AP - 83

STAGE 1 ABATEMENT PLAN

YEAR(S): 5-25-07

AP-83
Stage 1 Abatement
5-25-07

SENDER: *COMPLETE THIS SECTION*

- Complete items 1, 2, and 3. Also complete item 4 if Restricted Delivery is desired.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

MR. EDWARD HANSEN
NM OCD
1220 S. ST. FRANCIS DR
SANTA FE, NM 87504

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X Edward J. Hansen ☐ Agent ☒ Addressee

B. Received by (Printed Name) Edward J. Hansen
C. Date of Delivery June 4, 2007

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☒ No

3. Service Type
☒ Certified Mail ☐ Express Mail
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☐ Insured Mail ☐ C.O.D.

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2. Article Number *(Transfer from se* 7006 0100 0001 2438 3845

PS Form 3811, February 2004 Domestic Return Receipt 102595-02-M-1540

L. Peter Galusky, Jr. Ph.D., P.G.
Texerra

May 25th, 2007

Mr. Edward Hansen, Hydrologist
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**
C-16(1) Release
EME Salt Water Disposal System
UL-C, Sec 16 T20S R37E
NMOCD Case Number: 1R0476

Sent via U.S. Mail w/ Return Receipt No. 7006 0100 0001 2438 3485

Dear Mr. Hansen:

Please find enclosed a Stage I Abatement Plan for the above-referenced Rice Operating Company project. Also attached is a draft template for the requisite public notice.

As Rice Operating Company and I are anxious to make progress, we would be grateful for your expeditious review of this proposed Plan.

Please do not hesitate to contact me if you have any questions or need additional information.

Sincerely,

L. Peter (**Pete**) Galusky, Jr. Ph.D., P.G.
Principal

Texerra
505 N. Big Spring, Suite 404
Midland, Texas 70701
Tel: 432-634-9257
E-mail: lpg@texerra.com
Web site: www.texerra.com

Copy: Kristin Pope, Rice Operating Company

Public Notice Template

State of New Mexico
Energy, Minerals and Natural Resources Department
Oil Conservation Division

Notice is hereby given that pursuant to New Mexico Oil Conservation Division Regulations, the following Stage 1/Stage Abatement Plan Proposal has been submitted to the Director of the Oil Conservation Division, 1220 S. St. Francis Dr., Santa Fe, New Mexico 87505, Telephone (505) 476-3440:

Rice Operating Company, Carolyn Doran Haynes, Engineering Manager, Telephone (505) 393-9174, 122 West Taylor, Hobbs, New Mexico 88240, has submitted a Stage 1 Abatement Plan for the EME C16 (1) site, located about 3.5 miles south/southeast of Monument, New Mexico in Unit C, Sec 16 T20S R37E, Lea County, New Mexico. Concentrations of chlorides are above New Mexico ground water standards in monitoring wells at this location. The Stage 1 Abatement Plan describes the proposed measures: (i) to more definitively evaluate the source and magnitude of groundwater chloride levels at the subject site; and, (ii) to develop a Stage II Abatement Plan, if and as warranted, to attenuate contaminated groundwater and to protect uncontaminated groundwater

Any interested person may obtain further information from the Oil Conservation Division and may submit written comments to the Director of the Oil Conservation Division at the address given above. The Stage 1 Abatement Plan Revision Proposal may be viewed at the above address or at the Oil Conservation Division District Office, 1625 N. French Drive, Hobbs, New Mexico 88240, Telephone (505) 393-6161 between 8:00 a.m. and 4:00 p.m., Monday through Friday. Prior to ruling on any proposed Stage 1 Abatement Plan, the Director of the Oil Conservation Division shall allow at least thirty (30) days after the date of publication of this notice during which **written comments may be submitted to him.**

Stage I Abatement Plan

EME Salt Water Disposal System
C-16(1) Release
UL-C, Sec 16 T20S R37E
OCD No. 1R0476

May 25th, 2007

Prepared by:

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Stage I Abatement Plan

EME Salt Water Disposal System
C-16(1) Release
UL-C, Sec 16 T20S R37E
OCD No. 1R0476

Executive Summary

Rice Operating Company (ROC) discovered an accidental discharge of an estimated 35 bbls of produced water at the referenced location (Figure 1) on October 12th, 2005. The surface area affected by this release was approximately 3,700 sq ft (less than 1/10th of an acre). Soil sampling undertaken by ROC on October 25th, 2005 encompassed the area of the release. Approximately 120 cu yds of chloride-contaminated soil material from the upper 6 inches of the affected area was subsequently removed and taken to the Sundance Disposal facility in Eunice, NM in February, 2006. The site was re-graded to original contours, using clean soil material as backfill.

Near source and down gradient monitor wells were drilled in December of 2006. Soil cuttings indicated slightly elevated (640 ppm) chloride levels at the water table surface. Groundwater samples from these wells indicated chloride concentrations of 8,810 ppm chloride in the near-source well and 7,760 ppm chloride in the down gradient well. However, given the relatively small volume of this release, its small aerial extent, and that fact that soil chloride levels at the water table surface were relatively low, it appears unlikely that elevated groundwater chloride levels were caused by this release. Nevertheless, in order to elucidate the probable cause of elevated groundwater chlorides, the following scope of additional investigation and analysis is proposed:

1. Install an up gradient monitor well above the C16 (1) release site to determine the chloride concentration of groundwater flowing across the site.
2. Conduct limited pumping of groundwater at the near-source monitor well (MW-1) to determine if significant chloride mass can be removed through limited withdrawals. The water removed from this well will be properly disposed through the EME SWD system.
3. Analyze the data in light of investigative analysis from other nearby Rice sites (EME C16(2) and M-9) , to gain a "big picture" view of the actual effects of this particular release on groundwater chloride levels, and develop a report of this effort for OCD. Develop a Stage II Abatement Plan, if and as warranted, to address groundwater chloride contamination.

This work is to be performed in accordance with the work schedule described in this Plan.

Stage I Abatement Plan

EME Salt Water Disposal System
C-16(1) Release
UL-C, Sec 16 T20S R37E
OCD No. 1R0476

Contents

Figures

Tables

Stage I Abatement Plan
EME Salt Water Disposal System
C-16(1) Release
UL-C, Sec 16 T20S R37E
OCD No. 1R0476

Location and Physiographic Setting

The site is located approximately 3.5 miles south/southeast of Monument in Lea County (Figure 1). The topography is gently sloping toward the south/southeast. Soils on the site are mapped in the Lea County Soil Survey as belonging to Pyote-Maljamar-Kermit soil association. These are characterized as gently undulating and rolling, sandy soils of six feet or more depth overlying caliche. Groundwater was found to occur at a depth of approximately 17+/- feet, occurring in unconsolidated Tertiary alluvium of the Ogallala Formation, and is believed to flow toward the south/southeast in the direction of the surface topographic gradient.

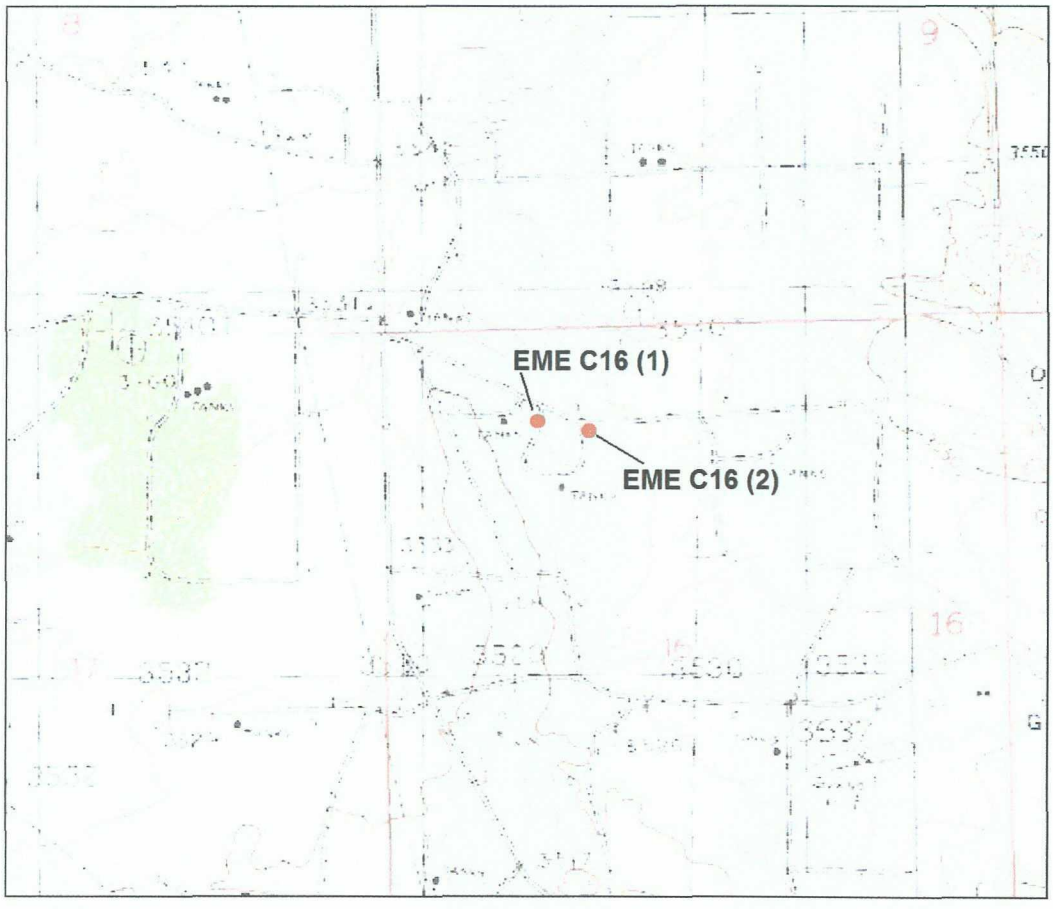

Figure 1 – EME C16 (1) site location shown on USGS Monument South Topographic Quadrangle. North is "up". Scale: 1 inch equals approximately 1,000 ft.

Initial Release and Remedial Actions

Rice Operating Company (ROC) discovered an accidental discharge of produced water at the referenced location on October 12, 2005. The source of the release was an asbestos-cement pipeline failure, releasing an estimated 35 bbls of produced water. The 4-inch diameter pipeline was replaced, thus precluding the threat of future releases and compounded impact.

The surface area affected by this release was approximately 3,700 sq ft (less than 1/10th of an acre; Figure 2). Regional groundwater information indicates that the depth to groundwater is approximately 17 to 20 ft below ground surface at this location.

Soil sampling was undertaken by ROC on October 25th. The initial sampling and impact delineation encompassed the area of the release. Samples were taken from the surface to a depth of 3 to 4 feet, using a hand auger, and analyzed for chlorides and organics using field titration and a portable PID, respectively. A subset of samples was sent to a commercial laboratory for verification of field results. A second round of soil sampling was undertaken using a backhoe on November 18th, 2005, where soils were sampled to depths of 12 to 14 ft at locations indicated during the previous investigation. Soils were analyzed for chlorides and organics.

As part of the initial response procedure, approximately 120 cu yds of chloride-contaminated soil material from the upper 6 inches of the affected area was removed. This material was taken to the Sundance Disposal facility in Eunice, NM in February, 2006. The site was re-graded to original contours, using clean soil material as backfill.

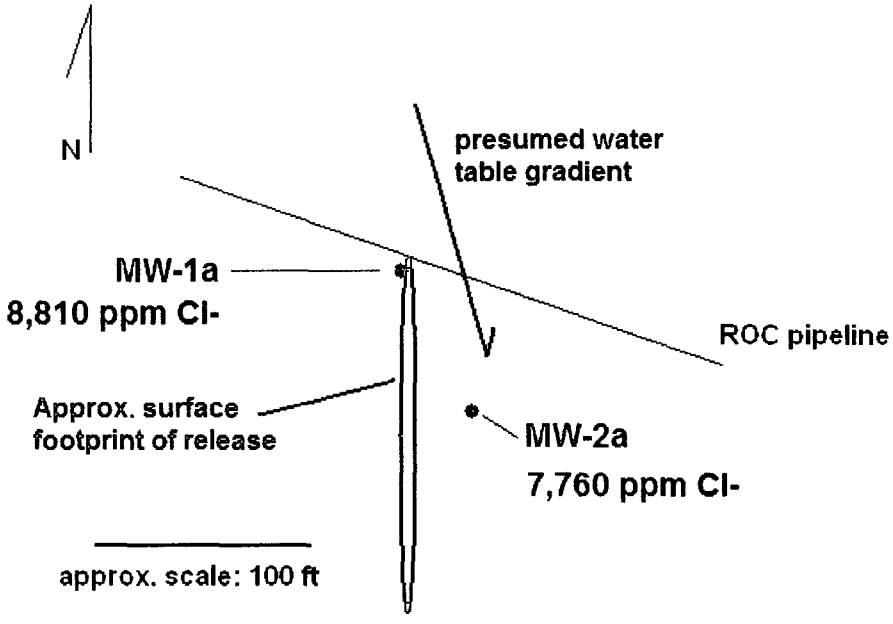

Figure 2 - Approximate surface footprint of release and groundwater chloride concentrations as sampled on December 22nd, 2006.

Results of Investigation and Characterization Plan

In accordance with the OCD approved Investigation and Characterization Plan of November 24th, 2006, two groundwater monitor wells (Figures 2 & 3) were drilled by Harrison and Cooper, Inc. on December 12th, 2006. Soil cuttings were logged by Peter Galusky of Texerra.

Field titration indicated that soil chloride concentrations for both soil borings were elevated to the water table surface, approx. 17 ft below ground surface, (Tables 1 & 2). Laboratory values for soil chlorides at the bottom depths were 576 and 640 ppm for MW-1 and MW-2, respectively.

Groundwater samples taken from these wells on December 22nd, 2006 indicated chloride concentrations of 8,810 ppm chloride at the near-source well and 7,760 ppm chloride at the down-gradient well (Figure 2). OCD was sent notice of groundwater impact on January 24th, 2007. OCD subsequently placed this project under "Rule 19" on March 26th, 2007, and requested a Stage I Abatement Plan.

Given the relatively small volume of this release, its small aerial extent, and that fact that soil chloride levels at the water table surface were relatively low, it appears unlikely that elevated groundwater chloride levels were caused by this release. Nevertheless, in order to elucidate the probable cause of elevated groundwater chlorides, the following scope of additional investigation and analysis is proposed:

Stage I Abatement Plan: Proposed Scope of Work and Schedule

Scope and Schedule of Work

1. Issuance of public notice within 14 calendar days of OCD approval of this Plan.
2. Install an up gradient monitor well above the C16(1) release site to determine the chloride concentration of groundwater flowing across the site, to be completed within 45 days of OCD approval.
3. Conduct limited pumping of groundwater at the near-source monitor well (MW-1) to determine if significant chloride mass can be removed through limited withdrawals. The water removed from this well will be properly disposed through the EME SWD system. This task is to be completed within 90 days of OCD approval.
4. Analyze the data in light of investigative analysis from other nearby Rice sites (EME C16(2) and M-9) , to gain a "big picture" view of the actual effects of this particular release on groundwater chloride levels, and provide a Stage I Investigation Report to OCD. Develop a Stage II Abatement Plan, if and as warranted, to address groundwater chloride contamination. While this work will be conducted as expeditiously as possible, the completion of this task will be contingent upon the results of the previous tasks.

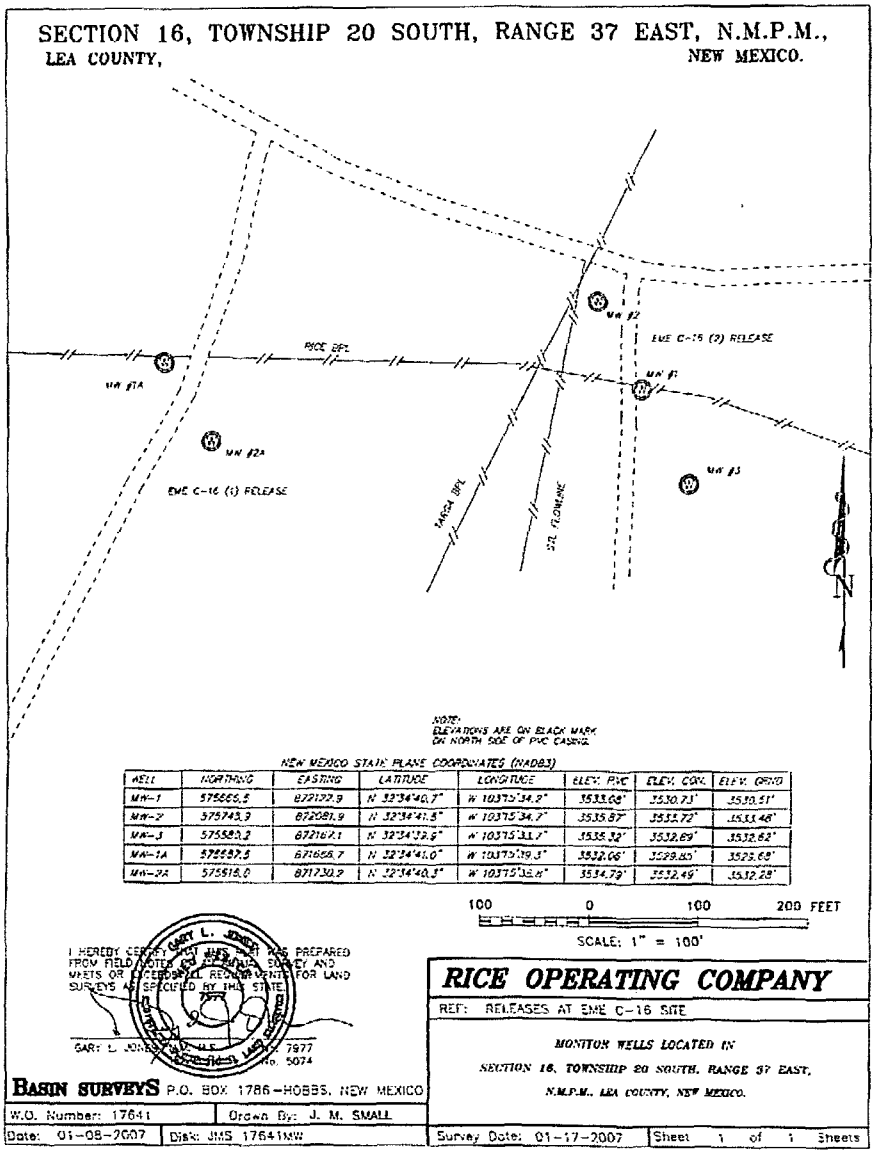

Figure 3 – Surveyed plat showing monitor well locations. (Monitor well locations for C16(1) are in the left of the figure).

Soil Boring Log
Rice Operating Company
EME Field SWD System
C16(1) release site

Identification:	**MW-1**
Location:	approx. 5 ft southeaset of center of release
Date:	12/12/2006
Driller:	Ken Cooper (Harrison and Cooper, Inc.)
Drill method:	Air Rotary
Logged by:	L. Peter Galusky, Jr.
Total depth:	28 ft below ground surface
Screened interval:	13 to 28 ft below ground surface
Pipe diameter:	4 inches

Depth	Field Chloride Test (ppm)	Lab Chloride Test (ppm)	Field OVM test (ppm)	Lab BTEX test (ppm)	Cutting Description	Well Schematic
0					olive brown sandy loam	solid pipe
5	112		0.5		olive brownish gray sand w/ ferric veriegation	"
10	421		0.2		light olive brownish gray sand w/ ferric veriegation	"
15	701	576	0.2	ND	"	"
20	937		0		light olive gray sandy loam	screen
25					"	"
30						"

Table 1 – Soil boring descriptions and chloride concentrations and well construction schematics for near-source monitor well (MW-2).

Soil Boring Log
Rice Operating Company
EME Field SWD System
C16(1) release site

Identification:	**MW-2**
Location:	approx. 100 ft southeast of center of release
Date:	12/12/2006
Driller:	Ken Cooper (Harrison and Cooper, Inc.)
Drill method:	Air Rotary
Logged by:	L. Peter Galusky, Jr.
Total depth:	30 ft below ground surface
Screened interval:	15 to 30 ft below ground surface
Pipe diameter:	2 inches

Depth	Field Chloride Test (ppm)	Lab Chloride Test (ppm)	Field OVM test (ppm)	Lab BTEX test (ppm)	Cutting Description	Well Schematic
0					brown sand	solid pipe
5	4554		0		light brown sand	"
10	1964		0		light olive brown sand	"
15	1356		0		"	"
20	1446	640	0		"	screen
25					"	"
30						"

Table 2 – Soil boring descriptions and chloride concentrations and well construction schematics for down-gradient monitor well (MW-2).