AP - 44

STAGE 1 & 2 REPORTS

DATE:

Aug. 18, 2006

Highlander Environmental Corp.

Midland, Texas

CERTIFIED MAIL
RETURN RECIEPT NO. 7005 1160 0005 3780 4845

August 18, 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 Release From Rule 19, at the Eunice Monument Eumont (EME) SWD H-13 Site, Unit H, Section 13, T-20-S, R-36-E, Lea County, New Mexico, NMOCD AP-44.**

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 (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

RICE Operating Company (ROC) discovered an accidental discharge at the Eunice Monument Eumont (EME) SWD H-13 location on July 3, 2002. The soil had settled underneath a 4" asbestos/concrete system line causing it to break. According to the C-141 form (Initial) filed on July 11, 2002, the total volume spilled was 10 barrels with 5 barrels recovered and disposed of into the EME SWD system. The pipeline leak was permanently repaired to minimize the potential for further impairment.

Two delineation trenches and a soil boring have been installed. Based upon the chloride concentrations and relatively shallow groundwater (~31' bgs), this soil boring was completed as a monitoring well. The monitoring well has been sampled on a quarterly basis since October

2002. The only constituent of concern observed is chloride, with concentrations ranging from 1,450 mg/L to 2,610 mg/L.

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 wells (MW-2 and MW-3) were installed on March 23, 2006. MW-2 was placed up-gradient of MW-1 and MW-3 was placed down-gradient. The wells were developed and sampled on March 27, 2006 and July 17, 2006. Both of the new monitor wells displayed similar qualities to the monitor well placed at the leak site (MW-1). 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 two wells in adjoining section of this site. Both wells were noted as "livestock watering wells" and both exhibited elevated chloride concentrations (1268 mg/L and 2680 mg/L).

In reviewing the original soil boring data, while chloride concentrations were above 250 mg/kg throughout the depth of the soil boring, the levels declined dramatically with depth and are not indicative of saturation of the vadose zone. A copy of the original boring log is included in Appendix B. Based upon the consistent data for all three monitor wells through two sampling events, and based upon the water well database searches, it appears that the background water quality is impaired over the entire region, and not as a result of this spill incident.

2.0 CHRONOLOGY OF EVENTS

July 3, 2002	ROC discovered an accidental discharge at the above referenced site.
July 11, 2002	A C-141 form (Initial) was filed. The total volume spilled was 10 barrels with 5 barrels recovered and disposed of into the EME SWD system. The pipeline leak was permanently repaired to minimize the potential for further impairment.
July 22, 2002	Two delineation trenches were excavated, one on the east side of the system line and one on the west side of the line.
September 25, 2002	A soil boring was installed to further delineate the depth of impact. Based upon the chloride concentrations and relatively shallow groundwater (~31' bgs), this soil boring was completed as a monitoring well. The well was completed to a total depth of 41' bgs.
October 29, 2002	Monitor Well (MW-1) was purged and sampled.
December 13, 2002	NMOCD director notified of groundwater impact.
March 6, 2003	Monitor Well (MW-1) was purged and sampled.
May 29, 2003	Monitor Well (MW-1) was purged and sampled.
August 22, 2003	Monitor Well (MW-1) was purged and sampled.
November 19, 2003	Monitor Well (MW-1) was purged and sampled.
February 18, 2004	Monitor Well (MW-1) was purged and sampled.
May 27, 2004	Monitor Well (MW-1) was purged and sampled.
September 7, 2004	Monitor Well (MW-1) was purged and sampled.
November 24, 2004	Monitor Well (MW-1) was purged and sampled.

January 14, 2005	2004 Monitor Well Report/Summary Sampling submitted to the NMOCD.
March 17, 2005	Investigation & Characterization Plan (ICP) submitted to the NMOCD.
March 30, 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.
July 12, 2005	Stage 1 Abatement Plan submitted to NMOCD.
September 16, 2005	Monitor Well (MW-1) was purged and sampled.
October 19, 2005	Monitor Well (MW-1) was purged and sampled.
November 18, 2005	Stage 1 Abatement Plan certified "Administratively Complete" by NMOCD.
January 18, 2006	Monitor Well (MW-1) was purged and sampled.
February 23, 2006	Stage 1 Abatement Plan approved by NMOCD.
March 23, 2006	Monitor Wells MW-2 and MW-3 installed.
March 27, 2006	Monitor Wells MW-2 and MW-3 were purged and sampled.
April 18, 2006	Monitor Wells MW-1, MW-2 and MW-3 were purged and sampled.
July 17, 2006	Monitor Wells MW-1, MW-2 and MW-3 were purged and sampled.

3.0 BACKGROUND & PREVIOUS WORK

ROC discovered an accidental discharge at the above referenced site on July 3, 2002. The soil had settled underneath a 4" asbestos/concrete system line causing it to break. According to the C-141 form (Initial) filed on July 11, 2002, the total volume spilled was 10 barrels with 5 barrels recovered and disposed of into the EME SWD system. The pipeline leak was permanently repaired to minimize the potential for further impairment. The site location is shown on Figure 1.

Two delineation trenches were excavated on July 22, 2002, one on the east side of the system line and one on the west side of the line. Chloride concentrations in the east trench decreased to 254 mg/kg at a depth of 8' below ground surface, while the west trench exhibited elevated chloride levels to 12' below ground surface (bgs). A soil boring was installed on September 25, 2002 to further delineate the depth of impact. Based upon the chloride concentrations and relatively shallow groundwater (~31' bgs), this soil boring was completed as a monitoring well. The well was completed to a total depth of 41' bgs (MW-1). This monitor well has been sampled on a quarterly basis since October 2002. In the quarterly sampling events to date, the only constituent of concern observed was chloride. Chloride concentrations have ranged from 1,450 mg/L to 2,610 mg/L.

4.0 GEOLOGY & HYDROGEOLOGY

4.1 Regional and Local Geology

This site is located in the Laguna Valley physiographic subdivision of southern Lea County. Laguna Valley is the eastern part of a vast sand dune area covering approximately 400 square miles. The site is immediately south-southwest of Mescalero Ridge. Sediments of Quaternary age are present in this area in the form of alluvial deposits, probably both of Pleistocene and Recent age and the dune sands of Recent age. The alluvium was deposited in topographically low areas where the Ogallala formation had been stripped away. The dune sands mantle the older alluvium in most places, with some dunes locally extending to 20-40 feet high. The Quaternary alluvium is underlain by the Dockum group of Triassic age. The uppermost formation of the Dockum Group is the Chinle.

4.2 Regional and Local Hydrogeology

Along the southern edge of the High Plains, water leaves the Ogallala formation and enters the Quaternary fill which underlies the Laguna Valley area. The saturated thickness of the sediments in the Quaternary fill of the Laguna Valley area ranges from about 15 to 30 feet, and water levels are approximately 30 feet below the land surface. The movement of groundwater in this area is primarily to the southeast. The depth to water in monitor well MW-1 is approximately 31' (TOC).

4.3 Water Well Inventory

In accordance with the Stage 1 Abatement Plan submitted by Highlander, 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 2 well records in Section 7, T20S, R37E. Unit Letter 'M' (SW ¼, SW ¼) of Section 7 would be within the search radius, however, the WAIDS database only provides the Section of the well location, not a quarter or unit letter. Both of these wells are noted to be livestock watering wells and both have elevated chloride concentrations (1268 and 2680 mg/L).

Unit Letters 'P' and 'O' (SE ¼) of Section 12 are also within the search radius and the WAIDS database yielded one well record in Section 12. The well purpose is reported as domestic. This well was also reported to have elevated chloride. A field inspection was unable to locate any of the wells within the search radius. Copies of the database search records are included in Appendix A.

5.0 SUBSURFACE SOILS

The soils in the vicinity of this site are of the Pyote soils and Dune land association. 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 soil boring at this site indicated sand with some caliche stringers to a depth of approximately 40 feet.

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 up-gradient and MW-3 was installed down-gradient. Both monitor wells were constructed according to EPA and industry standards to total depths of 40' (MW-2) and 43' (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 October 2002. Monitor wells MW-2 and MW-3 were added to the quarterly sampling program in March, 2006. Analytical data for all monitoring events are summarized in the tables in Appendix C.

6.3 Hydrocarbons in Groundwater

To date, no hydrocarbon impact has been detected in any of the monitor wells and as such is not considered a Constituent of Concern at this site.

6.4 Other Constituents of Concern

In the quarterly sampling events to date, the only constituent of concern observed was chloride. Chloride concentrations have ranged from 1,450 mg/L to 2,610 mg/L in MW-1.

7.0 RULE 19 RELEASE REQUEST and SOIL WORK PLAN

Based upon the results of the Stage I Abatement Plan implementation, it appears that the background water quality is impaired over the entire region, and not as a result of this spill incident. As a result, ROC request release from NMOCD Rule 19 requirements.

Additionally, ROC will complete assessment and remediation of chloride impacted soils for closure under NMOCD approval. The horizontal extent of chloride impact to soils will be evaluated with a backhoe. Once evaluated, the soils will be excavated down below the root zone (minimum of 3.0' below ground surface) and an evapotranspiration barrier (non-compacted clay cap) will be placed into the excavation. The excavated soils will be evaluated for placement back into the excavation to ensure that it will sustain vegetative cover. Once completed, a closure report will be prepared and submitted for the soils portion of this investigation. ROC also will secure but not plug the monitor wells, to retain these locations for possible further background quality evaluations for this region.

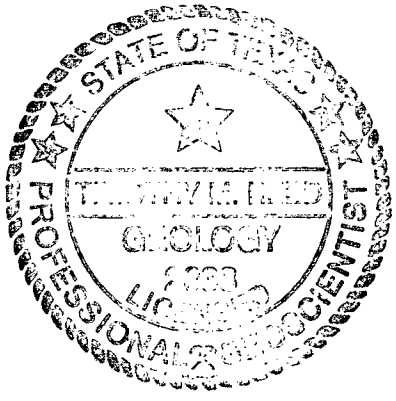
8.0 QUALITY ASSURANCE/ QUALITY CONTROL

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

The wells were inspected for the presence of phase-separated hydrocarbons (PSH) and none was detected. 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, and chloride by method 300.0.

9.0 PROPOSED SCHEDULE OF ACTIVITIES

Upon approval, the horizontal soil delineation outlined above will be implemented in a timely manner, dependent upon availability of local contractors. The NMOCD will be notified at least 48 hours in advance of sampling or construction activities. Upon approval from the NMOCD, quarterly sampling of the existing monitor wells will be discontinued. All results of activities for 2006 will be submitted in an annual summary report within the first quarter of 2007.



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, tables

FIGURES

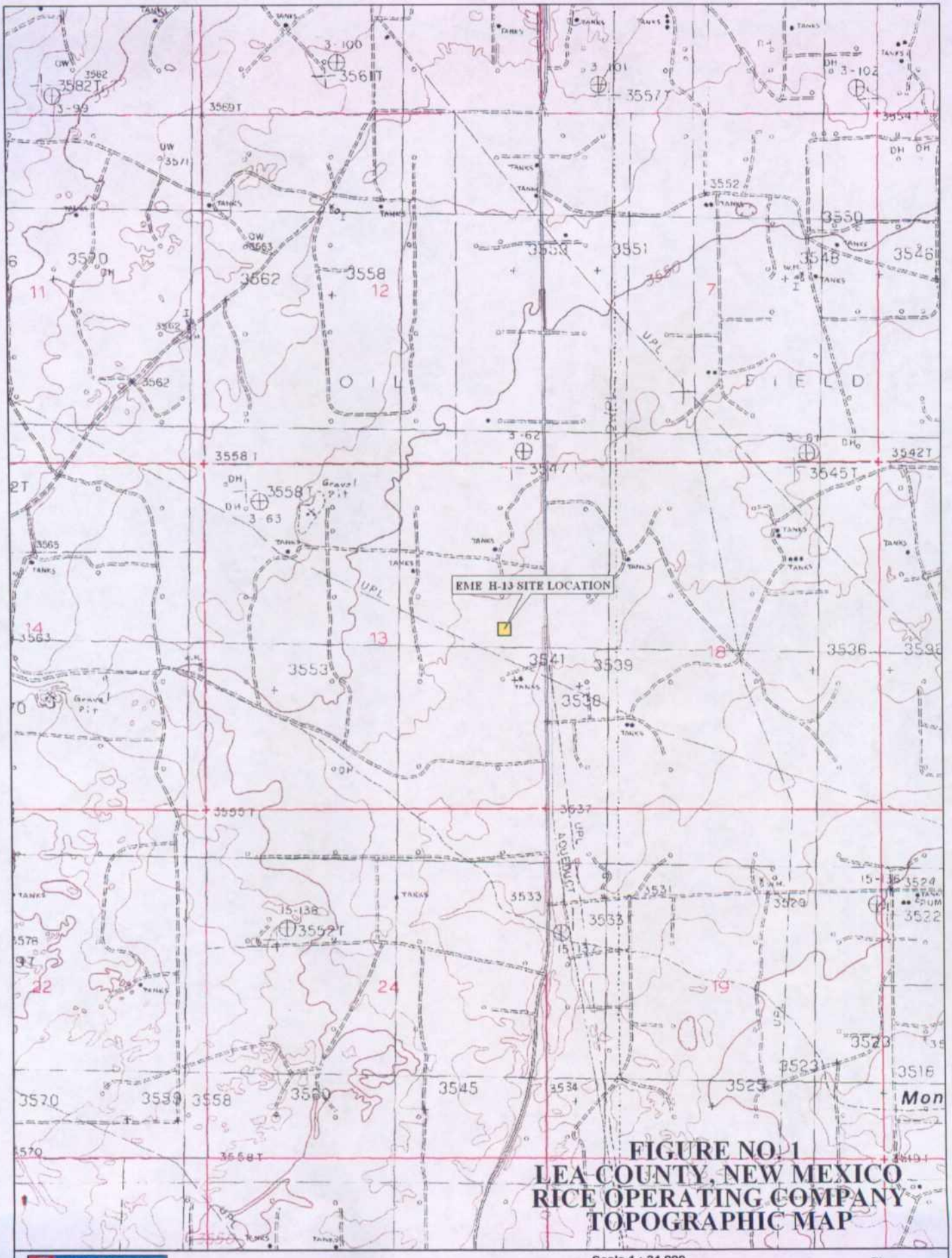
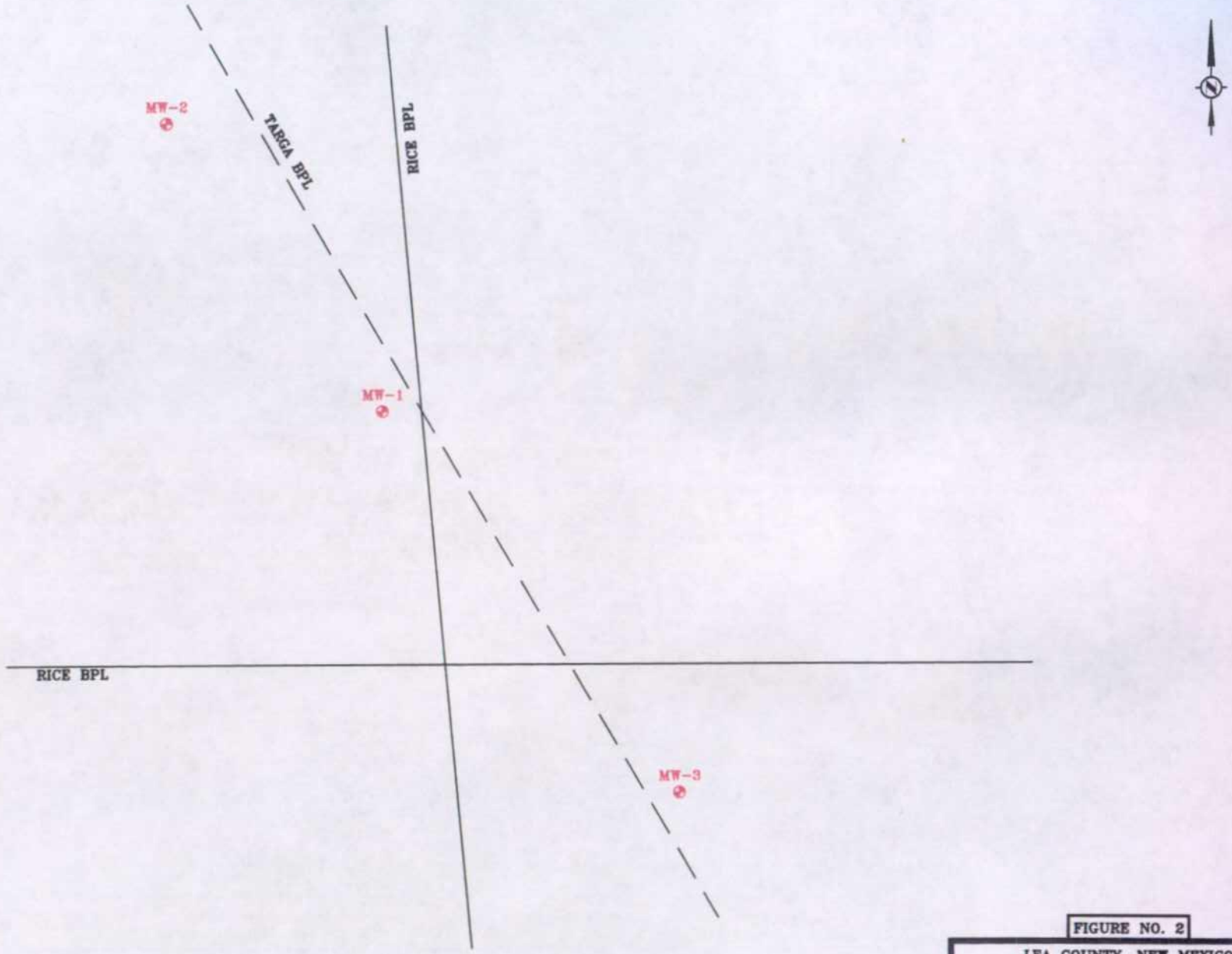


FIGURE NO. 1
LEA COUNTY, NEW MEXICO
RICE OPERATING COMPANY
TOPOGRAPHIC MAP

Scale 1 : 24,000
1" = 2000 ft

TN
MN
8.7°E



MONITOR WELL LOCATIONS

NOT TO SCALE

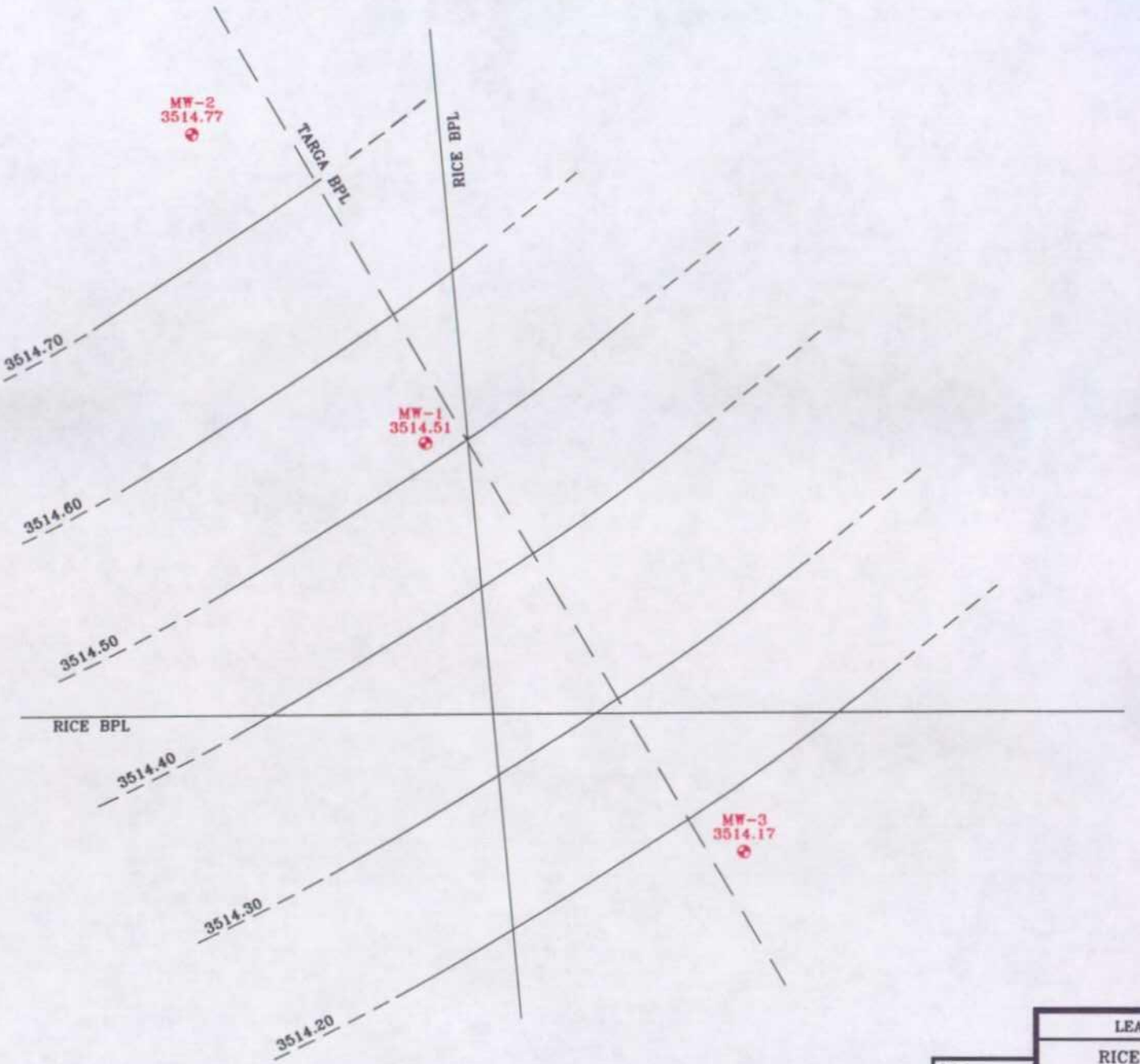
FIGURE NO. 2

LEA COUNTY, NEW MEXICO

RICE OPERATING COMPANY
EME H-13 LEAK
SITE MAP

DATE: 5/9/06
DWN. BY: JJ
FILE: C:\RICE\3307 SITE MAP

HIGHLANDER ENVIRONMENTAL CORP.
MIDLAND, TEXAS



MONITOR WELL LOCATIONS

NOT TO SCALE

FIGURE NO. 3

LEA COUNTY, NEW MEXICO

RICE OPERATING COMPANY
EME H-13 LEAK
GROUNDWATER MAP

DATE: 8/17/06
DWN. BY: JJ
FILE: C:\RICE\2307 SITE MAP

HIGHLANDER ENVIRONMENTAL CORP.
MIDLAND, TEXAS

Appendix A

Water Well Database Records

http://octane.nmt.edu/waterquality/

Section 12 General Information About: Sample 1197			
Section/ Township/Range	12 / 20 S / 36 E	Lat/Long	32.5878 / -103.3074
Elevation	0	Depth	0
Date Collected	5/15/1991	Chlorides	24000
Collector / Point of Collection	SEO / DP	Use	Domestic
Formation		TDS	0

Melanie located this well in Unit letter 'C' which is outside of the ½ mi. radius.

Section 7 General Information About: Sample 6369			
Section/ Township/Range	07 / 20 S / 37 E	Lat/Long	32.5878 / -103.2902
Elevation	3553	Depth	90
Date Collected	11/9/1979	Chlorides	1268
Collector / Point of Collection	SEO / DP	Use	Stock
Formation	OGALLALA	TDS	0

Melanie was unable to locate this well.

Section 7 General Information About: Sample 5313			
Section/ Township/Range	07 / 20 S / 37 E	Lat/Long	32.5878 / -103.2902
Elevation	3553	Depth	90
Date Collected	2/13/1985	Chlorides	2680
Collector / Point of Collection	SEO / DP	Use	Stock
Formation	OGALLALA	TDS	0

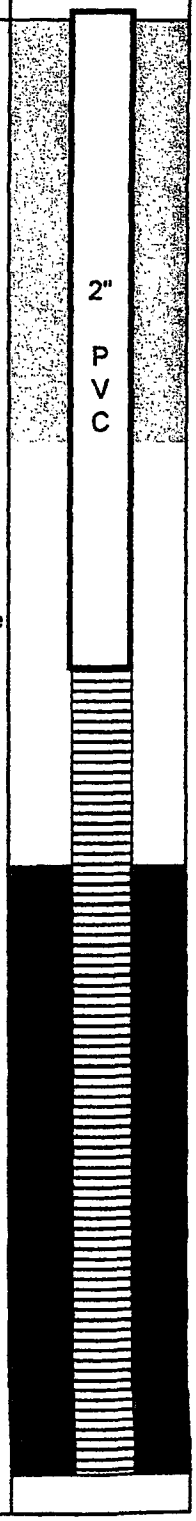
Melanie was unable to locate this well.

Appendix B

Boring and Completion Logs

DRILLING LOG	Site Name/Location	BORING/WELL INFORMATION			Logged by: Eades
RICE *Operarting Company*	H-13	Well No. SB-1/MW	Date Drilled: 9/25/02	Driller: Eades	Completion:
122 West Taylor	13-T20S-R36E	Well Depth:	Boring Depth: 41'	Well Material:	Plugged
Hobbs, New Mexico 88240	EME SWD System	Casing Length	Boring Diameter: 4.75"	Casing Size:	with
(505) 393-9174	Lea County, NM	Screen Length:	Drilling Method: Air Rotary	Slot Size:	cuttings.

DEPTH	SUBSURFACE LITHOLOGY	SAMPLE TYPE	Test Results (ppm) Cl⁻	TPH	REMARKS	Boring
0	Ground surface		Titrate	EPA 418.1		
8	Topsoil				cuttings	
19					bentonite	
20	Caliche Dry Sand	Grab	1503			
25	Damp Sand	Grab	557			
28					screen	
30	Damp Sand	Grab	370			
31	Sand					
34					water	
40					rathole	
41	Sand and Clay					

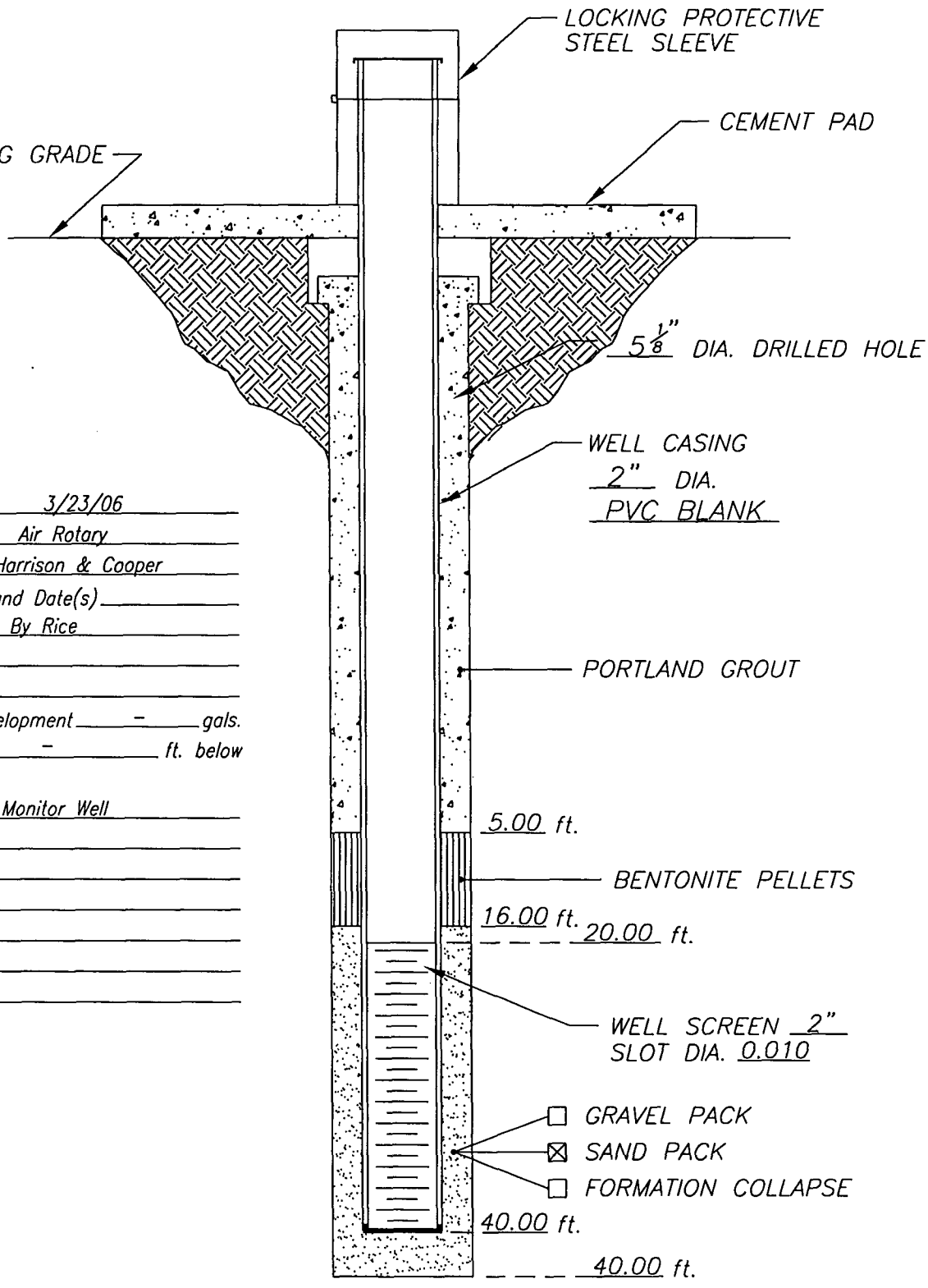


SAMPLE LOG

Boring/Well: BH-2
Project Number: 2307
Client: Rice
Site Location: H-13
Location: Lea County, New Mexico
Total Depth 40'
Date Installed: 3/23/2006

DEPTH (Ft)	OVM	SAMPLE DESCRIPTION
0-3	-	Tan, fine grain sand, some traces of caliche
3-5	-	Tan, fine grain sand, some traces of caliche
5.0	-	White, caliche, dense, friable, some fine grain sand
10.0	-	Tan, fine grain sand and white caliche
15.0	-	Tan, fine grain sand and white caliche, becoming sandy with depth
20.0	-	Tan, fine grain sand, loose
25.0	-	Tan and lt. green, fine grain sand, loose
30.0	-	Tan lt. green, fine grain sand, loose, cemented sandstone
35.0	-	Tan and lt. green, fine grain sand, loose, cemented sandstone
40.0	-	Tan, fine grain sand, loose,cemented sandstone, trace of red clay
		Total Depth - 40'

WELL CONSTRUCTION LOG



Installation Date(s) 3/23/06
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: 3/23/06	CLIENT: *Rice Operating Company* PROJECT: *H-13* LOCATION: *Lea County, New Mexico*	WELL NO. MW-2

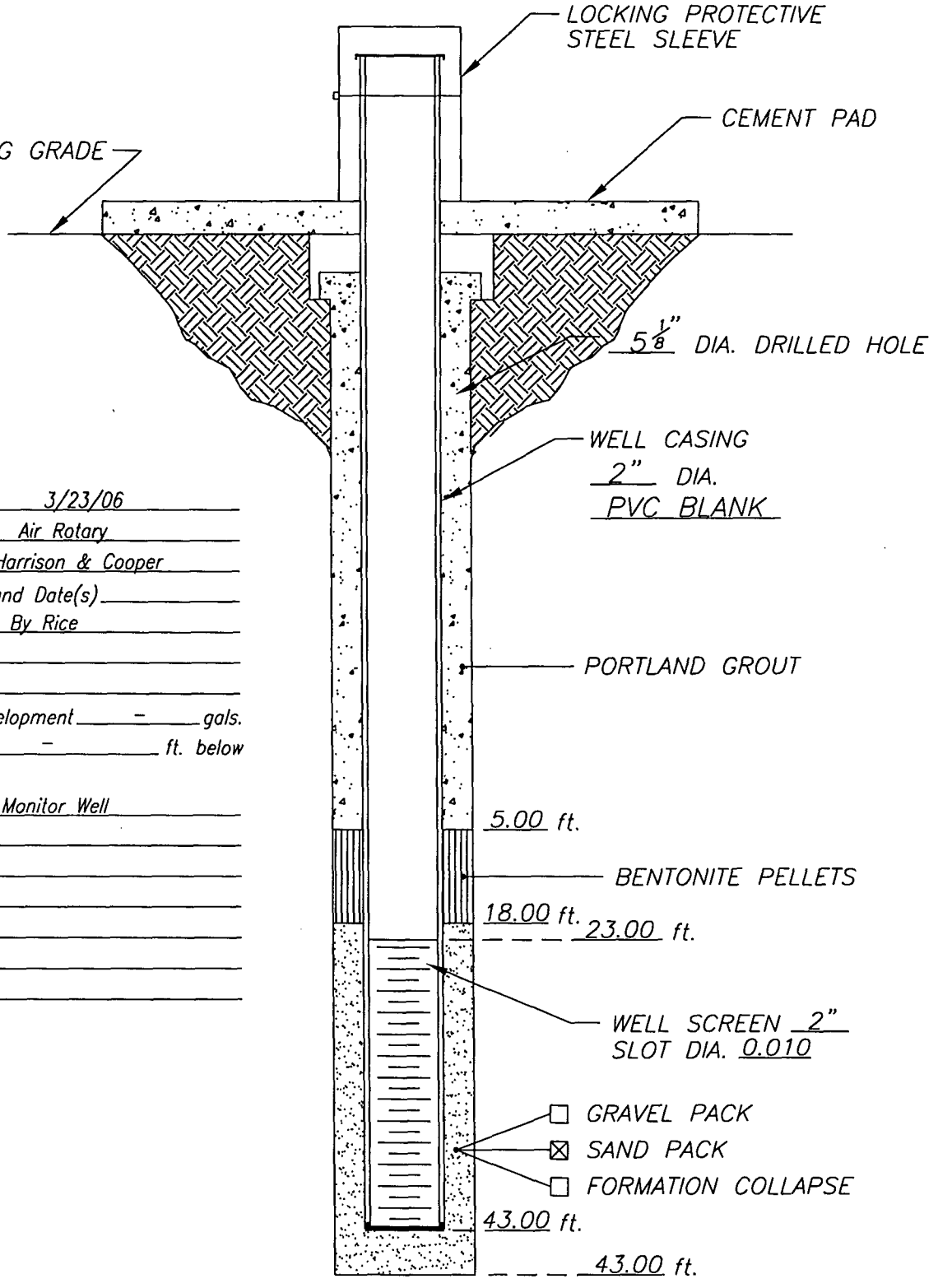
Highlander Environmental

SAMPLE LOG

Boring/Well: BH-3
Project Number: 2307
Client: Rice
Site Location: H-13
Location: Lea County, New Mexico
Total Depth 43'
Date Installed: 3/23/2006

DEPTH (Ft)	OVM	SAMPLE DESCRIPTION
0-3	-	Tan, fine grain sand, some traces of caliche
3-5	-	Tan, fine grain sand, some traces of caliche
5.0	-	White, caliche, dense, friable, some fine grain sand
10.0	-	Tan, fine grain sand and white caliche
15.0	-	Tan, fine grain sand and white caliche, becoming sandy with depth
20.0	-	Tan, fine grain sand, loose
25.0	-	Tan and lt. green, fine grain sand, loose
30.0	-	Tan, fine grain sand, loose and cemented sandstone
35.0	-	Tan, fine grain sand, loose, cemented sandstone
43.0000	-	Tan, fine grain sand, loose,and cemented sandstone
		Total Depth - 43'

WELL CONSTRUCTION LOG



Installation Date(s) 3/23/06
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: 3/23/06	CLIENT: Rice Operating Company PROJECT: H-13 LOCATION: Lea County, New Mexico	WELL NO. MW-3

Highlander Environmental

Appendix C

Analytical Data Tables

EME H-13 leak
unit 'H', Sec. 13, T20S, R36E

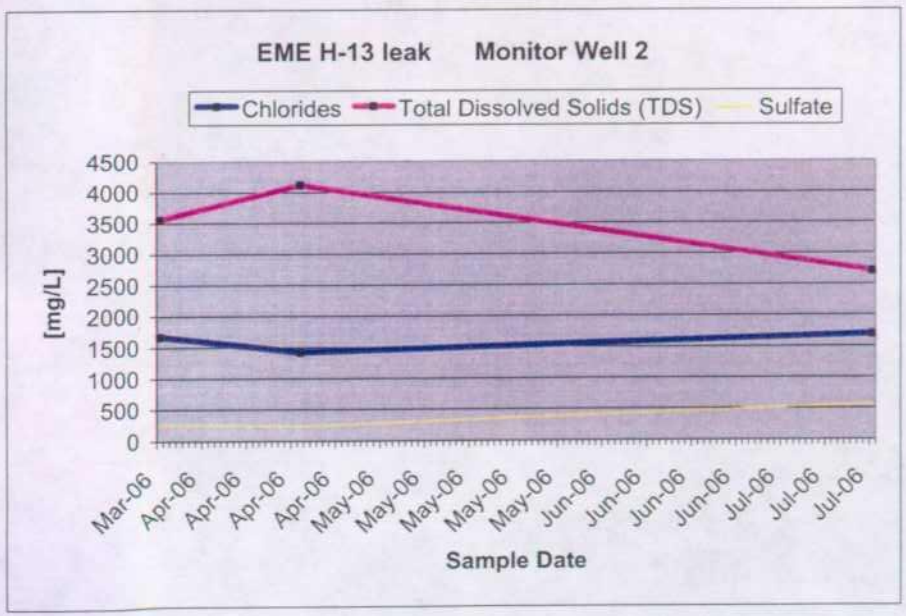
NMOCD Case #1R0429

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	30.69	43.10	2.000	8.00	03/27/06	1670	3560	<0.001	<0.001	<0.001	<0.001	264	
2	30.66	43.10	2.000	8.00	04/18/06	1420	4120	<0.001	<0.001	<0.001	<0.001	237	
2	30.80	43.10	2.000	10.00	07/17/06	1690	2710	<0.001	<0.001	<0.001	<0.001	562	

** Depth to water measured from top of casing*



EME H-13 leak
unit 'H', Sec. 13, T20S, R36E

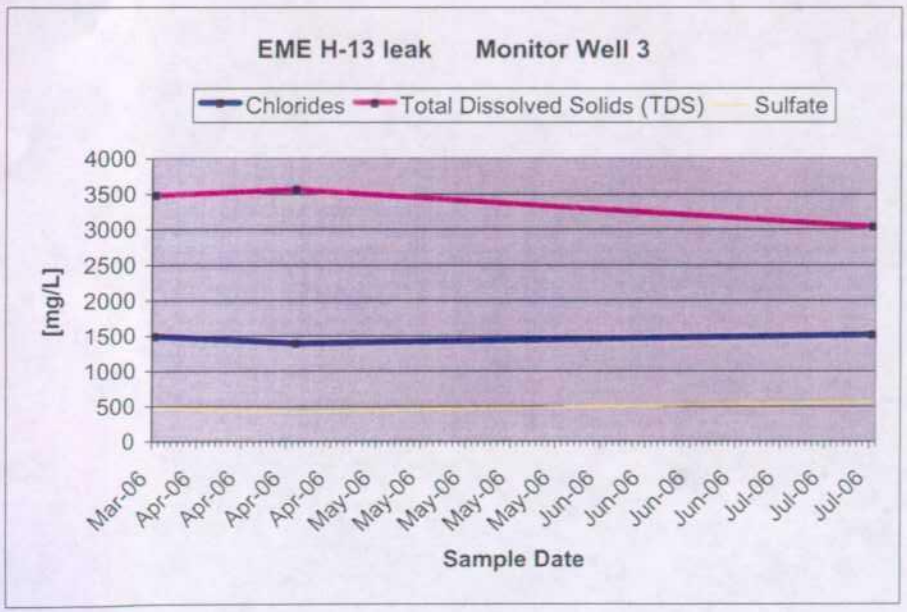
NMOCD Case #1R0429

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	31.89	46.00	2.300	8.00	03/27/06	1490	3480	<0.001	<0.001	<0.001	<0.001	472	
3	31.85	46.00	2.300	10.00	04/18/06	1390	3560	<0.001	<0.001	<0.001	<0.001	426	
3	32.08	46.00	2.200	10.00	07/17/06	1510	3035	<0.001	<0.001	<0.001	<0.001	557	

** Depth to water measured from top of casing*
Casing is 2.438 ft



EME H-13 leak
unit 'H', Sec. 13, T20S, R36E

NMOCD Case #1R0429

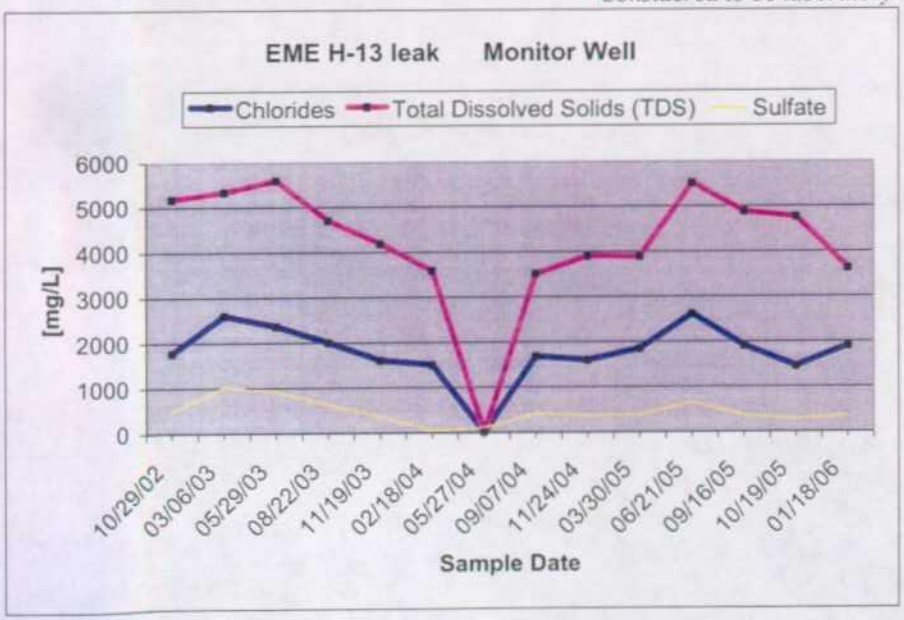
RICE *Operating Company*
Monitor Well Data Sheet

All concentrations are in mg/L

MW #	DEPTH TO WATER * (ft)	TOTAL DEPTH (ft)	WELL VOLUME (gal)	VOLUME PURGED (gal)	SAMPLE DATE	Cl	TDS	BENZENE	TOLUENE	ETHYL BENZENE	TOTAL XYLENES	SULFATE	COMMENTS
1	33.19	43.94	1.720	5.25	10/29/02	1770	5180	<0.001	<0.001	<0.001	<0.001	497	
1	33.18	43.90	1.710	5.10	03/06/03	2600	5340	<0.001	<0.001	<0.001	<0.001	1020	
1	33.20	43.91	1.212	5.10	05/29/03	2360	5600	<0.001	<0.001	<0.001	<0.001	920	
1	33.40	43.90	1.680	5.04	08/22/03	2000	4700	<0.001	<0.001	<0.001	<0.001	622	
1	33.35	43.91	1.600	5.00	11/19/03	1600	4180	<0.001	<0.001	<0.001	0.001	370	
1	33.41	43.90	1.670	5.00	02/18/04	1500	3580	<0.002	<0.002	<0.002	<0.006	44	
1	33.56	43.90	1.650	5.00	05/27/04	177**	751**	<0.001	<0.001	<0.001	<0.001	90.8	
1	33.40	44.10	1.712	5.14	09/07/04	1680	3510	<0.001	<0.001	<0.001	<0.001	418	
1	32.85	44.10	1.800	5.40	11/24/04	1590	3900	<0.001	<0.001	<0.001	<0.001	358	
1	32.19	44.10	1.910	25.00	03/30/05	1850	3890	<0.001	<0.001	<0.001	<0.001	376	
1	31.93	44.10	1.950	10.00	06/21/05	2610	5520	<0.001	<0.001	<0.001	<0.001	641	
1	XXX	XXX	XXX	XXX	09/16/05	1900	4880	<0.001	<0.001	<0.001	<0.001	358	
1	31.70	44.10	2.000	6.00	10/19/05	1450	4760	<0.001	<0.001	<0.001	<0.001	286	
1	31.59	44.10	2.000	8.00	01/18/06	1900	3620	<0.001	<0.001	<0.001	<0.001	351	
1	31.66	44.10	2.000	8.00	04/18/06	1600	4160	<0.001	<0.001	<0.001	<0.001	307	
1	31.75	44.1	2.00	10.00	07/17/06	1800	3240	<0.001	<0.001	<0.001	<0.001	412	

** Depth to water measured from top of casing*
Casing is 2.438 ft

*** Considered to be laboratory error, based upon historical sample results.*

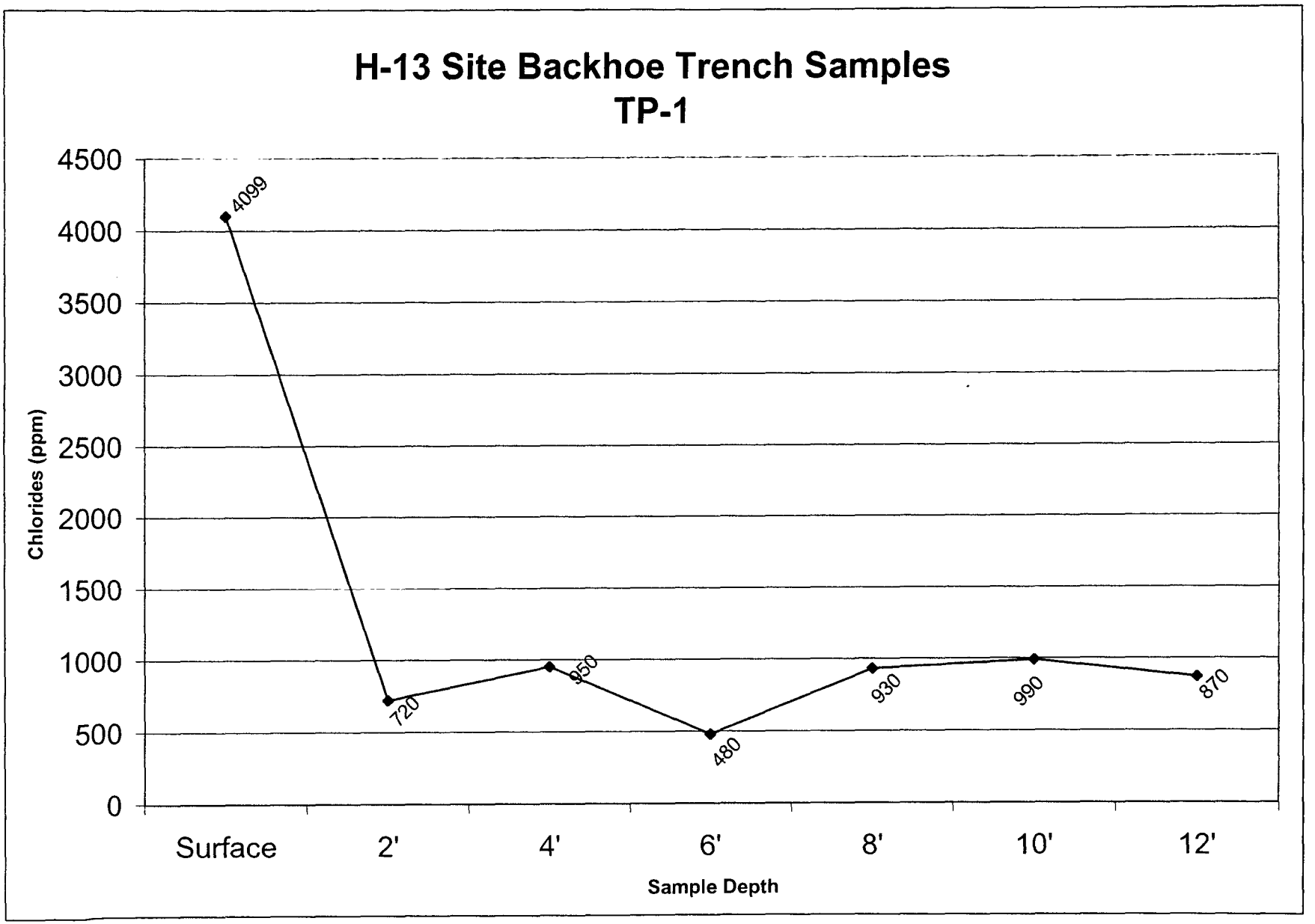


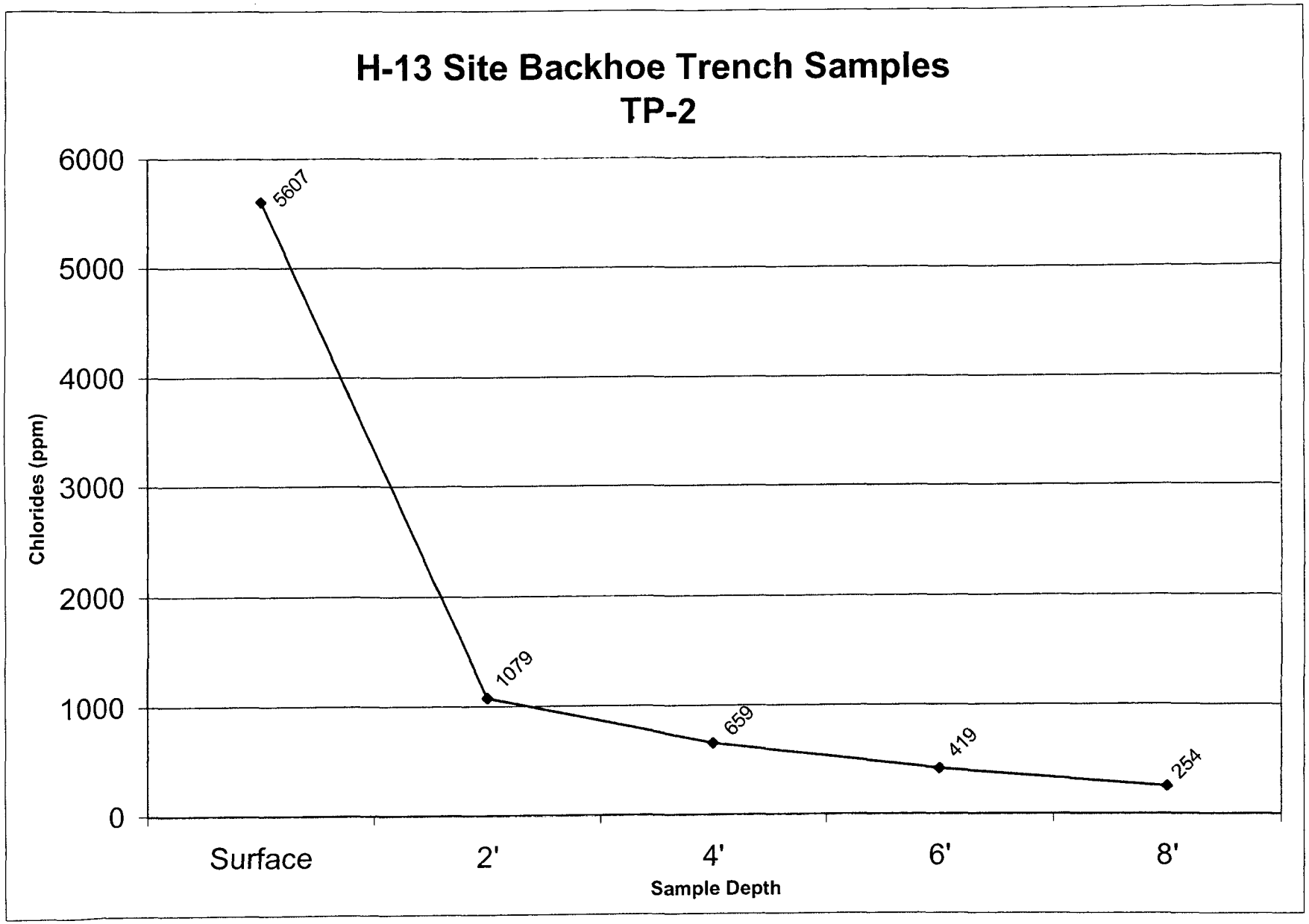
Appendix D

Backhoe Trench
Sample Graphs

H-13 Site Backhoe Trench Samples

Sample Area	Sample Depth	Chloride (ppm)
TP1 - West of Line	Surface	4099
	2'	720
	4'	950
	6'	480
	8'	930
	10'	990
	12'	870
TP2 - East of Line	Surface	5607
	2'	1079
	4'	659
	6'	419
	8'	254


H-13 Site Backhoe Trench Samples
TP-1
Chlorides (ppm)
4500
4000
3500
3000
2500
2000
1500
1000
500
0
4099
720
950
480
930
990
870
Surface
2'
4'
6'
8'
10'
12'
Sample Depth


H-13 Site Backhoe Trench Samples
TP-2
Chlorides (ppm)
6000
5000
4000
3000
2000
1000
0
5607
1079
659
419
254
Surface
2'
4'
6'
8'
Sample Depth