1R - 427-39

# APPROVALS

# YEAR(S):

2013

**Hansen, Edward J., EMNRD**

| | |
|---|---|
| **From:** | Hansen, Edward J., EMNRD |
| **Sent:** | Monday, September 16, 2013 9:20 AM |
| **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 (1R427-39) Termination - ROC EME G-18 Site |

**RE: Termination Request**
**for the Rice Operating Company's**
**EME G-18 Site**
**Unit Letter G, Section 18, T20S, R37E, NMPM, Lea County, New Mexico**
**Remediation Plan (1R427-39) 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 September 5, 2013 (received September 9, 2013). 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 (1R427-39) 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*
419 West Cain • Hobbs, New Mexico 88240
Phone: (575) 393-2967 • Fax: (575) 393-0293

CERTIFIED MAIL
RETURN RECEIPT NO. 7007 2560 0000 4569 8937



**September 5, 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: Termination Request
EME G-18 (1R427-39): UL/G, Sec. 18, T20S, R37E
RICE Operating Company – Eunice Monument Eumont SWD System

Mr. Hansen:

Rice Operating Company (ROC) is the service provider (agent) for the EME 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**
In 2003, ROC initiated work on the former G-18 junction box. The site is located in UL/G, Sec. 18, T20S, R37E. NM OSE records indicate that groundwater would likely be encountered at a depth of approximately 36 +/- feet. The site was delineated using a backhoe to collect soil samples at regular intervals, creating a 10x10x6 ft deep excavation. Each sample was field titrated for chlorides and field screened using a PID for hydrocarbons, resulting in chloride concentrations that relented with depth and low PID readings. The excavated soil was blended on site and representative composite samples of the excavation walls, bottom and remediated backfill were sent to a commercial for analysis of chloride and TPH, resulting in a sidewalls chloride concentration of 63.8 mg/kg and concentrations of gasoline range organics (GRO) concentration and diesel range organics (DRO) below detectable limits. The bottom composite resulted in a chloride concentration of 63.8 mg/kg and concentrations of GRO and DRO below detectable limits. The remediated backfill resulted in a chloride concentration of 279 mg/kg, a GRO concentration below detectable limits and a DRO concentration of 20.10 mg/kg. The excavation was backfilled with the remediated soil to ground surface and contoured to the surrounding area.

Vegetation has rebounding at this site; therefore, no revegetation is necessary. Vegetation will act as an evapo-transpiration barrier that will also inhibit the downward migration of chlorides and hydrocarbons. Plants capture water through their roots and so reduce the amount of water infiltrating below the root zone. A junction box is no longer necessary at this site.

The junction box site location map, area map, final report, photodocumentation, chloride graph, laboratory analysis, PID sheet and current photodocumentation are attached.

**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)393-2967 if you have any questions or wish to discuss this site. Thank you for your time and consideration.

Sincerely,
RICE Operating Company

Laura Flores

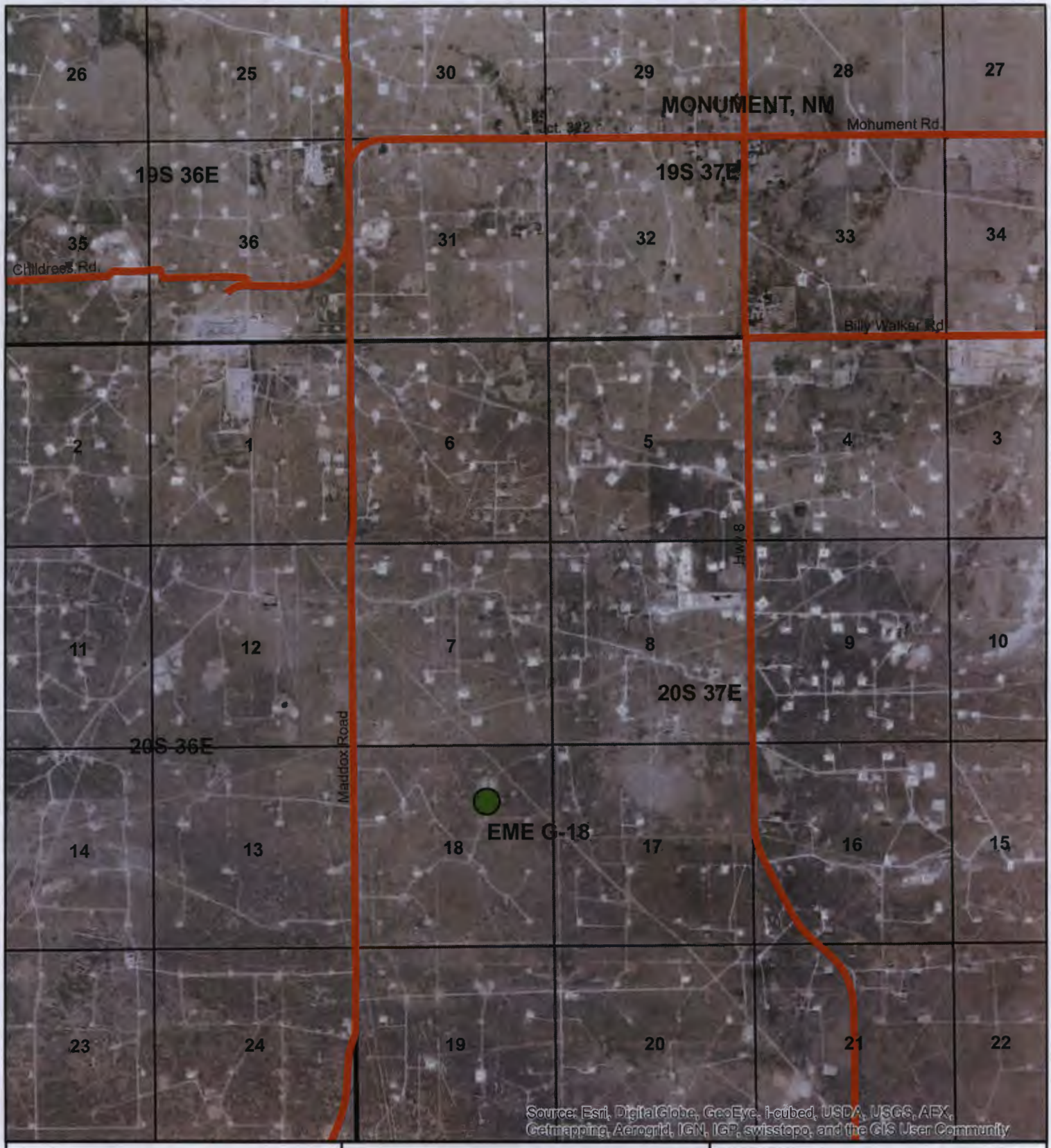
Laura Flores
Environmental Project Assistant Manager

enclosures

# Site Maps

**RICE *Operating Company* (ROC)**
419 West Cain Hobbs, NM 88240
Phone: (575) 393-2967 Fax: (575) 393-0293

# Site Location Map




RICE ENVIRONMENTAL RECS CONSULTING & SAFETY, LLC

# *EME G-18 (1R427-39)*

**UL G SECTION 18**
**T-20-S R-37-E**
**LEA COUNTY, NM**

N
W E
S

0 0.5 1 Miles

Drawing date: 5/6/13
Drafted by: T. Grieco

# Area Map


RICE ENVIRONMENTAL RECS CONSULTING & SAFETY, LLC

# *EME G-18 (1R427-39)*

**UL G SECTION 18**
**T-20-S R-37-E**
**LEA COUNTY, NM**

N W E S

0 0.1 0.2 Miles

Drawing date: 5/6/13
Drafted by: T. Grieco

# Junction Box Report

**RICE *Operating Company* (ROC)**
419 West Cain Hobbs, NM 88240
Phone: (575) 393-2967 Fax: (575) 393-0293

# RICE OPERATING COMPANY
## JUNCTION BOX FINAL REPORT

BOX LOCATION

| SWD SYSTEM | JUNCTION | UNIT | SECTION | TOWNSHIP | RANGE | COUNTY | BOX DIMENSIONS - FEET | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Length | Width | Depth |
| EME | G-18 | G | 18 | 20S | 37E | Lea | Junction has been eliminated | | |

LAND TYPE: BLM _____ STATE _____ FEE LANDOWNER Jimmy T. Cooper OTHER _____

Depth to Groundwater 36 feet NMOCD SITE ASSESSMENT RANKING SCORE: 20

Date Started 11/20/2003 Date Completed 11/24/2003 OCD Witness No

Soil Excavated 22 cubic yards Excavation Length 10 Width 10 Depth 6 feet

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

## FINAL ANALYTICAL RESULTS: **Sample Date** 11/20/2003 **Sample Depth** 6 ft bgs

Procure 5-point composite sample of bottom and 4-point composite sample of sidewalls. TPH, BTEX and Chloride laboratory test results completed by using an approved lab and testing procedures pursuant to NMOCD guidelines.

| Sample Location | PID ppm | GRO mg/kg | DRO mg/kg | Chloride mg/kg |
|---|---|---|---|---|
| SIDEWALLS | 0.00 | <10.0 | <10.0 | 63.8 |
| BOTTOM | 0.00 | <10.0 | <10.0 | 63.8 |
| REMEDIATED | 0.00 | <10.0 | 20.10 | 279 |

CHLORIDE FIELD TESTS

| LOCATION | DEPTH (ft) | ppm |
|---|---|---|
| Vertical @ source | 4 | 987 |
| | 5 | 962 |
| | 6 | 882 |
| | 6 | 788 |
| | 7 | 664 |
| | 8 | 400 |
| | 10 | 363 |
| | 11 | 239 |
| | 12 | 85 |
| bottom comp. | 6 | 209 |
| 4-wall comp. | n/a | 141 |
| remed. comp. | n/a | 315 |
| background | n/a | 59 |

General Description of Remedial Action: The junction box was surrounded by healthy vegetation. The site was delineated vertically and laterally with a backhoe. Chloride concentrations were minimal and exhibited a vertical and lateral decline. No indications of TPH impact were encountered and lab results confirmed that concentrations were well below NMOCD guidelines. The 10 x 10 x 6 ft excavation was backfilled with the excavated dirt that was blended site. The disturbed surface is expected to naturally re-vegetate.

enclosures: chloride graph, photos, lab results, PID readings

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

DATE 12/1/2003 PRINTED NAME Kristin Farris

SIGNATURE Kristin Farris TITLE Project Scientist

# EME jct. G-18

Junction Box Before NORM Removal 8/6/2003

Lumber Removed; Before Excavation

Delineation Nov. 2003

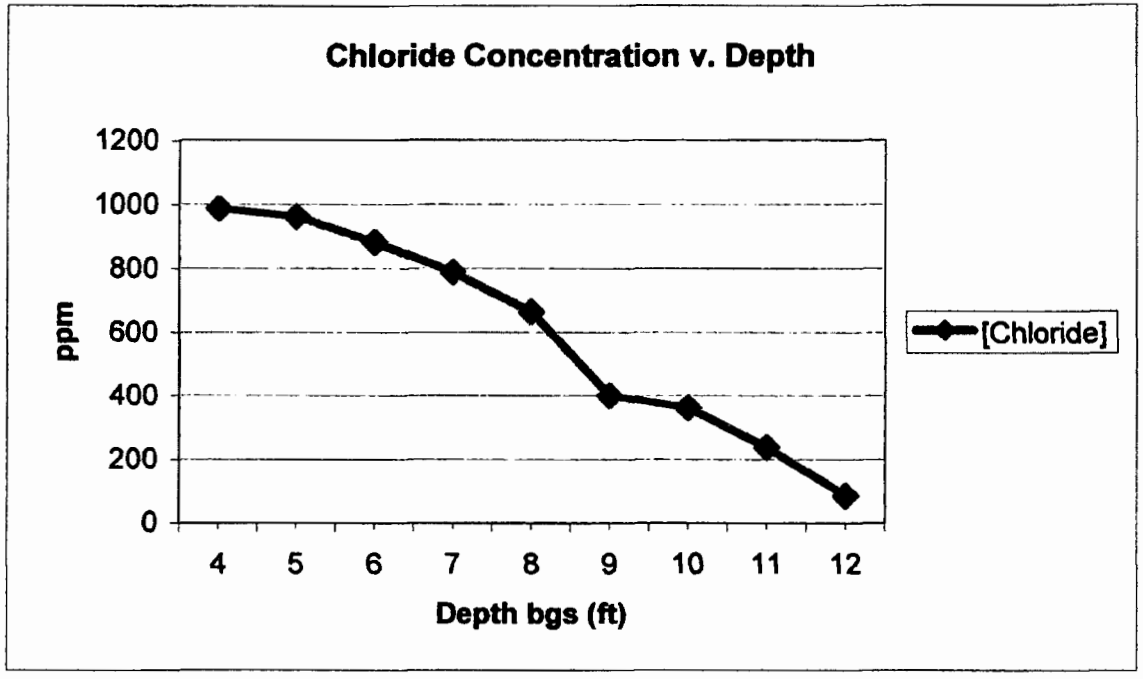
Backfilled Excavation 11/24/2003

# EME jct. G-18

T20S, R37E

| Depth bgs (ft) | [Cl⁻] ppm |
|---|---|
| 4 | 987 |
| 5 | 962 |
| 6 | 882 |
| 7 | 788 |
| 8 | 664 |
| 9 | 400 |
| 10 | 363 |
| 11 | 239 |
| 12 | 85 |

Groundwater = 36 ft



# ANALYTICAL REPORT

## Prepared for:

**Kristin Farris**
**Rice Operating**
**122 W. Taylor**
**Hobbs, NM 88240**

| | |
|---|---|
| **Project:** | EME G-18 |
| **PO#:** | |
| **Order#:** | G0308007 |
| **Report Date:** | 11/25/2003 |

**Certificates**
**US EPA Laboratory Code TX00158**

# ENVIRONMENTAL LAB OF TEXAS

## SAMPLE WORK LIST

Rice Operating
122 W. Taylor
Hobbs, NM 88240
505-397-1471

Order#: G0308007
Project:
Project Name: EME G-18
Location: Lee

The samples listed below were submitted to Environmental Lab of Texas and were received under chain of custody. Environmental Lab of Texas makes no representation or certification as to the method of sample collection, sample identification, or transportation/handling procedures used prior to the receipt of samples by Environmental Lab of Texas, unless otherwise noted.

| Lab ID: | Sample : | Matrix: | Date / Time Collected | Date / Time Received | Container | Preservative |
|---|---|---|---|---|---|---|
| 0308007-01 | Remediated Backfill | SOIL | 11/20/03 12:35 | 11/20/03 20:30 | 4 oz glass | ice |
| | ***Lab Testing:*** 8015M Chloride | **Rejected:** No | | **Temp:** 4.0 C | | |
| 0308007-02 | Bottom 6' | SOIL | 11/20/03 12:03 | 11/20/03 20:30 | 4 oz glass | ice |
| | ***Lab Testing:*** 8015M Chloride | **Rejected:** No | | **Temp:** 4.0 C | | |
| 0308007-03 | 4 Wall Comp | SOIL | 11/20/03 12:16 | 11/20/03 20:30 | 4 oz glass | ice |
| | ***Lab Testing:*** 8015M Chloride | **Rejected:** No | | **Temp:** 4.0 C | | |

# ENVIRONMENTAL LAB OF TEXAS

## ANALYTICAL REPORT

Kristin Farris
Rice Operating
122 W. Taylor
Hobbs, NM 88240

Order#: G0308007
Project:
Project Name: EME G-18
Location: Lee

Lab ID: 0308007-01
Sample ID: Remediated Backfill

*8015M*

| Method Blank | Date Prepared | Date Analyzed | Sample Amount | Dilution Factor | Analyst | Method |
|---|---|---|---|---|---|---|
| | | 11/21/03 | 1 | 1 | JLH | 8015M |

| Parameter | Result mg/kg | RL |
|---|---|---|
| GRO, C6-C12 | <10.0 | 10.0 |
| DRO, >C12-C35 | 20.1 | 10.0 |
| TOTAL, C6-C35 | 20.1 | 10.0 |

| Surrogates | % Recovered | QC Limits (%) | |
|---|---|---|---|
| 1-Chlorooctane | 92% | 70 | 130 |
| 1-Chlorooctadecane | 82% | 70 | 130 |

Lab ID: 0308007-02
Sample ID: Bottom 6'

*8015M*

| Method Blank | Date Prepared | Date Analyzed | Sample Amount | Dilution Factor | Analyst | Method |
|---|---|---|---|---|---|---|
| | | 11/21/03 | 1 | 1 | JLH | 8015M |

| Parameter | Result mg/kg | RL |
|---|---|---|
| GRO, C6-C12 | <10.0 | 10.0 |
| DRO, >C12-C35 | <10.0 | 10.0 |
| TOTAL, C6-C35 | <10.0 | 10.0 |

| Surrogates | % Recovered | QC Limits (%) | |
|---|---|---|---|
| 1-Chlorooctane | 92% | 70 | 130 |
| 1-Chlorooctadecane | 84% | 70 | 130 |

DL = Diluted out N/A = Not Applicable RL = Reporting Limit

# ENVIRONMENTAL LAB OF TEXAS

## ANALYTICAL REPORT

| | | | |
|---|---|---|---|
| Kristin Farris | | Order#: | G0308007 |
| Rice Operating | | Project: | |
| 122 W. Taylor | | Project Name: | EME G-18 |
| Hobbs, NM 88240 | | Location: | Lee |

Lab ID: 0308007-03
Sample ID: 4 Wall Comp

*8015M*

| Method Blank | Date Prepared | Date Analyzed | Sample Amount | Dilution Factor | Analyst | Method |
|---|---|---|---|---|---|---|
| | | 11/21/03 | 1 | 1 | JLH | 8015M |

| Parameter | Result mg/kg | RL |
|---|---|---|
| GRO, C6-C12 | <10.0 | 10.0 |
| DRO, >C12-C35 | <10.0 | 10.0 |
| TOTAL, C6-C35 | <10.0 | 10.0 |

| Surrogates | % Recovered | QC Limits (%) | |
|---|---|---|---|
| 1-Chlorooctane | 98% | 70 | 130 |
| 1-Chlorooctadecane | 92% | 70 | 130 |

Approval: Raland K. Tuttle 11-26-03
Raland K. Tuttle, Lab Director, QA Officer — Date
Celey D. Keene, Org. Tech. Director
Jeanne McMurrey, Inorg. Tech. Director
Sandra Biezugbe, Lab Tech.
Sara Molina, Lab Tech.

DL = Diluted out N/A = Not Applicable RL = Reporting Limit

# ENVIRONMENTAL LAB OF TEXAS

## ANALYTICAL REPORT

| | | | |
|---|---|---|---|
| **Kristin Farris** | | **Order#:** | **G0308007** |
| **Rice Operating** | | **Project:** | |
| **122 W. Taylor** | | **Project Name:** | **EME G-18** |
| **Hobbs, NM 88240** | | **Location:** | **Lee** |

**Lab ID:** 0308007-01
**Sample ID:** Remediated Backfill

***Test Parameters***

| Parameter | Result | Units | Dilution Factor | RL | Method | Date Analyzed | Analyst |
|---|---|---|---|---|---|---|---|
| Chloride | 279 | mg/kg | 1 | 12.0 | 9253 | 11/23/03 | SB |

**Lab ID:** 0308007-02
**Sample ID:** Bottom 6'

***Test Parameters***

| Parameter | Result | Units | Dilution Factor | RL | Method | Date Analyzed | Analyst |
|---|---|---|---|---|---|---|---|
| Chloride | 63.8 | mg/kg | 1 | 12.0 | 9253 | 11/23/03 | SB |

**Lab ID:** 0308007-03
**Sample ID:** 4 Wall Comp

***Test Parameters***

| Parameter | Result | Units | Dilution Factor | RL | Method | Date Analyzed | Analyst |
|---|---|---|---|---|---|---|---|
| Chloride | 63.8 | mg/kg | 1 | 12.0 | 9253 | 11/23/03 | SB |

**Approval:** Raland K Tuttle 11-26-03
Raland K. Tuttle, Lab Director, QA Officer — Date
Celey D. Keene, Org. Tech. Director
Jeanne McMurrey, Inorg. Tech. Director
Sandra Biezugbe, Lab Tech.
Sara Molina, Lab Tech.

**RL = Reporting Limit** **N/A = Not Applicable**



*ENVIRONMENTAL LAB OF TEXAS I, LTD.* **12600 West I-20 East, Odessa, TX 79765 Ph: 915-563-1800**

# ENVIRONMENTAL LAB OF TEXAS

## QUALITY CONTROL REPORT

### 8015M

**Order#: G0308007**

| *BLANK* SOIL | LAB-ID # | Sample Concentr. | Spike Concentr. | QC Test Result | Pct (%) Recovery | RPD |
|---|---|---|---|---|---|---|
| TOTAL, C6-C35-mg/kg | 0007537-02 | | | <10 | | |
| ***MS*** SOIL | **LAB-ID #** | **Sample Concentr.** | **Spike Concentr.** | **QC Test Result** | **Pct (%) Recovery** | **RPD** |
| TOTAL, C6-C35-mg/kg | 0308006-01 | 0 | 952 | 845 | 88.8% | |
| ***MSD*** SOIL | **LAB-ID #** | **Sample Concentr.** | **Spike Concentr.** | **QC Test Result** | **Pct (%) Recovery** | **RPD** |
| TOTAL, C6-C35-mg/kg | 0308006-01 | 0 | 952 | 865 | 90.9% | 2.3% |
| ***SRM*** SOIL | **LAB-ID #** | **Sample Concentr.** | **Spike Concentr.** | **QC Test Result** | **Pct (%) Recovery** | **RPD** |
| TOTAL, C6-C35-mg/kg | 0007537-05 | | 1000 | 928 | 92.8% | |

# ENVIRONMENTAL LAB OF TEXAS

## QUALITY CONTROL REPORT

### Test Parameters

**Order#: G0308007**

| *BLANK* SOIL | LAB-ID # | Sample Concentr. | Spike Concentr. | QC Test Result | Pct (%) Recovery | RPD |
|---|---|---|---|---|---|---|
| Chloride-mg/kg | 0007529-01 | | | <12.0 | | |
| ***MS*** SOIL | **LAB-ID #** | **Sample Concentr.** | **Spike Concentr.** | **QC Test Result** | **Pct (%) Recovery** | **RPD** |
| Chloride-mg/kg | 0307976-21 | 1180 | 500 | 1620 | 88.% | |
| ***MSD*** SOIL | **LAB-ID #** | **Sample Concentr.** | **Spike Concentr.** | **QC Test Result** | **Pct (%) Recovery** | **RPD** |
| Chloride-mg/kg | 0307976-21 | 1180 | 500 | 1630 | 90.% | 0.6% |
| ***SRM*** SOIL | **LAB-ID #** | **Sample Concentr.** | **Spike Concentr.** | **QC Test Result** | **Pct (%) Recovery** | **RPD** |
| Chloride-mg/kg | 0007529-04 | | 5000 | 5000 | 100.% | |

ECOT

# CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

CARDINAL LABORATORIES, INC.
2111 Beechwood, Abilene, TX 79603 101 East Marland, Hobbs, NM 88240
(915) 673 7001 Fax (915) 673-7020 (505) 393-2326 Fax (505) 393 2476

Page ____ of ____

| | |
|---|---|
| Company Name: RICE Operating Company | BILL TO |
| Project Manager: Kristin Farris | P.O. #: |
| Address: 122 W. Taylor | Company: RICE |
| City: Hobbs, State: NM Zip: 88240 | Attn: |
| Phone #: 393-9174 Fax #: 397-1471 | Address: |
| Project #: Project Owner: | City: |
| Project Name: EME G-18 | State: Zip: |
| Project Location: Lea | Phone #: |
| Sampler Name: Gary Stark | Fax #: |

ANALYSIS REQUEST: TPH 8015 | Chloride

| FOR LAB USE ONLY Lab I.D. | Sample I.D. | (G)RAB OR (C)OMP. | # CONTAINERS | MATRIX: GROUNDWATER | WASTEWATER | SOIL | CRUDE OIL | SLUDGE | OTHER: | PRESERV: ACID/BASE | ICE / COOL | OTHER: | SAMPLING: DATE | TIME | TPH | Chloride |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0308007 01 | Remediated backfill | C | G | | | X | | | | | | X | 11/20 | 12:05 | X | X |
| 02 | Bottom 6' | C | G | | | X | | | | | | X | 11/20 | 12:03 | X | X |
| 03 | 4 wall comp | C | G | | | X | | | | | | X | 11/20 | 12:16 | X | X |

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.

Terms and Conditions: Interest will be charged on all accounts more than 30 days past due at the rate of 24% per annum from the original date of invoice, and all costs of collection, including attorney's fees.

| | | | |
|---|---|---|---|
| Sampler Relinquished: | Date: | Received By: | Phone Result: ☐ Yes ☐ No Add'l Phone #: |
| | Time: | | Fax Result: ☐ Yes ☐ No Add'l Fax #: |
| Relinquished By: Gary Stark | Date: 11-20-03 Time: 20-30 | Received By: (Lab Staff) Rebecca Jo 11-20-03 2030 | REMARKS: Fax rec'd copy Ice 4°C. |

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

Sample Condition: Cool ☑ Yes ☐ No; Intact ☑ Yes ☐ No
CHECKED BY: (Initials)

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

# ENVIRONMENTAL TECHNOLOGY GROUP, INC.

2540 WEST MARLAND
HOBBS, NEW MEXICO 88240
PHONE: (505) 397-4882 FAX: (505) 397-4701

## VOC FIELD TEST REPORT FORM

MINI RAE PLUS CLASSIC PHOTOIONIZATION GAS DETECTOR

MODEL NO: PGM 761S
CALIBRATION GAS
GAS COMPOSITION: ISOBUTYLENE
AIR
LOT NO: 67401
EXP. DATE: 1/04
METER READING
ACCURACY: [redacted] 100:1

SERIAL NO: 103999
100 PPM
BALANCE
FILL DATE: 10-20-03
ACCURACY: 100 ppm ± 2%

| SYSTEM | JUNCTION | UNIT | SECTION | TOWNSHIP | RANGE |
|---|---|---|---|---|---|
| EME | G-18 | G | 18 | 20 | 37 |

| SAMPLE | PID RESULT | SAMPLE | PID RESULT |
|---|---|---|---|
| Vertical ft | | Remediated | |
| Source | | backfill | 0.0 |
| 12' | 0.0 | | |
| Lateral | | 4 well | 0.0 |
| 5' North | | | |
| 12' | 0.0 | 5' North | 0.0 |
| Lateral | | | |
| 5' South | | 5' South | 0.0 |
| 12' | 0.0 | | |
| | | 5' west | 0.0 |
| Composite | | | |
| Sample | | 5' East | 0.0 |
| Bottom 6' | 0.0 | | |

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

Gary Albert — Signature
Field Tech — Title
11-20-03 — Date

# Current Photodocumentation

**RICE *Operating Company* (ROC)**
419 West Cain Hobbs, NM 88240
Phone: (575) 393-2967 Fax: (575) 393-0293

**EME G-18 (1R427-39)**
Unit Letter G, Section 18, T20S, R37E

Facing east 7/22/2013

Facing south 7/22/2013

MULTIMED V1.01 DATE OF CALCULATIONS: 16-SEP-2013 TIME: 9:58:42

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 A-26

1R427-82
Chemical simulated is Chloride

Option Chosen Saturated and unsaturated zone models
Run was DETERMIN
Infiltration Specified By User: 3.050E-02 m/yr
Run was transient
Well Times: Find Maximium Concentration
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 | 9.00 | 1 |

DATA FOR MATERIAL 1
---- --- --------
VADOSE ZONE MATERIAL VARIABLES

| VARIABLE NAME | UNITS | DISTRIBUTION | PARAMETERS | | LIMITS | |
|---|---|---|---|---|---|---|
| | | | MEAN | STD DEV | MIN | 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 | 9.00 | 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 | | 2 |
| ITSGEN | - Time values generated or input | | 1 |
| TMAX | - Max simulation time | -- | 0.0 |

WTFUN - Weighting factor -- 1.2

OPTIONS CHOSEN
------- ------
Convolution integral approach
Nondecaying pulse 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 | 9.00 | -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 | 1/M-yr | CONSTANT | 0.000 | -999. | -999. | -999. |
| Neutral hydrolysis rate constant | 1/yr | CONSTANT | 0.000 | -999. | -999. | -999. |
| Base catalyzed hydrolysis rate | 1/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 | 24.1 | -999. | -999. | -999. |
| Duration of pulse | yr | CONSTANT | 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 | 0.000 | 0.000 | 0.000 | 0.000 |
| Initial concentration at landfill | mg/l | CONSTANT | 279. | -999. | -999. | -999. |
| Length scale of facility | m | CONSTANT | 6.10 | -999. | -999. | -999. |
| Width scale of facility | m | CONSTANT | 3.96 | -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. | | | | |

MAXIMUM WELL CONCENTRATION IS 143.3 AT 0.956E+02 YEARS