AP - 48

STAGE 1 & 2 REPORTS

DATE:

Aug. 10, 2006

Highlander Environmental Corp.

Midland, Texas

CERTIFIED MAIL
RETURN RECIEPT NO. 7005 1160 0005 3780 7501

August 10, 2006

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

RE: **Results of Stage 1 Abatement Plan Implementation and Request for Suspension of Rule 19 Requirements, at the Justis L-1 Site, Unit L, Section 1, T-25-S, R-37-E, Lea County, New Mexico, NMOCD AP-48.**

Mr. Price:

RICE Operating Company (ROC) has retained Highlander Environmental Corp (Highlander) to address environmental concerns at the above-referenced site. ROC is the service provider (agent) for the Justis SWD System (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.

1.0 EXECUTIVE SUMMARY

As part of the RICE Operating Company (ROC) Junction Box Upgrade Workplan, the original Justis L-1 junction box was removed and replaced with a new water tight junction box, located 50 feet south of the old box. Once the junction box was removed, evaluation of the surrounding and subsurface soils was initiated. Delineation was conducted with a backhoe. Chloride testing and PID field screening were performed at regular intervals. The final excavation measured 20' x 22' x 12' deep. PID readings were minimal and TPH testing revealed concentrations well below NMOCD regulatory guidelines. Chloride concentrations, however, did not appear to decline with depth. The Site location is shown on Figure 1.

On 12/29/2003, a soil boring was placed into the center of the excavation and advanced to a depth of 80' below ground surface, apparently encountering a saturated zone at 75' below ground surface. As with the excavation samples, chloride concentrations failed to decline and, in fact, increased in certain sections of the soil boring. The borehole was plugged and a 1.5 foot thick clay barrier was placed into the excavation at 6 feet below ground surface. A permanent marker was placed at the soil boring location. The remainder of the excavation was backfilled with excavated soils. On February 24, 2004, ROC submitted a Junction Box Disclosure Form to the NMOCD.

On December 9, 2004, a monitor well was installed at this junction box site and groundwater has been sampled and analyzed on a quarterly basis since that time. Traces of benzene and ethylbenzene found in the original sampling have not been evident in subsequent sampling events. Chloride and total dissolved solid (TDS) concentrations have been declining since the original sampling.

A Stage 1 Abatement Plan was submitted on July 12, 2005 and approved on February 23, 2006. As part of the Stage 1 Abatement Plan two additional monitor wells were proposed for the site. These two monitor well (MW-2 and MW-3) were installed on March 21, 2006. MW-2 was placed down-gradient of MW-1 and MW-3 was placed up-gradient. The wells were developed and sampled on March 28, 2006. The down-gradient monitor well, (MW-2) displayed similar qualities to the monitor well placed at the leak site (MW-1), with a chloride concentration of 564 mg/L and total dissolved solids of 1,730 mg/L.

Also as part of the Stage I Abatement Plan, a water well database search was performed to encompass a ½ mile radius around the site. The database search revealed one well in Section 1 and 3 wells in adjoining sections to this site. The field inspection revealed processing plant wells up-gradient of the site, one inaccessible well at the "Targa" booster or compressor station (4/10 mile south) and one inactive domestic well with no access (1/2 mile south). An open reserve pit located 135' up-gradient was sampled and had a chloride concentration of 42,286 mg/L.

2.0 CHRONOLOGY OF EVENTS

November 13, 2003	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 22' x 12'.
December 29, 2003	A soil boring was placed near the old box location and advanced to a depth of 80'.
February 24, 2004	ROC submitted a Junction Box Disclosure Form to the NMOCD.
June 15, 2004	Highlander submitted a work plan for a confirmation borehole and possible monitor well placement.
November 3, 2004	Highlander submitted a revised workplan to address NMOCD concerns.
November 4, 2004	NMOCD approved revised workplan.
December 9, 2004	Monitor Well (MW-1) was installed.
December 21, 2004	Monitor Well (MW-1) was purged and sampled.

January 14, 2005	Rice submitted a Notification of Groundwater Impact to the NMOCD.
March 29, 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 16, 2005	Monitor Well (MW-1) was purged and sampled.
July 12, 2005	Stage 1 Abatement Plan submitted to NMOCD.
September 19, 2005	Monitor Well (MW-1) was purged and sampled.
November 18, 2005	Stage 1 Abatement Plan certified "Administratively Complete" by NMOCD.
December 5, 2005	Monitor Well (MW-1) was purged and sampled.
February 23, 2006	Stage 1 Abatement Plan approved by NMOCD.
February 27, 2006	Monitor Well (MW-1) was purged and sampled.
March 21, 2006	Monitor Wells MW-2 and MW-3 installed.
March 28, 2006	Monitor Wells MW-2 and MW-3 were purged and sampled.
May 24, 2006	Monitor Wells MW-1, MW-2 and MW-3 were purged and sampled.

3.0 BACKGROUND & PREVIOUS WORK

As part of the ROC Junction Box Upgrade Workplan, the original junction box was removed and replaced with a new water tight junction box located 50 feet south of the old box. Once the junction box was removed, evaluation of the surrounding and subsurface soils was initiated. Delineation was conducted with a backhoe. Chloride testing and PID field screening were performed at regular intervals. The final excavation measured 20' x 22' x 12' deep. PID readings were minimal and TPH testing revealed concentrations well below NMOCD regulatory guidelines. Chloride concentrations, however, did not appear to decline with depth. The site location is shown on Figure 1.

On 12/29/2003, a soil boring was placed into the center of the excavation and advanced to a depth of 80' below ground surface, apparently encountering a saturated zone at 75' below ground surface. As with the excavation samples, chloride concentrations failed to decline and, in fact, increased in certain sections of the soil boring. The borehole was plugged and a 1.5 foot thick clay barrier was placed into the excavation at 6 feet below ground surface. A permanent marker was placed at the soil boring location. The remainder of the excavation was backfilled with excavated soils.

On February 24, 2004, ROC submitted a Junction Box Disclosure Form to the NMOCD. On June 15, 2004, Highlander submitted a work plan for a confirmation borehole and possible monitor well placement at the site. The NMOCD responded with requested revisions to the workplan and on November 3, 2004, Highlander submitted a revised workplan to address NMOCD concerns. The workplan was approved by the NMOCD on November 4, 2004. Highlander supervised the installation of Monitor Well (MW-1) on December 19, 2004. The well was purged and sampled on December 21, 2004. On January 14, 2005, Rice submitted a

Notification of Groundwater Impact to the NMOCD. A copy of the Junction Box Disclosure Form and Notification of Groundwater Impact are included in Appendix B.

The monitoring well has been sampled on a quarterly basis since December 2004. The most recent sampling was performed on May 24, 2006. Traces of benzene and ethylbenzene were found in the original sampling event and only benzene slightly exceeded the WQCC standards of 0.01 mg/L for benzene. In the past five quarters, BTEX parameters have not been detected at or above reporting limits. Chloride and total dissolved solid concentrations have been declining in MW-1 since the original sampling where chloride was 1,060 mg/L and TDS was 2,660 mg/L. The most recent sample concentrations are 420 mg/L chloride and 1,430 mg/L TDS.

4.0 GEOLOGY & HYDROGEOLOGY

4.1 Regional and Local Geology

This site is located in the southern edge of 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, however, the localized flow in this area may be more to the east towards Monument Draw, located approximately 1 mile to the east. The depth to water in monitor well MW-1 is approximately 78.5' (TOC).

4.3 Water Well Inventory

In accordance with the Stage 1 Abatement Plan submitted by Highlander Environmental, ROC performed an internet search of the New Mexico Office of the State Engineer (OSE) and the United States Geologic Survey (USGS) databases for water wells within a ½ mile radius of the subject site.

No water well records were found in the OSE or USGS databases for the prescribed radius. However, a search of a database supported by New Mexico Institute of Mining and Technology (New Mexico Tech) called New Mexico Water and Infrastructure Data System (WAIDS), yielded well records in Sections 1, 2, 11, and 12. Wells associated with a petroleum processing plant are recorded in sections 1, 2 and 11. The eastern half of Section 12 is also included in our search radius and the WAIDS database yielded one well record in Section 12. The well purpose is not reported.

These wells, as well as any non-reported wells in the ½ mile radius, were investigated in the field by RICE Operating Company. The field inspection revealed processing plant wells up-gradient of the site, one inaccessible well at the "Targa" booster or compressor station (4/10 mile south) and one inactive domestic well with no access (1/2 mile south). An open reserve pit located 135' up-gradient was sampled and had a chloride concentration of 42,286 mg/L. The water well inventory data is included in Appendix A.

5.0 SUBSURFACE SOILS

The soils in the vicinity of this site are of the Bernino-Cacique loamy fine sands association. In this association, typically, the surface layer is reddish-brown loamy fine sand about 6 inches thick. From 6 inches to 16 inches, is red light sandy clay loam. The subsoil from 16 inches to 60 inches is red to pink light sandy clay loam. The soil boring at this site indicated silty sand to 80', with shallow intermittent caliche stringers.

6.0 GROUNDWATER QUALITY

6.1 Installation of Additional Monitor Wells

As approved in the Stage I Abatement Plan, two additional monitor wells were installed at the site. Monitor well MW-2 was installed down-gradient and MW-3 was installed up-gradient. Both monitor wells were constructed according to EPA and industry standards to total depths of 90' (MW-2) and 90' (MW-3). Both wells were properly developed. Copies of the boring and completion logs are included in Appendix B. A water table map was generated for the most recent sampling event and is shown as Figure 3.

6.2 Monitoring Program

The original monitoring well (MW-1) has been sampled on a quarterly basis since December 21, 2005. The most recent sampling was performed on May 24, 2006. Quarterly sampling of this well and any additional well(s) will continue. Analytical data for all monitoring events are summarized in the tables in Appendix C.

6.3 Hydrocarbons in Groundwater

Traces of benzene and ethylbenzene found in the original sampling have not been evident in subsequent sampling events. In the past five quarters, BTEX parameters have not been detected at or above reporting limits.

6.4 Other Constituents of Concern

Chloride and total dissolved solid concentrations have been declining in MW-1 since the original sampling where chloride was 1,060 mg/L and TDS was 2,660 mg/L. The most recent sample concentrations are 420 mg/L chloride and 1,430 mg/L TDS.

7.0 CONCLUSIONS, GW WORK PLAN & RULE 19 SUSPENSION REQUEST

Based upon the results of the Stage I Abatement Plan implementation, it appears that the water quality at the original junction box site is improving over time. Chloride concentrations are approaching the New Mexico Water Quality Control Commission (WQCC) standard of 250 mg/L. The down-gradient water quality, while exceeding the New Mexico WQCC standards for chloride and TDS (549 and 1730 mg/L respectively) is similar to the quality in MW-1 and indicates some down-gradient diffusion of impact.

ROC proposes to complete delineation of this groundwater impact by placing one additional monitor well down-gradient of MW-2. ROC additionally proposes to continue to monitor all these wells on a quarterly basis to ensure continued improvement of groundwater quality. If conditions do not improve or if they deteriorate, a workplan for additional investigation will be prepared and submitted to the NMOCD.

Considering the lack of domestic wells down-gradient of this site, the improving quality of groundwater, and commitment to complete delineation and monitor groundwater conditions, ROC requests suspension of NMOCD Rule 19 Stage 2 Abatement Plan requirements at this time.

8.0 SOIL CORRECTIVE ACTION PLAN (CAP)

ROC will prepare and submit a Corrective Action Plan (CAP) to evaluate and address the horizontal extent of chloride impact to subsurface soils.

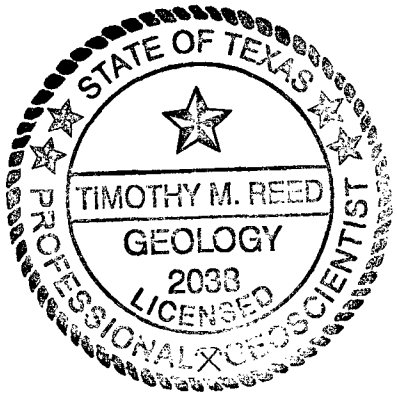
9.0 QUALITY ASSURANCE/ QUALITY CONTROL

All monitor wells were constructed to EPA and industry standards. All downhole equipment (i.e., drill rods, drill bits, etc.) were thoroughly decontaminated between each use with a steam cleaner. If approved, the additional down-gradient monitor well will be constructed to EPA and industry standards.

The wells were inspected for the presence of phase-separated hydrocarbons (PSH) and found not to contain any. The wells were properly purged and sampled with clean, dedicated, polyethylene bailers and disposable line. The groundwater samples were submitted to a laboratory for analysis of Benzene, Toluene, Ethylbenzene, and Xylene (BTEX) by method EPA 8021B, chloride, sulfate and total dissolved solids.

10.0 PROPOSED SCHEDULE OF ACTIVITIES

Upon approval, 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 2007. The additional monitor well will be installed within the last quarter of 2006.



Respectfully submitted,
Highlander Environmental Corp.

Timothy M. Reed, P.G.
Vice President

cc: ROC, Daniel Sanchez-NMOCD
enclosures: figures, water well information, boring and completion logs, junction box disclosure form, tables

FIGURES

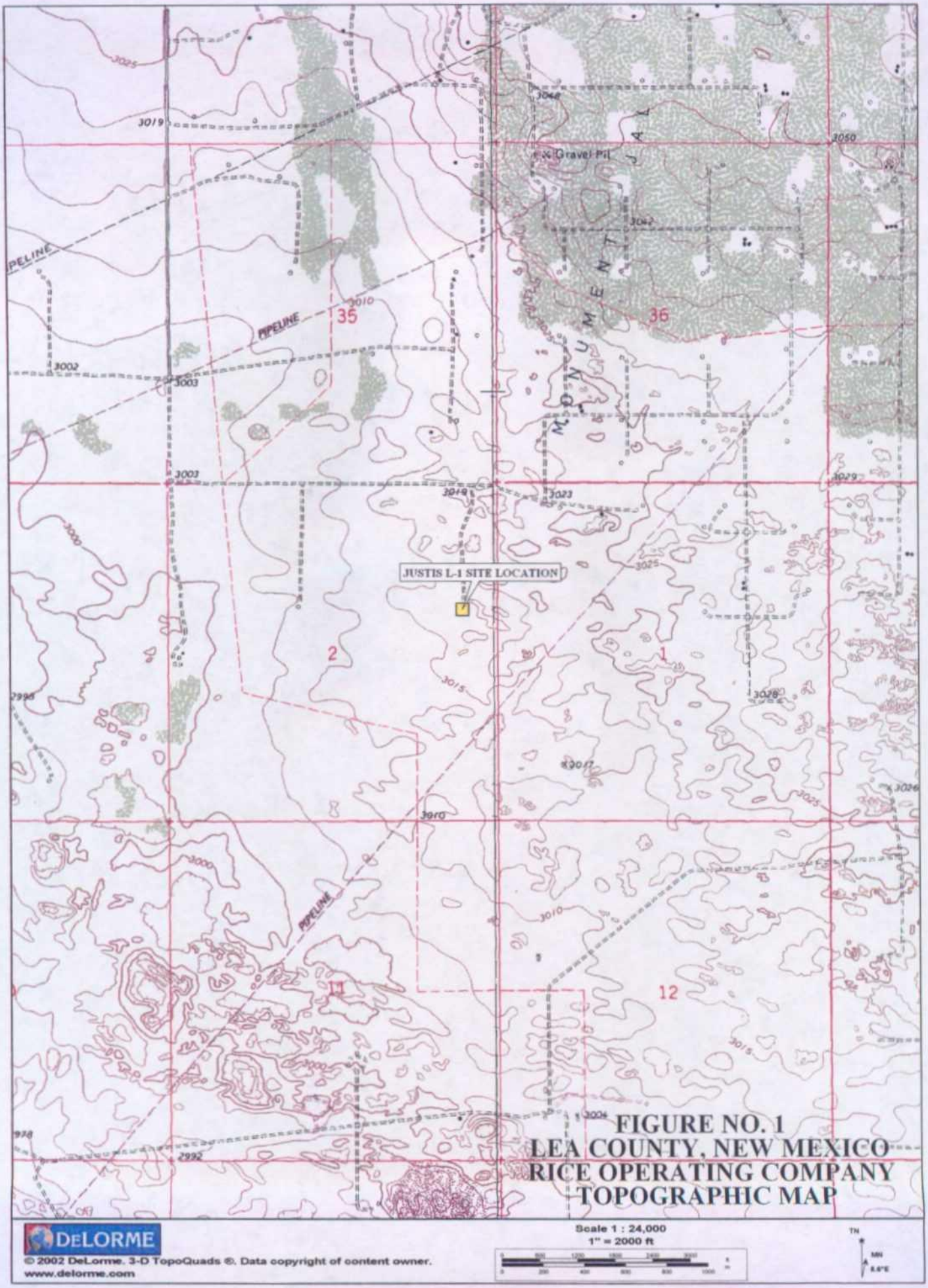
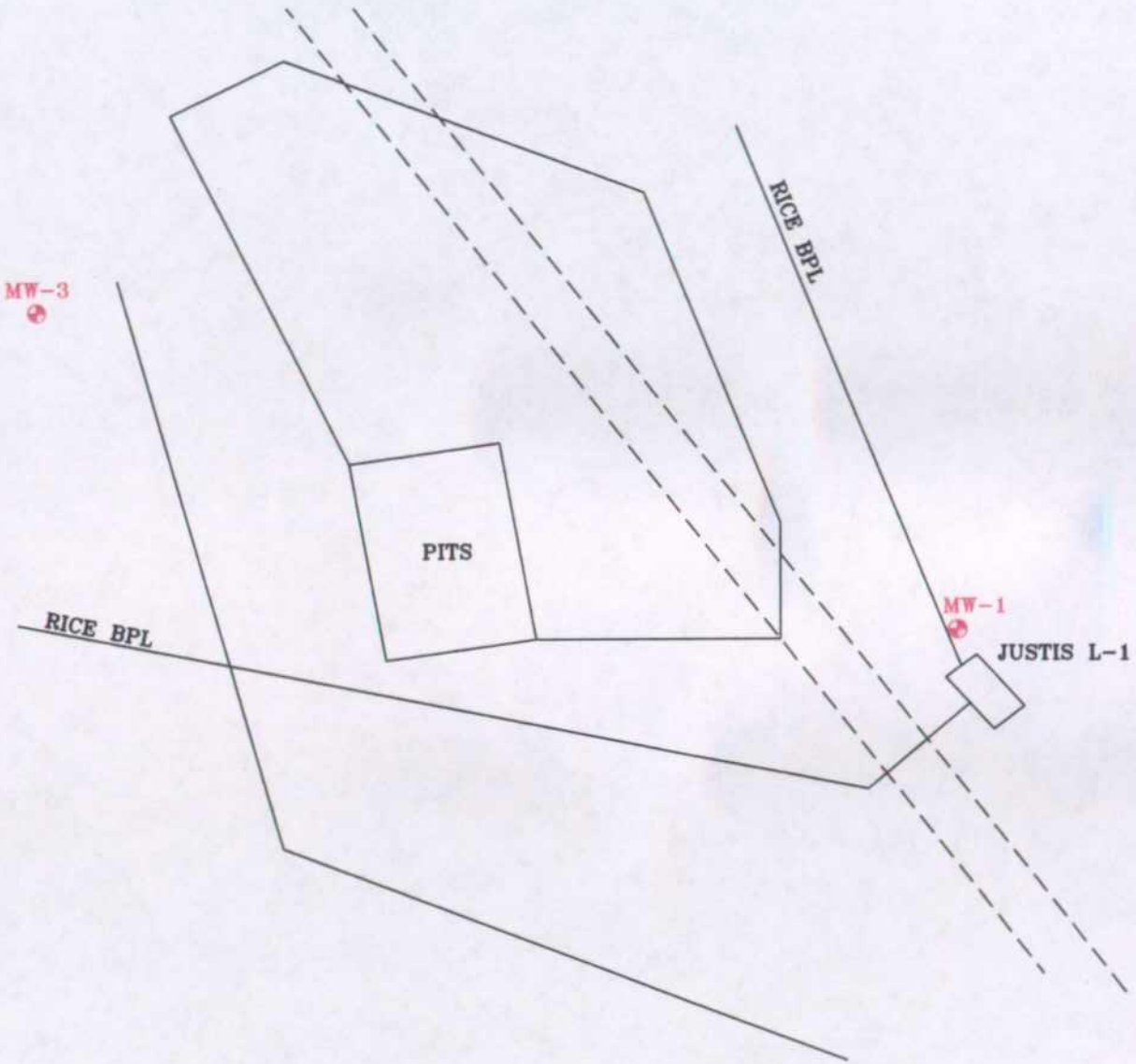


FIGURE NO. 1
LEA COUNTY, NEW MEXICO
RICE OPERATING COMPANY
TOPOGRAPHIC MAP



MONITOR WELL LOCATIONS

NOT TO SCALE

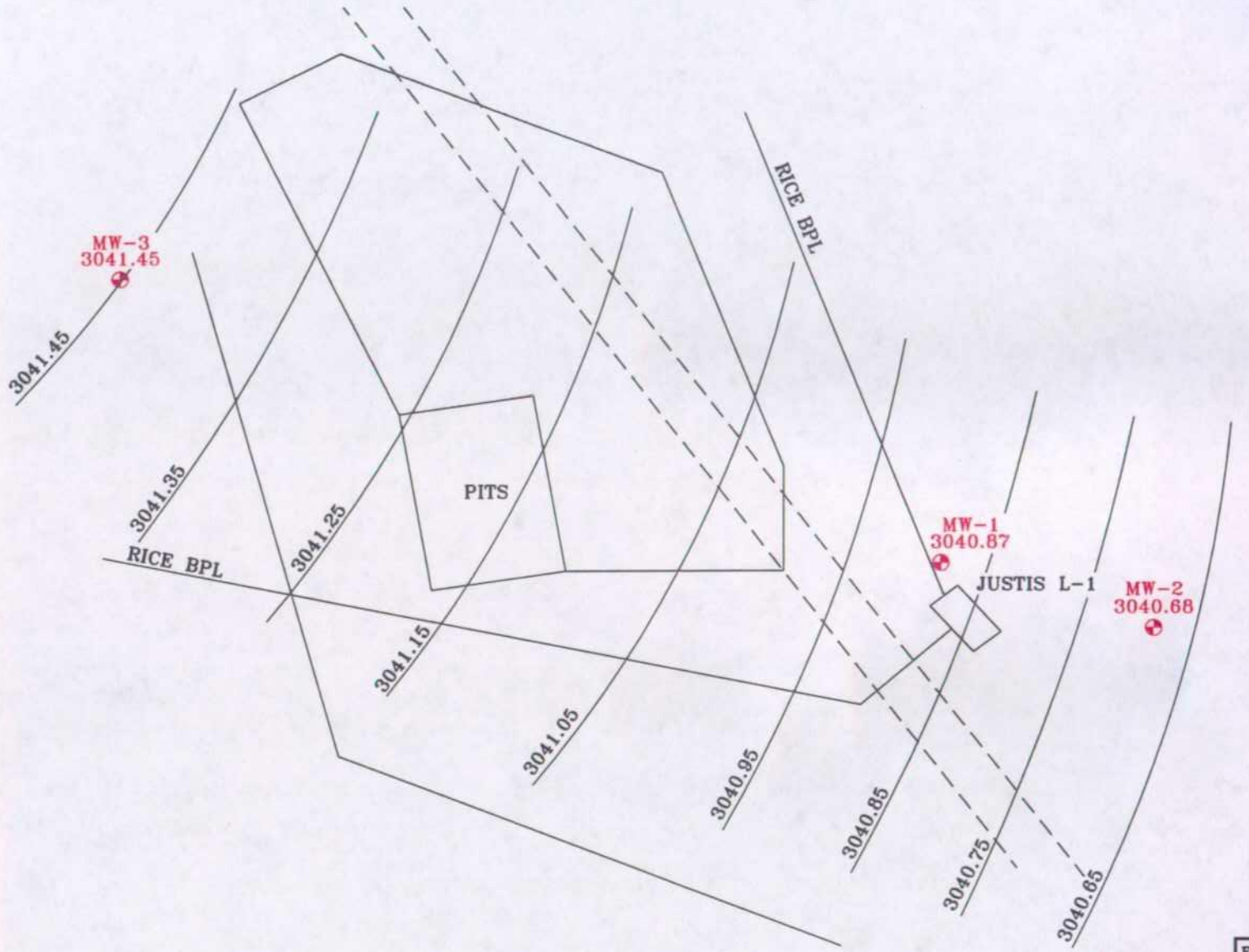
FIGURE NO. 2

LEA COUNTY, NEW MEXICO

RICE OPERATING COMPANY
JUSTIS L-1
SITE MAP

DATE: 5/9/06
DWN. BY: JJ
FILE: C:\RICE\1963 SITE MAP

HIGHLANDER ENVIRONMENTAL CORP.
MIDLAND, TEXAS



MONITOR WELL LOCATIONS

NOT TO SCALE

FIGURE NO. 3

LEA COUNTY, NEW MEXICO

RICE OPERATING COMPANY
JUSTIS L-1
GROUNDWATER MAP

DATE: 8/14/06
DWN. BY: JJ
FILE: C:\RICE\1863 SITE MAP

HIGHLANDER ENVIRONMENTAL CORP.
MIDLAND, TEXAS

Appendix A

Water Well Database Records

Water Resources

Data Category: Ground Water | Geographic Area: New Mexico | go

Ground-water levels for New Mexico

Search Results -- 1 sites found

Search Criteria

site_no list = • 320937103063101

Save file of selected sites to local disk for future upload

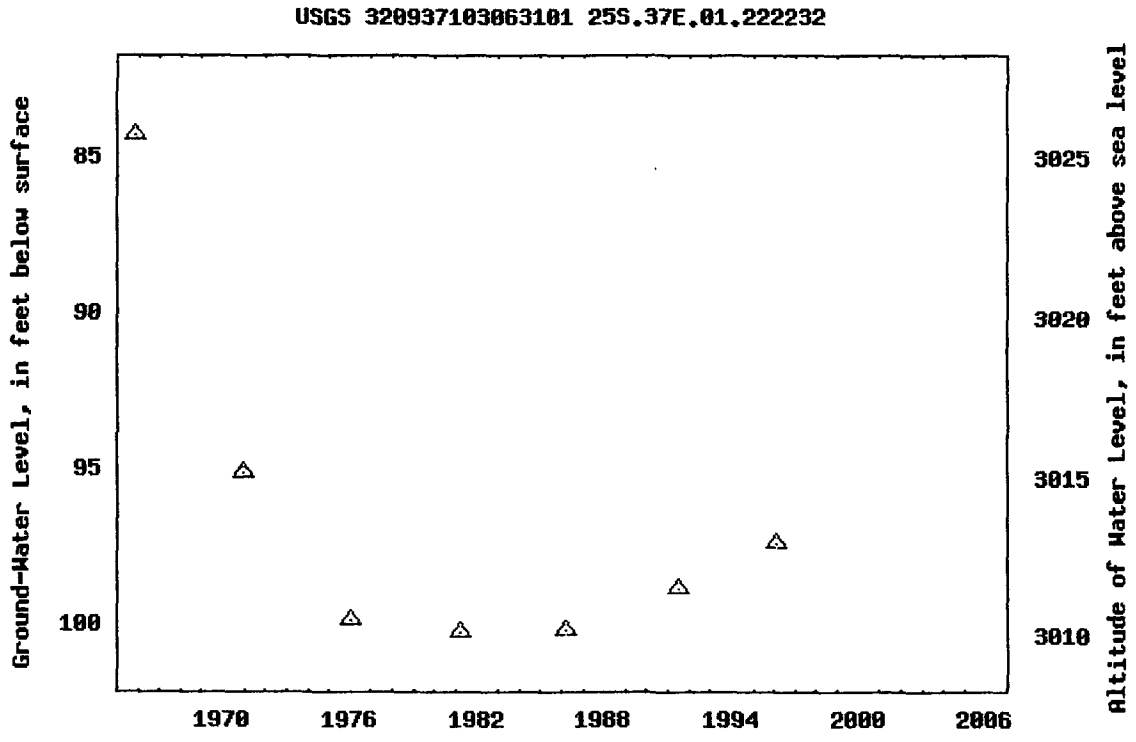
USGS 320937103063101 25S.37E.01.222232

Available data for this site: Ground-water: Levels | GO

Lea County, New Mexico
Hydrologic Unit Code 13070007
Latitude 32°09'37", Longitude 103°06'31" NAD27
Land-surface elevation 3,110.20 feet above sea level NGVD29
The depth of the well is 140 feet below land surface.
This well is completed in the ALLUVIUM,BOLSON DEPOSITS AND OTHER SURFACE DEPOSITS (110AVMB) local aquifer.

Output formats

- Table of data
- Tab-separated data
- Graph of data
- Reselect period



Breaks in the plot represent a gap of at least one calendar year between two consecutive points.
Download a presentation-quality graph

Questions about data | New Mexico NWISWeb Data Inquiries | Top

NM WAIDS

DATA MAPS HOME SCALE COR

General Information About: Sample 8816			
Section/ Township/Range	02 / 25 S / 37 E	Lat/Long	32.1593 / -103.1328
Elevation	3124	Depth	208
Date Collected	7/11/1990	Chlorides	400
Collector / Point of Collection	SEO / DP	Use	Petroleum Processing Plant
Formation	OAL	TDS	0

New Mexico Tech PRRC

NM WAIDS

DATA MAPS HOME SCALE COR

General Information About: Sample 10332			
Section/ Township/Range	01 / 25 S / 37 E	Lat/Long	32.1593 / -103.1157
Elevation	3115	Depth	198
Date Collected	12/6/1984	Chlorides	42
Collector / Point of Collection	SEO / TS@145	Use	Petroleum Processing Plant
Formation	OAL	TDS	0

NM WAIDS

DATA MAPS HOME SCALE COR

General Information About: Sample 10273			
Section/ Township/Range	11 / 25 S / 37 E	Lat/Long	32.1447 / -103.1328
Elevation	3119	Depth	482
Date Collected	3/6/1985	Chlorides	9330
Collector / Point of Collection	SEO / TS@137	Use	Petroleum Processing Plant
Formation	OAL	TDS	0

NM WAIDS

DATA MAPS HOME SCALE COR

General Information About: Sample 10902			
Section/ Township/Range	11 / 25 S / 37 E	Lat/Long	32.1447 / -103.1328
Elevation	3120	Depth	180
Date Collected	10/27/1977	Chlorides	100
Collector / Point of Collection	SEO / TS@176	Use	Petroleum Processing Plant
Formation	OAL	TDS	0

NM WAIDS

DATA MAPS HOME SCALE COR

General Information About: Sample 10597			
Section/ Township/Range	12 / 25 S / 37 E	Lat/Long	32.1447 / -103.1157
Elevation	3092	Depth	0
Date Collected	3/14/1985	Chlorides	175
Collector / Point of Collection	SEO / DP	Use	
Formation	OAL	TDS	0

New Mexico Tech PRRC

Appendix B

Boring and Completion Logs

RICE OPERATING COMPANY
JUNCTION BOX DISCLOSURE* REPORT

BOX LOCATION

SWD SYSTEM	JUNCTION	UNIT	SECTION	TOWNSHIP	RANGE	COUNTY	BOX DIMENSIONS - FEET		
							Length	Width	Depth
Justis	L-1	L	1	25S	37E	Lea	Moved 50 ft south		

LAND TYPE: BLM _____ STATE _____ FEE LANDOWNER Joyce Willis OTHER _____

Depth to Groundwater 75 feet NMOCD SITE ASSESSMENT RANKING SCORE: 10 *

Date Started 11/11/2003 Date Completed 12/29/2003 OCD Witness No

Soil Excavated 196 cubic yards Excavation Length 22 Width 20 Depth 12 feet

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

FINAL ANALYTICAL RESULTS: **Sample Date** 11/14/2003 **Sample Depth** 12 ft

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	PID ppm	GRO mg/kg	DRO mg/kg	Chloride mg/kg
SIDEWALLS	9.2	<10.0	89.2	1890
BOTTOM	0.7	<10.0	<10.0	2020
REMEDIATED	22.4	<10.0	213	1500

CHLORIDE FIELD TESTS

LOCATION	DEPTH (ft)	ppm
Vertical	7	1309
	8	811
	9	497
	10	610
	11	499
	12	719
	13	1071
	14	1360
	15	892
	20	2035
	25	4681
	30	1576
	35	1490
	40	2305
	45	2542
	50	2593
	55	2509
	60	3405
	67	1559

General Description of Remedial Action: Delineation was conducted with a backhoe producing a 20 x 22 x 12 ft deep excavation. Chloride tests and PID readings were performed at regular intervals. PID readings were minimal and TPH lab tests revealed concentrations well below NMOCD guidelines. Chloride concentrations, however, did not sufficiently decline with depth. On 12/29/2003, a soil bore was initiated to delineate the vertical extent of chloride impact. The bore was advanced to a depth of 80 ft and chloride concentrations still did not decline with depth. According to the bore log, it appears a saturated zone was encountered at 75 ft. The bore hole was then plugged (see log). At 6 ft bgs, a 1.5 ft compacted clay barrier was installed in the 22 x 20 ft excavation and the remainder of the hole was backfilled with the excavated soil. An identification plate to mark the bore location and clay barrier below was placed on the surface of this site for future identification. ROC will employ Highlander Environmental of Midland in 2004 to characterize potential environmental concerns at this site.

** A natural pond is located 685 ft south of the junction.*

ADDITIONAL EVALUATION IS HIGH PRIORITY.

enclosures: chloride graph, photos, lab results, diagram, PID readings, clay density test

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

DATE 2/23/2004 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.***

LOG OF BORING

K. Farris
RICE Operating Company

Logger:	Joe Gatts; Mort Bates	**Client:**	**Well ID:**
Driller:	Atkins Engineering Associates, Inc.	RICE Operating Company	SB-1
Drilling Method:	Hollow Stem Auger	**Project Name:**	
Start Date:	12/29/2003	jct. L-1	
End Date:	12/29/2003	**Location:**	
Notes: TD = 80 ft Groundwater = 75 ft		Justis SWD System Sec. 1, T25S, R37E Lea County, NM	

Depth (feet)	Split Spoon chloride	Split Spoon PID	Description	Lithology	Additional Notes
0.0			0-8 ft Silty Sand w/Broken Caliche: loose, tan, dry	3-6 ft bentonite seal	Mixed lithology backfill from original excavation to 12 ft with clay barrier
5.0					
10.0			8-10 ft Fat Clay: stiff, red, damp		
			10-15 ft Silty Sand w/Broken Caliche: loose, tan, dry		
15.0	892	no			
		odor	15-18 ft Silt: firm, white & tan, dry		
20.0	2035	no	18-60 ft Silty Sand: loose, light brown, dry		remainder of bore backfilled with drill cuttings
		odor			
25.0	4681	no			
		odor			
30.0	1576	no			
		odor			
35.0	1490	no			
		odor			
40.0	2305	no			
		odor			
45.0	2542	no			
		odor			
50.0	2593	no			
		odor			
55.0	2509	no			
		odor			
60.0	3405	no			
	3114	odor	60-63 ft Silty Sand: loose, lt. Gray, moist		
65.0			63-67 ft Silty Sand Partially Cemented: hard, white, dry		
	1559	no			
70.0		odor	67-76 ft Silty Sand: loose, reddish tan, moist	▼ 70-75 ft bentonite seal	
75.0	411	no			
		odor	76-80 ft Silty Sand: soft, reddish tan, wet		
80.0	247	no			
		odor			

Atkins Engineering Associates, Inc.
P.O. Box 3156
Roswell, New Mexico 88202-3156

Log of Boring Justis Vent L-1 Monitor Well

Rice Operating
122 West Taylor
Hobbs, New Mexico 88240
Contact: Roy Rascon
Job#: JUSTISL.MWD.04

Drill Start	: 12-09-04 (1700)	Logged By	: M. Bates
Drill End	: 12-10-04 (1130)		
Boring Location	: South edge of pit		
Site Location	: W. Monument		
Auger Type	: 4¼ Hollow Stem		

Depth In Feet	USCS	GRAPHIC	Sample	DESCRIPTION
0–5	SM		1	Silty Sand w/Caliche, Loose, Tan, Dry
5–10	SM		2	Silty Sand w/Caliche, Loose, Light Tan, Damp
10–20	SC		3, 4	Clayey Sand w/Caliche, Loose, Tan to White, Damp
20–25	SC		5	Clayey Sand, Loose, Redish Tan, Damp
25–30	SC		6	Clayey Sand w/Broken Sandstone, Firm, Tan, Dry
30–40	SC		7, 8	Clayey Sand, Loose, Tan, Dry
40–50	SP		9, 10	Poorly Graded Sand, Loose, Tan, Dry
50–55	SM		11	Silty Sand, Loose, Tan, Dry
55–60	SM		12	Silty Sand, Loose, Redish Tan, Damp
60–75	SM			Silty Sand w/Broken Sandstone, Firm, Tan and White, Damp
75–90	SM			Silty Flowing Sand, Soft, Redish Brown, Wet
90				Total Depth 90'

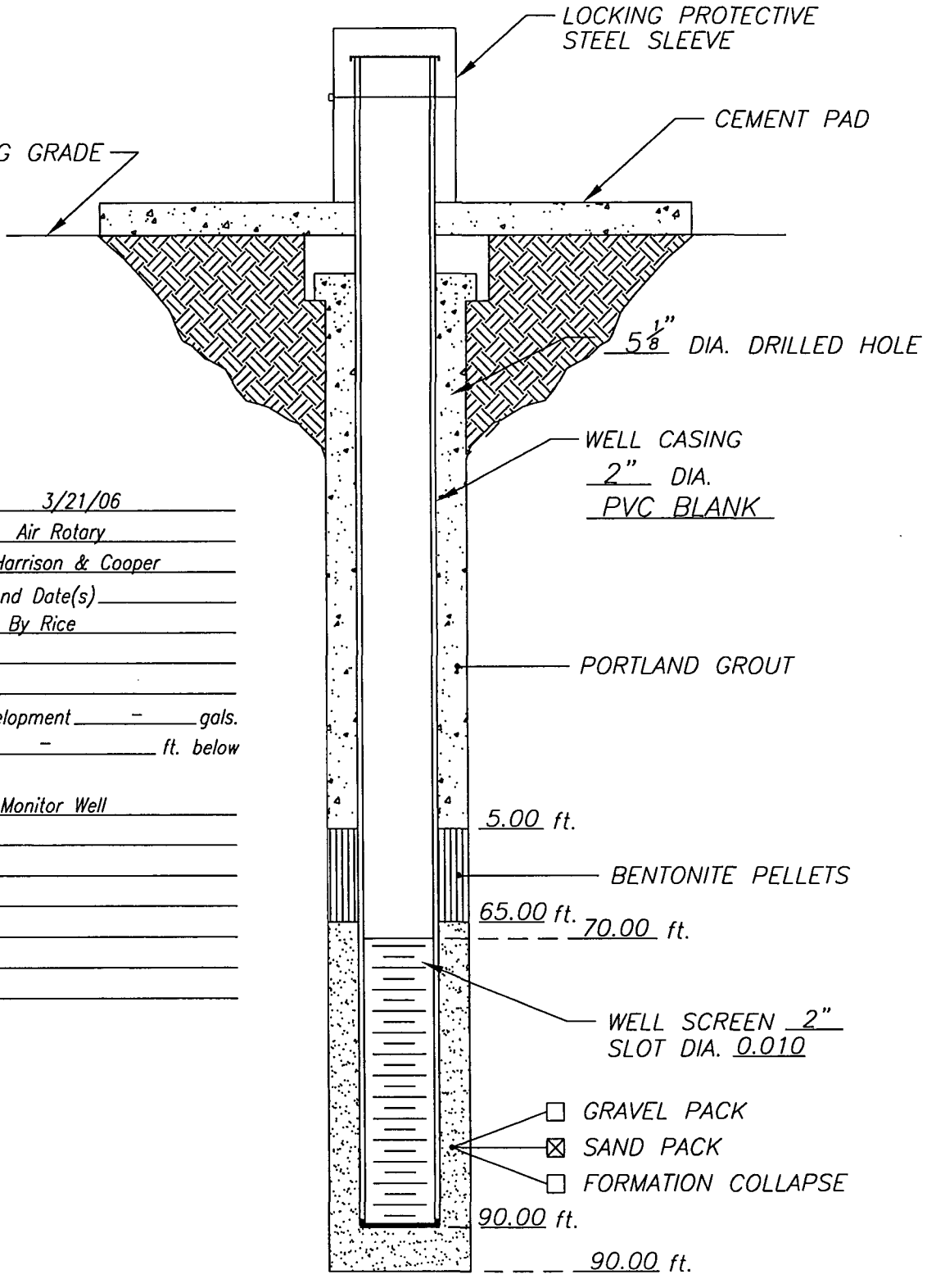
12-14-2004 C:\Program Files\mtech2002\rice5\mw.bor

SAMPLE LOG

Boring/Well: BH-2
Project Number: 2142
Client: Rice
Site Location: L-1
Location: Lea County, New Mexico
Total Depth 90'
Date Installed: 3/21/2006

DEPTH (Ft)	OVM	SAMPLE DESCRIPTION
0-3	-	Lt. brown, fine grain sand, some traces of caliche
3-5	-	Lt. brown, fine grain sand, some traces of caliche
5.0	-	White, caliche, dense, some layers of fine grain sand
10.0	-	White, caliche, dense, some layers of fine grain sand
15.0	-	White, caliche, dense, some layers of fine grain sand
20.0	-	Tan, fine grain sand, some loose with compacted layers sand
25.0	-	Tan, fine grain sand, some loose with compacted layers sand
30.0	-	Tan, fine grain sand, some loose with compacted layers sand, some caliche
35.0	-	Tan,fine grain sand, loose
40.0	-	Tan,fine grain sand, loose, with dense layers of caliche and cemented sandstone
45.0	-	Tan,fine grain sand, loose
50.0	-	Tan/lt. red, fine grain sand, some loose with compacted layers sand
55.0	-	Tan/lt. red, fine grain sand, some loose with compacted layers sand
60.0	-	Tan/lt. red, fine grain sand, some loose with compacted layers sand
65.0	-	Tan, fine grain sand, some loose with compacted layers sand
70.0	-	Tan, fine grain sand, some loose with compacted layers sand
75.0	-	Tan, fine grain sand, some loose with compacted layers sand
80.0	-	Tan, fine grain sand, loose, cemented sandstone
85.0	-	Tan, fine grain sand, loose, cemented sandstone
90.0		Tan, fine grain sand, loose, cemented sandstone
		Total Depth - 90'

WELL CONSTRUCTION LOG



Installation Date(s) 3/21/06
Drilling Method Air Rotary
Drilling Contractor Harrison & Cooper
Development Technique(s) and Date(s)
Developed By Rice

Water Removed During Development – gals.
Static Depth to Water – ft. below Ground Level
Well Purpose Monitor Well

Remarks

DATE: 3/21/06	CLIENT: Rice Operating Company PROJECT: L-1 LOCATION: Lea County, New Mexico	WELL NO. MW-2

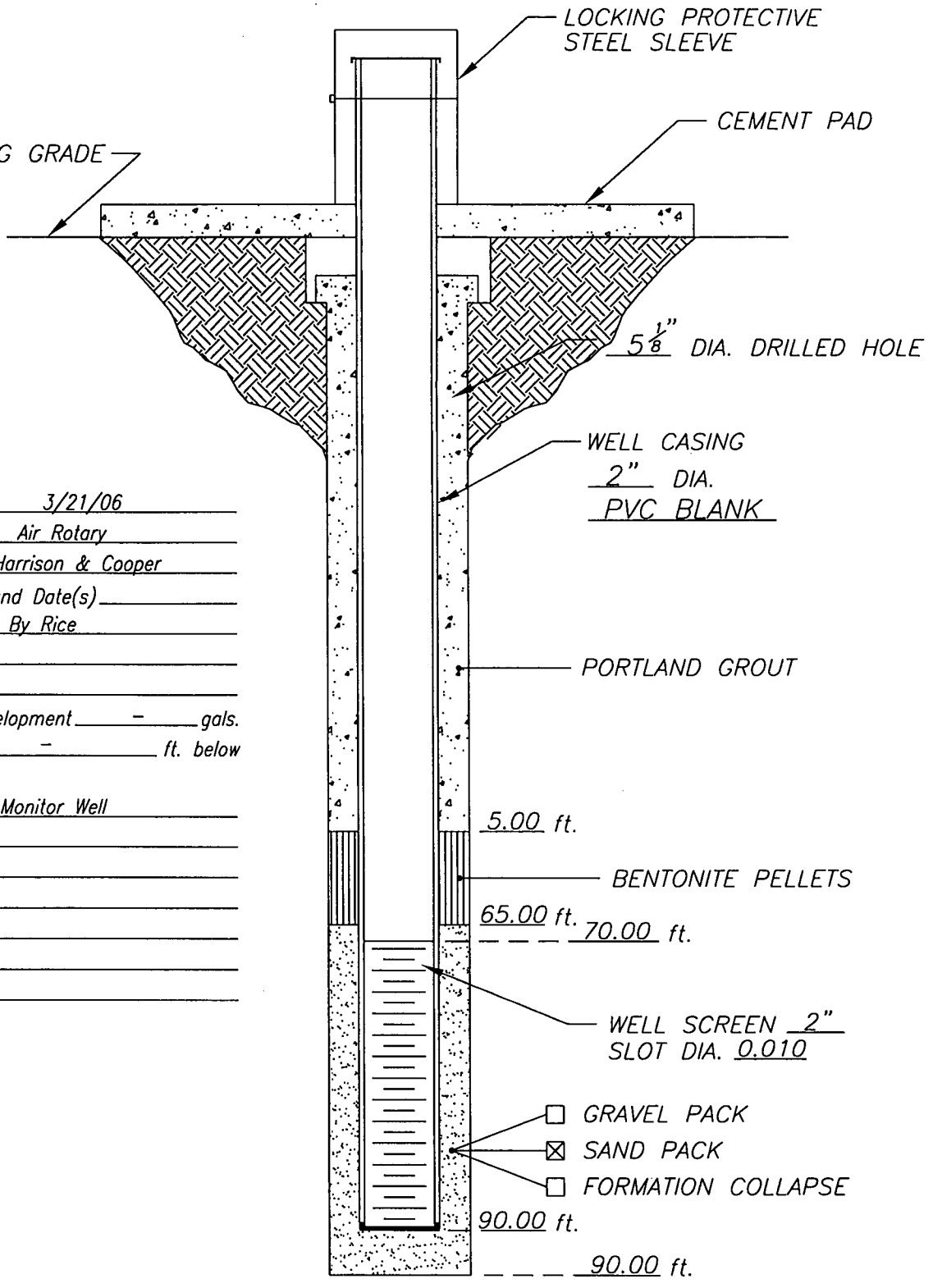
Highlander Environmental

SAMPLE LOG

Boring/Well: BH-3
Project Number: 2142
Client: Rice
Site Location: L-1
Location: Lea County, New Mexico
Total Depth 90'
Date Installed: 3/21/2006

DEPTH (Ft)	OVM	SAMPLE DESCRIPTION
0-3	-	Lt. brown, fine grain sand, some traces of caliche
3-5	-	Lt. brown, fine grain sand, some traces of caliche
5.0	-	White, caliche, dense, tan, fine grain sand
10.0	-	Tan, fine grain sand and wihte caliche
15.0	-	White, caliche, dense, tan, fine grain sand
20.0	-	Tan, fine grain sand, some loose with compacted layers sand
25.0	-	White, caliche, dense, tan, fine grain sand
30.0	-	Tan/lt. red, fine grain sand, some loose with compacted layers sand
35.0	-	Tan/lt. red, fine grain sand, some loose with compacted layers sand
40.0	-	Tan,fine grain sand, loose, dense layers of caliche and cemented sandstone
45.0	-	Tan,fine grain sand, loose
50.0	-	Tan,fine grain sand, loose
55.0	-	Tan/lt. red, fine grain sand, some loose with cemented sandstone
60.0	-	Tan/lt. red, fine grain sand, some loose with cemented sandstone
65.0	-	Tan, fine grain sand, some loose with compacted layers sand
70.0	-	Tan, fine grain sand, some loose with compacted layers sand
75.0	-	Tan, fine grain sand, some loose with compacted layers sand
80.0	-	Tan, fine grain sand, loose, cemented sandstone
85.0	-	Tan, fine grain sand, loose, cemented sandstone
90.0		Tan, fine grain sand, loose, cemented sandstone
		Total Depth - 90'

WELL CONSTRUCTION LOG



Installation Date(s) 3/21/06
Drilling Method Air Rotary
Drilling Contractor Harrison & Cooper
Development Technique(s) and Date(s)
Developed By Rice

Water Removed During Development – gals.
Static Depth to Water – ft. below Ground Level
Well Purpose Monitor Well

Remarks

DATE: 3/22/06	CLIENT: Rice Operating Company PROJECT: L-1 LOCATION: Lea County, New Mexico	WELL NO. MW-3
Highlander Environmental		

Appendix C

Analytical Data Tables

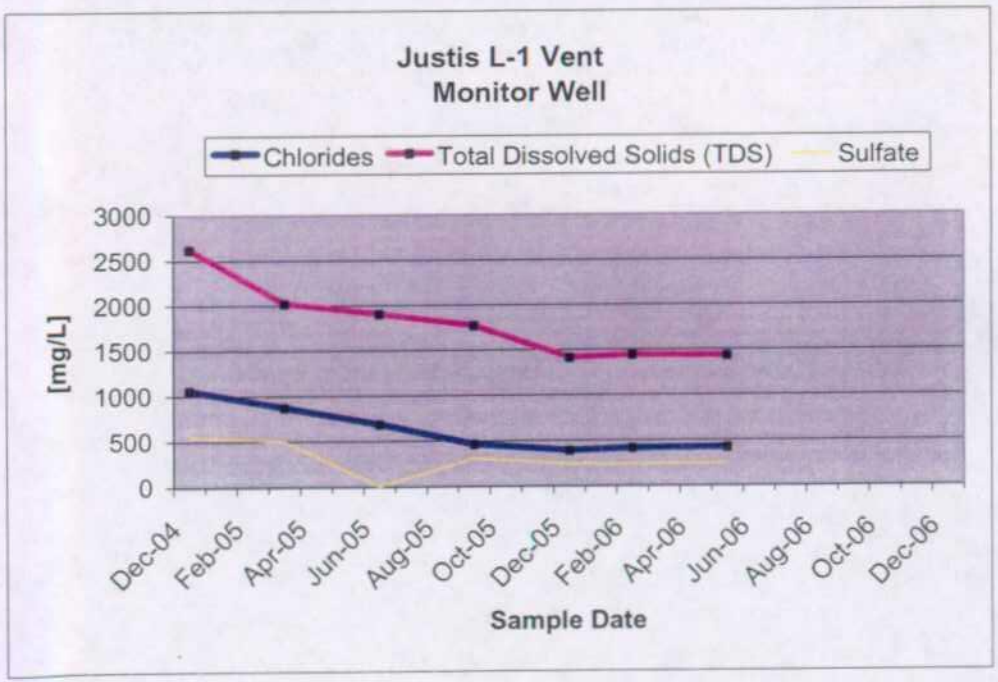
Justis L-1 vent
unit 'L', Sec. 1, T25S, R37E

2-in. well completed on 12/10/2004

RICE *Operating Company*
Monitor Well Data Sheet

(ft) (gal) All concentrations are in mg/L

MW #	DEPTH TO WATER	TOTAL DEPTH	WELL VOLUME	VOLUME PURGED	SAMPLE DATE	Cl⁻	TDS	BENZENE	TOLUENE	ETHYL BENZENE	TOTAL XYLENES	SULFATE	COMMENTS
1	78.43	XXX	XXX	XXX	12/21/04	1060	2620	0.0158	<0.001	0.00209	<0.001	550	
1	78.19	XXX	XXX	XXX	3/29/05	873	2020	0.000904	<0.001	<0.001	<0.001	502	
1	78.11	XXX	XXX	XXX	6/16/2005	684	1900	<0.001	<0.001	<0.001	<0.001	XXX	
1	XXX	XXX	XXX	XXX	9/15/2005	464	1770	<0.001	<0.001	<0.001	<0.001	307	
1	77.80	92.00	2.300	8.00	12/5/2005	390	1410	<0.001	<0.001	<0.001	0.000666	245	
1	77.56	92.00	2.300	8.00	2/27/2006	413	1440	<0.001	<0.001	<0.001	<0.001	236	
1	77.51	92.00	2.300	10.00	5/24/2006	420	1430	<0.001	<0.001	<0.001	<0.001	246	



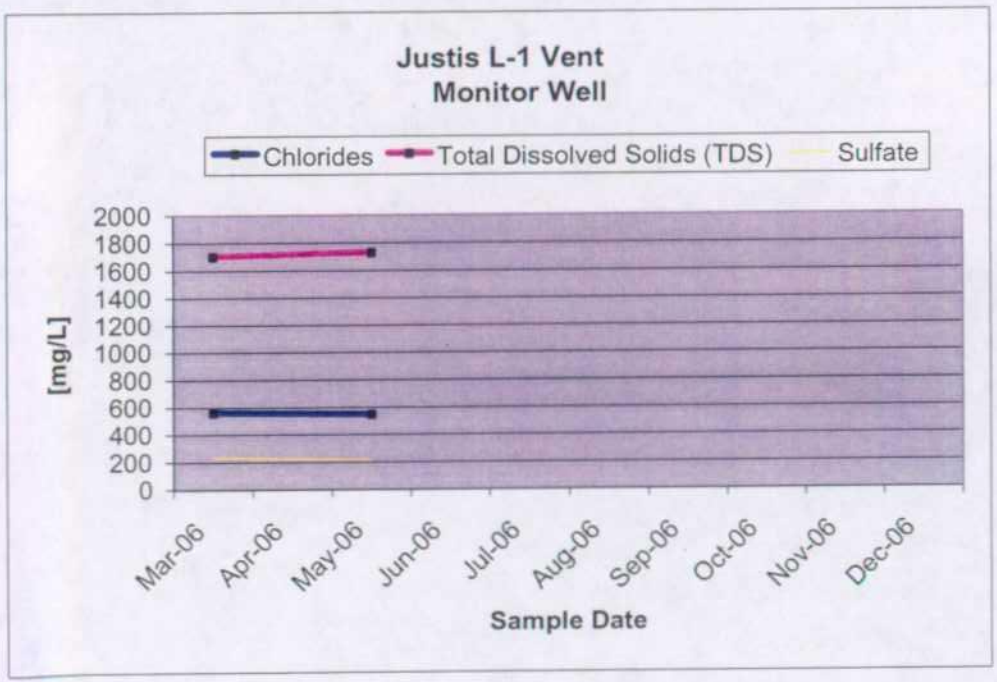
Justis L-1 vent
unit 'L', Sec. 1, T25S, R37E

2-in. well completed on 12/10/2004

RICE *Operating Company*
Monitor Well Data Sheet

(ft) (gal) All concentrations are in mg/L

MW #	DEPTH TO WATER	TOTAL DEPTH	WELL VOLUME	VOLUME PURGED	SAMPLE DATE	Cl⁻	TDS	BENZENE	TOLUENE	ETHYL BENZENE	TOTAL XYLENES	SULFATE	COMMENTS
2	77.72	93.05	2.500	12.00	03/28/06	564	1700	<0.001	<0.001	<0.001	<0.001	233	
2	77.48	93.05	2.500	15.00	5/24/06	549	1730	<0.001	<0.001	<0.001	<0.001	215	



Justis L-1 vent
unit 'L', Sec. 1, T25S, R37E

2-in. well completed on 12/10/2004

RICE *Operating Company*
Monitor Well Data Sheet

(ft) (gal) All concentrations are in mg/L

MW #	DEPTH TO WATER	TOTAL DEPTH	WELL VOLUME	VOLUME PURGED	SAMPLE DATE	Cl⁻	TDS	BENZENE	TOLUENE	ETHYL BENZENE	TOTAL XYLENES	SULFATE	COMMENTS
3	78.21	93.00	2.400	12.00	03/28/06	96.3	536	<0.001	<0.001	<0.001	<0.001	93.4	
3	77.99	93.00	2.400	10.00	5/24/06	91.4	616	<0.001	<0.001	<0.001	<0.001	88.3