[R-4]- 5

EME Jct. F-26 2013

CLOSURE

RICE Operating Company

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

April 1, 2014

Mr. Leonard Lowe

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 Jet. F-26: UL/F, Sec. 26, T20S, R36E

RICE Operating Company – Eunice Monument Eumont SWD System

Mr. Lowe:

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 2012, ROC initiated work on the former F-26 junction box. The site is located in UL/F, Sec. 26, T20S, R36E. NM OSE records indicate that groundwater would likely be encountered at a depth of approximately 112 +/- feet. The site was delineated using a backhoe to collect soil samples at regular intervals, creating a 3x7x12-ft deep excavation. Each sample was field titrated for chlorides and field screened using a PID for hydrocarbons, resulting in low concentrations. The 12 ft sample was sent to a commercial laboratory for analysis of chloride and TPH, resulting in a chloride concentration of 416 mg/kg and concentrations of gasoline range organics (GRO) concentration and diesel range organics (DRO) concentration below detectable limits. The excavated soil was returned to the excavation as backfill to ground surface and contoured to the surrounding area. On 11/7/2012, the site was seeded with a blend of native vegetation and is expected to return to a productive capacity at a normal rate. The junction box site map, area map, final report, photo documentation, laboratory analysis, PID sheet, chloride graph, and revegetation form 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

Hack Conder

Environmental Manager

enclosures

RICE OPERATING COMPANY JUNCTION BOX FINAL REPORT

BOX LOCATION

| | SWD SYSTEM | JUNCTION | UNIT | SECTION | TOWNSHIP | RANGE | COUNTY | | MENSIONS - F | |
|---|---------------------------------|---------------|----------------|------------------------------|---------------------|-----------------|--------------|------------------------------|-----------------------|---------------------------|
| | Eunice Monument Eumont (EME) | Jct. F-26 | F | 26 | 208 | 36E | Lea | Length | Width Eliminated | Depth |
| | | I | <u> </u> | l | 1 | L | | | | |
| | LAND TYPE: | BLM | STATE | FEE LA | NDOWNER | Dale Coop | er Family T | rust OTHER | (· · · · · · · · · · | |
| | Depth to Grour | ndwater | 112 | feet | NMOCD | SITE ASSI | ESSMENT | RANKING S | CORE: | 0 |
| | Date Started | 4/17 | /2012 | Date Co | mpleted | 11/7/2012 | oct | O Witness | No | |
| | Soil Excavated | 9.3 | cubic ya | rds Exc | cavation Le | ngth3 | Wid | th7 | Depth 1 | 2feet |
| | Soil Disposed | None | cubic ya | rds Of | fsite Facility | n | /a | _ Location | n/a | |
| FINA | L ANALYT | ICAL RE | SULTS: | Sampl | e Date | 4/17/201 | 2 | Sample De | pth | 12' |
| | | TPH and 0 | Chloride lab | oratory test i procedures | | • | | proved lab and | testing | |
| | Sample | PID (fi | eld) G | RO | DRO | Chloride | ⊢ | | IDE FIELD T | ESTS |
| _ | Location | ppm | | g/kg | mg/kg | mg/kg | | LOCATION | DEPTH | mg/kg |
| SOL | JRCE 12' GRA | B 13.2 | 2 < | :10 | <10 | 416 | | background | 6" | 89 |
| _ | | | | | | | | | 3' | 148 |
| | al Description | | | | | _ | ne | | 4' | 240 |
| | e replacement/up | | | | | | | | 5' | 391 |
| investigation was conducted using a backhoe to collect soil samples at regular intervals, | | | | | | | | | 6' | 441 |
| creating | g a 3x7x12 ft. dee | ep excavatior | n. Each samp | ole was field t | itrated for chl | orides and | | delineation trench at the | 7' | 362 |
| field sc | reened for organ | ic vapors, re | sulting in low | concentration | ns of each. Th | ne deepest | | junction | 8' | 478 |
| sample | e, 12 ft below gro | und surface (| BGS) was se | ent to a comn | nercial labora | tory for | | (source) | 9' | 594 |
| analysi | s of chloride and | TPH, which | confirmed lov | v concentratio | on of each. Th | ne | | (| 10' | 555 |
| excava | tion was backfille | d with excav | ated soil to g | round surface | and contour | ed to the | | | 11' | 622 |
| surrour | nding area. On 11 | 1/7/2012, the | site was see | ded with a bl | end of native | vegetation | | | 12' | 360 |
| and is | expected to return | n to a produc | tive capacity | at a normal r | ate. | | | | | , |
| | | | | | | | | | | |
| | | e | nclosures: s | ite map, area | map, photos | s. lab results. | PID (field) | screenings, chlo | oride graph, rev | egetation forn |
| THE | REBY CERTIF | | | | | | | | | |
| | | | | | AND BEL | IEF. | | | | |
| | EPORT SEMBLED BY | Laura Flor | on SI | SNATURE / | Lange of the second | | Ou | COMPANY | | ental Consulting afety |
| ASS | DEWIDEED B1 | Laura F101 | <u> </u> | DIVALURE | jaur | | UNIN | | | ental Consulting |
| SITE SI | UPERVISOR | Dustin Yarbr | ough SIC | SNATURE | 1 | Not available | | COMPANY | | afety |
| PROJE | CT LEADER | Kyle Norm | an SIC | SNATURE _ | hyle N | | | DATE | 2-24 | -14 |

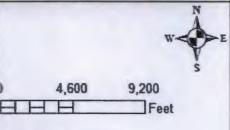
SITE MAP





EME Jct. F-26

UL/F Sec. 26 T20S R36E



Drawing date: 2/18/2014 LF

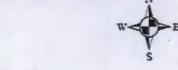
AREA MAP





EME Jct. F-26

UL/F Sec. 26 T20S R36E



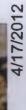
0 10 20 HHH Feet

Drawing date: 2/18/2014 LF

EME Jct. F-26 UL/F Sec.26 (T20S-R36E)



Excavating site, facing north







Site complete, facing west

11/7/2012

Seeding site, facing north



April 20, 2012

ZACH CONDER

Rice Operating Company

112 W. Taylor

Hobbs, NM 88240

RE: EME F-26 JCT

Enclosed are the results of analyses for samples received by the laboratory on 04/17/12 16:35.

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.taeq.texas.gov/field/go_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.

Celey D. Keine

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

Lab Director/Quality Manager





Analytical Results For:

Rice Operating Company ZACH CONDER 112 W. Taylor Hobbs NM, 88240

Fax To:

(575) 397-1471

Received: Reported: 04/17/2012

04/20/2012

Project Name: Project Number: EME F-26 JCT NONE GIVEN

Project Location:

NOT GIVEN

Sampling Date:

04/17/2012

Sampling Type:

Soil

Sampling Condition:

Cool & Intact

Sample Received By:

Jodi Henson

Sample ID: SOURCE @ 12' (H200889-01)

Chloride, SM4500CI-B

Analyzed By: AP

| od Blank BS % Recovery True Value QC RPD Qualifier ND 432 108 400 0.00 IS |
|---|
| IS . |
| |
| |
| od Blank BS % Recovery True Value QC RPD Qualifier |
| ND 162 80.8 200 4.12 |
| ND 156 78.0 200 8.10 |
| |

Surrogate: 1-Chlorooctane 81.1% 55.5-154

Surrogate: 1-Chlorooctadecane

77.4 %

57.6-158

Cardinal Laboratories *=Accredited Analyte

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 client for analyses. All claims, including those for negligence and any other cause whatsever shall be deemed waived unless made in writing and received by Cardinal within thirty (30) days after completion of the applicable service. In no event shall Cardinal be lable 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 the services hereunder by Cardinal, regardless of whether such claim is based upon any of the above stated reasons or otherwise. Results relate only to the samples identified above. This report shall not be reproduced except in full with written approval of Cardinal Laboratories.

Celey & Keene



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

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 client for 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 thirty (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 the services hereunder by Cardinal, regardless of whether such claim is based upon any of the above stated reasons or otherwise. Results relate only to the samplest identified above. This report shall not be reproduced except in full with written approval of Cardinal Laboratones.

Celey D. Keene

Page 4 of 4

CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

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 - ARDINAL LABORATORIES

| Company Name: | RICE Operating | | | | | | .#.E. | | 18 | BILL TO | | | | | ¥ | ANALYSIS | | REQUEST | ST | | | |
|---|--|------------------------------------|----------------------------------|--------------------------------|----------|-----------------------------------|--------------------------------|-----------------------------|--|--|--|---|----------|----------|----------|---------------|------|---------|----|------|---|---|
| Project Manager: Zach Conder | : Zach Conder | | | | | - | 9. | P.O. #: | | | | | | | - | | | | | | _ | _ |
| Address: 112 W. Taylor | W. Taylor | | Total and the | 7000 | | | ပိ | Company: | .: .: | | | | | | | S | | | | | | |
| city: Hobbs | State: NM | Zip: 88240 | 9824 | 40 | | | Attn: | ë | | | The state of the s | | <u> </u> | | | uo | | | | | | |
| Phone #: | Fax #: | THE REAL PROPERTY. | | | | | Αd | Address | S | | Minter our Marie serve stage system excession. | | | | | ΙU\ | | | | | | |
| Project #: | Project Owner: | 1 | : | | | | City: | | | - | | 5 | W | | | //S | | | | | | |
| Project Name: | | C and C and C | 1 | | | | State: | ë: | | Zip: | | jes | 91 | | | | | | | | | |
| Project Location: | : EME 15-26 TOT | | | | | | 전 | Phone #: | ÷: | | | oin | 0 | | | SC | | | | | | |
| Sampler Name: | Susan Vardicas | .) | 100 | | | - | Fax#: | # | | | A 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 | Olr | 8 F | T8 | K98 | | | | | | | |
| FOR LAB USE ONLY | | 卜 | H | | MATRIX | ≚ | | PRE | PRESERV. | SAMPLING | LING | 10 | 10 | | | ə | | | | | | |
| Lab I.D. 11200889 | Sample I.D. | (G)RAB OR (C)OMP. | # CONTAINERS # SECONDWATER | RETEWATER | rios | ernbee Ojr | : язнто | ACID/BASE: | одиєв : ісе і соог | DATE | TIME |) | IT (| | | Complet | | | | | | |
| | Spara @ 7. | ···· | | | - | | | - | | 1-11-1- | 2000 | 1 | 1 | - | - | _ | _ | | | | _ | Г |
| | | | | | | | | | | | | | | | | | | | | | | |
| LEASE NOTE: Listality and | LEASE NOTE: Listally and Derragos. Cardinal's hability and clean's necknow remedy for any claim artaing whether based in conitact or lost, shull be linked to the amount paid by the cleant for the | r claim as | rising w | thelher | ni besed | CONFAC | t or lar | Shall to | o limited | to the amount | pard by the clent fo | r the | | - | \dashv | - | 4 | _ | | | _ | 7 |
| malyses, All claims includers crivice. In no event shall Car iffiliates or successors onsax | minjoses. All claims Including those for usegigence and any other cuma whotscorver shall be deemed weived us crovice. In overnal shall Cardinabe be fable for includental or innecespental damages, including williard institution. If the consensus manso out of or included to the action manso of services insecured by Cardinal, insording | emed wa Allsout En Unat, reg | nivad u nitation, nordless | nloss m Dursing S of who | se inter | riting an uptions, sh claim | d recoin loss of is base | ed by (use, or dupon | Sardinal v kres of pr any of the | vithin 30 days or offis incurred to above stoled | ulosa made in variata and recowed by Cardinal verthin 30 days after correshation of the apprication Instances internations, has an interest, of loss of politis incurred by Celest, is a flecialisment so favolitise such claims is lussed upon any of the above select reasons or otherwise. | the applicable where some some some some some some some som | • | | | | | | | | | |
| Relinquished By | Date: // | Rece | Received By | I By | | 5 | - | | | | Phone Result | sult: | □ Yes | oN [] | | Add'l Phone # | e #: | | | | | П |
| 1/4/ | 1 WH | ~ | 1 | 1 | | - Fare | | 7// | DIN BUN | 1/4 | Fax Result: REMARKS: | S: | O Yes | S N | | Add'l Fax# | 2.* | | | | | |

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

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

hconder@rice-ecs.com; Lweinheimer@rice-ecs.com; Zconder@rice-ecs.com; Bbaker@rice-ecs.com;

kjones@riceswd.com

CHECKED BY:

Sample Condition
Cool Intact
Yes T Yes

Time: Date:

email results

RICE ENVIRONMENTAL CONSULTING & SAFETY

122 West Taylor Hobbs, NM 88240 PHONE: (505) 393-9174 FAX: (505) 397-1471 PID METER CALIBRATION & FIELD REPORT FORM

| CK. | | MODEL: PGM 7300 | SERIAL NO: 590-000508 |
|-------|---|-----------------|-----------------------|
| MODEL | | MODEL: PGM 7300 | SERIAL NO: 590-000504 |
| NO. | X | MODEL: PGM 7320 | SERIAL NO: 592-903318 |
| | | MODEL: PGM 7300 | SERIAL NO: 590-000183 |

GAS COMPOSITION: ISOBUTYLENE 100PPM / AIR: BALANCE

| LOT NO: HAL-248-100-1 | EXPIRATION DATE: 7/1/2015 |
|-----------------------|-----------------------------|
| | METER READING ACCURACY: 100 |

ACCURACY: +/- 2%

COMPANY RICE OPERATING

| SYSTEM | JUNCTION | UNIT | SECTION | TOWN SHIP | RANGE |
|--------|-----------|------|---------|-----------|-------|
| | | | _ | | |
| EME | Jct. F-26 | F | 26 | 20S | 36E |

| SAMPLE ID | PID | SAMPLE ID | PID |
|-----------------|------|-----------|-----|
| Background @ 6" | 0.6 | | |
| | | | |
| Source @ 3' | 10.1 | | |
| Source @ 4' | 24.5 | | |
| Source @ 5' | 34.5 | | |
| Source @ 6' | 16.1 | | |
| Source @ 7' | 12.8 | | |
| Source @ 8' | 16.8 | | |
| Source @ 9' | 25 | | |
| Source @ 10' | 5.2 | | |
| Source @ 11' | 10.8 | | |
| Source @ 12' | 13.2 | | |
| | | | |

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

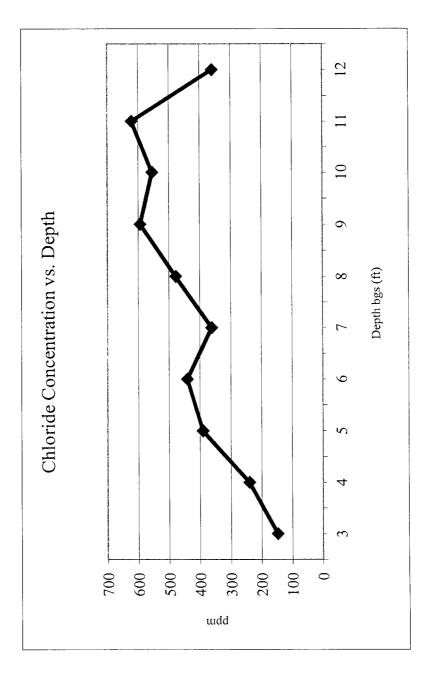
| SIGNATURE: | Not Available | DATE: | 4/17/2012 | |
|------------|---------------|-------|-----------|--|
| | | | | |

EME Jct. F-26 Unit 'F', Sec. 26, T20S, R36E

Backhoe samples at junction (source)

| ICIT page | 148 | 240 | 391 | 441 | 362 | 478 | 594 | 555 | 622 | 360 |
|----------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Depth bgs (ff) | 3 | 4 | 5 | 9 | 7 | 8 | 6 | 01 | 11 | 12 |

Groundwater = 112 ft





Hobbs, NM 88241 Phone: (575) 393-4411

Fax: (575) 393-0293

VEGETATION FORM

1. General Information

| Site name: | EME J | lct. F-26 | | | | | |
|------------------------|---------|------------------|---------------|-----------------|------------------------------------|---------------------------------|-------------------|
| U/L | T | Section | Township | Range | Count | y Latitude | Longitude |
| F | - 1 | 26 | 20S | 36E | Lea | 32 32'52.836" N | 103 19' 36.895" W |
| Contact Name: | Zach (| Conder | | | | | |
| Email: | zcono | ler@rice-ecs.com | | | | | |
| Site size: | 50 x 50 | 0 | SC | quare feet | | | |
| 2. Soils Salvaged from | site | *Do n | Imported | he rocks brough | t to the surface by rippin Blended | g shall be removed. Depth (in) | |
| Texture: | | | Describ | e soil & subsc | pil: | Light Brown Sand/Ca | liche |
| Soil prep meth | ods: | Rip | 6" Depth (in) | | Disc X | Depth (in) | Rollerpack |
| Date complete | d: | 4/17/2012 | | | | | |
| | | | | | | | |
| | | | | | | | |

3. Bioremediation Fertilizer Hay Other X Type: Describe: Lbs/acre: Describe:

| 4. Seeding | *Atte | ach seed bag tags i | to this fo | rm. Seed bag | tags shall contain | the site name and | ! S-T-R. | | |
|------------------------|---------|---------------------|------------|--------------|--------------------|-------------------|---------------------|-------|-----------|
| Custom Seed Mix | X | Prescribed Mix | ζ. | Seed | Mix Name: | 2 lbs blue grama | , 2 lbs. winter rye | Date: | 11/7/2012 |
| Broadcast | | | | | | Method: | Hand | - | |
| Soil conditions during | g seed: | Dry | Х | Damp | Wet | | | | |
| Observations: | | Raked seed tho | oroughly | y into soil | | | | | |

| 5. Cer | tification [1 | by certify that the information in this form and attachments is true and complete to the best of my knowledge and belief. | | |
|------------|---------------|---|-------|-----------|
| Name: | Willy Jencke | Title: Environmental Tech | Date: | 11/7/2012 |
| Signature: | : | Not Available | | |

RICE Operating Company

122 West Taylor • Hobbs, New Mexico 88240 114 MAS 32 A 10: 17 Phone: (575) 393-9174 • Fax: (575) 397-1471

April 1, 2014

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

RE: JUNCTION BOX UPGRADE REPORT for 2013

EME SWD SYSTEM Lea County, New Mexico

Mr. Lowe:

Rice Operating Company (ROC) takes this opportunity to submit the Junction Box Upgrade results for the year 2013. Enclosed is a list of the completed junction boxes and their respective closure/disclosure dates. These boxes are located in the Eunice-Monument-Eumont (EME) Salt Water Disposal (SWD) System located in the vicinity of Eunice, New Mexico.

ROC completed 11 junction boxes in 2013.

Enclosed are the 2008 results (17 sites evaluated with 22 sampling locations) from the PID/BTEX study described in the NMOCD-approved Revised Junction Box Upgrade Work Plan (July 16, 2003). A third-party analysis, conducted by Peter Galusky, Jr. Ph.D. of Texerra, concluded from the data collected thus far that field-composited values tend to produce slightly higher BTEX numbers above the point at which BTEX concentrations become significant. This is likely due to the fact that BTEX is volatile and quickly biodegradable. This analysis was submitted to NMOCD on March 12, 2009. An appropriate number of sample sites could not be obtained to conduct a 2013 BTEX comparison analysis. Peter Galusky, Jr. Ph.D. of Texerra also compared ROC's 2013 chloride field tests to chloride laboratory analyses; the analysis is also enclosed. The study of this data continues to validate the accuracy of the chloride field tests employed by ROC.

ROC is the service provider (agent) for the 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 Parties, who provide all operating capital on a percentage ownership/usage basis.

Replacement/closure projects of this magnitude require System Party AFE approval and work begins as funds are received.

Thank you for your consideration of this Junction Box Upgrade Report for 2013.

RICE OPERATING COMPANY

Hack Conder

Environmental Manager

enclosures as stated

cc: SC, file, Mr. Geoffrey Leking

NMOCD, District I Office 1625 N. French Drive Hobbs, NM 88240 Rice Operating Company

EME SWD System Junction Box Upgrade Project 2013 Completed Boxes

| | | Leg | al Des | scrip | llon | | | | 1.44 |
|----|--------------|------|--------|------------|------|-----------------|----------------------------|------------------|----------------|
| | Jct Box Name | Unit | Sec | T | R | Completion Date | OCD Assessment Score | Report Statue | Case Number |
| 1 | B-19 EOL | В | 19 | 198 | 37E | 6/28/2013 | 20 | Closure | |
| 2 | E-21 EOL | E | 21 | 20S | 37E | 1/8/2014 | 20 | Closure | |
| 3 | JCT. D-19 | D | 19 | 198 | 37E | 5/10/2013 | 20 | Closure | |
| 4 | JCT. D-20 | D | 20 | 198 | 37E | 6/10/2013 | 20 | Closure | |
| 5 | JCT. F-26 | F | 26 | 20S | 36E | 11/7/2012 | 0 | Closure | |
| 6 | JCT. H-4 | Н | 4 | 20S | 36E | 6/7/2013 | 20 | Closure | |
| 7 | JCT. I-9 | 1 | 9 | 205 | 36E | 6/7/2013 | 20 | Closure | |
| 8 | JCT. K-19 | K | 19 | 198 | 37E | 6/11/2013 | 20 | Closure | |
| 9 | M-9 EOL | М | 9 | 21S | 36E | 6/24/2013 | 0 | Closure | |
| 10 | O-28 EOL | 0 | 28 | 208 | 36E | n/a | 0 | Closure | |
| 11 | P-5 EOL | Р | 5 | 218 | 36E | 6/24/2013 | 0 | Closure | |

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

Texerra

505 N Big Spring, Suite 404 Midland, Texas 79701 Tel: 432-634-9257 E-mail: lpg@texerra.com

March 10th, 2009

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

Re: Comparison of Field versus Lab Compositing of BTEX soil samples

Rice Operating Company, Junction Box Upgrade Work Plan

Sent via Certified Mail w/ Return Receipt No. 7006 0100 0001 2438 3944

Dear Mr. Jones:

On behalf of Rice Operating Company (ROC) I am submitting the attached comparison and analysis of field versus laboratory soil compositing for soil BTEX samples. This is to address the question of whether it is better to mix multiple samples in the field or to do so in the laboratory in order to produce a composite, representative sample for analysis. This work was undertaken in support of ROC's Junction Box Upgrade Work Plan to ensure the quality of their field analysis program.

In brief, this work indicates that field compositing of soil samples generally gives rise to *slightly* higher BTEX values than does laboratory compositing of multiple samples. This is presumably due to the likelihood that field compositing and packaging of soil samples better preserves sample integrity. It would therefore appear that field compositing would represent the better method of procuring soil samples for subsequent analysis of BTEX.

Please call me if you have any questions or wish to discuss any of the details of this study.

ROC is the service provider (agent) for various Salt Water Disposal Systems (SWDs) and has no ownership of any portion of pipeline, well or facility. The SWD Systems that ROC operates are owned by a consortium of oil producers, System Partners, who provide all operating capital on a percentage ownership/usage basis.

Sincerely,

L. Peter Galusky, Jr. Ph.D.

Principal

Copy: Rice Operating Company,

Edward Hansen (NMOCD) sent certified mail w/ return receipt

No. 7006 0100 0001 2438 3937

Attachment: As noted, above.

Rice Operating Company Comparison of Field Compositing versus Laboratory Compositing of Soil BTEX Samples¹

The careful mixing of multiple soil samples is critical in order to produce a representative, composite sample from a respective study area (such as a excavation face or bottom). Field technicians typically take four or five "grab" samples from excavation walls and/or bottom and send each of these to a laboratory for analysis of the composite, or mixed, sample. It would be far simpler, however, to composite such samples in the field. This study was undertaken to determine if field compositing produced results substantially different than laboratory compositing for the analysis of BTEX. Data were provided by Rice Operating Company encompassing 22 sampling locations over the period of 2004 through 2008.

A comparison of lab-composited soil samples versus field-composited soil samples revealed a close correspondence for total BTEX between the two methods (Figure 1).

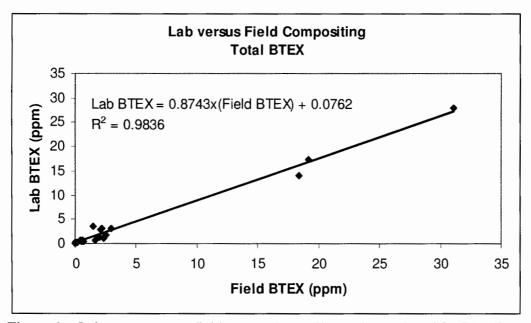


Figure 1 - Laboratory versus field-composited soil samples analyzed for BTEX.

The high R² value (0.9836) of the best-fit statistical regression line indicates a high degree of reliability in using the field-compositing method over the range of values observed. Below a "field-composited BTEX" value of 0.61 ppm the "lab-composited BTEX" values are slightly lower. However, above a field-composited BTEX value of 0.61 the lab-composited values run slightly lower. In other words, the field-composited values tended to produce slightly higher BTEX numbers above the point at which BTEX concentrations become significant.

There is a reason for this. BTEX is volatile and quickly biodegradable. The compositing and "packaging" of soil samples in the field minimize the handling and aeration that occur in the laboratory. Thus, field-composited soil samples lose less BTEX to evaporation and/or biodegradation prior to laboratory analysis. In other words, the field compositing and packaging of soil samples better preserves sample integrity, and for this reasons would appear to represent the better method of procuring soil samples for subsequent analysis of BTEX.

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Prepared 03-12-09 by L. Peter Galusky, Jr. of Texerra.

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

Texerra LLC

20055 Laredo Lane Monument, CO 80132 Tel: 719-339-6791 E-mail: lpg@texerra.com

March 25th, 2014

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

Re: Comparison of 2013 Laboratory versus Field Measured Soil Chloride Values

Rice Operating Company, Junction Box Upgrade Work Plan

Mr. Lowe:

The attached comparison and analysis of 2013 laboratory versus field measured soil chloride values is submitted in support of Rice Operating Company's (ROC's) Junction Box Upgrade Work Plan to ensure the quality of their field analysis program.

In brief, this work indicates that Rice's 2013 field chloride measurement efforts provided a reasonable qualitative approximation of the laboratory-measured (and presumed true) values.

ROC is the service provider (agent) for various Salt Water Disposal Systems (SWDs) and has no ownership of any portion of pipeline, well or facility. The SWD Systems that ROC operates are owned by a consortium of oil producers, System Parties, who provide all operating capital on a percentage ownership/usage basis.

Please call me if you have any questions or wish to discuss this study.

Sincerely,

L. Peter Galusky, Jr. Ph.D.

Principal

Copy: Glenn VonGonten, NMOCD; Rice Operating Company

Attachment: As noted, above.

Rice Operating Company Comparison of Laboratory to Field Measured Soil Chloride Concentrations Based upon 2013 Field Data

A representative sample of 29 pairs of laboratory versus field measured soil chloride values was compared to determine how well field measurements matched laboratory measurements. It is assumed that laboratory measurements better represent the "true" values due to the controlled environment that a laboratory provides. A simple plot of the laboratory versus field measured soil chloride values is given below (Figure 1).

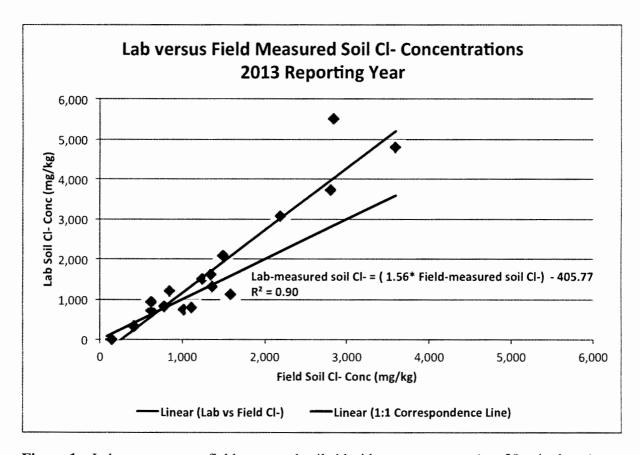


Figure 1 – Laboratory versus field measured soil chloride measurements (n = 29 paired sets).

A straight line fit to the data confirms a general linear trend over a wide range of soil chloride concentrations, and the R^2 value (0.90) indicates that field measurements provide a reliable approximation of laboratory-measured values. Based on the best-fit line of lab vs field measured values, field measured values overestimate lab measure values below a field measured value of 723 mg/kg and above this underestimate the lab-measured values. This is indicated in the graph where the (blue) best-fit line of lab vs field measured chlorides crosses the (black) line which would indicate a 1:1 correspondence.

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