1R - 426-279

WORKPLANS

Date:

3-20-13

Rice Environmental Consulting & Safety
P.O. Box 5630 Hobbs, NM 88241
Phone 575.393.4411 Fax 575.393.0293

CERTIFIED MAIL
RETURN RECEIPT NO. 7008 1140 0001 3073 0704

March 20th, 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: **Corrective Action Plan (CAP)**
Rice Operating Company – BD SWD System
BD jct. C-23-1 (1R426-279): UL/C 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 ownership/usage basis.

Background and Previous Work

The site is located approximately 4 miles southeast of Eunice, New Mexico at UL/C sec. 23 T22S R37E as shown on the Site Location Map (Figure 1). NM OSE records indicated that groundwater would likely be encountered at a depth of approximately 59 +/- feet. However, monitor well installation at the site shows that there is little to no groundwater at the site.

In 2010, ROC initiated work on the former BD C-23-1 junction box. The site was delineated using a backhoe to form a 35 ft x 5 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, the bottom composite and the backfill were taken to a commercial laboratory for analysis. Laboratory tests of the four-wall composite showed a chloride reading of 784 mg/kg and gasoline range organics (GRO) and diesel range organics (DRO) readings of non-detect. The bottom composite showed a chloride laboratory reading of 2,200 mg/kg and GRO and DRO readings of non-detect. The soil was blended on site and backfilled to six feet below ground surface (bgs). Laboratory analysis of the blended backfill showed a chloride reading of 1,310 mg/kg and GRO and DRO readings of non-detect. At 6-5 ft bgs, a one foot thick clay layer was installed to inhibit the downward movement of chlorides. A clay compaction test was performed on

March 23rd, 2010. The remaining backfill was taken to an NMOCD approved facility for disposal. Clean imported soil was used to backfill the site 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 August 4th, 2010 and a junction box disclosure report was submitted to NMOCD with all the 2010 junction box closures and disclosures.

As part of the Investigation and Characterization Plan approved by NMOCD on July 20th, 2011, one soil bore was advanced through the former junction box site on September 2nd, 2011. RECS personnel field tested the soil for chlorides and screened in the field with a photo-ionization detector (PID) for hydrocarbons. Representative samples from the bore were taken to a commercial laboratory for confirmation of field numbers. In SB-1, the laboratory chloride readings showed 1,250 mg/kg at 20 ft bgs, 1,630 mg/kg at 50 ft bgs and 4,800 mg/kg at 55 ft bgs.

On September 15th, 2011, an ICP Report was submitted to NMOCD that was subsequently approved on September 22nd, 2011. The report recommended that ROC continue to delineate the soils surrounding the former junction box site and the groundwater affected by the site by installing a near-source monitor well. On February 1st and 2nd, 2012, six additional soil bores (SB-2 through SB-7) were installed at the site. Representative samples from the bores were taken to a commercial laboratory for confirmation of field numbers. SB-2 returned laboratory chloride values of 960 mg/kg at 10 ft bgs, which decreased to 112 mg/kg at 40 ft bgs. SB-3 returned laboratory chloride values of 3,760 mg/kg at 20 ft bgs, which decreased to 1,730 mg/kg at 55 ft bgs. SB-4 returned laboratory chloride values of 1,540 mg/kg at 20 ft bgs, 1,580 mg/kg at 50 ft bgs, and 3,120 mg/kg at 55 ft bgs. SB-5 returned laboratory chloride values of 3,360 mg/kg at 45 ft bgs and 3,760 mg/kg at 55 ft bgs. SB-6 returned laboratory chloride values of 4,080 mg/kg, which decreased to 3,240 mg/kg at 55 ft bgs. SB-7 returned laboratory chloride values of 3,360 mg/kg at 10 ft bgs and 3,960 mg/kg at 55 ft bgs. GRO and DRO values were non detect in soil bores except for SB-6 which had DRO values of 28.9 mg/kg at 45 ft bgs and 13 mg/kg at 55 ft bgs.

On March 19th, 2012 ROC submitted a Report of Further Investigation which was approved by NMOCD on March 22nd, 2012. An extension request was sent to NMOCD on September 17th, 2012 and approved by NMOCD on September 18th, 2012. The report recommended that ROC continue to delineate the soils surrounding the former junction box and install a near-source monitor well to determine groundwater quality beneath the site. Additional monitor wells could be installed as necessary to fully delineate groundwater quality.

On February 12th, 2013, RECS personnel were on site to install three additional soil bores and two monitor wells. SB-8 delineated the eastern edge of the site, SB-9 delineated the western most edge of the site and SB-10 delineated the northern most edge of the site (Figure 2). As the three soil bores were being installed, soil samples were taken and field tested for both chlorides and hydrocarbons. Representative samples from each bores

were taken to a commercial laboratory for confirmation of field numbers. SB-8 returned chloride values of 1,040 mg/kg at 20 ft bgs, which decreased to 244 mg/kg at 30 ft bgs. SB-9 returned chloride values of 2,270 mg/kg at 15 ft bgs and 2,260 mg/kg at 50 ft bgs. SB-10 returned chloride values of 1,550 mg/kg at 10 ft bgs, 3,880 mg/kg at 45 ft bgs and 4,360 mg/kg at 50 ft bgs. GRO and DRO at all depths in all bores were non-detect (Appendix A).

Two monitor wells were installed at the site on February 12th, 2013. MW-1 was installed 71 ft southeast of the former junction box site and MW-2 was installed 92 ft northwest of the former junction box site (Figure 2). No sampling was conducted as MW-1 was installed. MW-2 was field sampled to determine background soil concentrations of chlorides and hydrocarbons. Representative samples from the bore were taken to a commercial laboratory for analysis. Background concentrations in MW-2 showed chloride values of 208 mg/kg at 25 ft bgs, 3,880 mg/kg at 45 ft bgs and 2,680 mg/kg at 50 ft bgs. GRO and DRO values at all depth were non-detect.

On February 18th, 2013, ARC Environmental arrived at the site to develop the two monitor wells. MW-1was installed at a total depth of 75.60 feet, and had 0.69 gallons of water in the well 120 hours after being drilled. The well pumped at 0.25 gallons per minute until the well would no longer pump; this took less than two minutes. The well was then bailed dry with a bailer. The well recovered to a depth of 74.26 feet after 24 hours after pumping and bailing. ARC Environmental determined that there is not a significant quantity of water to use as a representative sample for the site since the well cannot sustain pumping. During the installation of MW-2, red bed clay was encountered at a depth of 61 ft bgs, which delineates the bottom of the aquifer. When ARC Environmental attempted to develop MW-2, the well had no water to a depth of 75.98 ft bgs.

There is little to no groundwater water beneath the site which can be affected by the residual chlorides at the site. MW-1 has 0.69 gallons of water within the well bore. MW-2 is dry. The rate of recharge in the aquifer is very slow due to the small rainfall amounts, the porosity of the formation consisting of low permeable rock and the presence of clay, which leave sediments that are thinly saturated or dry. Thus, there is little underground flow of water in the aquifer in this area (Appendix B).

Corrective Action Plan

Therefore, RECS recommends that ROC prepare the site for seeding by tilling the site, adding soil amendments as necessary and seeding the site with a blend of native vegetation. Vegetation will act as an evapo-transpiration barrier that will also inhibit the downward migration of chlorides and hydrocarbons. Plants capture water through their roots and so reduce the amount of water infiltrating below the root zone.

Once the site has been seeded, ROC will submit a request for 'remediation termination' status for the regulatory file.

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

Sincerely,

Lara Weinheimer
Project Scientist
RECS
(575) 441-0431

Attachments:

- Figure 1 – Site Location Map
- Figure 2 – Soil Bore and MW Installation Map
- Appendix A – Soil Bore and MW Installation Documentation
- Appendix B – Well Development Notes

Figures

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

Site Map

RICE ENVIRONMENTAL RECS CONSULTING & SAFETY, LLC

BD jct. C-23-1

LEGALS: UL/C sec. 23
T22S R37E

NMOCD Case #: 1R426-279

Figure 1

N
W E
S

0 1,700 3,400 6,800
Feet

Drawing date: 5-3-11
Drafted by: L. Weinheimer

SB-1

Depth	Cl-	PID	LAB Cl-	GRO	DRO
15	628	5			
20	1103	8.5	1250	<10	<10
25	619	5.2			
30	343	5.5			
35	382	4.8			
40	322	4.8			
45	409	4.3			
50	1166	4.3	1630	<10	<10
55	2886	3.3	4800	<10	<10

SB-2

Depth	Cl-	PID	LAB Cl-	GRO	DRO
SS	250	1.4			
5	334	1.7			
10	1059	1.1	960	<10	<10
15	915	1.1			
20	903	1			
25	640	1.1			
30	193	1.5			
35	149	0.7			
40	140	0.9	112	<10	<10

SB-3

Depth	Cl-	PID	LAB Cl-	GRO	DRO
SS	113	1.6			
5	138	0.7			
10	236	1			
15	1245	1.5			
20	2708	1.3	3760	<10	<10
25	358	1.4			
30	269	1.7			
35	295	1.5			
40	213	1.6			
45	721	1.6			
50	2062	1.4			
55	3010	2	1730	<10	<10

SB-4

Depth	Cl-	PID	LAB Cl-	GRO	DRO
SS	145	0.4			
5	171	0.2			
10	1067	0.6			
15	1013	4.7			
20	1368	3.7	1540	<10	<10
25	316	3.9			
30	273	4.8			
35	195	4.8			
40	423	3.9			
45	891	6.4			
50	1510	4.6	1580	<10	<10
55	2920	2.7	3120	<10	<10

SB-5

Depth	Cl-	PID	LAB Cl-	GRO	DRO
SS	112	2.6			
5	153	3.7			
10	204	3.1			
15	1136	4.2			
20	923	4.3			
25	815	3.2			
30	345	4.2			
35	352	3.5			
40	1276	4.4			
45	2981	4.3	3360	<10	<10
50	2894	4.2			
55	3068	1.7	3760	<10	<10

SB-6

Depth	Cl-	PID	LAB Cl-	GRO	DRO
SS	563	2			
5	673	2.7			
10	1790	3.1			
15	2211	2.1			
20	1245	2.4			
25	540	4.1			
30	282	4			
35	385	3.7			
40	1307	3.3			
45	3295	1.7	4080	<10	28.9
50	2141	1.9			
55	2631	2.5	3240	<10	13

SB-7

Depth	Cl-	PID	LAB Cl-	GRO	DRO
SS	201	1.9			
5	528	2.3			
10	2386	2.6	3360	<10	<10
15	1684	2			
20	1693	1.6			
25	1106	2.6			
30	510	2.5			
35	393	1.6			
40	317	1.7			
45	965	2.7			
50	1095	2.1			
55	3137	2.3	3960	<10	<10

SB-8

Depth	Cl-	PID	LAB Cl-	GRO	DRO
SS	149	0.2			
5	188	0.9			
10	739	0.4			
15	920	0.4			
20	987	0.6	1040	<10	<10
25	412	0.3			
30	236	0.4	244	<10	<10

SB-9

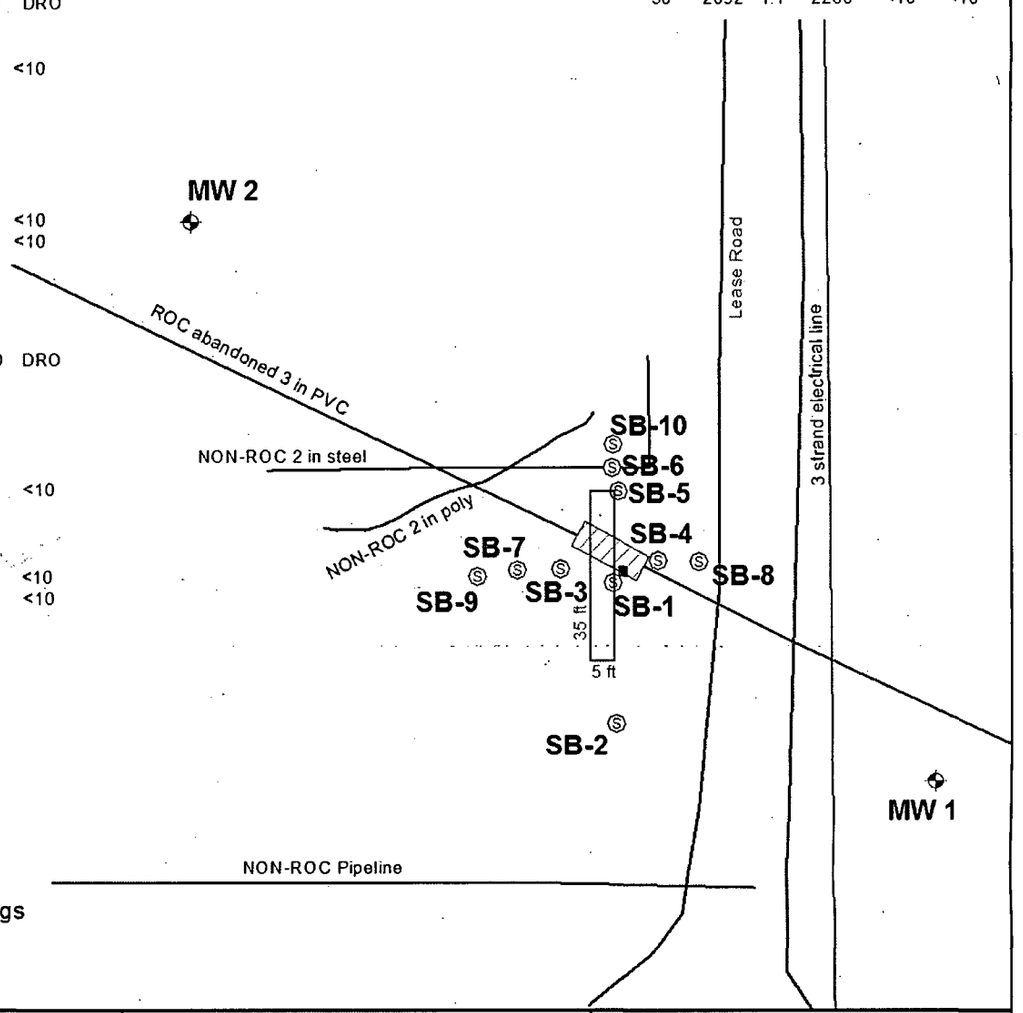
Depth	Cl-	PID	LAB Cl-	GRO	DRO
SS	206	1.4			
5	963	1.8			
10	2130	1.7			
15	2136	1.6	2270	<10	<10
20	1922	1.8			
25	982	1.4			
30	1348	1.7			
35	688	2.3			
40	309	2.6			
45	421	1.8			
50	2092	1.1	2260	<10	<10

SB-10

Depth	Cl-	PID	LAB Cl-	GRO	DRO
SS	113	0.5			
5	622	0.3			
10	1289	0.3	1550	<10	<10
15	666	0.4			
20	563	0.2			
25	472	0.6			
30	455	0.3			
35	760	0			
40	1224	0.2			
45	3353	0.3	3880	<10	<10
50	4010	0	4360	<10	<10

MW-2

Depth	Cl-	PID	LAB Cl-	GRO	DRO
SS	124	0.6			
5	120	1.3			
10	154	1			
15	141	1			
20	195	1.7			
25	199	0.3	208	<10	<10
30	1143	0.3			
35	2116	1.9			
40	3249	1.2			
45	3611	1.4	3880	<10	<10
50	2519	0.6	2680	<10	<10



RICE ENVIRONMENTAL CONSULTING & SAFETY, LLC

BD jct. C-23-1

LEGALS: UL/C sec. 23
T22S R37E

NMOCD Case #: 1R426-279

Figure 2

N W E S

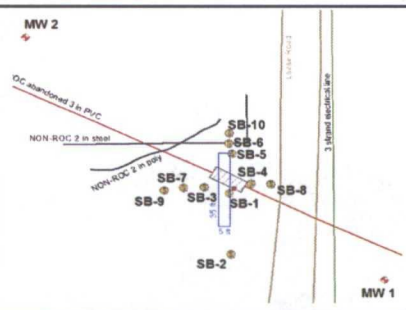
0 25 50 Feet

Drawing date: 2-19-2013
Drafted by: LS

Appendix A

Soil Bore and MW Installation Documentation

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

Logger:	Kyle Norman		**Project Name:** BD jct. C-23-1 **Well ID:** SB-8
Driller:	Harrison & Cooper, Inc.		**Project Consultant:** RECS
Drilling Method:	Air rotary		
Start Date:	2/12/2013		
End Date:	2/12/2013		

Comments: SB-8 is located 15 ft east of the former junction box.
All samples were from cutting.
DRAFTED BY: L. Weinheimer
TD = 30 ft GW = 59 ft

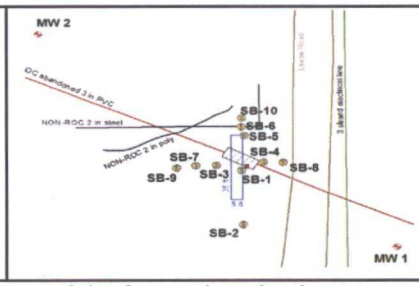
Location: UL/C sec. 23 T-22S R-37-E

Lat: 32°22'51.768"N **County**: Lea
Long: 103°8'10.222"W **State**: NM

Depth (feet)	Chloride field tests	LAB	PID	Description
				Tan Sand
SS	149		0.2	
				Red Sand
5 ft	188		0.9	
				Tan Sand with some Caliche
10 ft	739		0.4	
				Tan/Red Sand
15 ft	920		0.4	
				Red Sand
20 ft	987	Cl-1040	0.6	
		GRO <10		Red/Tan Sand with some Caliche
		DRO <10		
25 ft	412		0.3	
				Tan Sand with some Caliche
30 ft	236	Cl-224	0.4	
		GRO <10		
		DRO <10		

Lithology

Well Construction: bentonite seal

Logger:	Kyle Norman		RICE ENVIRONMENTAL CONSULTING & SAFETY, LLC — RECS
Driller:	Harrison & Cooper, Inc.		**Project Name:** BD jct. C-23-1 **Well ID:** SB-9
Drilling Method:	Air rotary		**Project Consultant:** RECS
Start Date:	2/12/2013		
End Date:	2/12/2013		

Comments: SB-9 is located 22 ft west of the former junction box.
All samples were from cutting.
DRAFTED BY: L. Weinheimer

TD = 50 ft GW = 59 ft

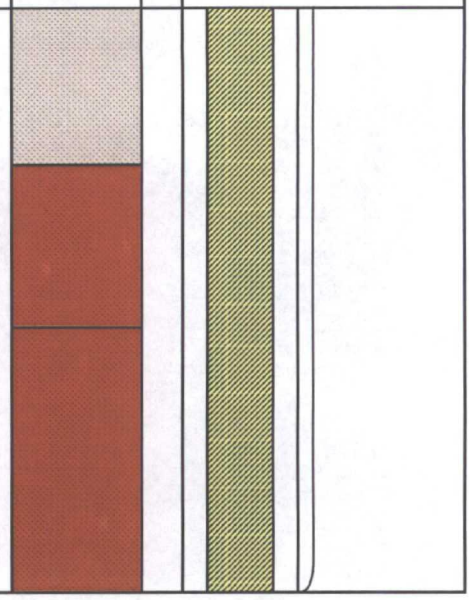
Location: UL/C sec. 23 T-22S R-37-E

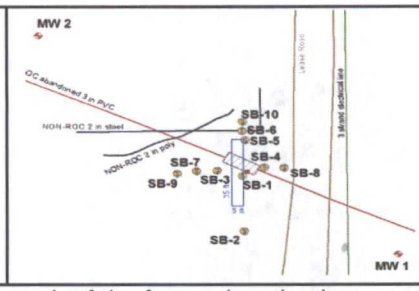
Lat: 32°22'51.731"N **County**: Lea
Long: 103°8'10.646"W **State**: NM

Depth (feet)	Chloride field tests	LAB	PID	Description
				Brown Sand
SS	206		1.4	
				Red Sand
5 ft	963		1.8	
				Red/Tan Sand
10 ft	2130		1.7	
15 ft	2136	Cl- 2270	1.6	
		GRO <10		
		DRO <10		
20 ft	1922		1.8	
25 ft	982		1.4	
				Tan Sand
30 ft	1348		1.7	
35 ft	688		2.3	

Lithology

Well Construction: bentonite seal

Depth (feet)	Chloride field tests	LAB	PID	Description	Lithology	Well Construction
				Tan Sand		
40 ft	309		2.6			
				Red Sand		
45 ft	421		1.8			
				Moist Red Sand		
50 ft	2092	Cl-2260	1.1			
		GRO <10				
		DRO <10				

Logger:	Kyle Norman		RICE ENVIRONMENTAL RECS CONSULTING & SAFETY, LLC
Driller:	Harrison & Cooper, Inc.		**Project Name:** BD jct. C-23-1 **Well ID:** SB-10
Drilling Method:	Air rotary		**Project Consultant:** RECS
Start Date:	2/12/2013		
End Date:	2/12/2013		

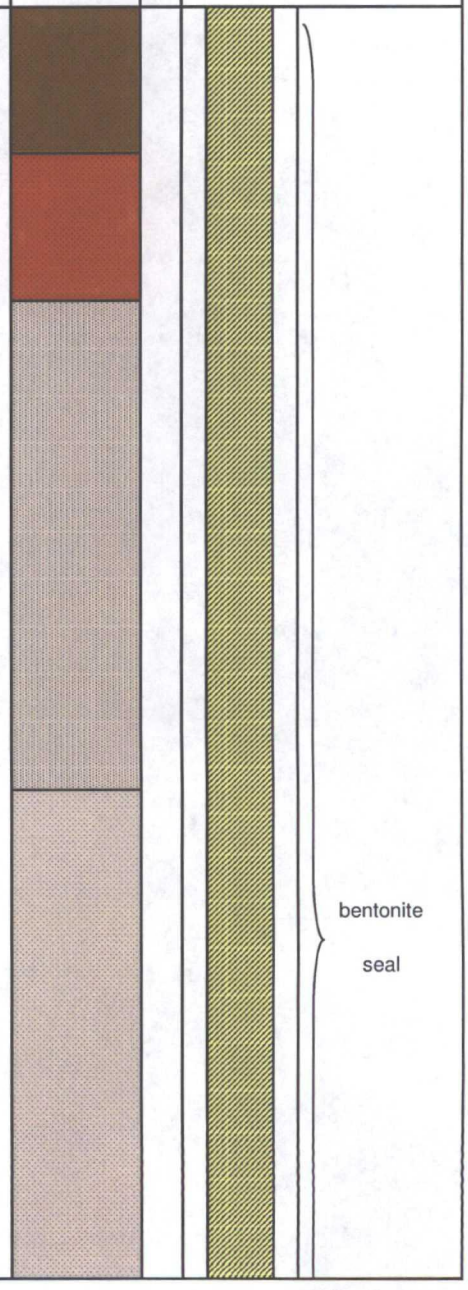
Comments: SB-10 is located 21 ft north of the former junction box.
All samples were from cutting.
DRAFTED BY: L. Weinheimer

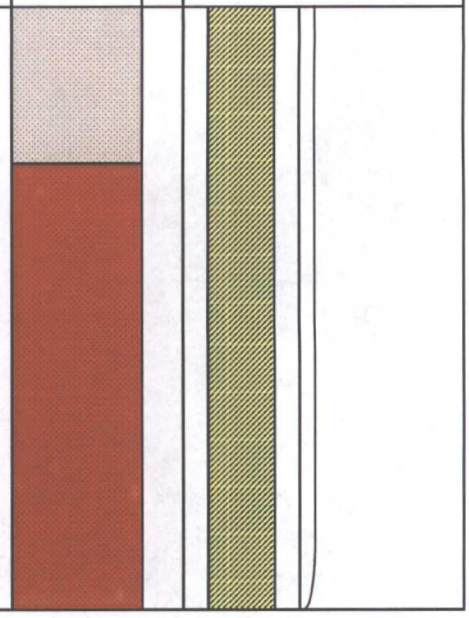
TD = 50 ft GW = 59 ft

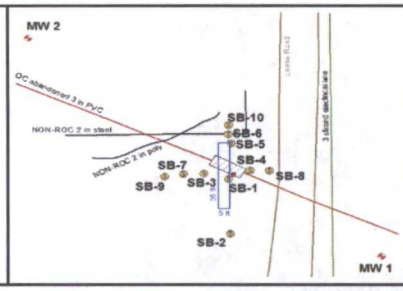
Location: UL/C sec. 23 T-22S R-37-E

Lat: 32°22'51.988"N **County**: Lea
Long: 103°8'10.382"W **State**: NM

Depth (feet)	Chloride field tests	LAB	PID	Description
				Brown Sand
SS	113		0.5	
				Red Sand
5 ft	622		0.3	
				Tan Sand with some Caliche
10 ft	1,289	Cl- 1550	0.3	
		GRO <10		
		DRO <10		
15 ft	666		0.4	
20 ft	563		0.2	
				Tan Sand
25 ft	472		0.6	
30 ft	455		0.3	
35 ft	760		0.0	



Depth (feet)	Chloride field tests	LAB	PID	Description	Lithology	Well Construction
				Tan Sand		
40 ft	1,224		0.2			
				Red Sand		
45 ft	3,353	Cl- 3880	0.3			
		GRO <10		Moist Red Sand		
		DRO <10				
50 ft	4,010	Cl- 4630	0.0			
		GRO <10				
		DRO <10				

Logger:	Kyle Norman		RICE ENVIRONMENTAL RECS CONSULTING & SAFETY, LLC
Driller:	Harrison & Cooper, Inc.		
Drilling Method:	Air rotary		**Project Name:** BD jct. C-23-1 **Well ID:** MW-1
Start Date:	2/12/2013		**Project Consultant:** RECS
End Date:	2/12/2013		

Comments: MW-1 is located 71 ft southeast of the former junction box. All samples were from cutting.

DRAFTED BY: L. Weinheimer

TD = 72 ft GW = 59 ft

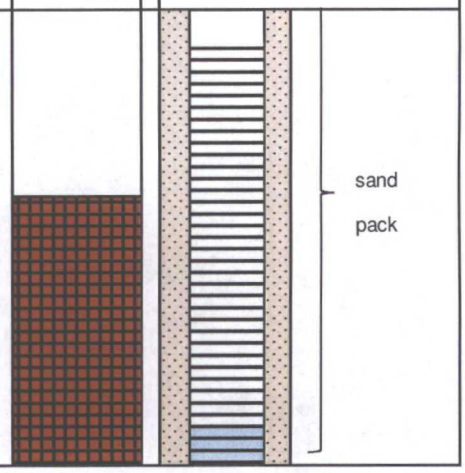
Location: UL/C sec. 23 T-22S R-37-E

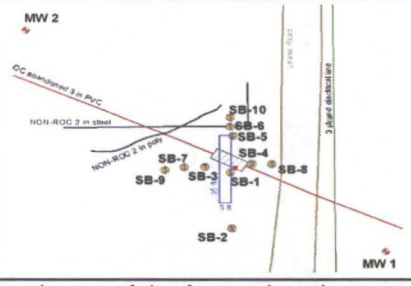
Lat: 32°22'51.344"N **County**: Lea

Long: 103°8'9.77"W **State**: NM

Depth (feet)	Chloride field tests	LAB	PID	Description	Lithology	Well Construction
				NO SAMPLES TAKEN		2 in PVC; bentonite seal
SS						
5 ft						
10 ft						
15 ft						
20 ft						
25 ft						
30 ft						
35 ft						
40 ft						
45 ft						
50 ft						

Depth (feet)	Chloride field tests	LAB	PID	Description	Lithology	Well Construction
55 ft						
60 ft				RED BED		
65 ft						
71 ft						



Logger:	Kyle Norman		RICE ENVIRONMENTAL RECS CONSULTING & SAFETY, LLC
Driller:	Harrison & Cooper, Inc.		**Project Name:** BD jct. C-23-1 **Well ID:** MW-2
Drilling Method:	Air rotary		**Project Consultant:** RECS
Start Date:	2/12/2013		
End Date:	2/12/2013		

Comments: MW-2 is located 92 ft northwest of the former junction box. All samples were from cuttings.

DRAFTED BY: L. Weinheimer

TD = 73 ft GW = NONE

Location: UL/C sec. 23 T-22S R-37-E

Lat: 32°22'52.412"N **County**: Lea

Long: 103°8'11.196"W **State**: NM

Depth (feet)	Chloride field tests	LAB	PID	Description
				Brown Sand
SS	124		0.6	
				Red/Brown Sand
5 ft	120		1.3	
				Tan Sand with Caliche
10 ft	154		1.0	
15 ft	141		1.0	
				Brown/Red Sand
20 ft	195		1.7	
25 ft	199	Cl-208	0.3	
		GRO <10		Tan Sand
		DRO <10		
30 ft	1143		0.3	
35 ft	2116		1.9	

Lithology

Well Construction: bentonite seal

Depth (feet)	Chloride field tests	LAB	PID	Description	Lithology	Well Construction
				Tan Sand		
40 ft	3249		1.2			
45 ft	3611	Cl- 3880	1.4			
		GRO <10		Red Sand		
		DRO <10				
50 ft	2519	Cl- 2680	0.6			
		GRO <10		NO SAMPLES TAKEN RED BED CLAY ENCOUNTERED AT 61 FT		sand pack
		DRO <10				
55 ft						
60 ft						
65 ft						
70 ft						
73 ft						

CARDINAL Laboratories

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

February 15, 2013

Hack Conder

Rice Operating Company

112 W. Taylor

Hobbs, NM 88240

RE: BD C-23-1 JCT (22/37)

Enclosed are the results of analyses for samples received by the laboratory on 02/12/13 15:20.

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/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.

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:	02/12/2013	Sampling Date:	02/12/2013
Reported:	02/15/2013	Sampling Type:	Soil
Project Name:	BD C-23-1 JCT (22/37)	Sampling Condition:	Cool & Intact
Project Number:	NONE GIVEN	Sample Received By:	Jodi Henson
Project Location:	NOT GIVEN		

Sample ID: SB 8 @ 20' (H300394-01)

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

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	**1040**	16.0	02/14/2013	ND	416	104	400	3.77	

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

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10	<10.0	10.0	02/14/2013	ND	210	105	200	2.24	
DRO >C10-C28	<10.0	10.0	02/14/2013	ND	194	96.8	200	5.26	

Surrogate: 1-Chlorooctane	*70.3 %*	*65.2-140*
Surrogate: 1-Chlorooctadecane	*83.3 %*	*63.6-154*

Sample ID: SB 8 @ 30' (H300394-02)

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

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	**224**	16.0	02/14/2013	ND	416	104	400	3.77	

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

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10	<10.0	10.0	02/14/2013	ND	210	105	200	2.24	
DRO >C10-C28	<10.0	10.0	02/14/2013	ND	194	96.8	200	5.26	

Surrogate: 1-Chlorooctane	*76.3 %*	*65.2-140*
Surrogate: 1-Chlorooctadecane	*92.8 %*	*63.6-154*

Cardinal Laboratories *=Accredited Analyte

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:	02/12/2013	Sampling Date:	02/12/2013
Reported:	02/15/2013	Sampling Type:	Soil
Project Name:	BD C-23-1 JCT (22/37)	Sampling Condition:	Cool & Intact
Project Number:	NONE GIVEN	Sample Received By:	Jodi Henson
Project Location:	NOT GIVEN		

Sample ID: SB 9 @ 15' (H300394-03)

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

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	**2270**	16.0	02/14/2013	ND	416	104	400	3.77	

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

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10	<10.0	10.0	02/15/2013	ND	210	105	200	2.24	
DRO >C10-C28	<10.0	10.0	02/15/2013	ND	194	96.8	200	5.26	

Surrogate: 1-Chlorooctane	*86.4 %*	*65.2-140*
Surrogate: 1-Chlorooctadecane	*102 %*	*63.6-154*

Sample ID: SB 9 @ 50' (H300394-04)

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

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	**2260**	16.0	02/14/2013	ND	416	104	400	3.77	

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

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10	<10.0	10.0	02/14/2013	ND	210	105	200	2.24	
DRO >C10-C28	<10.0	10.0	02/14/2013	ND	194	96.8	200	5.26	

Surrogate: 1-Chlorooctane	*72.3 %*	*65.2-140*
Surrogate: 1-Chlorooctadecane	*89.7 %*	*63.6-154*

Cardinal Laboratories *=Accredited Analyte

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:	02/12/2013	Sampling Date:	02/12/2013
Reported:	02/15/2013	Sampling Type:	Soil
Project Name:	BD C-23-1 JCT (22/37)	Sampling Condition:	Cool & Intact
Project Number:	NONE GIVEN	Sample Received By:	Jodi Henson
Project Location:	NOT GIVEN		

Sample ID: SB 10 @ 10' (H300394-05)

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

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	**1550**	16.0	02/14/2013	ND	416	104	400	3.77	

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

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10	<10.0	10.0	02/14/2013	ND	210	105	200	2.24	
DRO >C10-C28	<10.0	10.0	02/14/2013	ND	194	96.8	200	5.26	

Surrogate: 1-Chlorooctane	*71.7 %*	*65.2-140*
Surrogate: 1-Chlorooctadecane	*87.9 %*	*63.6-154*

Sample ID: SB 10@ 45' (H300394-06)

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

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	**3880**	16.0	02/14/2013	ND	416	104	400	3.77	

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

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10	<10.0	10.0	02/14/2013	ND	210	105	200	2.24	
DRO >C10-C28	<10.0	10.0	02/14/2013	ND	194	96.8	200	5.26	

Surrogate: 1-Chlorooctane	*69.2 %*	*65.2-140*
Surrogate: 1-Chlorooctadecane	*80.1 %*	*63.6-154*

Cardinal Laboratories *=Accredited Analyte

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:	02/12/2013	Sampling Date:	02/12/2013
Reported:	02/15/2013	Sampling Type:	Soil
Project Name:	BD C-23-1 JCT (22/37)	Sampling Condition:	Cool & Intact
Project Number:	NONE GIVEN	Sample Received By:	Jodi Henson
Project Location:	NOT GIVEN		

Sample ID: SB 10 @ 50' (H300394-07)

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

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	**4360**	16.0	02/14/2013	ND	416	104	400	3.77	

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

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10	<10.0	10.0	02/14/2013	ND	210	105	200	2.24	
DRO >C10-C28	<10.0	10.0	02/14/2013	ND	194	96.8	200	5.26	

Surrogate: 1-Chlorooctane	*80.8 %*	*65.2-140*
Surrogate: 1-Chlorooctadecane	*92.8 %*	*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

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	BILL TO
Project Manager: Hack Conder	P.O. #:
Address:	Company:
City: Hobbs State: NM Zip: 88240	Attn:
Phone #: Fax #:	Address:
Project #: Project Owner:	City:
Project Name:	State: Zip:
Project Location: BD C-23 / Tract	Phone #:
Sampler Name: Kyle Norman	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	TDS					
H300394																								
1	SB 5 @ 20'	G	1			✓					✓		2-12-13	9:20	✓	✓								
2	SB 8 @ 30'	G	1			✓					✓		"	10:00	✓	✓								
3	SB 9 @ 15'	G	1			✓					✓		"	11:20	✓	✓								
4	SB 9 @ 50'	G	1			✓					✓		"	11:45	✓	✓								
5	SB10 @ 10'	G	1			✓					✓		"	12:00	✓	✓								
6	SB10 @ 45'	G	1			✓					✓		"	1:30	✓	✓								
7	SB10 @ 50'	G	1			✓					✓		"	2:00	✓	✓								

Relinquished By:	Date: 2-12-13	Received By: Kedi Henson	Phone Result: ☐ Yes ☑ No Add'l Phone #:
	Time: 3:20		Fax Result: ☐ Yes ☑ No Add'l Fax #:
Relinquished By:	Date:	Received By:	REMARKS: email results: zconder@rice-ecs.com Knorman@rice-ecs.com; lpena@riceswd.com Kjones@riceswd.com; Bbaker@rice-ecs.com; hconder@rice-ecs.com; Lweinheimer@rice-ecs.com
	Time:		
Delivered By: (Circle One) Sampler - UPS - Bus - Other:	Sample Condition Cool: ☑ Yes ☐ No Intact: ☑ Yes ☐ No	CHECKED BY: (Initials)	

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

#26

CARDINAL Laboratories

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

February 22, 2013

Hack Conder

Rice Operating Company

112 W. Taylor

Hobbs, NM 88240

RE: BD C-23-1 JCT (22/37)

Enclosed are the results of analyses for samples received by the laboratory on 02/15/13 14:35.

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/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.

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:	02/15/2013	Sampling Date:	02/15/2013
Reported:	02/22/2013	Sampling Type:	Soil
Project Name:	BD C-23-1 JCT (22/37)	Sampling Condition:	Cool & Intact
Project Number:	NONE GIVEN	Sample Received By:	Jodi Henson
Project Location:	NOT GIVEN		

Sample ID: MW - 2 @ 25' (H300437-01)

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

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	**208**	16.0	02/20/2013	ND	448	112	400	0.00	

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

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10	<10.0	10.0	02/21/2013	ND	197	98.5	200	7.58	
DRO >C10-C28	<10.0	10.0	02/21/2013	ND	164	82.0	200	9.24	

Surrogate: 1-Chlorooctane	*68.9 %*	*65.2-140*
Surrogate: 1-Chlorooctadecane	*83.5 %*	*63.6-154*

Sample ID: MW - 2 @ 45' (H300437-02)

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

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	**3880**	16.0	02/20/2013	ND	448	112	400	0.00	

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

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10	<10.0	10.0	02/21/2013	ND	197	98.5	200	7.58	
DRO >C10-C28	<10.0	10.0	02/21/2013	ND	164	82.0	200	9.24	

Surrogate: 1-Chlorooctane	*75.6 %*	*65.2-140*
Surrogate: 1-Chlorooctadecane	*97.3 %*	*63.6-154*

Cardinal Laboratories

*=Accredited Analyte

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:	02/15/2013	Sampling Date:	02/15/2013
Reported:	02/22/2013	Sampling Type:	Soil
Project Name:	BD C-23-1 JCT (22/37)	Sampling Condition:	Cool & Intact
Project Number:	NONE GIVEN	Sample Received By:	Jodi Henson
Project Location:	NOT GIVEN		

Sample ID: MW - 2 @ 50' (H300437-03)

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

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	**2680**	16.0	02/20/2013	ND	448	112	400	0.00	

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

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10	<10.0	10.0	02/21/2013	ND	197	98.5	200	7.58	
DRO >C10-C28	<10.0	10.0	02/21/2013	ND	164	82.0	200	9.24	

Surrogate: 1-Chlorooctane	*87.6 %*	*65.2-140*
Surrogate: 1-Chlorooctadecane	*107 %*	*63.6-154*

Cardinal Laboratories *=Accredited Analyte

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

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	BILL TO		
Project Manager: Zack Conder	P.O. #:		
Address:	Company:		
City: Hobbs State: NM Zip: 88240	Attn:		
Phone #: Fax #:	Address:		
Project #: Project Owner:	City:		
Project Name:	State: Zip:		
Project Location: BD-C-23-1 Tank	Phone #:		
Sampler Name: Kyle Norman	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	TDS					
H30049																									
1	MW-2 @ 25'	G	1			✓					✓		2-5-13	1:30	✓	✓									
2	MW-2 @ 35'	G	1			✓					✓		"	1:45	✓	✓									
3	MW-2 @ 50'	G	1			✓					✓		"	1:55	✓	✓									

Relinquished By:	Date: 2-6-13	Received By:	Phone Result: ☐ Yes ☑ No Add'l Phone #:
	Time: 2:35		Fax Result: ☐ Yes ☑ No Add'l Fax #:
Relinquished By:	Date:	Received By:	REMARKS: email results: zconder@rice-ecs.com knorman@rice-ecs.com; lpena@riceswd.com kjones@riceswd.com; bbaker@rice-ecs.com; hconder@rice-ecs.com; lweinheimer@rice-ecs.com
	Time:		
Delivered By: (Circle One) Sampler - UPS - Bus - Other:	Sample Condition Cool / Intact ☑ Yes ☑ Yes ☐ No ☐ No	CHECKED BY: (Initials)	

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

#26

Appendix B

Well Development Notes

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

Arc Environmental
P. O. Box 1772
Lovington, New Mexico 88260
(575) 631-9310
Rozanne Johnson ~ rozanne@valornet.com

February 18, 2013

WELL DEVELOPMENT NOTES

The following summarizes the field activities at the RICE BD Jct. C-23-1, Lea County T22S, R37E, Sec 23 Unit Letter C on February 18 and 19, 2013:

- There were two 2-inch monitor wells drilled at the site. A Solinist Water Level Meter was used to determine the depth to water prior to pumping and bailing the wells for development following drilling on February 13, 2013.
    - The meter indicated water within monitor well #1 at a depth of 71.25 with the total depth of the well of 75.60 feet, giving 4.35 feet (0.69 gallons) of water within the well bore 120 hours after being drilled. The well was pumped at 0.25 gallons per minute until the well would no longer pump; this took less than two minutes. The well was then bailed dry with a bailer. The well recovered to a depth of 74.26 feet after 24 hours of pumping and bailing. There is not a significant quantity of water to use as a representable sample for the site.
    - The meter indicated no water within the up gradient monitor well #2 at a depth of 75.98 feet.
- The site is located in the eastern Eunice Plain area of Lea County, which is underlain by a hard caliche surface and is covered by a thin layer of reddish-brown dune sand. The dominant vegetation is bear grass, mesquite and grama grass. Cattle ranchers and oil production activities currently use the area.
- In this arid region the rate of recharge is very slow due to small rainfall amounts, the porosity of the formation consisting of low permeable rock and a presence of clay, which leaves sediments that are thinly saturated or dry. There is little underground flow of water in the area, again due to the formation. It is not uncommon that there is no water in this area of Lea County.

Sincerely,
Arc Environmental

Rozanne Johnson
Rozanne Johnson

Electronic Copy: Hack Conder
Katie Jones