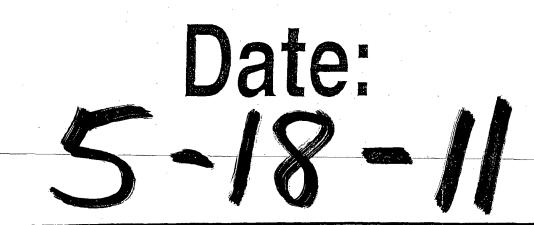
1R-426-286

WORKPLANS



P.O. Box 5630 Hobbs, NM 88241 Phone 575.393.4411 Fax 575.393.0293 RECEIVED UCD

2011 MAY 19 A 11: 24

CERTIFIED MAIL RETURN RECIEPT NO. 7008 1140 0001 3070 5825

May 18th, 2011

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 & CHARACTERIZATION PLAN Rice Operating Company – BD SWD System BD jct. G-23 (1R426-286): UL/G sec. 23 T22S 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 BD Salt Water Disposal (SWD) system. 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 system is owned by a consortium of oil producers, System Parties, who provide all operating capital on a percentage/usage basis. Environmental projects of this nature require System Party AFE approval prior to work commencing at the site. In general, project funding is not forthcoming until NMOCD approves the work plan. Therefore, your timely review of this submission is greatly appreciated.

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 4 miles south-east of Eunice, New Mexico at UL/G sec. 23 T22S R37E as shown on the Site Location Map (Figure 1). NM OSE records indicate that groundwater will likely be encountered at a depth of approximately 59 +/- feet.

In 2010 ROC initiated work on the former BD G-23 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 432 mg/kg and negligible gasoline range organics (GRO) reading and diesel range organics (DRO) reading. The bottom composite showed a chloride laboratory reading of 1,790 mg/kg and negligible GRO and DRO readings. The excavated soil was blended on site and a sample was taken to a commercial laboratory for analysis. The soil showed a chloride reading of 672 mg/kg and negligible GRO and DRO readings. The blended backfill was returned to the excavation to 6 ft below ground surface (bgs). At 6-5 ft bgs, a 1 ft clay layer was installed to inhibit downward migration of chlorides. A clay compaction test was conducted on March 1st, 2010. 156 yards of the remaining backfill was transported to a NMOCD approved facility for disposal. Clean soil was imported into the site and blended with the remaining backfill from the excavation. Laboratory analysis of the blended backfill with imported clean soil showed a chloride reading of 480 mg/kg. The excavation was backfilled with the blended backfill and imported clean soil to ground surface.

The area was contoured to the surrounding landscape, seeded, and an identification plate was placed on the surface of the site to mark its location for future environmental considerations. NMOCD was notified of potential groundwater impact on February 21st, 2011 and a junction box disclosure report (Appendix A) was submitted to NMOCD with all the 2010 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

- 1. Conduct vertical and lateral delineation of residual soil hydrocarbons and chlorides from samples taken using a drill rig, hand auger, and/or backhoe (see Appendix B for Quality Procedures).
 - a. Vertical sampling will be conducted until 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 ≤ 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.

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

Sincerely,

ACW

Lara Weinheimer Project Scientist RECS (575) 441-0431

Attachments:

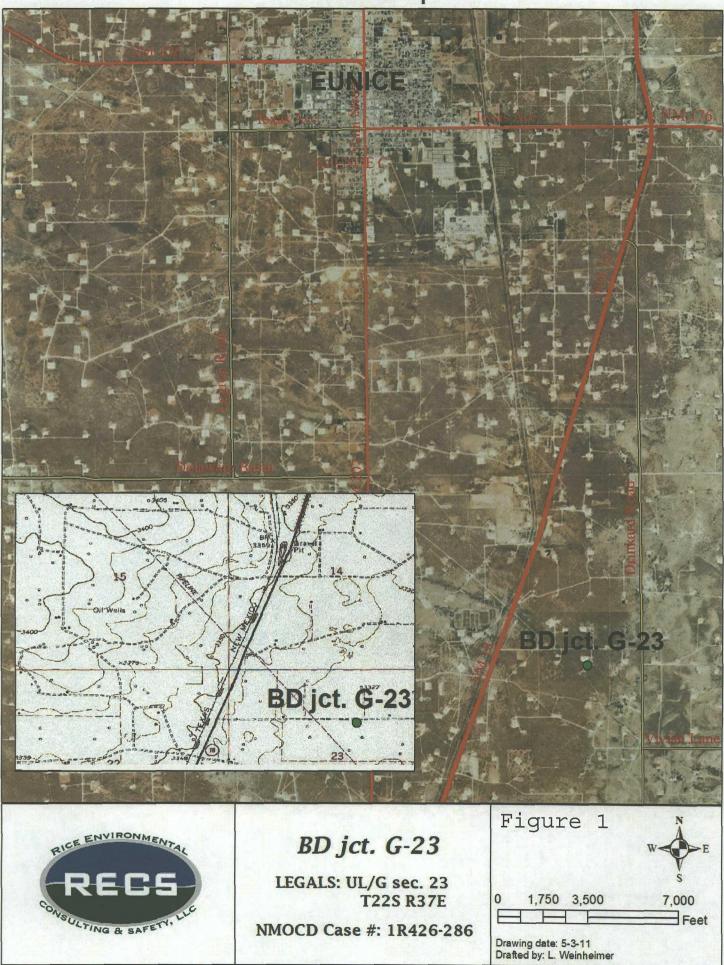
Figures – Site location map Appendix A – Junction Box Disclosure Report Appendix B – Quality Procedures

Figures

 \wedge

RICE Environmental Consulting and Safety (RECS) P.O. Box 5630 Hobbs, NM 88241 Phone 575.393.4411 Fax 575.393.0293

Site Map



Appendix A Junction Box Disclosure Report

RICE Environmental Consulting and Safety (RECS) P.O. Box 5630 Hobbs, NM 88241 Phone 575.393.4411 Fax 575.393.0293

RICE OPERATING COMPANY JUNCTION BOX DISCLOSURE* REPORT

			· · · ·	BOXLOCA	ATION	· · · · · · · · · · · · · · · · · · ·			_
SWD SYSTEM	JUNCTION	UNIT	SECTION	TOWNSHIP	RANGE	COUNTY	BOX DI	MENSIONS - P	EET
Blinebry-Drinkard	Jct.G-23	G	23	225	37E	Lea	Length 5'	Width 6'	Depth 4'
(BD)							- 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 199	eliminated	· · ·
LAND TYPE:	BLM	STATE	FEE LA	NDOWNER	Walc	o Ranch, LLC	OTHER		· .
Depth to Grou	ndwater	59	feet	NMO	D SITE A	SSESSMENT	RANKING S	ORE:	20
Date Started	1/29/	2010	Date Co	mpleted	3/12/201	<u>0</u> OCD \	Witness	no	
Soil Excavated	400.0	cubic yar	ds Exc	avation Ler	igth <u>3</u>	0Width	30	Depth1	12feet
Soil Disposed	156	cubic yar	ds Of	fsite Facility	Su	ndance	Location	Eunice	NM
• • • •				·			•		

FINAL ANALYTICAL RESULTS: Sample Date Sample Depth 12 ft 2/17/2010 3/01/2010

> Procure 5-point composite sample of bottom and 4-point composite sample of sidewalls. TPH and Chloride laboratory test results completed by using an approved lab and testing procedures pursuant to NMOCD guidelines.

and the second	1.1			e de la companya de l
Sample Location	PID (field) ppm	GRO mg/kg	DRO mg/kg	Chlorides mg/kg
4-WALL COMP.	3.1	<10.0	<10.0	432
BOTTOM COMP.	4.7	<10.0	<10.0	1,790
BACKFILL COMP.	1.8	<10.0	<10.0	672
BLENDED BACKFILL WITH IMPORTED SOIL	N/A	N/A	N/A	480

CHLORIDE FIELD TESTS

	00471011	DEDTU	
	OCATION	DEPTH	mg/kg
L	4-wall comp.	n/a	750
6	ottom comp.	12'	1,661
b	ackfill comp.	n/a	752
	background	6"	88
		2'	294
1.	vertical	4	688
d	elineation 15 ft. east of	6'	1,254
	junction	8'	984
	(source)	10'	1,089
		12	1,575

DATE

General Description of Remedial Action: This junction and line were eliminated during the pipeline replacement/upgrade program. After the former box was removed, an investigation was conducted using a backhoe to collect soil samples at regular intervals producing a 30x30x12-ft deep excavation. Chloride field tests were performed on each sample which did not relent with depth. Organic vapors were measured using a PID,

which yielded low concentrations. The excavated soil was blended on site and

representative composite samples were collected from the blended backfill, the bottom of the excavation, and the excavation walls. The representative samples were sent to a commercial laboratory for analysis of chloride and TPH. The blended backfill was returned to the excavation to 6 ft below ground surface (bgs). At 6-5 ft. BGS, a 1-ft. thick clay layer was installed and compaction test performed on 3/1/2010. 156 yards of the blended backfill was hauled to a NMOCD approved facility and the remaining blended backfill was blended with clean imported soil. A representative sample was collect and sent to a commercial laboratory for analysis of chloride. The remaining excavation was backfilled with the blended backfill with imported soil to ground surface and contoured to the surrounding area. An identification marker was placed on the surface at the former junction box to mark the presence of clay below. On 3/25/2010, the site was seeded with a blend of native vegetation and is expected to return to a productive capacity at a normal rate. NMOCD was notified of

potiential groundwater impact on 2/21/2011

Larry Bruce Baker Jr

ASSEMBLED BY

ADDITIONAL EVALUATION IS HIGH PRIORITY

enclosures: photos, lab reports, PID (field) screenings, cross-section, compaction test, hydraulic conductivity, proctor, chloride curve

a de la companya de la	a de la compañía de l	• .	and a last second				
IHER	EBY CERTIFY THAT	T THE INFOR	MATION ABOVE I	S TRUE AND C	OMPLETE TO THE	BEST OF M	Y
1. A.		1	KNOWLEDGE AND	D BELIEF.			÷
	Robert Eagans	SIGNATURE	Revert	Bene	COMPANY	RICE OPERATI	NG COMPAN
REPORT			12.0				

QBF

INITIAL Bruce Larry PROJECT LEADER SIGNATURE Larry Bruce Baker Jr. "This site is a "DISCLOSURE." It will be placed on a prioritized list of consideration.



Unit G, Section 23, T22S, R37E







3/25/2010

Seeding excavation



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

ANALYTICAL RESULTS FOR RICE OPERATING COMPANY ATTN: BRUCE BAKER 122 W. TAYLOR HOBBS, NM 88240

Receiving Date: 02/17/10 Reporting Date: 03/01/10** Project Number: NOT GIVEN Project Name: BD JCT. G.-23 Project Location: NOT GIVEN Sampling Date: 02/17/10 Sample Type: SOIL Sample Condition: COOL & INTACT Sample Received By: JH Analyzed By: AB/HM

GRO DRO (C₅-C₁₀) (>C₁₀-C₂₈) Ci* (mg/kg) (mg/kg) (mg/kg)

LAB NUMBER SAMPLE ID

	and the second			•		
ANALYSIS DA	TE			02/19/10	02/19/10	02/18/10
H19292-1**	5PT BOTTOM C	COMP @ 12		<10.0	<10.0	1,790
H19292-2	4-WALL COMP	an a		<10.0	<10.0	432
H19292-3	BLENDED BAC	KFILL	· · · · · · · · · · · · · · · · · · ·	<10.0	<10.0	672
Quality Control				553	536	500
True Value QC				500	500	500
% Recovery			Protection of an international states of the	111	107	100
Relative Perce	nt Difference			8.4	12.1,	<0.1

METHODS: TPH GRO & DRO: EPA SW-846 8015 M; CI : Std. Methods 4500-CI'E *Analyses performed on 1.4 w:v aqueous extracts. Reported on wet weight.

**REVISED REPORT.

03/01/10

H19292 TCL RICE

Chemist

PLEASE NUTE. Liability and Damages. Cardinal's liability and client's exclusive remoty for any claim arising, whether cased in contract or rord, shall be limited to the amount oald 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) gays after completion of the applicable service. In no event shall be liable for incidental or consequential damages, including, without limitation, business interruptions, tass of use, or loss of profits incurred by client, its subsidiaries, affiliates or successors arising but of or related to the performance of services nereunder 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.

	0 Samplo Condition C CleCKED BY:	1 BEECNWOOG, ADIIGNE,) 673-7001 FAX (326)6	I Beechwood, Abilane, TX 79603 I Bra-T001 FAX (326)673-7020 I Bra-T14 T I Bra	WSION HOLING			
0 aample Condition CHECKED BY:		any huma Kick Operating Longer Marken Consultant Kick Start	The I LICCU ARNOW				
The I COU ACNU	10 11000 NOVON	And Lyolds And Lyolds And Lyolds And Lyolds And Lyolds Bases MM Horb 12 With Strate Bir Manne Horb 12 Bir Manne Horb 12 Bir Manne Horb 12 Sample I.D. Sample I.D. Rev 12 Horb 12 And Horb 12 Mitt Preservi And Horb 13 Mitt Preservi And Horb 14 Horb 15 Sample I.D. Sample I.D. Rev 15 Mitt Preservi And Horb 15 Horb 15 Bir Manne Horb 17 And Horb 15 Horb 16 And Horb 16 Horb 17 And Horb 17 C 1 And Horb 16	7/10 Received By:	wis & Rice Swo can			
Circle One) Circle One) Circle One) Circle One) Circle BY:	The Marine Received By:	area Names: パレッシューム クロー・ロー・ロー・ Anther TyO manual Alt TyO manual anti- atta anti- atta 2.2 2017年7月7月 日本 2.2 3月1-1471 Anthenas: 2.0 6 年 atta 1.2 2.2 75-373-917月 Fastes: 575-391-1471 Anthenas: 2.0 15 atta molection: atta		-Mail Results			
The Theory and By: Clicle One) Upda: 17110 Received By: Clicle One) Upda: 101000 NOV By Boater " ' ' ' ' ' Clicle One) Upda: 0 Boater " ' ' ' ' ' ' ' ' ' ' ' ' ' ' ' ' ' '	Times <u>Avia</u> : 17/10 Received By: I PULVENCE FMARKA: F-Mail Results Unsi: 10 MCUL NeWDON BOAKE " " " " "	and Name: No. No. No. No. And. Yells Request Pro- transmit And. Yells Request Pro- transmit And. Yells Request Pro- transmit And. Yells Incolor 1 1 1 1 1 1 1 1 1 Incolor 2 3 1 1 1 1 1 1 1 Incolor 3 1 1 1 1 1 1 1 1 Incolor 3 1 1 1 1 1 1 1 1 Incolor 3 1 1 1 1 1 1 1 1 Incolor 3 1 1 1 1 1 1 1 Incolor 3 1 1 1 1 1 1 1 Incolor 3 1 1 1 1 1 1 1 Incolor 3 1 1 1 1 1 1 Incolor 3 1 1 1 1 1 1 Incolor 3 1 1 1 1 1 <tr< td=""><td></td><td>U Yes C</td><td></td></tr<>		U Yes C			
Times Ti	Times Ti	ану Милос, Кисс. Оре. Год., Гад. (О. К.). Амы. Yells. Request auximum Busic, IVM Inc. F52.40 Amil. Yells. Amil. Yells. Horb 12.3. (Inc.) Basic, IVM Inc. F52.40 Amil. Yells. Polo Horb 12.3. (Inc.) Basic, IVM Inc. F52.40 Amil. Yells. Polo Basic, IVM Inc. F52.40 Amil. Yells Polo Amil. Yells Basic, IVM Inc. F52.40 Amil. Yells Amil. Yells Amil. Yells Basic, IVM Inc. Stantion Little Basic, IVM Inc. F52.40 Amil. Yells Basic Dist. Form Little Basic Propertion Zinc. Little Basic Basic Marce Basic Marce Basic Marce Amil. Yells Basic Basic Basic Marce Basic Marce Each Zinc. Little Marce Basic Basic Basic Marce Zinc. Zinc.	ו המשור היו				
A reprint of the second service of the service of the second second second service of the second seco	A COLUME AND A COLUMN AND A COLUMN AND A COLUMN AND A COLUMN A COLUMNA	акумание Косс. Ореден 1 од 2014 рание Килен 1 акаларии: <i>Влие Балке</i> в <i>5.75-373-9114</i> ди: <i>88240</i> сании в <i>5.75-373-9114</i> ди: <i>88240</i> сании в <i>5.75-373-9114</i> данаен в <i>6.76</i> данаен в <i>5.75-373-9114</i> данаен в <i>5.75-373-9114</i> данаен в <i>6.76</i> данаен в <i>1.1</i> данаен	באו נהואסן שישרויה לנוואס ונו קטוביו כי אווי איי וויי איי ווי שוווים או איינע איי איינע איי איי איי איי איי אי מל איואן או ערוינו איינע איי איינע איי איינע איי איי איין איי איין איי איין איי איין איי איי				
a variation materia particular of a start and an an an and a supplication of the start and a start and	Index is index of a stand of data (data (data (data))) Index of a stand (data) (data (data)) Index of a stand (data) Index of a stand (data) Index is index of a stand (data) (da	any Namo: Кусс. Орс. г. с. 1.9 Сал. у Та. у Га. у С. п. And Yolis And Yolis <t< td=""><td></td><td></td><td></td></t<>					
A constrained of the market of the market of the constrained of the constrained of the constrained of the market of the market of the market of the constrained of th	A constrained and the instant the result and the dentifies of the dentification of the dentifica	ary Namo, Kije Opereting Langary Namo, Kije Opereting Langary Namo, Kije Opereting Langary La					
And the server at the server at the second pader to dentify the dentify the second pader to a server at the second second at the second	An child where there is a child be the area of the deriver to derive the child be and the first of the deriver the child be area and the child be area of the deriver the child be area of the deriver the child be area of the deriver and the child be area of the deriver and the child be area of the deriver and the deri	ану Numo: К/сс. Ореган/а Ден/али Ами. You ans: 1/2.3 Ш. Т. Д. (Т. Д. (Д. Д. (Д. (Д. (Д. (Д. (Д. (Д. (Д.					
An characteristic and the final of the mean part of the deminent of the second part of the se	An et NY worker land to externa werk and to how and provident for the second part of the dentifier the second part of the secon	ану Namos К/сс Ореган (л. 4) Дилан АМАLY808					
An and a subject of the second part of the damper of the d	An and where land to contract the data of the darm for th	any Namo: К/сс Орегені по Делари ANALYBIS ANALYBIS ANALYBIS REQUEST as: 1/2.3 W. Tay / Or Done P.O. 4: Done ANALYBIS ANALYBIS </td <td></td> <td></td> <td></td>					
An the second part of the second part of the clear first by the clear	An characteristic of the second part of the characteristic of the						
An characteristic of the second part of the dentity the second part of the dentity the second and the bar according to the second part of the dentity the second part of the bar according to the bar according to the second part of the bar according to the second part of the bar according to the	An characteristic of the second part of the daring the second part of	ary Names: Nice Operating Company et Managari Bruce Baker Hobbs Bulas: NM Zu: 757-397-1471 Address: 122 W: Tay Ior Hobbs Bulas: NM Zu: 55240 Admin as: 575-393-9174 Fax 8: 575-397-1471 Address: 10000 Admin as: 575-393-9174 Fax 8: 575-397-1471 Address: as: 575-393-9174 Fax 8: 575-397-1471 Address: as: 575-393-9174 Fax 8: 575-397-1471 Address: as: 575-393-9174 Fax 8: 575-3972-1471 Address: as: 575-393-9174 Fax 8: 575-3972 Address: as: 575-3973-9174 Fax 8: 575-3972 Address: as: 575-3973-9174 Fax 8: 575-3972 Address: b1LD. Sample 1.D. Sample 1.D. COMBETER Address: Address: 2000 Addre					
And of the second provided by the child by t	And the second second second add of the child in the second add of the child in the second se	ary Name: Nice Operating Longary Roll 19 Conserved thanges: Brue Barker Mar 2000 Attribute Barker B					
And the second s	And the second product of the child by the c	aty Name, Kice Operating Langary at Managoi: Bruce Baker Balai 1/20. Ex 12 W. Tay lor Hobbs Balai 1/M Zu: \$\$240 at minimum for the state of the	backfin cull 1				
1 1 2.094 1 1 1 2.094 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	1 1 2.094 1 1 1 2.094 1 1 1 1 1 2.094 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Any Nemo: Kick Operating Company at Manages: Bruck Bakker Bas: 1/22 W. Tay /or Bas: 1/27 / 2/37 / 2/1 / 2/17 / 2	No. 27701				
1 2.7.70 1.55m 1 1 2.770 2.090 1 1 2.090 2.090 1 1 1 1 1 1 1 1 2.090 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	1 1 2-7.70 1.55m 1 1 2 2 2 1 1 1 2 2 1 1 1 1 2 2 1 1 1 1 2 2 1 1 1 1 1 2 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Any Nermoi Kióc Operating Langany at Managoi Bruce Baker Bala 122 U. Taylor Plobs Bala 122 U. Taylor Bala 122 U. Taylor Plobs Bala 122 U. Taylor Plobs Bala 122 U. Taylor Bala 120					
1 1 2-17-0 1:35c 1 1 1 2 2-17-0 1:55c 1 1 1 2 2 1 1 1 1 2 2 1 1 1 1 2 2 1 1 1 1 2 2 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	1 1 1 2-7140 1.35ev 1 1 1 2 2-7140 1.35ev 1 1 1 2 2 1 1 1 1 1 1 1 1 1 1 1 2 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Any Neme: Kice Operating Company at Managoi: Bruce Baker Bas: 122 W: Tay 10r Hobbs Batas: NM Zp: \$5240 Attn: Company: Address: at: 575-373-9174 Rax 8: 5.75-397-1471 Address: at: 575-373-9174 Rax 8: 5.75-397-1471 Address: at : 575-373-9174 Rax 8: 5.75-397-121 Address: at : 575-373-9164 Rax 8: 5.75-397-121 Address: at : 575-373-9174 Rax 8: 5.75-394 Rax 8: 5.75-121 Address: at : 575-373-9164 Rax 8: 5.75-394 Rax 8: 5.75-394 Rax 8: 5.75-121 Address: at : 575-373-9164 Rax 8: 5.75-394 Rax 8: 5.75-394 Rax 8: 5.75-121 Address: at : 575-375-375-375-375-375-375-375-375-375-	(G)RAB O PONTAL SCONTAL SCONER: SCOL SCOL SCOL SCOL SCOL SCOL SCOL SCOL				
1 CONTA	1 2-17-10 1.27pm 2 1.27pm 1 2-17-10 1.25pm 1.27pm 1.27pm 1 2 2-17-10 1.55pm 1.2 1 2 2-17-10 1.55pm 1.2 1 2 2 1.25pm 1.2 1 2 2 2 1.2 1 2 2 1.2 1.2 1 2 2 1.2 1.2 1 1 1 1.2 1.2 1 1 1 1.2 1.2 1 1 1 1.2 1.2 1 1 1 1.2 1.2 1 1 1 1.2 1.2 1 1 1 1.2 1.2 1 1 1 1.2 1.2 1 1 1 1.2 1.2 1 1 1 1.2 1.2 1 1 1 1.2 1.2 1 1 1 1.2 1.2 1 1 1 1 1.2 1 1 1 1 1.2 1	Any Nemo: Rice Operating Company Relet TO and appli: Bruce Barker and 122 W. Tay Jor Hobbs Balae: NM ZD: \$8240 Attn: attn: Company: Address: Address: S75-393-9174 Rax 8: 575-397-1471 Address: att S75-397-9174 Rax 8: 575-397-1471 Address: att S75-397-3974 Rax 8: 575-397-1471 Address: att S75-3974 Rax 8: 575-397-1471 Address: att S75-3974 Rax 8: 575-397-1471 Rax 8: 575-5941 R	-Steelin Steelin Settaw Setta	> н			
Image: State of the state o	ACONTANTER MARKAGE ACONTANTER ACONTANTE	any Nemoi Rice Operating Company Relet TO and Relet To Company: Bruce Barker and 122 W. Tay Vor Hobbs Start Rent 20: \$8240 Atm atm: DD XH Rent S75-397-1471 Address at S75-393-9174 Rent 20: \$81400: att contain: DD XH G 2'3 at Location: Phone #: 210: Start Contain: Company: Company	1 KYANS FARS	10,			
Robert Kears Increased Bample I.D. Cample I.D. Sample I.D. <th>Ray #. Ray #. MUTUAL PRESERV MUTUAL PRESERVE MUTUAL PROPERTIE PROPACE PROPACE <</th> <td>ану Nemo: <i>Kice Operating Company</i> et Managoi: <i>Bruce Barker</i> ash: 122 W. Tay lor Hobbs shate: NM Zp: \$5240 Atm: ast: 575-393-9174 Faxe: 575-397-1471 Address: et fi. Project Owner: Cly: ct heme: DD Xt-G223 Stand States: Zlp: States: States: Zlp: States: Zlp: States: Zlp: States: Zlp: States: Zlp: States: States: Zlp: States: Zlp: States: Zlp: States: Zlp: States: Zlp: Zlp: States: Zlp: Zlp: States: States: Zlp: States: Zlp: Zlp: States: Zlp: Zlp: States: Zlp: States: Zlp: States: Zlp: States: Zlp: Zlp: States: Zlp: States: Zlp: Zlp: Zlp: Zlp: Zlp: Zlp: Zlp: Zlp</td> <td></td> <td>5</td> <td></td>	Ray #. Ray #. MUTUAL PRESERV MUTUAL PRESERVE MUTUAL PROPERTIE PROPACE PROPACE <	ану Nemo: <i>Kice Operating Company</i> et Managoi: <i>Bruce Barker</i> ash: 122 W. Tay lor Hobbs shate: NM Zp: \$5240 Atm: ast: 575-393-9174 Faxe: 575-397-1471 Address: et fi. Project Owner: Cly: ct heme: DD Xt-G223 Stand States: Zlp: States: States: Zlp: States: Zlp: States: Zlp: States: Zlp: States: Zlp: States: States: Zlp: States: Zlp: States: Zlp: States: Zlp: States: Zlp: Zlp: States: Zlp: Zlp: States: States: Zlp: States: Zlp: Zlp: States: Zlp: Zlp: States: Zlp: States: Zlp: States: Zlp: States: Zlp: Zlp: States: Zlp: States: Zlp: Zlp: Zlp: Zlp: Zlp: Zlp: Zlp: Zlp		5			
Plane Plane Bample I.D. Sample I.D. Sample I.D. Sample I.D. Bo there carry control Control Bo there carry control Contre con	Phone в. Рисла Раст. Ватріе I.D. Бат. в. Ватріе I.D. Ватріе I.D. Ватріе I.D. Ватріе I.D. Ватріе I.D. Ватеріе I.D. Ватеріе I.D. Ватеріе I.D. Ватеріе I.D. Ватеріе I.D. Ватеріе I.D. Ватеріе I.D. Ватеріе I.D. Ватеріе I.D. Ватеріе I.D. Ватеріе I.D.	atry Nemoir Rice Operating Company Riel TO et Managoi: Bruce Baker au: 122 W. Tay Vor Hobbs Buba: NM Zp: \$8240 Atm atm: 275-373-9174 Rax 8: 575-397-1471 Addresa: at: 575-373-9174 Rax 8: 575-397-1471 Addresa: at 575-373-9174 Rax 8: 575-397-1471 Addresa:	- 2.3	~			
Curr Formula Base Zp. Sample I.D. Phone s: Fare Addition Sample I.D. Reset Addition Addition Sample I.D. Reset Reset Addition Sample I.D. Reset Reset Addition Sample I.D. Reset Reset Addition Sample I.S. Reset Reset Reset Sample I.D. Reset Reset Reset Reset Reset Reset Reset Reset Reset Reset Reset Reset Reset Reset Reset Reset Reset Reset <	Currier Currier Plane F. Currier Fare Fare Currier Currier Currier	any Nemoi Rice Operating Congany et Managoi: Bruce Barker au: 122 W. Tay lor Hobbs Buue: NM Zp: \$8240 Atm: a. 575-393-9174 Faxe: 575-397-1471 Addresa:	Project Owner:				
Project Owner: Clubic Art. G 1/3 Bann Jie Bann Jie Jie	DD Dd Dd Dd DD Dd Dd Dd	any Nemoi Kice Operating Company Roll TO at Managoli Bruce Baker au: 122 W. Tay lor Hobbs Baute: NM Zpi: 85240 Atm.	Fax 8: 575-397-1471				
3-9174 Texet: 575-397-1471 Address: X-51.2 Polisti Ownor: Olbi X-51.2 Barnole B. Dec/7 Ext. Sample I.D. Ext. Dec/7 Ext. Barnole I.D. Ext. Dec/7 Ext. Barnole I.D. Ext. Dec/7 Ext. Barnole I.D. Ext.	3-9124 Raise: 575-391-1471 Address: Project Commen: Obi: X-G123 Basin: Der 7 Ext. Bannolle I.D. Bannolle I.D.<	P.O. 4: Company:	8tate: NM 21p: \$\$240				
HOBDS Bus MM Зил 4/24/0 Ани e.r. 575-373-91/4 Project Owner, Internet, D. X+, G 1/3 Project Owner, Distribution Project Owner,	Beater MM Beater MM Zur. \$52400 Attri 3-7174 Face 6. 57/5-397-14/11 Address: 3-7174 Face 6. 57/5-397-14/11 Address: 1 Pollari Owner: 0.01: 3 Pollari Owner: 0.01: 3 Pollari Owner: 0.01: 3 Polari Owner: 0.01:	P.O. &.					
Bits: 1.2.2 W. T. Z. W. T. Y. Or. Company: Hobbs: aux. IVM Zp. \$75.40 Aux. R. S. 75373-91W Rus. IVM Zp. \$75.40 Aux. R. S. 75373-91W Bub. Zp. Bub. Zp. R. Sample I.D. Sample I.D. Sample I.D. Rus. Zp. Answar Aux. Rus. IVM Zp. \$75.9 V Answar Apr. UxLuic Expect Rus. IVM Zp. Rus. Zp. Answar Bib. I.D. Sample I.D. Sample I.D. Rus. IVM Zp. Answar Bib. I.D. Sample I.D. Rus. IVM Zp. Rus. IVM Zp. Answar Bib. I.D. Sample I.D. Rus. IVM Zp. Rus. IVM Zp. Answar Bib. I.D. Sample I.D. Rus. IVM Zp. Rus. IVM Zp. Answar Bib. I.D. Sample I.D. Rus. IVM Zp. Rus. IVM Zp. Answar Bib. I.D. Sample I.D. Rus. IVM Zp. Rus. IVM Zp. Answar Bib. I.D. Sample I.D. Rus. IVM Zp. Rus. IVM Zp.	Bit: 1.2.2. Ш. Теу (Dr. Company: Company: HODDS: Base: (Mr) 29: 47.2.4.0 Atm: HODDS: Base: (Mr) 29: 7.7.7.4.0 29: Rtm: Dh 24: Flopic Outor: 00: Bit Manuer Dh 24: 7.7.7.7.6 14: Annual mar. Dh 24: 10: 10: Bit Manuer Dh 24: 10: 10: Bit Manuer Dh 24: 17.7.7.7 17.7.7.7 Annual mar. Annual mar. Annual mar. Annual mar. 17.7.7.7 An and mar. Bit Mark Annual mar. 17.7.7.7 17.7.7.7 And Mar. Bit Mark Annual mar. 17.7.7.7 17.7.7 And Mar. Bit Mark Annual mar. 17.7.7 17.7.7 And Mar. Bit Mark 17.7.7 17.7.7 17.7.7 And Mar. Bit Mark 17.7.7 17.7.7 17.7.7 And Mar. Bit Mark 17.7.7 17.7.7 17.7.7 And Mark Bit Mark 17.7.7 17.7.7 17.7.7 And Mark Bit Mark 17.7.7 17.7.7 17.7.7 And Mark B						
est Managesi Bruce, Barker est Arbohas est S75-373-7174 East S72-40 est S75-373-7174 East S72	et Managoii Bruce Barker et STS 201 Tay 101 et STS 33 - 9174 Entre 575. 397 - 1471 Adress: et STS 37 - 9174 Entre 575. 397 - 1471 Adress: et STS 37 - 9174 Entre 575. 397 - 1471 Adress: et STS 37 - 9174 Entre 575. 397 - 1471 Adress: et STS 37 - 9174 Entre 575. 397 - 1471 Adress: et Sts 100 - 100 et STS 37 - 9174 Entre 575. 397 - 1471 Adress: et Sts 100 - 100 et STS 37 - 9174 Entre 575. 397 - 1471 Adress: et Sts 100 - 100 et STS 37 - 9174 Entre 575. 397 - 1471 Adress: et Sts 100 - 100 et STS 100 - 100 et STS 100 - 170 et Sts 100 - 100 - 100 et STS 100 - 1			ANALYSIS REQUES			
P.O. R. NALVAIS REQUEST P.O. R. Company: Company: Phono B: Lin: Company: Phono B: Lin: Company: Phono B: Lin: Company: Phono B: Lin: Company: Raw minima Manual Company: Raw minima Company: Company: Raw mi	P.O. R. P.O. R. P.O. R. Company: Phono R: Phono R: Phono R: Phono R: <td>1 BEECNWOOG, ADIIGNE,) 673-7001 FAX (326)6</td> <td>l Beechwood, Abilene, TX 79803) 673-7001 FAX (328)673-7020</td> <td></td> <td></td>	1 BEECNWOOG, ADIIGNE,) 673-7001 FAX (326)6	l Beechwood, Abilene, TX 79803) 673-7001 FAX (328)673-7020				
I Beechwood Abilana, TX, 79603 I Bra-T001 FAX (328)673-7020 I Bra-T001 FAX (328)673-7020 I Bra-T001 FAX (328)673-7020 I I TX I I I TX I I I TX I I I I TX I I I I I I I I I I I I I I I I I I I	I Beechwood Abilane, TX, 79603 I Beechwood Abilane, TX, 79603 I B73-7001 F AX (328)673-7020 F CO. #: P.O. #: Prove Company: Prove Company: P.O. # Prove Company: Prove Company: Prove Prove </th <td></td> <td></td> <td>-OF-CUSTODY AND ANALYSIS</td> <td>REQUEST</td>			-OF-CUSTODY AND ANALYSIS	REQUEST		
CHAIN-OF-CUSTODY AND ANALYSIS FRAUE I Brachwood, Ablinne, TX 79603 I Brachwood, Ablinne, TX 7360 I Brachwood, Ablinne, TX 7360 I I T D H I I T D H I I T D H I I T D H I I T D H I I T D H I I T D H I I T D H I I T D H I I T D H I I I T D H I I I T D H I I I T D H I I I T D H I I I T D H I I I T D H I I I T D H I I T D H I I I T D H I I I T D H I I I T D H I I I T D H <td colspan="2" i="" i<="" th=""><th>I Beechwood, Abilane, TX, 78603 I Beechwood, Abilane, TX, 78603 I B.73-7001 FX 240 Attn: P.0. #: P.1 71 Address: Phono #: Phono #: P.1 71: Provide: P.1 71: P.1 71: P.1 01: P.1 01:</th><td></td><td>-</td><td></td><td></td></td>	<th>I Beechwood, Abilane, TX, 78603 I Beechwood, Abilane, TX, 78603 I B.73-7001 FX 240 Attn: P.0. #: P.1 71 Address: Phono #: Phono #: P.1 71: Provide: P.1 71: P.1 71: P.1 01: P.1 01:</th> <td></td> <td>-</td> <td></td> <td></td>		I Beechwood, Abilane, TX, 78603 I Beechwood, Abilane, TX, 78603 I B.73-7001 FX 240 Attn: P.0. #: P.1 71 Address: Phono #: Phono #: P.1 71: Provide: P.1 71: P.1 71: P.1 01:		-		





RICE OPERATING COMPANY

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

· · · · · · · · · · · · · · · · · · ·	Model	PGM 7300 Serial No	Check 1 590-000183 590-000508 590-000504	Model Number:	Model: PGM 7600 Model: PGM 7600 Model: PGM 7600	Serial No: 110-023920 Serial No: 110-013744 Serial No: 110-013670
			······································	LENE 100PPM / AIR:		
		7-25-09		EXPIRATION DAT	and the second	
	FILL DATE: 2	<u>1 ~9 07</u>		METER READING . Y : +/- 2%	ACCURACY: 100 P	
	SYSTEM	JUNCTION	UNIT	SECTION	TOWN SHIP	RANGE
	BD	G-23	G	23	22	37
	SA	MPLE ID	PID :	SA	MPLE ID	PID
	4Wall Co.	mposite	3.1			
	Bottom 5	pt Composite	4.7			
	Blended	BuckFill	1.8			
					· · · · · · · · · · · · · · · · · · ·	
				G	OPY	

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

SIGNATUE: Rolect yora

2-17-2010 DATE:





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

ANALYTICAL RESULTS FOR RICE OPERATING COMPANY ATTN: BRUCE BAKER 122 WEST TAYLOR HOBBS, NM 88240 FAX TO: (575) 397-1471

Receiving Date: 03/01/10 Reporting Date: 03/08/10* Project Owner: NOT GIVEN Project Name: BD JCT G-23* Project Location: NOT GIVEN Analysis Date: 03/02/10 Sampling Date: 03/01/10 Sample Type: SOIL Sample Condition: COOL & INTACT Sample Received By: JH Analyzed By: HM

LAB NO. SAMPLE ID	CI ⁻ (mg/kg)
H19361-1 BLENDED BACKFILL WITH IMPORTED	480
SOIL	and (2 - 192) - 192 (1974) - 1974) - 1984) 1984) - 1984) - 1984) - 1984) - 1984) - 1984) -
	· · · · · ·
A A	DNZ
	\mathbb{P}
Quality Control	510
True Value QC	500
% Recovery	102
Relative Percent Difference	< 0.1
	a kan di sala yang dan kata di san da yan da di kata da di sa

Note: Analysis performed on a 1:4 w:v aqueous extract. *Revised Report.

Chemist

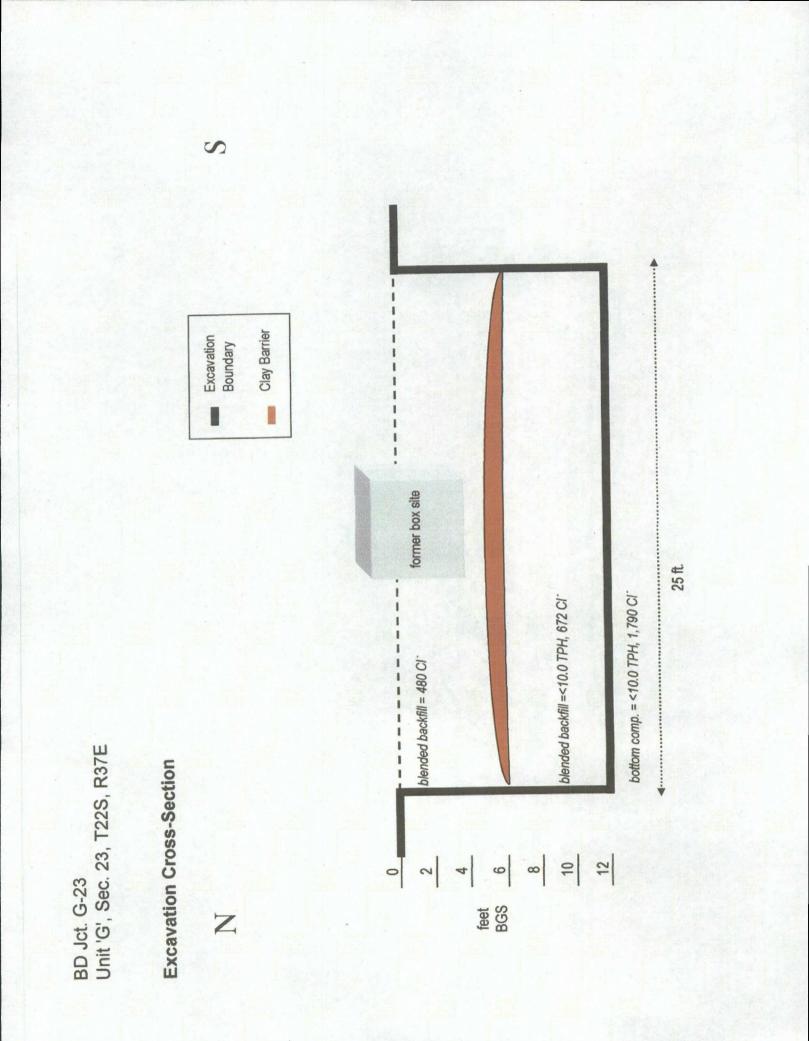
H19361 Rice

PLEASE NOTE: Liability and Damages. Cardinal's hability and client's exclusive remedy to; any claim arising, whether based in contract or tort, shall be limited to the amount paid by diant for analyses. All claims, including those for negligence and any other cause whatsoever shall be deemed waiven 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 indicated or consequential damagos, including, without limitation, business interruptions, loss of use, or loss of profits incurred by client, its subsidiaries, affiliaries or successors ansing out of or related to the performance of services hereunder by Cardinal, regardless of whother such claim is based upon any of the above-stated reasons or otherwise. Results rolate only to the samples identified above. This report shall not be reproduced except in full with written approval of Cardinal Laboratories. CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

ARDINAL LABORATORIES 101 East Marland, Hobbs, NM 88240 211

Company Name:	: Rice Operating	tring company			BILL TO			A	ANALÝSIS	S REQUEST	EST		
Project Manager:	Bruc			P.O. #:							•••••	- 	
Address: 122	2 W. Taplor			Company:	у:			· ·	· · · ·	· · ·		•.	
Clry: Hobb) 5	State: NM ZIp:	\$ 8246	Attn:									
Phone #: 5.75	5393-9174	Fax#: 575-391	11-1471	Address:									
Project #:		Project Owner:		CIN:	•								
Project Name: ${\cal B}$	DICTE	23 (22/37		State:	Zip:								
Project Location	1		242	Phone #									. :
Sampler Name:	Robert		<i>م</i> اري	Fax #:				 	<u>141 - 1</u>		·	r 	
FOR LAB USE CALY			MATRIX	IX PRESERV	ERV. SAMPLING	ING							
		AMO(;	RER 25							:			·
Lab I.D.	Sample I.D.		1.3 MIA	:3SV		-		7				<u> </u>	, ,,
		୫୨୪(୭	NOCOUL SOUL			TIME		() ()					<u></u>
H 19801-1	Ble wheel Buck P	Buck Fill with C		/ >				Z	•				
		:											
										Ž.	- - 		
•.•						2 ⁻¹			=		<u>)</u>		
									/	H			
											1	н. 19	
						·		-					
		- - -											
PLEAGE NOTE: Usbiry coajes: As deime "neue service. In no event shall (α πάλεγαι μαρά το προφοραία το Δητορία το Ταγράδο Ταγάλου Ταγράδου το	ายรับสามาร์ (การการ) หน้ายายาย แล้ว (การการการการการการการการการการการการการก	um aribing whether Desed in contr a werved unless marie in withing the Livitzton, pusingss in arruption	act of their actual and received b a, loss of the	2 to Unried in the emount pair y Costing within 30 days ever or loss of profits insured by d	aid by the client for the tast completion of the applicable r client, its authintaries	përekis.					F:	
Relinquished By:	IV:	Date: R	Ved			Phone Result			Add'l Phone #:	÷			
		Time:		· .		REMARKS:	P/ca54	24	A air F	<i>to:</i>			
Relinquished By	7 1	dí	Received By:	the way	Ę	B baker	มีร มีร	6550	12 07.				
Delivered By	Marad Bur Mirela Onal	14:50	CUUC (MULVUN	UUU HECKED BV	& Egans		.	1				
Sample) - UPS	Sample - UPS - Bus - Other:		See 12	Re et	- THE	Rozer	Wethawe C	ha weed	02.60	er Joe	3/8/	0. cla	.:
t Cardina	Cardinal cannot accept verbal changes. Please fax written changes to 505-393-2476	li changes. Please fa	x written chang	es to 505-393.	2476				Þ				ŀ

17 17



	PETTIGRE	ATORY TEST REPORT W & ASSOCIATES, P.2 1110 N. GRIMES IOBBS, NM 88240 (575) 393-9827	DEBRA	AGHTO RUS P. HICKS, P.E.A. S.I. M. HICKS. III, P.E.P.S
				n in the second s
То:	Rice Operating Company 122 W. Taylor Hobbs, NM 88240	Matərial: V	Vailach Red Clay	
Project:	Jot. (253) BD G-23 EOL 22/37	Test Method:	ASTM: D 2922	
	Project No. 2010.1062			
Date of Test:	March 1, 2010	Depth:	See Below	
		Depth of Probe:	12"	•
Test No.	Location	*Dry Density % Max	% Moisture	Depth
SG 1	Pit - 15' E. & 10' N. of SW C	omer 94.6	16.6	FSG

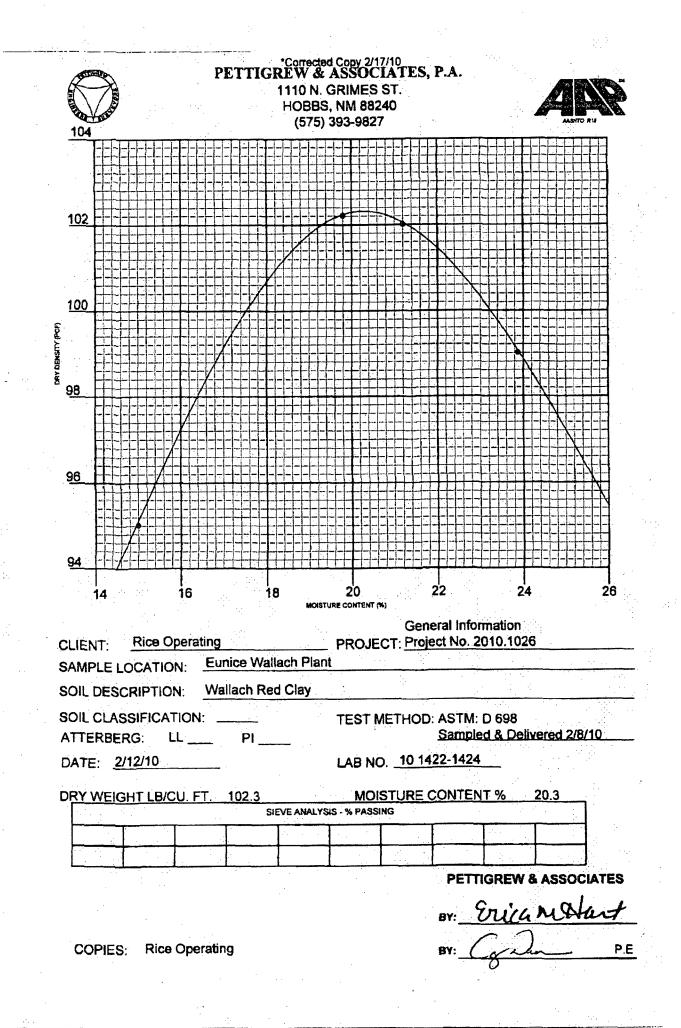
COP

Control Density:	102.3 ASTM: D 698	
Required Compact	tion: 90-95%	
Lab No.:	10 2231-2232	
Copies To:	Rice Operating	

Optimum Molsture: 20.3%

Densometer ID: 815 PETTIGREW & ASSOCIATES

Ericam Han BY: BY: P.E.





ETTL Engineers & Consultants Inc.

GEOTECHNICAL * MATERIALS * ENVIRONMENTAL * DRILLING * LANDFILLS

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

Pettigrew & Associates, P.A., Hobbs, NM - Project #2010.1028 Report No: 1-1201-000003 Protect : 2/5/2010 Panel Number : P 3: ASTM D 5084 Date: Project No. : C 4635-101 Permometer Data Bit Mercury to Binet Bo of Boring No .: 0.031418 cm2 1.8 ap e Equilibrioro cm3 Sample: 8540 88 = 0.767120 cm2 Pipet Ro 6.7 cm3 Mt= 0.030180 0.000434704 Depth (ft): C = 1.6 cm3 Annutus Ra 1.040953 0.203780628 Other Location: Wallach Plant Eunice M2 = Τœ Material Description : Red Clay (You: Sample No 10 1422-1424) Compacted D 698 at 95% of your M/D curve (wet side) SAMPLE DATA Wet Wil sample + ring or tare : 581.37 ٥ Tars or ring Wit. : 0.0 **Before Test** After Test a Wel WI: of Sample : 681.37 Tare No .: T 6 Tare No.: 13 g Diameter : 2.77 7.05 cm2 Wel WL Haro: 731.80 Wel WL+tere 800.51 in Longth : 2.79 'n 7.08 cm Day WL+tare; 841.75 Dry WL+tere: 690,35 Ares: 8.04 in^2 38.99 Tara WR: Tare Wt 218.78 220.69 cm2 (n^3 276.92 Volume : 18.84 cm3 Dry WL: 422.97 Dry WL: 469.66 pcf g/cm/3 Unit Wt.(wet): 128.95 2.03 Water WA: 80.15 Water WL: 110.18 Unit Wt (dry): 104.65 pcf 1.68 g/cm^3 % motst.: 21.9 % moist.: 23.5 Specific Gravity; 2.77 Max Dry Density(pcf) = 104.6948 OMC = 21.3135683 +/- OMC = % of max = 100.0 0.00 Vold ratto (e) 😐 99.58 0.85 Colculated % saturation: 0.39 Pornsilty (n)= TEST READINGS Z1(Mercury Height Difference @ 11): Hydraulic Gradiant = 51 cm 9 10 Date elapsed t 7 ΔZπ terrip α k k (soconds) ipet 🙉 I) (cm) (deg C) (cm/sec) (R./day) Resat = * (temp con 2/5/2010 4740 0.656997 28 0.889 8 1.17E-08 3.32E-06 2/5/2010 5940 5.9 0.758997 28 0.889 3.09E-05 1.09E-08 2/5/2010 0.856997 26 1.082-08 6900 5.8 0.889 3.05E-05 2/5/2010 7800 5.7 0.955997 28 0.889 1.08E-08 3.05E-05 SUMMARY 1.10E-08 cm/sec ka = Acceptance criteria « 25 % SI. ٧m k1 = 1.17E-08 cm/sec 8.3 Vm = [ka-ki] x 100 % k2 = 1.09E-08 onvaso 12 % ka 1.08E-08 k3 = om/sec 2.8 % k4 = 1.08E-08 cm/58C 2.8 % Hydraulic conductivity 1.10E-08 om/seo 3.13E-05 K = fl/day Vold Ratio 8 = 0.85 Porosity 0.39 <u>л ¤</u> 2.03 Bulk Density g/cm3 ν= ₩= 127.0 pol Water Content om3/om3 at 20 deg C) Intrinsic Permeability kint = 1.13E-13 cm2 at 20 dag C) Liquid Limit LL Plastic Limit PL **Plasticity Index Pl** - 200 Sleve + No 40 Sieve % + No 4 Sleve ٩, 210 Baech Street 1717 East Ernia 707 West Cotton Stree Texations, AR 71854 Telar, Texas 75752 Www, Texas 75504-5505 870-712-0013 Phone 993-585-4421 Phone 903-755-0915 Phone 003-695-8113 Pax 870-216-2415 Fax 903-758-8245 Fax w.stillno.com

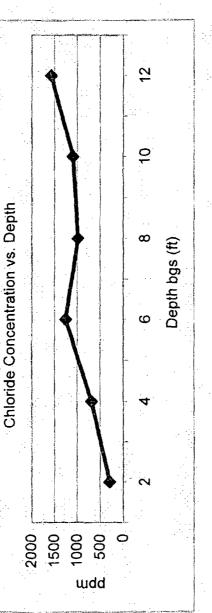
CHLORIDE CONCENTRATION CURVE

RICE Operating Company

BD JCT G-23 Unit G', Sec. 23, T22S, R37E

[CI] ppm	294	688	1254	984	1089	1575	
Depth bgs (ft)	2	4	9	8	10	12	





Appendix B Quality Procedures

RICE Environmental Consulting and Safety (RECS) P.O. Box 5630 Hobbs, NM 88241 Phone 575.393.4411 Fax 575.393.0293

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.

1

- 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

١

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 (K_2CrO_4) to mixture if necessary.

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:

<u>.282 X 35,450 X ml AgNO₃</u> X grams of water in mixture ml water extract 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.

2

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 crosscontamination. 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 Analyzed	Sample Container Size	Sample Container Description	Cap Requirements	Preservative	Maximum Hold Time
BTEX	_40 ml	VOA Container	Teflon Lined	HCL.	14 days
TPH (8015 Extended)	40 ounces	(2) 40ml VOA vials	Teflon Lined	HCL and Ice	14 days
РАН	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	300 ml	clear glass or 250 ml HD polyethylene	Any Plastic	Ice	7 Days
Cl-	500 ml	HD polyethylene	Any Plastic	None	28 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 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

π=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

3

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.

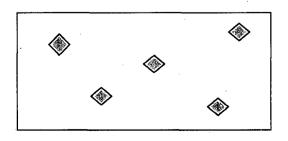
3.0 Sampling Procedure

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:



1

- 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, (59-77⁰F). 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

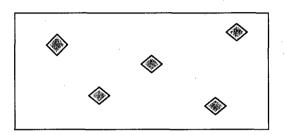
- 4.1 Prepare a Sample Plan. The plan will list the number, location and designation of each planned sample and the individual tests to be performed on the sample. The sampler will check the list against the available inventory of appropriate sample collection bottles to insure against shortage.
- 4.2 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.