1R - 426-101

WORKPLANS

Date:
1-17-11

Hansen, Edward J., EMNRD

From: Katie Jones [kjones@riceswd.com]
Sent: Friday, April 01, 2011 1:38 PM
To: Hansen, Edward J., EMNRD
Cc: Hack Conder; Hall, Sharon
Subject: BD H-14 (1R426-101) CAP Addendum
Attachments: BD H-14 (1R426-101) Proposed Liner Expansion.jpg; BD H-14 (1R426-101) Delineation Trench Lab Analysis.PDF; BD H-14 (1R426-101) Monitoring Well Report and CAP 1.17.11.pdf

Mr. Hansen,

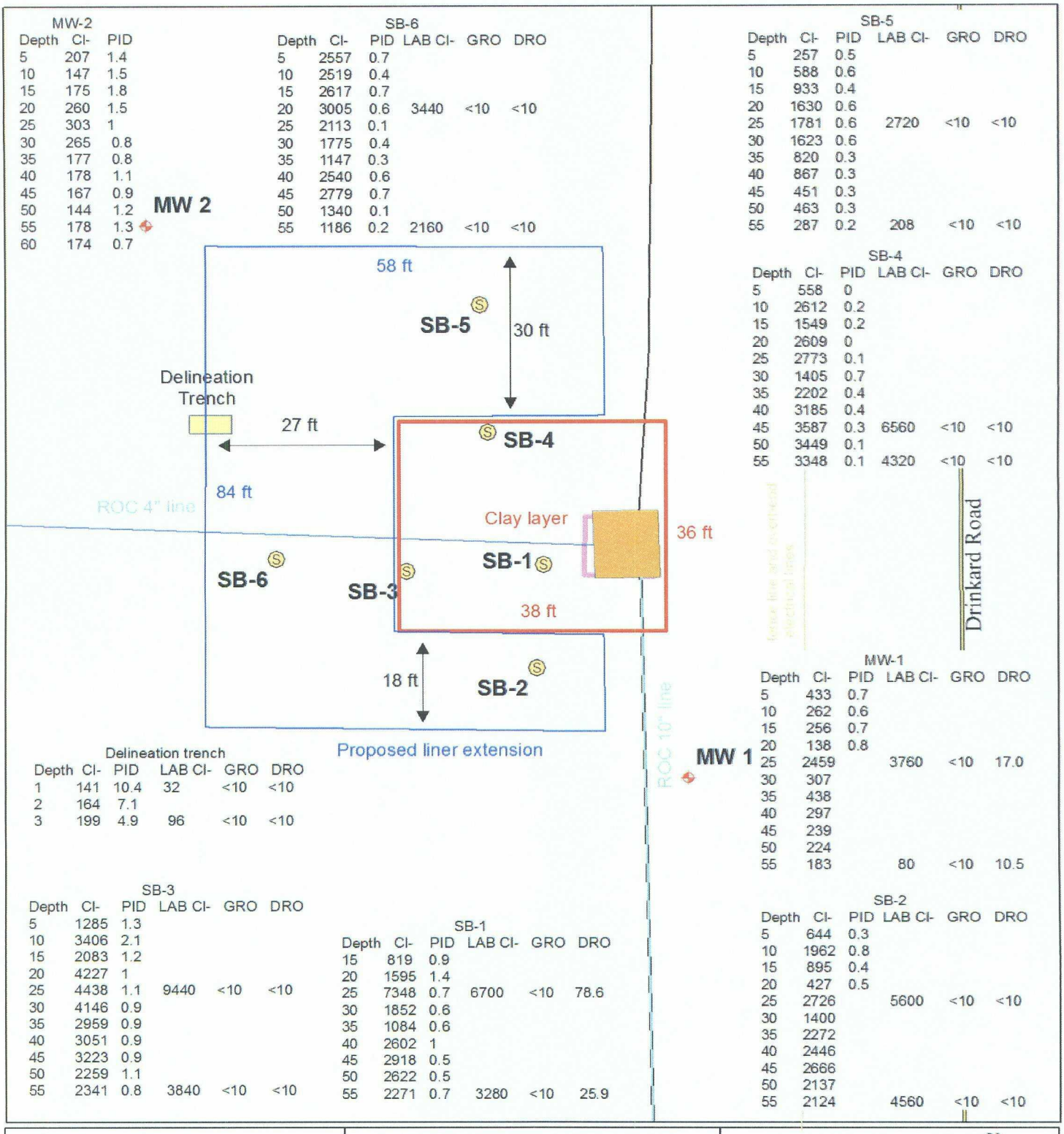
This email is an Addendum to the BD H-14 site (1R426-101) Monitoring Well Report and Corrective Action Plan (CAP), submitted to the NMOCD on January 17, 2011. Page 3, section: Estimate of Chloride Concentration Contributed from Vadoze Zone, paragraph 1: text in blue lettering, below, will be added to the paragraph. Red lettering marked with a strike-through will be deleted. A new plate showing the proposed liner dimensions and the additional delineation, laboratory results of the additional delineation, and the previously submitted Monitoring Well Report and CAP are attached. If you need any further information, please let me or Hack know.

"Since chloride impacts to soil are too deep to feasibly excavate impacted soils, ROC proposes extending the existing liner as shown in the attached figure. Impacted soils will be excavated to a depth of 5 to 6 feet bgs and a modified ~~53~~58 foot by 84 clay layer will be installed. The excavation will remain a safe distance (approximately ~~10~~5 feet) from a 10-inch line located on the east site of the site. To verify these proposed liner dimensions, additional delineation was conducted on January 28, 2011. A delineation trench was installed on the western edge of the proposed liner. Chloride concentrations were low (below 96 mg/kg based on laboratory analysis). Additional backfill soils will be placed over the liner and graded to prevent infiltration of rainwater. Backfill soils will not exceed a chloride concentration of 500 mg/kg or PID reading of 100 ppm. The excavated soil will be evaluated for use as backfill and any soils requiring disposal will be properly disposed of at a NMOCD approved facility. The site will be seeded with native grasses. The liner will be placed beneath the root zone and designed to inhibit downward migration of water and chlorides in the vadose zone. Plants use the water, capturing it through their roots, thereby reducing the volume of water infiltrating below the root zone. This natural infiltration barrier also serves to inhibit the downward migration of water and chlorides."

Thank you.

Katie Jones
Environmental Project Coordinator
RICE *Operating Company*

Site map and Proposed clay layer



RICE ENVIRONMENTAL RECS CONSULTING & SAFETY, LLC

BD H-14 site

Legals: UL/H sec. 14 T22S R37E
NMOCD Case #: 1R426-101

N W E S

0 10 20 40 Feet

Drawing date: 1/6/10
Drafted by: L. Weinheimer

CARDINAL Laboratories

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

February 02, 2011

Bruce Baker

Rice Operating Company

112 W. Taylor

Hobbs, NM 88240

RE: BD H-14 JCT 22/37

Enclosed are the results of analyses for samples received by the laboratory on 01/31/11 8:05.

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
Bruce Baker
112 W. Taylor
Hobbs NM, 88240
Fax To: (575) 397-1471

Received:	01/31/2011	Sampling Date:	01/28/2011
Reported:	02/02/2011	Sampling Type:	Soil
Project Name:	BD H-14 JCT 22/37	Sampling Condition:	Cool & Intact
Project Number:	NOT GIVEN	Sample Received By:	Jodi Henson
Project Location:	NOT GIVEN		

Sample ID: DELINEATION TRENCH @ 1' (H100207-01)

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

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	**32.0**	16.0	02/02/2011	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	02/01/2011	ND	255	102	250	7.26	
DRO >C10-C28	<10.0	10.0	02/01/2011	ND	227	90.9	250	3.97	

Surrogate: 1-Chlorooctane	*103 %*	*70-130*
Surrogate: 1-Chlorooctadecane	*111 %*	*70-130*

Sample ID: DELINEATION TRENCH @ 3' (H100207-02)

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

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	**96.0**	16.0	02/02/2011	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	02/01/2011	ND	255	102	250	7.26	
DRO >C10-C28	<10.0	10.0	02/01/2011	ND	227	90.9	250	3.97	

Surrogate: 1-Chlorooctane	*96.9 %*	*70-130*
Surrogate: 1-Chlorooctadecane	*99.8 %*	*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: Bruce Baker	**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 H-14 JCT 22.37	**State:** **Zip:**
Project Location:	**Phone #:**
Sampler Name: Harrison	**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						
H100207-1	DELINEATION TRENCH @ 1'	G	1			✓					✓		1.28.11	11:00	–	✓									
-2	DELINEATION TRENCH @ 3'	G	1			✓					✓		1.28.11	11:45	✓	✓									

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:	**Date:** 1.31.11 **Time:** 7:35	**Received By:**	Phone Result: ☐ Yes ☑ No Add'l Phone #:
Relinquished By:	**Date:** 1/31/11 **Time:** 8:05	**Received By:** Jodi Henson	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 Rharrisonr@riceswd.com; Bbaker@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

ARCADIS
Infrastructure, buildings, environment, communications

ARCADIS U.S., Inc.
1004 N. Big Spring Street
Suite 300
Midland Texas 79701
Tel 432.687.5400
Fax 432.687.5401
www.arcadis-us.com

Mr. Edward Hansen
New Mexico Oil Conservation Division
1220 So. Saint Francis Drive
Santa Fe, New Mexico 87505

Certified Mail Receipt No. 7002 2410 0001 5812 0332

Subject:
MONITOR WELL REPORT/SAMPLING SUMMARY AND CORRECTIVE ACTION PLAN (CAP)
NMOCD Case # 1R426-101
Blinebry-Drinkard (BD) H-14
T22S, R37E, Section 14, Unit H, Eunice, Lea County, New Mexico

Date:
January 17, 2011

Contact:
Sharon Hall

Phone:
432 687-5400

Email:
shall@arcadis-us.com

Mr. Hansen,

On behalf of Rice Operating Company (ROC), ARCADIS respectfully submits this Monitor Well Report/ Sampling Summary and Corrective Action Plan for the BD H-14 site located in the Blinebry-Drinkard (BD) Salt Water Disposal (SWD) System.

An Investigation Characterization Plan (ICP) was submitted to New Mexico Oil Conservation Division (NMOCD) on September 24, 2007 and was approved by NMOCD on January 17, 2008. Per the approved ICP, six soil borings and one monitoring well were drilled at the site in February and March 2010. A groundwater sample collected from the monitoring well (MW-1) on April 15, 2010 exhibited a chloride concentration of 980 milligrams per liter.

A Notification of Groundwater Impact was submitted to NMOCD on July 13, 2010. The report recommended drilling of an upgradient monitor well. Drilling of one upgradient and one downgradient monitoring well was approved by NMOCD on October 21, 2010. The monitoring wells were drilled on October 26, 2010 and sampled on November 10, 1010. The attached table summarizes the analytical results from groundwater samples collected from the monitor wells at the site. The groundwater laboratory reports are also attached.

The junction box H-14-1 was the main-line box of the three-box group. It was replaced with a new water-tight junction box. Junction box H-14-2 has been eliminated and Junction H-14 contained a boot that has been eliminated. Both junctions have been replaced with poly-piping that bypasses the former location. An area 38 feet by 36 feet by 6 feet deep was excavated and a compacted clay liner was installed at a depth of 6 feet below ground surface to inhibit downward chloride migration.

CORRECTIVE ACTION PLAN

As proposed in the approved ICP, we have evaluated the potential leaching from the vadose zone to groundwater. The proposed CAP consists of a chloride mass estimation and chloride mass removal plan as follows:

Estimate of Chloride Mass in Groundwater

Calculations used to estimate the chloride mass in groundwater that may have resulted from the former junction box are detailed in the table below. The size of the impacted area is conservatively assumed based on chloride concentrations in soil samples collected from monitoring wells and soil borings multiplied by a factor of 10 (the estimated horizontal dispersivity factor). This total area is then multiplied by the thickness of the aquifer (15 feet) and the estimated porosity (25%) resulting in a total saturated pore volume.

The increase in chloride concentrations in groundwater is calculated by subtracting the average elevated up gradient chloride concentration at the site (MW-2, 560 milligrams per Liter {mg/L}) from the average chloride concentration identified at the site (near source monitoring well MW-1, 903 mg/L). This net difference in chloride concentrations conservatively reflects the net impact to groundwater at the site resulting from the junction boxes.

The net difference in the concentration of chlorides is multiplied by the total saturated pore space volume resulting in the estimated chloride mass as shown in the following table.

Estimate of Chloride Mass in Ground water

Parameter	**Value**	**Description of equations used**
Impact Area	5,330 ft^2	Physical measurement of junction box excavation
Longitudinal Dispersivity	10	Professional estimate for factoring the plume length
Aquifer Thickness	15 ft	Based on regional groundwater data*
Porosity	25%	Professional estimate of pore volume
Volume of impacted groundwater below former junction boxes	199,875 ft^3	Multiplication of parameters listed above
Volume of impacted groundwater below former junction boxes	5,659,830 L	Unit conversion of above value to liters
Averaged increase in on-site chloride concentrations	343 mg/L	Difference between concentrations in MW-1 and MW-2
Total Chloride Mass	**1,941.32 kg**	Multiplication of two parameters above

* Ground-Water Report 6; Geology and Ground-Water Conditions in Southern Lea County, New Mexico; Nicholson and Clebsch

Estimate of Chloride Concentration Contributed From Vadose Zone

Since chloride impacts to soil are too deep to feasibly excavate impacted soils, ROC proposes extending the existing liner as shown in the attached figure. Impacted soils will be excavated to a depth of 5 to 6 feet bgs and a modified 53 foot by 84 clay layer will be installed. The excavation will remain a safe distance (approximately 10 feet) from a 10-inch line located on the east site of the site. Additional backfill soils will be placed over the liner and graded to prevent infiltration of rainwater. Backfill soils will not exceed a chloride concentration of 500 mg/kg or PID reading of 100 ppm. The site will be seeded with native grasses. The liner will be placed beneath the root zone and designed to inhibit downward migration of water and chlorides in the vadose zone. Plants use the water, capturing it through their roots, thereby reducing the volume of water infiltrating below the root zone. This natural infiltration barrier also serves to inhibit the downward migration of water and chlorides.

In light of the fact that an infiltration barrier is proposed, an exposure assessment was run for this site using the United States Environmental Protection Agency Exposure Assessment Multimedia Model (MULTIMED Version 1.01, June 1991). Data inputs and model outputs are attached. The model output concludes that the peak increased concentration of chlorides in groundwater contributed by soils in the vadose zone would be 185.1 mg/L in 12,000 years. Since the estimated increase in chloride concentrations in groundwater would not result in a groundwater background concentration exceedance, vadose zone chloride mass removal estimates are not warranted for this site.

CHLORIDE MASS REMOVAL

ROC proposes the installation of a groundwater recovery system at the BD O-23 vent site. A solar-driven pump will be placed in an existing 4-inch monitoring well with an average chloride concentration of 7,000 mg/L. The pump will operate 8-10 hours per day and the groundwater recovered from the well will be utilized for pipeline and well maintenance.

At a pumping rate of one gallon per minute the groundwater recovery system could extract 12.72 kg per day. At that rate it will take approximately 73,263 gallons and approximately 153 days to remove the 1,941.32 kg of chloride mass. Additionally, a second pump may be placed in another well.

ROC is the service provider (agent) for the BD Salt Water Disposal System and has no ownership of any portion of the pipelines, wells or facilities. The BD System is owned by a consortium of oil producers, System Parties, who provide all operating capital on a percentage ownership/usage basis.

Thank you for your consideration concerning this summary of groundwater monitoring information. If you have any questions please do not hesitate to contact me or Hack Conder.

Best Regards,

ARCADIS U.S, Inc.

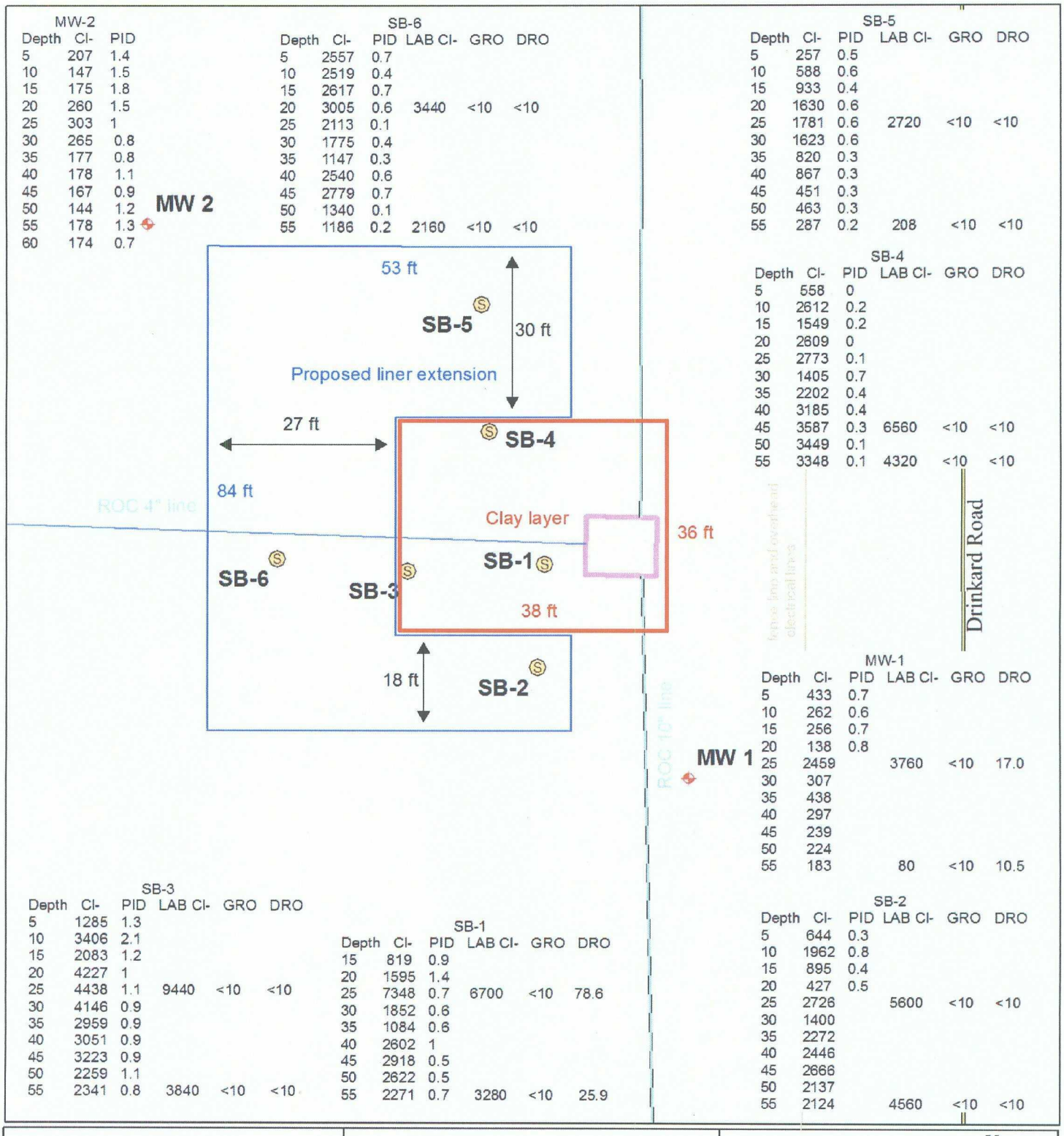
Sharon E. Hall

Sharon E. Hall
Associate Vice President

Copies: Hack Conder- ROC

Attachments:
Proposed Liner Extension Figure
BD H-14 and BD O-23 Locations
Monitor Well Summary Table
Monitor Well Location Figure
Monitor Well logs
Laboratory Analytical Results
Multi-Med Model

Site map and Proposed clay layer



RICE ENVIRONMENTAL RECS CONSULTING & SAFETY, LLC

BD H-14 site

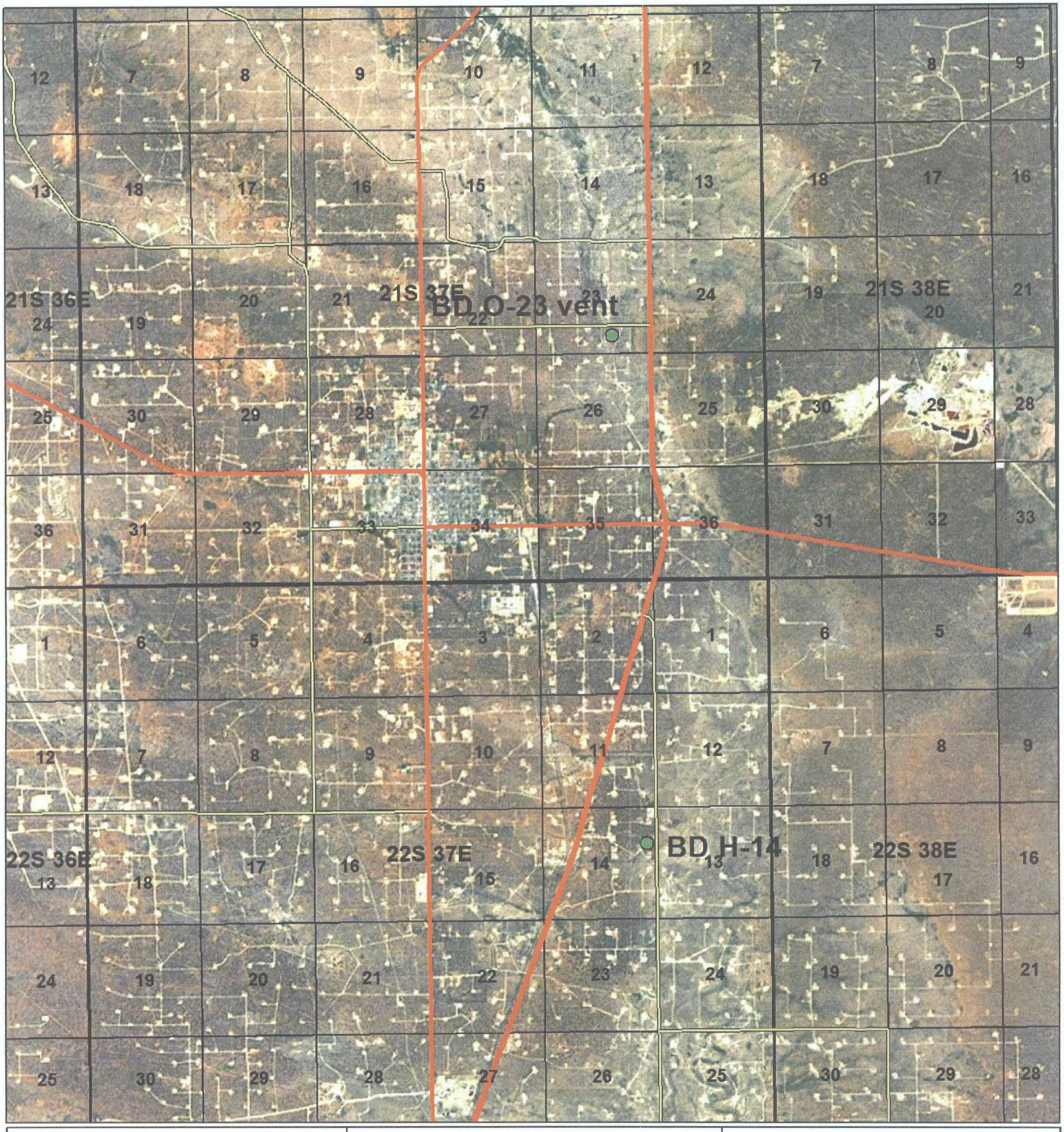
Legals: UL/H sec. 14 T22S R37E
NMOCD Case #: 1R426-101

N W E S

0 10 20 40 Feet

Drawing date: 1/6/10
Drafted by: L. Weinheimer

Site Locations



RICE ENVIRONMENTAL RECS CONSULTING & SAFETY, LLC

BD H-14

T22S R37E

BD O-23 vent

T21S R37E

N W E S

0 3,050 6,100 12,200 Feet

Drawing date: 1-17-11
Drafted by: L. Weinheimer

ROC BD H-14

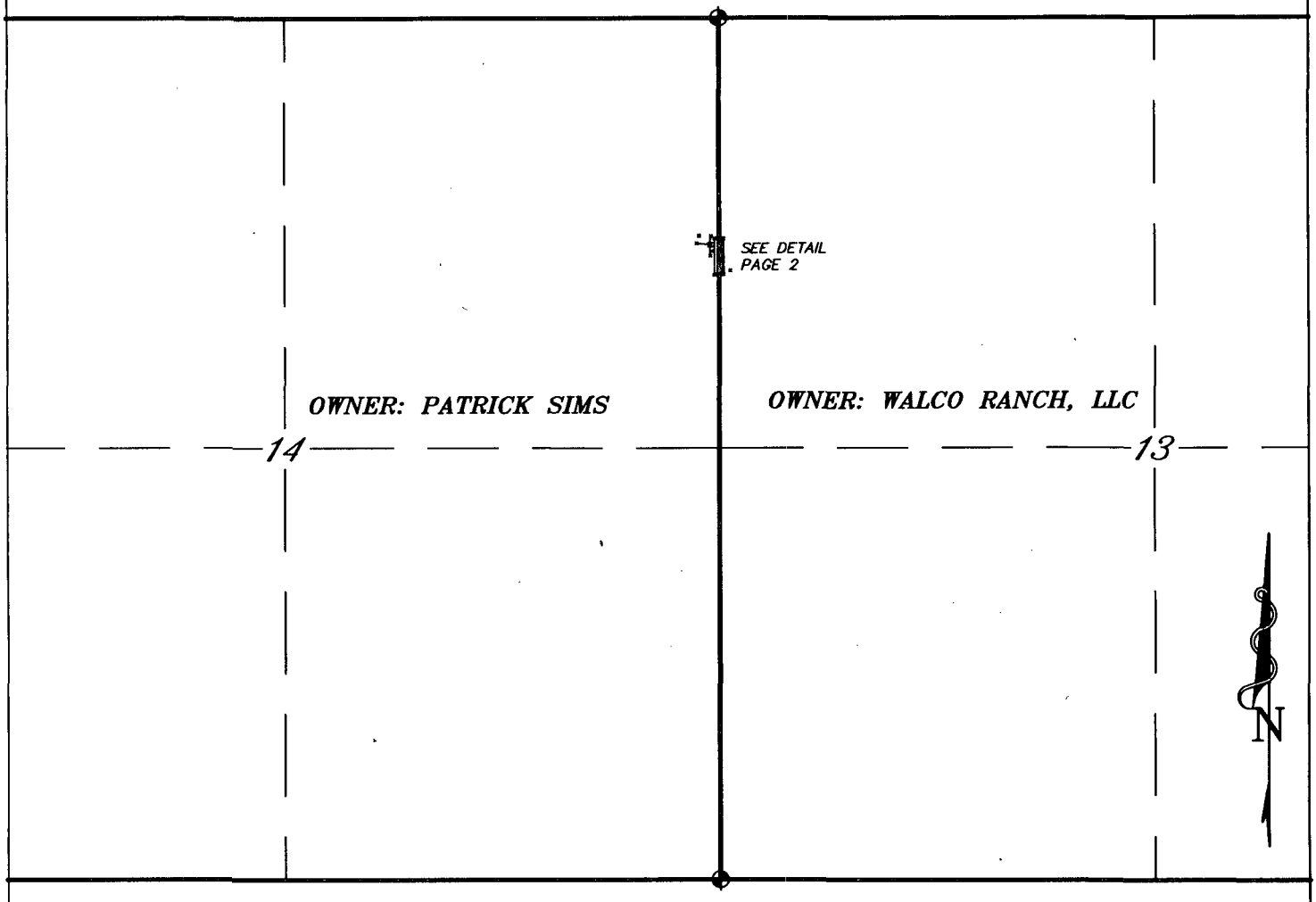
MW	Depth to Water (feet)	Total Depth (feet)	Well Volume (gallons)	Volume Purged (gallons)	Sample Date	Cl	TDS	Benzene	Toluene	Ethyl Benzene	Total Xylenes	Sulfate
1	62.31	77.50	2.4	10	4/15/2010	980	2470	<0.001	<0.001	<0.001	<0.003	368
1	62.30	77.50	2.4	10	7/9/2010	860	2250	<0.001	<0.001	<0.001	<0.003	378
1	62.32	77.50	2.4	10	10/7/2010	870	2310	<0.001	<0.001	<0.001	<0.003	301

MW	Depth to Water (feet)	Total Depth (feet)	Well Volume (gallons)	Volume Purged (gallons)	Sample Date	Cl	TDS	Benzene	Toluene	Ethyl Benzene	Total Xylenes	Sulfate
2	77.55	62.06	2.5	10	11/10/2010	560	1650	<0.001	<0.001	<0.001	<0.003	466

MW	Depth to Water (feet)	Total Depth (feet)	Well Volume (gallons)	Volume Purged (gallons)	Sample Date	Cl	TDS	Benzene	Toluene	Ethyl Benzene	Total Xylenes	Sulfate
3	77.68	61.90	2.5	10	11/10/2010	710	1810	<0.001	<0.001	<0.001	<0.003	297

Sample results in milligrams per liter

SECTION 14, TOWNSHIP 22 SOUTH, RANGE 37 EAST, N.M.P.M.,
LEA COUNTY, **NEW MEXICO.**



NOTE:
ELEVATIONS ARE ON BLACK MARK
ON NORTH SIDE OF PVC CASING.

NEW MEXICO STATE PLANE COORDINATES (NAD83)

WELL	NORTHING	EASTING	LATITUDE	LONGITUDE	ELEV. PVC	ELEV. GRND	ELEV. CON.
MW #1	509631.333	914173.313	32°23'42.921"	103°07'31.506"	3339.31'	3336.91'	3337.02'
MW #2	509726.639	914093.114	32°23'43.873"	103°07'32.429"	3339.20'	3336.48'	3336.61'
MW #3	509515.023	914288.705	32°23'41.258"	103°07'30.176"	3338.66'	3336.11'	3336.28'

1000 0 1000 2000 FEET

SCALE: 1" = 1000'

I HEREBY CERTIFY THAT THIS PLAT WAS PREPARED FROM FIELD NOTES OF AN ACTUAL SURVEY AND MEETS OR EXCEEDS ALL REQUIREMENTS FOR LAND SURVEYS AS SPECIFIED BY THIS STATE.

GARY L. JONES, N.M. P.S. No. 7977
No. 5074

BASIN SURVEYS P.O. BOX 1786 – HOBBS, NEW MEXICO

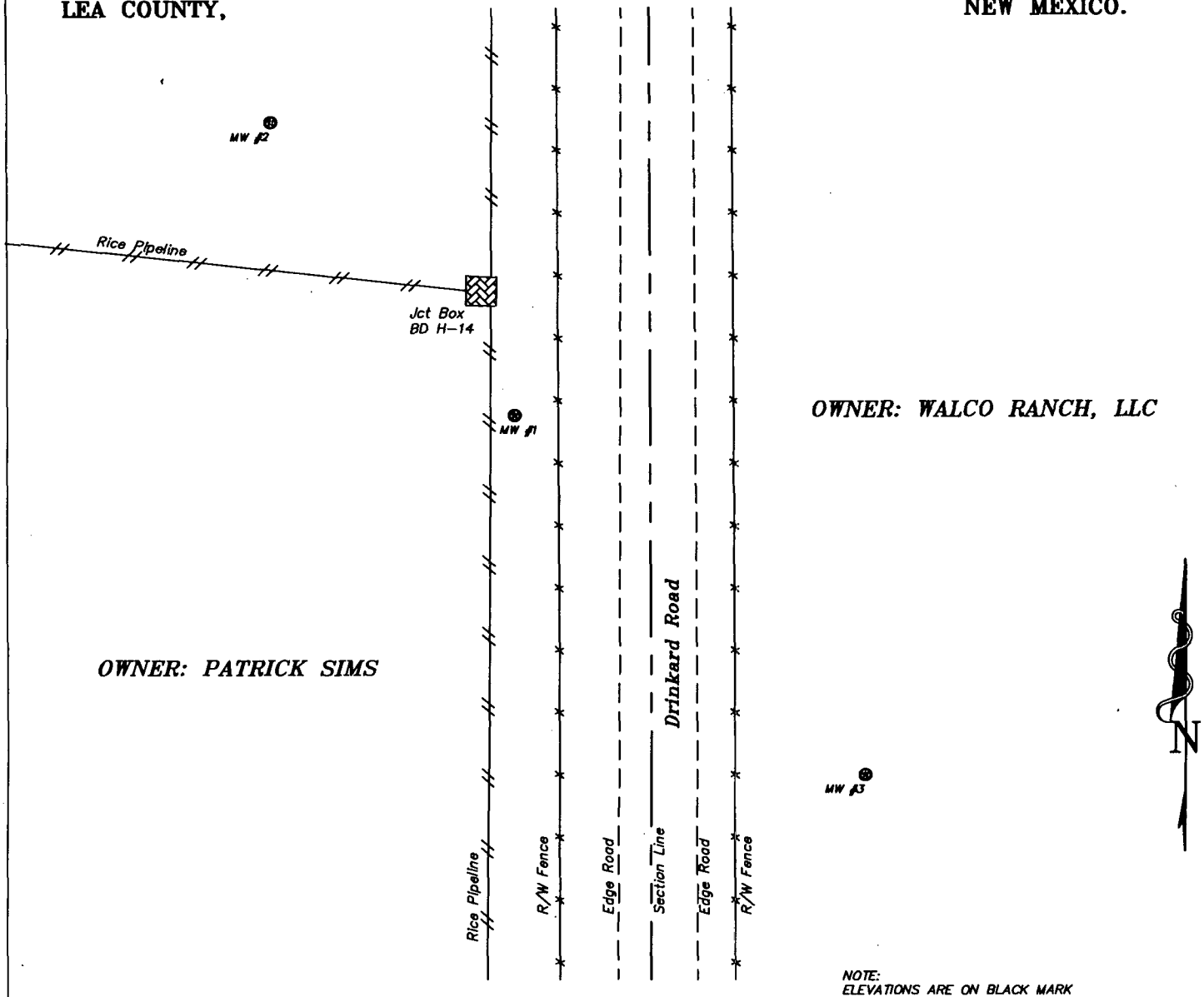
RICE OPERATING COMPANY

REF: BD H-14 SITE

MONITOR WELL LOCATED IN
SECTION 14, TOWNSHIP 22 SOUTH, RANGE 37 EAST,
N.M.P.M., LEA COUNTY, NEW MEXICO.

W.O. Number: 23725	Drawn By: K. GOAD		
Date: 11-22-2010	Disk: KJG – 23725MW.DWG	Survey Date: 11-16-2010	Sheet 1 of 2 Sheets

SECTION 14, TOWNSHIP 22 SOUTH, RANGE 37 EAST, N.M.P.M.,
LEA COUNTY, **NEW MEXICO.**



NOTE:
ELEVATIONS ARE ON BLACK MARK ON NORTH SIDE OF PVC CASING.

NEW MEXICO STATE PLANE COORDINATES (NAD83)

WELL	NORTHING	EASTING	LATITUDE	LONGITUDE	ELEV. PVC	ELEV. GRND	ELEV. CON.
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MW #2	509726.639	914093.114	32°23'43.873"	103°07'32.429"	3339.20'	3336.48'	3336.61'
MW #3	509515.023	914288.705	32°23'41.258"	103°07'30.176"	3338.66'	3336.11'	3336.28'

50 0 50 100 FEET
SCALE: 1" = 50'

I HEREBY CERTIFY THAT THIS PLAT WAS PREPARED FROM FIELD NOTES OF AN ACTUAL SURVEY AND MEETS OR EXCEEDS ALL REQUIREMENTS FOR LAND SURVEYS AS SPECIFIED BY THIS STATE.

GARY L. JONES N.M. P.S. No. 7977
TEXAS P.L.S. No. 5074

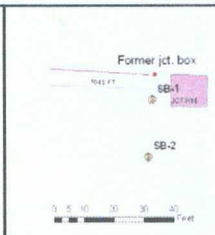
BASIN SURVEYS P.O. BOX 1786 – HOBBS, NEW MEXICO

RICE OPERATING COMPANY

REF: BD H-14 SITE

MONITOR WELL LOCATED IN
SECTION 14, TOWNSHIP 22 SOUTH, RANGE 37 EAST,
N.M.P.M., LEA COUNTY, NEW MEXICO.

W.O. Number: 23725	Drawn By: K. GOAD		
Date: 11-22-2010	Disk: KJG – 23725MW.DWG	Survey Date: 11-16-2010	Sheet 2 of 2 Sheets

Logger:	Lara Weinheimer		RICE OPERATING COMPANY ROC SINCE 1955
Driller:	Harrison & Cooper, Inc. Drilling		
Consultant:	Arcads		
Drilling Method:	Air rotary		
Start Date:	2/22/2010		
End Date:	2/22/2010		

Comments: Split spoon sampling from 5 - 20 ft. All other were from air rotary cutting. Located 50 ft south-east of the former junction box site.

Drafted by: Lara Weinheimer

TD = 55 ft GW = 60 ft

Project Name: BD H-14 site **Well ID:** MW-1

Location: UL/H sec. 14 T22S R37E

Lat: 32°23'42.923"N **County:** Lea

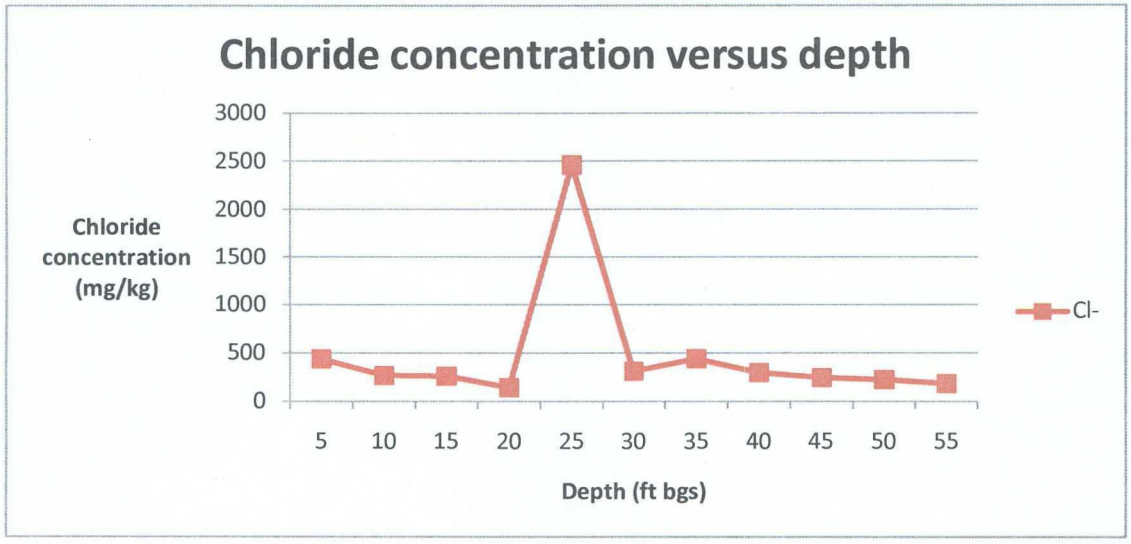
Long: 103°7'31.54" W **State:** NM

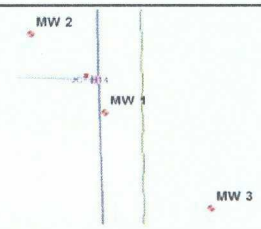
Depth (feet)	chloride field tests (ppm)	LAB	PID	Description
				0 - 20 feet VERY FINE TO FINE SAND; SANDSTONE light brown, dry, no odor
5	433		0.7	
10	262		0.6	
15	256		0.7	
20	138		0.8	
				20 - 25 feet VERY FINE TO FINE SAND; SANDSTONE orangey-brown, slightly moist, no odor
25	2459	Cl-3760		
		GRO <10.0		25 - 30 feet VERY FINE TO FINE SAND; SANDSTONE light brown, dry, no odor
		DRO 17.0		
30	307			
				30 - 35 feet VERY FINE TO FINE SAND; SANDSTONE orangey-brown, slightly moist, no odor
35	438			
				35 - 45 feet VERY FINE TO FINE SAND; SANDSTONE light brown, slightly moist, no odor
40	297			
45	239			
				45 - 50 feet VERY FINE TO FINE SAND; SANDSTONE light orangey-brown, slightly moist, no odor
50	224			

Lithology

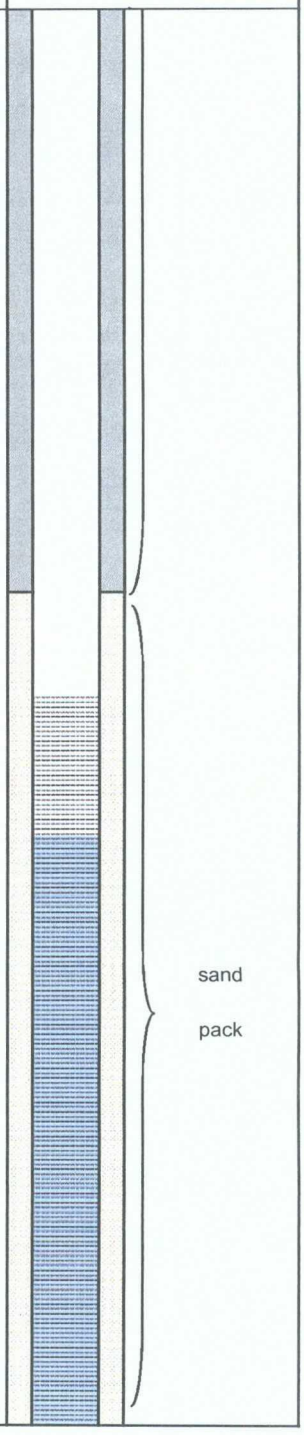
Well Construction: 2 in diameter PVC; 2 x 2 ft concrete pad on surface; sand pack

Depth (feet)	chloride field tests (ppm)	LAB	PID	Description	Lithology	Well Construction
				50 - 55 feet		
				VERY FINE TO FINE SAND; SANDSTONE		
55	183	Cl- 80		orangey-brown, slightly moist, no odor		
		GRO <10.0				
		DRO 10.5				
60				NO SAMPLES TAKEN		
65						
70						
75						screen = 0.01"



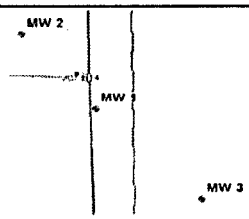
Logger:	Jordan Woodfin		RICE ENVIRONMENTAL RECS CONSULTING & SAFETY, LLC
Driller:	Harrison & Cooper, Inc.		**Project Name:** BD H-14 **Well ID:** MW-2
Drilling Method:	Air rotary		**Project Consultant:** Arcadis
Start Date:	10/26/2010		**Location:** UL/H sec. 14 T22S R37E
End Date:	10/26/2010		**Lat:** 32°23'43.844"N **County:** LEA
Comments: Located 78 ft north west of the former junction box site. **DRAFTED BY: L. Weinheimer** TD = 75 ft GW = 60 ft			**Long:** 103°7'32.465"W **State:** NM

Depth (feet)	chloride field tests	LAB	PID	Description	Lithology	Well Construction
				Tan very fine sand		2 in PVC
5 ft	207		1.4			
10 ft	147		1.5			
15 ft	175		1.8			
				Light brown very fine sand with very small caliche fragments		
20 ft	260		1.5			
				Tan very fine sand		bentonite seal
25 ft	303		1			
30 ft	265		0.8			
35 ft	177		0.8			

Depth (feet)	chloride field tests	LAB	PID	Description	Lithology	Well Construction
				Light brown very fine sand with very small caliche fragments		
40 ft	178		1.1			
45 ft	167		0.9			
50 ft	144		1.2			
				Red very fine silty sand		
55 ft	178		1.3			
60 ft	174		0.7			
				NO SAMPLES TAKEN		
65 ft						
70 ft						
75 ft						

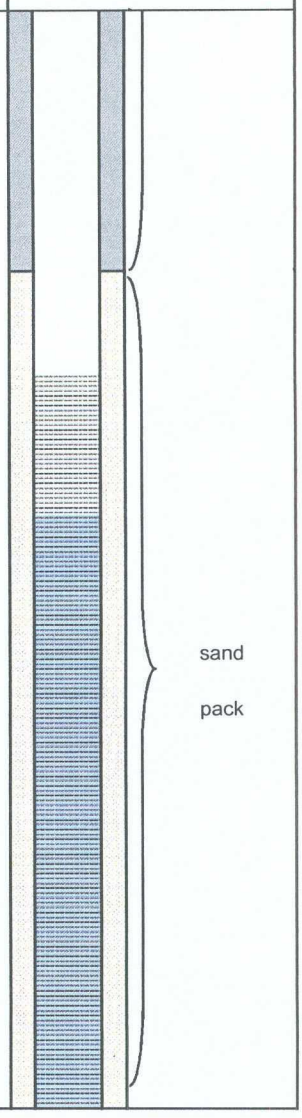
sand

pack

Logger:	Jordan Woodfin		
Driller:	Harrison & Cooper, Inc.		
Drilling Method:	Air rotary		**Project Name:** BD H-14 **Well ID:** MW-3
Start Date:	10/26/2010		
End Date:	10/26/2010		**Project Consultant:** Arcadis
Comments: Located 212 ft south east of the former junction box site. **DRAFTED BY: L. Weinheimer** TD = 75 ft GW = 60 ft			**Location:** UL/H sec. 14 T22S R37E **Lat:** 32°23'41.762"N **Long:** 103°7'30.178"W **County**: LEA **State**: NM

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								
60 ft								
65 ft								
70 ft								
75 ft								



CARDINAL Laboratories

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

October 18, 2010

Hack Conder

Rice Operating Company

112 W. Taylor

Hobbs, NM 88240

RE: BD H-14

Enclosed are the results of analyses for samples received by the laboratory on 10/12/10 12:33.

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:	10/12/2010	Sampling Date:	10/07/2010
Reported:	10/18/2010	Sampling Type:	Water
Project Name:	BD H-14	Sampling Condition:	Cool & Intact
Project Number:	NONE GIVEN	Sample Received By:	Celey D. Keene
Project Location:	T22S R37E SEC14 H-LEA CTY., NM		

Sample ID: MONITOR WELL #1 (H021039-01)

BTEX 8021B mg/L **Analyzed By: cms**

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Benzene*	<0.001	0.001	10/13/2010	ND	0.018	88.5	0.0200		
Toluene*	<0.001	0.001	10/13/2010	ND	0.017	87.4	0.0200		
Ethylbenzene*	<0.001	0.001	10/13/2010	ND	0.018	89.2	0.0200		
Total Xylenes*	<0.003	0.003	10/13/2010	ND	0.052	86.1	0.0600		

Surrogate: 4-Bromofluorobenzene (PIL *102 %* *80-120*

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

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	**870**	4.00	10/18/2010	ND	108	108	100	3.77	

Sulfate 375.4 mg/L **Analyzed By: HM**

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Sulfate	**301**	10.0	10/18/2010	ND	38.9	97.2	40.0	5.36	

TDS 160.1 mg/L **Analyzed By: HM**

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
TDS	**2310**	5.00	10/13/2010	ND				10.8	

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

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 H-14
Project Location: T22S R37E Sec14 H ~ 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 (2010)	TIME
H21039	Monitor Well #1	G	3	X				2				1		10-7	8:20

LAB # (LAB USE ONLY)	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	Anions (Cl, SO4, CO3, HCO3)	Cations (Ca, Mg, Na, K)	Sulfates (SO4)	Total Dissolved Solids	Chlorides	Turn Around Time ~ 24 Hours
H21039		X																	X	X	X	

ANALYSIS REQUEST
(Circle or Specify Method No.)

Relinquished by: Rozanne Johnson	Date: 10-12-2010	Time: 12:32	Received by:	Date: Time:
Relinquished by:	Date:	Time:	Received By: (Laboratory Staff)	Date: 10/12/10 Time: 12:33

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

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

Sample Condition: Cool: Yes ✓ No | Intact: Yes ✓ No

CHECKED BY: (Initials) CK

REMARKS:

Em Email Results to: hconder@riceswd.com
lweinheimer@riceswd.com
kjones@riceswd.com
rozanne@valornet.com

#26

CARDINAL Laboratories

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

November 21, 2010

Hack Conder

Rice Operating Company

112 W. Taylor

Hobbs, NM 88240

RE: BD H-14

Enclosed are the results of analyses for samples received by the laboratory on 11/15/10 16:41.

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:	11/15/2010	Sampling Date:	11/10/2010
Reported:	11/21/2010	Sampling Type:	Water
Project Name:	BD H-14	Sampling Condition:	Cool & Intact
Project Number:	NOT GIVEN	Sample Received By:	Aaron Berry
Project Location:	T22S R37E SEC14 H-LEA CTY., NM		

Sample ID: Monitor Well #2 (H021303-01)

BTEX 8260B mg/L **Analyzed By: CMS**

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Benzene*	<0.001	0.001	11/18/2010	ND	0.045	90.1	0.0500	5.31	
Toluene*	<0.001	0.001	11/18/2010	ND	0.045	89.9	0.0500	4.08	
Ethylbenzene*	<0.001	0.001	11/18/2010	ND	0.047	93.9	0.0500	0.997	
Total Xylenes*	<0.003	0.003	11/18/2010	ND	0.136	91.0	0.150	2.30	

Surrogate: Dibromofluoromethane	*81.1 %*	*80-120*
Surrogate: Toluene-d8	*102 %*	*80-120*
Surrogate: 4-Bromofluorobenzene	*105 %*	*80-120*

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

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	**560**	4.00	11/18/2010	ND	112	112	100	3.64	

Sulfate 375.4 mg/L **Analyzed By: HM**

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Sulfate	**466**	10.0	11/17/2010	ND	43.2	108	40.0	2.04	

TDS 160.1 mg/L **Analyzed By: HM**

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
TDS	**1650**	5.00	11/16/2010	ND				5.65	

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:	11/15/2010	Sampling Date:	11/10/2010
Reported:	11/21/2010	Sampling Type:	Water
Project Name:	BD H-14	Sampling Condition:	Cool & Intact
Project Number:	NOT GIVEN	Sample Received By:	Aaron Berry
Project Location:	T22S R37E SEC14 H-LEA CTY., NM		

Sample ID: Monitor Well #3 (H021303-02)

BTEX 8260B mg/L **Analyzed By: CMS**

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Benzene*	<0.001	0.001	11/18/2010	ND	0.045	90.1	0.0500	5.31	
Toluene*	<0.001	0.001	11/18/2010	ND	0.045	89.9	0.0500	4.08	
Ethylbenzene*	<0.001	0.001	11/18/2010	ND	0.047	93.9	0.0500	0.997	
Total Xylenes*	<0.003	0.003	11/18/2010	ND	0.136	91.0	0.150	2.30	

Surrogate: Dibromofluoromethane	*81.7 %*	*80-120*
Surrogate: Toluene-d8	*102 %*	*80-120*
Surrogate: 4-Bromofluorobenzene	*108 %*	*80-120*

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

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	**710**	4.00	11/18/2010	ND	112	112	100	3.64	

Sulfate 375.4 mg/L **Analyzed By: HM**

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Sulfate	**297**	10.0	11/17/2010	ND	43.2	108	40.0	2.04	

TDS 160.1 mg/L **Analyzed By: HM**

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
TDS	**1810**	5.00	11/17/2010	ND				5.65	

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

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 H-14
Project Location: T22S R37E Sec14 H ~ Lea County New Mexico	Sampler Signature: Rozanne Johnson (575)631-8310 rozanne@valornet.com

ANALYSIS REQUEST
(Circle or Specify Method No.)

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 (2010)	TIME	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	Anions (Cl, SO4, CO3, HCO3)	Cations (Ca, Mg, Na, K)	Sulfates (SO4)	Total Dissolved Solids	Chlorides	Turn Around Time ~ 24 Hours
H21303-1	Monitor Well #2	G	3	X				2				1		11-10	13:50		X																	X	X	X	
A,B,C-2	Monitor Well #3	G	3	X				2				1		11-10	15:20		X																	X	X	X	

Relinquished by: Rozanne Johnson	Date: 11-15-2010	Time: 16:40	Received by:
Relinquished by:	Date:	Time:	Received By: (Laboratory Staff)
Delivered By: (Circle One) Sampler - UPS - Bus - Other:	Sample Condition: Cool Yes / No; Intact Yes / No		CHECKED BY: (Initials)

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

REMARKS:

Em Email Results to: hconder@riceswd.com
lweinheimer@riceswd.com
kjones@riceswd.com
rozanne@valornet.com

Blinebry-Drinkard (BD) H-14
Rice Operating Company
T22S, R37E, Section 14, Unit H, Eunice, Lea County, New Mexico

MODEL INPUT AND OUTPUT						MODEL RANGE	
INPUT PARAMETERS						Minimum	Maximum
Unsaturated Zone Flow Parameters							
Depth of Unsaturated Zone	m	62	feet	18.9	m	0.000000001	None
Hydraulic Conductivity	cm/hr	2	ft/day	2.54	cm/hr	0.00000000001	10,000
Unsaturated Zone Porosity	fraction	0.05	fraction	0.05	fraction	0.000000001	0.99
Residual Water Content	fraction	0.01	fraction	0.010	fraction	0.000000001	1
Unsaturated Zone Transport Parameters							
Thickness of Layer	m	62	feet	18.9	m	0.000000001	None
Percent of Organic Matter	%	2.6	%	2.6	%	0	100
Bulk Density	g/cm^3	1.35	g/cm^3	1.35	g/cm^3	0.01	5
Biological Decay Coefficient	1/yr	0	1/yr	0	1/yr	0	None
Aquifer Parameters							
Aquifer Porosity	fraction	0.25	fraction	0.25	fraction	0.000000001	0.99
Bulk Density	g/cm^3	1.35	g/cm^3	1.35	g/cm^3	0.01	5
Aquifer Thickness	m	15	ft	4.6	m	0.000000001	100,000
Hydraulic Conductivity	m/yr	2	ft/day	223	m/yr	0.0000001	100,000,000
Hydraulic Gradient	m/m	0.007	m/m	0.007	m/m	0.00000001	None
Organic Carbon Content	fraction	0.00315	fraction	0.00315	fraction	0.000001	1
Temperature of Aquifer	°C	14.4	°C	14.4	°C	0.00000001	None
pH		6.2		6.2		0.3	14
x-distance Radial Distance from Site to Receptor	m	1	m	1	m	1	None
Source Parameters							
Infiltration Rate from the Facility	m/yr	0.05	in/yr	0.0013	m/yr	0.0000000001	10,000,000,000
Area of Waste Disposal Unit	m^2	5,330	ft^2	495	m^2	0.01	None
Length Scale of Facility	m	82	m	25.0	m	0.000000001	10,000,000,000
Width Scale of Facility	m	65	m	19.8	m	0.000000001	10,000,000,000
Recharge Rate into the Plume	m/yr	0	in/yr	0	m/yr	0	10,000,000,000
Duration of Pulse	yr	13,000	yr	13000	yr	0.000000001	None
Initial Concentration at Landfill	mg/L	9,440	mg/L	9,440	mg/L	0	None
Additional Parameters							
Method				Gaussian		Gaussian	Patch
Name of Chemical Specified				Chloride			

MODEL OUTPUT			
Final Concentration at Landfill	mg/L	0.0	mg/L

MODEL OUTPUT				
Concentration at Landfill	0.0	mg/L	Time	1 yr
	17.8	mg/L		200 yr
	56.4	mg/L		400 yr
	89.0	mg/L		600 yr
	127.2	mg/L		1,000 yr
	151.9	mg/L		1,500 yr
	164.9	mg/L		2,000 yr
	177.2	mg/L		3,000 yr
	183.4	mg/L		5,000 yr
	185.0	mg/L		10,000 yr
	185.0	mg/L		11,000 yr
	185.1	mg/L		12,000 yr
	166.0	mg/L		13,000 yr
	55.6	mg/L		14,000 yr
	18.3	mg/L		15,000 yr
	3.0	mg/L		20,000 yr
	2.4	mg/L		25,000 yr
	1.7	mg/L		30,000 yr
	0.4	mg/L		40,000 yr
	0.0	mg/L		50,000 yr

Blinebry-Drinkard (BD) H-14
Rice Operating Company
T22S, R37E, Section 14, Unit H, Eunice, Lea County, New Mexico