

AP -

44

STAGE 1 & 2 REPORTS

DATE:

2-19-10



TETRA TECH

CERTIFIED MAIL
RETURN RECEIPT NO. 7008 3230 0001 9310 7013

February 19, 2010

Mr. Ed Hansen
New Mexico Energy, Minerals, & Natural Resources Department
Oil Conservation Division, Environmental Bureau
1220 South St. Francis Drive
Santa Fe, New Mexico 87505

RECEIVED OGD
200 FEB 25 P 2:02

RE: Termination Request, Rice Operating Company, Eunice Monument Eumont (EME) Saltwater Disposal System (SWD) H-13 Leak, Unit H, Section 13, T-20-S, R-36-E, Lea County, New Mexico, NMOCD CASE #1R0429 (AP-44).

Mr. Hansen:

Tetra Tech, Inc. (Tetra Tech) submits the following Termination Request for the Rice Operating Company (ROC), Eunice Monument Eumont (EME) SWD System H-13 Leak. ROC is the service provider (agent) for the EME Salt Water Disposal System and has no ownership of any portion of the pipeline, well or facility. The EME SWD system is owned by a consortium of oil producers, System Parties, who provide all operating capital on a percentage ownership/usage basis. The site is shown on Figures 1 and 2.

1.0 BACKGROUND and PREVIOUS WORK

ROC discovered an accidental discharge at the above referenced site on July 3, 2002. The soil had settled underneath a 4" AC 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 in the EME SWD system. The pipeline leak was permanently repaired to minimize the potential for further impairment.

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 feet below ground surface, while the west trench exhibited elevated chloride levels to 12 feet below ground surface (bgs). A soil boring was drilled on September 25, 2002 to further delineate the depth of impact. Based upon the chloride concentrations and relatively shallow groundwater (~31 feet bgs), this soil boring was completed as a monitoring well. The well was completed to a total depth of 41 feet bgs.

Tetra Tech

1910 North Big Spring, Midland, TX 79705

Tel 432.682.4559 Fax 432.682.3946 www.tetrattech.com



On December 13, 2002, the NMOCD was notified of groundwater impact. The monitoring well has been sampled on a quarterly basis since October 2002. The only constituent of concern (COC) at this site is chloride.

STAGE 1 ABATEMENT PLAN IMPLEMENTATION

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, while MW-3 was placed down-gradient. The wells were developed and have been sampled on a quarterly basis since March 2006. These two additional monitor wells have displayed similar qualities to the monitor well placed at the leak site (MW-1), indicating the water quality is impaired over the entire region and not as a result of this release.

RULE 19 RELEASE REQUEST and SOIL WORK PLAN

In a report to the NMOCD dated August 18, 2006, ROC requested release from NMOCD Rule 19 requirements for the groundwater at the site. Additionally, ROC proposed additional assessment and remediation of chloride impacted soils for closure under NMOCD approval. The horizontal extent of chloride impacted soils was to be evaluated with a backhoe. Upon evaluation, the soils were to be excavated to a depth down below the root zone (minimum of 3.0' below ground surface) and an evapotranspiration barrier (non-compacted clay cap) was to be placed into the excavation. The excavated soils were to be evaluated and either placed back into the excavation or transported offsite for disposal. The OCD requested additional information in September 2006 which was provided in December 2006.

In a meeting between Mr. Wayne Price of the NMOCD, ROC, and Highlander on July 18, 2007, the site was evaluated for release from Rule 19 and proposed excavation, evaluation, and placement of the clay liner beneath the root zone (3.0' bgs). It was noted in the discussion, that the site has revegetated and formed a natural evapotranspiration barrier. A current site photo is included in Appendix A. As such, Mr. Price agreed with ROC that since the site has revegetated and formed a natural evapotranspiration barrier, ROC can be released from the proposed excavation and placement of the impervious liner. In a meeting with Mr. Ed Hansen of the NMOCD in January 2008, Mr. Hansen concurred with Mr. Price on releasing ROC from excavating and placement of an impervious liner at the site. With the exception of the meetings on the soils, no response was received from the NMOCD in regards to the termination request for sampling of groundwater at the site.

2.0 MONITOR WELL SAMPLE RESULTS

The chloride concentrations for the monitor wells at the EME H-13 have been consistent but elevated since the wells were installed in 2002 (MW-1) and 2006 (MW-2 and MW-3). The chloride concentrations have ranged from 1,380 mg/L in MW-3 on October 9, 2006 to 2,610 mg/L in MW-1 on June 21, 2005. Up gradient monitor well MW-2 has ranged from 1,360 mg/L on May 7, 2008 to 1,670 mg/L on March 27, 2006 with an average concentration of 1,533.75 mg/L. In the most recent sampling event (November



6, 2009), the chloride concentration for the well was 1,600 mg/L. The average chloride concentration between the three wells is 1,592 mg/L.

Since the installation of the three monitor wells at the EME H-13 in October 2002 (MW-1) and March 2006 (MW-2 and MW-3), there have been no BTEX constituents detected at or above reporting limits. Cumulative analytical data is summarized in the tables located in Appendix B.

3.0 COLLECTED REGIONAL HYDROGEOLOGIC DATA

A search of the database supported by the New Mexico Institute of Mining and Technology (New Mexico Tech) New Mexico Water and Infrastructure Data System (WAIDS), yielded 2 well records in Section 7, T20S, R37E, Unit Letter 'M' (SW $\frac{1}{4}$, SW $\frac{1}{4}$) located within a 1-mile radius of the subject site. Both of the wells are noted to be livestock watering wells and both have historically elevated chloride concentrations (1,268 and 2,680 mg/L). A copy of the database file is included in Appendix D.

In comparing the chloride concentration analysis data with other water quality in the area, specifically the ROC EME Jct. I-13, it appears the chloride concentrations at the site are consistent with regional groundwater degradation in the area. The EME Jct. I-13 data indicates chloride concentrations in existing monitor well MW-1 range from 1,120 mg/L to 1,220 mg/L with an average concentration of 1,188 mg/L. Copies of the analytical tables for both the EME H-13 and the EME Jct. I-13 are included in Appendix B and C, respectively.

A groundwater gradient map was constructed for the ROC EME H-13 site. Based on the collected data it appears the groundwater gradient for the EME H-13 is to the southeast. Regionally, the groundwater gradient is to the south to southeast. Figure 3 presents the groundwater gradient map for the EME H-13 as gauged on November 6, 2009. Figure 4 shows the adjacent EME Jct. I-13 in relation to the EME H-13.

4.0 CONCLUSIONS

1. Since the installation of the monitor wells in 2002 (MW-1) and in 2006 (MW-2 and MW-3), no BTEX constituents have been detected at or above the New Mexico Water Quality Control Commission (WQCC) standards.
2. Since the site has revegetated and formed a natural evapotranspiration barrier, it was agreed between Mr. Wayne Price and Mr. Ed Hansen of the NMOCD to release ROC from excavating and placement of an impervious liner at the site. As such, the soils are not an issue at this site.
3. The chloride concentrations for the monitor wells at the EME H-13 have been consistent but elevated since the wells were installed in 2002 (MW-1) and 2006 (MW-2 and MW-3). The chloride concentrations have ranged from 1,380 mg/L in MW-3 on October 9, 2006 to 2,610 mg/L in MW-1 on June 21, 2005. Up gradient monitor well MW-2 has ranged from 1,360 mg/L on May 7, 2008 to 1,670 mg/L on March 27, 2006, with an average concentration of




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1533.75 mg/L. In the most recent sampling event (November 6, 2009), the chloride concentration for the well was 1,600 mg/L. The average chloride concentration between the three wells is 1,592 mg/L. In comparing the chloride concentration analysis data with other water quality in the area, specifically the ROC EME Jct. I-13, it appears the chloride concentrations at the site are consistent with regional groundwater degradation in the area. The EME Jct. I-13 data indicates chloride concentrations in existing monitor well MW-1 ranges from 1,120 mg/L to 1,220 mg/L with an average concentration of 1,188 mg/L. In addition, 2 livestock wells in Section 7, T20S, R37E, Unit Letter 'M' (SW ¼, SW ¼) located within a 1-mile radius of the subject site also have historically elevated chloride concentrations (1,268 and 2,680 mg/L), indicating a regional chloride impact.

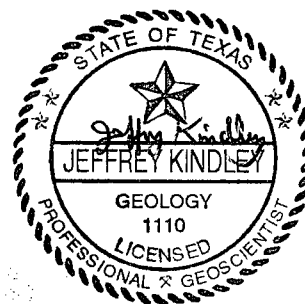
Since this site exhibits chloride concentrations consistent with water quality throughout the area, ROC requests that the NMOCD terminate further activities at this site. If you require any additional information or have any questions or comments concerning the assessment/termination request, please call me at (432) 682-4559 or Hack Conder of ROC at (575) 393-9174. Thank you for your attention to this matter.

Respectfully Submitted,
Tetra Tech, Inc.


Jeffrey Kindley, P.G.
Senior Environmental Geologist

cc: ROC- Hack Conder

Enclosures: site maps, site photo, data tables, figures



FIGURES

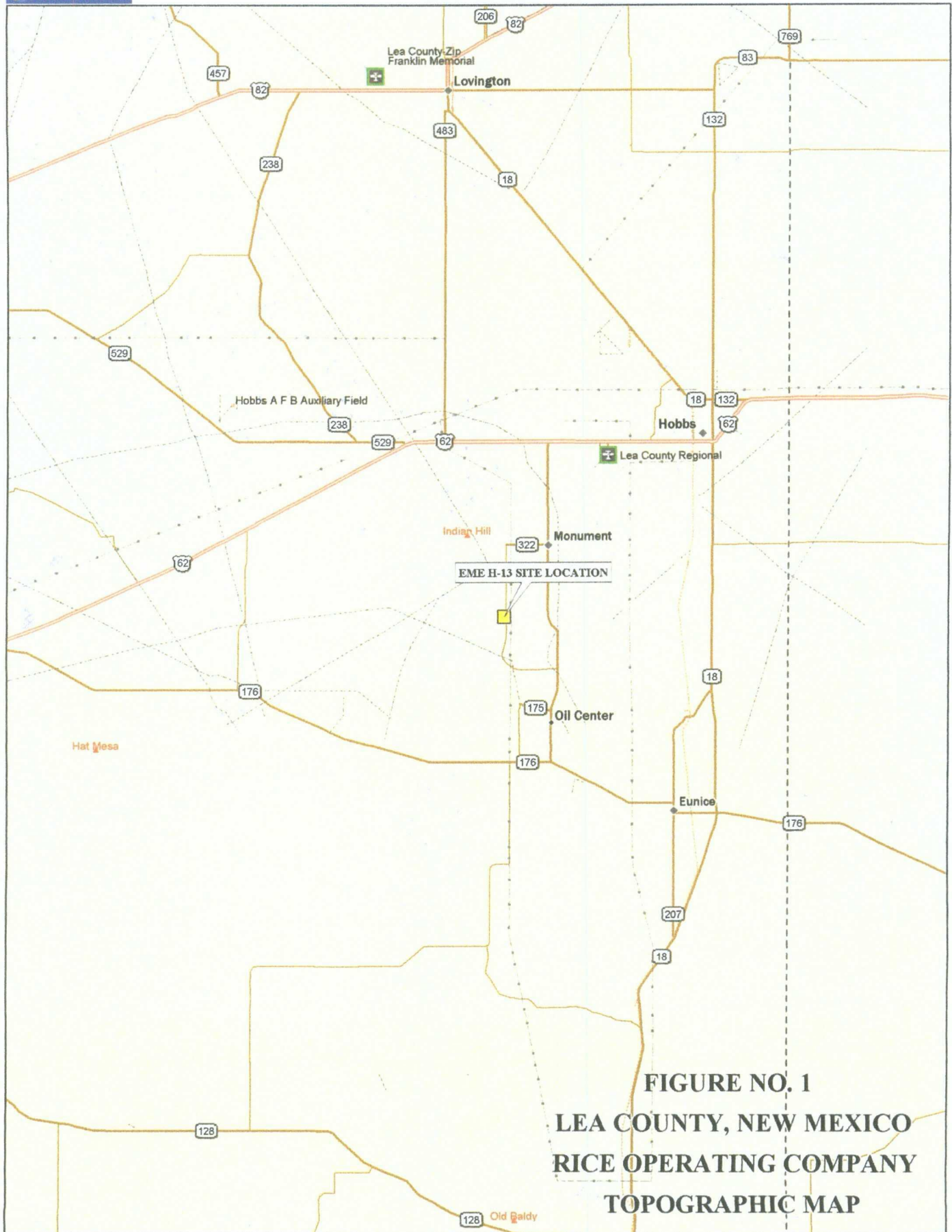
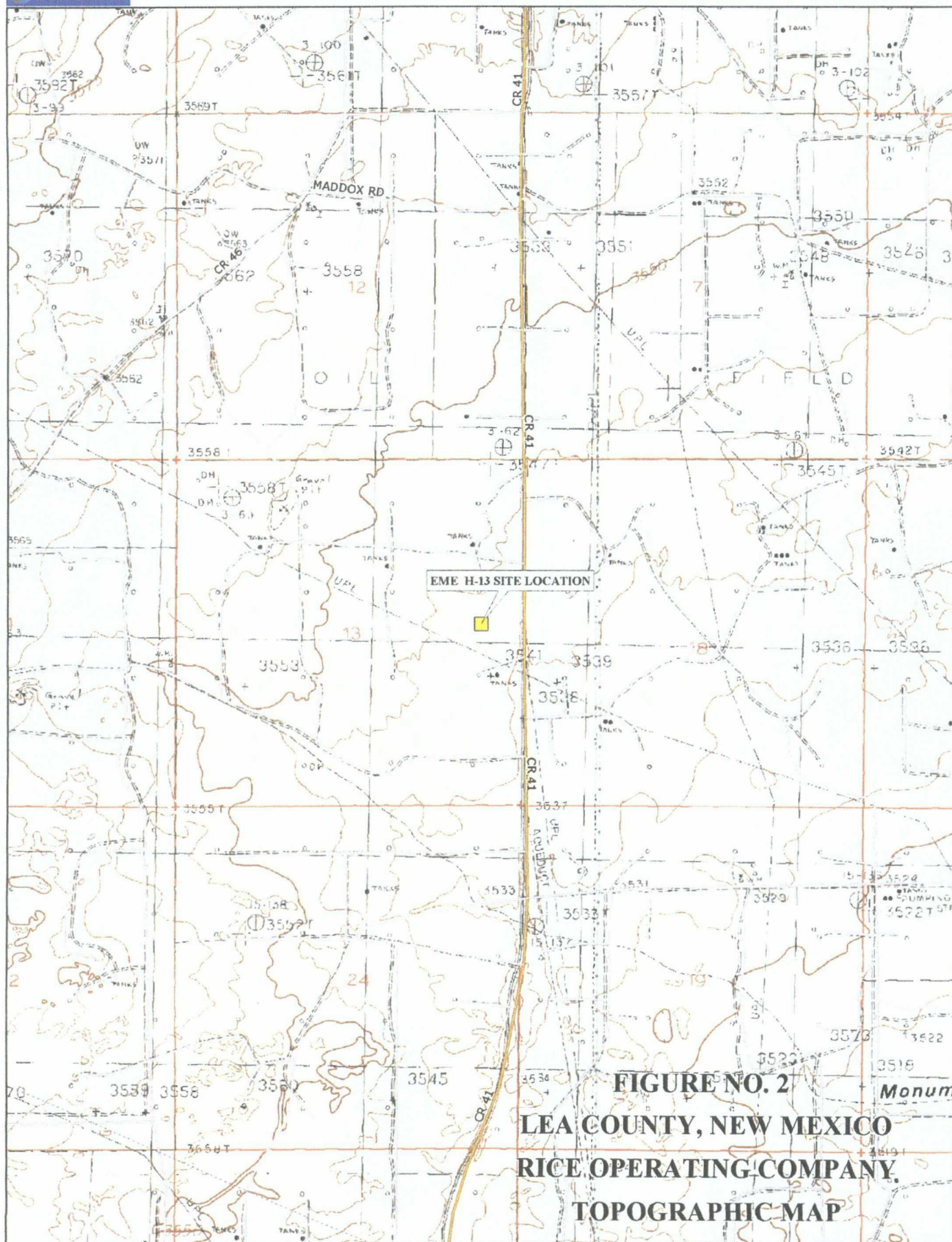


FIGURE NO. 1
LEA COUNTY, NEW MEXICO
RICE OPERATING COMPANY
TOPOGRAPHIC MAP



EME H-13 SITE LOCATION

FIGURE NO. 2

LEA COUNTY, NEW MEXICO
RICE OPERATING COMPANY
TOPOGRAPHIC MAP

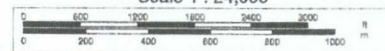
Data use subject to license.

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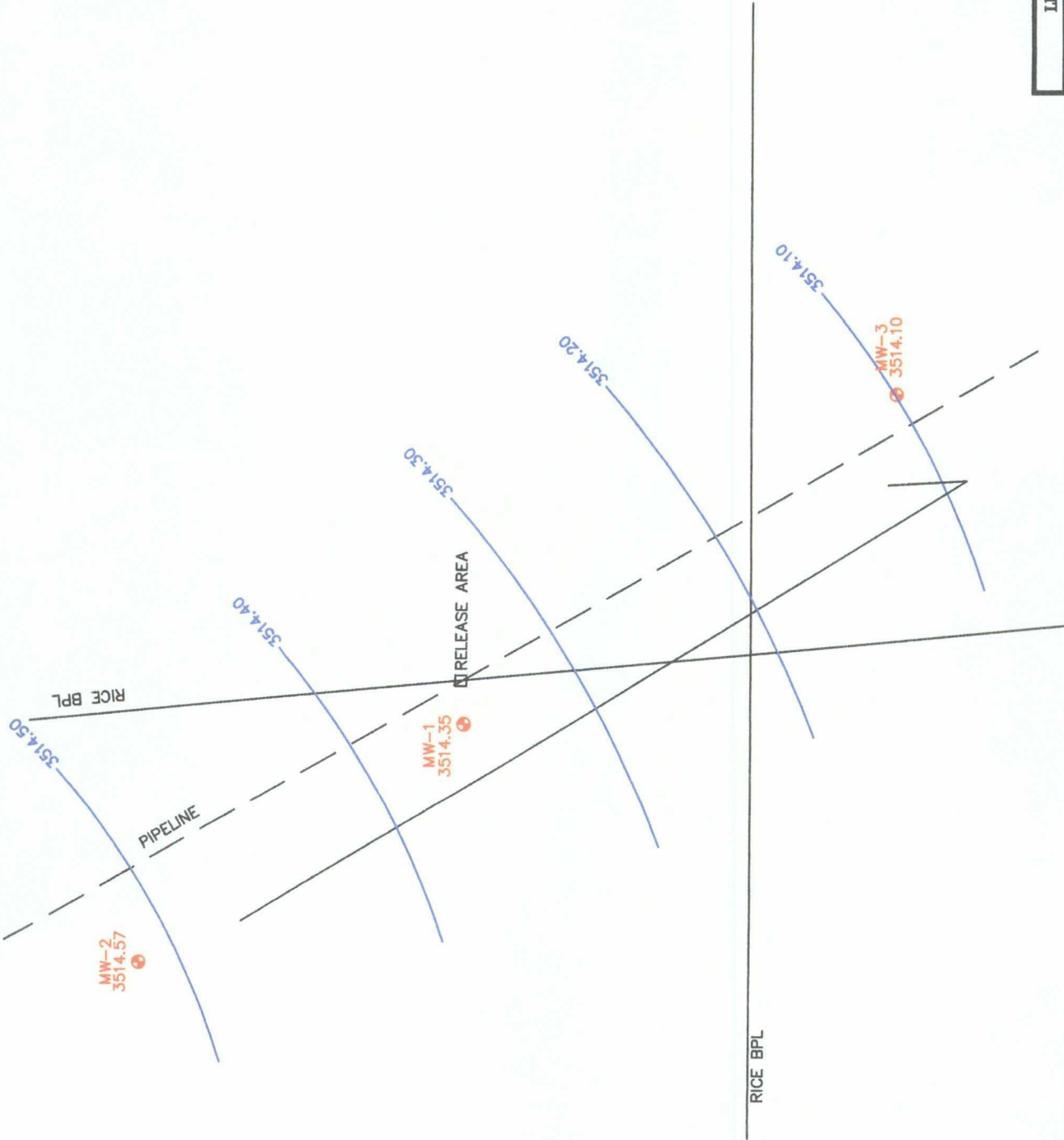


Scale 1 : 24,000



1" = 2,000.0 ft

Data Zoom 13-0



⊕ MONITOR WELL LOCATIONS
CONTOUR INTERVAL = 0.10'

NOT TO SCALE

FIGURE NO. 3

LEA COUNTY, NEW MEXICO

RICE OPERATING COMPANY

EME H-13 LEAK
GROUNDWATER GRADIENT MAP
GAUGED ON 11/6/09

TETRA TECH, INC.
MIDLAND, TEXAS

DWN. BY:
JJ
FILE:
C:\NCS\2307
SITE MAP

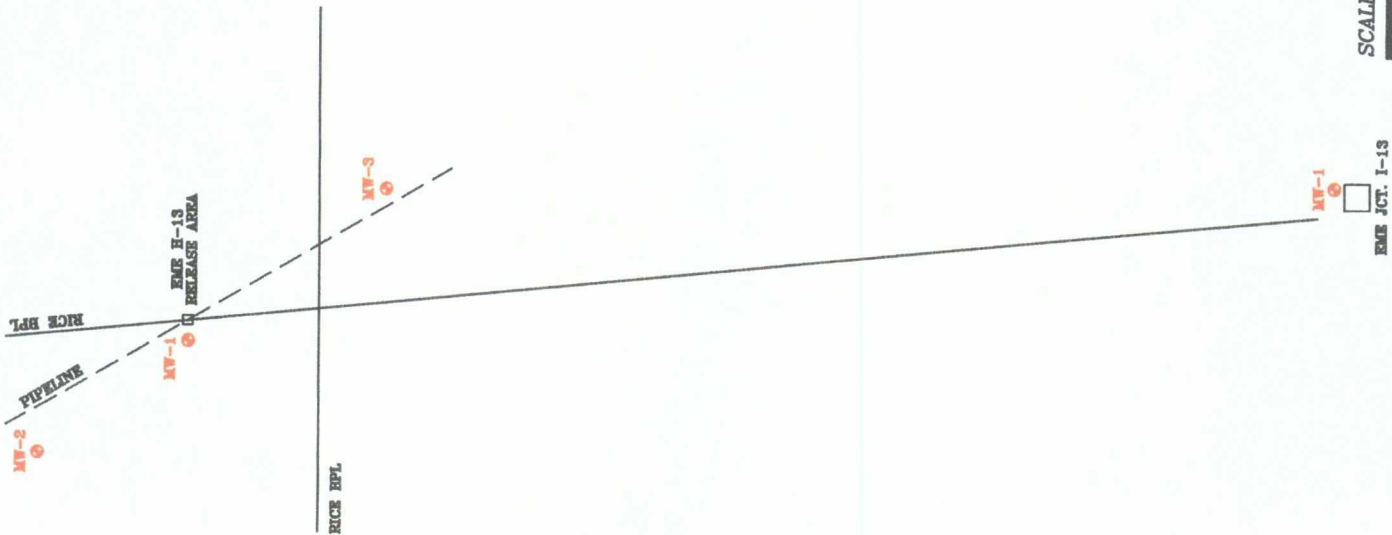


FIGURE NO. 4

LEA COUNTY, NEW MEXICO

RICE OPERATING COMPANY
EME 1-13/H-13
SITE MAP

TETRA TECH, INC.
MIDLAND, TEXAS

DATE:
5/9/06

DRAWN BY:
JJ

FILE:
C:\NEXA\3307
SITE MAP

SCALE: 1" = 110'



EME JCT. 1-13

● MONITOR WELL LOCATIONS

APPENDIX A
SITE PHOTOGRAPH



EME H-13 leak (AP-44) as of February 2010

APPENDIX B
EME H-13 TABLES

Graph 1
Rice Operating Company
MW-1
EME H-13
Lea County, New Mexico

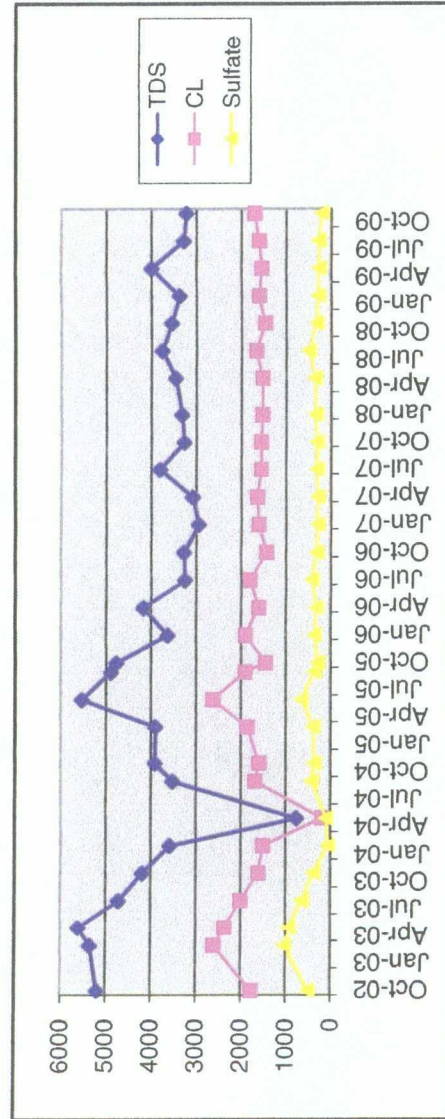
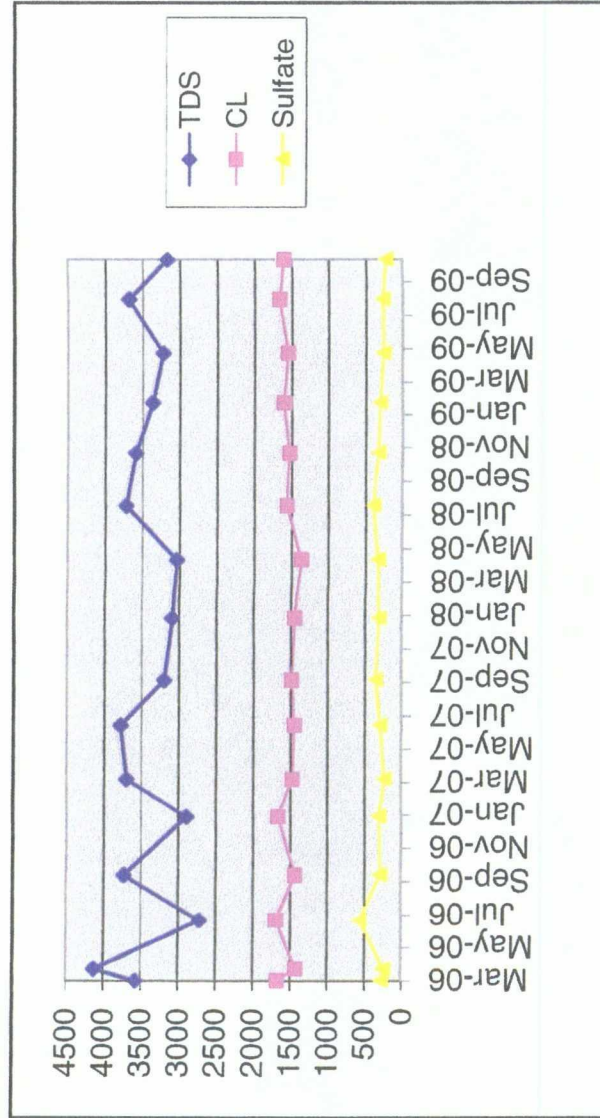


Table 2

Rice Operating Company
EME H-13
Upgradient Monitor Well MW-2
Lea County, New Mexico

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	2.00	8.00	03/27/06	1670	3560	<0.001	<0.001	<0.001	<0.001	264	xxx
2	30.66	43.10	2.00	8.00	04/18/06	1420	4120	<0.001	<0.001	<0.001	<0.001	237	xxx
2	30.80	43.10	2.00	10.00	07/17/06	1690	2710	<0.001	<0.001	<0.001	<0.001	562	xxx
2	30.85	43.10	2.00	10.00	10/09/06	1430	3720	<0.001	<0.001	<0.001	<0.001	284	Clear
2	30.78	43.03	2.00	6.00	01/24/07	1660	2890	<0.001	<0.001	<0.001	<0.001	300	Pumping
2	30.75	43.03	2.00	8.00	04/02/07	1470	3690	<0.001	<0.001	<0.001	<0.001	231	Pumping
2	30.79	43.03	2.00	8.00	07/10/07	1440	3770	<0.001	<0.001	<0.001	<0.002	291	Pumping
2	30.85	43.03	1.90	7.00	10/01/07	1480	3189	<0.001	<0.001	<0.001	<0.003	348	Clear
2	31.00	43.03	1.90	7.00	01/22/08	1440	3083	<0.001	<0.001	<0.001	<0.003	306	Clear
2	30.98	43.03	1.90	7.00	05/07/08	1360	3030	<0.002	<0.002	<0.002	<0.006	325	Clear
2	30.86	43.03	1.90	7.00	08/13/08	1560	3710	<0.001	<0.001	<0.001	<0.003	393	Clear
2	30.76	43.03	2.00	7.00	11/17/08	1520	3580	<0.001	<0.001	<0.001	<0.003	317	Clear
2	30.73	43.07	2.00	7.00	02/17/09	1600	3360	<0.001	<0.001	<0.001	<0.003	299	Clear
2	30.72	43.07	2.00	7.00	05/19/09	1540	3220	<0.001	<0.001	<0.001	<0.003	251	Clear
2	30.88	43.07	2.00	7.00	08/25/09	1660	3680	<0.001	<0.001	<0.001	<0.003	270	Clear
2	31.00	43.07	1.90	7.00	11/06/09	1600	3160	<0.001	<0.001	<0.001	<0.003	227	Turbid to clear/no odor

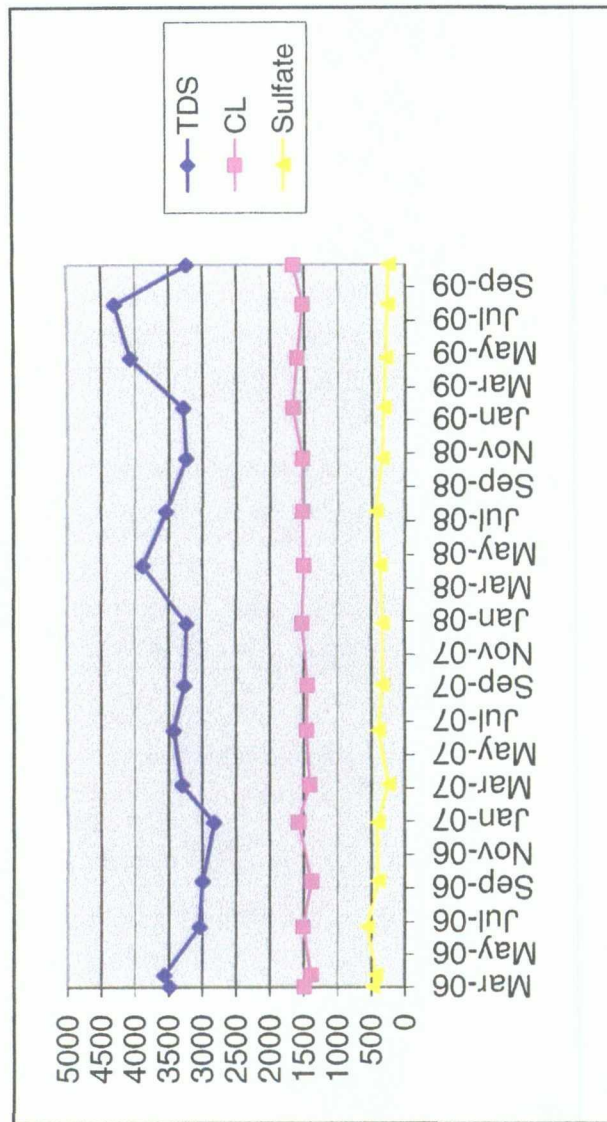
Rice Operating Company
MW-2
EME H-13
Lea County, New Mexico



Lea County, New Mexico

[illegible]

Rice Operating Company
MW-3
EME H-13
Lea County, New Mexico

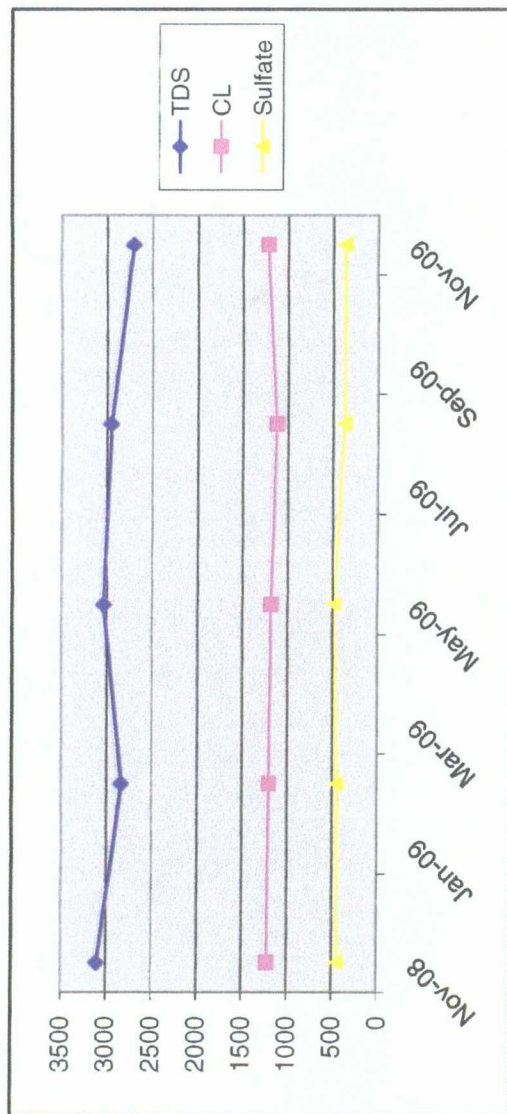


APPENDIX C
EME I-13 TABLES

Table 1
Rice Operating Company
EME I-13 Vent
Lea County, New Mexico

MW	Depth to Water	Total Depth	Well Volume	Volume Purged	Sample Date	Cl	TDS	Benzene	Toluene	Ethyl Benzene	Total Xylenes	Sulfate	Comments
1	32.05	43.22	1.80	6	11/17/08	1220	3100	<0.001	<0.001	<0.001	<0.003	439	Clear no odor
1	31.98	43.20	1.80	6	02/17/09	1200	2830	<0.001	<0.001	<0.001	<0.003	449	Clear no odor
1	31.94	43.20	1.80	6	05/19/09	1180	3030	<0.001	<0.001	<0.001	<0.003	484	Clear no odor
1	32.18	43.20	1.80	6	08/25/09	1120	2950	<0.001	<0.001	<0.001	<0.003	366	Clear no odor
1	32.27	43.20	1.70	6	11/06/09	1220	2700	<0.001	<0.001	<0.001	<0.003	364	Clear no odor
1													
1													

Graph 1
Rice Operating Company
MW-1
EME I-13 Vent
Lea County, New Mexico



APPENDIX D
DATABASE FILE

Water Well Data
Average Depth to Groundwater (ft)
ROC - EME Saltwater Disposal System (SWD) H-13 Leak, Lea County, New Mexico

19 South 35 East					
6 61	5	4	3	2	1
58	63	70			63
7	8	9 20	10	11	12
51	18		53		
18	17 26	16	15	14	13
	30		26	27	27
19	20	21	22	23	24
			27		20
30	29	28	27	26	25
31	32	33	34	35	36

19 South 36 East					
6	5	4	3	2	1
7	8	9	10	11	12
18	17	16	15	14	13
19	20	21	22	23	24
30	29	28	27	26	25
31	32	33	34	35	36

19 South 37 East					
6 50	5	4 39	3 41	2	1
7 43	8 42	9	10	11	12 63
18	17	16	15	14	13
53	65	39	46	20	46
19	20	21	22	23	24
48		33	38		48
30 20	29	28 30	27	26	25
Monument					
31	32 29	33	34	35	36
24		32	22		

20 South 35 East					
6 56	5 64	4	3	2	1
64					
7	8	9	10	11	12
18	17	16	15	14	13
19	20	21	22	23	24
30	29	28	27	26	25
31 65	32	33	34	35	36
		89			

20 South 36 East					
6	5	4	3	2	1
32	28	Maljamar		92	40
7	8	9	10	11	12
	33	38		32	29
18	17	16	15	14	13
34				45	SITE
19	20	21	22	23	24
30	29	28	27	26 106	25
				170	
31	32	33	34	35	36
	170			122	

20 South 37 East					
6 37	5 38	4 22	3	2	1
7 36	8 35	9	10	11	12
18	17	16	15	14	13
19	20	21	22	23	24
35					78
30	29	28	27	26	25
		40			
31	32	33	34	35	36
		198			

21 South 34 East					
6	5	4	3	2	1
7	8	9	10	11	12
18	17	16	15	14	13
19	20	21	22	23	24
30	29	28	27	26	25
31	32	33	34	35	36

21 South 35 East					
6	5	4	3	2	1
7	8	9	10	11	12
18	17	16	15	14	13
19	20	21	22	23	24
30	29	28	27	26	25
31	32	33	34	35	36

21 South 36 East					
6	5	4	3	2	1
7	8	9	10	11	12
18	17	16	15	14	13
106		195			
19	20	21	22	23 130	24
				150	
30	29	28	27	26	25
				150	148
31	32	33	34	35	36

- 88 New Mexico State Engineers Well Reports
- 105 USGS Well Reports
- 90 Geology and Groundwater Conditions in Southern Lea, County, NM (Report 6)
- Geology and Groundwater Resources of Eddy County, NM (Report 3)
- 34 NMOCD - Groundwater Data
- 121 Abandoned Waterwell (recently measured)

<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 1/2 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.