1R - 426-104

WORKPLANS

DATE:
6-16-08

ARCADIS
Infrastructure, buildings, environment, communications

RECEIVED
2008 JUN 19 PM 1 32

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 3647

1R426-104

Subject:
Investigation and Characterization Plan
Blinebry-Drinkard (BD) Junction B-25
T21S, R37E, Section 25, Unit B, Eunice, Lea County, New Mexico

Date:
June 16, 2008

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. 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 Partners, who provide all operating capital on a percentage ownership/usage basis. Environmental projects of this magnitude require System Partner AFE approval and work begins as funds are received. In general, project funding is not forthcoming until NMOCD approves the work plan. Therefore, your timely review of this submission is requested.

For all environmental projects, ROC will choose a path forward that:

- protects public health,
- provides the greatest net environmental benefit,
- complies with NMOCD Rules, and
- is supported by good science.

Each site shall have three submissions or a combination of:

1. This Investigation and Characterization Plan (ICP) is a proposal for data gathering and site characterization and assessment.

2. Upon evaluating the data and results from the ICP, a recommended remedy will be submitted in a Corrective Action Plan (CAP).

3. Finally, after implementing the remedy, a closure report with final documentation will be submitted.

On behalf of ROC, ARCADIS respectfully submits this ICP for the above-referenced site.

SITE HISTORY AND BACKGROUND

The site is located west of the town of Eunice, New Mexico (Figure1). Elevated chlorides in this area have been reported since as early as 1952 (Ground-Water Report 6, Geology and Ground-Water conditions in Southern Lea County, Alexander Nicholson, Jr. and Alfred Clebsch, Jr.). The expected depth to groundwater at this site is approximately 37 feet below ground surface.

The junction was eliminated and replaced with a new junction box located 20 feet south of the former junction box location (Figure 2). Initial delineation began on May 26, 2004 and was completed on June 24, 2004. A backhoe was used to collect soil samples to a depth of 12 feet below ground surface (bgs) at the removed junction box location and 15 feet and 25 feet north, 10 feet east and 10 feet west of the junction box location. Backhoe soil samples were collected to a depth of six feet bgs at a location five feet south of the former junction box. Soil samples were analyzed in the field for chlorides using field-adapted Method 9253 and screened in the field using a photoionization detector (PID). Field analytical results are shown in Table 1.

A backhoe was used to excavate soils from an excavation around the former junction box measuring 30 feet by 30 feet by 6 feet deep. A four wall composite sample was collected from each of the four walls and five-point composite sample was collected from the bottom of the excavation and submitted to Cardinal Laboratories for gasoline range organics (GRO), diesel range organics (DRO) and chloride analysis. DRO was detected at a concentration of 203 milligrams per kilogram (mg/kg) in the four-point composite wall sample and at a concentration of 36.8 mg/kg in the five-point composite bottom sample. GRO was not detected. Elevated chlorides were detected in both the samples submitted to the lab and the samples analyzed in the field. Field and Laboratory analytical results are summarized in Tables 1 and 2.

Based on the results of the soil sampling analytical results, elevated chloride and hydrocarbon concentrations are present at the subject site (Figure 2).

A one-foot thick clay barrier was installed at a depth of 5 to 6 feet bgs to inhibit downward chloride migration. The clay layer was compacted to a dry density of 99.4% and 16.3% moisture. The excavated soils were blended on-site and returned to the excavation to backfill the excavation to ground surface and to contour the surrounding area. An identification plate was placed on the surface at the location of the former junction box to mark the presence of the clay liner.

A sample of the blended backfill material was submitted to Cardinal Laboratories for GRO, DRO and chloride analysis. GRO was not detected. DRO was detected at a concentration of 15.3 mg/kg and chlorides were detected at a concentration of 2,160mg/kg.

ROC disclosed potential groundwater impact at the site to NMOCD via e-mail on 11/4/2004. A disclosure report was submitted to NMOCD with all of the ROC 2007 Junction Box Reports in March 2005 per the ROC Junction Box Upgrade Work plan. The source of this impact is historical and has been removed

INVESTIGATION AND CHARACTERIZATION PLAN

As discussed above, existing site data suggest a potential for impairment of ground water quality. Therefore the work elements described below are designed to assist ROC in selecting an appropriate vadose zone remedy and, if necessary, a groundwater remedy.

Task 1- Collect Regional Hydrogeologic Data

Chloride impacted regional groundwater has been reported in this area near the towns of Eunice and Monument since as early as 1952 (Groundwater Report 6, Geology and Ground-Water Conditions in Southern Lea County , New Mexico, Nicholson and Clebsch, United States Geological Survey).

A one-half mile water well inventory will be performed. The water well inventory will include 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

One soil boring will be installed at the site near the former Junction box location. Soil samples will be collected at regular intervals no greater than five feet, screened in the field using a photo ionization detector (PID) and field tested for chlorides. Soil lithology and the presence of any observed staining or odor will be recorded. Representative select samples will be submitted to a laboratory for laboratory analysis as confirmation of the field sampling. The soil boring will be drilled to a depth where chloride concentrations do not exceed 250 mg/kg or to groundwater, whichever is shallower. If field chloride testing indicates elevated chlorides at the total depth of the boring, the boring will be converted to a monitor well.

The monitor well will be constructed of Schedule 40 PVC blank and the well screen will consist of Schedule 40 PVC with 0.020 inch slots. 15 feet of well screen will be installed, 5 feet above the groundwater table and 10 foot below. The monitor well will be constructed, developed and sampled in accordance with Environmental Protection Agency and NMOCD standards. A groundwater sample will be collected and submitted for laboratory analysis for chlorides, BTEX and general chemistry.

If analytical results indicate that chloride and/or BTEX concentrations in groundwater exceed New Mexico Water Quality Control Commission standards, additional monitoring wells may be installed as warranted by the results of the investigation.

Additional soil borings will be used to evaluate soil impacts. Soil borings will be installed in the approximate locations shown in Figure 3 in order to delineate the lateral extent of impacts to soil. Soil samples will be collected at regular intervals no greater than five feet, screened in the field using a photo ionization detector (PID) and field tested for chlorides. Soil lithology and the presence of any observed staining or odor will be recorded. Representative select samples will be submitted to a laboratory for laboratory analysis as confirmation of the field sampling.

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

The information gathered from Tasks 1 and 2 will 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 will be selected. If the evaluation demonstrates that residual constituents pose no threat to groundwater quality, only a surface restoration plan protective of groundwater will be proposed. Such recommendations and findings will be presented to NMOCD in a subsequent Corrective Action Plan (CAP). When evaluating any proposed remedy or investigative work, ROC will confirm that there is a reasonable relationship between the benefits created by the proposed remedy or assessment and the economic and social costs.

A report that details the investigation activities and results will be submitted to the NMOCD. The report will include recommendations for further action (CAP) if necessary or for closure of the site.

Very truly yours,

ARCADIS U.S, Inc.

Sharon E. Hall

Sharon E. Hall
Associate Vice President

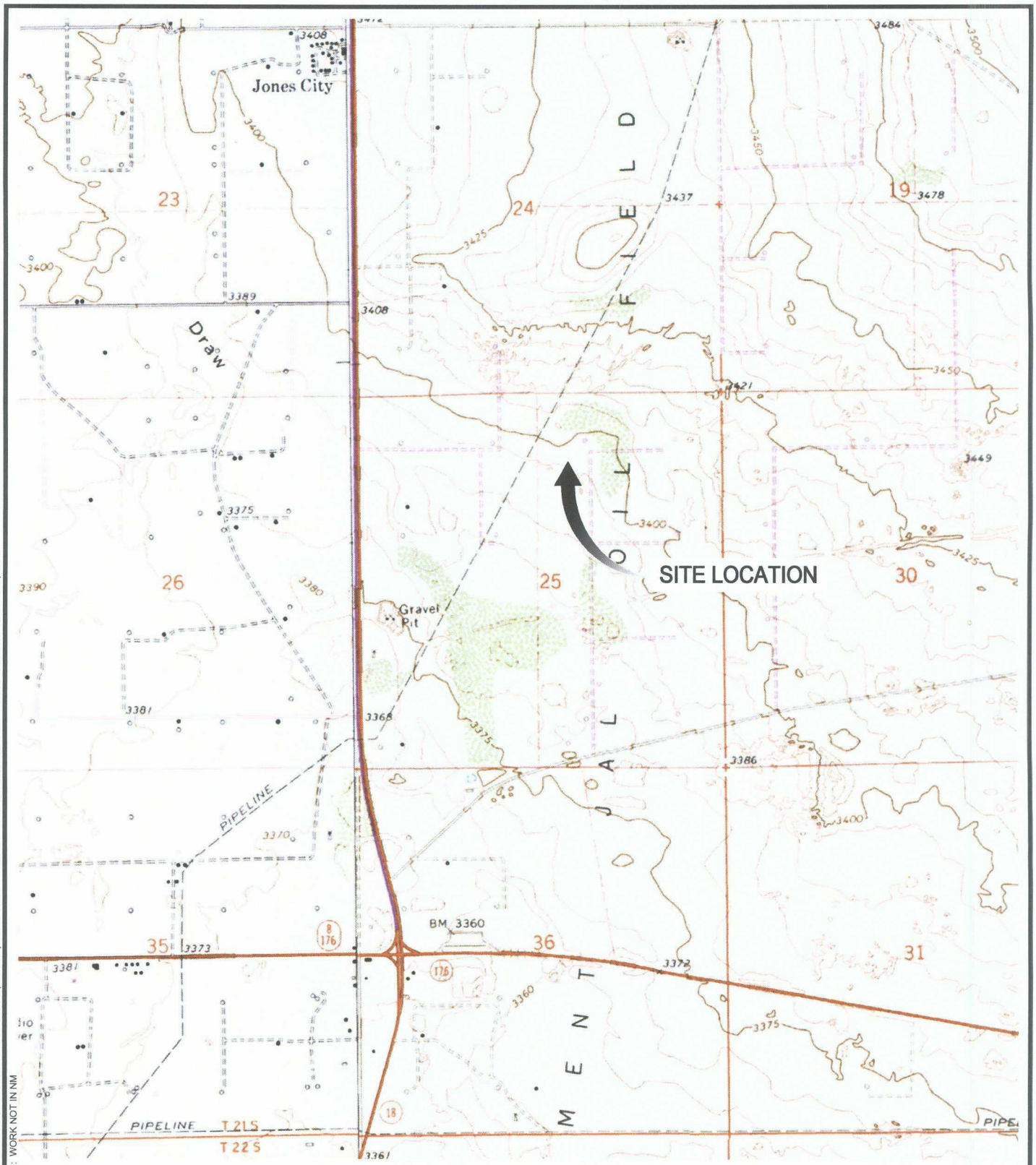
Copies:
Marvin Burrows- Rice Operating Company

Attachment:

Figures 1 and 2

Disclosure report with field sampling results

Tables 1 and 2



SOURCE: U.S. GEOLOGICAL SURVEY 7½ MINUTE TOPOGRAPHIC SERIES, EUNICE-EUNICE NE, NEW MEXICO QUADRANGLES, PUBLISHED 1979.

0 2000' 4000'

APPROXIMATE SCALE: 1" = 2000'

RICE OPERATING COMPANY
LEA COUNTY, NEW MEXICO

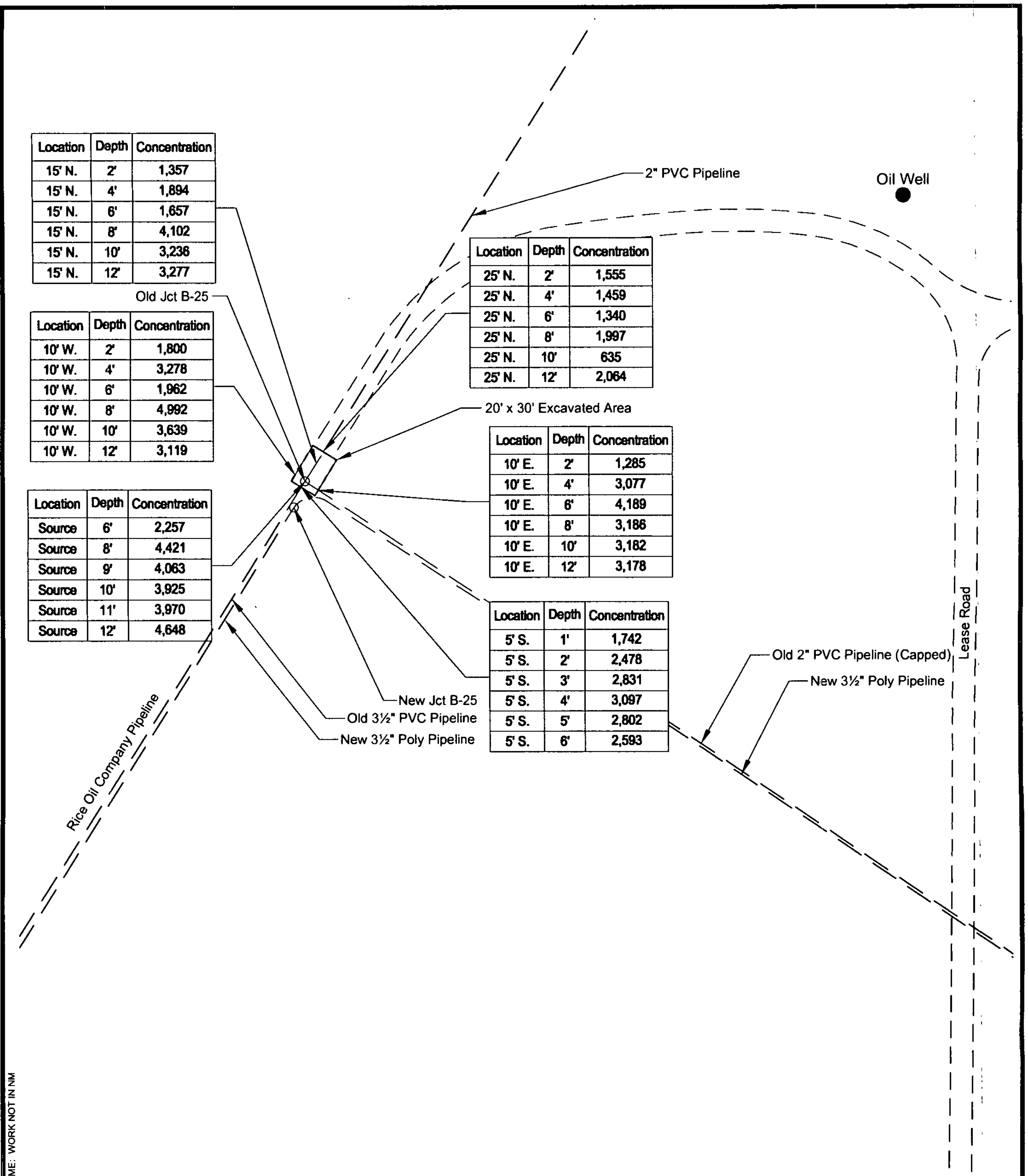
BLINEBRY-DRINKARD (BD) JUNCTION B-25
INVESTIGATION AND CHARACTERIZATION PLAN

SITE LOCATION MAP

ARCADIS

FIGURE 1

CITY: MIDLAND TX DIV/GROUP: ENV DB: HC LD: HC PIC: PM: SH TM: SH LYR: ON=*;OFF=*REF* UN:
G:\CAD\ACTIVITY\00101300001\0000101\DWG\00101300B01.DWG LAYOUT: 1 SAVED: 6/13/2008 7:26 AM ACADVER: 17.0S (LMS TECH) PAGESETUP: — PLOTSTYLETABLE: AGANDM.CTB PLOTTED: 6/13/2008 7:27 AM BY: CLARDY, HERB
XREFS:
IMAGES:
EUNICE-EUNICE NE.tif
PROJECTNAME: WORK NOT IN NM



Location	Depth	Concentration
15' N.	2'	1,357
15' N.	4'	1,894
15' N.	6'	1,657
15' N.	8'	4,102
15' N.	10'	3,236
15' N.	12'	3,277

Location	Depth	Concentration
10' W.	2'	1,800
10' W.	4'	3,278
10' W.	6'	1,962
10' W.	8'	4,992
10' W.	10'	3,639
10' W.	12'	3,119

Location	Depth	Concentration
Source	6'	2,257
Source	8'	4,421
Source	9'	4,063
Source	10'	3,925
Source	11'	3,970
Source	12'	4,648

Location	Depth	Concentration
25' N.	2'	1,555
25' N.	4'	1,459
25' N.	6'	1,340
25' N.	8'	1,997
25' N.	10'	635
25' N.	12'	2,064

Location	Depth	Concentration
10' E.	2'	1,285
10' E.	4'	3,077
10' E.	6'	4,189
10' E.	8'	3,186
10' E.	10'	3,182
10' E.	12'	3,178

Location	Depth	Concentration
5' S.	1'	1,742
5' S.	2'	2,478
5' S.	3'	2,831
5' S.	4'	3,097
5' S.	5'	2,802
5' S.	6'	2,593

EXPLANATION

PIPELINE TRACE

LEASE ROADS

BERMED AREAS

0 100' 200'

APPROXIMATE SCALE: 1" = 100'

PROJECTNAME: WORK NOT IN NM

RICE OPERATING COMPANY
LEA COUNTY, NEW MEXICO

BLINEBRY-DRINKARD (BD) JUNCTION B-25
INVESTIGATION AND CHARACTERIZATION PLAN

CHLORIDE CONCENTRATIONS
MILLIGRAM PER KILOGRAM (mg/kg)

ARCADIS

FIGURE 2

Table 1 - Field Delineation Results Milligrams per Kilogram						
Chlorides						
	Source	**5'S**	**15'N**	**25'N**	**10'W**	**10'E**
1'		1742				
2'		2478	1357	1555	1800	1285
3'		2831				
4'		3097	1894	1459	3278	3077
5'		2802				
6'	2257	2593	1657	1340	1962	4189
7'						
8'	4421		4102	1997	4992	3186
9'	4063					
10'	3925		3236	635	3639	3182
11'	3970					
12'	4648		3277	2064	3119	3178

Table 2- Field and Laboratory Results - Excavation and Backfill						
Test	Field			Lab Results (mg/kg)		
	CL mg/kg)	PID		CL	DRO	GRO
4-Wall Composite	2913	0.1		3200	203	<10
Bottom Composite	3334	0.1		3200	36.8	<10
Remediation Backfill	2293	0.1		2160	15.3	<10

RICE OPERATING COMPANY
JUNCTION BOX **DISCLOSURE** * REPORT

BOX LOCATION

SWD SYSTEM	JUNCTION	UNIT	SECTION	TOWNSHIP	RANGE	COUNTY	BOX DIMENSIONS - FEET		
							Length	Width	Depth
BD	B-25	B	25	21S	37E	Lea	moved 20 ft South		

LAND TYPE: BLM _____ STATE _____ FEE LANDOWNER Patricia House OTHER _____

Depth to Groundwater 37 feet NMOCD SITE ASSESSMENT RANKING SCORE: 20

Date Started 5/26/2004' *Date Completed* 6/24/2004 OCD Witness No

Soil Excavated 133 cubic yards Excavation Length 30 Width 20 Depth 6 feet

Soil Disposed 0 cubic yards Offsite Facility n/a Location n/a

FINAL ANALYTICAL RESULTS: **Sample Date** 5/28/2004 **Sample Depth** 6 ft

Procure 5-point composite sample of bottom and 4-point composite sample of excavation sidewalls. TPH and Chloride laboratory test results completed by using an approved lab and testing procedures pursuant to NMOCD guidelines.

Sample Location	PID ppm	GRO mg/kg	DRO mg/kg	Chloride mg/kg
4-WALL COMP.	0.1	<10.0	203	3200
BOTTOM COMP.	0.1	<10.0	36.8	3200
REMED. BACKFILL	0.1	<10.0	15.3	2160

CHLORIDE FIELD TESTS

LOCATION	DEPTH (ft)	ppm
vertical at junction box	6	2257
	8	4421
	9	4063
	10	3925
	11	3970
	12	4678
10 ft *west* of junction box	2	1800
	4	3278
	6	1962
	8	4992
	10	3639
	12	3119
4-wall comp.	n/a	2913
bottom comp.	6	3334
remed. backfill	n/a	2293

General Description of Remedial Action: This junction was moved 20 ft south where a new junction box was built. The former junction box site was delineated using a backhoe while chloride field tests and PID screenings were conducted at regular intervals. All PID results were relatively low and NMOCD TPH guidelines were met on the bottom and backfill composite samples of the 30 x 20 x 6-ft-deep excavation. The 4-wall composite, however, did not meet NMOCD TPH guidelines. Chloride impact was elevated and also did not decline with depth or breath. At the bottom of the excavation at 6 ft BGS, a 1-ft-thick compacted clay barrier was installed to inhibit further downward chloride migration. The excavated soils were blended on site and backfilled into the hole. An identification plate has been placed on the surface of this site for future considerations. NMOCD has been notified of potential groundwater impact at this location.

ADDITIONAL EVALUATION IS *HIGH* PRIORITY

enclosures: chloride graphs, photos, lab results, PID screenings, clay test, cross-section

I HEREBY CERTIFY THAT THE INFORMATION ABOVE IS TRUE AND COMPLETE TO THE BEST OF MY KNOWLEDGE AND BELIEF.

SITE SUPERVISOR Joe Gatts SIGNATURE Joe Gatts COMPANY RICE Operating Company

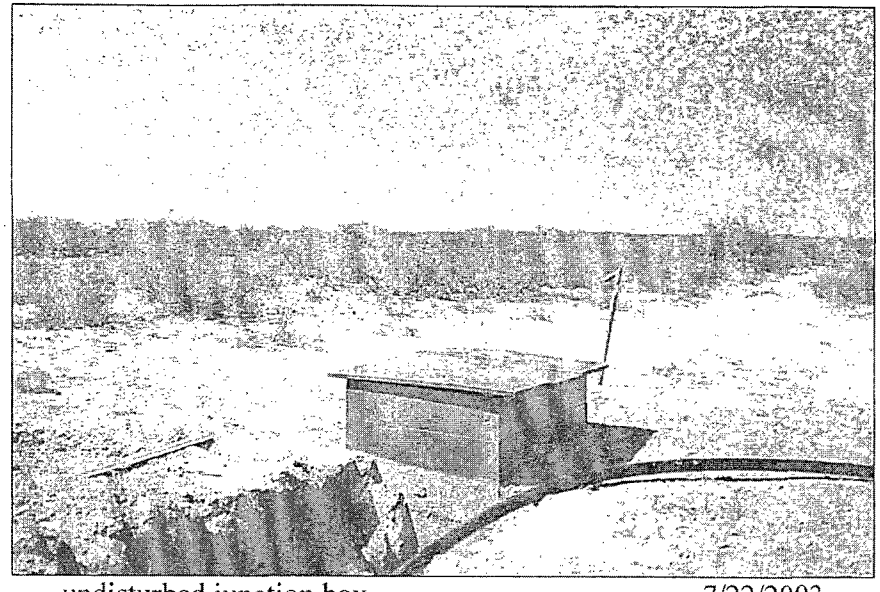
REPORT ASSEMBLED BY Kristin Farris Pope SIGNATURE Kristin Farris Pope

DATE 11/4/2004 TITLE Project Scientist

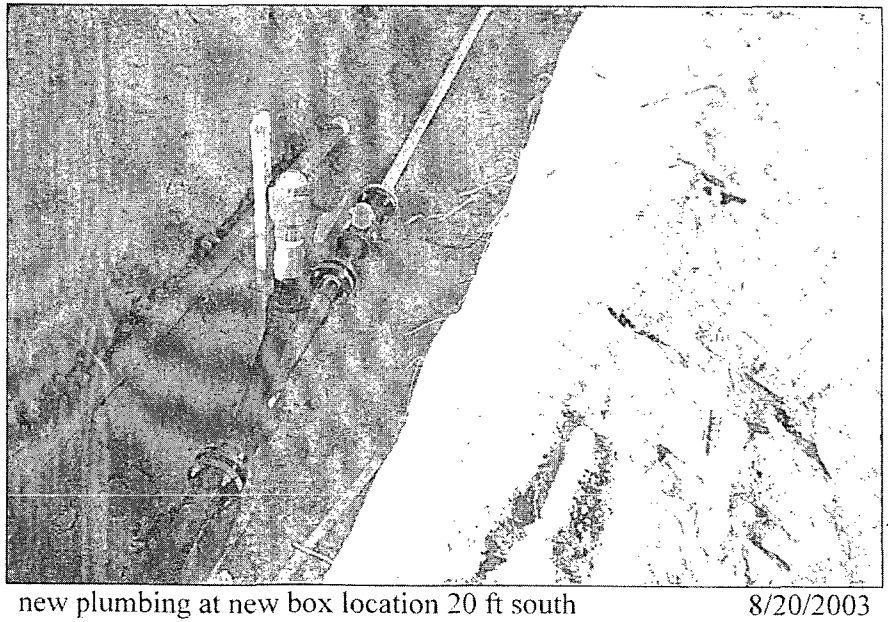
**** This site is a "DISCLOSURE." It will be placed on a prioritized list of similar sites for further consideration.***

EME jct. B-25

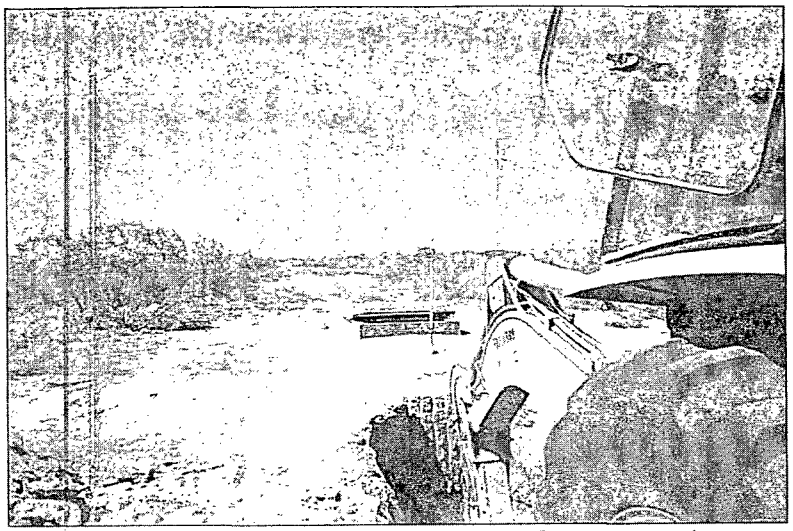
unit 'B', Sec. 25, T21S, R37E



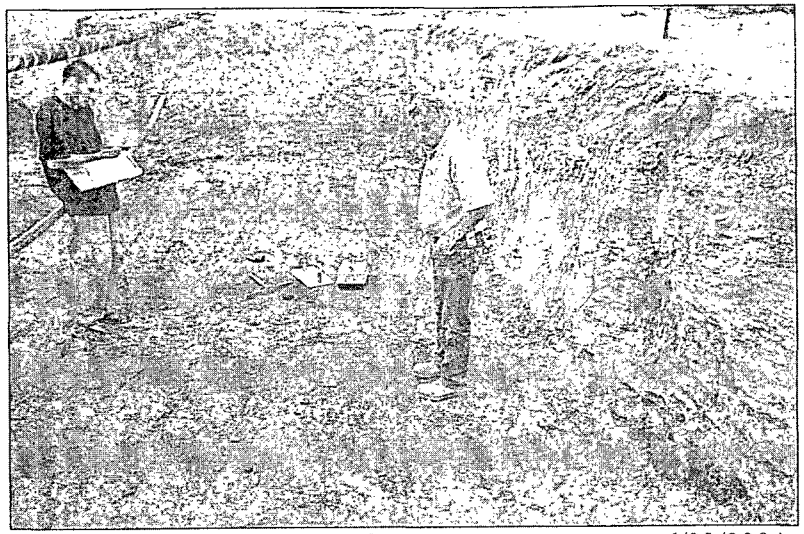
undisturbed junction box 7/22/2003



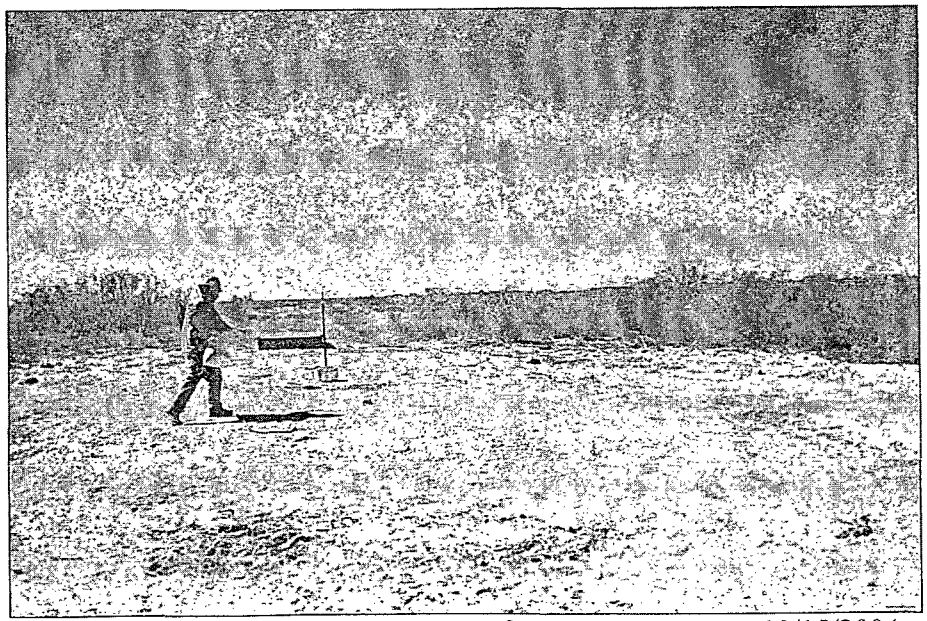
new plumbing at new box location 20 ft south 8/20/2003



beginning delineation & excavation at former box site;
new junction box in background 5/26/2004



testing compacted clay at 6 ft BGS 6/22/2004

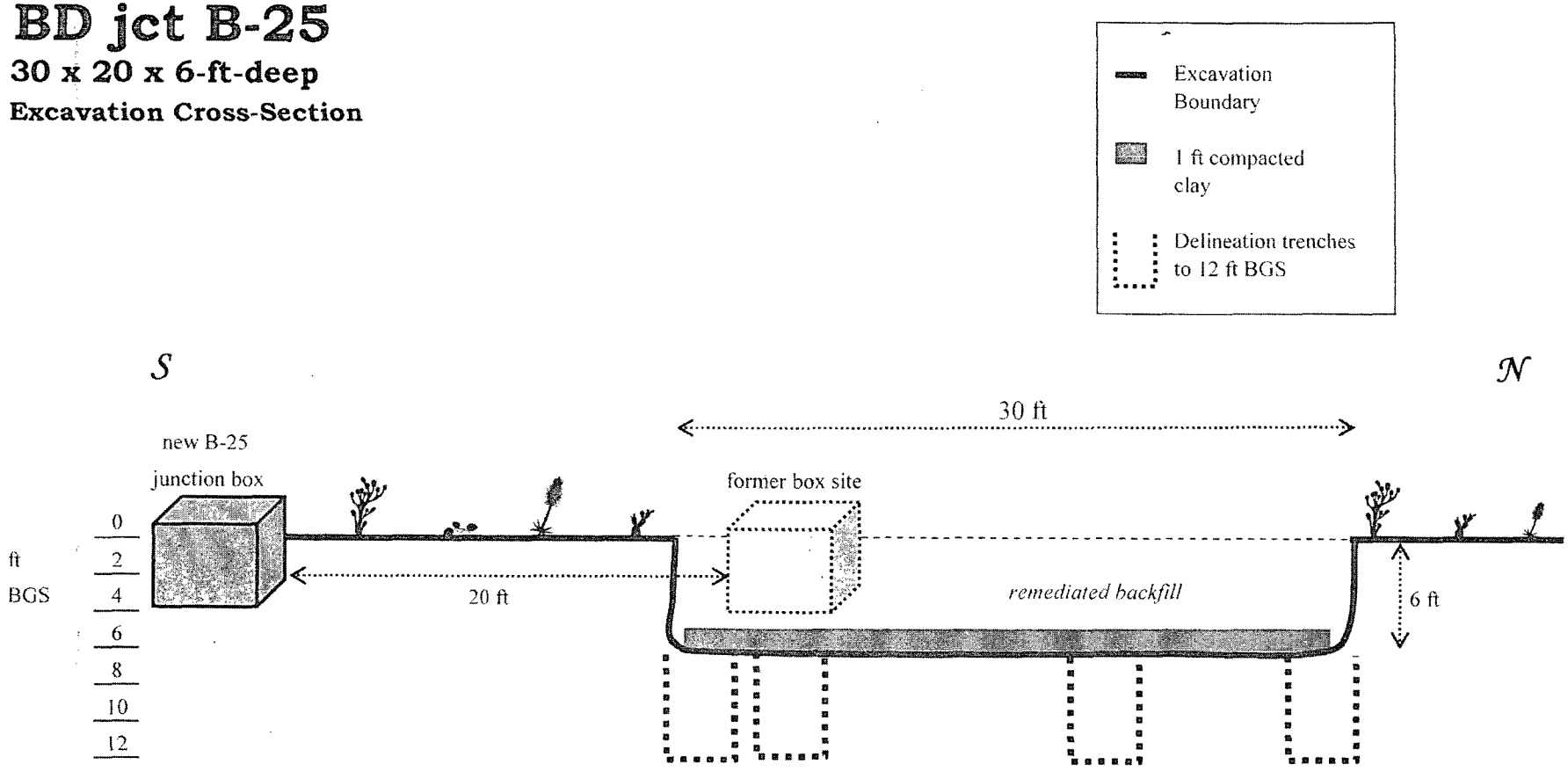


seeding disturbed area; ID plate on surface 10/15/2004

BD jct B-25

30 x 20 x 6-ft-deep

Excavation Cross-Section



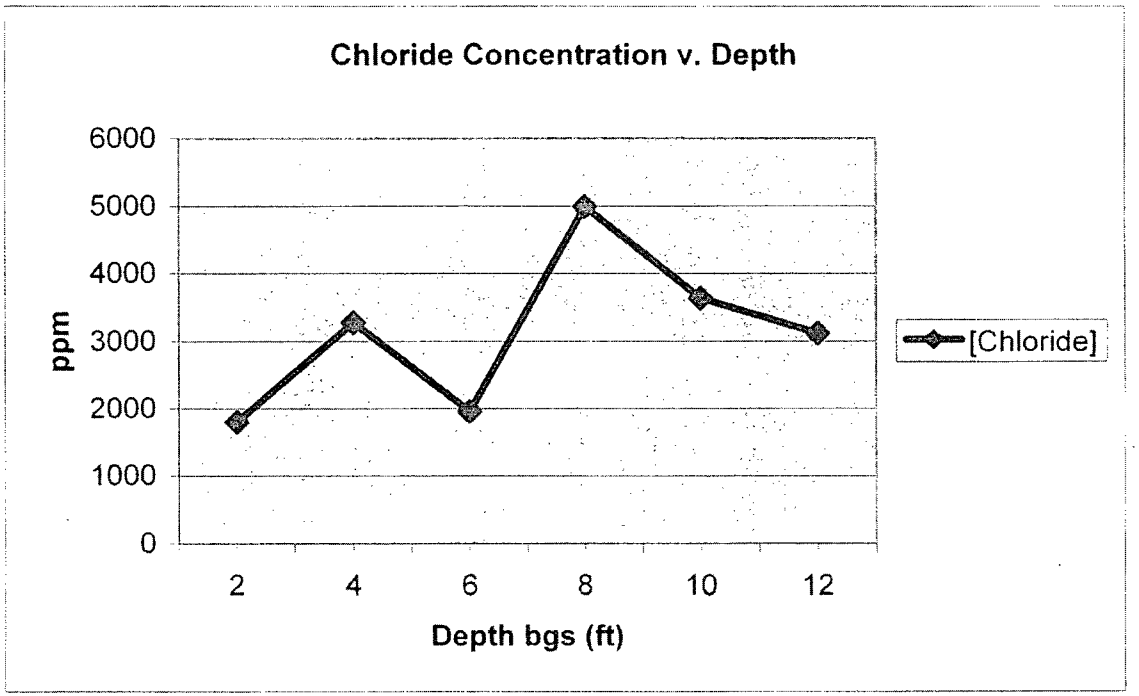
BD jct. B-25

unit 'B', Sec. 25, T21S, R37E

10 ft WEST of junction

Depth bgs (ft)	[Cl⁻] ppm
2	1800
4	3278
6	1962
8	4992
10	3639
12	3119

Groundwater = 37 ft



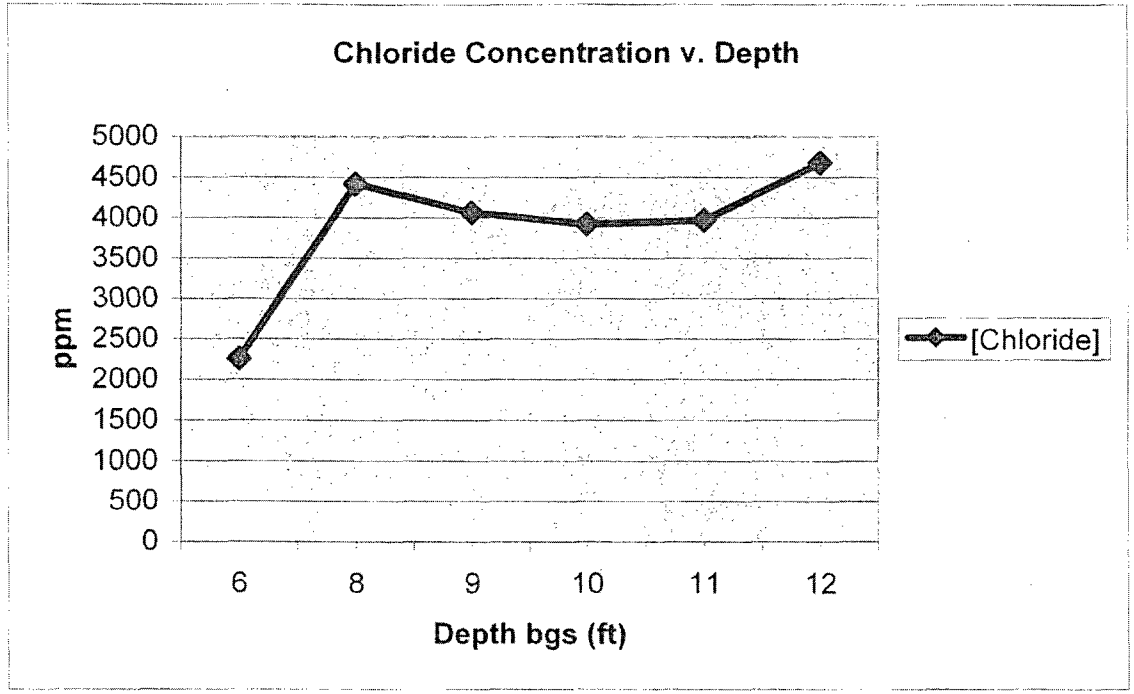
BD jct. B-25

unit 'B', Sec. 25, T21S, R37E

Vertical Delineation at Source

Depth bgs (ft)	[Cl⁻] ppm
6	2257
8	4421
9	4063
10	3925
11	3970
12	4678

Groundwater = 37 ft



CARDINAL LABORATORIES

PHONE (325) 673-7001 • 2111 BEECHWOOD • ABILENE, TX 79603
PHONE (505) 393-2326 • 101 E. MARLAND • HOBBS, NM 88240

ANALYTICAL RESULTS FOR
RICE OPERATING CO.
ATTN: J. GATTS
122 W. TAYLOR
HOBBS, NM 88240
FAX TO:

Receiving Date: 06/01/04
Reporting Date: 06/03/04
Project Number: NOT GIVEN
Project Name: B-25
Project Location: BD

Sampling Date: 05/28/04
Sample Type: SOIL
Sample Condition: COOL & INTACT
Sample Received By: AH
Analyzed By: BC/AH

LAB NUMBER	SAMPLE ID	GRO (C_6-C_{10}) (mg/Kg)	DRO (>C_{10}-C_{28}) (mg/Kg)	Cl* (mg/Kg)
ANALYSIS DATE		06/02/04	06/02/04	06/01/04
H8756-1	4 WALL COMP.	<10.0	203	3200
H8756-2	BOTT. COMP. @ 6' BGS	<10.0	36.8	3200
H8756-3	REMD. BACKFILL	<10.0	15.3	2160
Quality Control		781	785	950
True Value QC		800	800	1000
% Recovery		97.6	98.1	95.0
Relative Percent Difference		2.3	6.5	6.0

METHODS: TPH GRO & DRO: EPA SW-846 8015 M; Cl^-: Std. Methods 4500-Cl^-B
*Analyses performed on 1:4 w:v aqueous extracts.

Chemist

6/3/04
Date

H8756.XLS

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 client for 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 thirty (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.

CARDINAL LABORATORIES, INC.

CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

2111 Beechwood, Abilene, TX 79603 101 East Marland, Hobbs, NM 88240
(915) 673-7001 Fax (915) 673-7020 (505) 393-2326 Fax (505) 393-2476

Page ____ of ____

Company Name:	Rice Operating	BILL TO	
Project Manager:	J. Gatts	P.O. #:	
Address:	122 W. Taylor	Company:	
City:	Hobbs State: NM Zip: 88240	Attn:	
Phone #:	505 393-9174 Fax #:	Address:	
Project #:	Project Owner:	City:	
Project Name:	B-25	State: Zip:	
Project Location:	BD	Phone #:	
Sampler Name:	J. Gatts	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	TPH 3015	Cl.
H8756-1	4WALL Comp	C	1			X					X		5/28/04	8:15	X	X
-2	Bott Comp at 6'bgs	C	1			X					X		5/28/04	8:05	X	X
-3	REMD Backfill	C	1			X					X		5/28/04	8:25	X	X

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.

Terms and Conditions: Interest will be charged on all accounts more than 30 days past due at the rate of 24% per annum from the original date of invoice, and all costs of collections, including attorney's fees.

Sampler Relinquished:	Date:	Received By:	
	Time:		
Relinquished By:	Date: 6/1/04	Received By: (Lab Staff)	
	Time: 7:42		
Delivered By: (Circle One) Sampler - UPS - Bus - Other:		Sample Condition: Temp. °C / Intact? ☐ Yes ☐ No	Checked By: (Initials)

Phone Result: ☐ Yes ☐ No
Fax Result: ☐ Yes ☐ No
REMARKS:

† Cardinal cannot accept verbal changes. Please fax written changes to (915) 673-7020.

RICE OPERATING COMPANY

122 WEST TAYLOR
HOBBS, NEW MEXICO 88240
PHONE: (505) 393-9174 FAX: (505) 397-1471

VOC FIELD TEST REPORT FORM

MINI RAE PLUS CLASSIC PHOTOIONIZATION GAS DETECTOR

MODEL NO: PGM 761S
SERIAL NO: 104412
CALIBRATION GAS
GAS COMPOSITION: ISOBUTYLENE
100 PPM
AIR
BALANCE
LOT NO: 02-22-30
FILL DATE: 5/20/03
EXP. DATE: 11/20/04
ACCURACY: 1 or - 2%
METER READING
ACCURACY: 100.1

SYSTEM	JUNCTION	UNIT	SECTION	TOWNSHIP	RANGE
DD	B-25	B	25	21	37

SAMPLE	PID RESULT	SAMPLE	PID RESULT
10' U. WALL	.1		
10' E. WALL	.2		
25' N. WALL	.2		
5' S. WALL	.2		
4 WALL COMP	.1		
Bott. Compat'b'	.1		
REMD BACKFILL	.1		

I certify that I have calibrated the above instrument in accordance to the manufacture operation manual.

J. Scott
Signature

5/28/04
Date

LABORATORY TEST REPORT

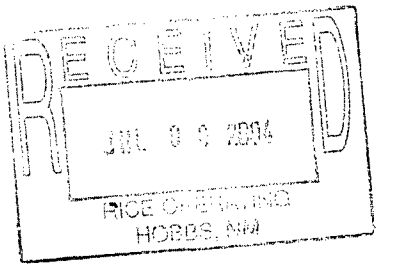
PETTIGREW & ASSOCIATES, P.A.
1110 N. GRIMES
HOBBS, NM 88240
(505) 393-9827

AASHTO R18

DEBRA P. HICKS, P.E./L.S.I.
WILLIAM M. HICKS, III, P.E./P.S.

To:	Rice Operating Attn: Carolyn Haynes 122 W. Taylor Hobbs, NM 88240	Material:	Red Clay
	BD	Test Method:	ASTM: D 2922
Project:	B-25		
Date of Test:	June 22, 2004	Depth:	Finished Subgrade

Test No.	Location	Dry Density % Maximum	% Moisture	Depth
SG-1	Pit - 20' E. & 5' S. of the NW Corner	99.4	16.3	



Control Density: 109.5
ASTM: D 698

Optimum Moisture: 16.6

Required Compaction: 95%

Lab No.: 04 7281

Copies To: Rice

PETTIGREW & ASSOCIATES

BY: [signature] S.E.I.

Israel Juarez 505 9613 OP