1R - 426-259

WORKPLANS

Date:
1-23-12

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:

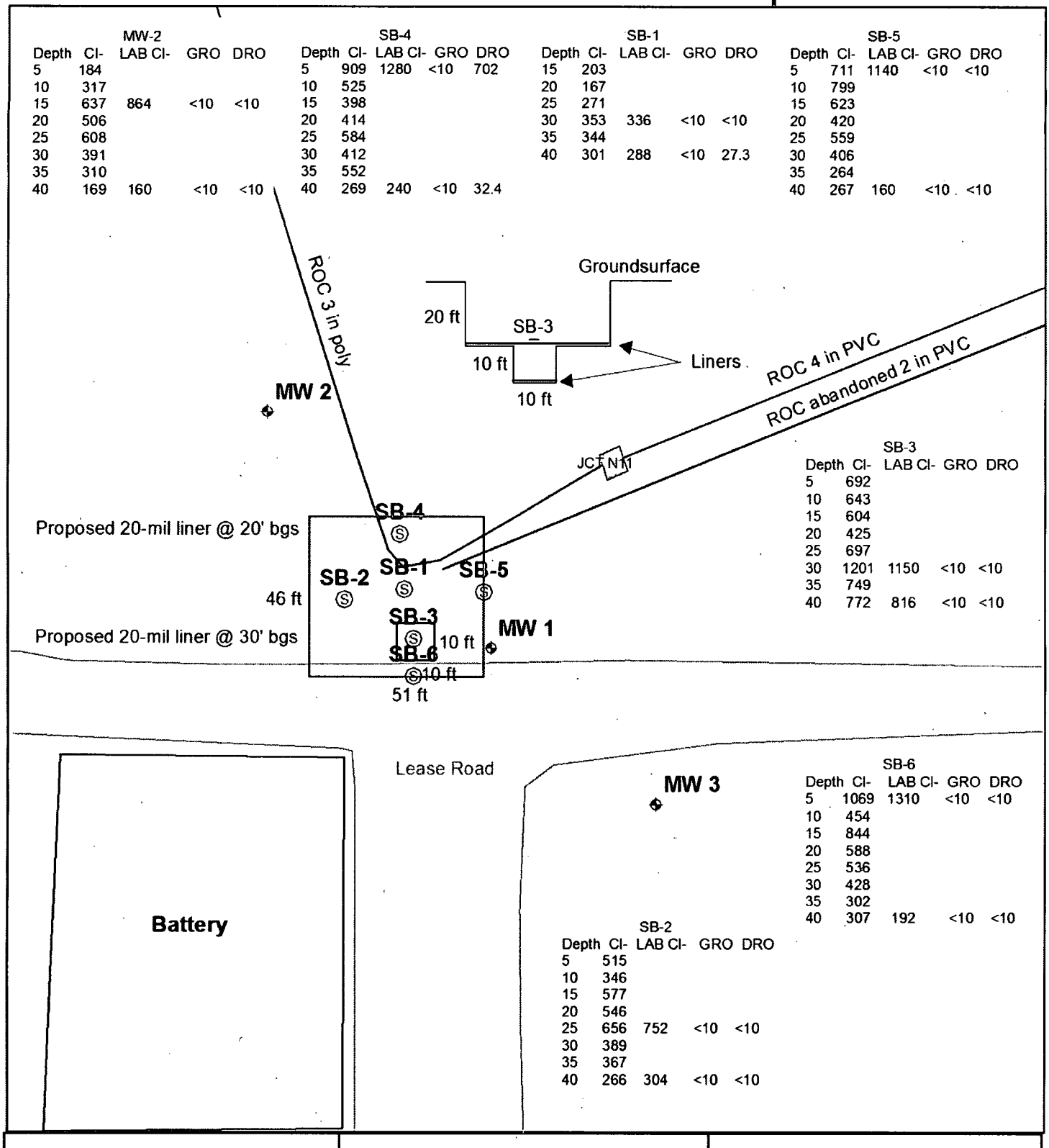
ROC must submit to the OCD a formal request for amendment of the corrective action plan within 10 days.

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.

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 RECS CONSULTING & SAFETY, LLC

BD N-11 boot

Case #: 1R426-259

Legals: UL/N sec. 11
T22S R37E

Figure 2

N W E S

0 15 30 60 Feet

Drawing date: 1-18-12
Drafted by: L. Weinheimer

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

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 20-mil, 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
Porosity	%	0.25	Professional Estimate for Water Saturated Pore 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
Chloride Concentration from Source	mg/L	560	Difference between Concentrations in Monitor Wells (MW-1 = 2,630 mg/L and MW-2 = 2,070 mg/L)
TOTAL CHLORIDE MASS	**kg**	**186**	Volume of Impacted Groundwater Below Site x Chloride Concentration Added to Soil from 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
Extraction Rate	kg/min	0.0099557	Pumping rate x Groundwater Concentration (kg/gal)
Extraction Rate	kg/day	5.9734262	Conversion from kg/min to kg/day
Representative Total Chloride Mass	kg	186	From above
Volume Removal	gals	18,683	Pumping rate x Estimated Removal Time x 60 min/hour x 10 hr/day

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

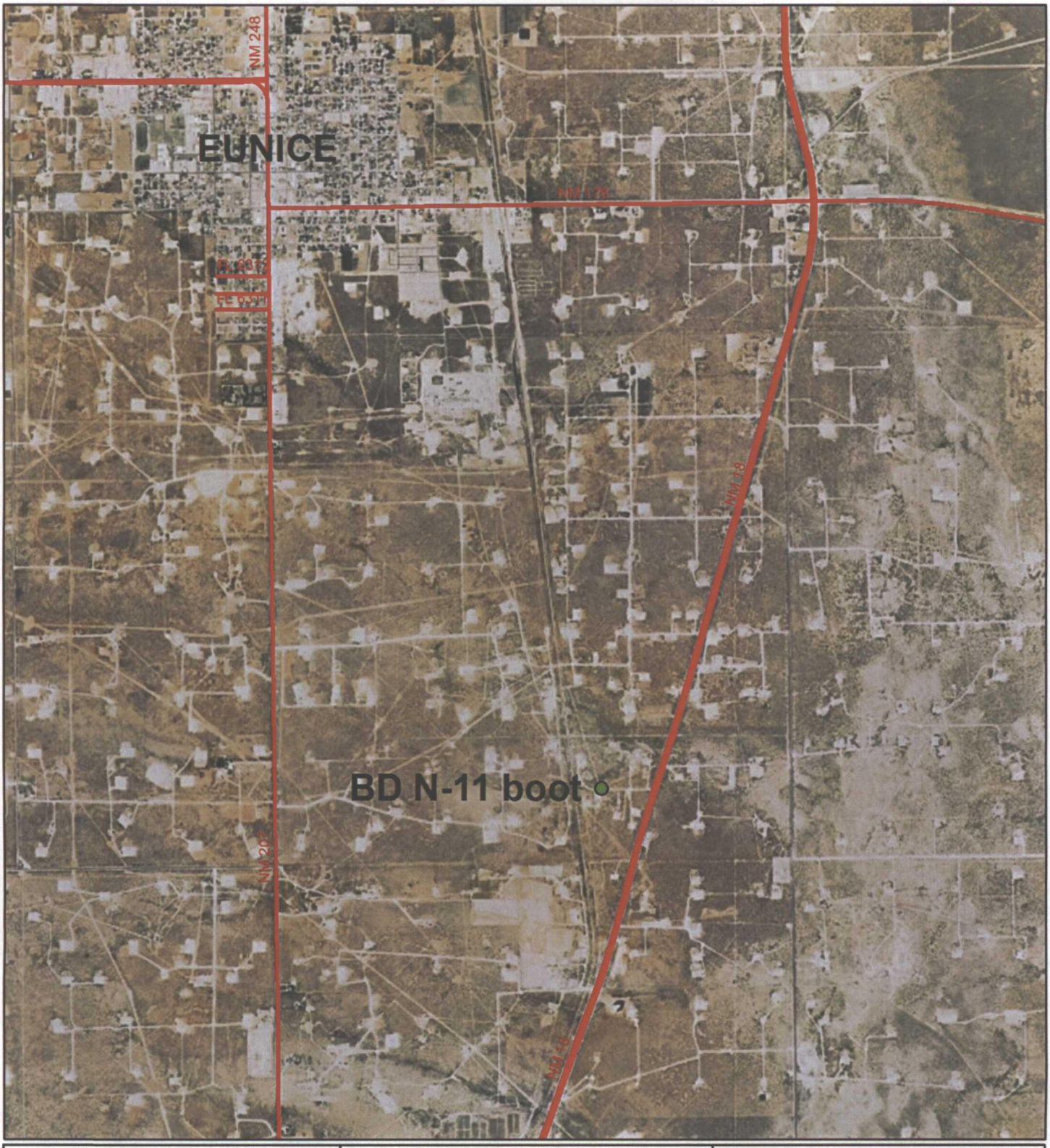
Attachments:

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



RICE ENVIRONMENTAL CONSULTING & SAFETY, LLC
RECS

BD N-11 boot

Case #: 1R426-259

Legals: UL/N sec. 11
T22S R37E

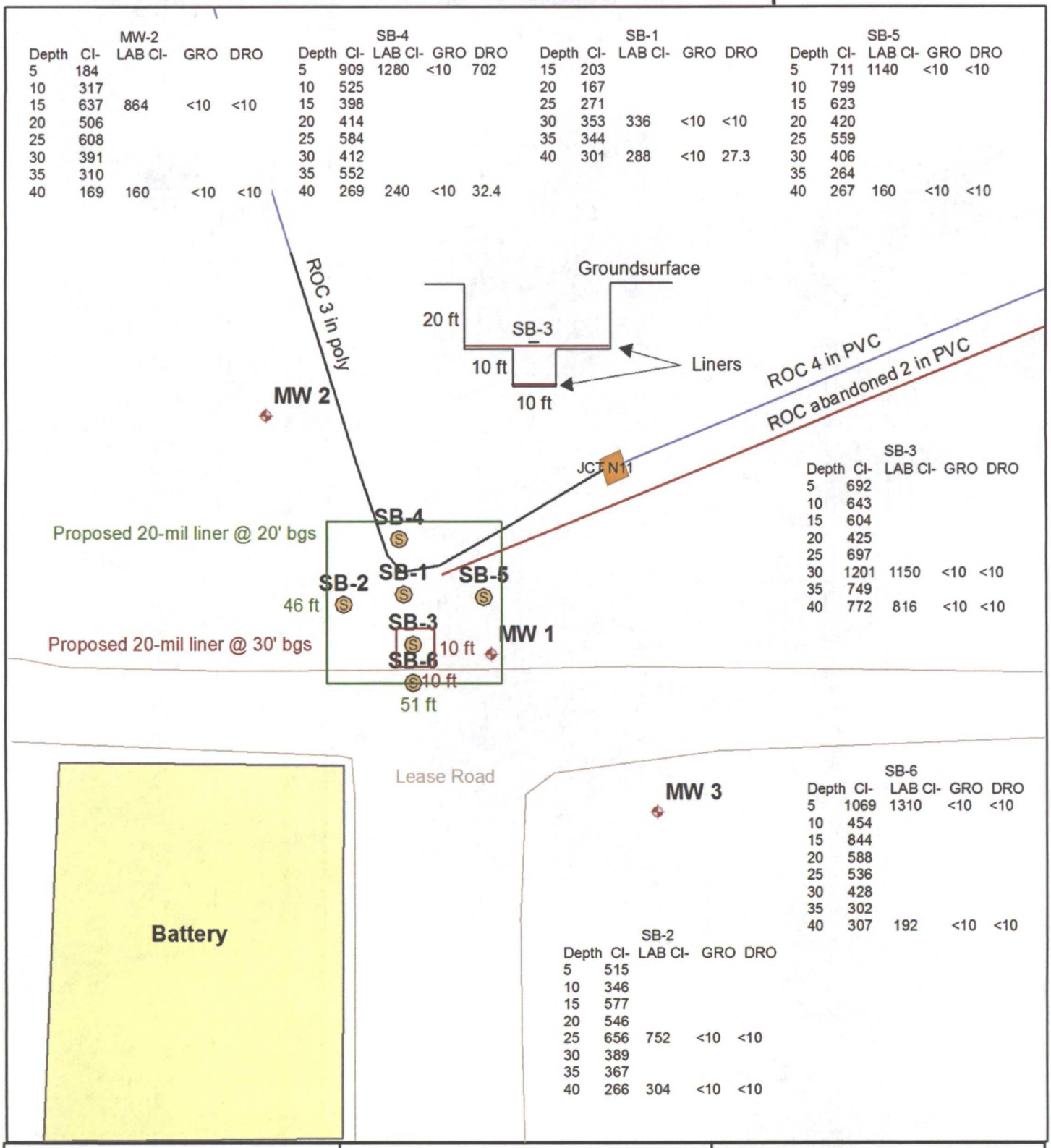
Figure 1

N
W E
S

0 0.25 0.5 1 Miles

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

Soil Bore and MW Installation and Proposed Liner



RICE ENVIRONMENTAL CONSULTING & SAFETY, LLC

RECS

BD N-11 boot

Case #: 1R426-259

Legals: UL/N sec. 11
T22S R37E

Figure 2

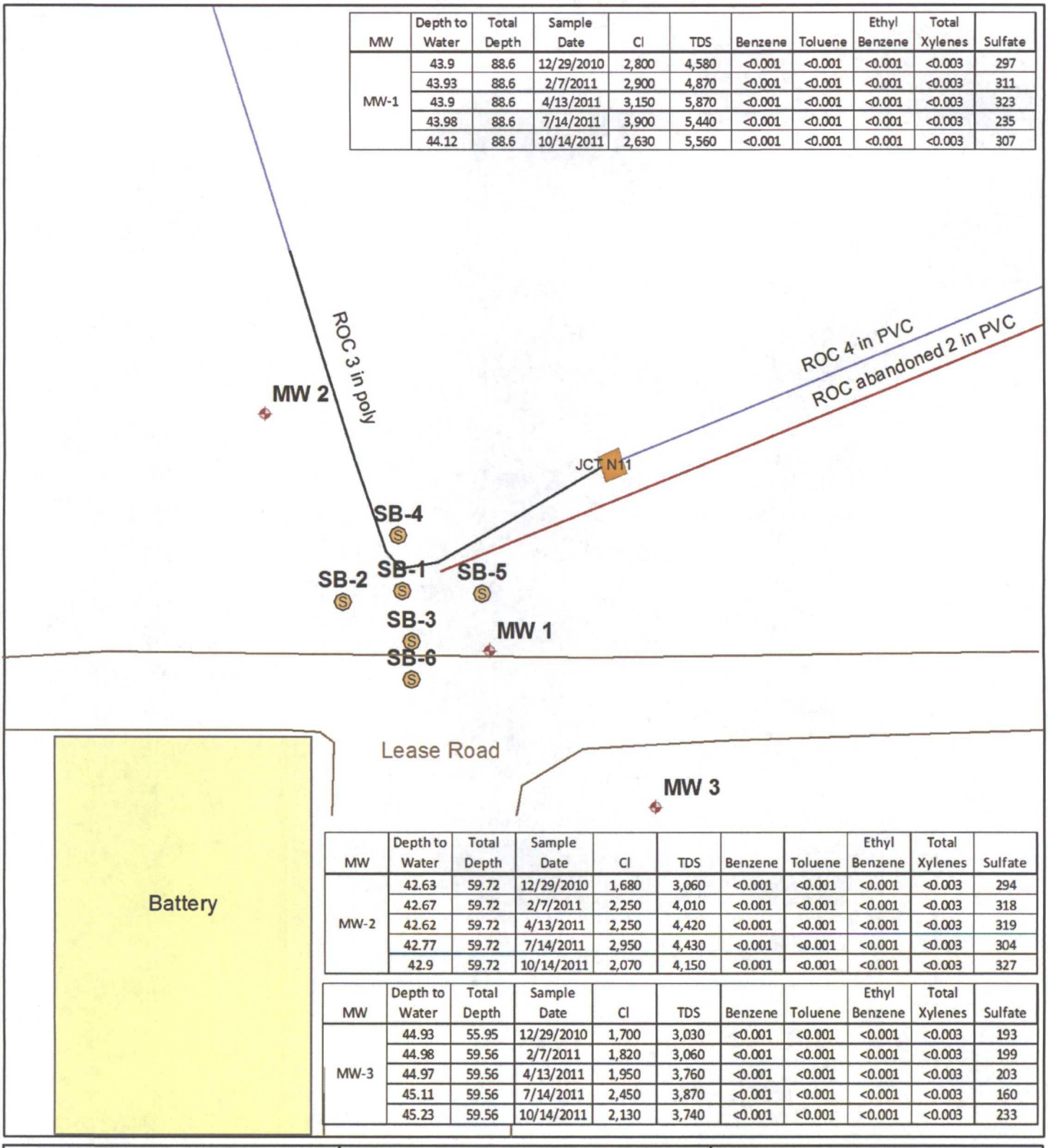
N W E S

0 15 30 60 Feet

Drawing date: 1-18-12
Drafted by: L. Weinheimer

Monitor Well Sampling Data

MW	Depth to Water	Total Depth	Sample Date	Cl	TDS	Benzene	Toluene	Ethyl Benzene	Total Xylenes	Sulfate
MW-1	43.9	88.6	12/29/2010	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
	43.9	88.6	4/13/2011	3,150	5,870	<0.001	<0.001	<0.001	<0.003	323
	43.98	88.6	7/14/2011	3,900	5,440	<0.001	<0.001	<0.001	<0.003	235
	44.12	88.6	10/14/2011	2,630	5,560	<0.001	<0.001	<0.001	<0.003	307



MW	Depth to Water	Total Depth	Sample Date	Cl	TDS	Benzene	Toluene	Ethyl Benzene	Total Xylenes	Sulfate
MW-2	42.63	59.72	12/29/2010	1,680	3,060	<0.001	<0.001	<0.001	<0.003	294
	42.67	59.72	2/7/2011	2,250	4,010	<0.001	<0.001	<0.001	<0.003	318
	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

MW	Depth to Water	Total Depth	Sample Date	Cl	TDS	Benzene	Toluene	Ethyl Benzene	Total Xylenes	Sulfate
MW-3	44.93	55.95	12/29/2010	1,700	3,030	<0.001	<0.001	<0.001	<0.003	193
	44.98	59.56	2/7/2011	1,820	3,060	<0.001	<0.001	<0.001	<0.003	199
	44.97	59.56	4/13/2011	1,950	3,760	<0.001	<0.001	<0.001	<0.003	203
	45.11	59.56	7/14/2011	2,450	3,870	<0.001	<0.001	<0.001	<0.003	160
	45.23	59.56	10/14/2011	2,130	3,740	<0.001	<0.001	<0.001	<0.003	233

RICE ENVIRONMENTAL CONSULTING & SAFETY, LLC

BD N-11 boot

Case #: 1R426-259

Legals: UL/N sec. 11 T22S R37E

Figure 3

N W E S

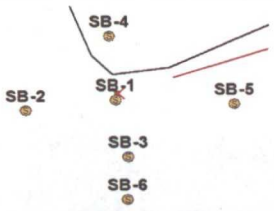
0 15 30 60 Feet

Drawing date:1-7-12
Drafted by: L. 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

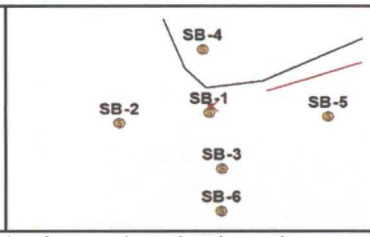
Logger:	T. Grieco		RICE ENVIRONMENTAL RECS CONSULTING & SAFETY, LLC
Driller:	Harrison & Cooper Inc. Drilling		**Project Name:** BD jct. N-11 boot — **Well ID:** SB-1
Drilling Method	Air rotary		**Project Consultant:** RECS
Start Date:	10/6/2010		
End Date:	10/6/2010		
Comments: Located at the source of the former junction box site. **Drafted by: LARA WEINHEIMER** TD = 40 ft GW = 42 ft			**Location:** UL/N sec. 11 T22S R37E **Lat:** 32°24'11.213"N **Long:** 103°8'16.641"W **County**: LEA **State**: NM

Depth (feet)	chloride field tests	LAB	PID	Description
				Tan, predominantly silt with some very fine grained sand, slightly clayey. Slightly damp, no odor or stain.
15 ft	203		0.1	
20 ft	167		0.0	
				Red, predominantly silt, with some very fine sand grains, slightly clayey. Unconsolidated to loosely consolidated. Slightly damp, no odor or stain.
25 ft	271		0.0	
30 ft	353	Cl- 336	0.0	
		GRO <10		
		DRO <10		
35 ft	344		0.0	
				Red, predominantly silt, with some very fine sand grains, slightly clayey. Unconsolidated to loosely consolidated. Very damp.
40 ft	301	Cl- 288	0.0	
		GRO <10		
		DRO 27.3		

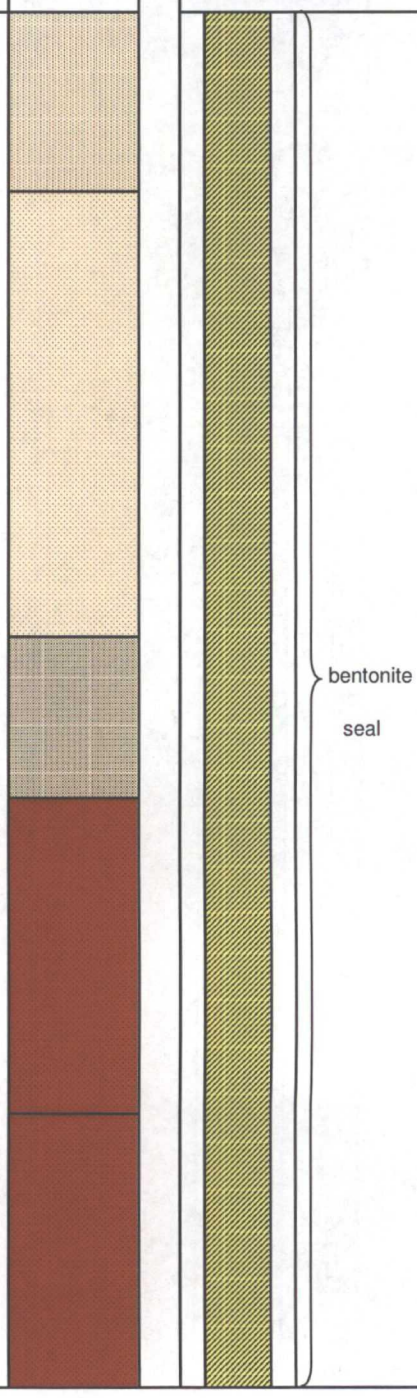
Lithology

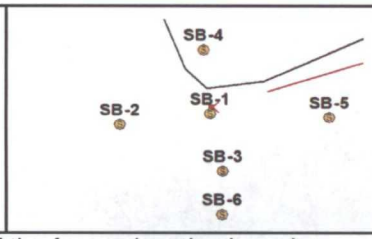
Well Construction

bentonite seal

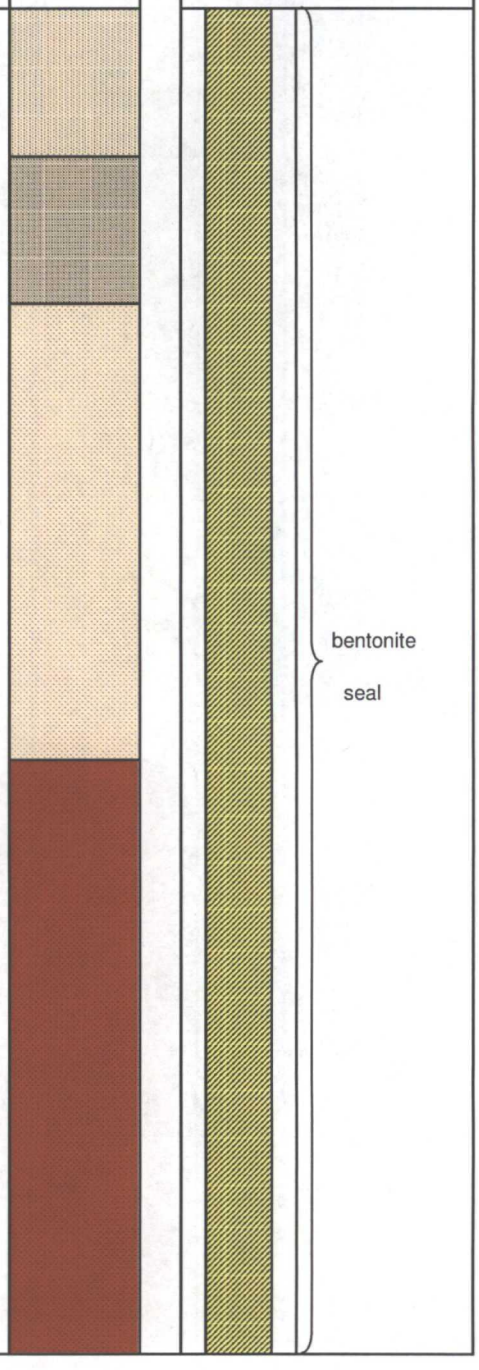
Logger:	T. Grieco		RICE ENVIRONMENTAL RECS CONSULTING & SAFETY, LLC
Driller:	Harrison & Cooper Inc. Drilling		
Drilling Method	Air rotary		**Project Name:** BD jct. N-11 boot — **Well ID:** SB-2
Start Date:	10/6/2010		
End Date:	10/6/2010		**Project Consultant:** RECS
Comments: Located 18 ft west of the former junction box site. **Drafted by: LARA WEINHEIMER** TD = 40 ft GW = 42 ft			**Location:** UL/N sec. 11 T22S R37E **Lat:** 32°24'11.182"N **Long:** 103°8'16.844"W **County**: LEA **State**: NM

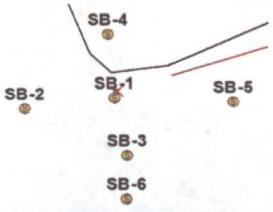
Depth (feet)	chloride field tests	LAB	PID	Description
				Tan, predominantly silt, some very fine grained sand, slightly clayey. Unconsolidated to moderately consolidated. Slight odor, no stain, slightly damp. Some masses of red clay also found in the sample.
5 ft	515		0.2	
				Tan, predominantly silt, some very fine grained sand, slightly clayey. Unconsolidated to moderately consolidated. Slight odor, no stain, slightly damp. No odor.
10 ft	346		0.2	
15 ft	577		0.0	
20 ft	546		0.1	
				Tan, predominantly silt, some very fine grained sand, slightly clayey. Unconsolidated to moderately consolidated. Scattered well consolidated masses of siltstone.
25 ft	656	Cl-752	0.0	
		GRO <10		Red, predominantly silt, some very fine sand grains, slightly clayey. Unconsolidated to moderately consolidated, slightly damp, no odor.
		DRO <10		
30 ft	389		0.0	
35 ft	367		0.0	
				Red, predominantly silt, some very fine sand grains, slightly clayey. Unconsolidated to moderately consolidated, very damp, no odor.
40 ft	266	Cl-304	0.0	
		GRO <10		
		DRO <10		



Logger:	T. Grieco		RICE ENVIRONMENTAL RECS CONSULTING & SAFETY, LLC
Driller:	Harrison & Cooper Inc. Drilling		
Drilling Method	Air rotary		**Project Name:** BD jct. N-11 boot — **Well ID:** SB-3
Start Date:	10/6/2010		
End Date:	10/6/2010		**Project Consultant:** RECS
Comments: Located 16 ft south of the former junction box site. **Drafted by: LARA WEINHEIMER** TD = 40 ft GW = 42 ft			**Location:** UL/N sec. 11 T22S R37E **Lat:** 32°24'11.069"N **Long:** 103°8'16.61"W **County**: LEA **State**: NM

Depth (feet)	chloride field tests	LAB	PID	Description
				Tan predominantly silt some very fine sand grains, slightly clayey. Unconsolidated to moderately consolidated. Scattered small pieces of caliche. Dry, no odor
5 ft	692		0	
				Tan predominantly silt some very fine sand grains, slightly clayey. Unconsolidated to loosely consolidated. Slighly damp, no odor
10 ft	643		0	
				Tan predominantly silt some very fine sand grains, slightly clayey. Unconsolidated to moderately consolidated. Slighly damp, no odor.
15 ft	604		0	
20 ft	425		0.5	
25 ft	697		0.5	
				Red predominantly silt with some very fine sand grains, slightly clayey, Unconsolidated to moderately consolidated, slightly damp, no odor.
30 ft	1,201	Cl- 1150	0.8	
		GRO <10		
		DRO <10		
35 ft	749		0.9	
				Red predominantly silt with some very fine sand grains, slightly clayey, Unconsolidated to moderately consolidated, very damp, no odor.
40 ft	772	Cl- 816	0.9	
		GRO <10		
		DRO <10		

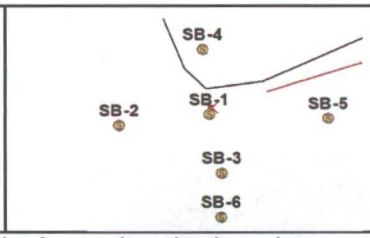


Logger:	T. Grieco		RICE ENVIRONMENTAL RECS CONSULTING & SAFETY, LLC
Driller:	Harrison & Cooper Inc. Drilling		
Drilling Method	Air rotary		**Project Name:** BD jct. N-11 boot — **Well ID:** SB-4
Start Date:	10/6/2010		
End Date:	10/6/2010		**Project Consultant:** RECS
Comments: Located 14 ft north of the former junction box site. **Drafted by: LARA WEINHEIMER** TD = 40 ft GW = 42 ft			**Location:** UL/N sec. 11 T22S R37E **Lat:** 32°24'11.368"N **Long:** 103°8'16.654"W **County**: LEA **State**: NM

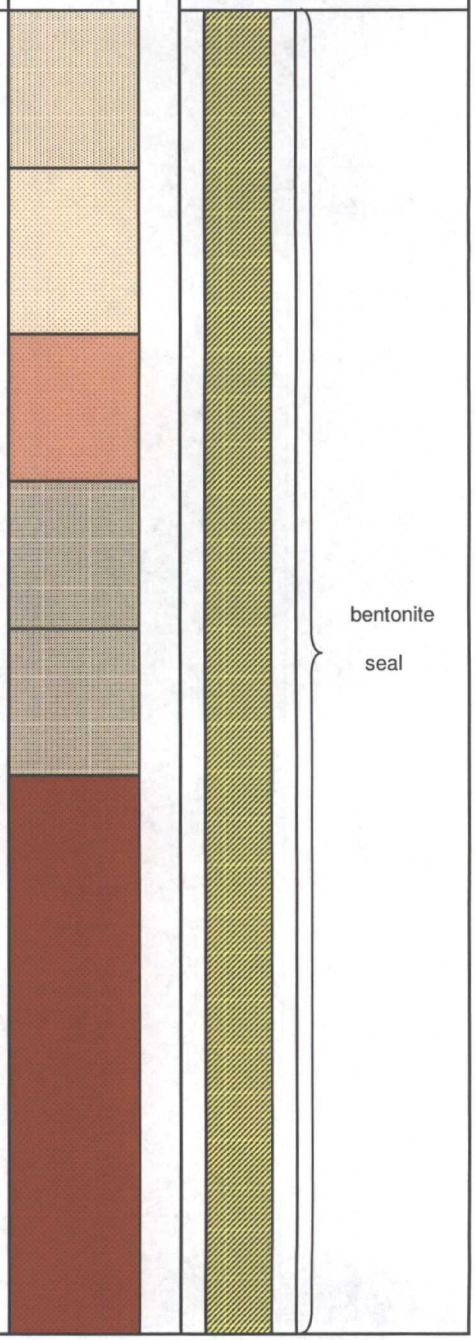
Depth (feet)	chloride field tests	LAB	PID	Description
				Tan predominantly silt with some very fine sand grains, slightly clayey. Unconsolidated to weakly consolidated. Slight odor, no stain. Slightly damp
5 ft	909	Cl- 1280	25.8	
		GRO <10		Tan predominantly silt with some very fine sand grains, slightly clayey. Unconsolidated to weakly consolidated. No odor, no stain. Slightly damp
		DRO 702		
10 ft	525		2.2	
				Tan predominantly silt with some very fine sand grains, slightly clayey. Unconsolidated to moderately consolidated. No odor, no stain. Slightly damp.
15 ft	398		1.9	
20 ft	414		1.2	
25 ft	584		1.3	
				Red predominantly silt with some very fine sand grains, slightly clayey. Unconsolidated to weakly consolidated. No odor, slightly damp.
30 ft	412		1.0	
35 ft	552		1.2	
				Red predominantly silt with some very fine sand grains, slightly clayey. Unconsolidated to weakly consolidated. No odor, very damp.
40 ft	269	Cl- 240	0.5	
		GRO <10		
		DRO 32.4		

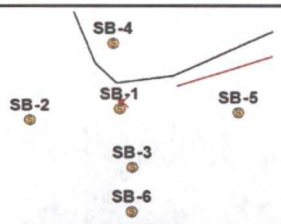
Lithology

Well Construction: bentonite seal

Logger:	T. Grieco		RICE ENVIRONMENTAL RECS CONSULTING & SAFETY, LLC
Driller:	Harrison & Cooper Inc. Drilling		
Drilling Method	Air rotary		**Project Name:** BD jct. N-11 boot — **Well ID:** SB-5
Start Date:	10/6/2010		**Project Consultant:** RECS
End Date:	10/6/2010		
Comments: Located 22 ft east of the former junction box site. **Drafted by: LARA WEINHEIMER** TD = 40 ft GW = 42 ft			**Location:** UL/N sec. 11 T22S R37E **Lat:** 32°24'11.2"N **Long:** 103°8'16.37"W **County**: LEA **State**: NM

Depth (feet)	chloride field tests	LAB	PID	Description
				Tan predominantly silt with some very fine sand grains, slightly clayey. Unconsolidated to weakly consolidated. Slightly damp, no odor. Scattered small caliche pieces.
5 ft	711	Cl- 1140	1.4	
		GRO <10		Tan predominantly silt with some very fine sand grains, slightly clayey. Unconsolidated to moderately consolidated. Slightly damp, no odor.
		DRO <10		
10 ft	799		0.7	
				Reddish-tan, predominantly silt with some very fine sand grains, slighly clayey. Unconsolidated to moderately consolidated. Slightly damp, no odor.
15 ft	623		0.6	
				Tan predominantly silt with some very fine sand grains, slightly clayey. Unconsolidated to weakly consolidated. Slightly damp, no odor. Scattered small nodules (up to 2 cm) of well cemented siltstone.
20 ft	420		0.7	
				Tan predominantly silt with some very fine sand grains, slightly clayey. Unconsolidated to weakly consolidated. Slightly damp, no odor.
25 ft	559		0.7	
				Red, predominantly silt with some very fine sand grains, slighly clayey. Unconsolidated to weakly consolidated. Slightly damp, no odor.
30 ft	406		0.5	
35 ft	264		0.5	
				Red, predominantly silt with some very fine sand grains, slighly clayey. Unconsolidated to weakly consolidated. Damp, no odor.
40 ft	267	Cl- 160	0.7	
		GRO <10		
		DRO <10		



Logger:	T. Grieco		RICE ENVIRONMENTAL RECS CONSULTING & SAFETY, LLC
Driller:	Harrison & Cooper Inc. Drilling		
Drilling Method	Air rotary		**Project Name:** BD jct. N-11 boot — **Well ID:** SB-6
Start Date:	10/6/2010		
End Date:	10/6/2010		**Project Consultant:** RECS
Comments: Located 27 ft south of the former junction box site. **Drafted by: LARA WEINHEIMER** TD = 40 ft GW = 42 ft			**Location:** UL/N sec. 11 T22S R37E **Lat:** 32°24'10.96"N **Long:** 103°8'16.607"W **County**: LEA **State**: NM

Depth (feet)	chloride field tests	LAB	PID	Description
				Tan predominantly silt with some very fine sand grain slightly clayey. 10 pct caliche particles. Slightly damp, no odor
5 ft	1069	Cl-1310	0.4	
		GRO <10		Tan predominantly silt with some very fine sand grain slightly clayey. Only scattered caliche particles. Slightly damp, no odor
		DRO <10		
10 ft	454		0.7	
15 ft	844		1.0	
20 ft	588		1.0	
25 ft	536		0.6	
				Red predominantly silt with some very fine sand grains, slightly clayey. Slightly damp, no odor
30 ft	428		0.7	
35 ft	302		0.5	
				Red predominantly silt with some very fine sand grains, slightly clayey. Very damp, no odor
40 ft	307	Cl-192	1.0	
		GRO <10		
		DRO <10		

Lithology

Well Construction: bentonite seal

CARDINAL Laboratories

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

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

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

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

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

Accreditation applies to public drinking water matrices.

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

Sincerely,

Celey D. Keene

Celey D. Keene
Lab Director/Quality Manager

CARDINAL Laboratories

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

Analytical Results For:

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

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

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	**336**	16.0	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	*111 %*	*70-130*
Surrogate: 1-Chlorooctadecane	*129 %*	*70-130*

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

Chloride, SM4500Cl-B mg/kg **Analyzed 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 %*	*70-130*
Surrogate: 1-Chlorooctadecane	*133 %*	*70-130*

Cardinal Laboratories

*=Accredited Analyte

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:	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 #2 @ 25 FT (H021002-03)

Chloride, SM4500Cl-B mg/kg **Analyzed 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 %*	*70-130*
Surrogate: 1-Chlorooctadecane	*103 %*	*70-130*

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

Chloride, SM4500Cl-B mg/kg **Analyzed 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 %*	*70-130*

Cardinal Laboratories

*=Accredited Analyte

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:	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 #3 @ 30 FT (H021002-05)

Chloride, SM4500Cl-B mg/kg **Analyzed 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, SM4500Cl-B mg/kg **Analyzed 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 **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	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 %*	*70-130*
Surrogate: 1-Chlorooctadecane	*100 %*	*70-130*

Cardinal Laboratories

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Celey D. Keene

Celey D. Keene, Lab Director/Quality Manager

CARDINAL Laboratories

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

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 **Analyzed 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 **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	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*
Surrogate: 1-Chlorooctadecane	*110 %*	*70-130*

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

Chloride, SM4500Cl-B mg/kg **Analyzed 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 **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	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*

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Celey D. Keene

Celey D. Keene, Lab Director/Quality Manager

CARDINAL Laboratories

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

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 **Analyzed 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 **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	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	*105 %*	*70-130*
Surrogate: 1-Chlorooctadecane	*105 %*	*70-130*

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

Chloride, SM4500Cl-B mg/kg **Analyzed 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 **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	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 %*	*70-130*
Surrogate: 1-Chlorooctadecane	*120 %*	*70-130*

Cardinal Laboratories *=Accredited Analyte

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:	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 #6 @ 5 FT (H021002-11)

Chloride, SM4500Cl-B mg/kg **Analyzed 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 **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	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, SM4500Cl-B mg/kg **Analyzed 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 **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	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 %*	*70-130*
Surrogate: 1-Chlorooctadecane	*99.1 %*	*70-130*

Cardinal Laboratories *=Accredited Analyte

Celey D. Keene

Celey D. Keene, Lab Director/Quality Manager

CARDINAL Laboratories

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

Notes and Definitions

S-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 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

Celey D. Keene, Lab Director/Quality Manager

CARDINAL LABORATORIES

CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

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

Company Name:	Rice Operating Company	**BILL TO**	
Project Manager:	Hack Conder	**P.O. #:**	
Address:	122 West Taylor	**Company:**	
City:	Hobbs **State:** NM **Zip:** 88240	**Attn:**	
Phone #:	575-393-9174 **Fax #:** 575-397-1471	**Address:**	
Project #:	**Project Owner:**	**City:**	
Project Name:	BD Jct N-11	**State:** **Zip:**	
Project Location:	Bd Jct N-11	**Phone #:**	
Sampler Name:	Jordan Woodfin	**Fax #:**	

FOR LAB USE ONLY				MATRIX						PRESERV.			SAMPLING		ANALYSIS REQUEST										
Lab I.D.	Sample I.D.	(G)RAB OR (C)OMP.	# CONTAINERS	GROUNDWATER	WASTEWATER	SOIL	OIL	SLUDGE	OTHER :	ACID/BASE:	ICE / COOL	OTHER :	DATE	TIME	Chlorides	TPH 8015 M	BTEX	Texas TPH	Complete Cations/Anions							
H21002-1	SB # 1 @ 30ft		1			✓					✓		10/6/10	08:50	✓	✓									
2	SB # 1 @ 40ft		1			✓					✓		10/6/10	09:10	✓	✓									
3	SB # 2 @25ft		1			✓					✓		10/6/10	09:55	✓	✓									
4	SB # 2 @ 40ft		1			✓					✓		10/6/10	10:10	✓	✓									
5	SB # 3 @ 30ft		1			✓					✓		10/6/10	10:50	✓	✓									
6	SB # 3 @ 40ft		1			✓					✓		10/6/10	11:10	✓	✓									
7	SB # 4 @ 5ft		1			✓					✓		10/6/10	11:30	✓	✓									
8	SB # 4 @ 40ft		1			✓					✓		10/6/10	12:00	✓	✓									
9	SB # 5 @ 5ft		1			✓					✓		10/6/10	02:00	✓	✓									
10	SB # 5 @ 40ft		1			✓					✓		10/6/10	02:30	✓	✓									

Relinquished By: Jordan Woodfin	**Date:** 10/7/10 **Time:** 2:30	**Received By:**	**Phone Result:** ☐ Yes ☑ No	**Add'l Phone #:**	
			Fax Result: ☐ Yes ☑ No	**Add'l Fax #:**	
Relinquished By:	**Date:** 10/7/10 **Time:** 3:12	**Received By:** Jodi Henson	**REMARKS:** email results Hconder@riceswd.com; jwoodfin@riceswd.com; Lweinheimer@riceswd.com kjones@riceswd.com		
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

NEED SAMPLES BACK, PLEASE

2

CARDINAL LABORATORIES

CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

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

Company Name: Rice Operating Company	**BILL TO**
Project Manager: Hack Conder	**P.O. #:**
Address: 122 West Taylor	**Company:**
City: Hobbs **State:** NM **Zip:** 88240	**Attn:**
Phone #: 575-393-9174 **Fax #:** 575-397-1471	**Address:**
Project #: **Project Owner:**	**City:**
Project Name: BD JCT N-11	**State:** **Zip:**
Project Location: BD JCT N-11	**Phone #:**
Sampler Name: Jordan Woodfin	**Fax #:**

FOR LAB USE ONLY				MATRIX						PRESERV.			SAMPLING		ANALYSIS REQUEST									
Lab I.D.	**Sample I.D.**	(G)RAB OR (C)OMP.	# CONTAINERS	GROUNDWATER	WASTEWATER	SOIL	OIL	SLUDGE	OTHER :	ACID/BASE	ICE / COOL	OTHER :	DATE	TIME	Chlorides	TPH 8015 M	BTEX	Texas TPH	Complete Cations/Anions						
H21002-11	SB # 6 @ 5FT		1			✓					✓		10/6/10	03:00	✓	✓								
12	SB # 6 @ 40FT		1			✓					✓		10/6/10	03:15	✓	✓								

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

Relinquished By: Jordan Woodfin	**Date:** 10/7/10 **Time:** 7:30	**Received By:**	**Phone Result:** ☐ Yes ☑ No **Add'l Phone #:**
Relinquished By:	**Date:** **Time:**	**Received By:**	**Fax Result:** ☐ Yes ☑ No **Add'l Fax #:**
Delivered By: (Circle One) Sampler - UPS - Bus - Other:	**Sample Condition** Cool: ☐ Yes ☐ No Intact: ☐ Yes ☐ No	**CHECKED BY: (Initials)**	**REMARKS:** email results Hconder@riceswd.com; jwoodfin@riceswd.com; Lweinheimer@riceswd.com KJONES@RICESWD.COM

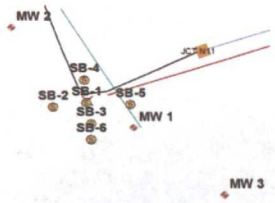
† Cardinal cannot accept verbal changes. Please fax written changes to 505-393-2476

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:	Jordan Woodfin		RICE ENVIRONMENTAL RECS CONSULTING & SAFETY, LLC
Driller:	Harrison & Cooper, Inc.		**Project Name:** BD jct. N-11 boot **Well ID:** MW-1
Drilling Method:	Air rotary		**Project Consultant:** RECS
Start Date:	11/9/2010		**Location:** UL/N sec. 11 T22S R37E
End Date:	11/9/2010		**Lat:** 32°24'11.037"N **Long:** 103°8'16.35"W **County**: LEA **State**: NM

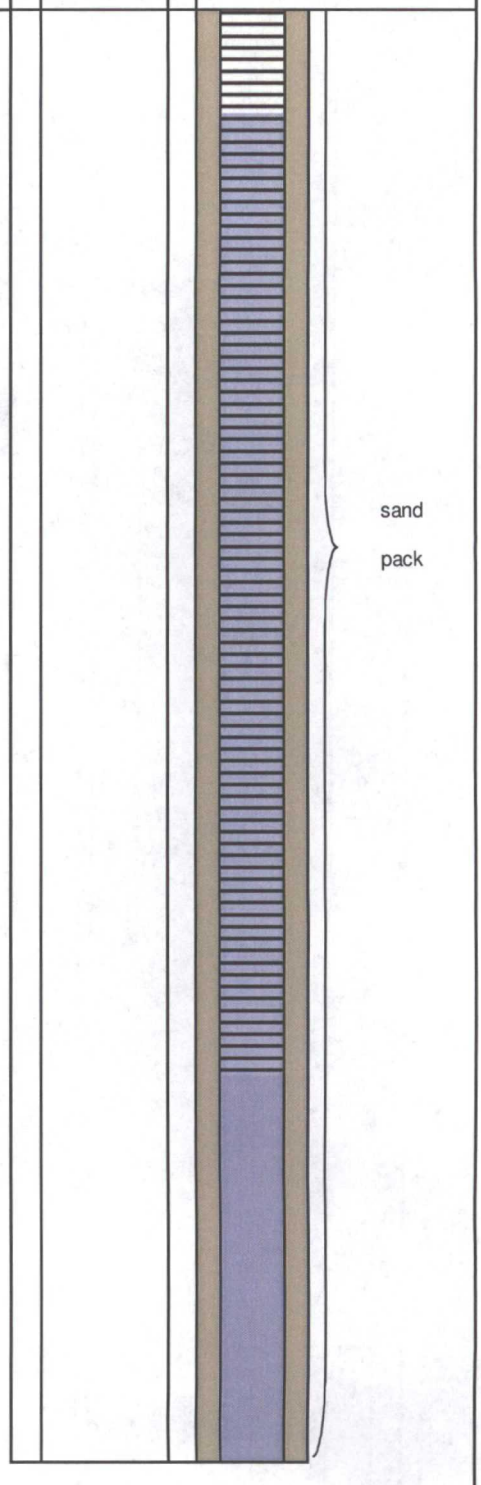
Comments: Located 31 ft south east of former junction box site.

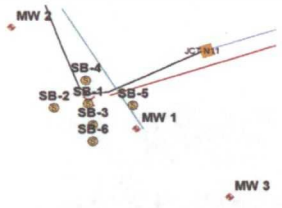
DRAFTED BY: L. Weinheimer

TD = 87 ft GW = 48 ft

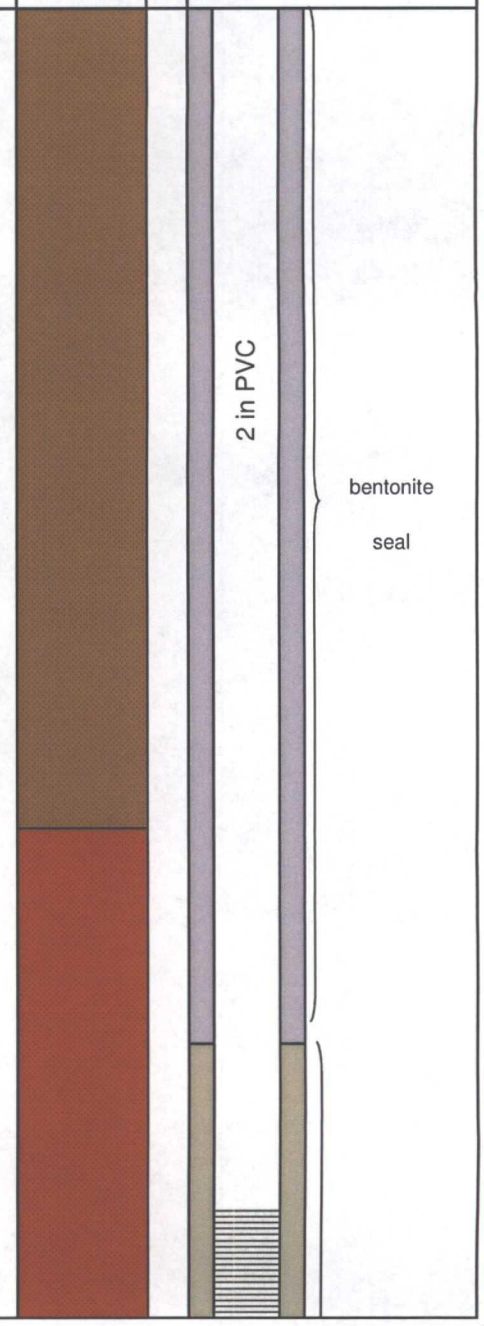
Depth (feet)	chloride field tests	LAB	PID	Description	Lithology	Well Construction
				NO SAMPLES TAKEN		4 in PVC; bentonite seal
5 ft						
10 ft						
15 ft						
20 ft						
25 ft						
30 ft						
35 ft						
40 ft						

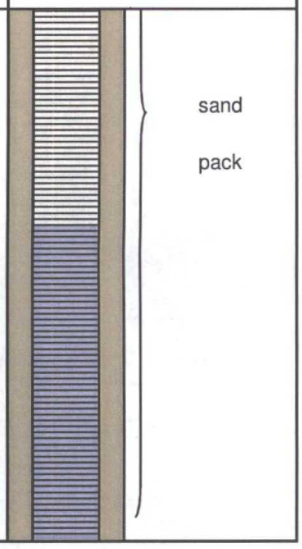
Depth (feet)	chloride field tests	LAB	PID	Description	Lithology	Well Construction
45 ft						
50 ft						
55 ft						
60 ft						
65 ft						
70 ft						
75 ft						
80 ft						
85 ft						
90 ft						

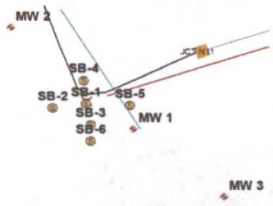


Logger:	Jordan Woodfin		RICE ENVIRONMENTAL CONSULTING & SAFETY, LLC — RECS
Driller:	Harrison & Cooper, Inc.		
Drilling Method:	Air rotary		**Project Name:** BD jct. N-11 boot — **Well ID:** MW-2
Start Date:	11/9/2010		
End Date:	11/9/2010		**Project Consultant:** RECS
Comments: Located 64 ft north west of former junction box site.			**Location: UL/N sec. 11 T22S R37E**
DRAFTED BY: L. Weinheimer			**Lat:** 32°24'11.718"N — **County**: LEA
TD = 57 ft	GW = 48 ft		**Long:** 103°8'17.103"W — **State**: NM

Depth (feet)	chloride field tests	LAB	PID	Description
				Light brown to tan fine silty sand with small to medium sized caliche fragments
5 ft	184		0	
10 ft	317		0	
15 ft	637	Cl- 864	0	
		GRO <10		
		DRO <10		
20 ft	506		0	
25 ft	608		0	
				Red very fine silty sand
30 ft	391		0	
35 ft	310		0	
40 ft	169	Cl- 160	0	



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

Logger:	Jordan Woodfin		**Project Name:** BD jct. N-11 boot **Well ID:** MW-3
Driller:	Harrison & Cooper, Inc.		**Project Consultant:** RECS
Drilling Method:	Air rotary		**Location:** UL/N sec. 11 T22S R37E
Start Date:	11/9/2010		**Lat:** 32°24'10.582"N **County**: LEA
End Date:	11/9/2010		**Long:** 103°8'15.79"W **State**: NM

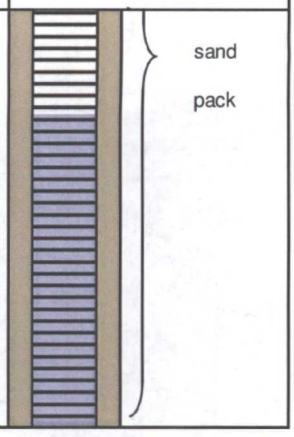
Comments: Located 97 ft south east of former junction box site.

DRAFTED BY: L. Weinheimer

TD = 57 ft GW = 48 ft

Depth (feet)	chloride field tests	LAB	PID	Description	Lithology	Well Construction
				NO SAMPLES TAKEN		2 in PVC; bentonite seal
5 ft						
10 ft						
15 ft						
20 ft						
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								



CARDINAL Laboratories

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

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

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

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

Accreditation applies to public drinking water matrices.

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

Sincerely,

Celey D. Keene

Celey D. Keene
Lab Director/Quality Manager

CARDINAL Laboratories

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

Analytical Results For:

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

Received:	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, SM4500Cl-B mg/kg **Analyzed 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/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	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 %*	*70-130*
Surrogate: 1-Chlorooctadecane	*95.4 %*	*70-130*

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

Chloride, SM4500Cl-B mg/kg **Analyzed 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 **Analyzed 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*

Cardinal Laboratories

*=Accredited Analyte

Celey D. Keene

Celey D. Keene, Lab Director/Quality Manager

CARDINAL Laboratories

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

Notes and Definitions

ND	Analyte NOT DETECTED at or above the reporting limit
RPD	Relative Percent Difference
**	Samples not received at proper temperature of 6°C or below.
***	Insufficient time to reach temperature.
-	Chloride by SM4500Cl-B does not require samples be received at or below 6°C
	Samples reported on an as received basis (wet) unless otherwise noted on report

Celey D. Keene

Celey D. Keene, Lab Director/Quality Manager

CARDINAL LABORATORIES

CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

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

Company Name:	Rice Operating Company	**BILL TO**	
Project Manager:	Hack Conder	**P.O. #:**	
Address:	122 West Taylor	**Company:**	
City:	Hobbs	**State:** NM **Zip:** 88240	**Attn:**
Phone #:	575-393-9174	**Fax #:** 575-397-1471	**Address:**
Project #:		**Project Owner:**	**City:**
Project Name:	BD Jct N-11		**State:** **Zip:**
Project Location:	BD Jct N-11		**Phone #:**
Sampler Name:	Jordan Woodfin		**Fax #:**

FOR LAB USE ONLY				MATRIX						PRESERV.			SAMPLING		ANALYSIS REQUEST										
Lab I.D.	**Sample I.D.**	(G)RAB OR (C)OMP.	# CONTAINERS	GROUNDWATER	WASTEWATER	SOIL	OIL	SLUDGE	OTHER :	ACID/BASE:	ICE / COOL	OTHER :	DATE	TIME	Chlorides	TPH 8015 M	BTEX	Texas TPH	Complete Cations/Anions	TPH 8015 M Extended Thru C40						
H21487-1	MW-2 @ 15'		1			✓					✓		12/9/10	03:00	✓	✓									
	MW-2 @ 40'		1			✓					✓		12/9/10	03:30	✓	✓									

Relinquished By:	Jordan Woodfin	**Date:** 12/9/10 **Time:** 1530	**Received By:**
Relinquished By:		**Date:** 12/10/10 **Time:** 9:55	**Received By:** Jodi Henson
Delivered By: (Circle One) Sampler - UPS - Bus - Other:		**Sample Condition** Cool: ☐ Yes ☐ No Intact: ☐ Yes ☐ No	**CHECKED BY: (Initials)**

Phone Result:	☐ Yes	☑ No	**Add'l Phone #:**
Fax Result:	☐ Yes	☑ No	**Add'l Fax #:**

REMARKS:

email results

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

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

#26

NEED SAMPLES BACK, PLEASE

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

CARDINAL Laboratories

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

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. 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:	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 **Analyzed 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 %* *70.7-118*

Chloride, SM4500Cl-B mg/L **Analyzed 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 **Analyzed 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 **Analyzed 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	

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:	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/L **Analyzed 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 %* *70.7-118*

Chloride, SM4500Cl-B mg/L **Analyzed 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 **Analyzed 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 **Analyzed 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	

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:	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 Analyzed 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 *101 %* *70.7-118*

Chloride, SM4500Cl-B mg/L Analyzed By: AP

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	**2130**	4.00	10/26/2011	ND	108	108	100	0.00	

Sulfate 375.4 mg/L Analyzed 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/L Analyzed 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	

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

101 East Marland - Hobbs, New Mexico 88240
Tel (575) 393-2326
Fax (575) 393-2476

Cardinal Laboratories, Inc.

CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

LAB Order ID # _____

Company Name: RICE Operating Company	BILL TO Company: RICE Operating Company PO#
Project Manager: Hack Conder	Address: (Street, City, Zip) 122 W Taylor Street ~ Hobbs, New Mexico 88240
Address: (Street, City, Zip) 122 W Taylor Street ~ Hobbs, New Mexico 88240	Phone#: (575) 393-9174 Fax#: (575)397-1471
Phone #: (575) 393-9174	Fax #: (575) 397-1471
Project #:	Project Name: BD Junction N-11 Boot
Project Location: T22S R37E Sec11 N ~ Lea County New Mexico	Sampler Signature: Rozanne Johnson (575)631-9310 rozanne@valornet.com

LAB # (LAB USE ONLY)	FIELD CODE	(G)rab or (C)omp	# CONTAINERS	MATRIX: WATER	SOIL	AIR	SLUDGE	PRESERVATIVE METHOD: HCL (2 40ml VOA)	HNO_3	$NaHSO_4$	H_2SO_4	ICE (1-1Liter HDPE)	NONE	SAMPLING: DATE (2011)	TIME
H102225															
1	Monitor Well #1	G	3	X				2				1		10-14	12:10
2	Monitor Well #2	G	3	X				2				1		10-14	8:25
3	Monitor Well #3	G	3	X				2				1		10-14	9:30

ANALYSIS REQUEST
(Circle or Specify Method No.)

MTBE 8021B/602	BTEX 8021B/602	TPH 418.1/TX1005 / TX1005 Extended (C35)	PAH 8270C	Total Metals Ag As Ba Cd Cr Pb Se Hg 6010B/200.7	TCLP Metals Ag As Ba Cd Cr Pb Se Hg	TCLP Volatiles	TCLP Semi Volatiles	TCLP Pesticides	RCI	GC/MS Vol. 8260B/624	GC/MS Semi. Vol. 8270C/625	PCB's 8082/608	Pesticides 8081A/608	BOD, TSS, pH	Moisture Content	Cations (Ca, Mg, Na, K)	Anions (Cl, SO4, CO3, HCO3)	Sulfates	Total Dissolved Solids	Chlorides	Turn Around Time ~ 24 Hours
	X																	X	X	X	
	X																	X	X	X	
	X																	X	X	X	

Relinquished by: Rozanne Johnson	Date: 10/18/2011	Time: 11:20	Received by: [signature]
Relinquished by:	Date:	Time:	Received By: (Laboratory Staff)

Phone Results: [ ] Yes [ ] No
Fax Results: [ ] Yes [ ] No Additional Fax Number:

REMARKS:

Email Results to: hconder@riceswd.com
bweinheimer@rice-ops.com
rjones@riceswd.com
rozanne@valornet.com

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

Sample Condition: Yes / No — Cool: Yes (1) / No — Intact: Yes (2) / No

CHECKED BY: (Initials)

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