1R - 426-12

REPORTS

DATE:

9-24-10

TETRA TECH

RECEIVED OCD
2010 OCT -1 P 1:45

CERTIFIED MAIL
RETURN RECIEPT NO. 7001 0320 0004 3736 6068

September 24, 2010

Mr. Ed Hansen
New Mexico Energy, Minerals, & Natural Resources Department
Oil Conservation Division, Environmental Bureau
1220 South St. Francis Drive
Santa Fe, New Mexico 87505

RE: **CAP Report and Termination Request, Rice Operating Company, Blinebry Drinkard (BD) Saltwater Disposal System (SWD) O-17-1 Vent, Unit O, Section 17, T-21-S, R-37-E, Lea County, New Mexico, NMOCD CASE #1R426-12.**

Mr. Hansen:

Tetra Tech, Inc. (Tetra Tech) submits the following CAP Report and Termination Request for the Rice Operating Company (ROC), Blinebry Drinkard (BD) Salt Water Disposal (SWD) System O-17-1 Vent, NMOCD Case #1R426-12. ROC is the service provider (agent) for the BD SWD System and has no ownership of any portion of the pipeline, well or facility. The BD SWD system is owned by a consortium of oil producers, System Parties, who provide all operating capital on a percentage ownership/usage basis. The site is shown on Figures 1 and 2.

1.0 BACKGROUND and PREVIOUS WORK

As part of the ROC Junction Box Upgrade Workplan, starting on March 7, 2003, the junction box was removed and the site was investigated vertically and horizontally with a backhoe. See site location as shown on Figure 1 and Figure 2. The site was excavated to the approximate dimensions of 27' x 18' x 12'. TPH impact was noted to a depth of at least 12' below ground surface (bgs). Chloride impact was consistent vertically and horizontally, with a bottom hole chloride concentration of 1,740 mg/kg at 12' below ground surface. Regional groundwater information indicates that the depth to groundwater is approximately 70' bgs.

The junction box once contained a vent, but the junction was eliminated and the site was plumbed straight through with new poly pipeline. ROC completed the replacement of the line on August 29, 2003. On September 16, 2003, ROC submitted a Junction Box

Tetra Tech
1910 North Big Spring, Midland,TX 79705
Tel 432.682.4559 Fax 432.682.3946 www.tetratech.com

Disclosure Report to the NMOCD. A copy of the Junction Box Disclosure Report is included in Appendix A.

On August 10, 2006, ROC submitted the ICP to Mr. Wayne Price of the NMOCD-Santa Fe office for review. Mr. Price granted approval of the ICP in a letter dated September 21, 2006.

On October 9 and 10, 2006, Highlander personnel were onsite to oversee the installation of five soil borings (SB-1, SB-2, SB-3, SB-4, and SB-5) within and adjacent to the former junction box location. Soil samples were collected every 5' beginning at a depth of 13 feet bgs within the excavated area and 3 feet bgs outside the excavated area. Samples were collected utilizing a split spoon sampler, and placed into laboratory supplied containers and delivered to the laboratory under chain-of-custody control for chloride analysis by EPA method 300.0 and specific samples for TPH analysis by EPA method 8015 modified. The collected samples were field screened for TPH utilizing a photoionization detector (PID) and for chlorides with a field sampling kit. The split spoons were decontaminated between samples utilizing an Alconox and deionization water wash followed by a deionization water rinse.

The TPH concentrations were below the NMOCD guidelines in all samples collected and submitted for analysis. The chloride concentrations showed a marked decrease with depth in each of the five soil borings.

On September 17, 2007, ROC submitted a CAP to the NMOCD office for review. Mr. Hansen granted approval of the CAP in an email dated January 7, 2009.

2.0 CORRECTIVE ACTION PLAN IMPLEMENTATION

As part of the Corrective Action Plan (CAP), ROC was onsite August 9, 2010 through August 18, 2010, to excavate chloride impacted soils from the K-4 release area. An area measuring 38 feet wide by 38 feet long by 6 feet deep was excavated. Two feet of topsoil was removed and stockpiled onsite. The site was excavated further and a total of 372 cubic yards of soil were disposed of at the NMOCD approved Sundance facility. A topsoil composite sample (PID reading 3.3ppm) was collected on August 17, 2010 and analyzed by Cardinal Laboratory, with the resulting chloride concentration of 352 mg/Kg, GRO <10 mg/Kg and DRO 126 mg/Kg. A total of seven (7) loads of red clay and six (6) loads of blow sand were hauled in from Wallach Concrete. Upon completion of the excavation, a clay barrier was installed and compacted from 5'-6' in the bottom of the excavation. The blow sand was blended with the stockpiled soils and a backfill composite sample (PID reading 3.5 ppm) was analyzed by Cardinal Laboratory resulting in a chloride concentration of 336 mg/Kg, GRO of <10 mg/Kg and DRO of 99.5 mg/Kg. Between September 10 and September 14, 2010, clean offsite soils blended with peanut hay were brought to the site to continue backfilling. The site was brought up to surface grade. (See Appendix A – Laboratory Data for analysis on the topsoil and blended excavated soils and soil compaction testing data). The site was fenced and on September 16, 2010, the site was reseeded with 8 pounds of Lea County mix and 10 pounds of rye. (See Appendix B – Site Photographs)

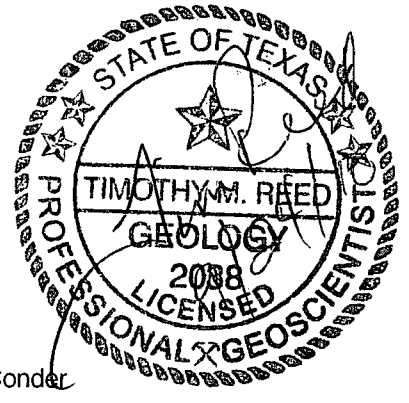
TETRA TECH

3.0 CONCLUSIONS

1. As per the CAP, an area measuring 38 feet wide by 38 feet long by 6 feet deep was excavated and a 1 foot compacted clay liner was installed in the bottom of the excavation. Upon completion of the liner the site was backfilled with blended and clean soils, and brought up to surface grade with excavated soils blended with hay. The site was fenced and reseeded with native vegetation.

2. Approximately 372 cubic yards of soil was hauled to the NMOCD approved Sundance facility for disposal

With the completion of the liner, backfilling and reseeding as per the CAP, ROC requests that the NMOCD terminate further activities at this site. If you require any additional information of have any questions or comments concerning the termination request, please call me at (432) 682-4559 or Hack Conder of ROC at (575) 393-9174. Thank you for your attention to this matter.



Respectfully Submitted,
Tetra Tech, Inc.

Tim Reed

Tim Reed, P.G.
Senior Project Manager

cc: ROC- Hack Conder

FIGURES

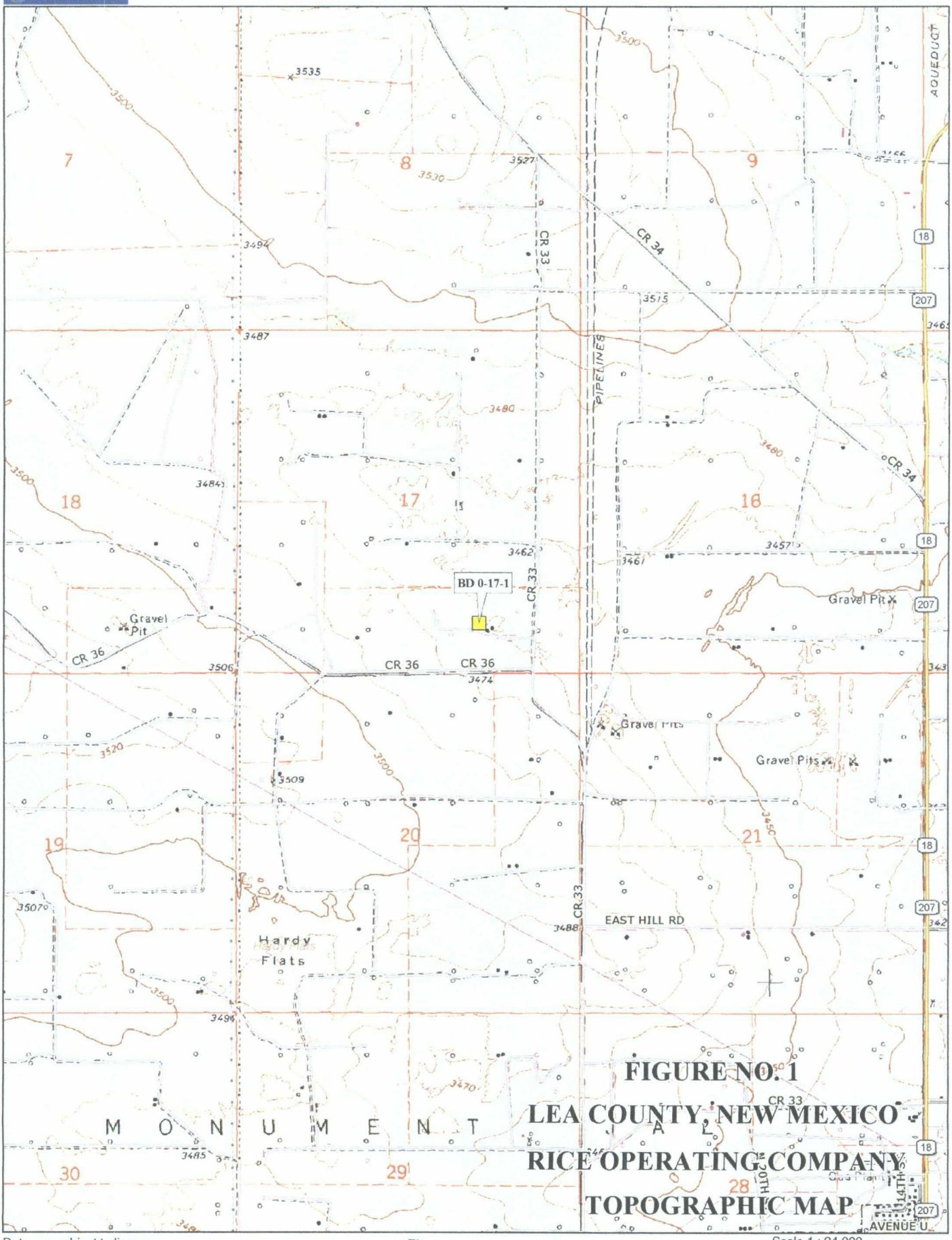


FIGURE NO. 1
LEA COUNTY, NEW MEXICO
RICE OPERATING COMPANY
TOPOGRAPHIC MAP

Data use subject to license.
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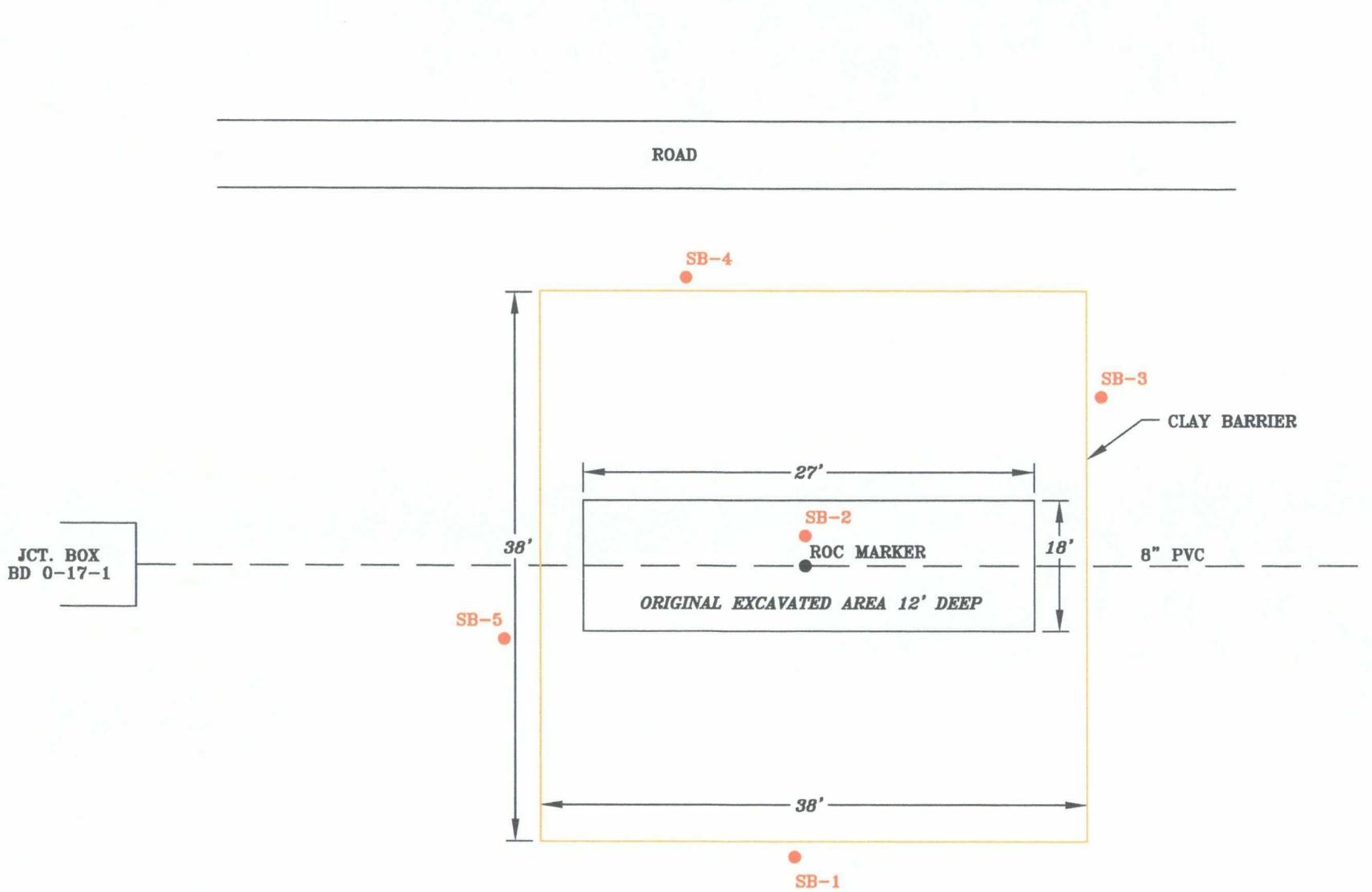
www.delorme.com

TN
MN (7.5°E)

Scale 1 : 24,000
1" = 2,000.0 ft
Data Zoom 13-0



● SOIL BORING LOCATIONS

NOT TO SCALE

FIGURE NO. 2

LEA COUNTY, NEW MEXICO

RICE OPERATING COMPANY
BD 0-17-1
PROPOSED CLAY LINER

DATE: 1/4/08
DWN. BY: JJ
FILE: C:\RICE\2844 SITE MAP

TETRA TECH, INC.
MIDLAND, TEXAS

APPENDIX A

RICE OPERATING COMPANY

122 West Tayor Hobbs, NM 88240
PHONE: (575) 393-9174 FAX: (575) 397-1471
PID METER CALIBRATION & FIELD REPORT FORM

Check Model Number:

	Model: PGM 7300	Serial No: 590-000183			Model: PGM 7600	Serial No: 110-023920
	Model: PGM 7300	Serial No: 590-000508			Model: PGM 7600	Serial No: 110-013744
X	Model: PGM 7300	Serial No: 590-000504			Model: PGM 7600	Serial No: 110-013676

GAS COMPOSITION: ISOBUTYLENE 100PPM / AIR: BALANCE

LOT NO : 924503	EXPIRATION DATE: 7-5-12
FILL DATE: 7-6-09	METER READING ACCURACY: 100

ACCURACY : +/- 2%

SYSTEM	JUNCTION	UNIT	SECTION	TOWN SHIP	RANGE
BD	O-17-1	O	17	21	37

SAMPLE ID	PID	SAMPLE ID	PID
Backfill #1	3.3		

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

SIGNATUE: Jordan Woodson DATE: 8-17-10

CARDINAL Laboratories

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

August 18, 2010

Hack Conder

Rice Operating Company

112 W. Taylor

Hobbs, NM 88240

RE: BD O-17-1 VENT

Enclosed are the results of analyses for samples received by the laboratory on 08/17/10 14:36.

Cardinal Laboratories is accredited through Texas NELAP for:

Method SW-846 8021	Benzene, Toluene, Ethyl Benzene, and Total Xylenes
Method SW-846 8260	Benzene, Toluene, Ethyl Benzene, and Total Xylenes
Method TX 1005	Total Petroleum Hydorcarbons

Certificate number T104704398-08-TX. Accreditation applies to solid and chemical materials and non-potable water matrices.

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 (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

Celey D. Keene
Lab Director/Quality Manager

CARDINAL Laboratories

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:	08/17/2010	Sampling Date:	08/17/2010
Reported:	08/18/2010	Sampling Type:	Soil
Project Name:	BD O-17-1 VENT	Sampling Condition:	Cool & Intact
Project Number:	NOT GIVEN	Sample Received By:	Celey D. Keene
Project Location:	BD O-17-1 VENT		

Sample ID: BACKFILL #1 (H020659-01)

Chloride, SM4500Cl-B mg/kg **Analyzed By: HM**

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	**352**	16.0	08/18/2010	ND	448	112	400	3.64	

TPH 8015M mg/kg **Analyzed By: AB**

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10	<10.0	10.0	08/18/2010	ND	174	86.9	200	3.77	
DRO >C10-C28	**126**	10.0	08/18/2010	ND	178	88.8	200	2.16	

Surrogate: 1-Chlorooctane	*97.8 %*	*70-130*
Surrogate: 1-Chlorooctadecane	*97.9 %*	*70-130*

Cardinal Laboratories

*=Accredited Analyte

PLEASE NOTE: Liability and Damages. Cardinal's liability and client's exclusive remedy for any claim arising, whether based in contract or tort, shall be limited to the amount paid by client for analyses. All claims, including those for negligence and any other cause whatsoever shall be deemed waived unless made in writing and received by Cardinal within thirty (30) days after completion of the applicable service. In no event shall Cardinal be liable for incidental or consequential damages, including, without limitation, business interruptions, loss of use, or loss of profits incurred by client, its subsidiaries, affiliates or successors arising out of or related to the performance of the services hereunder by Cardinal, regardless of whether such claim is based upon any of the above stated reasons or otherwise. Results relate only to the samples identified above. This report shall not be reproduced except in full with written approval of Cardinal Laboratories.

Celey D. Keene

Celey D. Keene, Lab Director/Quality Manager

CARDINAL Laboratories

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

Notes and Definitions

S-06	The recovery of this surrogate is outside control limits due to sample dilution required from high analyte concentration and/or matrix interference's.
QL-01	Sample results for the QC batch were accepted based on LCS/LCSD percent recoveries and RPD values.
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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Celey D. Keene

Celey D. Keene, Lab Director/Quality Manager

CARDINAL LABORATORIES

CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

101 East Marland, Hobbs, NM 88240 2111 Beechwood, Abilene, TX 79603
(505) 393-2326 FAX (505) 393-2476 (325) 673-7001 FAX (325)673-7020

Company Name: Rice Operating Company	BILL TO
Project Manager: Hack Conder	P.O. #:
Address: 122 West Taylor	Company:
City: Hobbs State: NM Zip: 88240	Attn:
Phone #: 393-9174 Fax #: 397-1471	Address:
Project #: Project Owner:	City:
Project Name: BLP [illegible] 0-17-1 Deck	State: Zip:
Project Location: BLP [illegible] 0-17-1 Deck	Phone #:
Sampler Name: J. Woodfin	Fax #:

FOR LAB USE ONLY				MATRIX						PRESERV.			SAMPLING		ANALYSIS REQUEST										
Lab I.D.	Sample I.D.	(G)RAB OR (C)OMP.	# CONTAINERS	GROUNDWATER	WASTEWATER	SOIL	OIL	SLUDGE	OTHER :	ACID/BASE:	ICE / COOL	OTHER :	DATE	TIME	Chlorides	TPH 8015 M	BTEX	Texas TPH	Complete Cations/Anions						
H20659-1	Back Fill #1	C	1			X					X		8-17-10	[illegible]	X	X									

PLEASE NOTE: Liability and Damages. Cardinal's liability and client's exclusive remedy for any claim arising whether based in contract or tort, shall be limited to the amount paid by the client for the analyses. All claims including those for negligence and any other cause whatsoever shall be deemed waived unless made in writing and received by Cardinal within 30 days after completion of the applicable service. In no event shall Cardinal be liable for incidental or consequential damages, including without limitation, business interruptions, loss of use, or loss of profits incurred by client, its subsidiaries affiliates or successors arising out of or related to the performance of services hereunder by Cardinal, regardless of whether such claim is based upon any of the above stated reasons or otherwise.

Relinquished By: J. Woodfin	Date: 8-17-10 Time: 2:36	Received By:	Phone Result: ☐ Yes ☑ No Add'l Phone #:
Relinquished By:	Date: Time:	Received By:	Fax Result: ☐ Yes ☑ No Add'l Fax #:
Delivered By: (Circle One) Sampler - UPS - Bus - Other: 5°C	Sample Condition Cool: ☑ Yes ☐ No Intact: ☑ Yes ☐ No	CHECKED BY: (Initials)	REMARKS: email results Rush ☺ Hconder@riceswd.com; Jwoodfin@riceswd.com Lweinheimer@riceswd.com

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

#26

RICE OPERATING COMPANY

122 West Tayor Hobbs, NM 88240
PHONE: (575) 393-9174 FAX: (575) 397-1471
PID METER CALIBRATION & FIELD REPORT FORM

Check Model Number:

	Model: PGM 7300	Serial No: 590-000183			Model: PGM 7600	Serial No: 110-023920
	Model: PGM 7300	Serial No: 590-000508			Model: PGM 7600	Serial No: 110-013744
X	Model: PGM 7300	Serial No: 590-000504			Model: PGM 7600	Serial No: 110-013676

GAS COMPOSITION: ISOBUTYLENE 100PPM / AIR: BALANCE

LOT NO : 924503	EXPIRATION DATE: 7-5-12
FILL DATE: 7-6-09	METER READING ACCURACY: 100

ACCURACY : +/- 2%

SYSTEM	JUNCTION	UNIT	SECTION	TOWN SHIP	RANGE
BD	O-17-1	O	17	21	37

SAMPLE ID	PID	SAMPLE ID	PID
Blended Backfill	3.5		

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

SIGNATUE: Jordan Woolf DATE: 8-24-10

CARDINAL Laboratories

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

August 25, 2010

Hack Conder

Rice Operating Company

112 W. Taylor

Hobbs, NM 88240

RE: BD O-17-1 VENT

Enclosed are the results of analyses for samples received by the laboratory on 08/24/10 11:20.

Cardinal Laboratories is accredited through Texas NELAP for:

Method SW-846 8021	Benzene, Toluene, Ethyl Benzene, and Total Xylenes
Method SW-846 8260	Benzene, Toluene, Ethyl Benzene, and Total Xylenes
Method TX 1005	Total Petroleum Hydorcarbons

Certificate number T104704398-08-TX. Accreditation applies to solid and chemical materials and non-potable water matrices.

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 (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

Celey D. Keene

Lab Director/Quality Manager

CARDINAL Laboratories

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:	08/24/2010	Sampling Date:	08/24/2010
Reported:	08/25/2010	Sampling Type:	Soil
Project Name:	BD O-17-1 VENT	Sampling Condition:	Cool & Intact
Project Number:	NOT GIVEN	Sample Received By:	Jodi Henson
Project Location:	BD O-17-1 VENT		

Sample ID: BLENDED BACKFILL (H020705-01)

Chloride, SM4500Cl-B mg/kg **Analyzed By: HM**

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	**336**	16.0	08/24/2010	ND	416	104	400	3.77	

TPH 8015M mg/kg **Analyzed By: AB**

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10	<10.0	10.0	08/24/2010	ND	162	81.2	200	0.699	
DRO >C10-C28	**99.5**	10.0	08/24/2010	ND	163	81.3	200	0.746	

Surrogate: 1-Chlorooctane	*90.2 %*	*70-130*
Surrogate: 1-Chlorooctadecane	*76.9 %*	*70-130*

Cardinal Laboratories

*=Accredited Analyte

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Celey D. Keene

Celey D. Keene, Lab Director/Quality Manager

CARDINAL Laboratories

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

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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Celey D. Keene

Celey D. Keene, Lab Director/Quality Manager

CARDINAL LABORATORIES

CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

101 East Marland, Hobbs, NM 88240 2111 Beechwood, Abilene, TX 79603
(505) 393-2326 FAX (505) 393-2476 (325) 673-7001 FAX (325)673-7020

Company Name: Rice Operating Company	BILL TO
Project Manager: Hack Conder	P.O. #:
Address: 122 West Taylor	Company:
City: Hobbs State: NM Zip: 88240	Attn:
Phone #: 393-9174 Fax #: 397-1471	Address:
Project #: Project Owner:	City:
Project Name: BD 0-17-1	State: Zip:
Project Location: BD 0-17-1	Phone #:
Sampler Name: J. Woodfin	Fax #:

FOR LAB USE ONLY				MATRIX						PRESERV			SAMPLING		ANALYSIS REQUEST											
Lab I.D.	Sample I.D.	(G)RAB OR (C)OMP.	# CONTAINERS	GROUNDWATER	WASTEWATER	SOIL	OIL	SLUDGE	OTHER :	ACID/BASE:	ICE / COOL	OTHER :	DATE	TIME	Chlorides	TPH 8015 M	BTEX	Texas TPH	Complete Cations/Anions							
H20105-1	Bladed Backfill	C	1			X					X		8-14-13	1100	X	X									

PLEASE NOTE: Liability and Damages. Cardinal's liability and client's exclusive remedy for any claim arising whether based in contract or tort, shall be limited to the amount paid by the client for the analyses. All claims, including those for negligence and any other cause whatsoever shall be deemed waived unless made in writing and received by Cardinal within 30 days after completion of the applicable service. In no event shall Cardinal be liable for incidental or consequential damages, including without limitation, business interruptions, loss of use, or loss of profits incurred by client, its subsidiaries affiliates or successors arising out of or related to the performance of services hereunder by Cardinal, regardless of whether such claim is based upon any of the above stated reasons or otherwise.

Relinquished By: J. Woodfin	Date: 8-14-13 Time: 11:20	Received By:	Phone Result: ☐ Yes ☑ No Add'l Phone #:
Relinquished By:	Date: Time:	Received By: Jodi Henson	Fax Result: ☐ Yes ☑ No Add'l Fax #:
Delivered By: (Circle One) Sampler - UPS - Bus - Other: X	Sample Condition Cool: ☑ Yes ☐ No Intact: ☑ Yes ☐ No	CHECKED BY: (Initials) JH	REMARKS: email results 631-1278 Jordan RUSH Hconder@riceswd.com; Jwoodfin@riceswd.com Lweinheimer@riceswd.com KJONES@

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

#26

LABORATORY TEST REPORT

PETTIGREW & ASSOCIATES, P.A.
1110 N. GRIMES
HOBBS, NM 88240
(575) 393-9827

AASHTO R18

DEBRA P. HICKS, P.E./L.S.I.
WILLIAM M. HICKS, III, P.E./P.S.

To: Rice Operating Company
122 W. Taylor
Hobbs, NM 88240

Material: Wallach Red Clay

Test Method: ASTM: D 2922

Project: BD Jct. O-17-1
Project No. 2010.1240

Date of Test: August 19, 2010

Depth: See Below

Depth of Probe: 6"

Test No.	Location	*Dry Density % Max	% Moisture	Depth
SG 1	15' N. & 12' W. of SE Corner	83.1	24.0	5' Below FSG Natural Ground
RT SG 1	15' N. & 12' W. of SE Corner	87.4	27.8	5' Below FSG Natural Ground
2RT SG 1	15' N. & 12' W. of SE Corner	93.1	21.5	5' Below FSG Natural Ground

Control Density: 101.1
ASTM: D 698

Optimum Moisture: 19.0%

Required Compaction: 90-95%

Densometer ID: 5071

Lab No.: 10 8749-8752

Copies To: Rice Operating

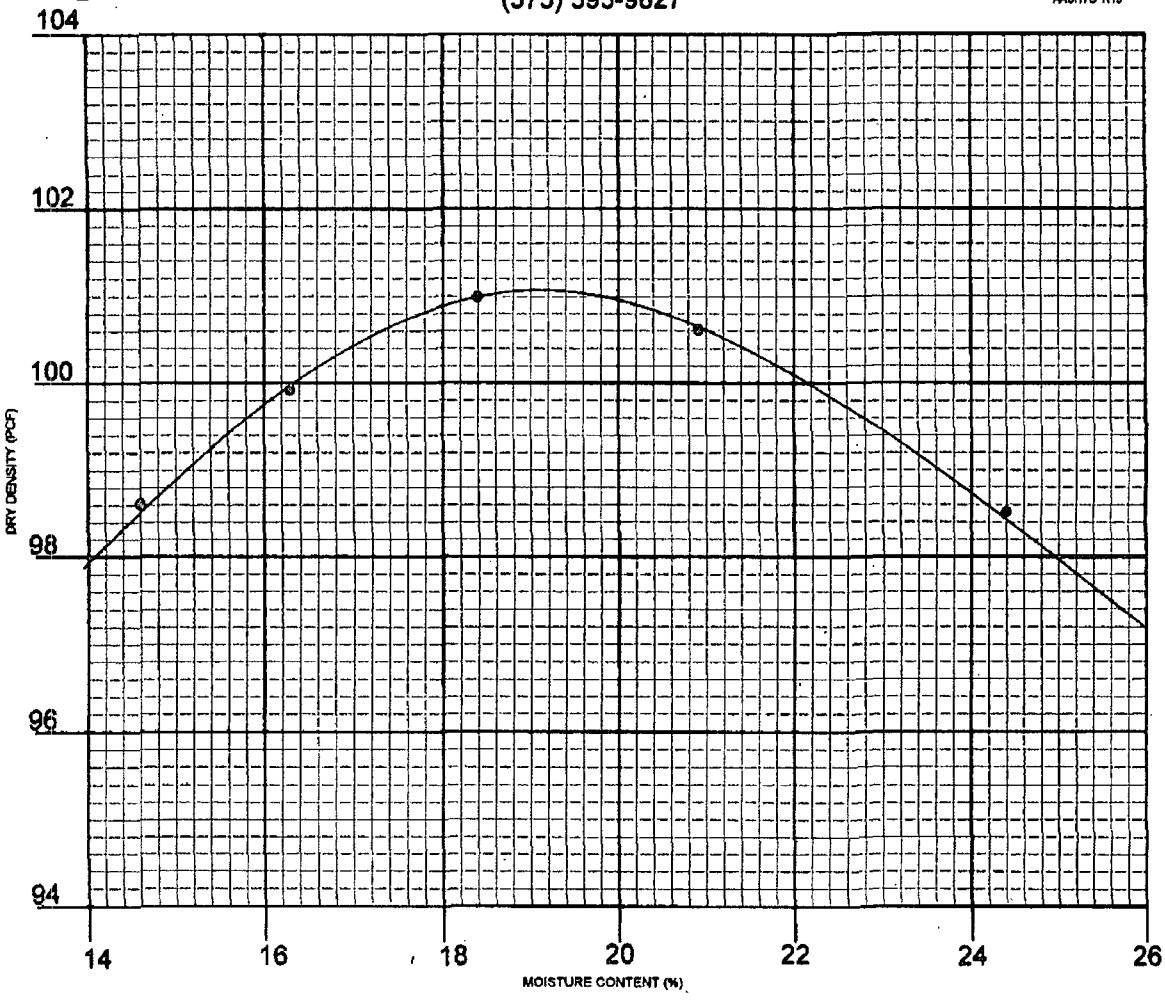
PETTIGREW & ASSOCIATES

BY: Erica M Hart

BY: for Debra Hicks **P.E.**

PETTIGREW & ASSOCIATES, P.A.
1110 N. GRIMES ST.
HOBBS, NM 88240
(575) 393-9827

AASHTO R18



General Information

CLIENT: Rice Operating PROJECT: Project No. 2010.1026

SAMPLE LOCATION: Wallach Pit

SOIL DESCRIPTION: Wallach Red Clay

SOIL CLASSIFICATION: _____ TEST METHOD: ASTM: D 698

ATTERBERG: LL ____ PI ____ Sampled & Delivered 8/13/10

DATE: 8/13/10 LAB NO. 10 5904-5906

DRY WEIGHT LB/CU. FT. 101.1 MOISTURE CONTENT % 19.0

SIEVE ANALYSIS - % PASSING									

PETTIGREW & ASSOCIATES

BY: Erica M Hart

BY: _____ P.E

COPIES: Rice Operating

Home Office - 1717 East Erwin Street
Tyler, Texas 75702-6398
Office: (903) 595-4421 Lab: (903) 595-6402 Fax: (903) 595-6113
Area Offices
210 Beech Street Texarkana, AR 71854 (870) 772-0013
707 West Cotton St. Longview, TX 75604 (903) 758-0402

Acct ID: PETTIGREW File ID: C4535-101 Date Sampled: 08/19/2010
Report Date: 08/27/2010 Sampled By: Client
Project: Pettigrew Associates - Project #2010.1026, Hobbs, NM By Order Of: Erica Hart
Location: Material Origin: Wallach Pit, Sample Location: N/G Order Number:
Client: Pettigrew & Associates, Hobbs, NM
Contractor: Not Given

REPORT: **FLEXIBLE WALL PERMEAMETER** LAB NO: 9881
Test Method: See Below

TEST RESULTS Report No: 1-1201-000005
Page 1 of 2

HYDRAULIC CONDUCTIVITY DETERMINATION
FLEXIBLE WALL PERMEAMETER - CONSTANT VOLUME
(Mercury Permometer Test)

Project : Rice Operating Project 2010.1026 for Pettigrew & Associates, P.A., Hobbs, NM
Date: 8/25/2010 Panel Number : P 2 ; ASTM D 5084
Project No. : C 4535-101 Permometer Data

Boring No.:		ap =	0.031416 cm2	Set Mercury to Pipet Rp at	Equilibrium	1.8	cm3
Sample:	9881	aa =	0.767120 cm2		Pipet Rp	6.7	cm3
Depth (ft):		M1 =	0.030180	C = 0.000448509	Annulus Ra	1.5	cm3
Other Location:	Wallach Pit	M2 =	1.040853	T = 0.203785086			

Material Description : Red Clay (Clients Sample No 10 5904-5908) Lab Molded @ ~95% ASTM D 698

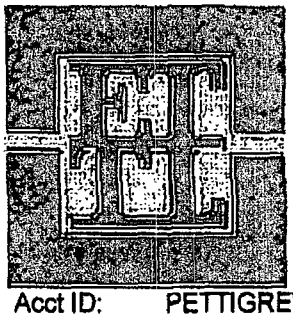
SAMPLE DATA

					Before Test		After Test	
Wet Wt. sample + ring or tare :			507.52	g	Tare No.:	T 9	Tare No.:	T 2
Tare or ring Wt. :			0.0	g	Wet Wt.+tare:	850.96	Wet Wt.+tare	728.58
Wet Wt: of Sample :			507.52	g	Dry Wt.+tare:	716.43	Dry Wt.+tare	621.60
Diameter :	2.72	in	6.90	cm2	Tare Wt:	220.51	Tare Wt:	216.59
Length :	2.75	in	6.98	cm	Dry Wt.:	495.92	Dry Wt.:	405.01
Area:	5.79	in^2	37.35	cm2	Water Wt.:	134.53	Water Wt.:	106.98
Volume :	15.94	in^3	261.23	cm3	% moist.:	27.1	% moist.:	26.4
Unit Wt.(wet):	121.23	pcf	1.94	g/cm^3				
Unit Wt.(dry):	95.38	pcf	1.53	g/cm^3				

Assumed Specific Gravity: 2.65 Max Dry Density(pcf) = 101.1 OMC = 19
% of max = 94.3 +/- OMC = 8.13
Calculated % saturation: 95.26 Void ratio (e) = 0.73 Porosity (n)= 0.42

Charge: Pettigrew & Associates Attn: Erica Hart
Orig: Pettigrew & Associates, Hobbs, NM Attn: Erica Hart
1-ec Pettigrew & Associates, Hobbs, NM Attn: Erica Hart
E-Mail: ehart@pettigrew.us

THIS REPORT APPLIES ONLY TO THE STANDARDS OR PROCEDURES INDICATED AND TO THE SAMPLE(S) TESTED AND/OR OBSERVED AND ARE NOT NECESSARILY INDICATIVE OF THE QUALITIES OF APPARENTLY IDENTICAL OR SIMILAR PRODUCTS OR PROCEDURES, NOR DO THEY REPRESENT AN ONGOING QUALITY ASSURANCE PROGRAM UNLESS SO NOTED. THESE REPORTS ARE FOR THE EXCLUSIVE USE OF THE ADDRESSED CLIENT AND ARE NOT TO BE REPRODUCED WITHOUT WRITTEN PERMISSION.



Home Office - 1717 East Erwin Street
Tyler, Texas 75702-6398
Office: (903) 595-4421 Lab: (903) 595-6402 Fax: (903) 595-6113

Area Offices

210 Beech Street	Texarkana, AR 71854	(870) 772-0013
707 West Cotton St.	Longview, TX 75604	(903) 758-0402

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TEST READINGS

Z1(Mercury Height Difference @ t1): 5.1 cm Hydraulic Gradient = 9.20

Date	elapsed t (seconds)	Z (pipet @ t)	□□□ (cm)	temp (deg C)	□ (temp corr)	k (cm/sec)	k (ft./day)	Reset = *
8/23/2010	960	6.1	0.5571305	25	0.889	5.01E-08	1.42E-04	
8/23/2010	1200	6	0.6571305	25	0.889	4.78E-08	1.35E-04	
8/23/2010	1500	5.9	0.7571305	25	0.889	4.46E-08	1.26E-04	
8/23/2010	1800	5.8	0.8571305	25	0.889	4.25E-08	1.21E-04	

SUMMARY

ka = 4.62E-08 cm/sec Acceptance criteria = 25 %

ki		Vm	
k1 =	5.01E-08 cm/sec	8.3	%
k2 =	4.78E-08 cm/sec	3.3	%
k3 =	4.46E-08 cm/sec	3.6	%
k4 =	4.25E-08 cm/sec	8.0	%

$$Vm = \frac{|ka - ki|}{ka} \times 100$$

Hydraulic conductivity	k =	**4.62E-08**	cm/sec	**1.31E-04**	ft/day
Void Ratio	e =	**0.73**			
Porosity	n =	**0.42**			
Bulk Density	□□□	**1.94**	g/cm3	**121.2**	pcf
Water Content	W =	**0.42**	cm3/cm3	(at 20 deg C)	
Intrinsic Permeability	kint =	**4.74E-13**	cm2	(at 20 deg C)	

Remarks: **These tests were performed solely at the request of the Client for his own use. No warranties are expressed or implied regarding the suitability of the site for construction or whether or not the reported data represents all conditions of the site.**

Charge: Pettigrew & Associates Attn: Erica Hart
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E-Mail: ehart@pettigrew.us

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112 West Taylor
Hobbs, NM 88240
Phone: (575) 393-9174
Fax: (575) 393-0293

REVEGETATION FORM

1. General Information

Site name: BD O-17-1 vent						
U/L O	Section 17	Township 21S	Range 37E	County Lea	Latitude 32.473	Longitude -103.181
Contact Name: Hack Conder						
Email: hconder@riceswd.com						
Site size: 7050 square feet			Map detail of site attached ☐			
Additional information:						

2. Soils **Do not rip caliche subsoils; caliche rocks brought to the surface by ripping shall be removed.*

Salvaged from site ☐	Bioremediated ☐	Imported ☒	Blended ☒	Depth (in):
Texture: blow sand	Describe soil & subsoil: fine grain sand			
Soil prep methods:	Rip ☐ Depth(in):	Disc ☒ Depth (in):	Rollerpack ☐	
Date completed: 9/16/2010				

3. Bioremediation

Fertilizer ☐	Hay ☒ Peanut hay	Other ☐ Describe:
Type:		
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: 8 lbs lea county mix, 10 lbs rye	Seeding date: 9/16 /2010
Broadcast ☒ Method: spreader			
Soil conditions during seeding: Dry ☒ Damp ☐ Wet ☐			
Photos attached ☐	Observations:		

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: Jordan Woodfin	Title: Environmental Technician	Date: 9/22/2010
Signature: Jordan Woodfin		

APPENDIX B

BD O-17-1 vent (1R426-12)
Unit O, Section 17, T-21-S, R-37-E

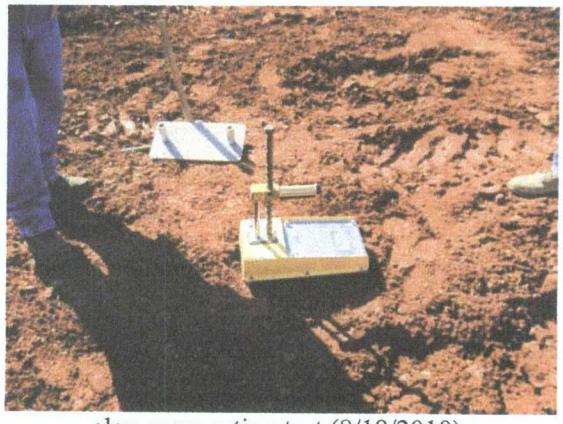
site prior to excavation, facing north

excavating a 38'x38' area, facing northeast

hauling off excavated soil, facing east

final excavation, facing southwest

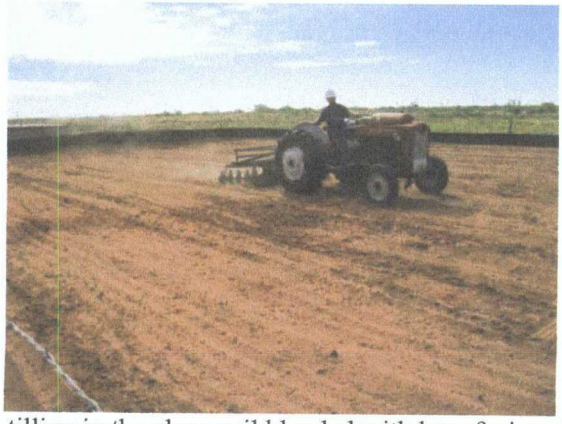
installing clay barrier, facing north (8/18/2010)



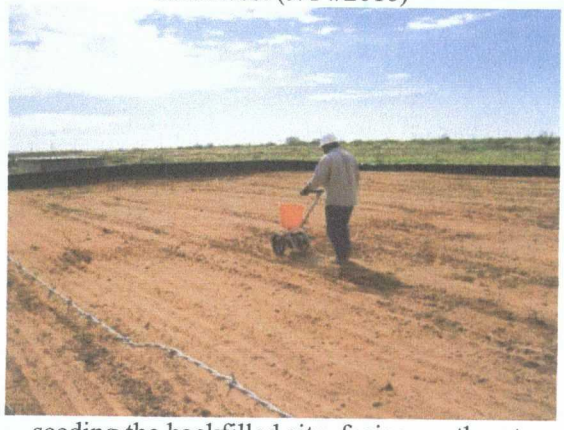
clay compaction test (8/19/2010)

backfilling the excavation, facing east

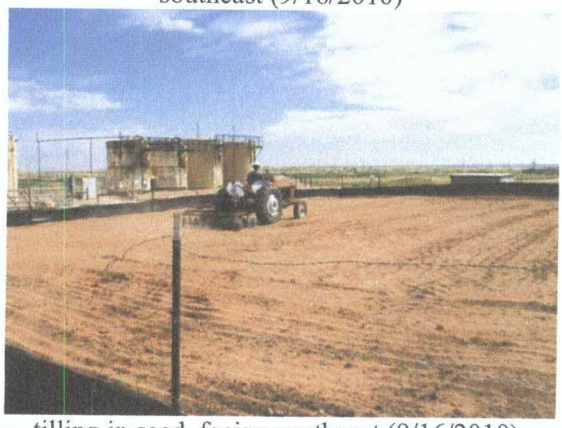
hauling in clean soil blended with hay, facing southwest (9/14/2010)



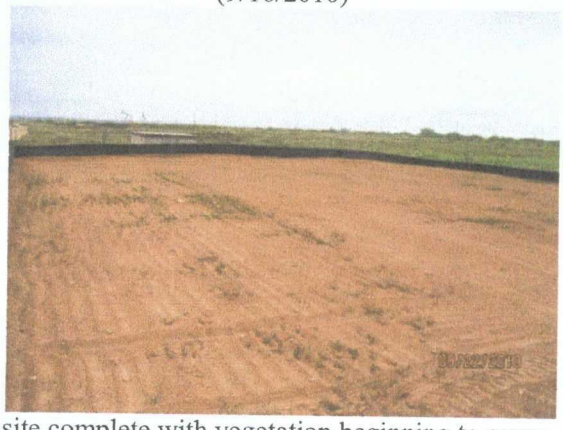
tilling in the clean soil blended with hay, facing southeast (9/16/2010)



seeding the backfilled site, facing southeast (9/16/2010)



tilling in seed, facing northeast (9/16/2010)



site complete with vegetation beginning to grow, facing east

Hansen, Edward J., EMNRD

From: Hack Conder [hconder@riceswd.com]
Sent: Monday, October 04, 2010 6:42 PM
To: Hansen, Edward J., EMNRD
Cc: Katie Jones
Subject: BD O-17-1 IR426-12

M. Hansen,

On October 9-10 2006 Rice Operating drilled five soil bores at BD O-17-1 (NMOCD Case # IR426-12) according to the August 10, 2006 approved ICP. Our records indicate that all borings were backfilled with 100% Bentonite chips a total of forty fifty pound bags were utilized for backfilling. I f you have any questions or concerns please let me know.

Hack Conder
Environmental Manager
Rice Operating Company
575-393-9174
fax 575-397-1471