

AP - 44

**STAGE 1 & 2  
WORKPLANS**

**DATE:**

July, 2005



# Highlander Environmental Corp.

Midland, Texas

CERTIFIED MAIL  
RETURN RECEIPT NO. 7004 1160 0000 4837 8614

July 7, 2005

Mr. Daniel Sanchez  
New Mexico Energy, Minerals, & Natural Resources  
Oil Conservation Division, Environmental Bureau  
1220 S. St. Francis Drive  
Santa Fe, New Mexico 87504

RE: **STAGE I ABATEMENT PLAN  
H-13 LEAK, EME SWD SYSTEM  
UNIT "H", SEC. 13, T20S, R36E  
NMOCD Case #1R0429**

2005 JUL 15 PM 02:00 JLB JRM PPS/SP 54

Mr. Price:

RICE Operating Company (ROC) has retained Highlander Environmental Corp. (Highlander) to address potential environmental concerns at the above-referenced site. ROC is the service provider (operator) for the Eunice Monument Eumont (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 Partners, who provide all operating capital on a percentage ownership/usage basis. In general, project funding is not forthcoming until NMOCD approves the work plan. Therefore, your timely review of this submission is requested. The following Stage I Abatement Plan is for the EME H-13 Site.

Should you have any questions, please contact me at (432) 682-4559. Your prompt review of this submission is appreciated. Thank you for your attention to this matter.

Highlander Environmental Corp.

Timothy M. Reed, P.G.  
Vice President

cc: Wayne Price – NMOCD  
Kristin Farris Pope - ROC

**STAGE I ABATEMENT PLAN**  
**H-13 LEAK, EME SWD SYSTEM**  
**UNIT "H", SEC. 13, T-20-S, R-36-E**  
**NMOCD CASE #1R0429**

**Prepared  
for**

**RICE OPERATING COMPANY**

**JULY 2005**



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*Highlander Environmental Corp.*

*Midland, Texas*

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# Highlander Environmental Corp.

Midland, Texas

## STAGE I ABATEMENT PLAN H-13 LEAK, EME SWD SYSTEM UNIT "H", SEC. 13, T20S, R36E NMOCD Case #1R0429

### 1.0 EXECUTIVE SUMMARY

RICE Operating Company (ROC) discovered an accidental discharge at the Eunice Monument Eumont (EME) SWD H-13 location on July 3, 2002. The soil had settled underneath a 4" asbestos/concrete system line causing it to break. According to the C-141 form (Initial) filed on July 11, 2002, the total volume spilled was 10 barrels with 5 barrels recovered and disposed of into the EME SWD system. The pipeline leak was permanently repaired to minimize the potential for further impairment.

Two delineation trenches and a soil boring have been installed. Based upon the chloride concentrations and relatively shallow groundwater (~31' bgs), this soil boring was completed as a monitoring well. The monitoring well has been sampled on a quarterly basis since October 2002. The only constituent of concern observed is chloride, with concentrations ranging from 177 mg/L to 2,610 mg/L.

### 2.0 CHRONOLOGY OF EVENTS

July 3, 2002	ROC discovered an accidental discharge at the above referenced site.
July 11, 2002	A C-141 form (Initial) was filed. The total volume spilled was 10 barrels with 5 barrels recovered and disposed of into the EME SWD system. The pipeline leak was permanently repaired to minimize the potential for further impairment.
July 22, 2002	Two delineation trenches were excavated, one on the east side of the system line and one on the west side of the line.
September 25, 2002	A soil boring was installed to further delineate the depth of impact. Based upon the chloride concentrations and relatively shallow groundwater (~31' bgs), this soil boring was completed as a monitoring well. The well was completed to a total depth of 41' bgs.
October 29, 2002	Monitor Well (MW-1) was purged and sampled.
December 13, 2002	NMOCD director notified of groundwater impact.

March 6, 2003	Monitor Well (MW-1) was purged and sampled.
May 29, 2003	Monitor Well (MW-1) was purged and sampled.
August 22, 2003	Monitor Well (MW-1) was purged and sampled.
November 19, 2003	Monitor Well (MW-1) was purged and sampled.
February 18, 2004	Monitor Well (MW-1) was purged and sampled.
May 27, 2004	Monitor Well (MW-1) was purged and sampled.
September 7, 2004	Monitor Well (MW-1) was purged and sampled.
November 24, 2004	Monitor Well (MW-1) was purged and sampled.
January 14, 2005	2004 Monitor Well Report/Summary Sampling submitted to the NMOCD.
March 17, 2005	Investigation & Characterization Plan (ICP) submitted to the NMOCD.
March 30, 2005	Monitor Well (MW-1) was purged and sampled.
May 5, 2005	Daniel Sanchez (NMOCD) requested a Rule 19, Stage I Abatement Plan for this site.
June 21, 2005	Monitor Well (MW-1) was purged and sampled.

### 3.0 BACKGROUND & PREVIOUS WORK

ROC discovered an accidental discharge at the above referenced site on July 3, 2002. The soil had settled underneath a 4" asbestos/concrete system line causing it to break. According to the C-141 form (Initial) filed on July 11, 2002, the total volume spilled was 10 barrels with 5 barrels recovered and disposed of into the EME SWD system. The pipeline leak was permanently repaired to minimize the potential for further impairment. The site location is shown on Figure 1.

Two delineation trenches were excavated on July 22, 2002, one on the east side of the system line and one on the west side of the line. Chloride concentrations in the east trench decreased to 254 mg/kg at a depth of 8' below ground surface, while the west trench exhibited elevated chloride levels to 12' below ground surface (bgs). A soil boring was installed on September 25, 2002 to further delineate the depth of impact. Based upon the chloride concentrations and relatively shallow groundwater (~31' bgs), this soil boring was completed as a monitoring well. The well was completed to a total depth of 41' bgs.

The monitoring well has been sampled on a quarterly basis since October 2002. The most recent sampling was performed on June 21, 2005, and the data was submitted to the NMOCD most recently on January 14, 2005, in the Annual Ground Water Report. In the quarterly sampling events to date, the only constituent of concern observed was chloride, with concentrations ranging from 177 mg/L to 2,610 mg/L. Total dissolved solid concentrations have ranged from 751 mg/L to 5,600 mg/L.



## 4.0 GEOLOGY & HYDROGEOLOGY

### 4.1 Regional and Local Geology

This site is located in the Laguna Valley physiographic subdivision of southern Lea County. Laguna Valley is the eastern part of a vast sand dune area covering approximately 400 square miles. The site is immediately south-southwest of Mescalero Ridge. Sediments of Quaternary age are present in this area in the form of alluvial deposits, probably both of Pleistocene and Recent age and the dune sands of Recent age. The alluvium was deposited in topographically low areas where the Ogallala formation had been stripped away. The dune sands mantle the older alluvium in most places, with some dunes locally extending to 20-40 feet high. The Quaternary alluvium is underlain by the Dockum group of Triassic age. The uppermost formation of the Dockum Group is the Chinle.

### 4.2 Regional and Local Hydrogeology

Along the southern edge of the High Plains, water leaves the Ogallala formation and enters the Quaternary fill which underlies the Laguna Valley area. The saturated thickness of the sediments in the Quaternary fill of the Laguna Valley area ranges from about 15 to 30 feet, and water levels are approximately 30 feet below the land surface. The movement of groundwater in this area is primarily to the southeast. The depth to water in monitor well MW-1 is approximately 31' (TOC).

### 4.3 Water Well Inventory

A water well inventory will be performed to encompass a ½ mile radius around the facility. The inventory will include a review of water well records on the New Mexico Office of the State Engineer W.A.T.E.R.S. database and United States Geologic Survey (USGS) website. Any water wells denoted on the USGS 7.5 minute topographic quadrangle map within the search radius will be inspected.

## 5.0 SUBSURFACE SOILS

The soils in the vicinity of this site are of the Pyote soils and Dune land association. Typically, the surface layer is light-brown fine sand about 30 inches thick. The subsoil is fine sandy loam approximately 18 inches thick. The subsoil, to a depth of approximately 60 inches is pink fine sandy loam. The soil boring at this site indicated sand with some caliche stringers to a depth of approximately 40 feet.



## 6.0 GROUNDWATER QUALITY

### 6.1 Monitoring Program

The monitoring well has been sampled on a quarterly basis since October 2002. The most recent sampling was performed on June 21, 2005, and the data was submitted to the NMOCD most recently on January 14, 2005, in the Annual Ground Water Report. Quarterly sampling of this well and any additional well(s) will continue.

### 6.2 Hydrocarbons in Groundwater

To date, no hydrocarbon impact has been detected in MW-1, and as such is not considered a Constituent of Concern at this site.

### 6.3 Other Constituents of Concern

In the quarterly sampling events to date, the only constituent of concern observed was chloride, with concentrations ranging from 177 mg/L to 2,610 mg/L. Total dissolved solid concentrations have ranged from 751 mg/L to 5,600 mg/L.

## 7.0 STAGE I ABATEMENT PLAN

Highlander proposes to install soil borings in the vicinity of the leak, in order to further delineate the vertical and horizontal extent of vadose zone impact. Highlander also proposes to install two additional monitoring wells. The monitor wells will be placed appropriately to evaluate groundwater impact and hydraulic gradient. The monitor wells will be constructed according to EPA and industry standards.

Following installation, the wells will be developed either by bailing with a rig or hand bailer, or pumping with an electric submersible pump to remove fine grained sediment disturbed during drilling and to ensure collection of representative groundwater samples. Water removed from the well will be disposed of in the EME SWD System.

As part of the Stage I Abatement Plan, the residual impact to Vadose Zone soils will be evaluated by various methods to determine what, if any remediation/isolation techniques will be required at the Site.

The information will be evaluated and utilized to design a groundwater remedy if needed. The groundwater remedy that offers the greatest environmental benefit while causing the least environmental impairment will be selected. Such recommendations and findings will be presented to NMOCD in a subsequent Stage II Abatement Plan. When evaluating any proposed remedy or investigative work, ROC will confirm that there is a reasonable relationship between the benefits created by the proposed remedy or assessment and the economic and social costs.



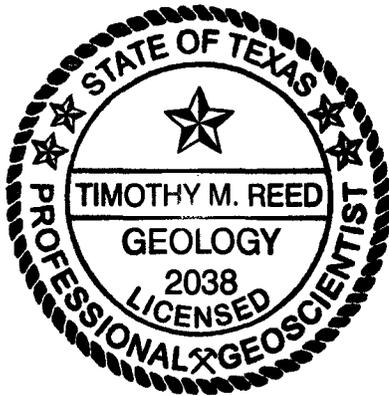
## 8.0 QUALITY ASSURANCE/ QUALITY CONTROL

All monitor wells will be constructed to EPA and industry standards. All downhole equipment (i.e., drill rods, drill bits, etc.) will be thoroughly decontaminated between each use with a steam cleaner.

The wells will be inspected for the presence of phase-separated hydrocarbons (PSH) and, if present, a sample will be collected and analyzed by gas chromatography (GC) to determine composition and origin. The wells will be properly purged and sampled with clean, dedicated, polyethylene bailers and disposable line. The groundwater samples will be submitted to a laboratory for analysis of Benzene, Toluene, Ethylbenzene, and Xylene (BTEX) by method EPA 8021B, and chloride by method 300.0.

## 9.0 PROPOSED SCHEDULE OF ACTIVITIES

Upon approval, the work outlined above will be implemented in a timely manner, dependent upon availability of local drilling contractors. Quarterly sampling of the existing monitor well will be continued and all results will be submitted in an annual summary report within the first quarter of 2006.



Respectfully submitted,  
Highlander Environmental Corp.

  
Timothy M. Reed, P.G.  
Vice President



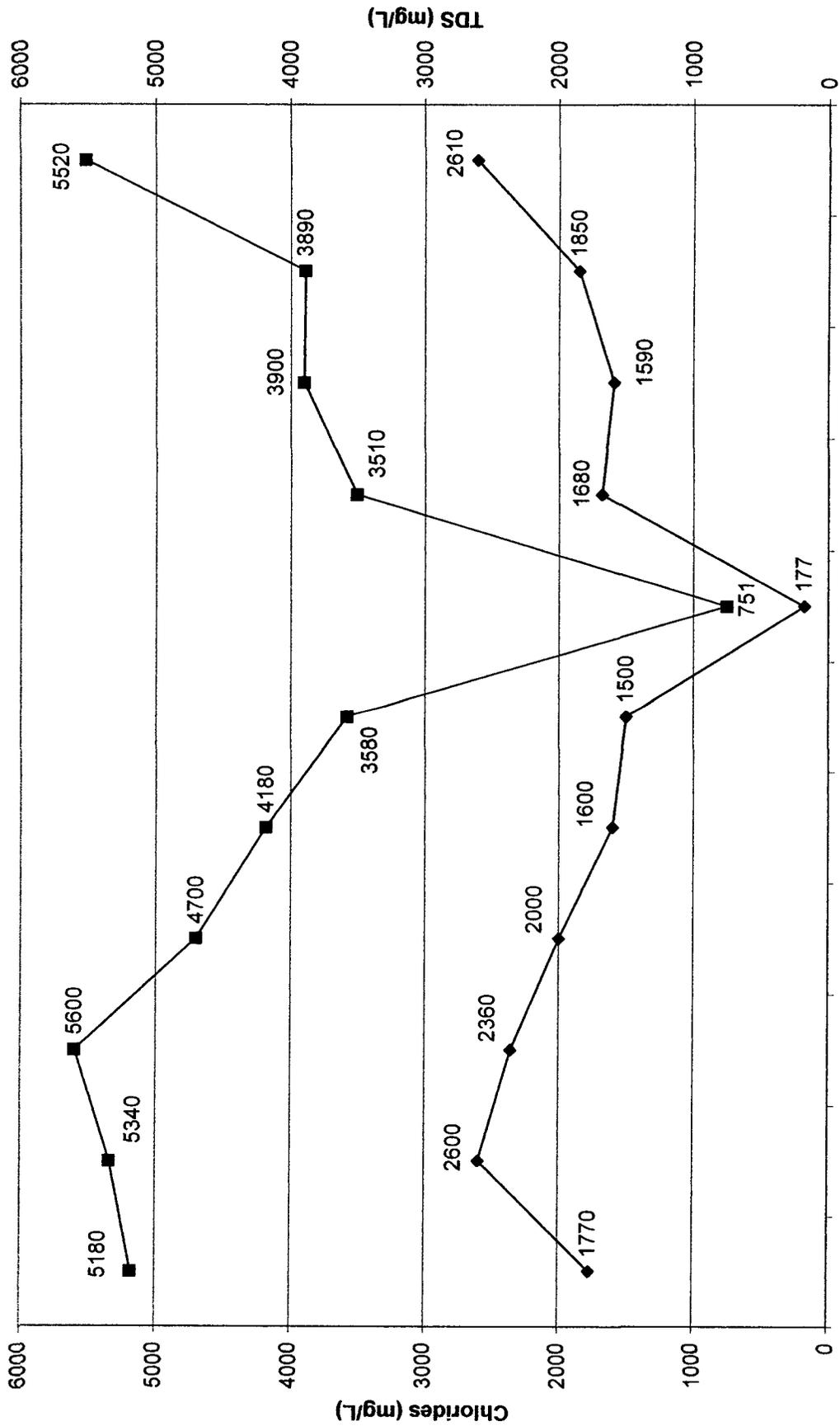
**TABLES**

Rice Operating Company  
 EME H-13 Monitor Well  
 Lea County, New Mexico

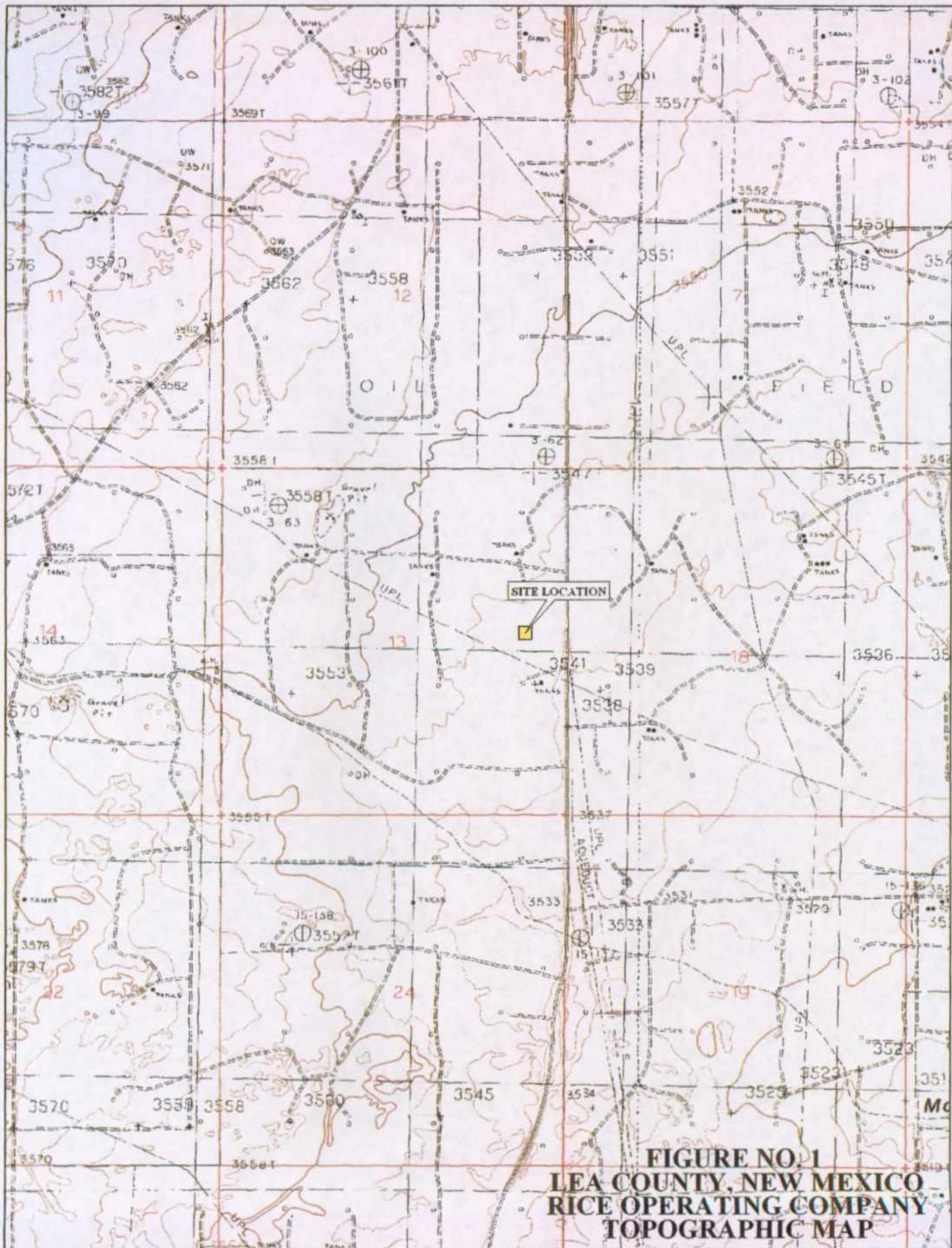
H:O&G/23057MW Table 6-28-05

MW #	Sample Date	Depth to Water	Total Depth	Well Volume	Volume Purged	Chlorides	TDS	Benzene	Toluene	Ethylbenzene	Total Xylenes
MW-1	10/29/2002	33.19	43.94	1.72	5.25	1770	5180	<0.001	<0.001	<0.001	<0.001
	3/6/2003	33.18	43.90	1.71	5.10	2600	5340	<0.001	<0.001	<0.001	<0.001
	5/29/2003	33.20	43.91	1.21	5.10	2360	5600	<0.001	<0.001	<0.001	<0.001
	8/22/2003	33.40	43.90	1.68	5.04	2000	4700	<0.001	<0.001	<0.001	<0.001
	11/19/2003	33.35	43.91	1.60	5.00	1600	4180	<0.001	<0.001	<0.001	0.001
	2/18/2004	33.41	43.90	1.67	5.00	1500	3580	<0.002	<0.002	<0.002	<0.006
	5/27/2004	33.56	43.90	1.65	5.00	177	751	<0.001	<0.001	<0.001	<0.001
	9/7/2004	33.4	44.10	1.71	5.14	1680	3510	<0.001	<0.001	<0.001	<0.001
	11/24/2004	32.85	44.10	1.80	5.4	1590	3900	<0.001	<0.001	<0.001	<0.001
	3/30/2005	32.19	44.10	1.91	25	1850	3890	<0.001	<0.001	<0.001	<0.001
	6/21/2005	31.93	44.10	1.95	10	2610	5520	<0.001	<0.001	<0.001	<0.001

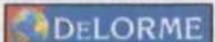
# MW-1 Chlorides vs TDS



**FIGURES**



**FIGURE NO. 1  
LEA COUNTY, NEW MEXICO  
RICE OPERATING COMPANY  
TOPOGRAPHIC MAP**



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www.delorme.com

Scale 1 : 24,000  
1" = 2000 ft



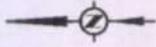
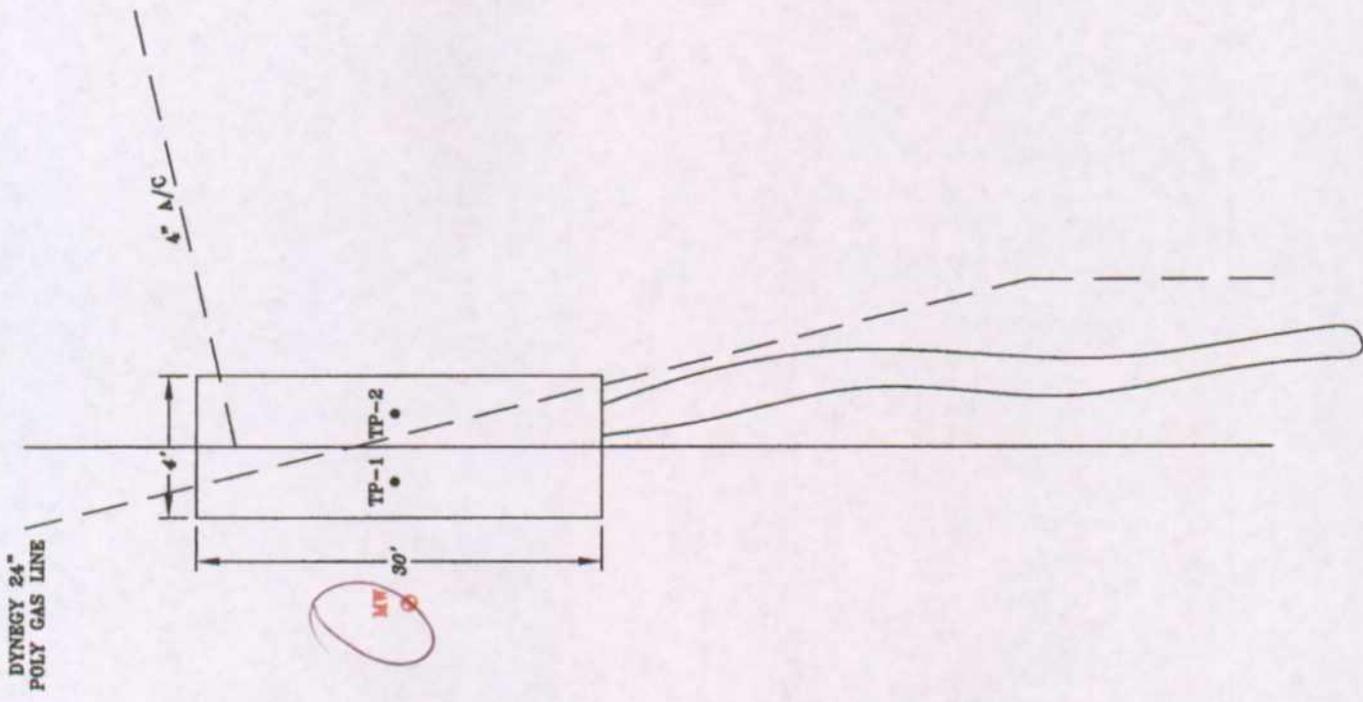


FIGURE NO. 2

LEA COUNTY, NEW MEXICO  
 RICE OPERATING COMPANY  
 EME H-13 LEAK  
 SITE MAP  
 HIGHLANDER ENVIRONMENTAL CORP.  
 MIDLAND, TEXAS

DATE	5/16/05
DRAWN BY	JJ
FILE	05050307
SCALE	SEE MAP

NOT TO SCALE

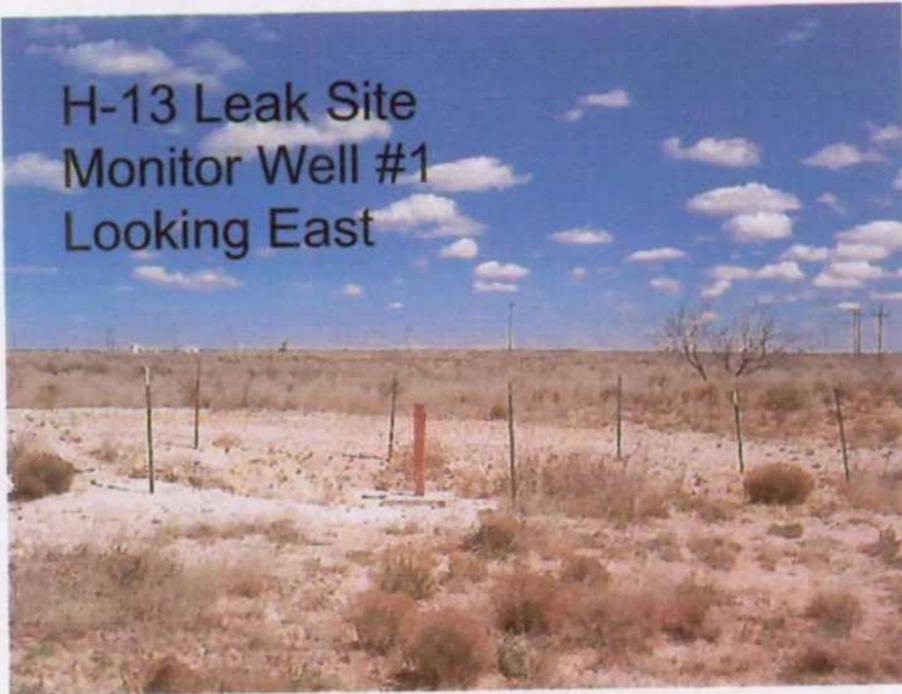
MONITOR WELL

**PHOTOGRAPHS**

H-13 Leak Site  
Monitor well #1,  
Looking North



H-13 Leak Site  
Monitor Well #1  
Looking East



**APPENDIX A**

# RICE Operating Company

122 West Taylor • Hobbs, New Mexico 88240  
Phone: (505)393-9174 • Fax: (505) 397-1471

July 11, 2002

Sylvia Dickey  
NMOCD Hobbs Office  
1625 N. French Dr.  
Hobbs, NM 88240

Re: EME SWD System  
UL-H Sec 13 T20S R36E  
Lea County, New Mexico

Dear Ms. Sylvia Dickey:

Rice Operating Company (ROC) discovered an accidental discharge at the above referenced site on July 3, 2002. The soil settled underneath a 4" A/C system line causing it to break. 10 bbls were released out onto the pasture affecting 152 square feet. 5 bbls were recovered and hauled to an EME SWD disposal facility. ROC will delineate the site as well as develop a remediation plan.

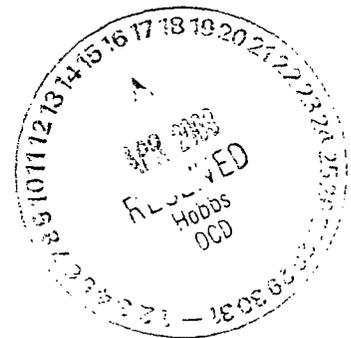
ROC requests approval of this C-141 form as an initial report. If you have any questions, please do not hesitate to call me at the above number.

Sincerely,



Chris Rodriguez  
Environmental Technician

Enclosed: C-141 Initial Report  
Drawing  
Generic Spill and Leak Remediation Work Plan Sheet



District I  
P.O. Box 1980, Hobbs, NM 88241-1980  
District II  
811 South First, Artesia, NM 88210  
District III  
1000 Rio Brazos, Aztec, NM 87410  
District IV  
2040 South Pacheco, Santa Fe, NM 87505

State of New Mexico  
Energy, Minerals & Natural Resources Department  
**OIL CONSERVATION DIVISION**  
2040 South Pacheco  
Santa Fe, NM 87505  
**OPERATOR'S MONTHLY REPORT**

Form C-141  
Originated 2/13/97  
Submit 2 copies to  
Appropriate District  
Office in accordance  
with Rule 116 on  
back side of form

**Release Notification and Corrective Action  
OPERATOR**

Initial Report     Final Report

Name Rice Operating Company	Contact Chris Rodriguez
Address 122 West Taylor Hobbs, NM 88240	Telephone No. 505-393-9174
Facility Name EME SWD System	Facility Type System Line

Surface Owner State	Mineral Owner	Lease No.
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**LOCATION OF RELEASE**

Unit Letter	Section	Township	Range	Feet from the	North/South line	Feet from the	East/West Line	County
H	13	20S	36E	1000' N	Jct I-13			LEA

**NATURE OF RELEASE**

Type of Release Produced water	Volume of Release 10 bbls	Volume Recovered 5 bbls
Source of Release 4" A/C line	Date and Hour of Occurrence 7-3-02 11:00 am	Date and Hour of Discovery 7-3-02 11:00 am
Was Immediate Notice Given? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If YES, To Whom?	
By Whom?	Date and Hour	
Was a Watercourse Reached? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If YES, Volume Impacting the Watercourse.	

If a Watercourse was Impacted, Describe Fully. (Attach Additional Sheets If Necessary)

Describe Cause of Problem and Remedial Action Taken. (Attach Additional Sheets If Necessary).  
The soil settled underneath a Rice Operating Company 4" A/C line causing it to break.  
No remedial action was taken at the time.

Describe Area Affected and Cleanup Action Taken. (Attach Additional Sheets If Necessary)

152' square feet was affected.  
Rice Operating Company recovered 5 bbls and hauled it to an EME SWD disposal facility.  
Rice Operating Company will delineate the site as well as develop a remediation plan.

I hereby certify that the information given above is true and complete to the best of my knowledge and understand that pursuant to NMOCD rules and regulations all operators are required to report and /or file certain release notifications and perform corrective actions for releases which may endanger public health or the environment. The acceptance of a C-141 report by the NMOCD marked as "Final Report" does not relieve the operator of liability should their operations have failed to adequately investigate and remediate contamination that pose a threat to ground water, human health or the environment. In addition, NMOCD acceptance of a C-141 report does not relieve the operator of responsibility for compliance with any other federal, state, or local laws and /or regulations.

Signature: <i>Chris Rodriguez</i>	OIL CONSERVATION DIVISION <i>Chris Rodriguez</i>
Printed Name: Chris Rodriguez	Approved by District Supervisor:
Title: Environmental Technician	Approval Date: 4-16-03 ENVIRONMENTAL ENGINEER
Date: July 3, 2002	505 393-9174 Conditions of Approval: Attached <input type="checkbox"/>

DRILLING LOG	Site Name/Location	BORING/WELL INFORMATION			Logged by: Eades
RICE Operating Company  122 West Taylor  Hobbs, New Mexico 88240  (505) 393-9174	<b>H-13</b>  <b>13-T20S-R36E</b>  <b>EME SWD System</b>  <b>Lea County, NM</b>	Well No. SB-1/MW	Date Drilled: 9/25/02	Driller: Eades	Completion:  Plugged  with  cuttings.
		Well Depth:	Boring Depth: 41'	Well Material:	
		Casing Length	Boring Diameter: 4.75"	Casing Size:	
		Screen Length:	Drilling Method: Air Rotary	Slot Size:	

DEPTH	SUBSURFACE LITHOLOGY	SAMPLE TYPE	Test Results (ppm)		REMARKS	Boring
			CI	TPH		
0	Ground surface		Titrate	EPA 418.1		
5						
6						
7						
8	Topsoil				cuttings	
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19					bentonite	
20	Caliche Dry Sand	Grab	1503			
21						
22						
23						
24						
25	Damp Sand	Grab	557			
26						
27						
28					screen	
29						
30	Damp Sand	Grab	370			
31	Sand					
32						
33						
34					water	
35						
36						
37						
38						
39						
40					rathole	
41	Sand and Clay					