1R-427-407

WORKPLANS

Date:

10-10-13

P.O. Box 2948, Hobbs, NM 88241 Phone 575.393.2967

RECEIVED OCD

CERTIFIED MAIL
RETURN RECEIPT NO. 7007 2560 0000 4569 8302

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October 10th, 2013

Mr. Edward Hansen

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

RE: Investigation and Characterization Plan (ICP)
Rice Operating Company – EME SWD System
EME Jct. F-32 (1R427-407): UL/F sec. 32 T19S R37E

Mr. Hansen:

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.

For all such environmental projects, ROC will choose the 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 generally have three submissions:

- 1. This <u>Investigation and Characterization Plan</u> (ICP) is proposed for gathering data and site characterization and assessment.
- 2. Upon evaluating the data and results from the ICP, a recommended remedy will be submitted in a <u>Corrective Action Plan</u> (CAP), if warranted.
- 3. Finally, after implementing the remedy, a <u>Termination Request</u> with final documentation will be submitted.

Background and Previous Work

The site is located approximately 0.5 miles southwest of Monument, New Mexico at UL/F sec. 32 T19S R37E as shown on the Site Location Map and Geographical Location

Map (Figure 1 and 2). NM OSE records indicate that groundwater will likely be encountered at a depth of approximately 27 +/- feet.

In 2012, ROC initiated work on the former EME F-32 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 four-wall composite and the bottom composite were taken to a commercial laboratory for analysis. Laboratory tests of the four-wall composite showed a chloride reading of 2,040 mg/kg and a gasoline range organics (GRO) readings and a diesel range organics (DRO) reading of non-detect. The bottom composite showed a chloride laboratory reading of 896 mg/kg and a GRO and a DRO reading of non-detect. The excavated soil was blended on site and a composite sample was taken to a commercial laboratory for analysis. The laboratory chloride result for the blended backfill was 656 mg/kg with a GRO reading of non-detect and a DRO reading of 121 mg/kg. A total of 584 yards of blended soil was taken to a NMOCD approved facility for disposal. The site was backfilled with the blended backfill to 6 ft bgs, where a 20-mil reinforced poly liner was installed and properly seated. The remainder of the excavation was backfill with clean, imported soil. A sample of this imported soil was taken to a commercial laboratory for analysis and returned a chloride, GRO and DRO result of nondetect. The area was contoured to the surrounding landscape, and 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 (Appendix A) was submitted to NMOCD with all the 2012 junction box closures and disclosures.

ROC proposes additional investigative work at the site to determine if there is potential for groundwater degradation from residual chlorides at the site.

Proposed Work Elements

- Conduct vertical and lateral delineation of residual chlorides and hydrocarbons from samples taken using a drill rig, hand augur and/or backhoe (see Appendix B for Quality Procedures).
 - a. Vertical sampling will be conducted until of the following criteria are met in the field.
 - i. Three samples in which the chloride concentration decreases and the third sample has a chloride concentration of ≤ 250 ppm; and,
 - ii. Three samples in which PID readings decrease and the third sample has a PID reading of \leq 100 ppm; or,
 - iii. The sampling reaches the capillary fringe.
 - b. Lateral sampling will be conducted until the following criteria are met in the field.
 - i. A decrease is observed in chloride concentrations between lateral bores at similar depths; and,
 - ii. A chloride concentration of ≤ 250 ppm is observed in a lateral surface sample; or,
 - iii. Safety concerns impede further lateral delineation

- 2. If warranted, install a monitor well to provide direct measurement of the potential groundwater impact at the site. (All monitor wells will be installed by EPA, NMOCD, and industry standards.)
- 3. Evaluate the risk of groundwater impact based on the information obtained.

If the evaluation of the site shows no threat to groundwater from residual chlorides, then only a vadose zone remedy will be undertaken. However, if groundwater shows impact from residual chlorides, a CAP will be developed to address these concerns.

RECS appreciates the opportunity to work with you on this project. Please call Hack Conder at (575) 393-2967 or me if you have any questions or wish to discuss the site.

Sincerely,

Lara Weinheimer

ACW.

Project Scientist

RECS

(575) 441-0431

Attachments:

Figure 1 – Site Location Map

Figure 2 – Geographical Location Map

Appendix A – Junction Box Disclosure Report

Appendix B – Quality Procedures



Site Location Map





EME Jct. F-32

Legals: UL/F sec. 32 T-19-S R-37-E LEA COUNTY, NM

NMOCD Case #: 1R427-407

Figure 1



0.5 0.25 Miles

Drawing date: 8/9/13 Drafted by: L. Weinheimer

Geographical Location Map





EME Jct. F-32

Legals: UL/F sec. 32 T-19-S R-37-E LEA COUNTY, NM

NMOCD Case #: 1R427-407

Figure 2



0.095 0.19

Drawing date: 8/9/13 Drafted by: L. Weinheimer



RICE OPERATING COMPANY JUNCTION BOX DISCLOSURE* REPORT

BOX LOCATION

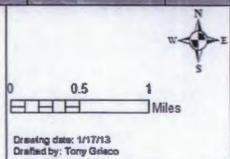
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	Depth to Groun	ndwater	27	feet	NMOC	D SITE AS	SESSME	NT RANKING	SCORE:	20
	Date Started	10/16	5/2012	Date Co	mpleted	11/13/2012	00	D Witness	No	
	Soil Excavated	400.0	cubic ya	rds Exc	cavation Le	ngth30	Wi	dth 30	Depth	12 feet
	Soil Disposed	584	cubic ya	rds Offsite	Facility	Sundance Ser	vices Inc.	Location	Eunice	, NM
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EME JCT F-32

UL F SECTION 32 T-19-S R-37-E LEA COUNTY, NM



EME Jct. F-32

UL/F, Section 32 (T19S, R37E)



Site prior, facing south



Excavating site, facing north

10/16/2012

10/16/2012



Exporting soil, facing northwest



Seeding site, facing south

11/13/2012



November 05, 2012

Bruce Baker Rice Operating Company 112 W. Taylor Hobbs, NM 88240

RE: EME F-32 JCT

Enclosed are the results of analyses for samples received by the laboratory on 10/31/12 16:03.

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.tceg.texas.cov/Neld/qa/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.

Celley B. Kenne

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



PHONE (575) 393-2326 * 101 E. MARLAND * HOBBS, NM 88240

Analytical Results For:

Rice Operating Company Bruce Baker 112 W. Taylor Hoobs NM, 88240 (575) 397-1471

Fax To:

Received: Reported: 10/31/2012 11/05/2012

Project Name: Project Number:

EME F-32 JCT NONE GIVEN

Project Location:

Analyte

Analyte

NOT GIVEN

Sampling Date:

BS

432

BS

179

170

10/31/2012

Sampling Type:

Soll

Sampling Condition:

Cool & Intact

Sample Received By:

Jodi Henson

Sample ID: 5 PT. COMP (H202654-01)

Chloride, SN4858CI-8

Chloride

TFH: 801534 .

GRO C6-C10

am/fee

Reporting Limit

16.0

Reporting Limit

50.0

50.0

Result

896

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RPD Qualifier

Qualifier

DRO >C10-C28 Surrogare: I-Chlorooctane

82.0 %

65.2-140

Surrogain: 1-Chlorooctadecane

86.9%

63.6-154

Sample ID: 4 WALL COMP (H202654-02)

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Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO 05-C10	<50.0	50.0	11/02/2012	ND	179	89.7	200	5.10	
DRO >C10-C28	<50.0	50.0	11/02/2012	ND	170	85.1	200	15.4	

Surrogate: I-Chlorooctane 82.8 % 65.2-140 Surrogate: 1-Chlorooctadecane 90.6% 63.6-154

Cardinal Laboratories

*=Accredited Analyte

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

Cardinal Laboratories

*=Accredited Analyte

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Colony & Kenne

Celey D. Keene, Lab Director/Quality Manager



CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

101 East Marland, Hobbs, NM 88240 (575) 393-2326 FAX (575) 393-2476

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November 14, 2012

Bruce Baker Rice Operating Company 112 W. Taylor Hobbs, NM 88240

RE: EME F-32 JCT

Enclosed are the results of analyses for samples received by the laboratory on 11/07/12 11:46.

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 https://www.toeq.texas.gov/field/ga/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.

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



PHONE (575) 393-2326 * 101 E. MARLAND * HOBBS, NM 88240

Analytical Results For:

Rice Operating Company **Bruce Baker** 112 W. Taylor Hobbs NM, 88240

Fax To:

(575) 397-1471

Received: Reported: 11/07/2012 11/14/2012 Sampling Date: Sampling Type: 11/07/2012 Soil

Project Name: Project Number: Project Location: EME F-32 JCT NONE GIVEN NOT GIVEN

Sampling Condition: Sample Received By:

** (See Notes) Jodi Henson

Sample ID: BLENDED BACKFILL (H202712-01)

Critoridis, Spikisonica a	300	/kg	Analysis	d Byc. 1984			-		_
Analyte Chloride	Result 656	Reporting Limit	Analyzed 11/09/2012	Method Blank ND	432	% Recovery	True Value QC 400	0,00	Qualifier
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GRO C6-C10	<50.0	50.0	11/13/2012	ND	197	98.7	200	2.81	
DRO >C10-C28	121	50.0	11/13/2012	ND	205	102	200	5.59	
Summater Li Chlomostane	A2 I	% 65.2-14	'n					-	

63.6-154 Surrogate: I-Chlorooctadecane 96.3 %

Cardinal Laboratories

*=Accredited Analyte

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 SM4500CI-8 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

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Celey D. Keene, Lab Director/Quality Manager



CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

101 East Marland, Hobbs, NM 88240 (575) 393-2326 FAX (575) 393-2476

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November 16, 2012

Hack Conder Rice Operating Company 112 W. Taylor Hobbs, NM 88240

RE: EME F-32 JCT

Enclosed are the results of analyses for samples received by the laboratory on 11/14/12 16:05.

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.tceq.texas.gov/field/ga/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.

Celly D. Kenne

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



PHONE (575) 393-2326 * 101 E. MARLAND * HOBBS, NM 88240

Analytical Results For:

Rice Operating Company Hack Conder 112 W, Taylor Hobbs NM, 88240

Fax To:

(575) 397-1471

Received: Reported: 11/14/2012 11/16/2012

Sampling Date: Sampling Type: 11/13/2012 Soil

Project Name: Project Number: EME F-32 JCT NONE GIVEN

Sampling Condition: Sample Received By: Cool & Intact Jodi Henson

Project Location:

NOT GIVEN

Sample ID: TOP SOIL (H202762-01)

Chapride, \$194006CF-B	mg	/leg	Analyza	d by AP		, At			
Analyte Chloride	Result <16.0	Reporting Limit	Analyzed 11/15/2012	Method Blank ND	85 416	% Recovery	True Value QC 400	RPD 3,92	Qualifier
TOH BOLEN	tig/		Academ	Original .	Basin, America				
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10	<10.0	10.0	11/15/2012	ND	187	93.7	200	1.91	
DRO >C10-C28	<10.0	10.0	11/15/2012	'ND	205.	103	200	2.87	
Surrogate: I-Chloroociane	80.7	% 65.2-14	0		-				
Surrogate: 1-Chlorooctadecane	85.6	% 63,6-15	4						

Cardinal Laboratories

*=Accredited Analyte

PLEASE MOTE Limites and Company. 'Chimists' limites' and cames auditors remain for pury stant unity; industry hands in explanate or long, and he limited to the measure part by any other cames returning and to compact tomore values years to present any compact or the applicable meter. To put or contains, before the applicable meter, to put or contains, before the explanation of the applicable meter. The contains a surrounce, delined, before the applicable meters, to put or contains a surrounce, and any memory are not one contains the contains the contains a surrounce and the provision of the contains the conta

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 SM4500CI-8 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

PARKET NOTE: Unlikely and transpin. Cordinals bookly and clasery analysis record up day cann desting, whether based in another or half, what he learned and the connect control in classes, substance about the connect control control control on the control of Comman control contr

Chy D. Kann

Celey D. Keene, Lab Director/Quality Manager



CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

101 East Martand, Hobbs, NM 88240 (575) 393-2326 FAX (575) 393-2476

Company Name:	RECE		3/14/10	ANALYSIS REQUEST
Project Manager:		1000 0 1/000	P.O. 8:	
Address:			Company:	
City:	State:	Zip:	Attn:	
Phone #:	Fax#:		Address:	
Project #:	Project Owne)P*	Сну:	
Project Name:			State: Zip:	
Project Location:	Emt F-32 50	_)	Phone #:	
Sampler Name:			Fax#:	
FOR LAB USE ONLY		MATRIX	PRESERV. SAMPLING	
Lab I.D. H203762	Sample I.D.	(G)(G)RAB OR (C)OMP ### CONTAINERS GROUNDWATER WASTEWATER CONTAINERS CONTA	STUDGE STUDGE OTHER: OTHER:	
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PUPANE NOTE: PERSONAL	والمنظور والمناورة والمناورة			
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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-32	F	32	198	37E

SAMPLE ID	PID	SAMPLE ID	PID
Background @ 6"	1.2		
Source @ 3'	16.4		
Source @ 4'	11.5		
Source @ 5'	33.8		
Source @ 6'	38.7	COF	
Source @ 7'	41.4	6611	
Source @ 8'	41.5	Annahu	
Source @ 9'	39.2		
Source @ 10'	43.6		
Source @ 11'	40.4		
Source @ 12'	45.5		

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

SIGNATURE: 10/16/2012

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 NO. X	MODEL: PGM 7300 MODEL: PGM 7300 MODEL: PGM 7320 MODEL: PGM 7300	SERIAL SERIAL	NO: 590-000508 NO: 590-000504 NO: 592-903318 NO: 590-000183		
	GAS COMPOSITION	ON: ISOBUTY	LENE 100PPM / AIR:	BALANCE	
OT NO: HAL-248	-100-1		EXPIRATION DATE:	7/1/2015	
	MET		ACCURACY: 100		
		ACCURA	CY:+1-2%		
		CO	MPANY		
		RICE	OPERATING		
SYSTEM	JUNCTION	UNIT	SECTION	TOWN SHIP	RANGE
ЕМЕ	Jct. F-32	F	32	T19S	R37E
SAMPLE ID		PID	SAMPLE ID		PID
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ВОТТО	M COMPOSITE	3.4			
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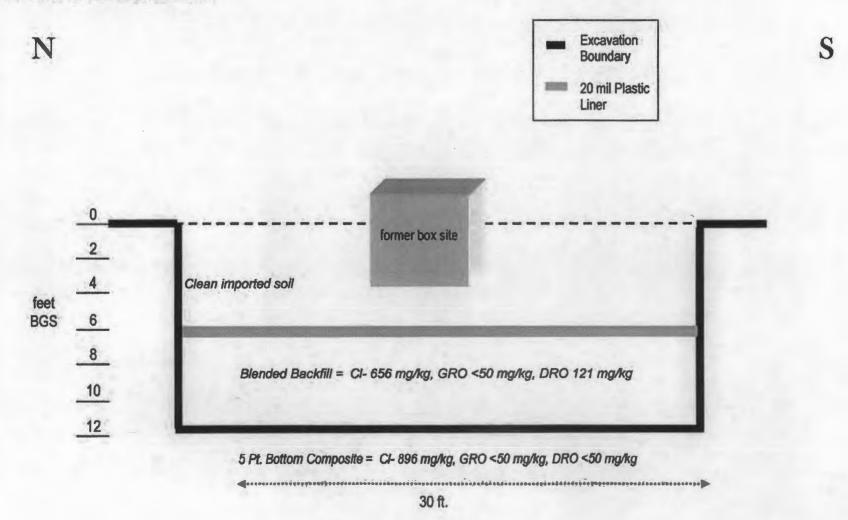
RICE ENVIRONMENTAL CONSULTING & SAFETY

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

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	GAS COMPOSITIO	ON: ISOBUTY	LENE 100PPM / AIR:	BALANCE	
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		RICE	OPERATING		
SYSTEM	JUNCTION	UNIT	SECTION	TOWN SHIP	RANGE
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SAMPLE ID BLENDED BACKFILL		PID	SAMPLE ID PII		PID
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EME Jct. F-32 Unit 'F', Sec. 32, T19S, R37E

Excavation Cross-Section



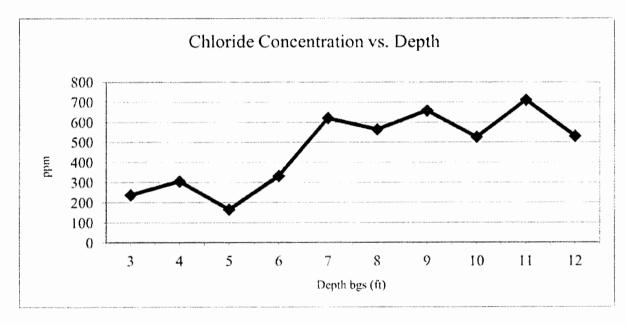
EME Jct. F-32

Unit 'F', Sec. 32, T19S, R37E

Backhoe samples at junction (source)

Depth bgs (ft)	[Cl] ppm
3	237
4	305
5	165
6	332
7	621
8	564
9	658
10	526
11	711
12	530

Groundwater = 27 ft.





PO Box 5630 Hobbs, NM 88241 Phone: (575) 393-4411 Fax: (575) 393-0293

REVEGETATION FORM 1. General Information Site name: EME Jct. F-32 U/L Section Township Range County Latitude Longitude F 32 N 32°37'10.73" W 103°16'25.45" 19S 37E Lea Contact Name: ZACHARY CONDER Email: zconder@rice-ecs.com Site size: 162x42 Map detail of site attached Square feet: 22,852 Additional information: 2. Soils *Do not rip caliches subsoils; caliche rocks brought to the surface by ripping shall be removed. Bioremediated Salvaged from site Imported 🛛 Blended Depth (in): Texture: Describe soil & subsoil: Soil prep methods: Rip Depth(in): Disc 🗌 Depth (in): Roller pack Date completed: 11/13/2012 3. Bioremediation Fertilizer Hay 🗍 Other 🗌 Type: Describe: Lbs/acre: 4. Seeding *Attach seed bag tags to this form. Seed bag tags shall contain the site name and S-T-R. Custom seed mix Prescribed mix Seed mix name: Side Oats and Black Grama Seeding date: 11/13/2012 Broadcast 🛛 Method: Mechanical Hand Seeder Soil conditions during seeding: Dry 🛛 Damp Wet Photos attached 25 lbs Side Oats and Black Grama Observations: Number of photos: 5. Certification I hereby certify that the information in this form and attachments is true and complete to the best of my knowledge and belief. Name: Dyllan Yarborough Title: **Environmental Tech** Date: 11/13/2012

Appendix B Quality Procedures

Quality Procedures

Table of Contents

QP-1	Soil Samples for Transportation to a Laboratory
QP-2	Chloride Titration Using 0.282 Normal Silver Nitrate Solution
QP-3	Development of Cased Water-Monitoring Wells
QP-4	Sampling of Cased Water-Monitoring Well
QP-5	Composite Sampling of Excavation Sidewalls and Bottoms for TPH and Chloride Analysis
QP-6	Sampling and Testing Protocol for VOC in soil
QP-7	Composite Sampling of Excavation Sidewalls and Bottoms for BTEX
QP-8	Procedure for Plugging and Abandonment of Cased Water-Monitoring wells

Quality Procedure 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.
- 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 nitrile gloves to help minimize any 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.

QP-01

- 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

QUALITY PROCEDURE Chloride Titration Using 0.282 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 20 grams of reverse osmosis water to the soil sample and shake well.
- 4.3 Allow the sample to set for a period of 5 minutes or until the separation of soil and water.

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 (K₂CrO₄) to mixture if necessary.

QP-02

- 5.3 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.
- 5.4 Record the ml of silver nitrate used.

6.0 Calculation

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

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.

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.
- 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 Environmental Consulting and Safety 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.

Quality Procedure Sampling of Cased Water-Monitoring Well

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.
- 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			Cap Requirements	Preservative	Maximum Hold Time	
Analyzed	Size	Description	Requirements		11014 11116	
BTEX	X 40 ml VOA (Teflon Lined	HCL	14 days	
TPH (8015 Extended)	40 ounces	(2) 40ml VOA vials	Teflon Lined	HCL and Ice	14 days	
PAH	AH 1 liter amber glass		Teflon Lined	Ice	7 days	
Cation/Anion	1 liter	HD polyethylene	Any Plastic	None	48 Hrs	
Metals	1 liter	HD polyethylene	Any Plastic	Ice/HNO ₃	28 Days	
TDS	DS 300 ml clear		Any Plastic	Ice	7 Days	
Cl-	500 ml	HD polyethylene	Any Plastic	None	28 Days	

QP-04

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 or submersible pump, purge a minimum of three well volumes. Place the water in storage container for transport to a ROC disposal facility.
- 5.3 If using a bailer, take care to insure that the bailing device and string does not become cross-contaminated. A clean pair of nitrile 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 or submersible pump.
- 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 Formula V= $(\pi r^2 h)$ 2" well [V/231=gal] X 3 = Purge Volume

V=Volume

 $\pi=pi$

r=inside radius of the well bore

h=maximum height of well bore in water table

Example:

π	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

Quality Procedure Composite Sampling of Excavation Sidewalls and Bottoms For TPH and Chloride Analysis

1.0 Purpose

This procedure outlines the methods to be employed when obtaining final composite soil samples for TPH and Chloride analysis.

2.0 Scope

This procedure is to be used in conjunction with *Quality Procedure* – 02: Soil Samples for Transportation to a Laboratory and will be inserted at subparagraph 5.2 of Section 5.0: Sampling Procedure.

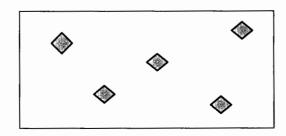
3.0 Sampling Procedure

Follow *Quality Procedure – 02:* Soil Samples for Transportation to a *Laboratory* for all Sections and subparagraphs until subparagraph 5.2 of Section 5.0: Sampling Procedure. Instead of 5.2 instructions, perform the composite sample collection procedure as follows:

3.1 Go to the excavation with a new plastic baggie. If not analyzing for ions or metals, use a trowel to obtain the soil. If the excavation is deeper than 6' BGS, do not enter the pit, but use a backhoe to assist in procurement of the sample. (If a backhoe is used, the backhoe will obtain an amount of soil from each composite point; bring the purchase to the surface staging area where a sample-portion of soil will be extracted from the backhoe purchase. The remainder of the backhoe purchase will be staged on the surface with other staged soils.)

3.2 Sidewall samples

3.2.1 On each sidewall, procure a 5oz sample from each of five distinct points on the sidewall with distinct points resembling the "W" pattern:



- 3.2.2 Thoroughly blend these five samples in a labeled baggie.
- 3.2.3 Repeat steps 3.2.1 through 3.2.4 for each remaining sidewall.
- 3.2.4 From each labeled baggie, procure a 5 oz portion and pour into a baggie labeled "Sidewall Composite". Blend this soil mixture completely.
- 3.2.5 Obtain proper laboratory sample container for "Sidewall Composite" and continue with subparagraph 5.3 of QP 01.

3.3 Bottom Sample

- 3.3.1 From bottom of excavation, procure a 5oz sample from each of five distinct points with distinct points resembling the "W" pattern as illustrated above.
- 3.3.2 Thoroughly blend these five samples in a clean baggie.
- 3.3.3 Obtain proper laboratory sample container for "Bottom Composite" and continue with subparagraph 5.3 of QP 01.

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°F). 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 a RAE Systems Photoionization device. (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 QP-7. 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.

Quality Procedure Composite Sampling of Excavation Sidewalls and Bottoms For BTEX

1.0 Purpose

This procedure outlines the methods to be employed when obtaining final composite soil samples for BTEX analysis.

2.0 Scope

This procedure is to be used when collecting soil samples intended for ultimate transfer to a testing laboratory for BTEX analysis. This procedure is to be used only when the PID field-test results for OVM exceeds 100 ppm.

3.0 Preliminary

3.1 Obtain sterile, clear, 2 oz. glass containers with Teflon lid from a laboratory supply company or the testing laboratory designated to conduct analyses of the soil.

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.

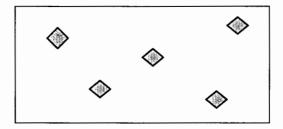
5.0 Sampling Procedure

- 5.1.Do not touch the soil with your bare hands. Use new nitrile gloves to help minimize any cross-contamination.
- 5.2.If safe and within OSHA regulations, go to the sampling point with the sample container. If not analyzing for ions or metals, use a trowel to

obtain the soil. If the excavation is deeper than 6' BGS, do not enter the pit, but use a backhoe to assist in procurement of the sample. (If a backhoe is used, the backhoe will obtain an amount of soil from each composite point; bring the purchase to the surface staging area where a sample-portion of soil will be extracted from the backhoe purchase. The remainder of the backhoe purchase will be staged on the surface with other staged soils.)

5.3. Sidewall Samples

5.3.1.On each sidewall, procure a 2oz sample from each of five distinct points on the sidewall with distinct points resembling the "W" pattern:



- 5.4.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. Repeat for each sampling point.
- 5.5.Place the samples directly on ice for transport to the laboratory if required.
- 5.6. 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

Procedure for Plugging & Abandonment of Cased Water Monitoring Wells

1.0 Purpose

This procedure outlines the methods to be employed to plug and abandon cased monitoring wells.

2.0 Scope

This procedure shall be used for developed, cased water monitoring wells located in the State of New Mexico

3.0 Preliminary

3.1 No well may be drilled, modified or plugged without NMOCD approval. Additional approvals may be required if the well is situated in a sensitive area, within municipal jurisdictions or on federal or tribal lands.

4.0 Plugging

- **4.1** Each bore will be filled with a 1% 3% bentonite/concrete slurry to three feet bgs. The remaining three feet will be capped with concrete only.
- **4.2** All wellheads will be removed to below ground surface.

5.0 Records

- **5.1** The company plugging the well shall prepare a report on their company letter head listing the site name and describing general well construction including total depth of the well, the diameter of casing, material used to plug the well (e.g. bentonite/cement slurry), and date of the plugging operation.
- **5.2** It is recommended but not required that photographs of the final surface restoration be taken and included within the records.
- **5.3** Copies of the plugging report shall be submitted to all appropriate agencies and retained by the well operator for a minimum period of ten years.