

Hansen, Edward J., EMNRD

From:	Katie Jones [kjones@riceswd.com]
Sent:	Thursday, February 09, 2012 9:51 AM
To:	Hansen, Edward J., EMNRD
Cc:	Leking, Geoffrey R, EMNRD; Hack Conder; Laura Pena
Subject:	RE: Corrective Action Plan (1R426-259) Amendment Verbal Approval - ROC BD N-11 Boot Site
Attachments:	BD N-11 boot (1R426-259) Poposed Liner.jpg

Mr. Hansen,

This email is an Amendment to the Corrective Action Plan (CAP) submitted to the NMOCD on January 23, 2012 and approved by the NMOCD on January 31, 2012. ROC requests to shift the 46x51-ft liner approximately 4 feet to the west, as shown on the attached Figure 2. The attached figure will replace Figure 2 in the ICP Report and CAP. Shifting the liner west will exclude the existing 4-inch well (MW-1) from the excavation. The 46x51-ft, 20-mil reinforced liner will be installed approximately 20 ft below ground surface (bgs) and a 10x10-ft, 20-mil reinforced liner will be installed surrounding SB-3 at approximately 30 ft bgs (10 ft below the upper liner). The soils placed above each liner will have a laboratory chloride reading no greater than 500 mg/kg and a field PID measurement below 100 ppm. Excavated soil will be evaluated for use as backfill and any soil requiring disposal will be properly disposed of at a NMOCD approved facility. If you have any questions or require any additional information, please contact me at (575)393-9174.

Thank you.

Katie Jones Environmental Project Manager RICE Operating Company

From: Hansen, Edward J., EMNRD [mailto:edwardj.hansen@state.nm.us]
Sent: Tuesday, February 07, 2012 11:38 AM
To: Katie Jones
Cc: Leking, Geoffrey R, EMNRD; Hack Conder
Subject: Corrective Action Plan (1R426-259) Amendment Verbal Approval - ROC BD N-11 Boot Site

RE: ICP Report and Corrective Action Plan for the Rice Operating Company's BD N-11 Boot Site Unit Letter N, Section 11, T22S, R37E, NMPM, Lea County, New Mexico Corrective Action Plan (1R426-259) Amendment Verbal Approval

Dear Ms. Jones:

Per our telephone conversation of today, the New Mexico Oil Conservation Division (OCD) has received the proposed Amendment to the Corrective Action Plan for the BD N-11 Boot Site, dated January 23, 2012, and has conducted a review of the Plan Amendment. The Amendment indicates that Rice Operating Company (ROC) has met the requirements of 19.15.29 NMAC (Rule 29; formerly, Rule 116) for a remediation plan. Therefore, the OCD hereby conditionally approves verbally the Corrective Action Plan Amendment as proposed per our telephone conversation of today (i.e., shift the liner location just to the west of MW-1) for above-referenced site in accordance with 19.15.29 NMAC:

1

ROC must submit to the OCD a formal request for amendment of the corrective action plan within 10 days.

Please be advised that OCD approval of this plan does not relieve the owner/operator of responsibility should operations pose a threat to ground water, surface water, human health or the environment. In addition, OCD approval does not relieve the owner/operator of responsibility for compliance with any OCD, federal, state, or local laws and/or regulations.

2

If you have any questions regarding this matter, please contact me at 505-476-3489.

Edward J. Hansen Hydrologist Environmental Bureau

Soil Bore and MW Installation and Proposed Liner



Rice Environmental Consulting & Safety

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

CERTIFIED MAIL RETURN RECEIPT NO. 7011 2000 0002 0285 5032 2012 JAN 30 A.H: 31

RECEIVED OCD

January 23rd, 2012

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: ICP Report and Corrective Action Plan (CAP) Rice Operating Company – BD SWD System BD N-11 boot (1R426-259): UL/N sec. 11 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 2.5 miles southeast of Eunice, New Mexico at UL/N sec. 11 T22S R37E as shown on the Site Location Map (Figure 1). Monitor well sampling at the site establishes groundwater at a depth of +/- 44 feet.

Between 2005 and 2008, ROC initiated work on the former BD N-11 boot. The site was delineated using a backhoe to form a trench and soil samples were screened at regular intervals for both hydrocarbons and chlorides. The site was excavated to 30 x 10 x 12 feet. From the excavation, composite samples were collected for laboratory analysis. Laboratory tests of the site showed negligible gasoline range organics (GRO). The diesel range organics (DRO) in the 4-wall composite was 39.7 mg/kg and in the bottom composite was 16.5 mg/kg. Chlorides concentrations from the excavation read 1,152 mg/kg in the 4-wall composite and 1,232 mg/kg in the bottom composite. The site was backfilled with clean, imported soil to 4 feet below ground surface where a 1 ft clay layer was installed. A clay compaction test was performed on June 3rd, 2008. The site was brought up to ground surface with the remaining imported soil. 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 July 16th, 2010 and a junction box disclosure report was submitted to NMOCD via email on August 6th, 2010 with all the 2010 junction box closures and disclosures.

ICP Investigative Results

As part of the Investigation and Characterization Plan (ICP) approved by NMOCD on September 1st, 2010, six soil bores were advanced through the former junction box site on October 6th, 2010 (Figure 2). ROC personnel field tested the soil for chlorides and screened in the field with a photo-ionization detector for hydrocarbons. Representative samples from the bore were taken to a commercial laboratory for confirmation of chloride and hydrocarbon field numbers (Appendix A). In all the soil bores, except for SB-3, laboratory chloride readings decreased with depth to near background levels as they reached the capillary fringe. However, in SB-3, the laboratory chloride reading at the capillary fringe was 816 mg/kg; although, the chloride levels did decreased with depth. GRO readings were non-detect at all depths throughout the bores, and DRO readings were non-detect at all depths in all bores except for the readings in SB-1 and SB-4. In SB-1, the DRO reading at 30 ft bgs was non-detect and at 40 ft bgs was 27.3 mg/kg. In SB-4, the DRO reading at 5 ft bgs was 702 mg/kg and at 40 ft bgs was 32.4 mg/kg.

To determine what affect the vadose zone chloride and hydrocarbon levels may have had on the groundwater below the site, three monitor wells were installed on November 9th, 2010. MW-1 and MW-3 were not sampled as they were advanced. However, MW-2 was sampled to determine background levels of chlorides and hydrocarbons. Representative samples from MW-2 were taken to a commercial laboratory for confirmation of chloride and hydrocarbon field numbers (Appendix B). At 15 ft bgs, the laboratory chloride reading was 864 mg/kg and at 40 ft bgs it was 160 mg/kg. GRO and DRO readings throughout the bore were non-detect.

Since installation, the monitor wells have been sampled quarterly (Figure 3). From the sampling data, it is evident that groundwater quality is impaired from an up gradient source. During the last sampling event that occurred on October 14th, 2011, MW-2, the up gradient monitor well, showed a chloride concentration of 2,070 mg/L. The near source monitoring well, MW-1, showed a chloride concentration of 2,630 mg/L and the chloride concentration in the down gradient monitor well, MW-3, was 2,130 mg/L. All three monitor wells had BTEX levels of non-detect (Appendix C).

Recommendations

Since groundwater quality beneath the BD N-11 boot site is being impaired from an up gradient source, RECS submits the following as a Corrective Action Plan.

Soil Remedy:

ROC proposes to excavate the site to dimensions of 46 ft x 51 ft and properly seat a 20mil, reinforced poly liner at approximately 20 ft bgs. In addition, a 10 ft x 10 ft area surrounding SB-3 will be excavated an additional 10 ft to a total depth of 30 ft bgs and an additional 20-mil reinforced poly liner will be installed and properly seated (Figure 2). Excavating the area surrounding SB-3 will remove the highest soil chloride concentrations from the site, and the two liners will provide a barrier that will inhibit the downward migration of chloride and hydrocarbons to groundwater. The soils placed above each liner will have a laboratory chloride reading no greater than 500 mg/kg and a field PID measurement below 100 ppm. Excavated soil will be evaluated for use as backfill and any soil requiring disposal will be properly disposed of at a NMOCD approved facility.

Upon completion of backfilling, the site will be seeded with a native vegetative mix. The surface soils over and surrounding the site will be prepared with soil amendments as needed and then seeded. Vegetation above the liner will also provide a natural infiltration barrier for the site since plants capture water through their roots thereby reducing the volume of water moving through the vadose zone to groundwater.

Groundwater Remedy:

ROC proposes to remove chloride impacted groundwater from the site using the 4 inch well, MW-1. A groundwater recovery system will be placed at the site to facility groundwater pumping and recovery. Removed water will be used for pipeline and well maintenance or revegetation of the site. Our estimate conservatively reflects the net impact to groundwater at the site resulting from the former junction box site. It does not take into account other sources or regional groundwater conditions that may exist up gradient of the site.

• Estimated chloride mass in the vadose zone

With the proposed infiltration barriers measuring 46 ft x 51 ft and 10 ft x 10 ft, we conclude that the low concentrations of chlorides and hydrocarbons from the vadose zone will in no way impact the groundwater. The average background soil chloride concentration, as measured in the up gradient well (MW-2), is approximately 390 mg/kg. The average soil chloride concentration at this site is approximately 516 mg/kg, 126 mg/kg above background concentrations. The infiltration barriers will prevent the vertical movement of water in the vadose zone thereby eliminating the number of chlorides and hydrocarbons moving to groundwater.

• Estimated chloride mass in the groundwater

The estimated impact area for the site is 2,346 square feet. The aquifer thickness is 20 ft and the porosity is estimated at 0.25. The volume of impacted groundwater beneath the site is determined by multiplying the impact area by the aquifer thickness by the porosity. Therefore, the volume of impacted groundwater beneath the site is 11,730 cubic feet. The result is then converted to liters giving a value of 332,156 liters. The chloride concentration contributed from the source is the difference between the most recent concentration in MW-1 and the concentration in MW-2, which is determined to be 560 mg/L. The total chloride mass in the groundwater is then determined by multiplying the volume of

impacted groundwater beneath the site by the chloride concentration contributed from the site. This is then converted to kilograms. Thus, the total chloride mass beneath the site is 186 kg.

Estimate of Chloride Mass in Groundwater

Parameter	Unit	Value	Description
Impact area	ft ²	2,346	Estimated Area of Impact
Aquifer Thickness	ft	20	NMOCD Approved Estimation
			Professional Estimate for Water Saturated Pore
Porosity	%	0.25	Volume
· · · · ·			
Volume of Impacted			
Groundwater Below Site	ft ³	11,730	Impact Area x Aquifer Thickness x Porosity
Volume of Impacted			
Groundwater Below Site	L .	332,156	Conversion from ft ³ to Liters
			Difference between Concentrations in Monitor
Chloride Concentration			Wells (MW-1 = 2,630 mg/L and MW-2 = 2,070
from Source	mg/L	560	mg/L)
			Volume of Impacted Groundwater Below Site x
			Chloride Concentration Added to Soil from
TOTAL CHLORIDE MASS	kg	186	Source

Once a recovery system is installed in MW-1, the system is expected to extract one gallon a minute. Given the chloride concentration in MW-1 of 2,630 mg/L, it is estimated that the system will require a total of 31 days to extract the 445 barrels of groundwater equating to 186 kg of chloride.

Estimated Groundwater Recovery System Removal at the BD N-11 boot MW-1

Parameter	Unit	Value	Description
Groundwater			
Concentration	mg/L	2,630	Groundwater Concentration from MW-1
Groundwater			
Concentration	kg/gal	0.0099557	Conversion from mg/L to kg/gal
Pumping Rate	gals/min	1	Given
		*	Pumping rate x Groundwater Concentration
Extraction Rate	kg/min	0.0099557	(kg/gal)
Extraction Rate	kg/day	5.9734262	Conversion from kg/min to kg/day
Representative Total			
Chloride Mass	kg	186	From above
			Pumping rate x Estimated Removal Time x 60
Volume Removal	gals	18,683	min/hour x 10 hr/day

Volume Removal	bbls	445	Conversion from gals to bbls
ESTIMATED			Representative Total Chloride Mass/Extraction
REMOVAL TIME	day	31	Rate

Upon completion of the CAP work elements, ROC will submit a written report that will include a request for 'remediation termination' of 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 and Proposed Liner Map

Figure 3 – Monitor Well Sampling Data

Appendix A – Soil Bore Installation Logs and Laboratory Confirmation

Appendix B – MW Installation Logs and Laboratory Confirmation

Appendix C – Monitor Well Sampling Laboratory Confirmation



Figures

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

Site Location Map





BD N-11 boot

Case #: 1R426-259 Legals: UL/N sec. 11 T22S R37E

Figure 1	W
	1 Miles
Drawing date: 1-19-12 Drafted by: L. Weinheimer	

Soil Bore and MW Installation and Proposed Liner



Monitor Well Sampling Data

		Depth to	Total	Sample					Ethyl	Total	
	MW	Water	Dept	n Date	CI	TDS	Benzene	Toluene	Benzene	Xylenes	Sulfate
		43.9	88.6	12/29/201	0 2.800	4.580	< 0.001	<0.001	<0.001	<0.003	297
		43.93	88.6	2/7/2011	2,900	4.870	< 0.001	<0.001	<0.001	<0.003	311
	MW-1	43.9	88.6	4/13/2011	1 3,150	5.870	<0.001	<0.001	< 0.001	<0.003	323
		43.98	88.6	7/14/201	1 3,900	5.440	< 0.001	<0.001	< 0.001	< 0.003	235
		44.12	88.6	10/14/201	1 2 630	5 560	<0.001	<0.001	<0.001	<0.003	307
		That	00.0	120/24/201	2,000	0,000	401002	-01002			
MWV 2	2 SB SI	-4 B-3 B-6	SB-5 S	JC W 1	IN11			ROC	abando	oned 2 in	PVC
	(S			~			The state			
	Le	ase K	oad			MW :	3				
	De	epth to	Total	Sample		1			Ethyl	Total	
N	w	Nater	Depth	Date	CI	TDS	Benzene	Toluene	Benzene	Xylenes	Sulfate
		12 62	50 72	12/20/2010	1 690	2.000	<0.001	<0.001	<0.001	<0.002	204
Battery	H	12.03	50.72	2/7/2010	2,000	3,000	<0.001	0.001	<0.001	<0.003	234
Dattery		42.07	59.72	4/12/2011	2,250	4,010	<0.001	0.001	<0.001	<0.003	318
M	VV-2	42.62	59.72	4/13/2011	2,250	4,420	<0.001	<0.001	<0.001	<0.003	319
	-	42.77	59.72	7/14/2011	2,950	4,430	< 0.001	< 0.001	< 0.001	< 0.003	304
		42.9	59.72	10/14/2011	2,070	4,150	<0.001	< 0.001	< 0.001	< 0.003	327
	De	pth to	Total	Sample			1		Ethyl	Total	
	W	Vater	Denth	Date	CI	TDS	Benzene	Toluene	Benzene	Xylenes	Sulfate
I STATE OF A	V	14.02	SE OF	12/20/2010	1 700	2 020	00004	ronuerie	20.004	Ayrenes	Junale
	-4	44.93	55.95	12/29/2010	1,700	3,030	<0.001	<0.001	<0.001	<0.003	193
	4	14.98	59.56	2/7/2011	1,820	3,060	<0.001	< 0.001	< 0.001	< 0.003	199
M	N-3 4	14.97	59.56	4/13/2011	1,950	3,760	<0.001	< 0.001	< 0.001	< 0.003	203
	4	45.11	59.56	7/14/2011	2,450	3,870	<0.001	< 0.001	< 0.001	< 0.003	160
	4	45.23	59.56	10/14/2011	2,130	3,740	<0.001	< 0.001	< 0.001	< 0.003	233
RICE ENVIRONMENTAL	E	BD	N	11 b	000	t	Figu	ure 3	3	W	E

Case #: 1R426-259 Legals: UL/N sec. 11 T22S R37E

CONSULTING & SAFETY, LLC

1 13	gui	00	W E	
0	15	30	60	
			Feet	
Drawi Drafte	ng date d by: L	:1-7-12 Weinheimer		

Appendix A Soil Bore Installation Logs and Laboratory Confirmation

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

Log Drill Drilling Start End Comme	Iger: Iler: Method Date: Date: Date: ents: Loc TD	Harri II ated = 40	T. Griec ison & C nc. Drillii Air rota 10/6/20 10/6/20 at the s Drafted ft	o ooper ng ry 10 10 ource d by: LA	SB-2 $SB-3$ $SB-3$ $SB-6$ of the former junction box site. RA WEINHEIMER GW = 42 ft	Pro Lo La Lo	Project Nan BD jct. N-111 oject Consulta cation: UL/N s t: 32°24'11.213 ng: 103°8'16.6	RECS No a BAFETY US ne: boot int: RECS ec. 11 T22 "N 641 "W	Well ID: SB-1 SR37E County: LEA State: NM
Depth (feet)	chlori field te	de sts	LAB	PID	Description		Lithology	Well C	construction
15 ft	203			0.1	Tan, predominantly silt with some very fine grained sand, slightly clayey. Slightly damp, no odor or stain.				
20 ft	167			0.0	Red, predominantly silt, with some very fine sand grains, slightly clayey.				
25 ft	271			0.0	consolidated. Slightly damp, no odor or stain.				bentonite
30 ft	353		CI- 336 GRO <10 DRO <10	0.0					seal
35 ft	344			0.0	Red, predominantly silt, with some very fine sand grains, slightly clayey.	11			
40 ft	301		CI- 288 GRO <10 DRO 27.3	0.0	Unconsolidated to loosely consolidated. Very damp.				

Log	aer:		T. Gried	:0	\ SB-4	RICEEN	VIRONMENTAL
	Driller: Harrison & Coope		cooper		R	ECS	
Dril	ler:	I	nc. Drilli	ng	SB-2 SB-1 SB-5	ONSULTIN	9 & SAFETY, LLC
Drilling	Method		Air rota	ry	SB-3	Project Nam	e: Well ID:
End I	Date:		10/6/20	10	SB-6	Project Consultar	nt: RECS
Comme	ents: Lo	ocated	18 ft w	est of	the former junction box site.	Location: UL/N se	ec. 11 T22S R37E
	Т	0 = 40	Drafte ft	d by: L/	GW = 42 ft	Long: 103°8'16.8	44"W County: L
Depth	chlo	ride	LAB	PID	Description	Lithology	Well Constructio
(feet)	field	ests					
)	Tan, predominantly silt, some very fine grained sand, slightly clayey. Unconsolidated		
					to moderately consolidated. Slight odor, no		
E 44	51	5		0.2	clay also found in the sample.		
511	51	5		0.2			
10.5					fine grained sand, slightly clavey.		
10 ft	34	6		0.2	Unconsolidated to moderately		
-			-		consolidated. Slight odor, no stain,		
					Signity damp. No odor.		
15 ft	57	7		0.0			
20 ft	54	6		0.1			
					fine grained sand, slightly clayey,		bentonite
	15 -	1.1	1		Unconsolidated to moderately		seal
25 ft	65	6	CI- 752	0.0	consolidated. Scattered well		
			GRO	0.0			
			DRO				
			<10		Red, predominantly silt, some very		
30 ft	38	9		0.0	fine sand grains, slightly clayey.		
					consolidated, slightly damp, no odor.		
35 ft	36	7		0.0			
			<u> </u>		Red, predominantly silt, some very		
40 ft	26	6	CI- 304	0.0	tine sand grains, slightly clayey. Unconsolidated to moderately		
			GRO <10		consolidated, very damp, no odor.		
			DRO		1		
			<10				

Log Dril Drilling	ger: ller: Method	Harr	T. Griec ison & C nc. Drilli Air rota	o ooper ng ry	SB-2 SB-3		Project Na	RECS	Well ID:
Start End	Date: Date:	1	0/6/20	10 10	SB-6	Pro	BD jct. N-11 pject Consul	1 boot tant: RECS	SB-3
Comme	ents: Lo TD	catec catec	I 16 ft s Drafte ft	outh of d by: LA	the former junction box site. RA WEINHEIMER GW = 42 ft	Loc Lat	cation: UL/N : 32°24'11.06 ng: 103°8'16	sec. 11 T225 69"N 6.61"W	S R37E County: LEA State: NM
Depth (feet)	chlor field t	ride ests	LAB	PID	Description		Lithology	Well C	onstruction
			3		Tan predominantly silt some very fine sand grains, slightly clayey. Unconsolidated to moderately consolidated. Scattered small				
5 ft	69	2		0	pieces of caliche. Dry, no odor				
					Tan predominantly silt some very fine sand grains, slightly clayey. Unconsolidated to				
10 ft	64	3		0	loosely consolidated. Slighly damp, no odor				
1					-				
15 ft	604	4		0	fine sand grains, slightly clayey.				
					consolidated. Slighly damp, no odor.				
20 ft	42	5		0.5					
									seal
25 ft	69	7		0.5					
30 ft	1,20	01	CI- 1150	0.8	Red predominantly silt with some very fine sand grains, slightly clayey,	1			
-			<10 DRO		consolidated, slightly damp, no odor.				
35 ft	74	9	<10	0.9					
					Red predominantly silt with some				
40 ft	77:	2	CI- 816 GRO	0.9	very fine sand grains, slightly clayey, Unconsolidated to moderately consolidated, very damp, no odor.				
			DRO <10						

Log	ger:		T. Gried	:0	SB-4	RIC	RECS
Dril	ller:	Harr	rison & C Inc. Drilli	ooper ng	SB-2 SB-1 SB-5	CONSU	LTING & SAFETTI LLE
Drilling	Method		Air rota	ry	SB-3	Project Na	me: Well ID:
Start End	Date: Date:	-37	10/6/20 10/6/20	10 10	SB-6	BD jct. N-11 Project Consult	boot SB-4 ant: RECS
Comme	ents: Loo TD	= 40	14 ft no Drafted ft	rth of th I by: LAI	ne former junction box site. RA WEINHEIMER GW = 42 ft	Location: UL/N Lat: 32°24'11.36 Long: 103°8'16.	sec. 11 T22S R37E 8"N County: LEA 654"W State: NM
Depth (feet)	chlor field te	ide ests	LAB	PID	Description	Lithology	Well Construction
	See.	lé seri	1.1		Tan predominantly silt with some very fine		
		4		1	sand grains, slightly clayey. Unconsolidated		
5.64	000		CI-	25.9	Slightly damp		
511	908	,	GRO	20.0	Tan predominantly silt with some	-	
1 10		1	<10 DBO		very fine sand grains, slightly clayey.		
100	1		702	dis.	consolidated. No odor, no stain.		
10 ft	525	5		2.2	Slightly damp		
-							
					Tan predominantly silt with some		
15 ft	398	3		1.9	Unconsolidated to moderately		
					consolidated. No odor, no stain.		
-				1	olightiy damp.		
20 ft	414	1	-	1.2			
							> bentonite
1 March	-						seal
25 ft	584	1		1.3			
1.30		1	1.2.2	1.0	Red predominantly silt with some very fine		
	1			1	sand grains, slightly clayey. Unconsolidated to weakly consolidated. No odor, slightly		
30 ft	412	2		1.0	damp.		
	·						
35 ft	552	2		1.2			
	002				Red predominantly silt with some	-	
					very fine sand grains, slightly clayey.		
	-		CI-		Unconsolidated to weakly consolidated. No odor, very damp		
40 ft	269)	240 GBO	0.5			
4. 2	1		<10				
	12 .		DRO 32.4				

Log Dril	Logger: T. Grie Driller: Harrison & Inc. Dri			SB-4 SB-2 SB-1 SB-5	RECS			
Drilling	Method	Air rotar	У	SB-3	Project Name:	Well I		
Start	Date:	10/6/201	0	SB-6	BD jct. N-11 boot	t SB-		
Comme	Date:	10/6/201	0 ast of t	©	Project Consultant:	RECS 11 T225 B37E		
Comme	mis. Loca	Drafte	d by: L/	ARA WEINHEIMER	Lat: 32°24'11.2"N	County		
Nr.	TD =	40 ft		GW = 42 ft	Long: 103°8'16.37"V	V State: N		
Depth (feet)	chloride field test	e LAB	PID	Description	Lithology	Well Construc		
	10			Tan predominantly silt with some very fine				
				sand grains, slightly clayey. Unconsolidated				
1.2		CI-		odor. Scattered small caliche pieces.				
5 ft	711	1140	1.4	The second second second second second				
		<10		I an predominantly slit with some				
	1346	DRO		Unconsolidated to moderately				
		<10	2	consolidated. Slightly damp, no				
10 ft	799	-	0.7	odor.				
19				Reddish-tan, predominantly silt with some				
	220			Unconsolidated to moderately consolidated.				
15 ft	623		0.6	Slightly damp, no odor.				
	010		0.0	Tan predominantly silt with some very fine				
- A				sand grains, slightly clayey. Unconsolidated				
10				odor. Scattered small nodules (up to 2 cm) of				
20 ft	420		0.7	well cemented siltstone.		ben		
	1267			Tan predominantly silt with some very fine		se se		
	and the	3		sand grains, slightly clayey. Unconsolidated to weakly consolidated. Slightly damp, no				
25 ft	559		0.7	odor.				
				Red predominantly silt with some yory first				
All and a		16.3	0	sand grains, slighly clayey. Unconsolidated				
			-	to weakly consolidated. Slightly damp, no odor.				
30 ft	406		0.5					
				4				
35 ft	264		0.5					
				Red, predominantly silt with some				
				very fine sand grains, slighly clayey.				
		CI-		Unconsolidated to weakly				
40 ft	267	160	0.7	consolidated. Damp, no odor.				
		GRO <10						
		DRO		1				
		<10						

Log Dril	ger: ler:	Harri	T. Griec son & C nc. Drillii	o ooper ng	SB-2 SB-1 SB-5	RECS BANSULTING & BAFETY, LG	
Drilling Start End I	Method Date: Date:	1	Air rotai 0/6/20 ⁻ 10/6/20 ⁻	у 10 10	SB-3 © SB-6 ©	Project Nam BD jct. N-11 b Project Consulta	Weil ID: poot SB-6 nt: RECS 00075
Comme	ents: Lo	rate c rate c	Drafte ft	d by: LA	RA WEINHEIMER GW = 42 ft	Location: UL/N se Lat: 32°24'10.96"N Long: 103°8'16.6	County: LEA 07"W State: NM
Depth (feet)	chlor field t	ride ests	LAB	PID	Description	Lithology	Well Construction
2.2	-30			- 2	Tan predominantly silt with some very fine sand grain slightly clayey		
-			CI-		10 pct caliche particles. Slightly		
5 ft	106	9	1310 GBO	0.4			
			<10				
1			<10	-	Tan predominantly silt with some		
10 ft	454	4		0.7	Only scattered caliche particles.		
		19			olightly damp, no odor		
15 ft	844	4		1.0			
20 ft	58	8		1.0			
							bentonite
25 ft	53	6		0.6			sear
	47.1				Red predominantly silt with some very fine sand grains, slightly clayey.		
30 ft	428	8		0.7	Slightly damp, no odor		
35 ft	302	2		0.5			
					Red predominantly silt with some		
			CI-		very fine sand grains, slightly clayey.		
40 ft	30	/	192 GRO	1.0	very damp, no odor		
			<10 DRO <10				

October 14, 2010

Hack Conder

Rice Operating Company

112 W. Taylor

Hobbs, NM 88240

RE: BD JCT N-11

Enclosed are the results of analyses for samples received by the laboratory on 10/07/10 8:12.

Cardinal Laboratories is accredited through Texas NELAP for:

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

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

Cardinal Laboratories is accreditated through the State of Colorado Department of Public Health and Environment for:

Method EPA 552.2	Haloacetic Acids (HAA-5)
Method EPA 524.2	Total Trihalomethanes (TTHM)
Method EPA 524.4	Regulated VOCs (V2, V3)

Accreditation applies to public drinking water matrices.

This report meets NELAP requirements and is made up of a cover page, analytical results, and a copy of the original chain-of-custody. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Celey D. Kune

Celey D. Keene Lab Director/Quality Manager

Analytical Results For:

Rice Operating Company Hack Conder 112 W. Taylor Hobbs NM, 88240 Fax To: (575) 397-1471

Received:	10/07/2010	Sampling Date:	10/06/2010
Reported:	10/14/2010	Sampling Type:	Soil
Project Name:	BD JCT N-11	Sampling Condition:	Cool & Intact
Project Number:	NONE GIVEN	Sample Received By:	Jodi Henson
Project Location:	BD JCT N-11		

Sample ID: SB #1 @ 30 FT (H021002-01)

Chloride, SM4500CI-B	mg/	kg	Analyze	d By: HM					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	336	16.0	10/08/2010	ND	432	108	400	3.77	
TPH 8015M	mg/kg		Analyzed By: AB						
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10	<10.0	10.0	10/14/2010	ND	199	99.4	200	2.11	
DRO >C10-C28	<10.0	10.0	10/14/2010	ND	211	105	200	9.38	
Surrogate: 1-Chlorooctane	1119	6 70-130							
Surrogate: 1-Chlorooctadecane	129 %	6 70-130							

Sample ID: SB #1 @ 40 FT (H021002-02)

Chloride, SM4500Cl-B	mg/	kg	Analyze	d By: HM					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	288	16.0	10/08/2010	ND	432	108	400	3.77	
TPH 8015M	mg/kg		Analyzed By: AB						S-04
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10	<10.0	10.0	10/14/2010	ND	199	99.4	200	2.11	
DRO >C10-C28	27.3	10.0	10/14/2010	ND ·	211	105	200	9.38	
Surrogate: 1-Chlorooctane	118%	6 70-130							
Surrogate: 1-Chlorooctadecane	133 %	6 70-130							¢

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Celey D. Keene, Lab Director/Quality Manager

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Page 2 of 10

Analytical Results For:

Rice Operating Company Hack Conder 112 W. Taylor Hobbs NM, 88240 Fax To: (575) 397-1471

10/07/2010	Sampling Date:	10/06/2010
10/14/2010	Sampling Type:	Soil
BD JCT N-11	Sampling Condition:	Cool & Intact
NONE GIVEN	Sample Received By:	Jodi Henson
BD JCT N-11		
	10/07/2010 10/14/2010 BD JCT N-11 NONE GIVEN BD JCT N-11	10/07/2010Sampling Date:10/14/2010Sampling Type:BD JCT N-11Sampling Condition:NONE GIVENSample Received By:BD JCT N-11Sample Received By:

Sample ID: SB #2 @ 25 FT (H021002-03)

Chloride, SM4500CI-B	mg/l	kg .	Analyze	d By: HM					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	752	16.0	10/08/2010	ND	432	108	400	3.77	
TPH 8015M	mg/kg		Analyzed By: AB						
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10	<10.0	10.0	10/14/2010	ND	199	99.4	200	2.11	
DRO >C10-C28	<10.0	10.0	10/14/2010	ND	211	105	200	9.38	
Surrogate: 1-Chlorooctane	91.0%	6 70-130	· · · · · · · · · ·						
Surrogate: 1-Chlorooctadecane	103 %	5 70-130							

Sample ID: SB #2 @ 40 FT (H021002-04)

Chloride, SM4500CI-B	mg/	/kg	Analyze	d By: HM					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	304	16.0	10/08/2010	ND	432	108	400	3.77	
TPH 8015M	mg/kg		Analyzed By: AB						
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10	<10.0	10.0	10/14/2010	ND	199	99.4	200	2.11	
DRO >C10-C28	<10.0	10.0	10/14/2010	ND	211	105	200	9.38	
Surrogate: 1-Chlorooctane	97.0	% 70-130							
Surrogate: 1-Chlorooctadecane	109 9	% 70-130							

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Celey D. Keene, Lab Director/Quality Manager

Analytical Results For:

Rice Operating Company Hack Conder 112 W. Taylor Hobbs NM, 88240 Fax To: (575) 397-1471

Received:	10/07/2010	Sampling Date:	10/06/2010
Reported:	10/14/2010	Sampling Type:	Soil
Project Name:	BD ICT N-11	Sampling Condition:	Cool & Intact
Project Number: Project Location:	NONE GIVEN BD JCT N-11	Sample Received By:	Jodi Henson

Sample ID: SB #3 @ 30 FT (H021002-05)

Chloride, SM4500CI-B	mg/k	g	Analyze	d By: HM					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	1150	16.0	10/08/2010	ND	432	108	400	3.77	
TPH 8015M	mg/kg		Analyzed By: AB						S-04
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10	<10.0	10.0	10/14/2010	ND	199	99.4	200	2.11	•
DRO >C10-C28	<10.0	10.0	10/14/2010	ND	211	105	200	9.38	
Surrogate: 1-Chlorooctane	116%	70-130							
Surrogate: 1-Chlorooctadecane	134 %	70-130	· .						

Sample ID: SB #3 @ 40 FT (H021002-06)

Chloride, SM4500CI-B	mg/l	kg	Analyze	d By: HM					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	816	16.0	10/08/2010	ND	432	108	400	3.77	
TPH 8015M	mg/	kg	Analyze	d By: AB					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10	<10.0	10.0	10/14/2010	ND	192	96.0	200	17.6	
DRO >C10-C28	<10.0	10.0	10/14/2010	ND	181	90.6	200	8.48	
Surrogate: 1-Chlorooctane	101 %	6 70-130							
Surrogate: 1-Chlorooctadecane	100 %	6 70-130							

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Analytical Results For:

Rice Operating Company Hack Conder 112 W. Taylor Hobbs NM, 88240 Fax To: (575) 397-1471

Received:	10/07/2010	Sampling Date:	10/06/2010
Reported:	10/14/2010	Sampling Type:	Soil
Project Name:	BD JCT N-11	Sampling Condition:	Cool & Intact
Project Number:	NONE GIVEN	Sample Received By:	Jodi Henson
Project Location:	BD JCT N-11		

Sample ID: SB #4 @ 5 FT (H021002-07)

Chloride, SM4500Cl-B	mg,	/kg	Analyze	d By: HM					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	1280	16.0	10/08/2010	ND	432	108	400	3.77	
TPH 8015M	mg,	/kg	Analyze	d By: AB					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10	<10.0	10.0	10/14/2010	ND	192	96.0	200	17.6	
DRO >C10-C28	702	10.0	10/14/2010	ND	181	90.6	200	8.48	
Surrogate: 1-Chlorooctane	92.4	% 70-130	1						
Surrogate: 1-Chlorooctadecane	110	% 70-130							

Sample ID: SB #4 @ 40 FT (H021002-08)

Chloride, SM4500CI-B	mg/	/kg	Analyze	d By: HM					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	240	16.0	10/08/2010	ND	432	108	400	3.77	
TPH 8015M	mg/	/kg	Analyze	d By: AB			= 1 10		
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10	<10.0	10.0	10/14/2010	ND	192	96.0	200	17.6	
DRO >C10-C28	32.4	10.0	10/14/2010	ND	181	90.6	200	8.48	
Surrogate: 1-Chlorooctane	95.2	% 70-130					· · · · ·		
Surrogate: 1-Chlorooctadecane	97.3	% 70-130	1						•

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Page 5 of 10

Analytical Results For:

Rice Operating Company Hack Conder 112 W. Taylor Hobbs NM, 88240 Fax To: (575) 397-1471

Received:	10/07/2010	Sampling Date:	10/06/2010
Reported:	10/14/2010	Sampling Type:	Soil
Project Name:	BD JCT N-11	Sampling Condition:	Cool & Intact
Project Number:	NONE GIVEN	Sample Received By:	Jodi Henson
Project Location:	BD JCT N-11		

Sample ID: SB #5 @ 5 FT (H021002-09)

Chloride, SM4500Cl-B	mg,	/kg	Analyze	d By: HM					-
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	1140	16.0	10/08/2010	ND	432	108	400	3.77	
TPH 8015M	mg,	/kg	Analyze	d By: AB					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10	<10.0	10.0	10/14/2010	ND	192	96.0	200	17.6	
DRO >C10-C28	<10.0	10.0	10/14/2010	NÐ	181	90.6	200	8.48	
Surrogate: 1-Chlorooctane	105	% 70-130							
Surrogate: 1-Chlorooctadecane	105	% 70-130							

Sample ID: SB #5 @ 40 FT (H021002-10)

Chloride, SM4500CI-B	mg/	kg	Analyze	d By: HM					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	160	16.0	10/08/2010	ND	432	108	400	3.77	÷
TPH 8015M	mg/	kg	Analyze	d By: AB					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10	<10.0	10.0	10/14/2010	ND	192	96.0	200 ໍ	17.6	
DRO >C10-C28	<10.0	10.0	10/14/2010	ND	181	90.6	200	8.48	
Surrogate: 1-Chlorooctane	120 9	% 70-130							
Surrogate: 1-Chlorooctadecane	- 120 9	% 70-130	I						

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Analytical Results For:

Rice Operating Company
Hack Conder
112 W. Taylor
Hobbs NM, 88240
Fax To: (575) 397-1471

10/07/2010	Sampling Date:	10/06/2010
10/14/2010	Sampling Type:	Soil
BD JCT N-11	Sampling Condition:	Cool & Intact
NONE GIVEN	Sample Received By:	Jodi Henson
BD JCT N-11		
	10/07/2010 10/14/2010 BD JCT N-11 NONE GIVEN BD JCT N-11	10/07/2010Sampling Date:10/14/2010Sampling Type:BD JCT N-11Sampling Condition:NONE GIVENSample Received By:BD JCT N-11Sample Received By:

Sample ID: SB #6 @ 5 FT (H021002-11)

Chloride, SM4500CI-B	mg,	/kg	Analyze	d By: HM					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	1310	16.0	10/08/2010	ND	432	108	400	3.77	
TPH 8015M	mg,	/kg	Analyze	d By: AB					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10	<10.0	10.0	10/14/2010	ND	192	· 96.0	200	17.6	•
DRO >C10-C28	<10.0	10.0	10/14/2010	ND '	181	90.6	200	8.48	
Surrogate: 1-Chlorooctane	94.3	% 70-130					•		
Surrogate: 1-Chlorooctadecane	94.9	% 70-130	•						

Sample ID: SB #6 @ 40 FT (H021002-12)

Chloride, SM4500CI-B	mg/l	kg	Analyze	d By: HM					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	192	16.0	10/08/2010	ND	432	108	400	3.77	
TPH 8015M	mg/	kg	Analyze	d By: AB					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10	<10.0	10.0	10/14/2010	ND	192	96.0	200	17.6	
DRO >C10-C28	<10.0	10.0	10/14/2010	ND	181	90.6	200	8.48	
Surrogate: 1-Chlorooctane	98.9 9	6 70-130	•						
Surrogate: 1-Chlorooctadecane	99.1 %	6 70-130						•	

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Celey D. Keene, Lab Director/Quality Manager

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

Notes and Definitions

S-04	The surrogate recovery for this sample is outside of established control limits due to a sample matrix effect.
ND	Analyte NOT DETECTED at or above the reporting limit
RPD	Relative Percent Difference
**	Samples not received at proper temperature of 6°C or below.
***	Insufficient time to reach temperature.
-	Chloride by SM4500CI-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

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Celey D. Keene, Lab Director/Quality Manager

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CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

Page 9 of 10

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- ARDINAL LABORATORIES

0 **CHAIN-OF-CUSTODY AND ANALYSIS REQUEST**

	(505) 393-2326 FAX (505) 393-2	2476 (325) 673-7001 h	-AX (325)673-7	, 360.3 1020								
Company Nam	le: Rice Operating Company		7/8	LTO				NALY	SIS RI	EQUEST		
Project Manag	er: Hack Conder		P.O. #:						┡			r
Address: 122	? West Taylor		Company:	• 1				S				
City: Hobbs	State: NM	Zip: 88240	Attn:					uo				
Phone #: 575	-393-9174 Fax #: 575-3	97-1471	Address:	-				ļυ				
Project #:	Project Owne	er:	City:			M	Ĥ	√/ S	·			
Project Name:	BD JCT N-11	4 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9	State:	Zip:	sə	(2	Id.	suc				
Project Locatic	sin: BD JCT N-11		Phone #:		hin		Γs	Dife	,			
Sampler Name	: Jordan Woodfin		Fax #:		οιι	8 F TE	;e>	<u>;</u>)				
FOR LAB USE ONLY		MATRIX	PRESERV.	SAMPLING		3 	(ə	Ð				
Lab I.D.	Sample I.D.	ор (C)omp. Кајиерс ирматер Катаwи Катаw	OO SSV	-	,		L	ajdwo		- -		
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PLEASE NOTE: LIADINY	and Damages. Cardinal's flability and client's exclusive remedy for	r any claim arising whether based in contra	ct or tort, shall be limited to	the amount paid by the clien	t for the	-		-	-			7
enziyees. Al claims inclu service: in no event shall affiliates or successors ari	ding those for negligence and any other cause whatsoever chail by Catidinal be flable for middental or consequential damages, indudin sing out of or relate d to the performance of services hereunder by	e doemed waived unless måde in writing a ing without tinitation, business interruption. i Cardinal, regendess of whether such clair	nd received by Cardinal wit , loss of use, or loss of proi n is based upon any of the ;	hin 30 days after completion fis incurred by client, its subs above strated reasons or othe	of the applicable. Maries rwise.					-		
Relinquished E	3y: (Date: / Date: / 7 / 20	Received By:	1	Phone	Result: C	Yes D	Ŷ	Add'l Pho	ne #:		and the second se	
Jorda	n Woodfin		i.	REMAR	KS:	Les K	2	AGO I FAX		1		
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	Time:	•			م ما کش				ý-jr			
Delivered B	y: YCircle One) - Blis - Other	Sample Cond Cool Intact	tion CHECKE (Initia		inteime	iceswo er@rice	svd.	, jwaa com k		griceswu. ES@RICI	som; ESWD.COM	
			ġ ĵo			ŕ						
† Cardina	I cannot accept verbal changes. Pleas	se fax written changes to	505-393-2476				1					

Page 10 of 10

NEED SAMPLES BACK, PLEASE

Appendix B MW Installation Logs and Laboratory Confirmation

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

Logger: Driller: Drilling N Start Date End Date Comme	Method: e: b: ents: Loca	Jor Harrisc	rdan Woo on & Coop Air rotary 11/9/2010 11/9/2010 31 ft so	dfin per, Inc. / 0 0 uth east	MWW 2 SB-2 SE-3 SB-3 SB-3 SB-3 MWW 1 MWW 3 of former junction box site.	Project Name BD jct. N-1 Project Cons Location: UL	RECS CLATING & SAFET : V 1 boot ultant: REC /N sec. 11	Vell ID: MW-1 CS T22S R37E
	TD =	= 87 f	DRAFT	TED BY: L.	Weinheimer GW = 48 ft	Lat: 32°24'11. Long: 103°8'1	037"N 6.35"W	County: LEA State: NM
Depth (feet)	chlorid field tes	de sts	LAB	PID	Description	Lithology	Well C	construction
5 11					NO SAMPLES TAKEN			
10 ft								
15 ft							n PVC	bentonite
20 ft							4 i	seal
25 ft								
30 ft								
35 ft								
40 ft								
		_						

Depth (feet)	chloride field tests	LAB	PID	Description	Lithology	Well Construction
45 ft						
50 ft						
55 ft						
60 ft						sand pack
65 ft						
70 ft						
75 ft						
80 ft						
85 ft						
90 ft	-					

		_						ENVIRONME	
Logger:		Jor	dan Woo	odfin	MW 2 52-4		R	ECS	
Driller:	н	larriso	n & Coo	per, Inc.	SB-2 58-1 58-5		CONSULT	ING & SAFETY	LLC
Drilling N	Method:		Air rotar	y	SB-3 (MW 1 SB-6 ()	Pro	oject Name:		Well ID:
Start Dat	ie:		11/9/201	0	MW 3		BD jct. N-11	boot	MW-2
End Date	e:		11/9/201	0	*	Pro	oject Consulta	ant: RECS	3
Comme	ents: Loc	ated	64 ft n	orth we	est of former junction box site.	Lo	cation: UL/N	sec. 11 T	22S R37E
	TD =	= 57	DRAF ft	TED BY	7: L. Weinheimer GW = 48 ft	La Lo	t: 32°24'11.718 ng: 103°8'17.1	3"N 03"W	County: LEA State: NM
Depth (feet)	chlorid field tes	de sts	LAB	PID	Description		Lithology	Well	Construction
5 ft	184			0					
10 ft	317			0				DVC	
15 ft	637		CI- 864 GRO <10 DRO <10	0	small to medium sized caliche fragments			2 in F	bentonite seal
20 ft	506	-		0					
25 ft	608			0					
30 ft	391			0					
					Red very fine silty sand)
35 ft	310			0					
40 ft	169		CI-	0					

Depth (feet)	chloride field tests	LAB	PID	Description	Lithology		Well Construction
		GRO <10					
		DRO <10		NO SAMPLES TAKEN			sand
45 ft							pack
-							
50 ft							
55 ft							
						- 1	

Logger: Driller: Drilling M Start Date End Date Comme	Nethod: e: o: ents: Loca	Jor Harriso ated {	dan Woo on & Coop Air rotary 11/9/201 11/9/201 97 ft sc	dfin ber, Inc. / 0 0 0 0 0 0 0 0 0 0	MWW 2 SB-2 SB-2 SB-3 SB-3 SB-4 MWV 1 MWV 3 of former junction box site.	P	roject Name: BD jct. N-11 roject Consu ocation: UL/	RECT Prino & BAFET boot ltant: RE N sec. 11	Well ID: MW-3 CS T22S R37E
1.	TD =	= 57 f	DRAF	TED BY: L.	Weinheimer GW = 48 ft	L	at: 32°24'10.5 ong: 103°8'15	82"N .79"W	County: LEA State: NM
Depth (feet)	chloric field tes	de sts	LAB	PID	Description		Lithology	Well	Construction
5 ft									
10 ft					NO SAMPLES TAKEN			in PVC	
15 ft								2	bentonite seal
20 ft									
25 ft									
30 ft									
35 ft									
40 ft									

Depth (feet)	chloride field tests	LAB	PID	Description	Litholo	gy	Well Construction	on
45 ft							sand pack	1
50 ft								
55 ft								

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

December 14, 2010

Hack Conder

Rice Operating Company

112 W. Taylor

Hobbs, NM 88240

RE: BD JCT N-11

Enclosed are the results of analyses for samples received by the laboratory on 12/10/10 7:50.

Cardinal Laboratories is accredited through Texas NELAP for:

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

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

Cardinal Laboratories is accreditated through the State of Colorado Department of Public Health and Environment for:

Method EPA 552.2	Haloacetic Acids (HAA-5)
Method EPA 524.2	Total Trihalomethanes (TTHM)
Method EPA 524.4	Regulated VOCs (V2, V3)

Accreditation applies to public drinking water matrices.

This report meets NELAP requirements and is made up of a cover page, analytical results, and a copy of the original chain-of-custody. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Celey D.Keine

Celey D. Keene Lab Director/Quality Manager

Analytical Results For:

Rice Operating Company Hack Conder 112 W. Taylor Hobbs NM, 88240 Fax To: (575) 397-1471

	182.10.	(5/5) 59/-14/1	
Received:	12/10/2010	Sampling Date:	12/09/2010
Reported:	12/14/2010	Sampling Type:	Soil
Project Name:	BD JCT N-11	Sampling Condition:	Cool & Intact
Project Number:	NONE GIVEN	Sample Received By:	Jodi Henson
Project Location:	BD JCT N-11		

Sample ID: MW 2 @15' (H021487-01)

Chloride, SM4500CI-B	mg/l	g	Analyze	d By: HM					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	864	16.0	12/10/2010	ND	416	104	400	3.92	
TPH 8015M	mg/k	g	Analyze	d By: AB					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10	<10.0	10.0	12/13/2010	ND	213	106	200	6.74	
DRO >C10-C28	<10.0	10.0	12/13/2010	ND	226	113	200	5.87	•
Surrogate: 1-Chlorooctane	93.0 %	6 70-130							
Surrogate: 1-Chlorooctadecane	95.4%	6 70-130				. ,			

Sample ID: MW 2 @40' (H021487-02)

Chloride, SM4500CI-B	mg	/kg	Analyze	d By: HM					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	160	16.0	12/10/2010	ND	416	104	400	3.77	
TPH 8015M	mg	/kg	Analyze	ed By: AB			•		
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10	<10.0	10.0	12/14/2010	ND	213	106	200	6.74	
DRO >C10-C28	<10.0	10.0	12/14/2010	ND	226	113	200	5.87	
Surrogate: 1-Chlorooctane	103	% 70-130)						
Surrogate: 1-Chlorooctadecane	106	% 70-130)						

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*=Accredited Analyte

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Celuy une

Celey D. Keene, Lab Director/Quality Manager

Notes and Definitions

ND	Analyte NOT DETECTED at or above the reporting limit
RPD	Relative Percent Difference
**	Samples not received at proper temperature of 6°C or below.
***	Insufficient time to reach temperature.
-	Chloride by SM4500CI-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

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Celeyr June

Celey D. Keene, Lab Director/Quality Manager

ARDINAL LABORATORIES

CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

DundT bebneize M 2108 H9T	complete Cations/Anons	HqT sexaT			M 2108 HOT	Chlorides	TIME 03:300	Zip: bATE 12/9/10 12/9/10						Dany State: NM Fax #: 575-39 Project Owner:	Rice Operating com : Hack Conder West Taylor 93-9174 93-9174 93-9174 BD Jct N-11 Jordan Woodfin Jordan Woodfin MW-2 @ 15' MW-2 @ 40'	Project Manager Address: 1221 City: Hobbs Phone #: 575-3 Project Name: B Project Location Sampler Name: For Us USE ONLY Cab Lab L.D.
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Page 4 of 4

NEED SAMPLES BACK, PLEASE

Hconder@riceswd.com; jwoodfin@riceswd.com; Lweinheimer@riceswd.com kjones@riceswd.com

> CHECKED BY: (Mitials)

Sample Condition Cool. Intact Cool. Intact No No No

Delivered/By: (Circle One) Sampler - UPS - Bus - Other:

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ŗ,

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

Mensor

Appendix C Monitor Well Sampling Laboratory Confirmation

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

October 26, 2011

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

RE: BD JUNCTION N-11 BOOT

Enclosed are the results of analyses for samples received by the laboratory on 10/18/11 11:20.

Cardinal Laboratories is accredited through Texas NELAP for:

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

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

Cardinal Laboratories is accreditated through the State of Colorado Department of Public Health and Environment for:

Method EPA 552.2	Haloacetic Acids (HAA-5)
Method EPA 524.2	Total Trihalomethanes (TTHM)
Method EPA 524.4	Regulated VOCs (V2, V3)

Accreditation applies to public drinking water matrices.

This report meets NELAP requirements and is made up of a cover page, analytical results, and a copy of the original chain-of-custody. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Celey D. Keine

Celey D. Keene Lab Director/Quality Manager

Analytical Results For:

Rice Operating Company Hack Conder 112 W. Taylor Hobbs NM, 88240 Fax To: (575) 397-1471.

Received:	10/18/2011	Sampling Date:	10/14/2011
Reported:	10/26/2011	Sampling Type:	Water
Project Name:	BD JUNCTION N-11 BOOT	Sampling Condition:	Cool & Intact
Project Number:	NONE GIVEN	Sample Received By:	Jodi Henson
Project Location:	T22S R37E SEC 11 N~ LEA CTY NM		

Sample ID: MONITOR WELL #1 (H102238-01)

BTEX 8021B	mg/	L	Analyze	d By: MS					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Benzene*	<0.001	0.001	10/20/2011	ND	0.051	103	0.0500	4,42	
Toluene*	<0.001	0.001	10/20/2011	ND	0.052	104	0.0500	3.67	
Ethylbenzene*	<0.001	0.001	10/20/2011	ND	0.052	104	0.0500	4.79	
Total Xylenes*	<0.003	0.003	10/20/2011	ND	0.154	103	0.150	5.47	
Surrogate: 4-Bromofluorobenzene (PIL	102 %	% 70.7-11	8				· · · · · ·		•
Chloride, SM4500CI-B	mg/	L	Analyze	d By: AP					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	2630	4.00	10/26/2011	ND	108	108	100	0.00	
Sulfate 375.4	mg/	L	Analyze	d By: HM					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Sulfate	307	10.0	10/24/2011	ND	23.3	116	20.0	15.2	
TDS 160.1	mg/	L	Analyze	d By: HM			·		
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
TDS	5560	5.00	10/18/2011	ND.	· 222	92.5	240	2.59	

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Celey D. Kune

Celey D. Keene, Lab Director/Quality Manager

Analytical Results For:

Rice Operating Company Hack Conder 112 W. Taylor Hobbs NM, 88240 Fax To: (575) 397-1471

Received:	10/18/2011	Sampling Date:	10/14/2011
Reported:	10/26/2011	Sampling Type:	Water
Project Name:	BD JUNCTION N-11 BOOT	Sampling Condition:	Cool & Intact
Project Number:	NONE GIVEN	Sample Received By:	Jodi Henson
Project Location:	T22S R37E SEC 11 N~ LEA CTY NM		

Sample ID: MONITOR WELL #2 (H102238-02)

BTEX 8021B	mg/	۲ L	Analyze	d By: MS					
Analyte	Result	Reporting Limit	Analyzed'	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Benzene*	<0.001	0.001	10/20/2011	ND .	0.051	103	0.0500	4.42	
Toluene*	<0.001	0.001	10/20/2011	ND	0.052	104	0.0500	3.67	
Ethylbenzene*	<0.001	0.001	10/20/2011	ND	0.052	104	0.0500	4.79	
Total Xylenes*	<0.003	0.003	10/20/2011	ND	0.154	103	0.150	5.47	
Surrogate: 4-Bromofluorobenzene (PIL	100 :	% 70.7-11	8						
Chloride, SM4500CI-B	mg/	'L	Analyze	d By: AP					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	2070	4.00	10/26/2011	ND	108	108	100	0.00	
Sulfate 375.4	mg/	′L	Analyze	d By: HM					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Sulfate	327	10.0	10/24/2011	ND	23.3	116	20.0	15.2	
TDS 160.1	mg/	′L	Analyze	d By: HM					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
TDS	4150	5.00	10/18/2011	ND	222	92.5	240	2.59	

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Celuz D. Kune

Celey D. Keene, Lab Director/Quality Manager

Analytical Results For:

Rice Operating Company Hack Conder 112 W. Taylor Hobbs NM, 88240 Fax To: (575) 397-1471

Received:	10/18/2011	Sampling Date:	10/14/2011
Reported:	10/26/2011	Sampling Type:	Water
Project Name:	BD JUNCTION N-11 BOOT	Sampling Condition:	Cool & Intact
Project Number:	NONE GIVEN	Sample Received By:	Jodi Henson
Project Location:	T22S R37E SEC 11 N~ LEA CTY NM		

Sample ID: MONITOR WELL #3 (H102238-03)

BTEX 8021B	mg/	L	Analyze	d Bý: MS					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Benzene*	<0.001	0.001	10/20/2011	ND	0.051	103	0.0500	4.42	
Toluene*	<0.001	0.001	10/20/2011	ND	0.052	104	0.0500	3.67	
Ethylbenzene*	<0.001	0.001	10/20/2011	ND	0.052	104	0.0500	4.79	
Total Xylenes*	<0.003	0.003	10/20/2011	ND	0.154	103	0.150	5.47	
Surrogate: 4-Bromofluorobenzene (PIL	101 %	% 70.7-11	8						
Chloride, SM4500Cl-B	mg/	L	Analyze	d By: AP					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	2130	4.00	1`0/26/2011	ND	108	108	100	0.00	
Sulfate 375.4	mg/	L	Analyze	d By: HM					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Sulfate	233 10.0		10/24/2011	ND	23.3	116	20.0	15.2	
TDS 160.1	mg/	1	Analyze	d By: HM					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
TDS	3740	5.00	10/18/2011	ND	222	92.5	240	2.59	

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Celuz D. Kune

Celey D. Keene, Lab Director/Quality Manager

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 SM4500CI-B does not require samples be received at or below 6°C
	Samples reported on an as received basis (wet) unless otherwise noted on report

Cardinal Laboratories

*=Accredited Analyte

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Celey D. Kune

Celey D. Keene, Lab Director/Quality Manager

Page 5 of 6

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