

1-427-408

**Approval & ICP/CAP
Report**

DATE

July 7, 2014

From: Lowe, Leonard, EMNRD
To: "[Hack Conder \(hconder@riceswd.com\)](mailto:hconder@riceswd.com)"
Cc: [Oberding, Tomas. EMNRD](mailto:Oberding.Tomas.EMNRD); "[Katie Jones <kjones@riceswd.com>](mailto:kjones@riceswd.com)"; "lflores@rice-ecs.com"; "[Lara Weinheimer \(lweinheimer@rice-ecs.com\)](mailto:Lara.Weinheimer@rice-ecs.com)"
Subject: ICP & CAP (1R427-408) Approval - ROC EME Jct. J - 4
Date: Monday, July 07, 2014 3:20:00 PM
Importance: High

RE: Investigation and Characterization Plan (ICP) Report and Corrective Action Plan (CAP) for the Rice Operating Company's EME Jct. J - 4 Unit Letter K, Section 30, T19S, R37E, NMPM, Lea County, New Mexico Corrective Action Plan (1R427-408) Approval

Dear Mr. Conder:

The New Mexico Oil Conservation Division (OCD) has received the Investigation and Characterization Plan and Corrective Action Plan for the EME Jct. J - 4, dated **June 12, 2014**, and has conducted a review of the Plan. The Plan indicates that Rice Operating Company (ROC) has met the requirements of 19.15.29 NMAC (Rule 29; formerly, Rule 116) for a remediation plan. Therefore, the OCD hereby conditionally approves the Corrective Action Plan as proposed for above-referenced site in accordance with 19.15.29 NMAC:

ROC must submit to the OCD a report of the corrective actions within 270 days.

Please be advised that OCD approval of this plan 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 505-476-3492.

Leonard Lowe

Environmental Engineer

[Environmental Bureau]

Oil Conservation Division

Energy Minerals and Natural Resources Department

1220 South St. Frances

Santa Fe, New Mexico 87004

Office: 505-476-3492

Fax: 505-476-3462

E-mail: leonard.lowe@state.nm.us

Website: <http://www.emnrd.state.nm.us/ocd/>

From: [Katie Jones](#)
To: [Lowe, Leonard, EMNRD](#)
Cc: [Hack Conder](#); [VonGonten, Glenn, EMNRD](#); [Laura Flores](#)
Subject: ROC - EME Jct. J-4 (1R427-408) ICP Report and CAP
Date: Thursday, June 12, 2014 8:27:01 AM
Attachments: [ROC - EME Jct. J-4 \(1R427-408\) ICP Report and CAP.pdf](#)
[ROC Flow Chart for Report Submissions CAP.pdf](#)
[EME Jct. J-4 Multimed.inp](#)
[EME Jct. J-4 Soil Data.xlsx](#)

Mr. Lowe,

I've attached a Corrective Action Plan (CAP) for the EME Jct. J-4 (1R427-408) site. I've also attached the ROC Flow Chart, the multimed input file, and an excel document summarizing soil data and multimed inputs.

This report will be top priority for us so that we are able to continue working over the next few months. If you have any questions or require any additional information, please contact me or Hack Conder.

Thank you,

Katie Jones
Environmental Project Manager
RICE Operating Company (ROC)



PO Box 2948 | Hobbs, NM 88241 | Phone 575.393.2967

June 12, 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: ICP Report & Corrective Action Plan (CAP)
Rice Operating Company – EME SWD System
EME Jct. J-4 (1R427-408): UL/J sec. 4 T20S R37E**

Mr. Lowe:

RICE Operating Company (ROC) has retained Rice Environmental Consulting and Safety (RECS) to address potential environmental concerns at the above-referenced site in the EME Salt Water Disposal (SWD) system. 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.

Background and Previous Work

The site is located approximately 1.5 miles southeast of Monument, New Mexico in Unit J, Section 4, T20S R37E as shown on the Geographical Location and Area Maps (Figures 1 and 2). NM OSE records indicate that groundwater will likely be encountered at a depth of approximately 33 +/- feet.

In 2012, ROC initiated work on the former EME J-4 junction box. The site was delineated using a backhoe to form a 30 ft x 30 ft x 12 ft deep excavation and soil samples were screened at regular intervals for both hydrocarbons and chlorides. From the excavation, the wall composites and the bottom composite were taken to a commercial laboratory for analysis. The laboratory test of the north wall composite showed a chloride reading of 688 mg/kg, the south wall composite showed a chloride reading of 976 mg/kg, the east wall composite showed a chloride reading of 944 mg/kg and the west wall composite showed a chloride reading of 912 mg/kg. The Gasoline Range Organics (GRO) readings and Diesel Range Organics (DRO) readings of all the wall composites showed non-detect, except for the DRO readings of the south wall composite, which showed a reading of 525 mg/kg, and the west wall, which showed a reading of 74.9 mg/kg. The bottom composite showed a chloride laboratory reading of 864 mg/kg and GRO and DRO readings of non-detect.

The excavated soil was blended on site and a total of 552 yards of the blended soil was taken to a NMOCD approved facility for disposal. The excavation was backfilled with imported caliche to 6 ft bgs. At 6 ft bgs, a 20-mil reinforced poly liner was installed and properly seated in the excavation. The excavation was backfilled with clean, imported top soil to the ground surface and contoured to the surrounding location. An 8 point composite from the imported top soil and caliche were taken to a commercial laboratory for analysis. The top soil returned a chloride value of 80 mg/kg and the caliche returned a chloride value of 704 mg/kg.

On October 24th, 2012, the site was seeded with a blend of native vegetation. NMOCD was notified of potential groundwater impact on March 4th, 2013 and a junction box disclosure report was submitted to NMOCD with all the 2012 junction box closures and disclosures.

As part of the Investigation and Characterization Plan (ICP) submitted to NMOCD on October 10th, 2013 and approved on October 28th, 2013, five soil bores were installed at the site on February 3rd, 2014. As the bores were advanced, soil samples were taken at regular intervals and field tested for chlorides and hydrocarbons. Representative samples from each bore were taken to a commercial laboratory for analysis (Appendix A). Laboratory analysis of SB-1 returned chloride concentrations of 768 at 18 ft bgs and 335 mg/kg at 27 ft bgs. SB-2 returned chloride concentrations of 976 mg/kg at 6 ft bgs and 32 mg/kg at 24 ft bgs. SB-3 returned chloride concentrations of 768 mg/kg at 3 ft bgs and 48 mg/kg at 21 ft bgs. SB-4 returned chloride concentrations of 1,150 mg/kg at 3 ft bgs and 176 mg/kg at 12 ft bgs. SB-5 returned chloride concentrations of 1,280 mg/kg at 3 ft bgs and 464 mg/kg at 27 ft bgs. GRO and DRO analysis returned values of non-detect in all bores at all depths except at SB-2, where the DRO reading was 20.1 mg/kg at 24 ft bgs and at SB-5, where the DRO reading was 12.5 mg/kg at 27 ft bgs. The bore holes were plugged in total with bentonite to the ground surface.

Corrective Action Plan

To determine if the residual chlorides in the vadose zone pose a threat to groundwater quality, RECS ran the U.S. Environmental Protection Agency Exposure Assessment Multimedia Model (MULTIMED Version 1.5, 2005). Model outputs and the graph are included in Appendix B. With a proposed infiltration barrier of 63 ft x 60 ft, the model output concludes that the peak concentration of chlorides in groundwater contributed by the vadose zone soils would be approximately 77.65 mg/L in 68.5 years. Since the estimated increase in chloride concentrations in groundwater from residual chloride migration is below the WQCC standard of 250 mg/L, no action is warranted for the groundwater at this site.

Based on the multimted results, RECS recommends that ROC install a 20-mil reinforced poly liner at the site with dimensions of 63 ft x 60 ft at a depth of 4 – 5 ft bgs (Figure 2). The liner will inhibit the downward migration of constituents through the vadose zone. The soils placed above the liner will have a laboratory chloride reading no greater than 500 mg/kg and a field PID measurement below 100 ppm. Excavated soils will be

evaluated for use as backfill and any soils requiring disposal will be properly disposed of at a NMOCD approved facility. The excavation will be backfilled to ground surface and contoured to the surrounding location. The soils over and surrounding the site will then be prepared with soil amendments, as necessary, and seeded with a native vegetative mix. Vegetation above the liner will also provide a natural infiltration barrier for the site since plants capture water through their roots thereby reducing the volume of water moving through the vadose zone to groundwater.

Once the CAP work is completed by installing the 20-mil reinforced poly liner and seeding the site, ROC will submit a written report that will include a request for 'remediation termination' and site closure.

RECS appreciates the opportunity to work with you on this project. Please call Hack Conder at (575) 393-9174 or me if you have any questions or wish to discuss the site.

Sincerely,



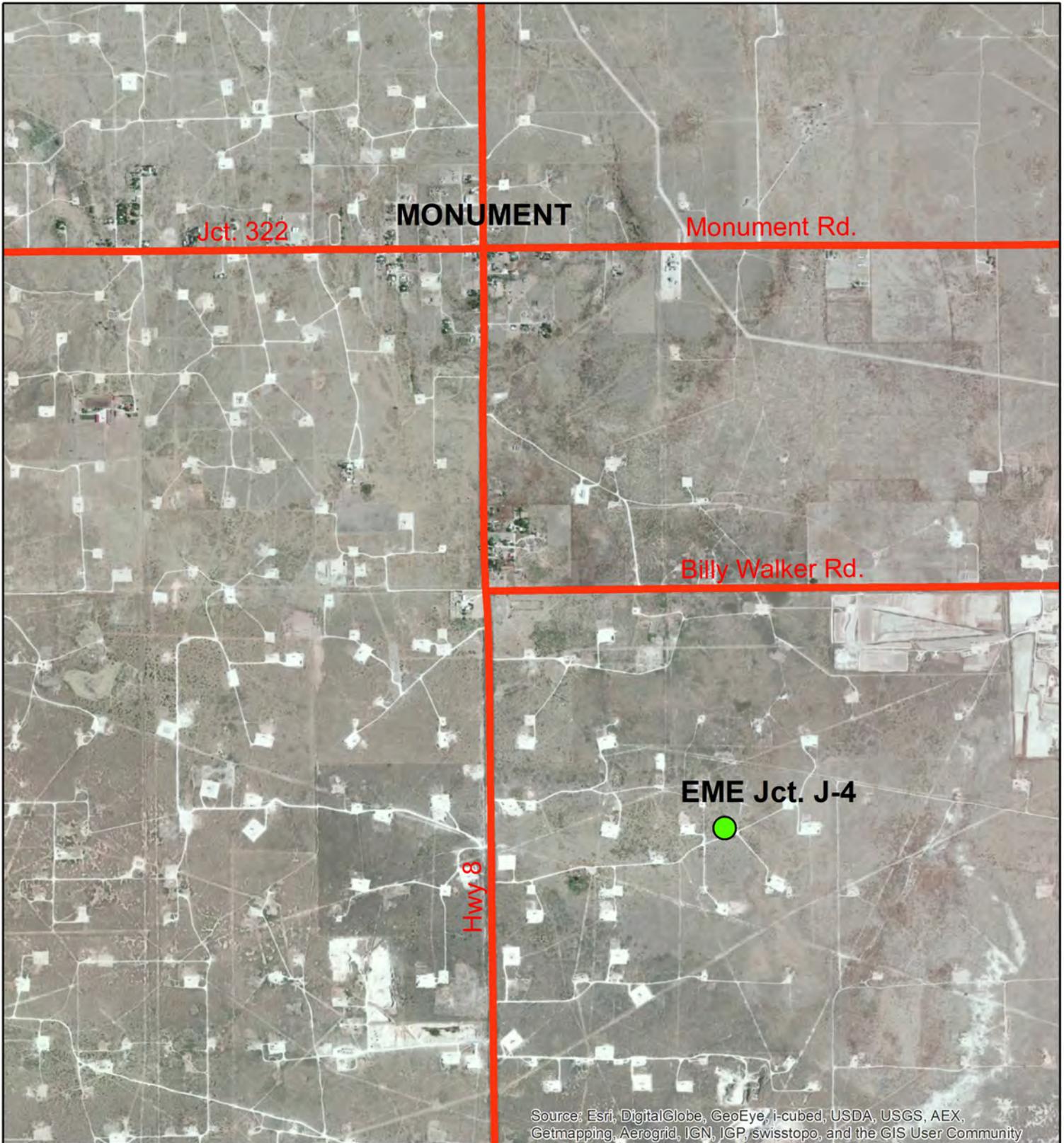
Laura Flores
Rice Environmental Consulting & Safety (RECS)
Project Manager

Attachments:

- Figure 1 – Geographical Location Map
- Figure 2 – Area Map
- Figure 3 – Soil Bore Installation and Proposed Liner Map
- Appendix A – Soil Bore Installation Documentation
- Appendix B – Multimed Documentation

Figures

Geographical Location Map

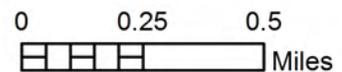


EME Jct. J-4

UL J SECTION 4
T-20-S R-37-E
LEA COUNTY, NM

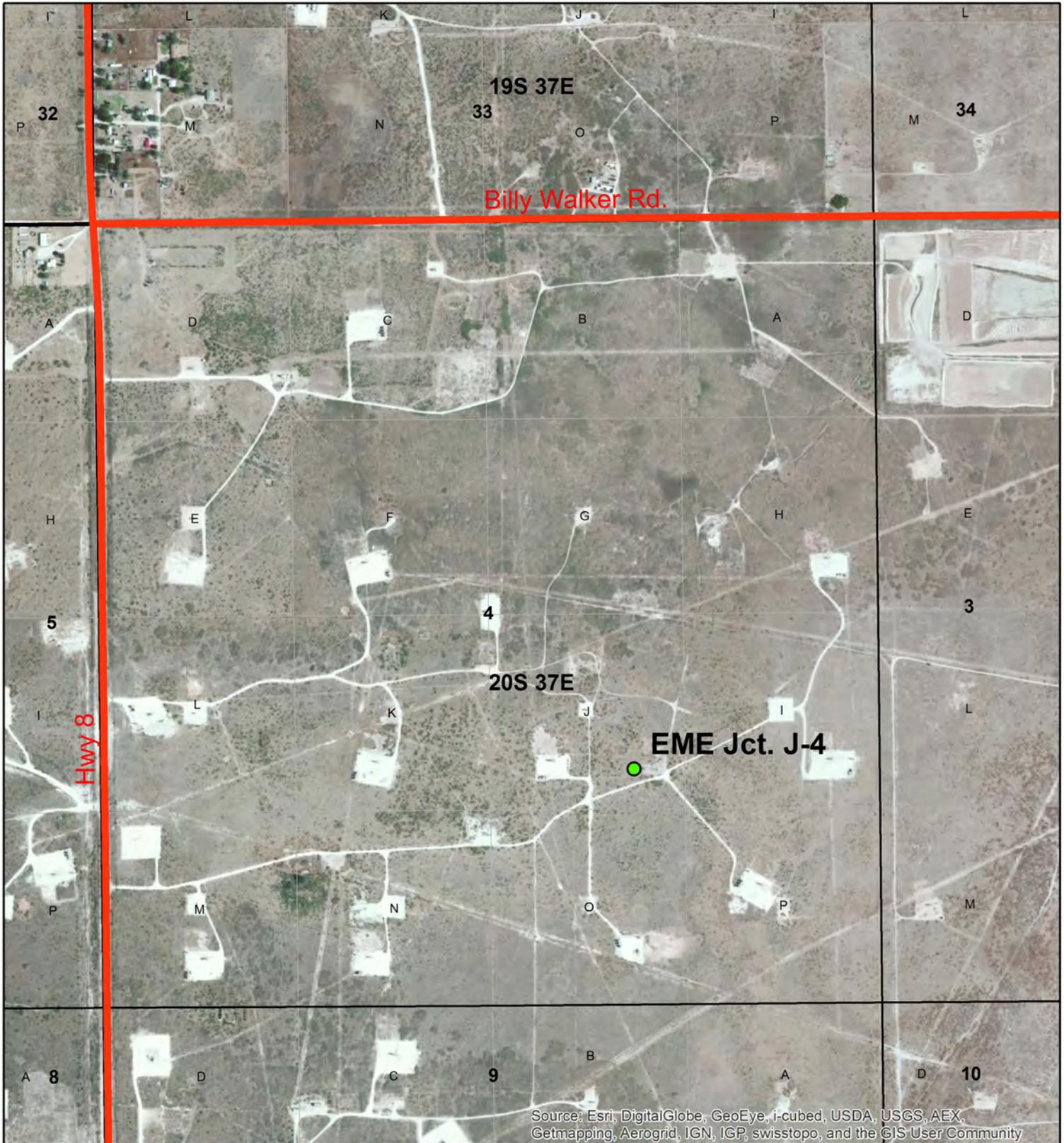
NMOCD Case #: 1R427-408

Figure 1



Drawing date: 1/17/13
Drafted by: L. Weinheimer

Area Map



Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

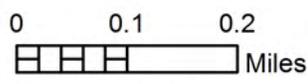


EME Jct. J-4

UL J SECTION 4
T-20-S R-37-E
LEA COUNTY, NM

NMOCD Case #: 1R427-408

Figure 2



Drawing date: 8/5/13
Drafted by: L. Weinheimer

Soil Bore Installation and Proposed Liner

SB-1

| | CI- | PID | Lab | CI- | GRO | DRO |
|-----|-----|-----|-----|-----|-----|-----|
| 15' | 424 | 2.1 | | | | |
| 18' | 463 | 1.7 | 768 | <10 | <10 | |
| 21' | 366 | 3.1 | | | | |
| 24' | 431 | 1 | | | | |
| 27' | 181 | 1.2 | 335 | <10 | <10 | |

SB-2

| | CI- | PID | Lab | CI- | GRO | DRO |
|-----|-----|-----|-----|-----|------|-----|
| SS | 122 | 1.1 | | | | |
| 3' | 552 | 2 | | | | |
| 6' | 825 | 2.6 | 976 | <10 | <10 | |
| 9' | 330 | 3.2 | | | | |
| 12' | 367 | 1.5 | | | | |
| 15' | 405 | 1.3 | | | | |
| 18' | 456 | 0.7 | | | | |
| 21' | 381 | 0.8 | | | | |
| 24' | 151 | 0.6 | 32 | <10 | 20.1 | |

SB-3

| | CI- | PID | Lab | CI- | GRO | DRO |
|-----|-----|-----|-----|-----|-----|-----|
| SS | 119 | 1.3 | | | | |
| 3' | 669 | 1.5 | 768 | <10 | <10 | |
| 6' | 660 | 0.7 | | | | |
| 9' | 360 | 1 | | | | |
| 12' | 445 | 1 | | | | |
| 15' | 565 | 1.2 | | | | |
| 18' | 259 | 1.1 | | | | |
| 21' | 119 | 2 | 48 | <10 | <10 | |

SB-4

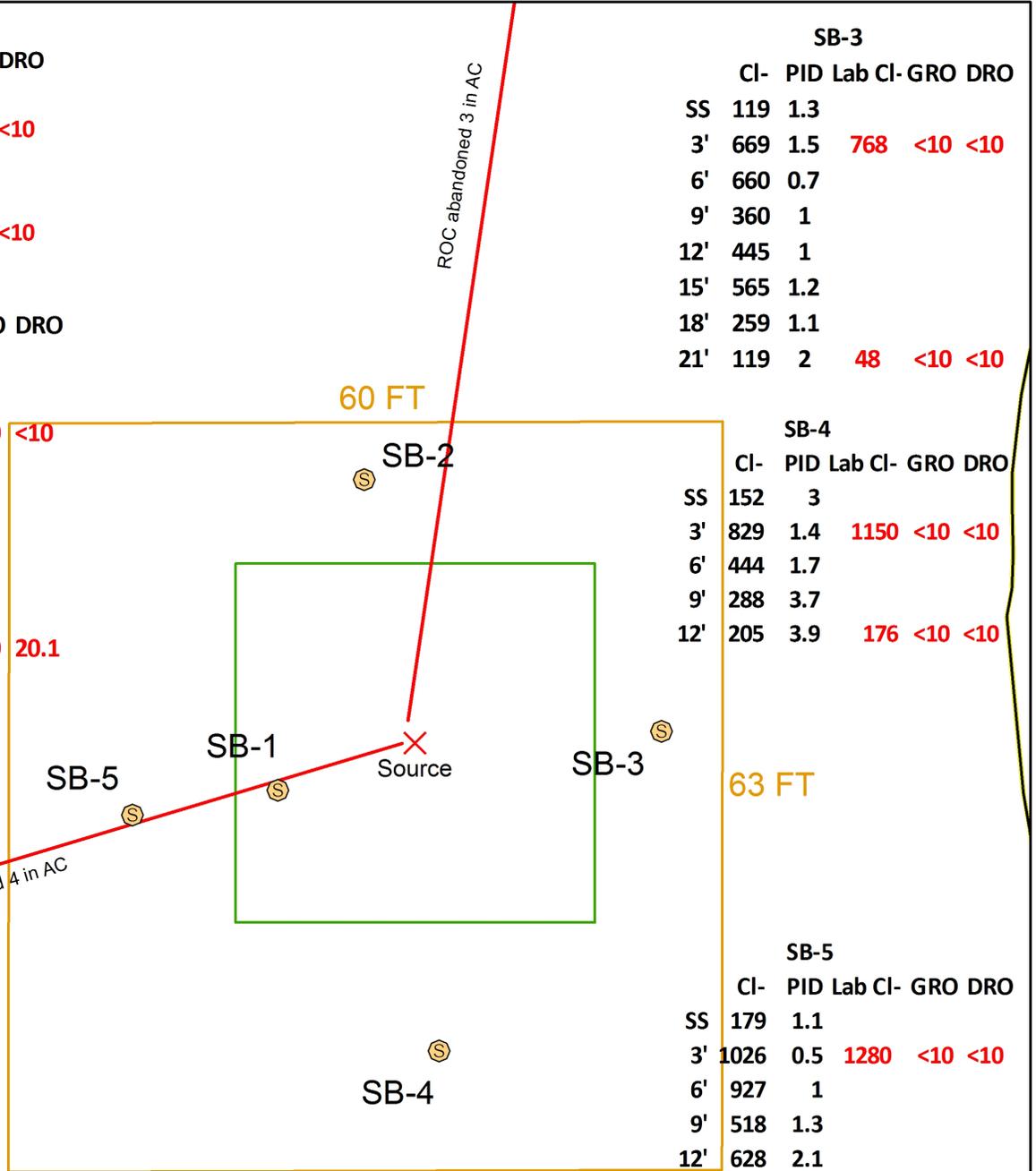
| | CI- | PID | Lab | CI- | GRO | DRO |
|-----|-----|-----|------|-----|-----|-----|
| SS | 152 | 3 | | | | |
| 3' | 829 | 1.4 | 1150 | <10 | <10 | |
| 6' | 444 | 1.7 | | | | |
| 9' | 288 | 3.7 | | | | |
| 12' | 205 | 3.9 | 176 | <10 | <10 | |

SB-5

| | CI- | PID | Lab | CI- | GRO | DRO |
|-----|------|-----|------|-----|------|-----|
| SS | 179 | 1.1 | | | | |
| 3' | 1026 | 0.5 | 1280 | <10 | <10 | |
| 6' | 927 | 1 | | | | |
| 9' | 518 | 1.3 | | | | |
| 12' | 628 | 2.1 | | | | |
| 15' | 772 | 3.9 | | | | |
| 18' | 643 | 2.6 | | | | |
| 21' | 720 | 3.9 | | | | |
| 24' | 347 | 2.3 | | | | |
| 27' | 207 | 1.9 | 464 | <10 | 12.5 | |

Legend

-  EME SOIL BORES
-  EME REMOVED BOXES
-  BURIED PIPELINE
-  SURFACE PIPELINE
-  30' x 30' REINFORCED POLY LINER @ 6 FT
-  PROPOSED 20-MIL LINER @ 4-5 FT

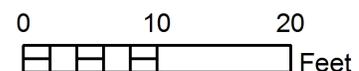


Landowner: Martha Laughlin Williams
DGW = 33 ft



EME Jct. J-4
UL J SECTION 4
T-20-S R-37-E
LEA COUNTY, NM
NMOCD Case #: 1R427-408

Figure 3



Drawing date: 4/30/14
Drafted by: L. Weinheimer

Appendix A

Soil Bore Installation Documentation

RICE Environmental Consulting and Safety (RECS)
P.O. Box 2948 Hobbs, NM 88241
Phone 575.393.2967

| | | | |
|---|-----------------------|--|---|
| Logger: | Kyle Schnaidt | | |
| Driller: | Harrison&Cooper, Inc. | | |
| Drilling Method: | Air Rotary | | |
| Start Date: | 2/3/2014 | | |
| End Date: | 2/3/2014 | | Project Name: EME Jct. J-4 Well ID: SB-1 Project Consultant: RECS |
| Comments: All samples were taken from cuttings. SB-1 is located 12 ft southwest of the former Jct. box site. TD = 27' GW = 33' DRAFTED BY: C. Ursanic | | | Location: UL/ J Sec. 4 T-20-S R-37-E Lat: 32°35'57.462"N County: Lea Long: 103°15'11.989"W State: NM |

| Depth (feet) | Chloride field tests | LAB | PID | Description | Lithology | Well Construction |
|--------------|----------------------|------------|-----|-------------------------|-----------|--------------------|
| 15 ft | 424 | | 2.1 | sand stone with caliche | | Bentonite Seal |
| 18 ft | 463 | Lab Cl-768 | 1.7 | | | |
| | | GRO <10.0 | | | | |
| | | DRO <10.0 | | | | |
| 21 ft | 366 | | 3.1 | | | |
| 24 ft | 431 | | 1.0 | | | |
| 27 ft | 181 | Lab Cl-335 | 1.2 | | | |
| | | GRO <10.0 | | | | |
| | | DRO <10.0 | | | | |



February 07, 2014

KYLE NORMAN

Rice Operating Company

112 W. Taylor

Hobbs, NM 88240

RE: EME JCT. J-4

Enclosed are the results of analyses for samples received by the laboratory on 02/03/14 16:45.

Cardinal Laboratories is accredited through Texas NELAP under certificate number T104704398-13-5. 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.tceq.texas.gov/field/qa/lab_accred_certif.html.

Cardinal Laboratories is accredited 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.

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,

A handwritten signature in cursive script that reads "Celey D. Keene".

Celey D. Keene

Lab Director/Quality Manager

Analytical Results For:

 Rice Operating Company
 KYLE NORMAN
 112 W. Taylor
 Hobbs NM, 88240
 Fax To: (575) 397-1471

| | | | |
|-------------------|--------------|---------------------|---------------|
| Received: | 02/03/2014 | Sampling Date: | 02/03/2014 |
| Reported: | 02/07/2014 | Sampling Type: | Soil |
| Project Name: | EME JCT. J-4 | Sampling Condition: | Cool & Intact |
| Project Number: | NOT GIVEN | Sample Received By: | Jodi Henson |
| Project Location: | T-205 R-37E | | |

Sample ID: SB 1 @ 27' (H400329-01)

| Chloride, SM4500CI-B | | mg/kg | | Analyzed By: AP | | | | | |
|--------------------------------------|------------|-----------------|-----------------|-----------------|-----|------------|---------------|------|-----------|
| Analyte | Result | Reporting Limit | Analyzed | Method Blank | BS | % Recovery | True Value QC | RPD | Qualifier |
| Chloride | 335 | 16.0 | 02/07/2014 | ND | 416 | 104 | 400 | 0.00 | |
| TPH 8015M | | mg/kg | | Analyzed By: ms | | | | | |
| Analyte | Result | Reporting Limit | Analyzed | Method Blank | BS | % Recovery | True Value QC | RPD | Qualifier |
| GRO C6-C10 | <10.0 | 10.0 | 02/05/2014 | ND | 226 | 113 | 200 | 7.46 | |
| DRO >C10-C28 | <10.0 | 10.0 | 02/05/2014 | ND | 208 | 104 | 200 | 3.02 | |
| <i>Surrogate: 1-Chlorooctane</i> | | <i>95.8 %</i> | <i>65.2-140</i> | | | | | | |
| <i>Surrogate: 1-Chlorooctadecane</i> | | <i>101 %</i> | <i>63.6-154</i> | | | | | | |

Sample ID: SB 1 @ 18' (H400329-02)

| Chloride, SM4500CI-B | | mg/kg | | Analyzed By: AP | | | | | |
|--------------------------------------|------------|-----------------|-----------------|-----------------|-----|------------|---------------|------|-----------|
| Analyte | Result | Reporting Limit | Analyzed | Method Blank | BS | % Recovery | True Value QC | RPD | Qualifier |
| Chloride | 768 | 16.0 | 02/07/2014 | ND | 416 | 104 | 400 | 0.00 | |
| TPH 8015M | | mg/kg | | Analyzed By: ms | | | | | |
| Analyte | Result | Reporting Limit | Analyzed | Method Blank | BS | % Recovery | True Value QC | RPD | Qualifier |
| GRO C6-C10 | <10.0 | 10.0 | 02/05/2014 | ND | 226 | 113 | 200 | 7.46 | |
| DRO >C10-C28 | <10.0 | 10.0 | 02/05/2014 | ND | 208 | 104 | 200 | 3.02 | |
| <i>Surrogate: 1-Chlorooctane</i> | | <i>86.2 %</i> | <i>65.2-140</i> | | | | | | |
| <i>Surrogate: 1-Chlorooctadecane</i> | | <i>86.3 %</i> | <i>63.6-154</i> | | | | | | |

Cardinal Laboratories

*=Accredited Analyte

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Celey D. Keene, Lab Director/Quality Manager

Analytical Results For:

 Rice Operating Company
 KYLE NORMAN
 112 W. Taylor
 Hobbs NM, 88240
 Fax To: (575) 397-1471

 Received: 02/03/2014
 Reported: 02/07/2014
 Project Name: EME JCT. J-4
 Project Number: NOT GIVEN
 Project Location: T-205 R-37E

 Sampling Date: 02/03/2014
 Sampling Type: Soil
 Sampling Condition: Cool & Intact
 Sample Received By: Jodi Henson

Sample ID: SB 2 @ 6' (H400329-03)

| Chloride, SM4500CI-B | | mg/kg | | Analyzed By: AP | | | | | |
|--------------------------------------|---------------|-----------------|------------|-----------------|-----|------------|---------------|------|-----------|
| Analyte | Result | Reporting Limit | Analyzed | Method Blank | BS | % Recovery | True Value QC | RPD | Qualifier |
| Chloride | 976 | 16.0 | 02/07/2014 | ND | 416 | 104 | 400 | 0.00 | |
| TPH 8015M | | mg/kg | | Analyzed By: ms | | | | | |
| Analyte | Result | Reporting Limit | Analyzed | Method Blank | BS | % Recovery | True Value QC | RPD | Qualifier |
| GRO C6-C10 | <10.0 | 10.0 | 02/05/2014 | ND | 226 | 113 | 200 | 7.46 | |
| DRO >C10-C28 | <10.0 | 10.0 | 02/05/2014 | ND | 208 | 104 | 200 | 3.02 | |
| <i>Surrogate: 1-Chlorooctane</i> | <i>100 %</i> | <i>65.2-140</i> | | | | | | | |
| <i>Surrogate: 1-Chlorooctadecane</i> | <i>99.5 %</i> | <i>63.6-154</i> | | | | | | | |

Sample ID: SB 2 @ 24' (H400329-04)

| Chloride, SM4500CI-B | | mg/kg | | Analyzed By: AP | | | | | |
|--------------------------------------|---------------|-----------------|------------|-----------------|-----|------------|---------------|------|-----------|
| Analyte | Result | Reporting Limit | Analyzed | Method Blank | BS | % Recovery | True Value QC | RPD | Qualifier |
| Chloride | 32.0 | 16.0 | 02/07/2014 | ND | 416 | 104 | 400 | 0.00 | |
| TPH 8015M | | mg/kg | | Analyzed By: ms | | | | | |
| Analyte | Result | Reporting Limit | Analyzed | Method Blank | BS | % Recovery | True Value QC | RPD | Qualifier |
| GRO C6-C10 | <10.0 | 10.0 | 02/05/2014 | ND | 226 | 113 | 200 | 7.46 | |
| DRO >C10-C28 | 20.1 | 10.0 | 02/05/2014 | ND | 208 | 104 | 200 | 3.02 | |
| <i>Surrogate: 1-Chlorooctane</i> | <i>95.7 %</i> | <i>65.2-140</i> | | | | | | | |
| <i>Surrogate: 1-Chlorooctadecane</i> | <i>97.4 %</i> | <i>63.6-154</i> | | | | | | | |

Cardinal Laboratories

*=Accredited Analyte

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Celey D. Keene, Lab Director/Quality Manager

Analytical Results For:

 Rice Operating Company
 KYLE NORMAN
 112 W. Taylor
 Hobbs NM, 88240
 Fax To: (575) 397-1471

 Received: 02/03/2014
 Reported: 02/07/2014
 Project Name: EME JCT. J-4
 Project Number: NOT GIVEN
 Project Location: T-205 R-37E

 Sampling Date: 02/03/2014
 Sampling Type: Soil
 Sampling Condition: Cool & Intact
 Sample Received By: Jodi Henson

Sample ID: SB 3 @ 3' (H400329-05)

| Chloride, SM4500CI-B | | mg/kg | | Analyzed By: AP | | | | | |
|--------------------------------------|------------|-----------------|-----------------|-----------------|-----|------------|---------------|------|-----------|
| Analyte | Result | Reporting Limit | Analyzed | Method Blank | BS | % Recovery | True Value QC | RPD | Qualifier |
| Chloride | 768 | 16.0 | 02/07/2014 | ND | 416 | 104 | 400 | 0.00 | |
| TPH 8015M | | mg/kg | | Analyzed By: ms | | | | | |
| Analyte | Result | Reporting Limit | Analyzed | Method Blank | BS | % Recovery | True Value QC | RPD | Qualifier |
| GRO C6-C10 | <10.0 | 10.0 | 02/05/2014 | ND | 226 | 113 | 200 | 7.46 | |
| DRO >C10-C28 | <10.0 | 10.0 | 02/05/2014 | ND | 208 | 104 | 200 | 3.02 | |
| <i>Surrogate: 1-Chlorooctane</i> | | <i>95.0 %</i> | <i>65.2-140</i> | | | | | | |
| <i>Surrogate: 1-Chlorooctadecane</i> | | <i>97.8 %</i> | <i>63.6-154</i> | | | | | | |

Sample ID: SB 3 @ 21' (H400329-06)

| Chloride, SM4500CI-B | | mg/kg | | Analyzed By: AP | | | | | |
|--------------------------------------|-------------|-----------------|-----------------|-----------------|-----|------------|---------------|------|-----------|
| Analyte | Result | Reporting Limit | Analyzed | Method Blank | BS | % Recovery | True Value QC | RPD | Qualifier |
| Chloride | 48.0 | 16.0 | 02/07/2014 | ND | 416 | 104 | 400 | 0.00 | |
| TPH 8015M | | mg/kg | | Analyzed By: ms | | | | | |
| Analyte | Result | Reporting Limit | Analyzed | Method Blank | BS | % Recovery | True Value QC | RPD | Qualifier |
| GRO C6-C10 | <10.0 | 10.0 | 02/05/2014 | ND | 226 | 113 | 200 | 7.46 | |
| DRO >C10-C28 | <10.0 | 10.0 | 02/05/2014 | ND | 208 | 104 | 200 | 3.02 | |
| <i>Surrogate: 1-Chlorooctane</i> | | <i>89.8 %</i> | <i>65.2-140</i> | | | | | | |
| <i>Surrogate: 1-Chlorooctadecane</i> | | <i>93.1 %</i> | <i>63.6-154</i> | | | | | | |

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*=Accredited Analyte

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Celey D. Keene, Lab Director/Quality Manager

Analytical Results For:

 Rice Operating Company
 KYLE NORMAN
 112 W. Taylor
 Hobbs NM, 88240
 Fax To: (575) 397-1471

 Received: 02/03/2014
 Reported: 02/07/2014
 Project Name: EME JCT. J-4
 Project Number: NOT GIVEN
 Project Location: T-205 R-37E

 Sampling Date: 02/03/2014
 Sampling Type: Soil
 Sampling Condition: Cool & Intact
 Sample Received By: Jodi Henson

Sample ID: SB 4 @ 3' (H400329-07)

| Chloride, SM4500CI-B | | mg/kg | | Analyzed By: AP | | | | | |
|--------------------------------------|-------------|-----------------|-----------------|-----------------|-----|------------|---------------|------|-----------|
| Analyte | Result | Reporting Limit | Analyzed | Method Blank | BS | % Recovery | True Value QC | RPD | Qualifier |
| Chloride | 1150 | 16.0 | 02/07/2014 | ND | 416 | 104 | 400 | 0.00 | |
| TPH 8015M | | mg/kg | | Analyzed By: ms | | | | | |
| Analyte | Result | Reporting Limit | Analyzed | Method Blank | BS | % Recovery | True Value QC | RPD | Qualifier |
| GRO C6-C10 | <10.0 | 10.0 | 02/05/2014 | ND | 226 | 113 | 200 | 7.46 | |
| DRO >C10-C28 | <10.0 | 10.0 | 02/05/2014 | ND | 208 | 104 | 200 | 3.02 | |
| <i>Surrogate: 1-Chlorooctane</i> | | <i>99.9 %</i> | <i>65.2-140</i> | | | | | | |
| <i>Surrogate: 1-Chlorooctadecane</i> | | <i>101 %</i> | <i>63.6-154</i> | | | | | | |

Sample ID: SB 4 @ 12' (H400329-08)

| Chloride, SM4500CI-B | | mg/kg | | Analyzed By: AP | | | | | |
|--------------------------------------|------------|-----------------|-----------------|-----------------|-----|------------|---------------|------|-----------|
| Analyte | Result | Reporting Limit | Analyzed | Method Blank | BS | % Recovery | True Value QC | RPD | Qualifier |
| Chloride | 176 | 16.0 | 02/07/2014 | ND | 416 | 104 | 400 | 0.00 | |
| TPH 8015M | | mg/kg | | Analyzed By: ms | | | | | |
| Analyte | Result | Reporting Limit | Analyzed | Method Blank | BS | % Recovery | True Value QC | RPD | Qualifier |
| GRO C6-C10 | <10.0 | 10.0 | 02/05/2014 | ND | 226 | 113 | 200 | 7.46 | |
| DRO >C10-C28 | <10.0 | 10.0 | 02/05/2014 | ND | 208 | 104 | 200 | 3.02 | |
| <i>Surrogate: 1-Chlorooctane</i> | | <i>94.1 %</i> | <i>65.2-140</i> | | | | | | |
| <i>Surrogate: 1-Chlorooctadecane</i> | | <i>93.8 %</i> | <i>63.6-154</i> | | | | | | |

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*=Accredited Analyte

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Celey D. Keene, Lab Director/Quality Manager

Analytical Results For:

 Rice Operating Company
 KYLE NORMAN
 112 W. Taylor
 Hobbs NM, 88240
 Fax To: (575) 397-1471

 Received: 02/03/2014
 Reported: 02/07/2014
 Project Name: EME JCT. J-4
 Project Number: NOT GIVEN
 Project Location: T-205 R-37E

 Sampling Date: 02/03/2014
 Sampling Type: Soil
 Sampling Condition: Cool & Intact
 Sample Received By: Jodi Henson

Sample ID: SB 5 @ 3' (H400329-09)

| Chloride, SM4500CI-B | | mg/kg | | Analyzed By: AP | | | | | |
|--------------------------------------|-------------|-----------------|-----------------|-----------------|-----|------------|---------------|------|-----------|
| Analyte | Result | Reporting Limit | Analyzed | Method Blank | BS | % Recovery | True Value QC | RPD | Qualifier |
| Chloride | 1280 | 16.0 | 02/07/2014 | ND | 416 | 104 | 400 | 0.00 | |
| TPH 8015M | | mg/kg | | Analyzed By: ms | | | | | |
| Analyte | Result | Reporting Limit | Analyzed | Method Blank | BS | % Recovery | True Value QC | RPD | Qualifier |
| GRO C6-C10 | <10.0 | 10.0 | 02/05/2014 | ND | 226 | 113 | 200 | 7.46 | |
| DRO >C10-C28 | <10.0 | 10.0 | 02/05/2014 | ND | 208 | 104 | 200 | 3.02 | |
| <i>Surrogate: 1-Chlorooctane</i> | | <i>98.1 %</i> | <i>65.2-140</i> | | | | | | |
| <i>Surrogate: 1-Chlorooctadecane</i> | | <i>101 %</i> | <i>63.6-154</i> | | | | | | |

Sample ID: SB 5 @ 27' (H400329-10)

| Chloride, SM4500CI-B | | mg/kg | | Analyzed By: AP | | | | | |
|--------------------------------------|-------------|-----------------|-----------------|-----------------|-----|------------|---------------|------|-----------|
| Analyte | Result | Reporting Limit | Analyzed | Method Blank | BS | % Recovery | True Value QC | RPD | Qualifier |
| Chloride | 464 | 16.0 | 02/07/2014 | ND | 416 | 104 | 400 | 0.00 | |
| TPH 8015M | | mg/kg | | Analyzed By: ms | | | | | |
| Analyte | Result | Reporting Limit | Analyzed | Method Blank | BS | % Recovery | True Value QC | RPD | Qualifier |
| GRO C6-C10 | <10.0 | 10.0 | 02/05/2014 | ND | 226 | 113 | 200 | 7.46 | |
| DRO >C10-C28 | 12.5 | 10.0 | 02/05/2014 | ND | 208 | 104 | 200 | 3.02 | |
| <i>Surrogate: 1-Chlorooctane</i> | | <i>97.3 %</i> | <i>65.2-140</i> | | | | | | |
| <i>Surrogate: 1-Chlorooctadecane</i> | | <i>98.5 %</i> | <i>63.6-154</i> | | | | | | |

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Celey D. Keene, Lab Director/Quality Manager

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



Celey D. Keene, Lab Director/Quality Manager

Appendix B

Multimed Documentation

RICE Environmental Consulting and Safety (RECS)
P.O. Box 2948 Hobbs, NM 88241
Phone 575.393.2967

U. S. ENVIRONMENTAL PROTECTION AGENCY

EXPOSURE ASSESSMENT

MULTIMEDIA MODEL

MULTIMED (Version 1.50, 2005)

1

Run options
--- -----

Rice EME Jct J-4

1R427-408
Chemical simulated is Chloride

Option Chosen Saturated and unsaturated zone models
Run was DETERMIN
Infiltration Specified By User: 1.524E-02 m/yr
Run was transient
Well Times: Entered Explicitly
Reject runs if Y coordinate outside plume
Reject runs if Z coordinate outside plume
Gaussian source used in saturated zone model

1

1

UNSATURATED ZONE FLOW MODEL PARAMETERS
(input parameter description and value)
NP - Total number of nodal points 240
NMAT - Number of different porous materials 1
KPROP - Van Genuchten or Brooks and Corey 1
IMSHGN - Spatial discretization option 1
NVFLAYR - Number of layers in flow model 1

OPTIONS CHOSEN

Van Genuchten functional coefficients
User defined coordinate system

1

Layer information

| LAYER NO. | LAYER THICKNESS | MATERIAL PROPERTY |
|-----------|-----------------|-------------------|
| ----- | ----- | ----- |
| 1 | 3.50 | 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 | 3.50 | 0.000 | 0.000 | 0.000 |

DATA FOR MATERIAL 1

VADOSE ZONE FUNCTION VARIABLES

| VARIABLE NAME | UNITS | DISTRIBUTION | PARAMETERS | | LIMITS | |
|------------------------------|-------|--------------|------------|---------|--------|-------|
| | | | MEAN | STD DEV | MIN | 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. |

UNSATURATED ZONE TRANSPORT MODEL PARAMETERS

NLAY - Number of different layers used 1
 NTSTPS - Number of time values concentration calc 40
 DUMMY - Not presently used 1
 ISOL - Type of scheme used in unsaturated zone 2
 N - Stehfest terms or number of increments 18
 NTEL - Points in Lagrangian interpolation 3
 NGPTS - Number of Gauss points 104
 NIT - Convolution integral segments 2
 IBOUND - Type of boundary condition 3
 ITSGEN - Time values generated or input 1
 TMAX - Max simulation time -- 0.0
 WTFUN - Weighting factor -- 1.2

OPTIONS CHOSEN

 Convolution integral approach
 Exponentially decaying continuous source
 Computer generated times for computing concentrations

DATA FOR LAYER 1

VADOSE TRANSPORT VARIABLES

| VARIABLE NAME | UNITS | DISTRIBUTION | PARAMETERS | | LIMITS | |
|------------------------------------|-------|--------------|------------|---------|--------|-------|
| | | | MEAN | STD DEV | MIN | MAX |
| Thickness of layer | m | CONSTANT | 3.50 | -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. |

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 | cm ² /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 |

SOURCE SPECIFIC VARIABLES

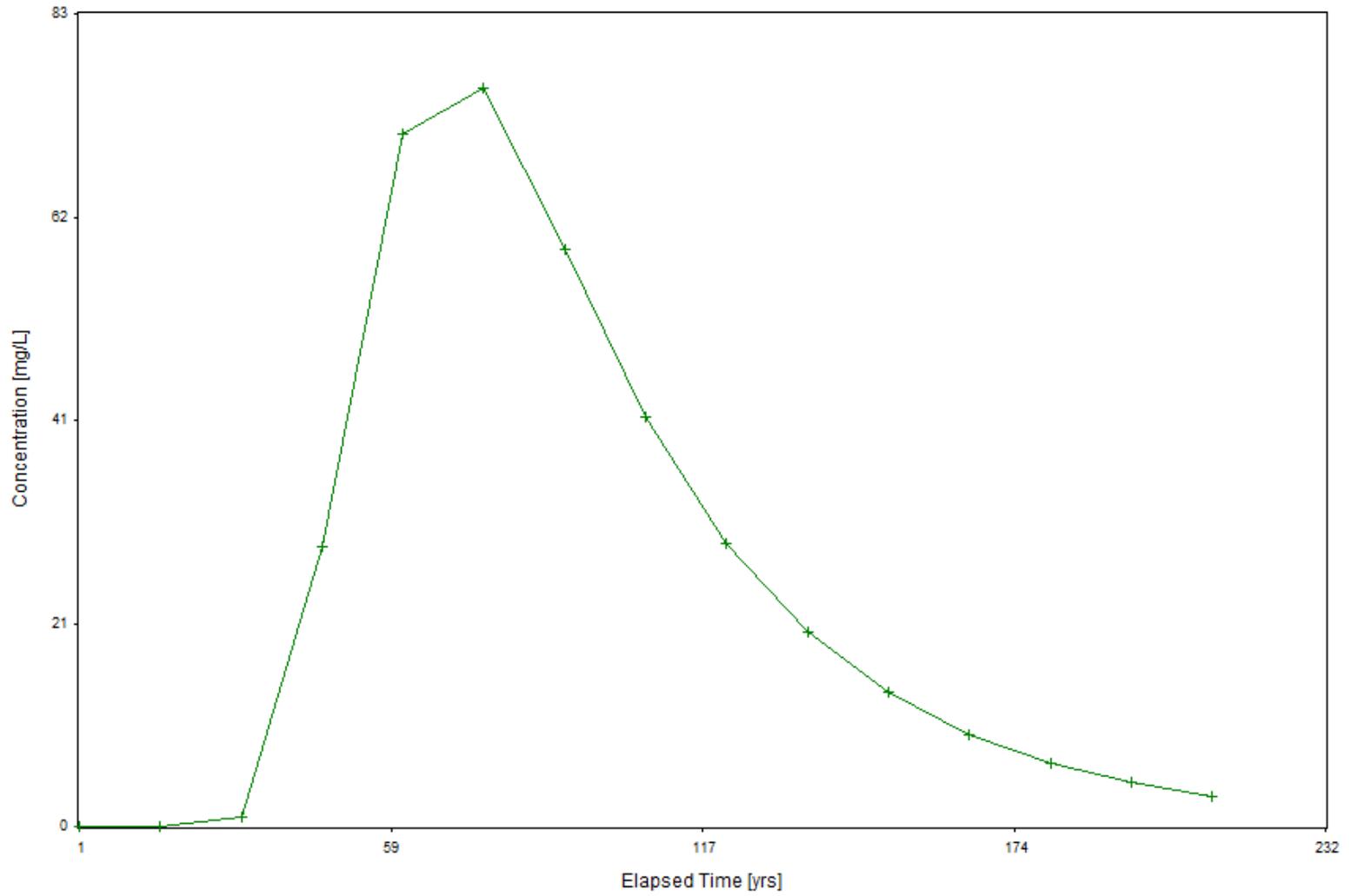
| VARIABLE NAME | UNITS | DISTRIBUTION | PARAMETERS | | LIMITS | |
|-----------------------------------|----------------|--------------|------------|---------|--------|-------|
| | | | MEAN | STD DEV | MIN | MAX |
| Infiltration rate | m/yr | CONSTANT | 0.152E-01 | -999. | -999. | -999. |
| Area of waste disposal unit | m ² | CONSTANT | 351. | -999. | -999. | -999. |
| Duration of pulse | yr | DERIVED | 0.100E-08 | -999. | -999. | -999. |
| Spread of contaminant source | m | DERIVED | -999. | -999. | -999. | -999. |
| Recharge rate | m/yr | CONSTANT | 0.000 | -999. | -999. | -999. |
| Source decay constant | 1/yr | CONSTANT | 0.250E-01 | 0.000 | 0.000 | 0.000 |
| Initial concentration at landfill | mg/l | CONSTANT | 436. | -999. | -999. | -999. |
| Length scale of facility | m | DERIVED | -999. | -999. | -999. | -999. |
| Width scale of facility | m | DERIVED | -999. | -999. | -999. | -999. |
| Near field dilution | | DERIVED | 1.00 | 0.000 | 0.000 | 1.00 |

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. |

| TIME | CONCENTRATION |
|-----------|---------------|
| 0.100E+01 | 0.00000E+00 |
| 0.160E+02 | 0.00000E+00 |
| 0.310E+02 | 0.95680E+00 |
| 0.460E+02 | 0.28375E+02 |
| 0.610E+02 | 0.70424E+02 |
| 0.760E+02 | 0.75086E+02 |
| 0.910E+02 | 0.58643E+02 |
| 0.106E+03 | 0.41642E+02 |
| 0.121E+03 | 0.28759E+02 |
| 0.136E+03 | 0.19831E+02 |
| 0.151E+03 | 0.13601E+02 |
| 0.166E+03 | 0.93700E+01 |
| 0.181E+03 | 0.64235E+01 |
| 0.196E+03 | 0.44261E+01 |
| 0.211E+03 | 0.30335E+01 |

Chloride Concentration At The Receptor Well Rice EME Jct. J-4



| General | | | | | |
|----------------------------|-------------------------------------|-----|--------|----------------|--|
| 1 | Title | | | | EME Jct. J-4 |
| 2 | Application Type | | | | Generic |
| 3 | Run Type | | | | Deterministic |
| 4 | Source Type | | | | Transient |
| 5 | Aquifer Source Patch | | | | Gaussian |
| 6 | Active Modules | | | | Unsaturated Zone |
| | | | | | Saturated Zone |
| Source | | | | | |
| 7 | Source Area | | 351.17 | m ² | Area |
| 8 | Source Length | 60 | ft | 18.29 | m |
| 9 | Source Width | 63 | ft | 19.20 | m |
| 10 | Source Infiltration Rate | 0.6 | in | 0.01524 | Pool Liner |
| 11 | Outside Recharge Rate | | | m/yr | 0 |
| 12 | Initial Leachate Concentration | | | 436 | mg/L |
| | | | | | Average all bores |
| 13 | Source Duration | | | yrs | Derive |
| 14 | Source Decay Coefficient | | | 1/yr | 2.5% |
| 15 | Initial Spread of Source | | | m | Derive |
| Chemical | | | | | |
| 16 | Chemical Name | | | | Chloride |
| 17 | Dissolved Decay Coefficients | | | 1/yr | Derive |
| 18 | Sorbed Phase Decay Coef. | | | 1/yr | Derive |
| 19 | Overall Aquifer Decay Coef. | | | 1/yr | Derive |
| 20 | Acid Catalyzed Rate | | | l/mole-yr | 0 |
| 21 | Neutral Rate | | | 1/yr | 0 |
| 22 | Base Catalyzed Rate | | | l/mole-yr | 0 |
| 23 | Reference Temperature | | | deg C | 25 |
| 24 | Normalized Distribution Coef. | | | ml/g | 0 |
| 25 | Aquifer Distribution Coef. | | | ml/g | Derive |
| Unsaturated Zone Flow | | | | | |
| 26 | Layer Thickness and Material Number | 12 | ft | 3.66 | m |
| | | | | | Difference average depth and depth to GW |
| 27 | Saturated Hydraulic Conductivity | | | cm/hr | 3.6 |
| 28 | Effective Porosity | | | fraction | 0.25 |
| 29 | Air Entry Pressure Head | | | m | 0.7 |
| 30 | Residual Water Content | | | fraction | 0.116 |
| 31 | van Genuchten Alpha | | | 1/cm | 0.005 |
| 32 | van Genuchten Beta | | | fraction | 1.09 |
| 33 | Brooks and Corey Exponent | | | fraction | ----- |
| Unsaturated Zone Transport | | | | | |
| 34 | Transport Layer Thickness | 12 | ft | 3.66 | m |
| | | | | | Difference average depth and depth to GW |
| 35 | Longitudinal Dispersivity | | | m | Derive |
| 36 | Percent Organic Matter | | | % | 0 |

| | | | | | | |
|------------------------|----------------------------------|----|----|------|-------------------|--------------------------|
| 37 | Bulk Density | | | | g/cm ³ | 1.99 |
| 38 | Biological Decay Coefficient | | | | 1/yr | 0 |
| Saturated Zone Flow | | | | | | |
| 39 | Aquifer Thickness | 20 | ft | 6.10 | m | Aquifer Thickness |
| 40 | Mixing Zone Thickness | | | | m | Derive |
| 41 | Effective Porosity | | | | fraction | 0.3 |
| 42 | Bulk Density | | | | g/cm ³ | 1.855 |
| 43 | Saturated Hydraulic Conductivity | | | | m/yr | 315 |
| 44 | Hydraulic Gradient | | | | fraction | 0.003 |
| 45 | Seepage Velocity | | | | m/yr | Derive |
| 46 | Longitudinal Dispersivity | | | | m | Derive |
| 47 | Transverse Dispersivity | | | | m | Derive |
| 48 | Vertical Dispersivity | | | | m | Derive |
| 49 | Aquifer Temperature | | | | deg C | 20 |
| 50 | Aquifer pH | | | | | 7 |
| 51 | Fraction Organic Carbon | | | | fraction | 0 |
| 52 | Retardation Factor | | | | fraction | Derive |
| 53 | Biological Decay Coefficient | | | | 1/yr | 0 |
| Well Location and Time | | | | | | |
| 54 | Radial Distance to Well | | | | m | 1 |
| 55 | Angle Off Plume Axis | | | | degree | 0 |
| 56 | Well Screen Depth Fraction | | | | fraction | 0 |
| 57 | Time Step Option | | | | | Max Concentration |
| | | | | | | Time Intervals |
| Run Project | | | | | | |
| | | | | | | 77.65 mg/L at 68.5 years |