1R - 426-108

REPORTS

DATE:

2-4-10

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

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

Certified Mail Receipt No. 7002 2410 0001 5813 3852

Subject:
Investigation and Characterization Plan Report and Termination Request
OCD Case #1R426-108
Blinebry Drinkard (BD) Jct. F-25-1
T21S, R37E, Section 25, Unit F, Eunice, Lea County, New Mexico

Date:
February 4, 2010

Contact:
Sharon Hall

Phone:
432 687-5400

Email:
shall@arcadis-us.com

Dear Mr. Hansen,

RICE Operating Company (ROC) has retained ARCADIS U.S, Inc. (ARCADIS) to address potential environmental concerns at the above-referenced site. ROC is the service provider (agent) for the Blinebry Drinkard (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.

On behalf of ROC, ARCADIS respectfully submits this Investigation and Characterization Plan (ICP) Report and Termination Request for the above-referenced site.

SITE HISTORY AND BACKGROUND

The site is located near the town of Eunice, Lea County, New Mexico. The expected depth to groundwater at this site is approximately 65 feet below ground surface (bgs).

The junction box F-25-1 was eliminated and replaced with poly piping that bypasses this junction. Initial delineation began on June 23, 2004 and was completed on February 23, 2005 by trenching with a backhoe to 12 feet bgs. An area 30 feet x 30 feet x 12 feet-deep was excavated and backfilled with blended soils to a depth 6 feet bgs. A compacted clay barrier was installed to inhibit downward chloride migration. The excavated area was then backfilled with the remaining blended excavation soil. The disturbed surface was seeded with a blend of native vegetation and monitored for growth. An identification plate was placed on the surface in the location of the former junction box for future environmental consideration and to identify the presence of the clay barrier.

During the excavation, soil samples were analyzed in the field for chlorides using field-adapted Method 4500-Cl-B and screened in the field using a photoionization detector (PID). Confirmation samples were collected from the bottom, side walls (four wall composite

sample), and remediated backfill and sent to Environmental Lab of Texas for Total Petroleum Hydrocarbons (TPH) and Chloride analysis. PID readings were all low and laboratory analysis confirmed gasoline range organics (GRO) and diesel range organics (DRO) were not detected.

Based on the results of the soil sampling analytical results, elevated chloride concentrations are present at the subject site.

ROC disclosed potential groundwater impact at the site to New Mexico Oil Conservation Division (NMOCD) in an e-mail dated March 9, 2005. A disclosure report was submitted to NMOCD with all of the ROC 2004 Junction Box Reports in March 2005 per the ROC Junction Box Upgrade Workplan. The source of this impact is historical; there is no longer a threat of compounded conditions at this site because the junction has been eliminated and replaced with poly piping that bypasses this junction.

On behalf of ROC, ARCADIS submitted an ICP to NMOCD on July 17, 2007 and subsequently approved by NMOCD on August 8, 2007. The plan proposed three tasks:

Task 1- Collect Regional Hydrogeologic Data

A one-half mile water well inventory that includes a review of water well records listed on the New Mexico State Engineer Office and United States Geological Survey (USGS) websites and windmills indicated on applicable USGS topographic maps.

Task 2- Evaluate Concentrations of Constituents of Concern in Soil and Groundwater

Installation of one soil boring at the former junction box location in order to delineate the depth of impacted soil. Additional soil borings were proposed to evaluate soil impacts. One soil boring was proposed in each direction from the former junction box location (north, south, east and west of the excavated area) in order to delineate the lateral extent of impacted soil. It was proposed that if chloride and/or hydrocarbon concentrations do not decline sufficiently with depth or exceed 250 milligrams per kilogram (mg/kg) or PID readings of 100 within 10 feet of the suspected groundwater depth, one soil boring would be converted to a monitor well. The monitoring well would be placed near-source to observe soil impacts.

Task 3- Evaluate Potential Flux from the Vadose Zone to Ground Water

As proposed in the ICP, the information gathered from tasks 1 and 2 would be evaluated and utilized to design a groundwater remedy if needed. The groundwater remedy that offers the greatest environmental benefit while causing the least environmental impairment would be selected. If the evaluation demonstrates that residual constituents pose no threat to groundwater quality, only a surface restoration plan protective of groundwater would be

proposed. Such recommendations and findings would be presented to NMOCD in a subsequent Corrective Action Plan (CAP).

Based on the results of the water well inventory and discussions with the landowner, it came to our attention that groundwater may not be present at the site. Following a call between Edward Hansen (NMOCD) and Sharon Hall (ARCADIS), ARCADIS submitted a request via email on August 7, 2008 to drill one soil boring at the site to a depth of 75 feet bgs, ten feet below the average water depth in Section 23. Attached to the request was a State Engineer's Report for Township 21S Range 37E, Sections 23, 24, 25, 26, 35 and 36. Of 29 wells drilled in these sections only two wells reported groundwater. Both wells were located in Section 23 and the average depth to groundwater is 65 feet bgs.

NMOCD conditionally approved the request on September 25, 2008 providing that the boring be drilled to a depth of 85 feet bgs and the boring remain open for at least 48 hours following completion.

BORING RESULTS

On October 7, 2008 a boring was drilled at the site five feet east of the former junction box location (Figure 1). The boring was drilled to a depth of 25 feet bgs where moist soils were encountered. Soil samples were collected at depths of 15, 20 and 25 feet bgs and analyzed for field chloride results using field-adapted Method 4500-Cl-B. Chloride concentrations were 143, 178 and 305 mg/kg, respectively. The sample collected from a depth of 25 feet bgs was submitted for laboratory analysis for chlorides. The laboratory analytical result for this sample was 112 mg/kg.

Because State Engineer records and discussions with the landowner indicated that groundwater was not likely present at the site, yet moist soil was encountered in the soil boring, two additional soil borings were drilled at the site on September 22, 2009. One soil boring was drilled upgradient, and one near-source boring, downgradient of the former junction box location (based on regional gradient). The boring locations are shown on Figure 1. Each of the borings was drilled to a depth of 53 feet bgs and logged to a depth of 50 feet bgs. (Boring logs attached.) Soil samples were collected at five-foot intervals, screened in the field using a PID, and analyzed for field chloride results using field-adapted Method 4500-Cl-B. PID and field chloride results are shown on the attached table and boring logs. Two soil samples from each of the borings were submitted for laboratory analysis for chlorides. The results, as shown on the attached table and boring logs are as follows:

SB #2	25 feet bgs	Chlorides 208 mg/kg
SB #2	45 feet bgs	Chlorides 16 mg/kg
SB #3	20 feet bgs	Chlorides 1120 mg/kg
SB #3	45 feet bgs	Chlorides 32 mg/kg

ROC was not able to obtain landowner permission to install a monitoring well at this site. Therefore, a groundwater sample was collected from each of the soil borings at a depth of 53 feet bgs and submitted for laboratory analysis for chlorides and total dissolved solids (TDS). The chloride concentration in the sample collected from SB #2 was 176 milligrams per liter (mg/L) and from SB #3 was 184 mg/L. The TDS concentration in the sample collected from SB #2 was 624 mg/L and from SB #3 was 661 mg/L.

RECOMMENDATIONS

Chloride concentrations in excess of 250 milligrams per liter (mg/L) were not detected in groundwater samples collected from the two soil borings drilled to groundwater. The maximum chloride concentration in the groundwater samples was 184 mg/L. This sample was collected from the near-source boring (SB #3).

The maximum chloride concentration in soil samples analyzed from soil samples collected from SB #1 and SB #2 was 317 mg/kg. The maximum chloride concentration in soil samples collected and analyzed from the near-source boring SB #3 was 1,184 mg/kg at a depth of 20 feet bgs. Chloride concentrations in soil boring SB #3 declined with depth to 220 mg/kg at 50 feet bgs based on field titrations and 32 mg/kg at 45 feet bgs based on laboratory analysis. Further, a compacted clay barrier has been installed at the site to inhibit downward chloride migration.

Based on the fact that chloride concentrations in excess of 250 mg/L were not detected in groundwater samples, chloride concentrations in soil are either not elevated or decline with depth and a clay liner has been installed at this site, we request termination of this site. Your approval for termination will be appreciated.

Very Truly Yours,

ARCADIS U.S., Inc.

Shan E. Hall

Sharon E. Hall Associate Vice President

Copies:
Hack Conder- Rice Operating Company

Attachments:
Chloride and PID Results Table
Figure 1- Boring Locations
Boring Logs
Analytical Results
Groundwater Analytical Results Table

BD Jct. F-25-1 SOIL CHLORIDE AND PID RESULTS

Sample ID	Field Chloride Result mg/kg	Lab Chloride Result mg/kg	PID
SB 1 15'	143	NA	NA
SB 1 20'	178	NA	NA
SB 1 25'	305	112	NA
SB 2 5'	212	NA	2.5
SB 2 10'	167	NA	1.5
SB 2 15'	201	NA	0.5
SB 2 20'	208	NA	0.1
SB 2 25'	317	208	0.2
SB 2 30'	279	NA	0.1
SB 2 35'	225	NA	0
SB 2 40'	245	NA	0.2
SB 2 45'	195	16	0
SB 2 50'	232	NA	0
SB 3 5'	213	NA	2.1
SB 3 10'	506	NA	0.1
SB 3 15'	1058	NA	0.1
SB 3 20'	1184	1120	0
SB 3 25'	549	NA	0
SB 3 30'	378	NA	0.1
SB 3 35'	285	NA	0
SB 3 40'	303	NA	0
SB 3 45'	259	32	0
SB 3 50'	220	NA	0

mg/kg= milligrams per kilogram

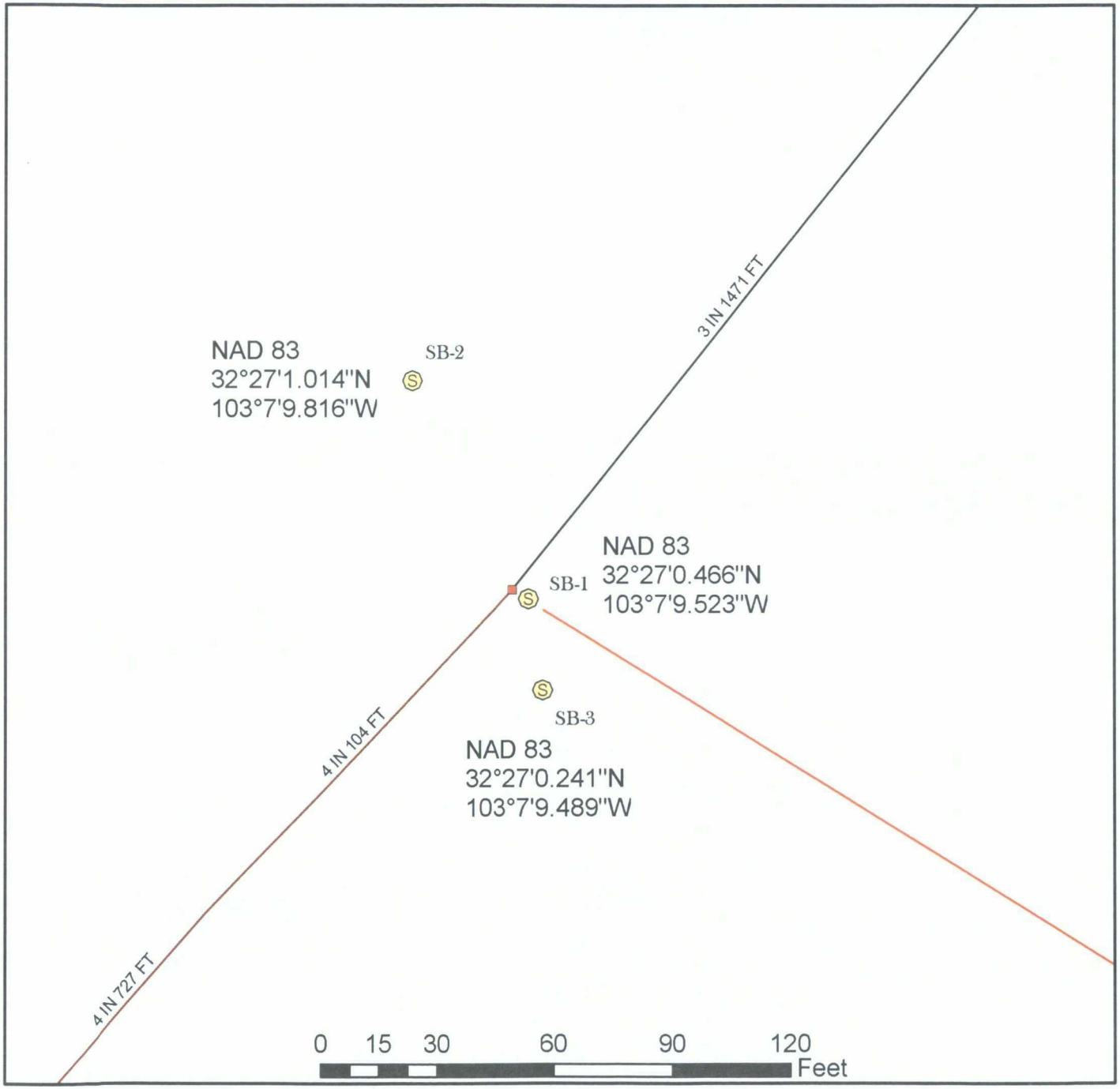
NA= Not Analyzed

GROUNDWATER LABORATORY ANALYTICAL RESULTS

Sample ID	Chloride Result mg/L	TDS Result mg/L
SB 2	176	624
SB 3	184	661

mg/L= milligrams per liter

Soil Bore Locations



RICE OPERATING COMPANY
ROC
SINCE 1955

122 W. Taylor
Hobbs, NM 88240
Phone (575) 393-9174
Fax (575) 397-1471

BD jct. F-25-1

Legals: UL/F sec. 25 T21S R37E
NMOCD Case #: 1R426-108
Consultant: Arcadis

Soil Bores
Center of Former Junction Box
Inactive line
PROJECTED

PIPELINE TYPE

AC
AC WITH POLY SLIP
POLY
PVC
PVC WITH POLY SLIP

Drawing date: 10-9-09
Revision date:
Drafted by: Lara Weinheimer

N
W E
S

Figure 1

Logger:	Lara Weinheimer	**Client:**	**Well ID:**
Driller:	Harrison & Cooper, Inc. Drilling	RICE Operating Company	
Drilling Method:	Air rotary	**Project Name:**	
Start Date:	10-7-08	BD jct. F-25-1	
End Date:	10-7-08	**Location:**	SB - 1
Comments: Located 5 ft east of the former jct. box site TD = 25 ft GW = 55 ft		BD SWD System unit 'F' Sec.25 T21S, R37E Lea County, NM	

Depth (feet)	chloride field tests	PID	Description	Lithology	Soil Bore Construction
			15 - 25 ' VERY FINE TO FINE SAND rocky, some caliche, orangey-brown, dry		bentonite seal
15	143				
20	178				
25	305				
Lab	112				

Logger:	Hack Conder
Driller:	Harrison & Cooper, Inc. Drilling
Consultant:	Arcadis
Drilling Method:	Air rotary
Start Date:	9/22/2009
End Date:	9/22/2009

Comments: All samples from cuttings.

Drafted by: Lara Weinheimer

TD = 50 ft DGW = 53 ft

RICE OPERATING COMPANY ROC SINCE 1955

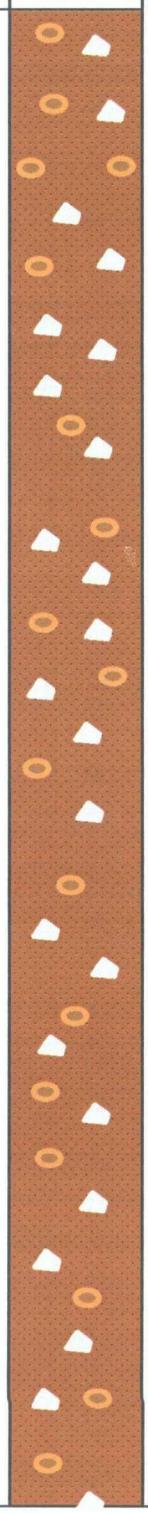
Project Name: BD jct. F-25-1 **Well ID:** SB #2

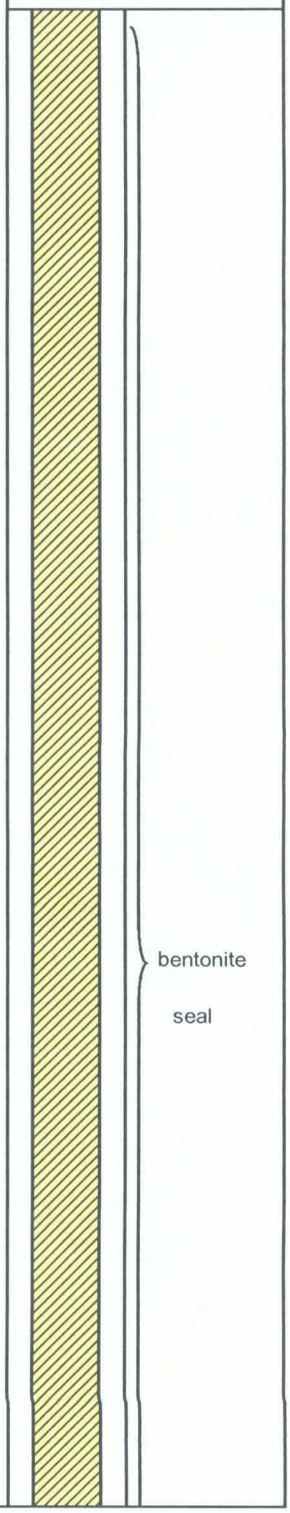
Location: UL/F sec. 25 T21S R37E

Lat: N103°27'1.014" **County:** Lea

Long: W103°7'9.816" **State:** NM

Depth (feet)	chloride field tests	LAB	PID	Description
5	212		2.5	
10	167		1.5	
15	201		0.5	0 - 50 ft
				VERY FINE TO FINE SAND
				rocky, some caliche, orangey-brown, dry
20	208		0.1	
25	317	Cl-208	0.2	
30	279		0.1	
35	225		0	
40	245		0.2	





45	195	Cl- 16	0		
50	232		0		
	Water	Cl- 176	TDS 624		

Logger:	Hack Conder
Driller:	Harrison & Cooper, Inc. Drilling
Consultant:	Arcadis
Drilling Method:	Air rotary
Start Date:	9/22/2009
End Date:	9/22/2009

Comments: All samples from cuttings

Drafted by: Lara Weinheimer

TD = 50 ft DGW = 53 ft

RICE OPERATING COMPANY ROC SINCE 1955

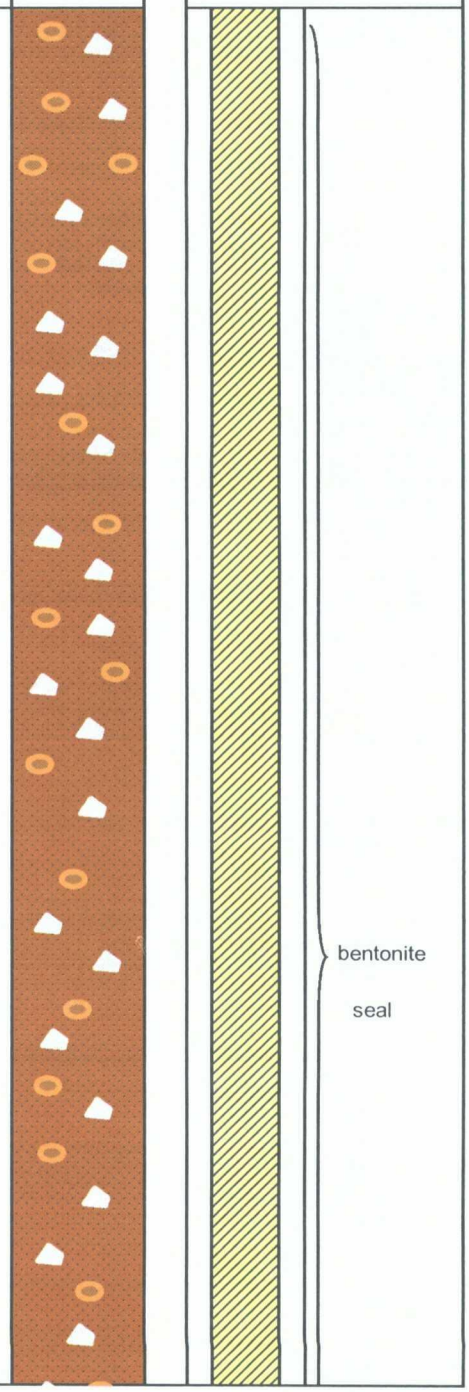
Project Name: BD jct. F-25-1 **Well ID:** SB #3

Location: UL/F sec. 25 T21S R37E

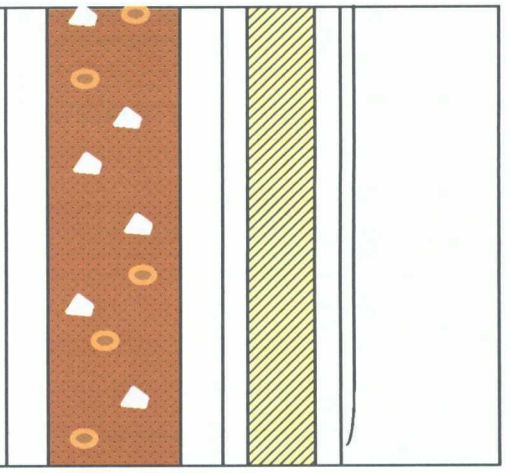
Lat: N32°27'0.241" **County:** Lea

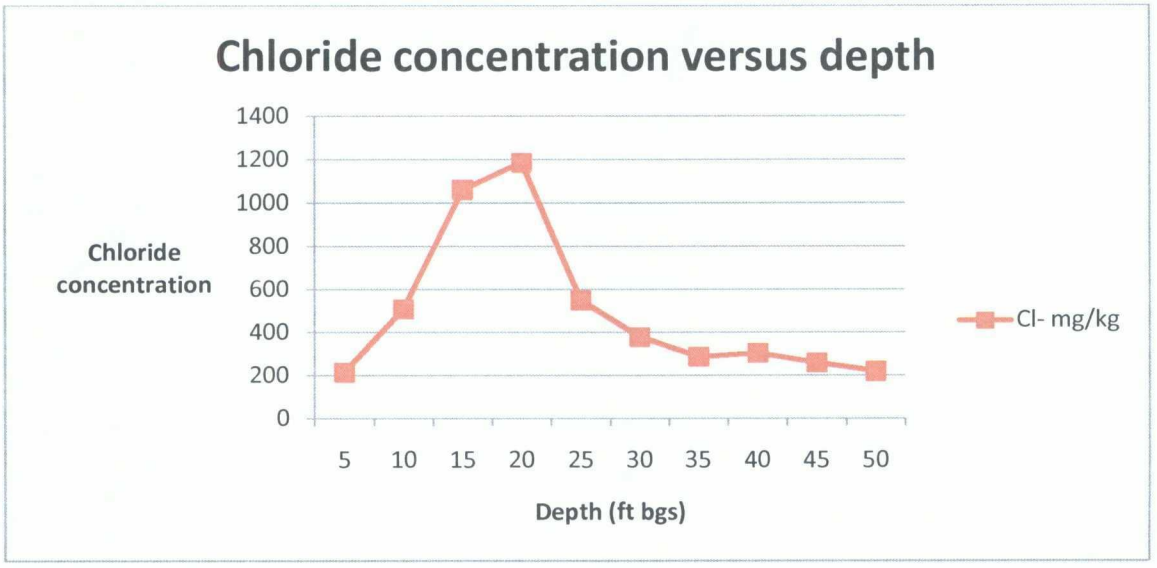
Long: W103°7'9.489" **State:** NM

Depth (feet)	chloride field tests	LAB	PID	Description
				0 - 50 ft VERY FINE TO FINE SAND rocky, some caliche, orangey-brown, dry
5	213		2.1	
10	506		0.1	
15	1058		0.1	
20	1184	Cl-1120	0	
25	549		0	
30	378		0.1	
35	285		0	
40	303		0	



45	259	Cl- 32	0	
50	220		0	
	Water	Cl- 184	TDS 661	





CARDINAL LABORATORIES

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

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

Receiving Date: 10/15/08
Reporting Date: 10/16/08
Project Number: NOT GIVEN
Project Name: BD JCT. F-25-1
Project Location: BD JCT. F-25-1

Analysis Date: 10/16/08
Sampling Date: 10/07/08
Sample Type: SOIL
Sample Condition: COOL & INTACT
Sample Received By: ML
Analyzed By: TR

LAB NO.	SAMPLE ID	Cl^- (mg/kg)
H16123-1	SB #1 @ 25'	112
Quality Control		500
True Value QC		500
% Recovery		100
Relative Percent Difference		< 0.1

METHOD: Standard Methods	4500-ClB

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

Chemist

10-17-08
Date

H16123 RICE

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 #: 393-9174 Fax #: 397-1471	Address:
Project #: Project Owner:	City:
Project Name: BD jct. F-25-1	State: Zip:
Project Location: BD jct. F-25-1	Phone #:
Sampler Name: Lara Weinheimer/ Tony Grieco	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
H16123-1	SB #1 @ 25'		1			✓					✓		10/7/08	12:52	✓

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Relinquished By: L. Weinheimer	Date: 10/8/08 Time: 9:45	Received By: Kristy LeBert	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) MAB	REMARKS: email results Hconder@riceswd.com; jpurvis@riceswd.com; Lweinheimer@riceswd.com

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

New sampler bottle, please

CARDINAL LABORATORIES

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

Receiving Date: 09/29/09
Reporting Date: 09/30/09
Project Number: NOT GIVEN
Project Name: SB #2 @ 25 & 45 FT. SB #3 @ 20 & 45 FT.
Project Location: B.D. F-25-1

Analysis Date: 09/30/09
Sampling Date: 09/22/09
Sample Type: SOIL
Sample Condition: COOL & INTACT
Sample Received By: ML
Analyzed By: HM

LAB NO.	SAMPLE ID	Cl^- (mg/kg)
H18368-1	SB #2 @ 25 FT.	208
H18368-2	SB #2 @ 45 FT.	16
H18368-3	SB #3 @ 20 FT.	1,120
H18368-4	SB #3 @ 45 FT.	32
Quality Control		500
True Value QC		500
% Recovery		100
Relative Percent Difference		< 0.1

METHOD: Standard Methods	4500-ClˉB

Note: Analyses performed on 1:4 w:v aqueous extracts.

Chemist

10/01/09
Date

H18368 RICE

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	BILL TO
Project Manager: Darrell Mitchell	P.O. #:
Address: 122 W TAYLOR	Company:
City: HOBBS State: NM Zip: 88240	Attn:
Phone #: 393-9174 Fax #:	Address:
Project #: Project Owner:	City:
Project Name: SB# 2 @ 25 & 45 FT. SB#3 @ 20 & 45 FT	State: Zip:
Project Location: B.D F-25-1	Phone #:
Sampler Name:	Fax #:

FOR LAB USE ONLY Lab I.D.	Sample I.D.	(G)RAB OR (C)OMP.	# CONTAINERS	MATRIX: GROUNDWATER	WASTEWATER	SOIL	OIL	SLUDGE	OTHER :	PRESERV.: ACID/BASE:	ICE / COOL	OTHER :	SAMPLING: DATE	TIME	ANALYSIS REQUEST: Chlorides
H18368-1	SB# 2 @ 25 FT.	G	1			✓					✓		9-22-09	1:15pm	✓
-2	SB# 2 @ 45 FT.	G	1			✓					✓		9-22-09	1:30pm	✓
-3	SB# 3 @ 20 FT.	G	1			✓					✓		9-22-09	2:00pm	✓
-4	SB# 3 @ 45 FT.	G	1			✓					✓		9-22-09	2:15pm	✓

Relinquished By: Darrell Mitchell	Date: 9/24/09 Time: 4:21p	Received By: Mary Rhett	Phone Result: ☐ Yes ☐ No Add'l Phone #:
Relinquished By:	Date: Time:	Received By:	Fax Result: ☐ Yes ☐ No Add'l Fax #: RICE
Delivered By: (Circle One) Sampler - UPS - Bus - Other:	Sample Condition Cool ☑ Yes ☐ No Intact ☑ Yes ☐ No	CHECKED BY: (Initials) MRB	REMARKS: EMAIL - HACK CONNER S@WD.COM

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

CARDINAL LABORATORIES

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

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

Receiving Date: 09/25/09
Reporting Date: 09/27/09
Project Number: NOT GIVEN
Project Name: BD F-25-1
Project Location: NOT GIVEN

Sampling Date: 09/25/09
Sample Type: WATER
Sample Condition: INTACT
Sample Received By: AB
Analyzed By: HM

LAB NO.	SAMPLE ID	Cl^- (mg/L)	TDS (mg/L)
Analysis Date:		09/26/09	09/26/09
H18342-1	SOIL BORE #2 WATER SAMPLE @ 53'	176	624
H18342-2	SOIL BORE #3 WATER SAMPLE @ 53'	184	661
Quality Control		500	NR
True Value QC		500	NR
% Recovery		100	NR
Relative Percent Difference		< 0.1	< 0.1
METHOD: Standard Methods, EPA		4500-Cl B	160.1

Chemist

09/28/09
Date

H18342 RICE

CARDINAL LABORATORIES

101 East Marland, Hobbs, NM 88240
(575) 393-2326 Fax (575) 393-2476

Page____ of____

Company Name:	Rice Operating Co.	**BILL TO**	
Project Manager:	Bruce Baker	P.O. #:	
Address:	122 W Taylor	Company:	
City:	Hobbs State: NM Zip: 88240	Attn:	
Phone #:	393-9174 Fax #: 397-1471	Address:	
Project #:	Project Owner:	City:	
Project Name:	BD 33 F-25-1	State: Zip:	
Project Location:		Phone #:	
Sampler Name:	Bruce Baker	Fax #:	

FOR LAB USE ONLY Lab I.D.	Sample I.D.	(G)RAB OR (C)OMP.	# CONTAINERS	MATRIX: GROUNDWATER	WASTEWATER	SOIL	OIL	SLUDGE	OTHER:	PRESERV.: ACID/BASE	ICE / COOL	OTHER:	SAMPLING: DATE	TIME	ANALYSIS REQUEST: Cl-	TDS
H03424	Soil Bore #2 water Sample													4S	✓	✓
-1	@ 53'	G	1	✓									9-25-09	9:30am		
-2	Soil Bore #3 water															
	Sample @ 53'	G	1	✓									9-25-09	9:30am	✓	✓

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.

Sampler Relinquished:	Date: 9-25-09 Time: 3:52	Received By:	
Bruce Baker			
Relinquished By:	Date: Time:	Received By:	
Delivered By: (Circle One) Sampler - UPS - Bus - Other:	Temp.	Sample Condition: Cool ☐ Yes ☑ No; Intact ☑ Yes ☐ No	CHECKED BY: (Initials)

Phone Result: ☐ No Add'l Phone #:
Fax Result: ☐ No Add'l Fax #:
REMARKS:
email results
Heander@riceswd.com, jpurvis@ricesud.com, Lweinheimer@ricesudca

† Cardinal cannot accept verbal changes. Please fax written changes to 575-393-2476.