AP - 47

STAGE 1 & 2 WORKPLANS

DATE:

July, 2005

Highlander Environmental Corp.

Midland, Texas

CERTIFIED MAIL
RETURN RECIEPT NO. 7004 1160 0000 4837 8621

July 7, 2005

Mr. Daniel Sanchez
New Mexico Energy, Minerals, & Natural Resources
Oil Conservation Division, Environmental Bureau
1220 S. St. Francis Drive
Santa Fe, New Mexico 87504

2005 JUL 15 PM 12 51

RE: **STAGE I ABATEMENT PLAN**
JCT. F-17, BD SWD SYSTEM
UNIT "F", SEC. 17, T21S, R37E
NMOCD Case #1R0426-14

Mr. Price:

RICE Operating Company (ROC) has retained Highlander Environmental Corp. (Highlander) to address potential environmental concerns at the above-referenced site. ROC is the service provider (operator) for the Blinebry Drinkard 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. In general, project funding is not forthcoming until NMOCD approves the work plan. Therefore, your timely review of this submission is requested. The following Stage I Abatement Plan is for the BD F-17 Site.

Should you have any questions, please contact me at (432) 682-4559. Your prompt review of this submission is appreciated. Thank you for your attention to this matter.

Respectfully Submitted,
Highlander Environmental Corp.

Tim Reed

Timothy M. Reed, P.G.
Vice President

cc: Wayne Price – NMOCD
Kristin Farris Pope - ROC

STAGE I ABATEMENT PLAN

JCT. F-17, BD SWD SYSTEM

UNIT "F", SEC. 17, T-21-S, R-37-E

NMOCD CASE #1R0426-14

Prepared
for

RICE OPERATING COMPANY

JULY 2005

Highlander Environmental Corp.

Midland, Texas

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STAGE I ABATEMENT PLAN
JCT. F-17, BD SWD SYSTEM
UNIT "F", SEC. 17, T21S, R37E
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1.0 EXECUTIVE SUMMARY

As part of the ROC Junction Box Upgrade Workplan, on September 17, 2002, the Blinebry Drinkard (BD) SWD System junction box F-17 was removed. The Site was delineated vertically and horizontally with a backhoe. Visible hydrocarbon impact was noted to a depth of 11' below ground surface (bgs). Chloride impact was consistent vertically. During the excavation, an older junction box was discovered approximately 10' south of the existing location. A soil boring was placed near this old box location and advanced to a depth of 75'. Chloride concentrations declined with depth, however, chloride impact to groundwater was observed. No TPH impact to groundwater was indicated.

A cased monitor well was installed and groundwater has been sampled and analyzed on a quarterly basis. The quarterly sampling has confirmed that there is no hydrocarbon impact to groundwater at this Site. The only Constituent of Concern (COC) at this Site is chloride.

The excavation was backfilled and the junction moved 45' south of the original site. ROC submitted a Junction Box Disclosure Form to the NMOCD. According to measurements taken from the monitor well, the depth to water is approximately 75' bgs.

2.0 CHRONOLOGY OF EVENTS

September 17, 2002	The junction box was removed and the Site was delineated vertically and horizontally with a backhoe. The Site was excavated to the approximate dimensions of 20' x 20' x 12'.
November 18, 2002	A soil boring was placed near the old box location and advanced to a depth of 75'. A cased monitor well was installed to a total depth of 85'.
December 13, 2002	NMOCD director notified of groundwater impact.
November 7, 2003	ROC submitted a Junction Box Disclosure Form to the NMOCD.
June 5, 2003	Monitor Well (MW-1) was purged and sampled.
August 22, 2003	Monitor Well (MW-1) was purged and sampled.

1910 N. Big Spring • Midland, Texas 79705 • (432) 682-4559 • Fax (432) 682-3946

November 20, 2003	Monitor Well (MW-1) was purged and sampled.
February 25, 2004	Monitor Well (MW-1) was purged and sampled.
May 27, 2004	Monitor Well (MW-1) was purged and sampled.
September 2, 2004	Monitor Well (MW-1) was purged and sampled.
December 21, 2004	Monitor Well (MW-1) was purged and sampled.
January 21, 2005	2004 Monitor Well Report/Sampling Summary was submitted to the NMOCD.
January 26, 2005	Monitor Well (MW-1) was purged and sampled.
March 17, 2005	Investigation & Characterization Plan (ICP) submitted to the NMOCD.
April 28, 2005	Monitor Well (MW-1) was purged and sampled.
May 5, 2005	Daniel Sanchez (NMOCD) requested a Rule 19 Stage I Abatement Plan for this site.
June 21, 2005	Monitor Well (MW-1) was purged and sampled.

3.0 BACKGROUND & PREVIOUS WORK

As part of the ROC Junction Box Upgrade Workplan, starting on September 17, 2002, the junction box was removed and the Site was delineated vertically and horizontally with a backhoe. The Site was excavated to the approximate dimensions of 20' x 20' x 12'. Visible TPH impact was noted to a depth of 11' below ground surface (bgs). Chloride impact was consistent vertically. No TPH impact to groundwater was indicated. During the excavation, an older junction box was discovered approximately 10' south of the existing location. On November 18, 2002, a soil boring was placed near this old box location and advanced to a depth of 75'. Chloride concentrations declined with depth, however, chloride impact to groundwater was observed. As with the previous excavation, no TPH impact to groundwater was indicated. The Site location is shown on Figure 1.

A 2" diameter monitor well was installed to a total depth of 85'. Groundwater has been sampled and analyzed on a quarterly basis since June 2003. The quarterly sampling has confirmed that there is no hydrocarbon impact to groundwater at this Site, and in sampling events to date, the only constituent of concern observed was chloride, with concentrations ranging from 177 mg/L to 2,510 mg/L. Total dissolved solid concentrations have ranged from 589 mg/L to 4,770 mg/L.

The excavation was backfilled and the junction moved 45' south of the original site. On November 7, 2003 ROC submitted a Junction Box Disclosure Form to the NMOCD. According to measurements taken from the monitor well, the depth to water is approximately 75' bgs.

The source of this impact is historical. There is no longer a threat of compounded impact at this site because pipeline was replaced and the box was replaced with a new watertight junction box.

4.0 GEOLOGY & HYDROGEOLOGY

4.1 Regional and Local Geology

This site is located in the Eunice Plain physiographic subdivision of southern Lea County. The Eunice Plain is bounded on the north by the Llano Estacado, and on the southwest by San Simon Ridge and Antelope Ridge. The Eunice Plain is underlain by a hard caliche surface and is almost entirely covered by a reddish-brown dune sand. Tertiary rocks in this area are represented by the Ogallala formation of Pliocene age. The Ogallala underlies most of the Eunice Plain. It is a heterogeneous complex of terrestrial sediments, which mantles an irregular erosion surface cut into the Triassic rocks.

4.2 Regional and Local Hydrogeology

Groundwater occurs under unconfined conditions in the Ogallala Formation. The Ogallala Formation is regionally known as the High Plains Aquifer. Recharge to the Ogallala Formation occurs through infiltration of rainfall and snowmelt. Discharge occurs principally through pumping from wells.

The regional flow direction for groundwater in the High Plains aquifer is primarily to the south-southeast. The depth to water in monitor well MW-1 is approximately 75' (TOC).

4.3 Water Well Inventory

A water well inventory will be performed to encompass a ½ mile radius around the facility. The inventory will include a review of water well records on the New Mexico Office of the State Engineer W.A.T.E.R.S. database and United States Geologic Survey (USGS) website. Any water wells denoted on the USGS 7.5 minute topographic quadrangle map within the search radius will be inspected.

5.0 SUBSURFACE SOILS

The soils in the vicinity of this site are of the Pyote soils and Dune land association, and soils of the Simona Series. In Pyote soils, typically, the surface layer is light-brown fine sand about 30 inches thick. The subsoil is fine sandy loam approximately 18 inches thick. The subsoil, to a depth of approximately 60 inches is pink fine sandy loam.

The Simona Series soil is represented by the Simona fine sandy loam, 0 to 3 percent slopes (SE). The Simona fine sandy loam has a surface layer consisting of grayish-brown fine sandy loam, approximately 8 inches thick. The surface layer is underlain by subsoil consisting of pale brown fine sandy loam, approximately 8 inches thick. The subsoil is underlain by a dense layer of white indurated caliche. The caliche is typically about 16 inches thick and strongly cemented.

The soil boring performed at this site indicated sand, with intermittent caliche layers and sandstone stringers to 75'.

6.0 GROUNDWATER QUALITY

6.1 Monitoring Program

The monitoring well has been sampled on a quarterly basis since installation. The most recent sampling was performed on June 21, 2005, and the data was submitted to the NMOCD most recently on January 21, 2005, in the Annual Ground Water Report. Quarterly sampling of this well and any additional well(s) will continue.

6.2 Hydrocarbons in Groundwater

To date, no hydrocarbon impact has been detected in MW-1, and as such is not considered a Constituent of Concern at this site.

6.3 Other Constituents of Concern

In the quarterly sampling events to date, the only constituent of concern observed was chloride, with concentrations ranging from 177 mg/L to 2,510 mg/L. Total dissolved solid concentrations have ranged from 589 mg/L to 4,770 mg/L.

7.0 STAGE I ABATEMENT PLAN

Highlander proposes to install two additional monitoring wells at the junction box location. The monitor wells will be placed appropriately to evaluate groundwater impact and hydraulic gradient. The monitor wells will be constructed according to EPA and industry standards.

Following installation, the wells will be developed either by bailing with a rig or hand bailer, or pumping with an electric submersible pump to remove fine grained sediment disturbed during drilling and to ensure collection of representative groundwater samples. Water removed from the well will be disposed of in the BD SWD System.

As part of the Stage I Abatement Plan, the residual impact to Vadose Zone soils will be evaluated by various methods to determine what, if any remediation/isolation techniques will be required at the Site.

The information 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. Such recommendations and findings will be presented to NMOCD in a subsequent Stage II Abatement Plan. 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.

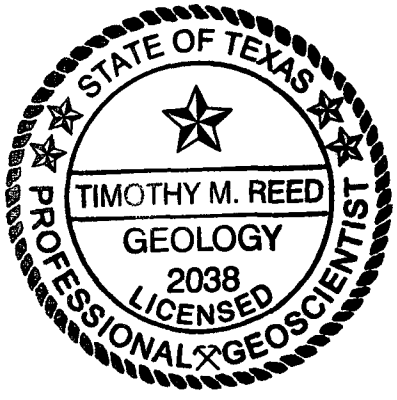
8.0 QUALITY ASSURANCE/ QUALITY CONTROL

All monitor wells will be constructed to EPA and industry standards. All downhole equipment (i.e., drill rods, drill bits, etc.) will be thoroughly decontaminated between each use with a steam cleaner.

The wells will be inspected for the presence of phase-separated hydrocarbons (PSH) and, if present, a sample will be collected and analyzed by gas chromatography (GC) to determine composition and origin. The wells will be properly purged and sampled with clean, dedicated, polyethylene bailers and disposable line. The groundwater samples will be submitted to a laboratory for analysis of Benzene, Toluene, Ethylbenzene, and Xylene (BTEX) by method EPA 8021B, and chloride by method 300.0.

9.0 PROPOSED SCHEDULE OF ACTIVITIES

Upon approval, the work outlined above will be implemented in a timely manner, dependent upon availability of local drilling contractors. Quarterly sampling of the existing monitor well will be continued and all results will be submitted in an annual summary report within the first quarter of 2006.



Respectfully Submitted,
Highlander Environmental Corp.

Tim Reed

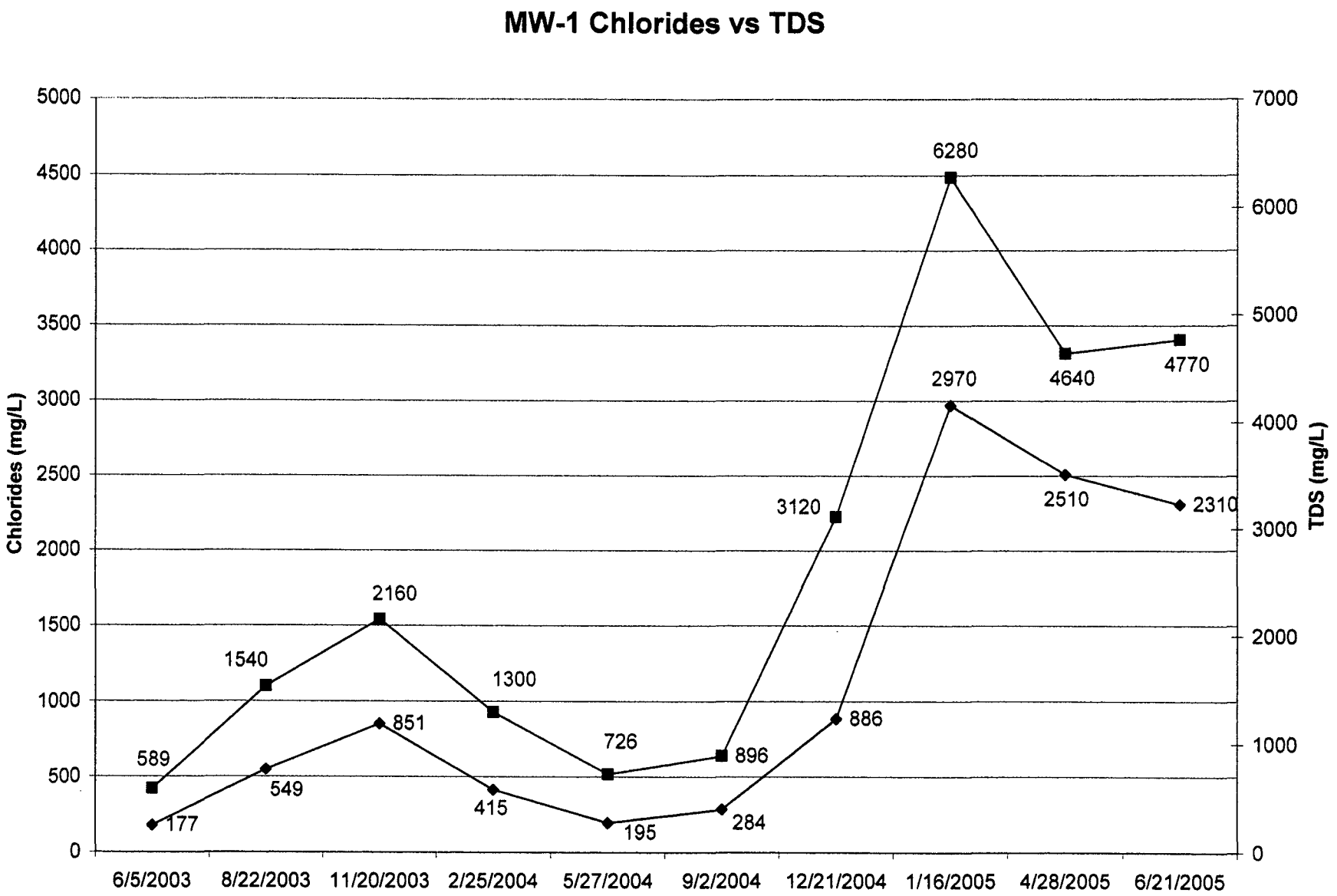
Timothy M. Reed, P.G.
Vice President

TABLES

Rice Operating Company
F-17 Monitor Well Data

H:O&G/2305/MW Table 6-28-05

MW #	Sample Date	Depth to Water	Total Depth	Well Volume	Volume Purged	Chlorides	TDS	Benzene	Toluene	Ethylbenzene	Total Xylenes
MW-1	6/5/2003	75.67	85.20	1.52	4.50	177	589	<0.004	<0.001	<0.001	<0.001
	8/22/2003	75.73	85.12	1.50	4.50	549	1540	<0.001	<0.001	<0.001	<0.001
	11/20/2003	75.75	84.85	1.46	4.30	851	2160	<0.001	<0.001	<0.001	<0.001
	2/25/2004	75.73	84.48	1.40	4.20	415	1300	<0.001	<0.001	<0.001	<0.001
	5/27/2004	71.75	85.12	2.13	6.40	195	726	<0.001	<0.001	<0.001	<0.001
	9/2/2004	75.48	84.60	1.46	4.40	284	896	<0.001	<0.001	<0.001	<0.001
	12/21/2004	75.10	84.00	1.42	4.50	886	3120	<0.001	<0.001	<0.001	<0.001
	1/16/2005	75.18	84.07	1.42	4.26	2970	6280	<0.001	<0.001	<0.001	<0.001
	4/28/2005	75.21	84.20	1.44	5.00	2510	4640	<0.001	<0.001	<0.001	<0.001
	6/21/2005	75.20	84.15	1.43	10.00	2310	4770	<0.001	<0.001	<0.001	<0.001


MW-1 Chlorides vs TDS
Chlorides (mg/L)
TDS (mg/L)
5000
4500
4000
3500
3000
2500
2000
1500
1000
500
0
7000
6000
5000
4000
3000
2000
1000
0
589
1540
2160
1300
726
896
3120
6280
4640
4770
177
549
851
415
195
284
886
2970
2510
2310
6/5/2003
8/22/2003
11/20/2003
2/25/2004
5/27/2004
9/2/2004
12/21/2004
1/16/2005
4/28/2005
6/21/2005

FIGURES

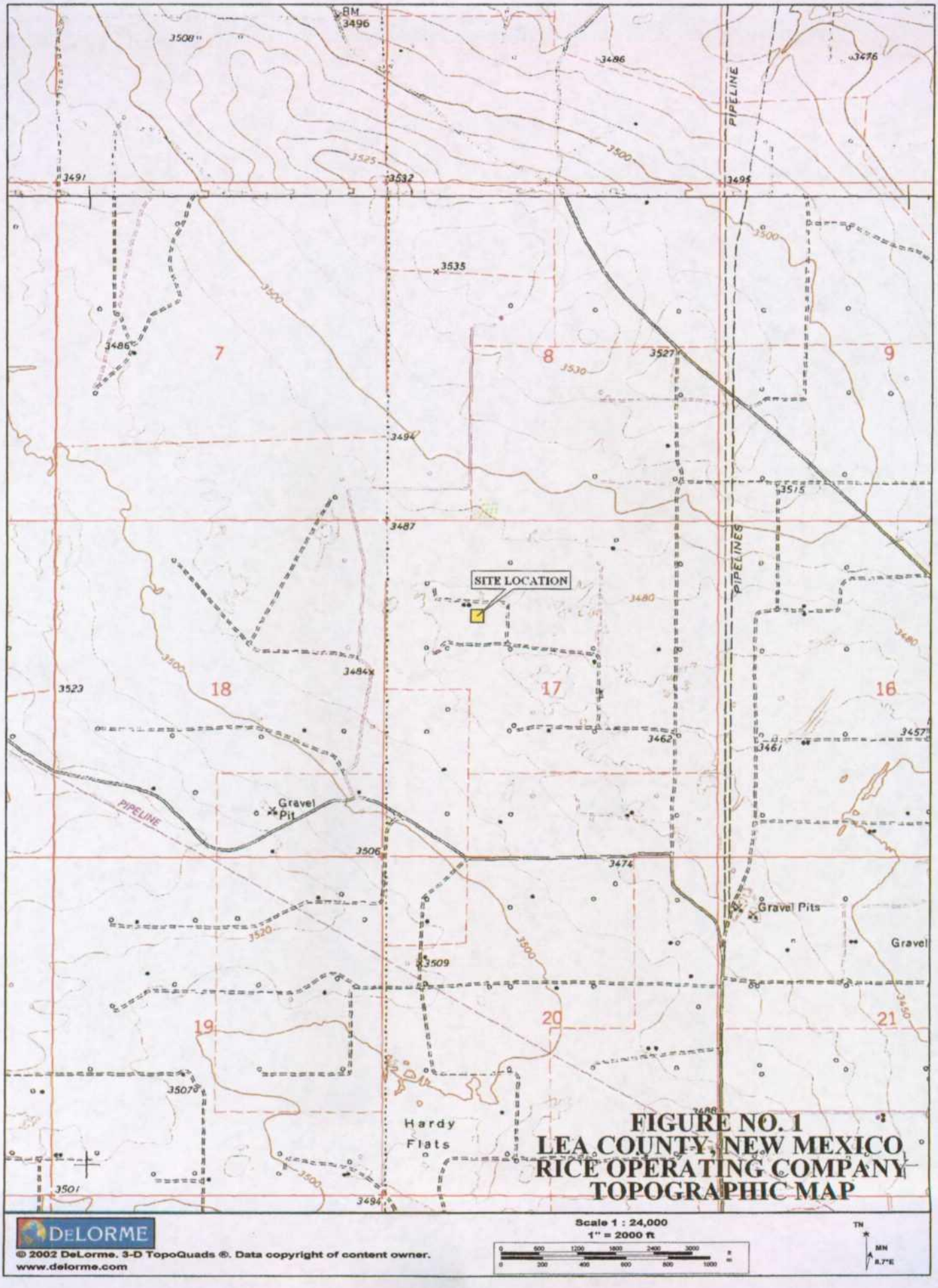
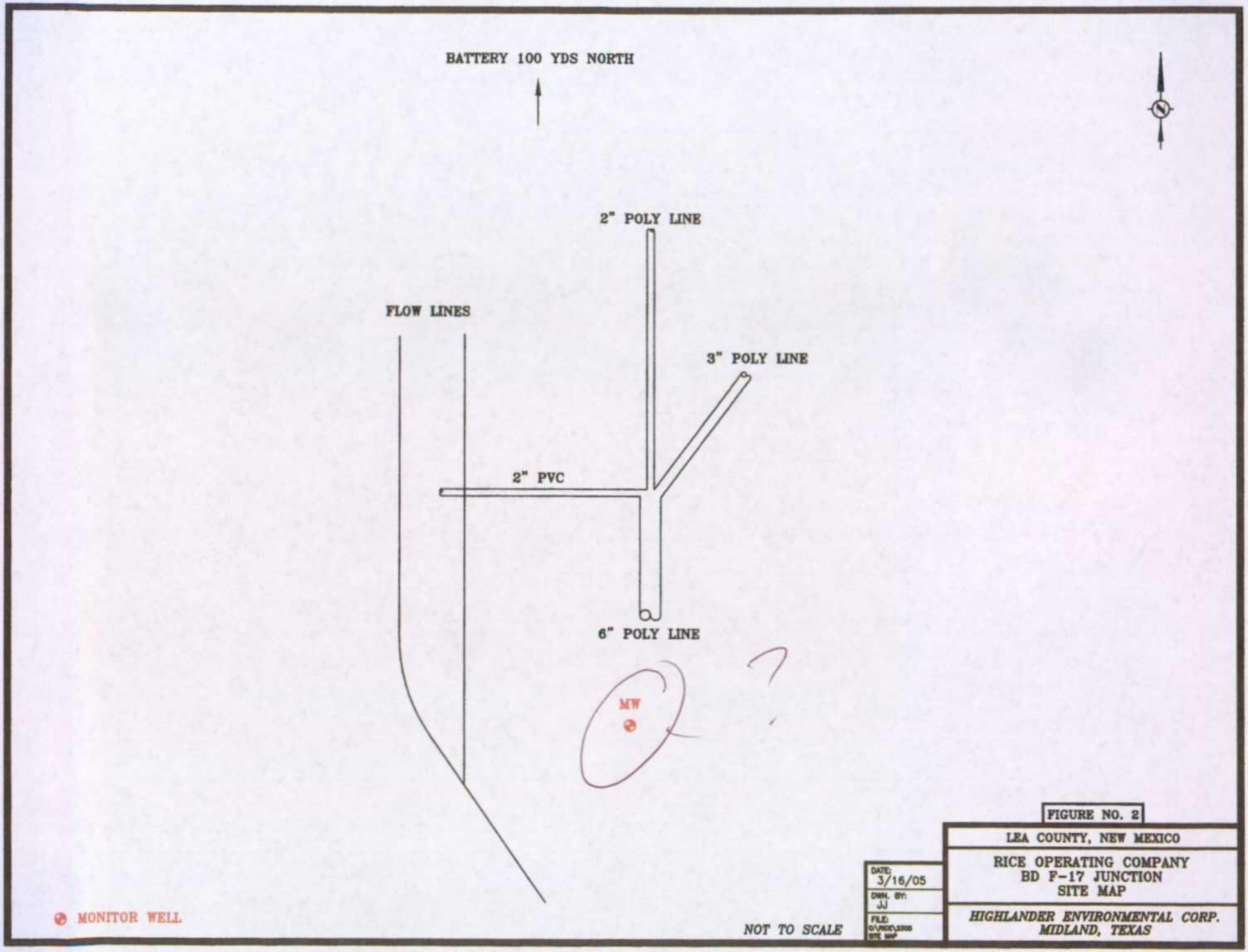


FIGURE NO. 1
LEA COUNTY, NEW MEXICO
RICE OPERATING COMPANY
TOPOGRAPHIC MAP

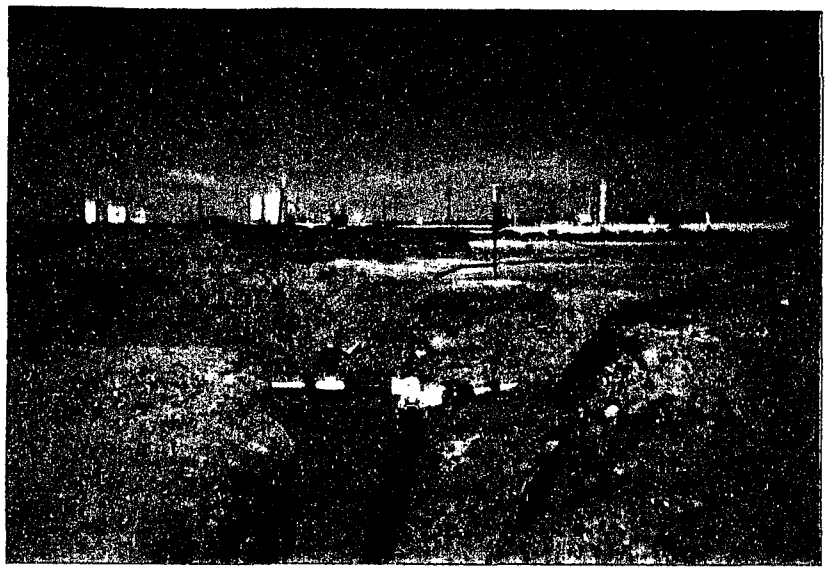
Scale 1 : 24,000
1" = 2000 ft

TN
MN
8.7°E

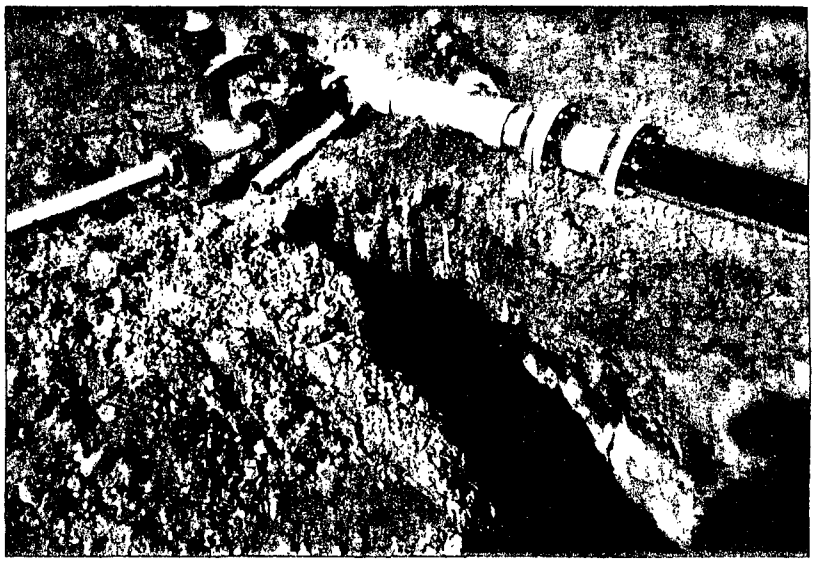

BATTERY 100 YDS NORTH
2" POLY LINE
FLOW LINES
3" POLY LINE
2" PVC
6" POLY LINE
MW
MONITOR WELL
NOT TO SCALE
FIGURE NO. 2
LEA COUNTY, NEW MEXICO
RICE OPERATING COMPANY
BD F-17 JUNCTION
SITE MAP
DATE: 3/16/05
DWN. BY: JJ
FILE: G:\RICE\3305 SITE MAP
HIGHLANDER ENVIRONMENTAL CORP.
MIDLAND, TEXAS

PHOTOGRAPHS

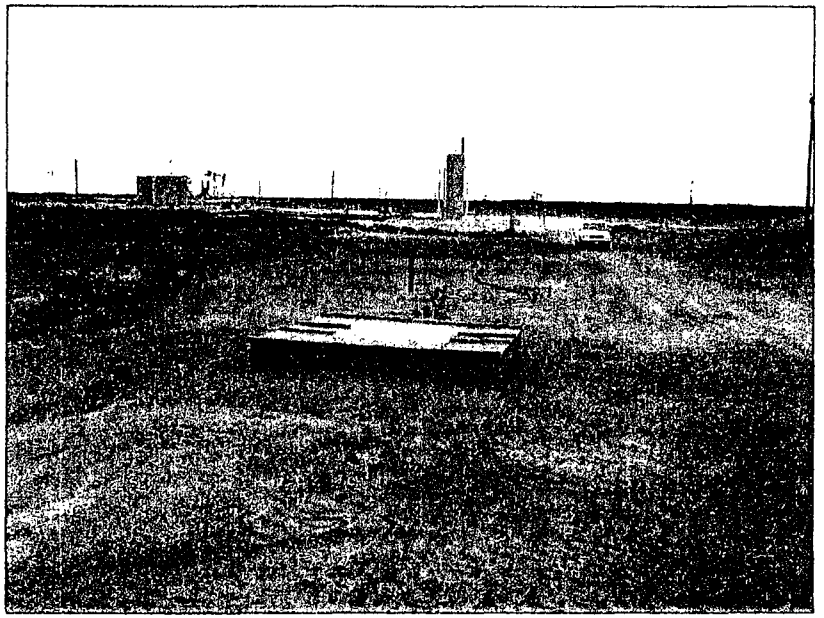
BD jct. F-17



Junction Looking North 10/16/2002



Delineation Trench at Junction 10/16/2003



New Junction Box Looking North (monitor well in background; T-post indicating old junction marker)

APPENDIX A

Disclosure Package

RICE OPERATING COMPANY

JUNCTION BOX DISCLOSURE FORM *

BOX LOCATION

SWD SYSTEM	JUNCTION	UNIT	SECTION	TOWNSHIP	RANGE	COUNTY	BOX DIMENSIONS - FEET		
							Length	Width	Depth
BD	F-17	F	17	21S	37E	Lea	Box has been moved 45 ft south		

LAND TYPE: BLM _____ STATE _____ FEE LANDOWNER Millard Deck Estate OTHER _____

Depth to Groundwater 72 feet NMOCD SITE ASSESSMENT RANKING SCORE: 10

Date Started 9/17/2002 Date Completed not complete OCD Witness No

Soil Excavated 175 cubic yards Excavation Length 20 Width 20 Depth 12 feet

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

FINAL ANALYTICAL RESULTS: **Sample Date** n/a **Sample Depth** n/a

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

Sample Location	Benzene mg/kg	Toluene mg/kg	Ethyl Benzene mg/kg	Total Xylenes mg/kg	GRO mg/kg	DRO mg/kg	Chlorides mg/kg
Vertical @ 12 ft	<0.005	0.009	<0.005	<0.015	<10.0	724	1040

General Description of Remedial Action: Site was delineated vertically and laterally with a backhoe. Chloride impact was consistent vertically, while TPH was visible to 11' bgs. The site was bored on 11/18/02 and chloride was found to impact groundwater with no indications of TPH. A cased monitor well was installed and the groundwater has been sampled and analyzed quarterly (see annual groundwater report for results). ROC has contracted a hydrologic consultant to assist ROC in developing a remediation plan for the vadose zone at groundwater-impacted sites with the ultimate objective being final closure. The excavation has been backfilled and the junction moved 45 ft south of this site.

ADDITIONAL EVALUATION IS *MEDIUM* PRIORITY.

enclosures: chloride curve, well log, photos, lab results

CHLORIDE FIELD TESTS

LOCATION	DEPTH (ft)	ppm
Vertical	3	6001
	5	1591
	11	1749
	13	3273
10' S **	7	2401
	11	4278
Soil Bore	20	5197
	50	2133
	70	1209
	75	425

** During excavation of this site, an older box was found; The bore was conducted close to this box

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

DATE 11/7/2003 PRINTED NAME Kristin Farris

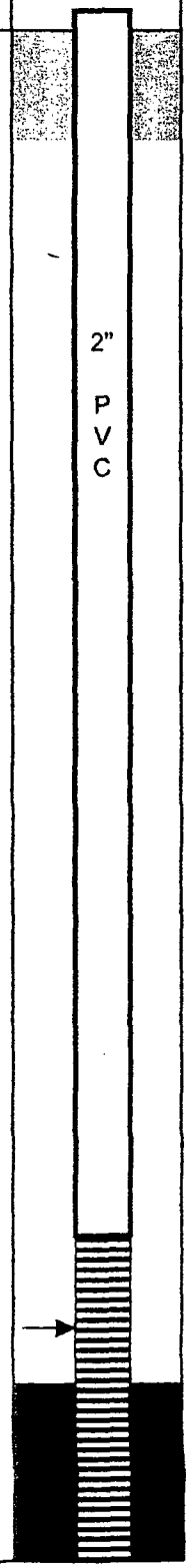
SIGNATURE Kristin Farris TITLE Project Scientist

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

DRILLING LOG	Site Name/Location	BORING/WELL INFORMATION			Logged by: Eades
RICE *Operarting Company*	**Jct. F-17**	Well No. MW 1	Date Drilled: 11-18-02	Driller: Eades	Completion:
122 West Taylor	**17-T21S-R37E**	Well Depth: 85'	Boring Depth: 85'	Well Material: PVC	Packed with
Hobbs, New Mexico 88240	**BD SWD System**	Casing Length: 88'	Boring Diameter: 2"	Casing Size: 2"	bentonite; grouted
(505) 393-9174	**Lea County, NM**	Screen Length: 20'	Drilling Method: Air Rotary	Slot Size: N/A	at surface.

DEPTH	SUBSURFACE LITHOLOGY	SAMPLE TYPE	Test Results (ppm) Cl⁻	TPH	REMARKS
0	Ground surface		Titrate	EPA 418.1	
	Top Soil				
5	Caliche	Grab	2,212		grout
10	Tan caliche and loam chunks	Grab	492		
15	Sand	Grab	2,412		
20	Red sand	Grab	5,197		
21	Sand and Sandstone Stringers				
25	Red Sand	Grab	3,152		
30	Tan caliche powder	Grab	4,628		
34	Sand				
35	Tan sand	Grab	2,508		
					bentonite
36	Sand and Sandstone Stringers				
40	Tan Sand	Grab	352		
45	Tan Sand	Grab	2,420		
50	Reddish-brown sand	Grab	2,133		
55	Sandy Gravel	Grab	2,665		
60	Reddish-brown sand	Grab	1,905		
64	Sand and Sandstone Stringer				
65	Tan sand and Caliche	Grab	1,800		
70	Tan sand and caliche moist	Grab	1,209		screen
75	Tan sand with rocks, moist	Grab	425		
80					water
85	Sand and Sandstone Stringers				

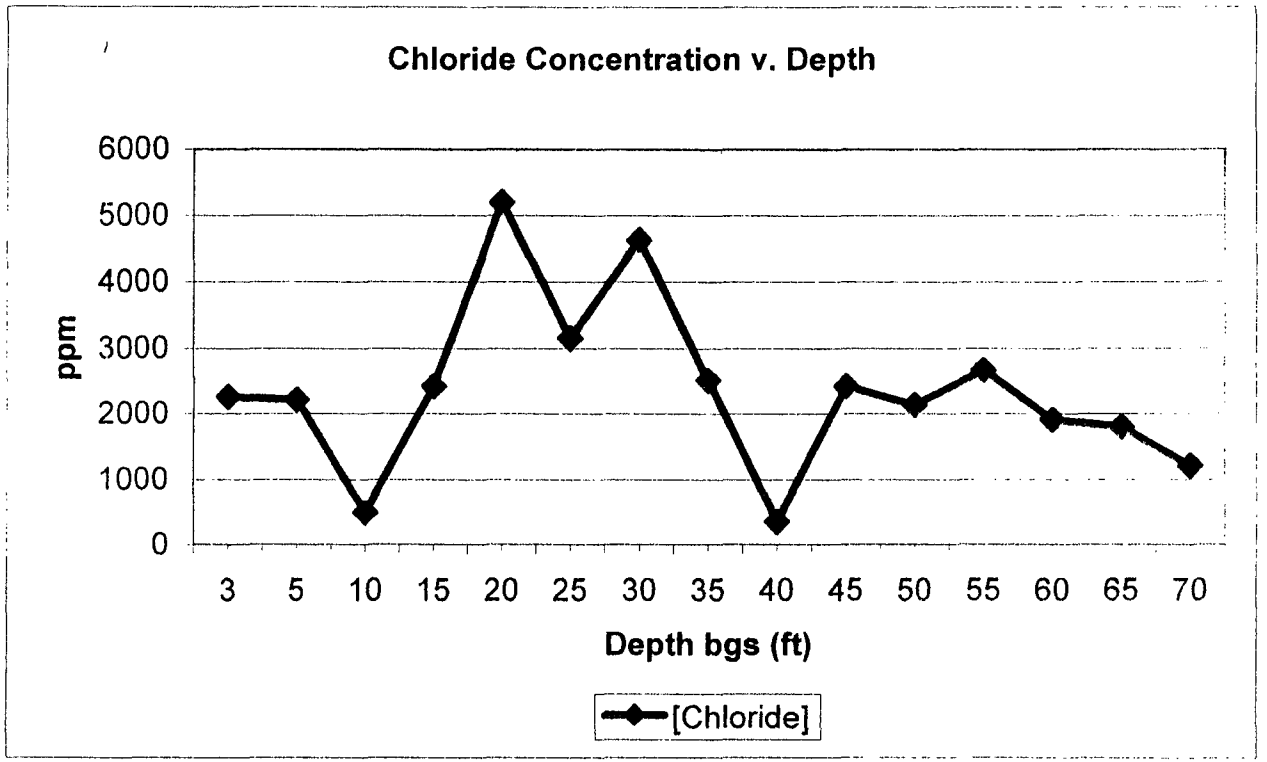
Boring



BD jct. F-17

T21S, R37E

Depth bgs (ft)	[Cl⁻] ppm
3	2256
5	2212
10	492
15	2412
20	5197
25	3152
30	4628
35	2508
40	352
45	2420
50	2133
55	2665
60	1905
65	1800
70	1209



Groundwater = 72 ft