

AP - 66

**STAGE 1 & 2
REPORTS**

DATE:

MARCH 11, 2005

**Investigation and Characterization Plan
EME N-5 Junction Box Site
T20S, R36E, Section 5, Unit Letter N
Lea County, New Mexico**

MARCH 11, 2005

Prepared For:
**RICE Operating Company
122 West Taylor
Hobbs, New Mexico 88240**



Prepared By:

**TRIDENT**
ENVIRONMENTAL

**P O Box 7624
Midland, Texas 79708**



CERTIFIED MAIL
RETURN RECEIPT NO. 7099 3400 0017 1737 2527

March 11, 2005

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

RE: **INVESTIGATION & CHARACTERIZATION PLAN**
EME N-5 Junction Box Site
T20S-R36E-Section 5, Unit Letter N
NMOCD CASE # 1R0427-90

Mr. Price:

RICE Operating Company (ROC) has retained Trident Environmental to address potential environmental concerns at the above-referenced site. ROC is the service provider (operator) for the Eunice -Monument- Eumont (EME) SWD System and has no ownership of any portion of the pipeline, well, or facility. The System is owned by a consortium of oil producers, System Partners, who provide all operating capital on a percentage ownership/usage basis. Environmental projects of this magnitude require System Partner AFE approval and work begins as funds are received. In general, project funding is not forthcoming until NMOCD approves the work plan. Therefore, your timely review of this submission is requested.

For all environmental projects, ROC will choose a path forward that:

- protects public health,
- provides the greatest net environmental benefit,
- complies with NMOCD Rules, and
- is supported by good science.

Each site shall have three submissions or a combination of:

1. This Investigation and Characterization Plan (ICP) is a proposal for data gathering and site characterization and assessment.
2. Upon evaluating the data and results from this ICP, a recommended remedy will be submitted in a Corrective Action Plan (CAP).
3. Finally, after implementing the remedy, a closure report with final documentation will be submitted.

BACKGROUND

The N-5 junction box site is located in township 20 south, range 36 east, section 5, unit letter N approximately 2 miles south-southwest of Monument, NM as shown on the attached Site Location Map. The site is located on land owned by the Bureau of Land Management (BLM), which is primarily utilized for crude oil and gas production and cattle ranching. According to production data records from the NMOCD Online database, Read & Stevens Inc., Lynx Petroleum Consultants Inc., and Nadel & Gussman Permian, LLC, are actively producing crude oil and gas in the area.

PREVIOUS WORK

The subsurface soils at the N-5 junction box site were initially investigated on August 17, 2001, by trenching with a backhoe and field-tested for chloride and hydrocarbon levels. This investigation indicated chloride and hydrocarbon impact to the vadose zone. On December 20, 2001, three soil borings were performed 20 feet south, west, and north of the junction box. To further assess if groundwater was impacted with chlorides, a monitoring well (MW-1) was installed within a few feet south of the former junction box on January 2002, and has been sampled and analyzed for benzene, toluene, ethylbenzene, and xylenes (BTEX), major ions, and total dissolved solids (TDS) on a quarterly basis since that date. ROC submitted notification of groundwater impact to the NMOCD on January 18, 2002. The junction box disclosure form was sent on January 23, 2003. During 2003, the replacement of the existing junction box with a lined watertight plastic junction box was completed after the replacement of the 10-inch diameter A/C pipeline with 6-inch diameter PVC pipeline for continuance to the M-5 SWD system. A photograph of the site before the upgrade is included in the appendices. The 2004 Monitor Well Report for the N-5 site was submitted on January 26, 2005. A summary of the historical groundwater sampling results is presented in Table 1 and depicted graphically in Figure 1. The laboratory analytical report and chain of custody documentation for the most recent groundwater sampling event conducted on February 9, 2005 is included in the appendices.

RECOMMENDATION FOR FURTHER ACTIONS

The source of this impact is historical. The upgrade of the N-5 junction box and pipeline replacement has minimized the threat of additional impact from the vadose zone, however further investigation and characterization of the site is necessary to delineate the vadose zone and evaluate the extent of groundwater impact by historical releases from the N-5 junction box or other off site sources. The additional assessment is also necessary to assist ROC in selecting the appropriate soil and/or groundwater remedy.

Task 1 Evaluate Concentrations of Constituents of Concern in the Vadose Zone

Subsurface soil samples for characterization of the lateral and vertical extent of hydrocarbon- and chloride-impacted soil will be collected in accordance with the procedures explained in QP-02, QP-03, and QP-07 (attached). Soil samples will be and field-tested for chloride content using the titration method. Soil samples submitted to the laboratory shall be analyzed for gas and diesel range organics (GRO and DRO) using EPA Method 8015 to determine TPH concentrations. Samples will also be collected for headspace analysis using an organic vapor meter (OVM), which will be calibrated to assume a benzene response factor. Samples with headspace readings or GRO levels above 100 ppm will also be analyzed for benzene, toluene, ethylbenzene, and xylenes (BTEX) using EPA Method 8021B.

The following concentrations of analytes will be used to delineate the lateral and vertical extent of impact to the vadose zone:

- 100 mg/kg TPH
- 100 ppm OVM, and/or 10 mg/kg benzene and 50 mg/kg BTEX
- 250 ppm chloride

Task 2 Evaluate Concentrations of Constituents of Concern in the Groundwater

Additional monitoring wells may be installed to determine the local groundwater gradient direction and extent of groundwater impact. Groundwater samples will be collected in accordance with procedures explained in QP-04 and QP-05 (attached), and analyzed for BTEX, major ions, and total dissolved solids (TDS).

The information gathered from tasks 1 and 2 will be evaluated and utilized to design a soil and/or ground water remedy if needed. The remedy that offers the greatest environmental benefit while causing the least environmental impairment will be selected. Such recommendations and findings will be presented to NMOCD in a subsequent Corrective Action Plan (CAP). When evaluating any proposed remedy or investigative work, ROC will confirm that there is a reasonable relationship between the benefits created by the proposed remedy or assessment and the economic and social costs.

We appreciate the opportunity to work with you on this project. Please feel free to call me at 432-638-3106 or Kristin Farris Pope at 505-393-9174, if you have any questions.

Sincerely,



Gilbert J. Van Deer, REM, PG, NMCS
Trident Environmental - Project Manager

cc: CDH, KFP, file

enclosures: site location map, table and graph of sampling results, and sampling procedures

Site Location Map

Table 1
Summary of Groundwater Sampling Results

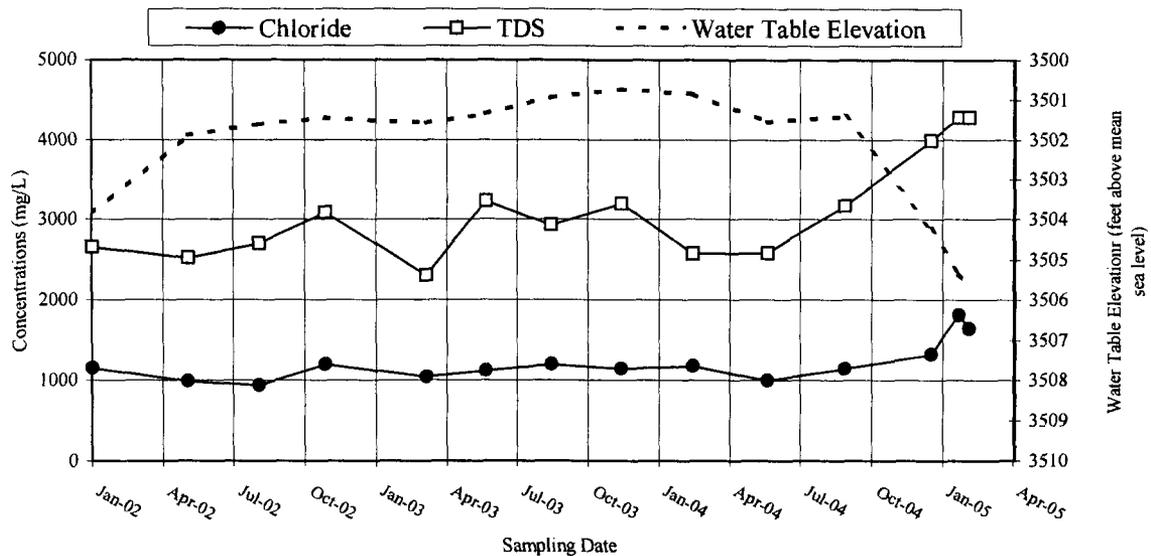
Figure 1
Chloride, Sulfate, TDS and Depth to Groundwater Values Versus Time

Table 1
Summary of Groundwater Sampling Results
EME N-5 Junction Box Site

Monitoring Well	Sample Date	Depth to Groundwater (feet BTOC)	Water Table Elevation (feet AMSL)	Chloride (mg/L)	TDS (mg/L)	Benzene (mg/L)	Toluene (mg/L)	Ethylbenzene (mg/L)	Xylene (mg/L)
MW-1	01/10/02	35.50	3503.85	1160	2652	<0.002	<0.002	<0.006	<0.006
	05/13/02	37.47	3501.88	993	2520	<0.001	0.002	0.003	0.009
	08/12/02	37.75	3501.60	939	2700	<0.001	<0.001	<0.001	0.001
	11/04/02	37.90	3501.45	1200	3083	<0.002	<0.002	<0.002	<0.006
	03/14/03	37.78	3501.57	1050	2310	<0.001	0.002	0.004	0.011
	05/29/03	38.00	3501.35	1130	3230	<0.001	0.001	0.004	0.01
	08/22/03	38.42	3500.93	1200	2930	---	---	---	---
	11/20/03	38.63	3500.72	1150	3200	<0.001	0.002	0.003	0.012
	02/20/04	38.50	3500.85	1180	2575	<0.002	<0.002	<0.002	<0.006
	05/26/04	37.80	3501.55	1000	2583	<0.002	0.005	0.005	0.010
	09/02/04	37.94	3501.41	1150	3170	0.000	0.001	0.002	0.003
	12/21/04	35.12	3504.23	1330	3990	<0.001	<0.001	<0.001	<0.001
	01/26/05	34.03	3505.32	1810	4280	<0.001	<0.001	0.001	0.001
	02/08/05	33.79	3505.56	1640	4280	<0.001	<0.001	0.002	0.001
WQCC Standards				250	1000	0.01	0.75	0.75	0.62

Total Dissolved Solids (TDS), chloride, sulfate, and BTEX concentrations listed in milligrams per liter (mg/L).
Analyses performed by Environmental Lab of Texas (Odessa TX) or Cardinal Laboratories (Hobbs NM).
Values in boldface type indicate concentrations exceed New Mexico Water Quality Commission (WQCC) standards.

Figure 2
EME N-5 Junction Box Site
Chloride, TDS, and Water Table Elevation Values Versus Time Graph (MW-1)

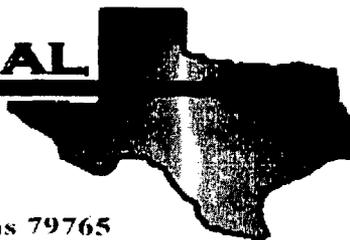


Laboratory Analytical Reports

and

Chain-of-Custody Documentation

E NVIRONMENTAL
LAB OF



12600 West I-20 East - Odessa, Texas 79765

Analytical Report

Prepared for:

Kristin Farris

Rice Operating Co.

122 W. Taylor

Hobbs, NM 88240

Project: EME System N-5 Junction Box Site

Project Number: None Given

Location: T2OS, R36E, Sec 5, Unit Letter N

Lab Order Number: 5B09005

Report Date: 02/20/05

Rice Operating Co.
122 W. Taylor
Hobbs NM, 88240

Project: EME System N-5 Junction Box Site
Project Number: None Given
Project Manager: Kristin Farris

Fax: (505) 397-1471
Reported:
02/20/05 14:21

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
MW-1	5B09005-01	Water	02/08/05 11:40	02/09/05 07:00

Rice Operating Co.
122 W. Taylor
Hobbs NM, 88240

Project: EME System N-5 Junction Box Site
Project Number: None Given
Project Manager: Kristin Farris

Fax: (505) 397-1471

Reported:
02/20/05 14:21

Organics by GC
Environmental Lab of Texas

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
MW-1 (5B09005-01) Water									
Benzene	ND	0.00100	mg/L	1	EB51807	02/14/05	02/15/05	EPA 8021B	
Toluene	ND	0.00100	"	"	"	"	"	"	
Ethylbenzene	0.00225	0.00100	"	"	"	"	"	"	
Xylene (p/m)	0.00115	0.00100	"	"	"	"	"	"	
Xylene (o)	ND	0.00100	"	"	"	"	"	"	
Surrogate: <i>a,a,a-Trifluorotoluene</i>		85.0 %	80-120		"	"	"	"	
Surrogate: <i>4-Bromofluorobenzene</i>		82.5 %	80-120		"	"	"	"	

Rice Operating Co.
122 W. Taylor
Hobbs NM, 88240

Project: EME System N-5 Junction Box Site
Project Number: None Given
Project Manager: Kristin Farris

Fax: (505) 397-1471

Reported:
02/20/05 14:21

General Chemistry Parameters by EPA / Standard Methods
Environmental Lab of Texas

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
MW-1 (5B09005-01) Water									
Total Alkalinity	346	2.00	mg/L	1	EB51404	02/15/05	02/15/05	EPA 310.2M	
Carbonate Alkalinity	ND	0.100	"	"	"	"	"	"	
Chloride	1640	25.0	"	50	EB51713	02/10/05	02/10/05	EPA 300.0	
Total Dissolved Solids	4280	5.00	"	1	EB51004	02/09/05	02/10/05	EPA 160.1	
Sulfate	230	25.0	"	50	EB51713	02/10/05	02/10/05	EPA 300.0	

Environmental Lab of Texas

The results in this report apply to the samples analyzed in accordance with the samples received in the laboratory. This analytical report must be reproduced in its entirety, with written approval of Environmental Lab of Texas.

Page 3 of 10

Rice Operating Co.
122 W. Taylor
Hobbs NM, 88240

Project: EME System N-5 Junction Box Site
Project Number: None Given
Project Manager: Kristin Farris

Fax: (505) 397-1471

Reported:
02/20/05 14:21

Total Metals by EPA / Standard Methods
Environmental Lab of Texas

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
MW-1 (5B09005-01) Water									
Calcium	520	1.00	mg/L	100	EB51702	02/14/05	02/16/05	EPA 6010B	
Magnesium	180	0.100	"	"	"	"	"	"	
Potassium	16.8	0.500	"	10	"	"	"	"	
Sodium	483	1.00	"	100	"	"	"	"	

Environmental Lab of Texas

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Page 4 of 10

Rice Operating Co.
122 W. Taylor
Hobbs NM, 88240

Project: EME System N-5 Junction Box Site
Project Number: None Given
Project Manager: Kristin Farris

Fax: (505) 397-1471

Reported:
02/20/05 14:21

Organics by GC - Quality Control
Environmental Lab of Texas

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch EB51807 - EPA 5030C (GC)

Blank (EB51807-BLK1)

Prepared & Analyzed: 02/14/05

Benzene	ND	0.00100	mg/L							
Toluene	ND	0.00100	"							
Ethylbenzene	ND	0.00100	"							
Xylene (p/m)	ND	0.00100	"							
Xylene (o)	ND	0.00100	"							
Surrogate: a,a,a-Trifluorotoluene	16.5		ug/l	20.0		82.5	80-120			
Surrogate: 4-Bromofluorobenzene	17.4		"	20.0		87.0	80-120			

LCS (EB51807-BS1)

Prepared & Analyzed: 02/14/05

Benzene	105		ug/l	100		105	80-120			
Toluene	105		"	100		105	80-120			
Ethylbenzene	95.9		"	100		95.9	80-120			
Xylene (p/m)	196		"	200		98.0	80-120			
Xylene (o)	95.7		"	100		95.7	80-120			
Surrogate: a,a,a-Trifluorotoluene	16.5		"	20.0		82.5	80-120			
Surrogate: 4-Bromofluorobenzene	16.8		"	20.0		84.0	80-120			

LCS Dup (EB51807-BSD1)

Prepared & Analyzed: 02/14/05

Benzene	113		ug/l	100		113	80-120	7.34	20	
Toluene	112		"	100		112	80-120	6.45	20	
Ethylbenzene	107		"	100		107	80-120	10.9	20	
Xylene (p/m)	224		"	200		112	80-120	13.3	20	
Xylene (o)	111		"	100		111	80-120	14.8	20	
Surrogate: a,a,a-Trifluorotoluene	18.6		"	20.0		93.0	80-120			
Surrogate: 4-Bromofluorobenzene	20.2		"	20.0		101	80-120			

Calibration Check (EB51807-CCV1)

Prepared: 02/14/05 Analyzed: 02/16/05

Benzene	97.5		ug/l	100		97.5	80-120			
Toluene	104		"	100		104	80-120			
Ethylbenzene	93.1		"	100		93.1	80-120			
Xylene (p/m)	194		"	200		97.0	80-120			
Xylene (o)	97.9		"	100		97.9	80-120			
Surrogate: a,a,a-Trifluorotoluene	16.7		"	20.0		83.5	80-120			
Surrogate: 4-Bromofluorobenzene	17.8		"	20.0		89.0	80-120			

Environmental Lab of Texas

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Page 5 of 10

Rice Operating Co.
122 W. Taylor
Hobbs NM, 88240

Project: EME System N-5 Junction Box Site
Project Number: None Given
Project Manager: Kristin Farris

Fax: (505) 397-1471

Reported:
02/20/05 14:21

Organics by GC - Quality Control
Environmental Lab of Texas

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch EB51807 - EPA 5030C (GC)

Matrix Spike (EB51807-MS1)

Source: 5B09008-01

Prepared: 02/14/05 Analyzed: 02/18/05

Benzene	93.3		ug/l	100	ND	93.3	80-120			
Toluene	101		"	100	ND	101	80-120			
Ethylbenzene	102		"	100	ND	102	80-120			
Xylene (p/m)	206		"	200	ND	103	80-120			
Xylene (o)	97.3		"	100	ND	97.3	80-120			
Surrogate: a,a,a-Trifluorotoluene	23.3		"	20.0		116	80-120			
Surrogate: 4-Bromofluorobenzene	20.4		"	20.0		102	80-120			

Environmental Lab of Texas

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Page 6 of 10

Rice Operating Co.
122 W. Taylor
Hobbs NM, 88240

Project: EME System N-5 Junction Box Site
Project Number: None Given
Project Manager: Kristin Farris

Fax: (505) 397-1471

Reported:
02/20/05 14:21

General Chemistry Parameters by EPA / Standard Methods - Quality Control
Environmental Lab of Texas

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch EB51004 - General Preparation (WetChem)

Blank (EB51004-BLK1) Prepared: 02/09/05 Analyzed: 02/10/05

Total Dissolved Solids	ND	5.00	mg/L							
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Duplicate (EB51004-DUP1) Source: 5B09003-01 Prepared: 02/09/05 Analyzed: 02/10/05

Total Dissolved Solids	16200	5.00	mg/L		14600			10.4	20	
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Batch EB51404 - General Preparation (WetChem)

Blank (EB51404-BLK1) Prepared & Analyzed: 02/15/05

Total Alkalinity	ND	2.00	mg/L							
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Duplicate (EB51404-DUP1) Source: 5B09003-01 Prepared & Analyzed: 02/15/05

Total Alkalinity	395	2.00	mg/L		396			0.253	20	
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Reference (EB51404-SRM1) Prepared & Analyzed: 02/15/05

Carbonate Alkalinity	0.0510		mg/L	0.0500		102	80-120			
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Batch EB51713 - General Preparation (WetChem)

Blank (EB51713-BLK1) Prepared & Analyzed: 02/10/05

Sulfate	ND	0.500	mg/L							
Chloride	ND	0.500	"							

LCS (EB51713-BS1) Prepared & Analyzed: 02/10/05

Sulfate	9.66		mg/L	10.0		96.6	80-120			
Chloride	9.56		"	10.0		95.6	80-120			

Rice Operating Co.
 122 W. Taylor
 Hobbs NM, 88240

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 Project Number: None Given
 Project Manager: Kristin Farris

Fax: (505) 397-1471

Reported:
 02/20/05 14:21

General Chemistry Parameters by EPA / Standard Methods - Quality Control
Environmental Lab of Texas

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
---------	--------	-----------------	-------	-------------	---------------	------	-------------	-----	-----------	-------

Batch EB51713 - General Preparation (WetChem)

LCS Dup (EB51713-BSD1)

Prepared & Analyzed: 02/10/05

Sulfate	9.64		mg/L	10.0		96.4	80-120	0.207	20	
Chloride	9.51		"	10.0		95.1	80-120	0.524	20	

Calibration Check (EB51713-CCV1)

Prepared & Analyzed: 02/10/05

Chloride	9.73		mg/L	10.0		97.3	80-120			
Sulfate	9.88		"	10.0		98.8	80-120			

Duplicate (EB51713-DUP1)

Source: 5B09004-01

Prepared & Analyzed: 02/10/05

Chloride	304	10.0	mg/L		304			0.00	20	
Sulfate	357	10.0	"		356			0.281	20	

Rice Operating Co.
122 W. Taylor
Hobbs NM, 88240

Project: EME System N-5 Junction Box Site
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Project Manager: Kristin Farris

Fax: (505) 397-1471

Reported:
02/20/05 14:21

Total Metals by EPA / Standard Methods - Quality Control
Environmental Lab of Texas

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
---------	--------	-----------------	-------	-------------	---------------	------	-------------	-----	-----------	-------

Batch EB51702 - 6010B/No Digestion

Blank (EB51702-BLK1)

Prepared: 02/14/05 Analyzed: 02/16/05

Calcium	ND	0.0100	mg/L							
Magnesium	ND	0.00100	"							
Potassium	ND	0.0500	"							
Sodium	ND	0.0100	"							

Calibration Check (EB51702-CCVI)

Prepared: 02/14/05 Analyzed: 02/16/05

Calcium	2.22		mg/L	2.00		111	85-115			
Magnesium	2.08		"	2.00		104	85-115			
Potassium	1.75		"	2.00		87.5	85-115			
Sodium	1.94		"	2.00		97.0	85-115			

Duplicate (EB51702-DUP1)

Source: SB09003-01

Prepared: 02/14/05 Analyzed: 02/16/05

Calcium	905	1.00	mg/L		848			6.50	20	
Magnesium	254	0.100	"		239			6.09	20	
Potassium	88.3	2.50	"		90.7			2.68	20	
Sodium	5810	10.0	"		4840			18.2	20	

Rice Operating Co.
122 W. Taylor
Hobbs NM, 88240

Project: EME System N-5 Junction Box Site
Project Number: None Given
Project Manager: Kristin Farris

Fax: (505) 397-1471

Reported:
02/20/05 14:21

Notes and Definitions

DET Analyte DETECTED
ND Analyte NOT DETECTED at or above the reporting limit
NR Not Reported
dry Sample results reported on a dry weight basis
RPD Relative Percent Difference
LCS Laboratory Control Spike
MS Matrix Spike
Dup Duplicate

Report Approved By:

Raland K Tuttle

Date:

2/20/2005

Raland K. Tuttle, Lab Manager
Celey D. Keene, Lab Director, Org. Tech Director
Peggy Allen, QA Officer

Jeanne Mc Murrey, Inorg. Tech Director
James L. Hawkins, Chemist/Geologist
Sandra Sanchez, Lab Tech.

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If you have received this material in error, please notify us immediately at 432-563-1800.

Environmental Lab of Texas

The results in this report apply to the samples analyzed in accordance with the samples received in the laboratory. This analytical report must be reproduced in its entirety, with written approval of Environmental Lab of Texas.

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**Environmental Lab of Texas
Variance / Corrective Action Report – Sample Log-In**

Client: Rice Operating Co.

Date/Time: 02-09-05 @ 0700

Order #: SB09005

Initials: JMM

Sample Receipt Checklist

Temperature of container/cooler?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	-1.0	C
Shipping container/cooler in good condition?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No		
Custody Seals intact on shipping container/cooler?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	Not present	
Custody Seals intact on sample bottles?	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input checked="" type="checkbox"/> Not present	
Chain of custody present?	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No		
Sample Instructions complete on Chain of Custody?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No		
Chain of Custody signed when relinquished and received?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No		
Chain of custody agrees with sample label(s)	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No		
Container labels legible and intact?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No		
Sample Matrix and properties same as on chain of custody?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No		
Samples in proper container/bottle?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No		
Samples properly preserved?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No		
Sample bottles intact?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No		
Preservations documented on Chain of Custody?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No		
Containers documented on Chain of Custody?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No		
Sufficient sample amount for indicated test?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No		
All samples received within sufficient hold time?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No		
VOC samples have zero headspace?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No		Not Applicable

→ on Black Box
* not in drop box
Client dropped by later

Other observations: * No seals on L-HDPE
Seals on 40mL glass w/HCl
JMM 03-11-05

Variance Documentation:

Contact Person: - Gil Van Darent Date/Time: 02-09-05 @ 0900 Contacted by: Jeanne McManis

Regarding: missing COC

Corrective Action Taken:
Client will bring COC by later this morning

RICE *Operating Company*
Quality Procedures

QP-02: Procedure for Obtaining Soil Samples for Transportation to a Lab

QP-03: Sampling and Testing Protocol for Chloride Titration

QP-04: Development of Cased Water-Monitoring Wells

QP-05: Procedure for Obtaining Water Samples (Cased Wells)

QP-07: Sampling and Testing Protocol for VOC in Soil

Rice Operating Company

Quality Procedure

**Procedure for Obtaining
Soil Samples for Transportation to a Laboratory**

1.0 Purpose

This procedure outlines the methods to be employed when obtaining soil samples to be taken to a laboratory for analysis.

2.0 Scope

This procedure is to be used when collecting soil samples intended for ultimate transfer to a testing laboratory.

3.0 Preliminary

- 3.1 Obtain sterile sampling containers from the testing laboratory designated to conduct analyses of the soil. The shipment should include a Certificate of Compliance from the manufacturer of the collection bottle or vial and a Serial Number for the lot of containers. Retain this Certificate for future documentation purposes.
- 3.2 If collecting TPH, BTEX, RCRA 8 metals, cation /anions or O&G, the sample jar may be a clear 4 oz. container with Teflon lid. If collecting PAH's, use an amber 4 oz. container.

4.0 Chain of Custody

- 4.1 Prepare a Sample Plan. The plan will list the number, location and designation of each planned sample and the individual tests to be performed on the sample. The sampler will check the list against the available inventory of appropriate sample collection bottles to insure against shortage.
- 4.2 Transfer the data to the Laboratory Chain of Custody Form. Complete all sections of the form except those that relate to the time of delivery of the samples to the laboratory.
- 4.3 Pre-label the sample collection jars. Include all requested information except time of collection. (Use a fine point Sharpie to insure that the ink remains on the label.) Affix the labels to the jars.

5.0 Sampling Procedure

- 5.1. Do not touch the soil with your bare hands. Use new latex gloves with each sample to help minimize any cross-contamination.
- 5.2. Go to the sampling point with the sample container. If not analyzing for ions or metals, use a trowel to obtain the soil.
- 5.3. Pack the soil tightly into the container leaving the top slightly domed. Screw the lid down tightly. Enter the time of collection onto the sample collection jar label.
- 5.4. Place the sample directly on ice for transport to the laboratory if required.
- 5.5. Complete the Chain of Custody form to include the collection times for each sample. Deliver all samples to the laboratory.

6.0 Documentation

- 6.1 The testing laboratory shall provide the following minimum information:
 - a. Project and sample name.
 - b. Signed copy of the original Chain of Custody Form including the time the sample was received by the lab.
 - c. Results of the requested analyses
 - d. Test Methods employed
 - e. Quality Control methods and results

Rice Operating Company

QUALITY PROCEDURE

Sampling and Testing Protocol
Chloride Titration Using .282 Normal
Silver Nitrate Solution

1.0 Purpose

This procedure is to be used to determine the concentration of chloride in soil.

2.0 Scope

This procedure is to be used as the standard field measurement for soil chloride concentrations.

3.0 Sample Collection and Preparation

- 3.1 Collect at least 80 grams of soil from the sample collection point. Take care to insure that the sample is representative of the general background to include visible concentrations of hydrocarbons and soil types. If necessary, prepare a composite sample for soils obtained at several points in the sample area. Take care to insure that no loose vegetation, rocks or liquids are included in the sample(s).
- 3.2 The soil sample(s) shall be immediately inserted into a one-quart or larger polyethylene freezer bag. Care should be taken to insure that no cross-contamination occurs between the soil sample and the collection tools or sample processing equipment.
- 3.3 The sealed sample bag should be massaged to break up any clods.

4.0 Sample Preparation

- 4.1 Tare a clean glass vial having a minimum 40 ml capacity. Add at least 10 grams of the soil sample and record the weight.
- 4.2 Add at least 10 grams of reverse osmosis water to the soil sample and shake for 20 seconds.
- 4.3 Allow the sample to set for a period of 5 minutes or until the separation of soil and water.
- 4.4 Carefully pour the free liquid extract from the sample through a paper filter into a clean plastic cup if necessary.

5.0 Titration Procedure

- 5.1 Using a graduated pipette, remove 10 ml extract and dispense into a clean plastic cup.
- 5.2 Add 2-3 drops potassium chromate (K_2CrO_4) to mixture.
- 5.3 If the sample contains any sulfides (hydrogen or iron sulfides are common to oilfield soil samples) add 2-3 drops of hydrogen peroxide (H_2O_2) to mixture.
- 5.4 Using a 1 ml pipette, carefully add .282 normal silver nitrate (one drop at a time) to the sample while constantly agitating it. Stop adding silver nitrate when the solution begins to change from yellow to red. Be consistent with endpoint recognition.
- 5.5 Record the ml of silver nitrate used.

6.0 Calculation

To obtain the chloride concentration, insert measured data into the following formula:

$$\frac{.282 \times 35.450 \times \text{ml AgNO}_3}{\text{ml water extract}} \times \frac{\text{grams of water in mixture}}{\text{grams of soil in mixture}}$$

Using Step 5.0, determine the chloride concentration of the RO water used to mix with the soil sample. Record this concentration and subtract it from the formula results to find the net chloride in the soil sample.

Record all results on the delineation form.

Rice Operating Company

Quality Procedure Development of Cased Water-Monitoring Wells

1.0 Purpose

This procedure outlines the methods to be employed to develop cased monitoring wells.

2.0 Scope

This procedure shall be used for developed, cased water monitoring wells. It is not to be used for standing water samples such as ponds or streams.

3.0 Sample Collection and Preparation

- 3.1 Prior to development, the static water level and height of the water column within the well casing will be measured with the use of an electric D.C. probe or a steel engineer's tape and water sensitive paste.
- 3.2 All measurements will be recorded within a field log notebook.
- 3.3 All equipment used to measure the static water level will be decontaminated after each use by means of Liquinox, a phosphate free laboratory detergent, and water to reduce the possibility of cross-contamination. The volume of water in each well casing will be calculated.

4.0 Purging

- 4.1 Wells will be purged by using a 2" decontaminated submersible pump or dedicated one liter Teflon bailer. Wells should be purged until the pH and conductivity are stabilized and the turbidity has been reduced to the greatest extent possible.
- 4.2 If a submersible is used the pump will be decontaminated prior to use by scrubbing the outside surface of tubing and wiring with a Liquinox water mixture, pumping a Liquinox-water mixture through the pump, and a final flush with fresh water.

5.0 Water Disposal

- 5.1 All purge and decontamination water will be temporarily stored within a portable tank to be later disposed of in an appropriate manner.

6.0 Records

- 6.1 Rice Operating Company will record the amount of water removed from the well during development procedures. The purge volume will be reported to the appropriate regulatory authority when filing the closure report.

Rice Operating Company

Quality Procedure

Procedure for Obtaining Water Samples (Cased Wells) Using One Liter Bailer

1.0 Purpose

This procedure outlines the methods to be employed in obtaining water samples from cased monitoring wells.

2.0 Scope

This procedure shall be used for developed, cased water monitoring wells. It is not to be used for standing water samples such as ponds or streams.

3.0 Preliminary

3.1 Obtain sterile sampling containers from the testing laboratory designated to conduct analyses of the water. The shipment should include a Certificate of Compliance from the manufacturer of the collection bottle or vial and a Serial Number for the lot of containers. Retain this Certificate for future documentation purposes.

3.2 The following table shall be used to select the appropriate sampling container, preservative method and holding times for the various elements and compounds to be analyzed.

Compound to be Analyzed	Sample Container Size	Sample Container Description	Cap Requirements	Preservative	Maximum Hold Time
BTEX	40 ml	VOA Container	Teflon Lined	HCl	7 days
TPH	1 liter	clear glass	Teflon Lined	HCl	28 days
PAH	1 liter	amber glass	Teflon Lined	Ice	7 days
Cation/Anion	1 liter	clear glass	Teflon Lined	None	48 Hrs
Metals	1 liter	HD polyethylene	Any Plastic	Ice/HNO ₃	28 Days
TDS	300 ml	clear glass	Any Plastic	Ice	7 Days

4.0 Chain of Custody

- 4.1 Prepare a Sample Plan. The plan will list the well identification and the individual tests to be performed at that location. The sampler will check the list against the available inventory of appropriate sample collection bottles to insure against shortage.
- 4.2 Transfer the data to the Laboratory Chain of Custody Form. Complete all sections of the form except those that relate to the time of delivery of the samples to the laboratory.
- 4.3 Pre-label the sample collection jars. Include all requested information except time of collection. (Use a fine point Sharpie to insure that the ink remains on the label). Affix the labels to the jars.

5.0 Bailing Procedure

- 5.1 Identify the well from the sites schematics. Place pre-labeled jar(s) next to the well. Remove the plastic cap from the well bore by first lifting the metal lever and then unscrewing the entire assembly.
- 5.2 Using a dedicated one liter Teflon bailer, purge a minimum of three well volumes. Place the water in storage container for transport to a ROC disposal facility.
- 5.3 Take care to insure that the bailing device and string do not become cross-contaminated. A clean pair of rubber gloves should be used when handling either the retrieval string or bailer. The retrieval string should not be allowed to come into contact with the ground.

6.0 Sampling Procedure

- 6.1 Once the well has been bailed in accordance with 5.2 of this procedure, a sample may be decanted into the appropriate sample collection jar directly from the bailer. The collection jar should be filled to the brim. Once the jar is sealed, turn the jar over to detect any bubbles that may be present. Add additional water to remove all bubbles from the sample container.
- 6.2 Note the time of collection on the sample jar with a fine Sharpie.

6.3 Place the sample directly on ice for transport to the laboratory. The preceding table shows the maximum hold times between collection and testing for the various analyses.

6.4 Complete the Chain of Custody form to include the collection times for each sample. Deliver all samples to the laboratory.

7.0 Documentation

7.1 The testing laboratory shall provide the following minimum information:

- A. Project and sample name.
- B. Signed copy of the original Chain of Custody Form including the time the sample was received by the lab.
- C. Results of the requested analyses
- D. Test Methods employed
- E. Quality Control methods and results

Calculation for Determining the Minimum Bailing Volume for Monitor Wells

$$\text{Formula } V = (\pi r^2 h)$$

$$2'' \text{ well } [V/231 = \text{gal}] \times 3 = \text{Purge Volume}$$

V=Volume

$\pi = \text{pi}$

r=inside radius of the well bore

h=maximum height of well bore in water table

Example:

π	r^2	h(in)	V(cu.in)	V(gal)	X 3 Volumes	Actual
3.1416	1	180	565.488	2.448	7.34 gal	>10 gal

Rice Operating Company

QUALITY PROCEDURE Sampling and Testing Protocol for VOC in Soil

1.0 Purpose

This procedure is to be used to determine the concentrations of Volatile Organic Compounds in soils.

2.0 Scope

This procedure is to be used as the standard field measurement for soil VOC concentrations. It is not to be used as a substitute for full spectrographic speciation of organic compounds.

3.0 Procedure

3.1 Sample Collection and Preparation

3.1.1 Collect at least 500 g. of soil from the sample collection point. Take care to insure that the sample is representative of the general background to include visible concentrations of hydrocarbons and soil types. If necessary, prepare a composite sample of soils obtained at several points in the sample area. Take care to insure that no loose vegetation, rocks or liquids are included in the sample(s).

3.1.2 The soil sample(s) shall be immediately inserted into a one-quart or larger polyethylene freezer bag and sealed. When sealed, the bag should contain a nearly equal space between the soil sample and trapped air. Record the sample name and the time that the sample was collected on the Field Analytical Report Form.

3.1.3 The sealed samples shall be allowed to set for a minimum of five minutes at a temperature of between 10-15 Celsius, (59-77^oF). The sample temperatures may be adjusted by cooling the sample in ice, or by heating the sample within a generally controlled environment such as the inside of a vehicle. The samples should not be placed directly on heated surfaces or placed in direct heat sources such as lamps or heater vents.

3.1.4 The sealed sample bag should be massaged to break up any clods, and to provide the soil sample with as much exposed surface area as practically possible.

3.2 Sampling Procedure

- 3.2.1 The instrument to be used in conducting VOC concentration testing shall be an Environmental Instruments 13471 OVM / Datalogger or a similar PID-type instrument. (Device will be identified on VOC Field Test Report Form.) Prior to use, the instrument shall be zeroed-out in accordance with the appropriate maintenance and calibration procedure outlined in the instrument operation manual. The PID device will be calibrated each day it's used.
- 3.2.2 Carefully open one end of the collection bag and insert the probe tip into the bag taking care that the probe tip not touch the soil sample or the sidewalls of the bag.
- 3.2.3 Set the instrument to retain the highest result reading value. Record the reading onto the Field Test Report Form.
- 3.2.4 If the instrument provides a reading exceeding 100 ppm, proceed to conduct BTEX Speciation in accordance with QP-02 and QP-06. **If the reading is 100 ppm or less, NMOCD BTEX guideline has been met and no further testing for BTEX is necessary. File the Field Test Report Form in the project file.**

4.0 Clean-up

After testing, the soil samples shall be returned to the sampling location, and the bags collected for off-site disposal. **IN NO CASE SHALL THE SAME BAG BE USED TWICE. EACH SAMPLE CONTAINER MUST BE DISCARDED AFTER EACH USE.**