	% calculation	

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

Organics by GC - Quality Control
Environmental Lab of Texas

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch EH53003 - Solvent Extraction (GC)										
Blank (EH53003-BLK1)				Prepared & Analyzed: 08/30/05						
Gasoline Range Organics C6-C12	ND	10.0	mg/kg wet							
Diesel Range Organics >C12-C35	ND	10.0	"							
Total Hydrocarbon C6-C35	ND	10.0	"							
Surrogate: 1-Chlorooctane	*44.3*		*mg/kg*	*50.0*		*88.6*	*70-130*			
Surrogate: 1-Chlorooctadecane	*46.7*		"	*50.0*		*93.4*	*70-130*			
LCS (EH53003-BS1)				Prepared & Analyzed: 08/30/05						
Gasoline Range Organics C6-C12	409	10.0	mg/kg wet	500		81.8	75-125			
Diesel Range Organics >C12-C35	424	10.0	"	500		84.8	75-125			
Total Hydrocarbon C6-C35	833	10.0	"	1000		83.3	75-125			
Surrogate: 1-Chlorooctane	*49.9*		*mg/kg*	*50.0*		*99.8*	*70-130*			
Surrogate: 1-Chlorooctadecane	*51.2*		"	*50.0*		*102*	*70-130*			
Calibration Check (EH53003-CCV1)				Prepared: 08/30/05 Analyzed: 08/31/05						
Gasoline Range Organics C6-C12	468		mg/kg	500		93.6	80-120			
Diesel Range Organics >C12-C35	484		"	500		96.8	80-120			
Total Hydrocarbon C6-C35	952		"	1000		95.2	80-120			
Surrogate: 1-Chlorooctane	*57.1*		"	*50.0*		*114*	*0-200*			
Surrogate: 1-Chlorooctadecane	*59.3*		"	*50.0*		*119*	*0-200*			
Matrix Spike (EH53003-MS1)	**Source: 5H30002-01**			Prepared & Analyzed: 08/30/05						
Gasoline Range Organics C6-C12	465	10.0	mg/kg dry	547	ND	85.0	75-125			
Diesel Range Organics >C12-C35	436	10.0	"	547	ND	79.7	75-125			
Total Hydrocarbon C6-C35	901	10.0	"	1090	ND	82.7	75-125			
Surrogate: 1-Chlorooctane	*53.5*		*mg/kg*	*50.0*		*107*	*70-130*			
Surrogate: 1-Chlorooctadecane	*50.2*		"	*50.0*		*100*	*70-130*			
Matrix Spike Dup (EH53003-MSD1)	**Source: 5H30002-01**			Prepared & Analyzed: 08/30/05						
Gasoline Range Organics C6-C12	466	10.0	mg/kg dry	547	ND	85.2	75-125	0.215	20	
Diesel Range Organics >C12-C35	446	10.0	"	547	ND	81.5	75-125	2.27	20	
Total Hydrocarbon C6-C35	912	10.0	"	1090	ND	83.7	75-125	1.21	20	
Surrogate: 1-Chlorooctane	*53.9*		*mg/kg*	*50.0*		*108*	*70-130*			
Surrogate: 1-Chlorooctadecane	*50.8*		"	*50.0*		*102*	*70-130*			

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

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch EH53008 - General Preparation (WetChem)										
Blank (EH53008-BLK1)				Prepared & Analyzed: 08/30/05						
Chloride	ND	20.0	mg/kg Wet							
Matrix Spike (EH53008-MS1)		Source: 5H29006-01		Prepared & Analyzed: 08/30/05						
Chloride	1960	20.0	mg/kg Wet	1000	1080	88.0	80-120			
Matrix Spike Dup (EH53008-MSD1)		Source: 5H29006-01		Prepared & Analyzed: 08/30/05						
Chloride	1980	20.0	mg/kg Wet	1000	1080	90.0	80-120	1.02	20	
Reference (EH53008-SRM1)				Prepared & Analyzed: 08/30/05						
Chloride	5000		mg/kg	5000		100	80-120			
Batch EH53102 - General Preparation (Prep)										
Blank (EH53102-BLK1)				Prepared & Analyzed: 08/31/05						
% Solids	100		%							
Duplicate (EH53102-DUP1)		Source: 5H29014-01		Prepared & Analyzed: 08/31/05						
% Solids	98.5		%		98.5			0.00	20	

Notes and Definitions

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

Report Approved By: Raland K Tuttle Date: 8-31-05

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

Environmental Lab of Texas, Inc.

2600 West I-20 East
Odessa, Texas 79763
Phone: 915-563-1800
Fax: 915-563-1713

CHAIN OF CUSTODY RECORD AND ANALYSIS REQUEST

Project Manager: Roy Rascon
Company Name: Rice Operating Company
Company Address: 122 W Taylor
City/State/Zip: Hobbs, NM 88240
Telephone No: 505-393-9174 Fax No: 505-397-1471
Sampler Signature: Jose Hernandez

Project Name: Vacuum - Mack Energy EOL
Project #:
Project Loc:
PO #:

LAB # (lab use only)	FIELD CODE	Date Sampled	Time Sampled	No. of Containers	Preservative: Ice	Preservative: HNO_3	Preservative: HCl	Preservative: NaOH	Preservative: H_2SO_4	Preservative: None	Preservative: Other (Specify)	Matrix: Water	Matrix: Sludge	Matrix: Soil	Matrix: Other (specify):	Analyze For: TCLP: / CL /	TOTAL: / CL /	TPH 418.1	TPH TX 1005/1006	TPH 8015M GRO/DRO	Metals: As Ag Ba Cd Cr Pb Hg Se	Volatiles	Semivolatiles	BTEX 8021B/5030	EC, CEC, SAR, ESP	Major cations/anions, TDS					RUSH TAT (Pre-Schedule)	Standard TAT
5H30002																																
-01	4-wall Composite	8-29-05	9:40 AM	1	X									X		X				X												
-02	Remediate Back Wall	8-29-05	9:45 AM	1	X									X		X				X												
-03	Bottom Composite @ 12'	8-29-05	1:00 PM	1	X									X		X				X												

Special Instructions:

Sample Containers Intact? (Y) N
Temperature Upon Receipt: 21.5°C
Laboratory Comments:
4 oz glass on ice
labels + seals
Seal on cooler

Relinquished by:	Date	Time	Received by:	Date	Time
	8-29-05			8/29	17:00
Relinquished by:	Date	Time	Received by ELOT:	Date	Time
	8/30	8:00	Jeanne McMurry	08-30-05	0800

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

Client: RICE OP.

Date/Time: 8/30/05 8:00

Order #: 5t130002

Initials: CK

Sample Receipt Checklist

Temperature of container/cooler?	Yes	No	2.5 C
Shipping container/cooler in good condition?	Yes	No	
Custody Seals intact on shipping container/cooler?	Yes	No	Not present
Custody Seals intact on sample bottles?	Yes	No	Not present
Chain of custody present?	Yes	No	
Sample Instructions complete on Chain of Custody?	Yes	No	
Chain of Custody signed when relinquished and received?	Yes	No	
Chain of custody agrees with sample label(s)	Yes	No	
Container labels legible and intact?	Yes	No	
Sample Matrix and properties same as on chain of custody?	Yes	No	
Samples in proper container/bottle?	Yes	No	
Samples properly preserved?	Yes	No	
Sample bottles intact?	Yes	No	
Preservations documented on Chain of Custody?	Yes	No	
Containers documented on Chain of Custody?	Yes	No	
Sufficient sample amount for indicated test?	Yes	No	
All samples received within sufficient hold time?	Yes	No	
VOC samples have zero headspace?	Yes	No	Not Applicable

Other observations:

Variance Documentation:

Contact Person: - Date/Time: Contacted by:

Regarding:

Corrective Action Taken:

30 x 20 x 12 ft

RICE OPERATING COMPANY

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

VOC FIELD TEST REPORT FORM

MINI RAE PLUS CLASSIC PHOTOIONIZATION GAS DETECTOR

MODEL NO: PGM 761S
SERIAL NO: 104412
CALIBRATION GAS
GAS COMPOSITION: ISOBUTYLENE 100 PPM
AIR BALANCE
LOT NO: 061-2747
FILL DATE: 2-1-05
EXP. DATE: 8-1-06
ACCURACY: ± 2%
METER READING
ACCURACY: 100

SYSTEM	JUNCTION	UNIT	SECTION	TOWNSHIP	RANGE
vacuum	mack Energy EOL	F	7	18S	35E

SAMPLE	PID RESULT	SAMPLE	PID RESULT
4- Wall Composit	0.5		
Remediate Soil Pile	1.2		
Bottom Composit	0.3		

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

Signature

8-29-05
Date

Appendix B
MultiMed Output File, Graph

MULTIMED V1.01 DATE OF CALCULATIONS: 29-JUN-2012 TIME: 15:32:27

U. S. ENVIRONMENTAL PROTECTION AGENCY

EXPOSURE ASSESSMENT

MULTIMEDIA MODEL

MULTIMED (Version 1.50, 2005)

1

Run options

Vacuum Mack Energy F-7 EOL

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	20.00	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	20.0	0.000	0.000	0.000

DATA FOR MATERIAL 1

VADOSE ZONE FUNCTION VARIABLES

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

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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

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DATA FOR LAYER 1

VADOSE TRANSPORT VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS		LIMITS	
			MEAN	STD DEV	MIN	MAX
Thickness of layer	m	CONSTANT	20.0	-999.	-999.	-999.
Longitudinal dispersivity of layer	m	DERIVED	-999.	-999.	-999.	-999.
Percent organic matter	--	CONSTANT	0.000	-999.	-999.	-999.
Bulk density of soil for layer	g/cc	CONSTANT	1.99	-999.	-999.	-999.
Biological decay coefficient	1/yr	CONSTANT	0.000	-999.	-999.	-999.

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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

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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	55.7	-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	0.115E+04	-999.	-999.	-999.
Length scale of facility	m	CONSTANT	9.14	-999.	-999.	-999.
Width scale of facility	m	CONSTANT	6.10	-999.	-999.	-999.
Near field dilution		DERIVED	1.00	0.000	0.000	1.00

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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	0.400E-02	-999.	-999.	-999.
Groundwater seepage velocity	m/yr	DERIVED	-999.	-999.	-999.	-999.
Retardation coefficient	--	DERIVED	-999.	-999.	-999.	-999.
Longitudinal dispersivity	m	FUNCTION OF X	-999.	-999.	-999.	-999.
Transverse dispersivity	m	FUNCTION OF X	-999.	-999.	-999.	-999.
Vertical dispersivity	m	FUNCTION OF X	-999.	-999.	-999.	-999.
Temperature of aquifer	C	CONSTANT	20.0	-999.	-999.	-999.
pH	--	CONSTANT	7.00	-999.	-999.	-999.
Organic carbon content (fraction)		CONSTANT	0.000	-999.	-999.	-999.
Well distance from site	m	CONSTANT	1.00	-999.	-999.	-999.
Angle off center	degree	CONSTANT	0.000	-999.	-999.	-999.
Well vertical distance	m	CONSTANT	0.000	-999.	-999.	-999.

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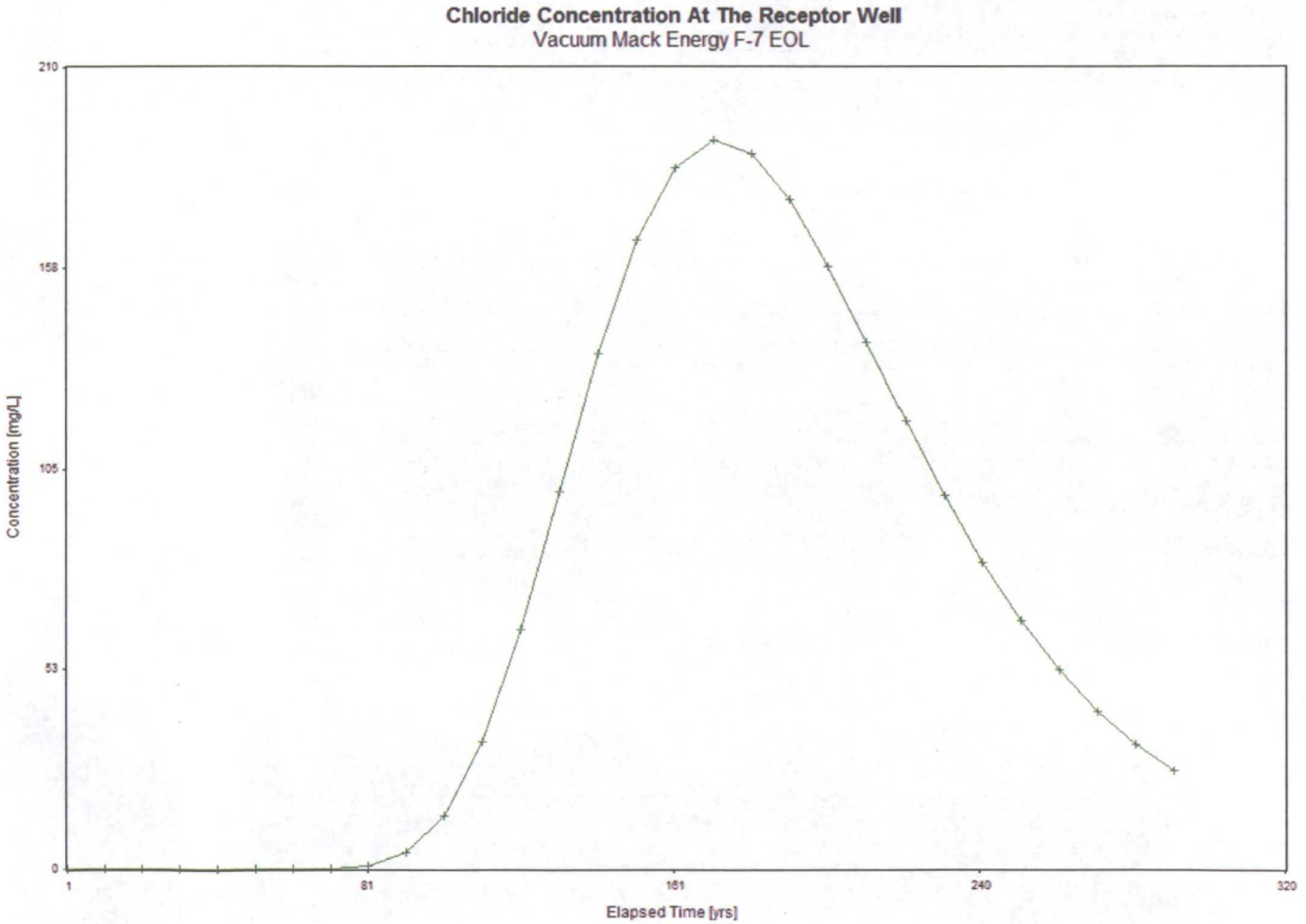
TIME	CONCENTRATION
0.100E+01	0.00000E+00
0.110E+02	0.00000E+00
0.210E+02	0.00000E+00
0.310E+02	0.00000E+00
0.410E+02	0.00000E+00
0.510E+02	0.00000E+00
0.610E+02	0.15896E-02
0.710E+02	0.71076E-01
0.810E+02	0.77408E+00
0.910E+02	0.41377E+01
0.101E+03	0.13868E+02
0.111E+03	0.33379E+02
0.121E+03	0.63000E+02
0.131E+03	0.98970E+02
0.141E+03	0.13494E+03
0.151E+03	0.16459E+03
0.161E+03	0.18370E+03
0.171E+03	0.19091E+03
0.181E+03	0.18724E+03
0.191E+03	0.17521E+03
0.201E+03	0.15780E+03
0.211E+03	0.13778E+03
0.221E+03	0.11731E+03
0.231E+03	0.97887E+02
0.241E+03	0.80372E+02

0.251E+03 0.65152E+02
0.261E+03 0.52163E+02
0.271E+03 0.41460E+02
0.281E+03 0.32886E+02
0.291E+03 0.25898E+02


Chloride Concentration At The Receptor Well
Vacuum Mack Energy F-7 EOL
210
158
105
53
0
Concentration [mg/L]
1
81
161
240
320
Elapsed Time [yrs]