AP - 48

STAGE 2 WORKPLANS

Date: 10-4-10

Hansen, Edward J., EMNRD

From: Katie Jones [kjones@riceswd.com]
Sent: Wednesday, December 22, 2010 3:44 PM
To: Hansen, Edward J., EMNRD
Cc: Hack Conder; Reed, Timothy
Subject: Justis L-1 boot (AP-48) Stage 2 Abatement Plan Addendum
Attachments: Justis L-1 proposed infiltration barrier.jpg

Mr. Hansen:

The following is an Addendum to the Justis L-1 boot (AP-48) Stage 2 Abatement Plan Addendum submitted to the NMOCD on October 4, 2010.

Page 2, paragraph 2: Proposed Soil Remediation; red lettering will be deleted from the paragraph and blue lettering should be added to the paragraph.

"With elevated chlorides and negligible levels of TPH, ROC proposes to excavate an area measuring 45 feet by ~~55~~ 60 feet by 4 feet deep and placing a 20 mil polyethylene liner at 4 feet bgs in order to impede further vertical migration of the remaining chlorides within the soil. The liner will extend from the initial junction box and cover all the soil borings plus 9 feet passed SB-7. See attached Figure 4 for the proposed soil liner location and dimensions. The site will be backfilled with soils containing a chloride concentration of less than 500 mg/kg and a PID reading of 100 parts per million (ppm) or less. Upon completion of the liner and backfilling, ROC proposes to revegetate the site with native grasses."

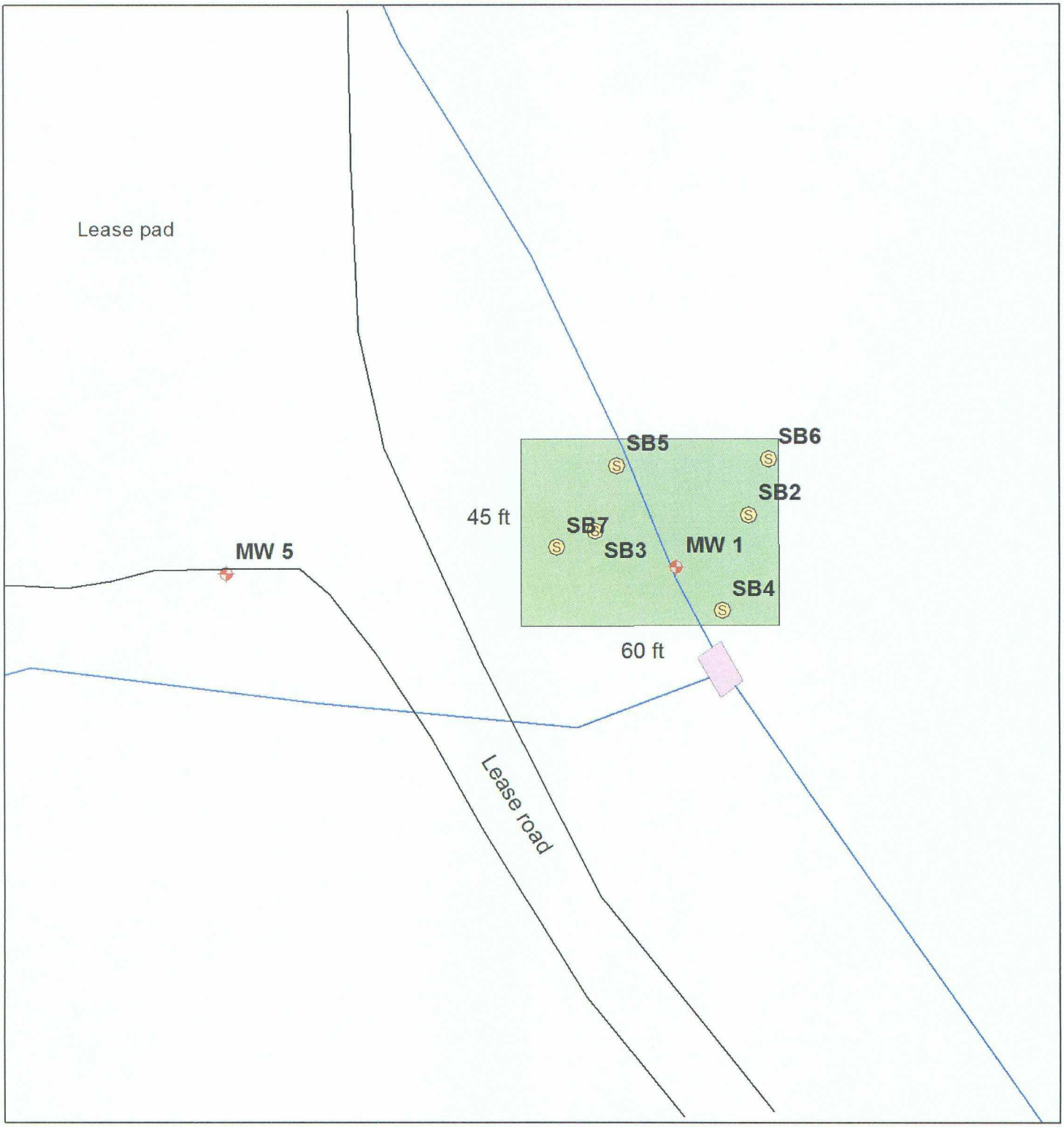
Page 3, Proposed Groundwater Remediation, last paragraph; red lettering will be deleted from the paragraph and blue lettering should be added to the paragraph. If you need any other information, please let me know.

"Therefore, ROC proposes to remove 434 kg of chloride or approximately 60,385.60 gallons of chloride impacted groundwater. A 4-inch recovery well will be installed near MW-1 to enhance recovery efforts. Removed groundwater will be utilized for pipeline and well maintenance and possibly treated and used to promote the growth of vegetation."

Thank you.

Katie Jones
Environmental Project Coordinator
RICE *Operating Company*

Proposed Infiltration Barrier



RICE ENVIRONMENTAL CONSULTING & SAFETY, LLC

RECS

Justis L-1 boot

Legals: UL/L sec. 1
T25S R37E
NMOCD Case #: AP-48

Figure 4

N
W E
S

0 15 30 60
Feet

Drawing date:9-23-10
Drafted by: L. Weinheimer

TETRA TECH

CERTIFIED MAIL
RETURN RECEIPT NO. 7001 0320 0004 3736 6044

October 4, 2010

Mr. Edward Hansen
New Mexico Energy, Minerals, & Natural Resources Dept.
Oil Conservation Division, Environmental Bureau
1220 S. St. Francis Drive
Santa Fe, New Mexico 87505

Re: Stage 2 Abatement Plan Addendum, Rice Operating Company, Justis Saltwater Disposal System (SWD) Jct. L-1, Unit L, Section 1, T-25-S, R-37-E, Lea County, New Mexico, NMOCD CASE #1R0423-0 (AP-48)

Mr. Hansen:

Tetra Tech Inc. (Tetra Tech) submits the following Stage 2 Abatement Plan Addendum for the Rice Operating Company (ROC), Jct. L-1 site (AP-48), located in the Justis Salt Water Disposal System (Justis) in Unit L, Section 1, T-25-S, R-37-E in Lea County, New Mexico. See Figures 1 and 2 for site location. ROC is the service provider (agent) for the Justis Salt Water Disposal System and has no ownership of any portion of the pipeline, well, or facility. The Justis SWD system is owned by a consortium of oil producers, System Parties, who provide all operating capital on a percentage ownership/usage basis. This report is submitted as an addendum to the report entitled *Stage 1/Stage 2 Abatement Plan, Jct. L-1, Justis SWD System Unit "L", Sec. 1, T25S, R37E, (NMOCD AP-48),* which is dated December 12, 2006 and submitted on January 12, 2007, and addresses both the chlorides within the soils and groundwater.

Chloride Impacted Site Soils

On June 9 and 10, 2010, Tetra Tech personnel were onsite to oversee the installation of six soil borings (SB-2, SB-3, SB-4, SB-5, SB-6, and SB-7) adjacent to the former junction box location. See Figure 3 for soil boring locations. Soil samples were collected every 5' beginning at a depth of 1 foot below ground surface (bgs) outside the original excavated junction box area. Samples were collected from cuttings, with select samples placed into laboratory supplied containers and delivered to the laboratory under chain-of-custody control for chloride analysis by EPA Std. method 4500-CL-B and for TPH analysis by EPA method 8015 modified. All collected samples were field screened

Tetra Tech
[illegible] North Big Spring, Midland, TX 79705
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for TPH utilizing a photoionization detector (PID) and for chlorides with a field sampling kit.

Analytical results indicate that soil boring chloride concentrations were less than 494 mg/kg in SB-3 and SB-4 within the first five feet of the surface, while SB-6 was less than 906 mg/kg within the first 15 feet, and SB-2 and SB-7 less than 935 mg/kg within 20 and 25 feet, respectively. Greater then these depths, the chloride concentrations increased and ranged from 1,137 mg/kg at 35 feet in SB-6 to 3,503 mg/kg at 40 feet in SB-7. Soil boring SB-5 had chloride concentrations equivalent to background with the exception of the sample at 10 feet which had a concentration of 620 mg/kg. The PID meter readings for TPH were all at or below 2 parts per million with confirmation laboratory samples of <10 mg/kg for TPH Gro/Dro. See attached soil boring logs which includes both field and laboratory analysis.

Proposed Soil Remediation

With elevated chlorides and negligible levels of TPH, ROC proposes to excavate an area measuring 45 feet by 55 feet by 4 feet deep and placing a 20 mil polyethylene liner at 4 feet bgs in order to impede further vertical migration of the remaining chlorides within the soil. The liner will extend from the initial junction box and cover all the soil borings. See attached Figure 4 for the proposed soil liner location and dimensions. The site will be backfilled with soils containing a chloride concentration of less than 500 mg/kg and a PID reading of 100 parts per million (ppm) or less. Upon completion of the liner and backfilling, ROC proposes to revegetate the site with native grasses.

Chloride Impacted Groundwater

To date, five monitor wells have been installed at the site in order to define the lateral extent of chloride impacts to the groundwater from the former junction box. Of the five wells, three have remained above background levels. The three wells are monitor well MW-1, MW-2 and MW-5. Monitor well MW-1, initially installed in December of 2004 had chloride concentrations initially with 1,060 mg/L and declined to 390 mg/L in December 2005. In May 2007, the chloride concentrations increased four fold in monitor well MW-1 and have since, ranged from 1,880 mg/L to 3,000 mg/L. See attached Figure 5 for monitor well locations. In order to determine if the increase in chlorides was from a separate source, in May 2007 monitor well MW-5 was placed up gradient from MW-1 and down gradient of a reserve pit from an adjacent well location. Chloride concentrations in MW-5 have fluctuated since the well was installed and have had concentrations ranging from 416 mg/L to 1,940 mg/L. In a March 9, 2005 aerial photograph obtained on Google Earth, it appears a fresh water frac pit is located at the site of the original closed reserve pit. See Figure 6 for Google Earth aerial of site. Two years later, in May 2007, down gradient monitor well MW-1 had a four fold increase in chloride concentrations. ROC believes the use of a fresh water frac pit over a former reserve pit may have flushed preexisting chlorides within the reserve pit down and into the underlying Ogallala Aquifer thereby, over time, impacting ROCs adjacent monitor well MW-1.

Proposed Groundwater Remediation

Since it appears that the groundwater underlying the ROC site is impacted with chlorides from an adjacent (up gradient) reserve pit, ROC proposes to provide a mass calculation scenario of impact to groundwater from the former junction box. Therefore, if we assume the ROC's primary point source is the former junction box, then our extents of our chloride impact can be seen as a conical dispersion pattern. See attached Figure 7 for the area of calculated impact. For calculation purposes a point starting at the eastern edge of the road up gradient of monitor well MW-1 and extending 15 feet down gradient of monitor well MW-2 with the base of the triangle extending 60 feet. If we utilize the sampling results from monitor wells MW-1 (up until May 2007 when it is apparent the increase is from the reserve pit) and MW-2, we end up with an average chloride concentration of 560 mg/L. If we remove the background chloride concentration (151 mg/L) from up gradient monitor well MW-3 we end up with an average chloride impact within these two wells of 409 mg/L. If we take the area of impact (triangle) we end up with a release area measuring 125 ft. by 60 ft. The surface area of the triangular is 125 ft. by ½ (60 ft.) which gives us an area of impact measuring 3,750 ft^3. If we assume the aquifer thickness is 50 feet thick and the porosity of the underlying formation (very fine sugar sand) is 0.2 then the volume of impacted groundwater underlying the site is calculated as follows:

3,750 ft^3 x 50 ft x 0.2 = 37,500 ft^3

Converting to liters, we multiply the above by 28.3168 L/ft^3 which gives us a result of 1,061,880 L.

Taking the average chloride impact from monitor wells MW-1 and MW-2 we end up with a concentration of 409 mg/L.

If we multiply the two parameters together we get the following:

409 mg/L x 1,061,880 L = 434,308,920 mg of total chloride mass

To convert to gallons we take the chloride mass and divide by (1,900 mg/L x 3.7854 L/gal)

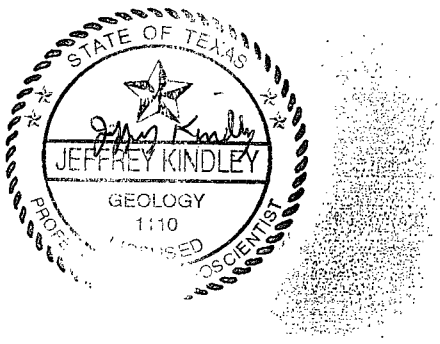
434,308,920 mg / (1,900 mg/L x 3.7854 L/gal) = 60,385.60 gallons

The total calculated chloride impacted groundwater required to be removed from the site would be approximately 60,385.60 gallons.

Therefore, ROC proposes to remove 434 kg of chloride or approximately 60,385.60 gallons of chloride impacted groundwater. A 4-inch recovery well will be installed near MW-1 to enhance recovery efforts.

TETRA TECH

If you have any questions or comments regarding the above proposed remediation methods for the onsite soils and groundwater, please do not hesitate to contact us at (432) 682-4559 or Hack Conder of ROC at (575) 393-9174.



Respectfully Submitted,
Tetra Tech, Inc.

Jeffrey Kindley, P.G.
Senior Project Manager

cc: Hack Conder – ROC
Enclosures: Tables, Graphs, Boring Logs, Figures

FIGURES

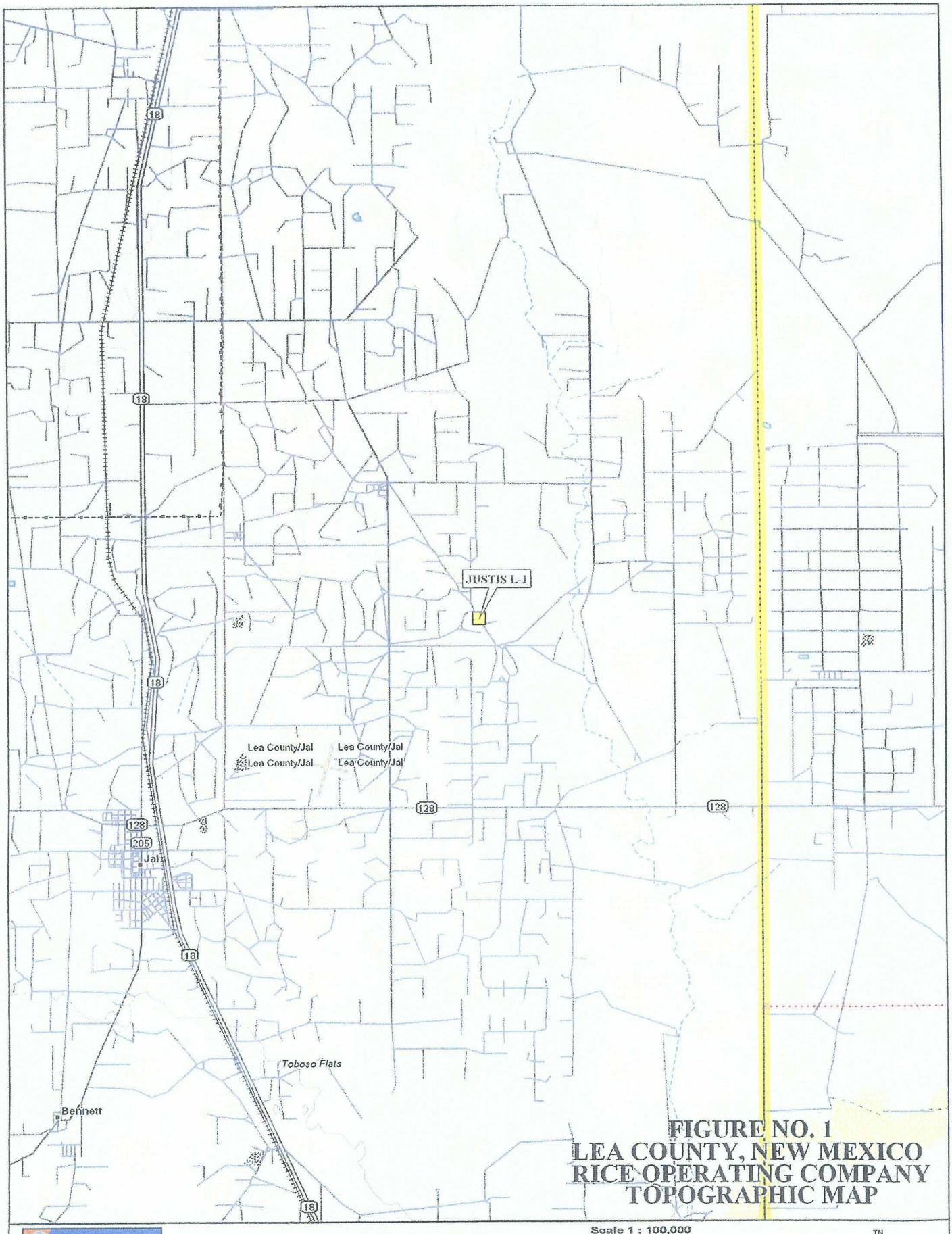


FIGURE NO. 1
LEA COUNTY, NEW MEXICO
RICE OPERATING COMPANY
TOPOGRAPHIC MAP

Scale 1 : 100,000
1" = 1.58 mi

TN
MN
8.6°E

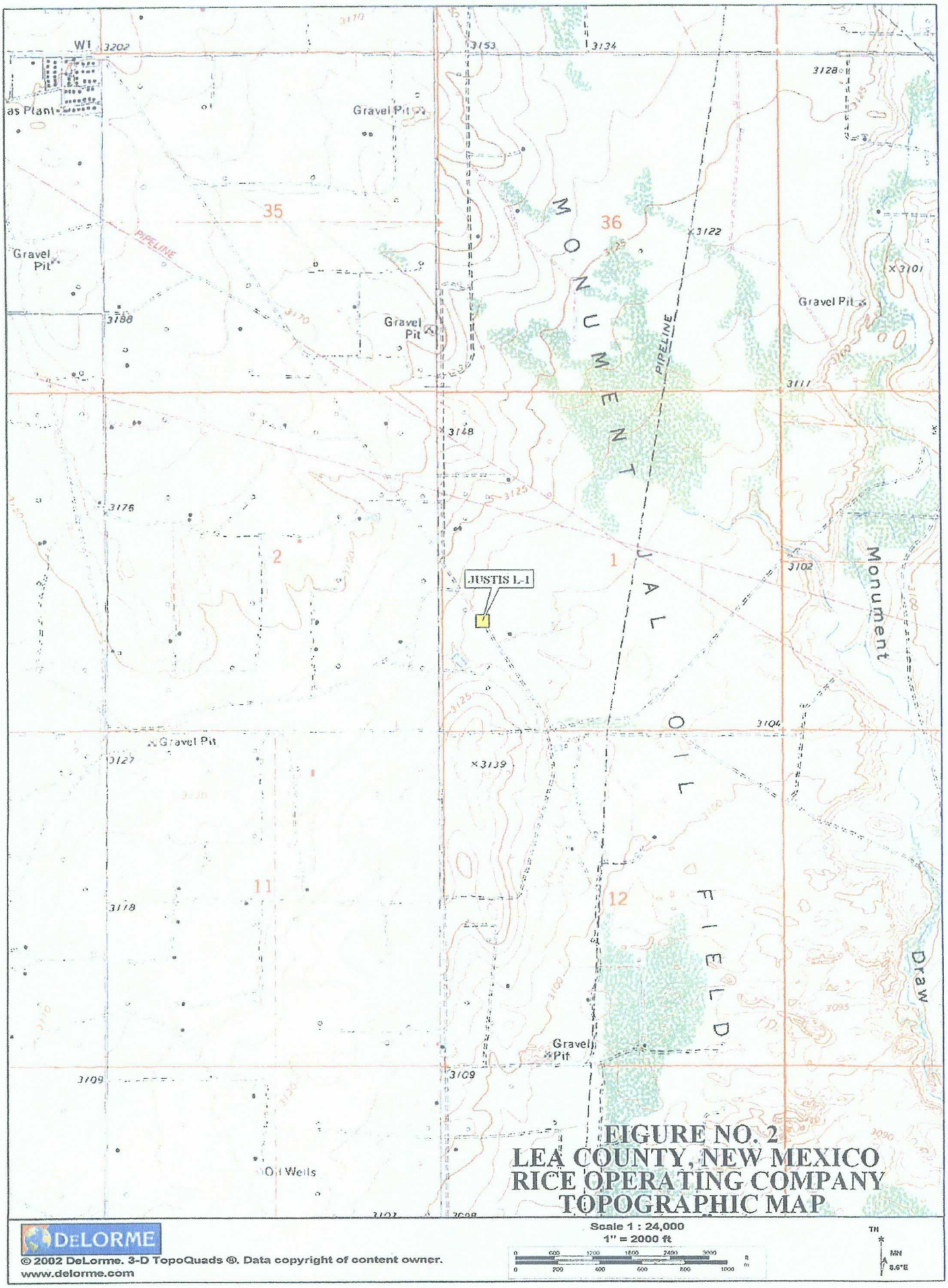
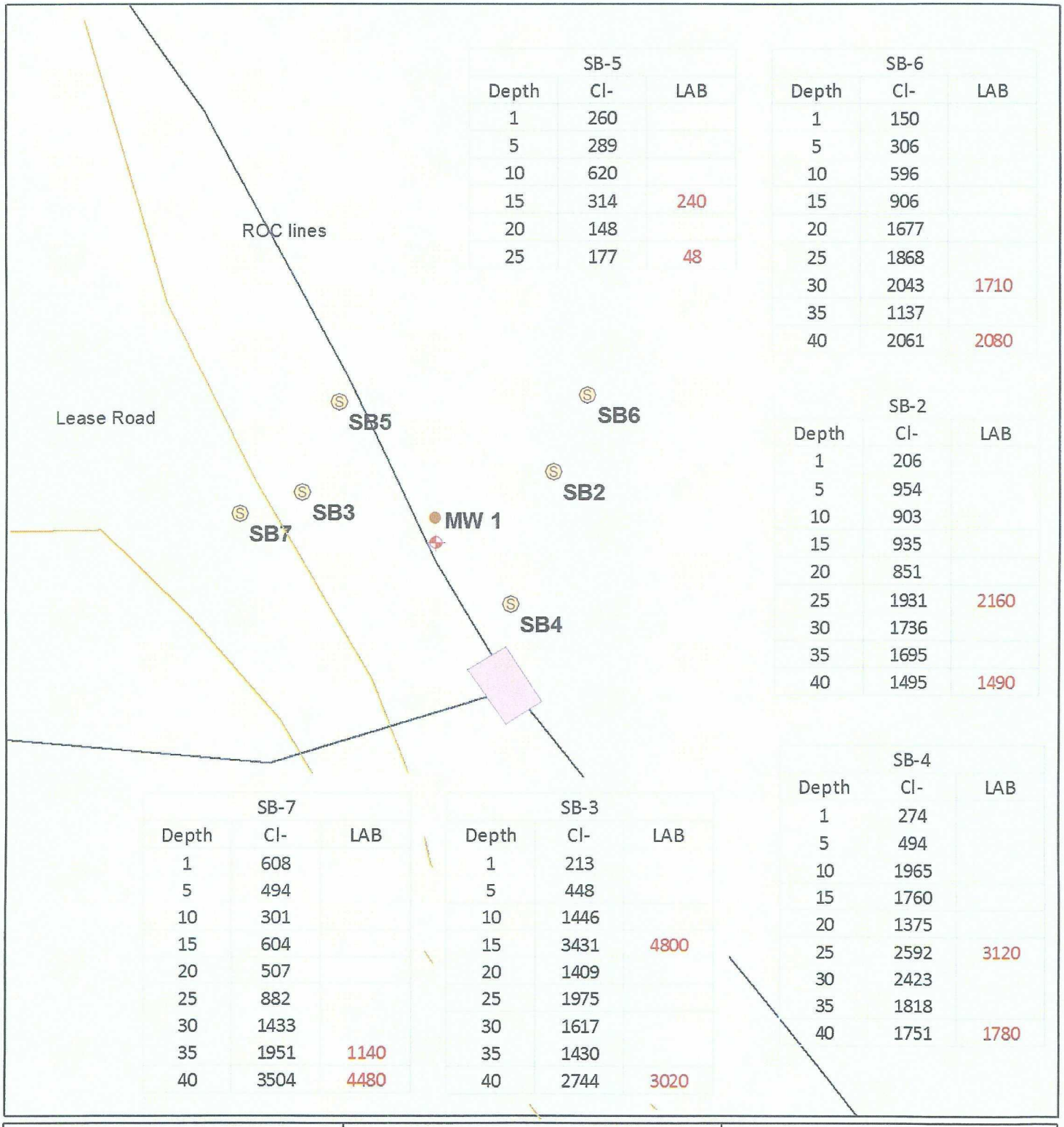


FIGURE NO. 2
LEA COUNTY, NEW MEXICO
RICE OPERATING COMPANY
TOPOGRAPHIC MAP

Soil Data



SB-5		
Depth	Cl-	LAB
1	260	
5	289	
10	620	
15	314	240
20	148	
25	177	48

SB-6		
Depth	Cl-	LAB
1	150	
5	306	
10	596	
15	906	
20	1677	
25	1868	
30	2043	1710
35	1137	
40	2061	2080

SB-2		
Depth	Cl-	LAB
1	206	
5	954	
10	903	
15	935	
20	851	
25	1931	2160
30	1736	
35	1695	
40	1495	1490

SB-4		
Depth	Cl-	LAB
1	274	
5	494	
10	1965	
15	1760	
20	1375	
25	2592	3120
30	2423	
35	1818	
40	1751	1780

SB-7		
Depth	Cl-	LAB
1	608	
5	494	
10	301	
15	604	
20	507	
25	882	
30	1433	
35	1951	1140
40	3504	4480

SB-3		
Depth	Cl-	LAB
1	213	
5	448	
10	1446	
15	3431	4800
20	1409	
25	1975	
30	1617	
35	1430	
40	2744	3020

RICE ENVIRONMENTAL CONSULTING & SAFETY, LLC

Justis L-1 boot

Legals: UL/L sec. 1
T25S R37E
NMOCD Case #: AP-48

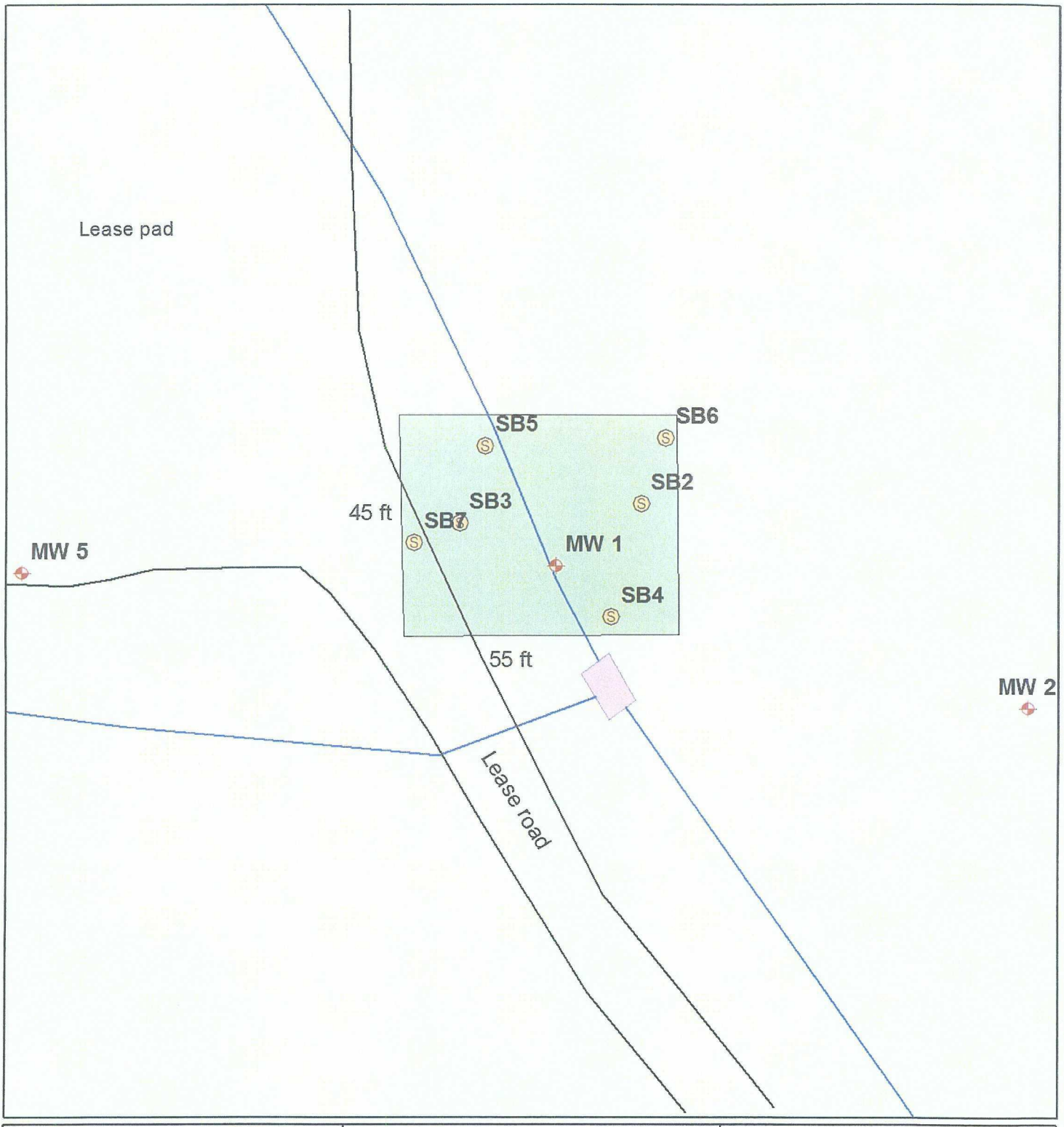
Figure 3

N W E S

0 5 10 20
Feet

Drawing date: 9-30-10
Drafted by: L. Weinheimer

Proposed Infiltration Barrier



RICE ENVIRONMENTAL CONSULTING & SAFETY, LLC

Justis L-1 boot

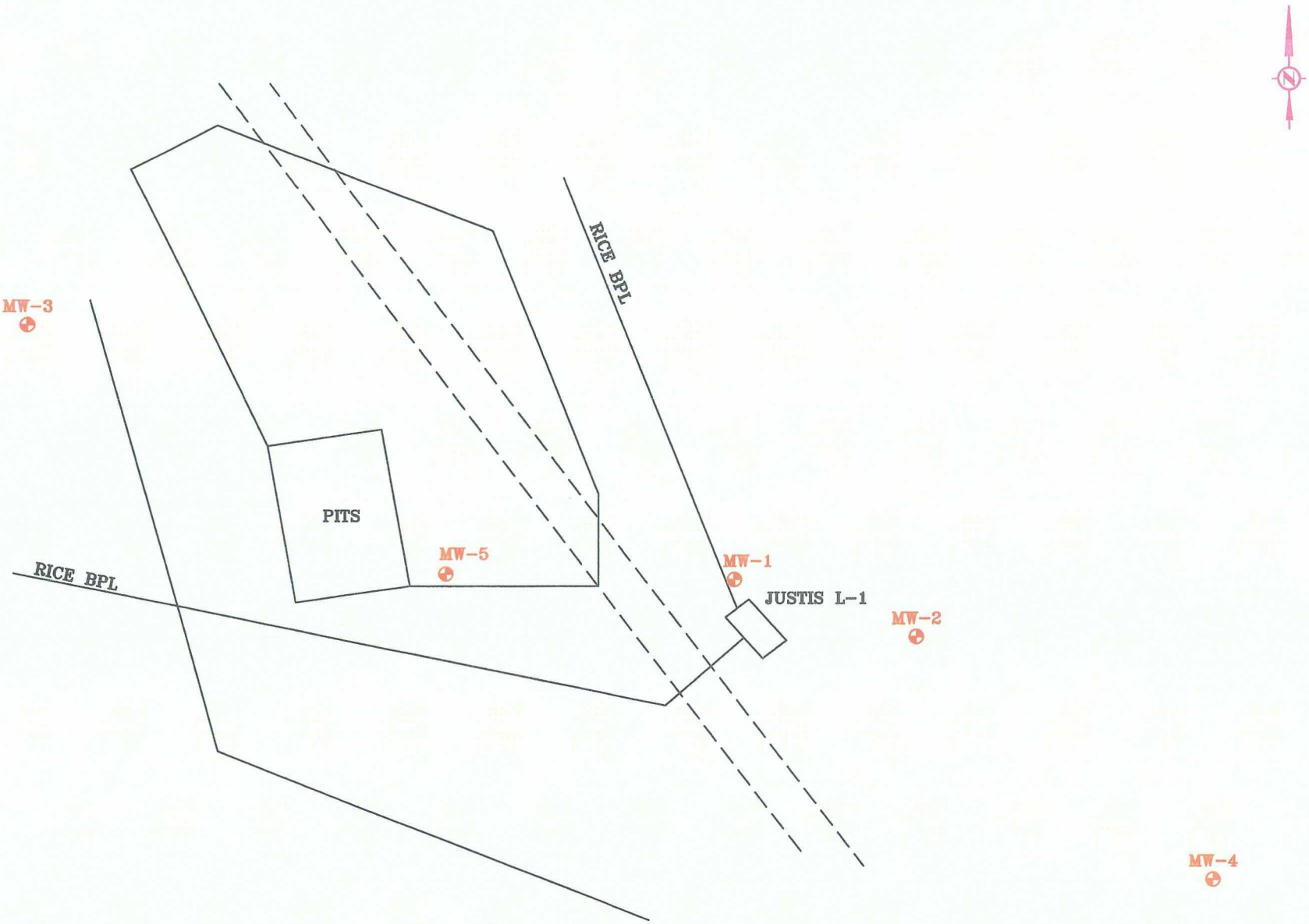
Legals: UL/L sec. 1
T25S R37E
NMOCD Case #: AP-48

Figure 4

N
W E
S

0 12.5 25 50
Feet

Drawing date:9-23-10
Drafted by: L. Weinheimer



MONITOR WELL LOCATIONS

SCALE: 1" = 83'

0 83'

FIGURE NO. 5

LEA COUNTY, NEW MEXICO

RICE OPERATING COMPANY
JUSTIS L-1
SITE MAP

DATE: 1/22/08
DWN. BY: RC
FILE: C:\RICE\2142 SITE MAP

TETRA TECH, INC.
MIDLAND, TEXAS

Imagery from March 9, 2005

RICE ENVIRONMENTAL
RECS
CONSULTING & SAFETY, LLC

Justis L-1 boot

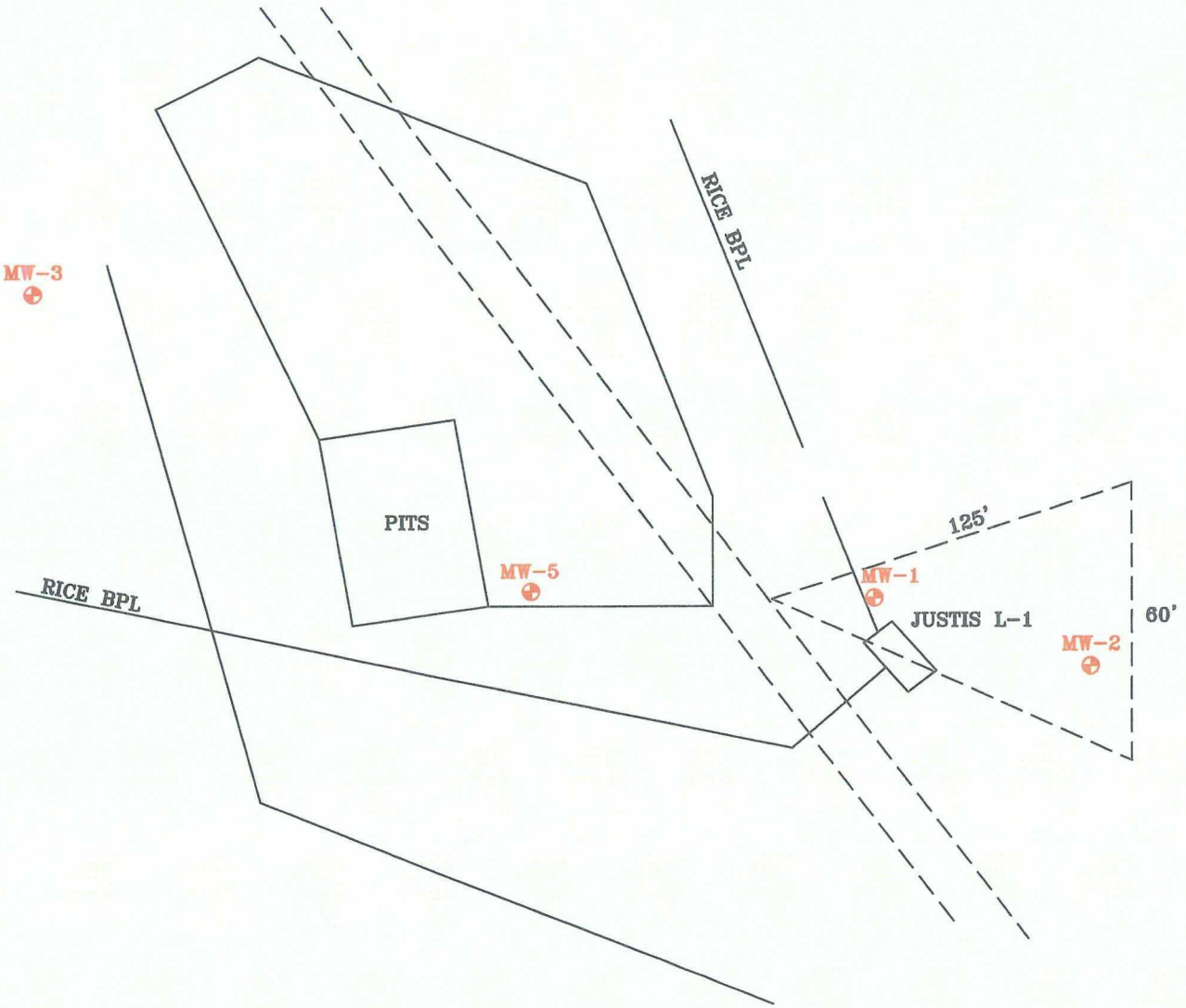
Legals: UL/L sec. 1
T25S R37E
NMOCD Case #: AP-48

Figure 6

N
W E
S

0 12.5 25 50
Feet

Drawing date:10-1-10
Drafted by: L. Weinheimer



△ AREA OF CALCULATED IMPACT

◔ MONITOR WELL LOCATIONS

NOT TO SCALE

FIGURE NO. 7

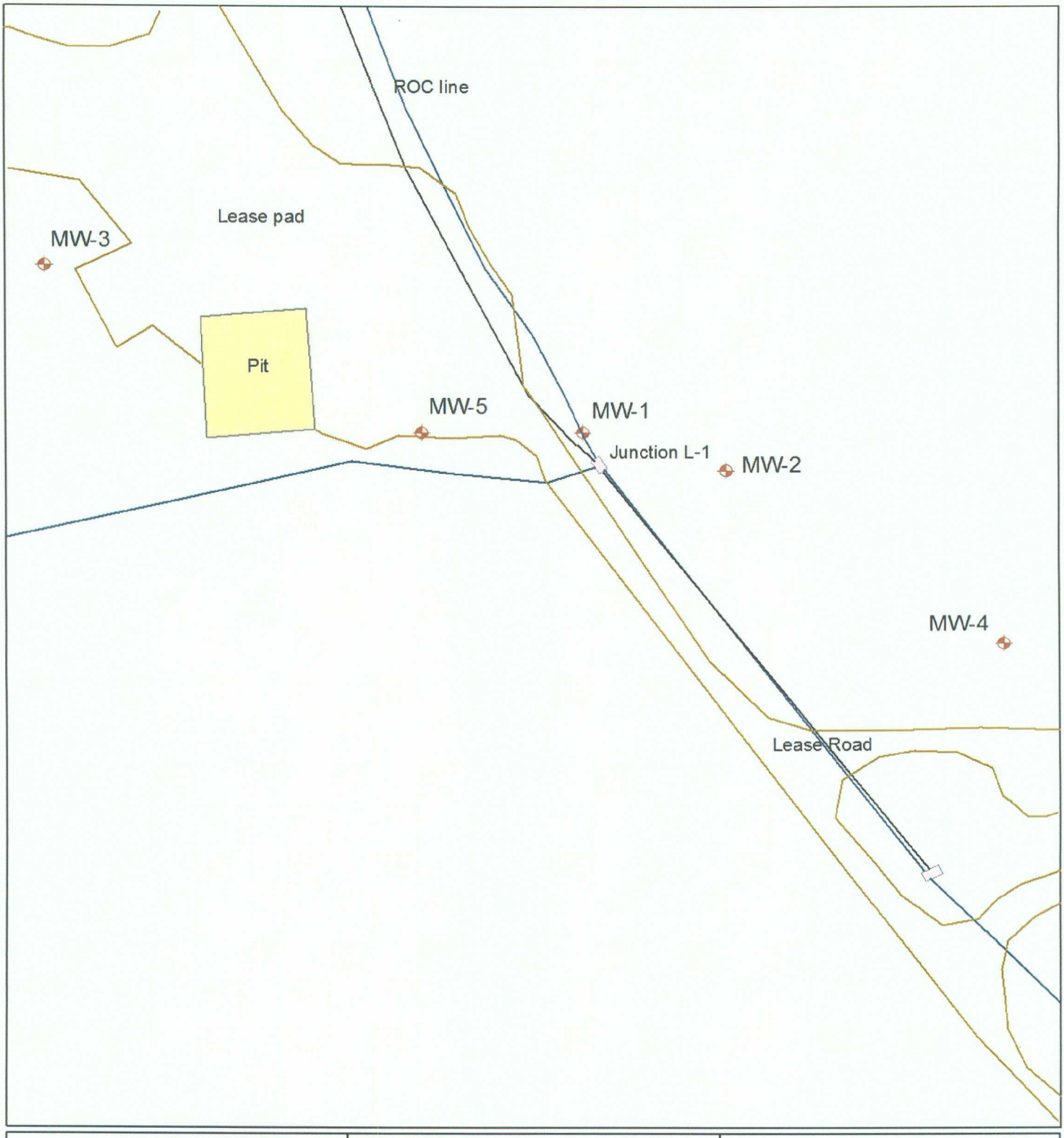
LEA COUNTY, NEW MEXICO

RICE OPERATING COMPANY
JUSTIS L-1
CHLORIDE MASS CALCULATION MAP

DATE: 1/22/08
DWN. BY: RC
FILE: C:\RICE\2142 SITE MAP

TETRA TECH, INC.
MIDLAND, TEXAS

Site Map



RICE ENVIRONMENTAL CONSULTING & SAFETY, LLC

RECS

Justis L-1 boot

Legals: UL/E sec. 1
T21S R37E
NMOCD Case #: AP-48

N
W E
S

0 50 100 200
Feet

Drawing date: 7-20-10
Drafted by: L. Weinheimer

TABLES

Table 1
Rice Operating Company
Justis L-1
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	78.43	92.00	xxx	20	12/21/04	1060	2620	0.0158	<0.001	0.00209	<0.001	550	xxx
1	78.19	92.00	xxx	20	03/29/05	873	2020	0.000904	<0.001	<0.001	<0.001	502	xxx
1	78.11	92.00	xxx	20	06/16/05	684	1900	<0.001	<0.001	<0.001	<0.001	468	xxx
1	77.95	92.00	xxx	2.5	09/15/05	464	1770	<0.001	<0.001	<0.001	<0.001	307	xxx
1	77.80	92.00	2.30	8	12/05/05	390	1410	<0.001	<0.001	<0.001	0.000666	245	xxx
1	77.56	92.00	2.30	8	02/27/06	413	1440	<0.001	<0.001	<0.001	<0.001	236	xxx
1	77.51	92.00	2.30	10	05/24/06	420	1430	<0.001	<0.001	<0.001	<0.001	246	xxx
1	77.25	92.00	2.40	10	09/14/06	672	1870	<0.001	<0.001	<0.001	<0.001	339	xxx
1	77.12	92.00	2.40	10	10/30/06	943	2360	<0.001	<0.001	<0.001	<0.001	339	Clear no odor
1	76.95	91.85	2.40	10	03/16/07	519	3630	<0.001	<0.001	<0.001	<0.001	112	Clear no odor
1	76.80	91.85	2.40	10	05/15/07	2160	4530	<0.001	<0.001	<0.001	<0.001	397	Clear no odor
1	76.48	91.85	2.50	10	08/29/07	2179	7305	<0.002	<0.002	<0.002	<0.006	500	Clear no odor
1	76.30	91.85	2.50	10	11/14/07	2250	4679	<0.002	<0.002	<0.002	<0.006	477	Clear no odor
1	76.10	91.83	2.50	10	02/27/08	2360	5420	<0.002	<0.002	<0.002	<0.006	455	Clear no odor
1	75.88	91.83	2.80	10	05/23/08	3000	6560	<0.002	<0.002	<0.002	<0.006	439	Clear no odor
1	75.77	91.83	2.60	10	08/28/08	2150	5110	<0.001	<0.001	<0.001	<0.003	550	Clear no odor
1	75.59	91.83	2.60	10	12/17/08	2500	5100	<0.001	<0.001	<0.001	<0.003	538	Clear no odor
1	75.37	91.35	2.60	10	02/23/09	2240	4630	xxx	xxx	xxx	xxx	486	Clear no odor
1	75.22	91.35	2.60	10	05/28/09	2150	4620	xxx	xxx	xxx	xxx	636	Clear no odor
1	74.98	91.35	2.60	10	09/09/09	1940	5030	xxx	xxx	xxx	xxx	546	Clear no odor
1	74.84	91.35	2.60	10	11/18/09	1980	4640	xxx	xxx	xxx	xxx	418	Clear no odor
1	74.63	91.34	2.70	10	03/09/10	1880	5330	xxx	xxx	xxx	xxx	814	Clear no odor
1	74.42	91.34	2.70	10	06/03/10	1860	5530	xxx	xxx	xxx	xxx	510	Clear no odor

Graph 1
Rice Operating Company
MW-1
Justis L-1
Lea County, New Mexico

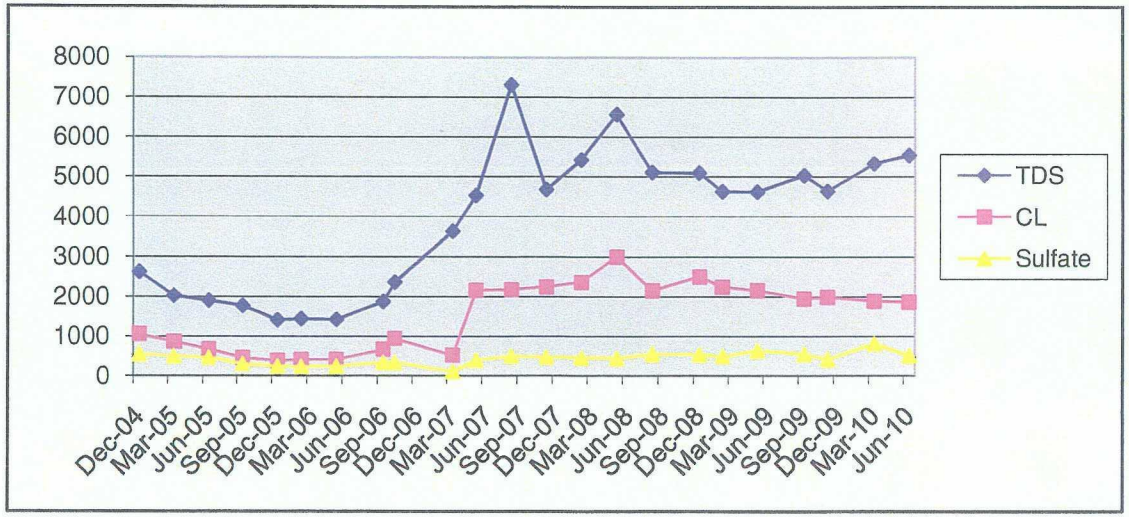


Table 2
Rice Operating Company
Justis L-1
Lea County, New Mexico

MW	Depth to Water	Total Depth	Well Volume	Volume Purged	Sample Date	Cl	TDS	Benzene	Toluene	Ethyl Benzene	Total Xylenes	Sulfate	Comments
2	77.72	93.05	2.50	12	03/28/06	564	1700	<0.001	<0.001	<0.001	<0.001	233	xxx
2	77.48	93.05	2.50	15	05/24/06	549	1730	<0.001	<0.001	<0.001	<0.001	215	xxx
2	77.23	93.05	2.50	10	09/14/06	546	1660	<0.001	<0.001	<0.001	<0.001	306	xxx
2	77.11	93.05	2.60	10	10/30/06	505	1560	<0.001	<0.001	<0.001	<0.001	275	Clear no odor
2	76.93	92.88	2.60	10	03/16/07	584	1392	<0.001	<0.001	<0.001	<0.001	362	Clear no odor
2	76.78	92.88	2.60	10	05/15/07	437	1490	<0.001	<0.001	<0.001	<0.001	262	Clear no odor
2	76.47	92.88	2.60	10	08/29/07	424	1438	<0.002	<0.002	<0.002	<0.006	295	Clear no odor
2	76.3	92.88	2.70	10	11/14/07	396	1353	<0.002	<0.002	<0.002	<0.006	283	Clear no odor
2	76.07	92.65	2.70	10	02/27/08	412	1360	<0.002	<0.002	<0.002	<0.006	269	Clear no odor
2	75.82	92.65	2.70	10	05/23/08	428	1380	<0.002	<0.002	<0.002	<0.006	267	Clear no odor
2	75.74	92.65	2.70	10	08/28/08	430	1400	<0.001	<0.001	<0.001	<0.003	240	Clear no odor
2	75.57	92.65	2.70	10	12/17/08	500	1660	<0.001	<0.001	<0.001	<0.003	351	Clear no odor
2	75.32	92.58	2.80	10	02/23/09	500	1700	xxx	xxx	xxx	xxx	346	Clear no odor
2	75.19	92.58	2.80	10	05/28/09	490	1710	xxx	xxx	xxx	xxx	438	Clear no odor
2	74.96	92.58	2.80	10	09/09/09	460	1730	xxx	xxx	xxx	xxx	438	Clear no odor
2	74.80	92.58	2.80	10	11/18/09	480	1660	xxx	xxx	xxx	xxx	349	Clear no odor
2	74.59	92.58	2.90	10	03/09/10	428	1680	xxx	xxx	xxx	xxx	511	Clear no odor
2	74.41	92.58	2.90	10	06/03/10	460	1720	xxx	xxx	xxx	xxx	475	Clear no odor

Graph 2
Rice Operating Company
MW-2
Justis L-1
Lea County, New Mexico

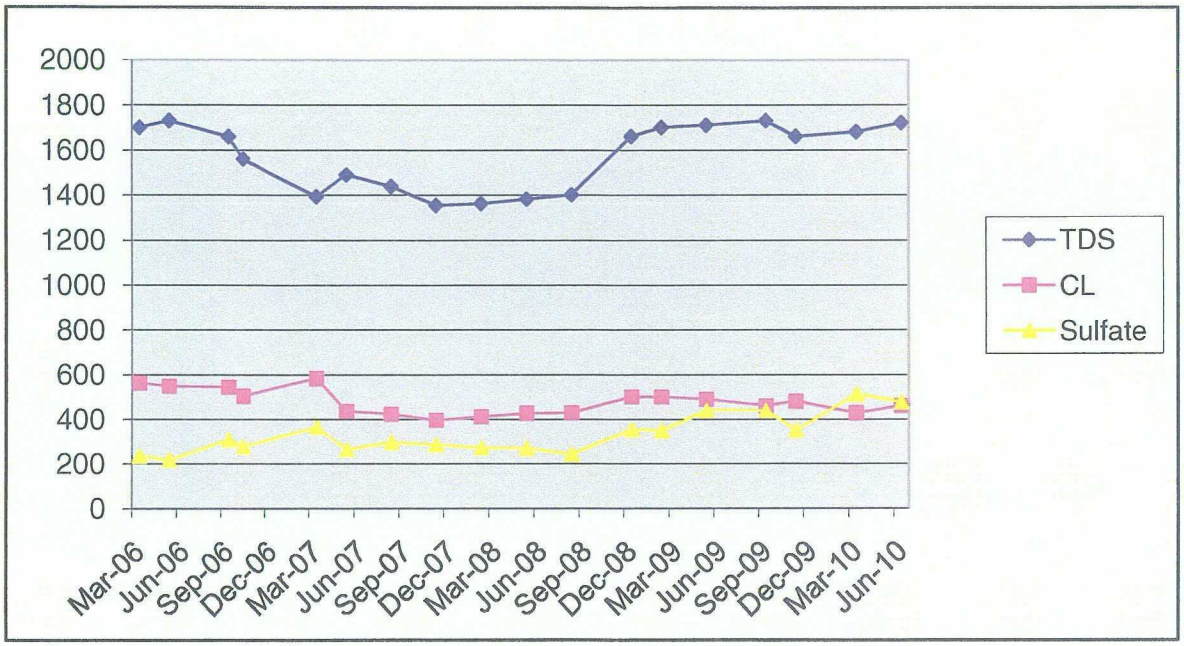


Table 3
Rice Operating Company
Justis L-1
Lea County, New Mexico

MW	Depth to Water	Total Depth	Well Volume	Volume Purged	Sample Date	Cl	TDS	Benzene	Toluene	Ethyl Benzene	Total Xylenes	Sulfate	Comments
3	78.21	93.00	2.40	12	03/28/06	96.3	536	<0.001	<0.001	<0.001	<0.001	93.4	xxx
3	77.99	93.00	2.40	10	05/24/06	91.4	616	<0.001	<0.001	<0.001	<0.001	88.3	xxx
3	77.99	93.00	2.40	10	09/14/06	125	562	<0.001	<0.001	<0.001	<0.001	125	xxx
3	77.61	93.00	2.50	10	10/30/06	114	518	<0.001	<0.001	<0.001	<0.001	111	Clear no odor
3	77.47	92.84	2.50	10	03/16/07	146	574	<0.001	<0.001	<0.001	<0.001	146	Clear no odor
3	77.30	92.84	2.50	10	05/15/07	128	538	<0.001	<0.001	<0.001	<0.001	108	Clear no odor
3	76.98	92.84	2.50	10	08/29/07	156	702	<0.002	<0.002	<0.002	<0.006	134	Clear no odor
3	76.84	92.84	2.60	10	11/14/07	132	621	<0.002	0.002	0.003	0.007	131	Clear no odor
3	76.58	92.48	2.50	10	02/27/08	124	613	<0.002	<0.002	<0.002	<0.006	131	Clear no odor
3	76.36	92.48	2.60	10	05/23/08	164	696	<0.002	<0.002	<0.002	<0.006	126	Clear no odor
3	76.30	92.48	2.60	10	08/28/08	88	558	<0.001	<0.001	<0.001	<0.003	128	Clear no odor
3	76.23	92.48	2.60	10	12/17/08	140	661	<0.001	<0.001	<0.001	<0.003	128	Clear no odor
3	75.84	92.35	2.60	10	02/23/09	184	642	xxx	xxx	xxx	xxx	113	Clear no odor
3	75.76	92.35	2.70	10	05/28/09	188	751	xxx	xxx	xxx	xxx	115	Clear no odor
3	75.52	92.35	2.70	10	09/09/09	184	647	xxx	xxx	xxx	xxx	117	Clear no odor
3	75.32	92.35	2.70	10	11/18/09	196	660	xxx	xxx	xxx	xxx	85.9	Clear no odor
3	75.11	92.29	2.70	10	03/09/10	224	793	xxx	xxx	xxx	xxx	147	Clear no odor
3	74.96	92.29	2.80	10	06/03/10	240	903	xxx	xxx	xxx	xxx	99	Clear no odor

Graph 3
Rice Operating Company
MW-3
Justis L-1
Lea County, New Mexico

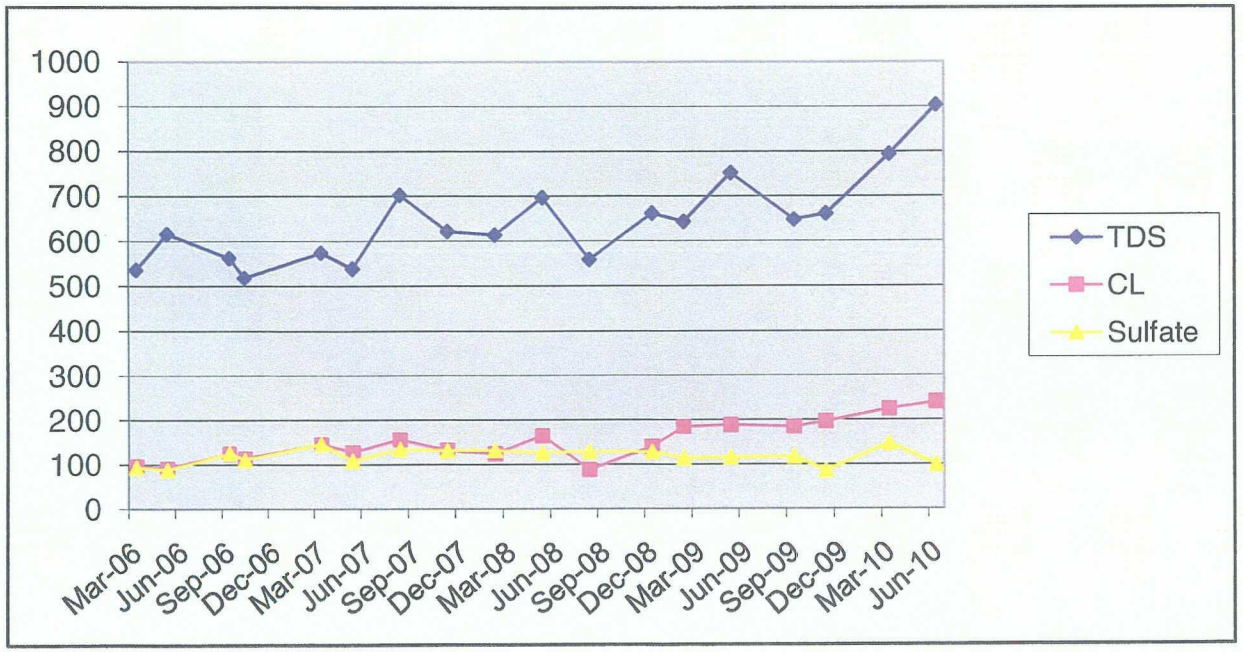


Table 4
Rice Operating Company
Justis L-1
Lea County, New Mexico

MW	Depth to Water	Total Depth	Well Volume	Volume Purged	Sample Date	Cl	TDS	Benzene	Toluene	Ethyl Benzene	Total Xylenes	Sulfate	Comments
4	78.44	91.24	2.00	10	10/30/06	44.2	492	<0.001	<0.001	<0.001	<0.001	115	Clear no odor
4	78.32	90.62	2.00	10	03/16/07	45.8	512	<0.001	<0.001	<0.001	<0.001	109	Clear no odor
4	78.11	90.62	2.00	8	05/15/07	48.0	518	<0.001	<0.001	<0.001	<0.001	109	Clear no odor
4	77.84	90.62	2.00	8	08/29/07	52.0	578	<0.002	<0.002	<0.002	<0.006	151	Clear no odor
4	77.67	90.62	2.10	8	11/14/07	52.0	562	<0.002	<0.002	<0.002	<0.006	135	Clear no odor
4	77.44	90.51	2.10	8	02/27/08	52.0	554	<0.002	<0.002	<0.002	<0.006	126	Clear no odor
4	77.18	90.51	2.10	8	05/23/08	56.0	538	<0.002	<0.002	<0.002	<0.006	139	Clear no odor
4	77.11	90.51	2.10	8	08/28/08	52.0	580	<0.001	<0.001	<0.001	<0.003	114	Clear no odor
4	76.91	90.51	2.20	8	12/17/08	76.0	565	<0.001	<0.001	<0.001	<0.003	136	Clear no odor
4	76.65	90.37	2.20	8	02/23/09	52.0	567	xxx	xxx	xxx	xxx	120	Clear no odor
4	76.33	90.37	2.20	8	05/28/09	52.0	566	xxx	xxx	xxx	xxx	124	Clear no odor
4	76.27	90.37	2.30	8	09/09/09	56.0	565	xxx	xxx	xxx	xxx	121	Clear no odor
4	76.11	90.37	2.30	8	11/18/09	48.0	481	xxx	xxx	xxx	xxx	87.2	Clear no odor
4	75.89	90.36	2.30	8	03/09/10	48.0	536	xxx	xxx	xxx	xxx	162	Sand to clear
4	75.71	90.36	2.30	8	06/03/10	52.0	525	xxx	xxx	xxx	xxx	106	Sand to clear

Graph 4
Rice Operating Company
MW-4
Justis L-1
Lea County, New Mexico

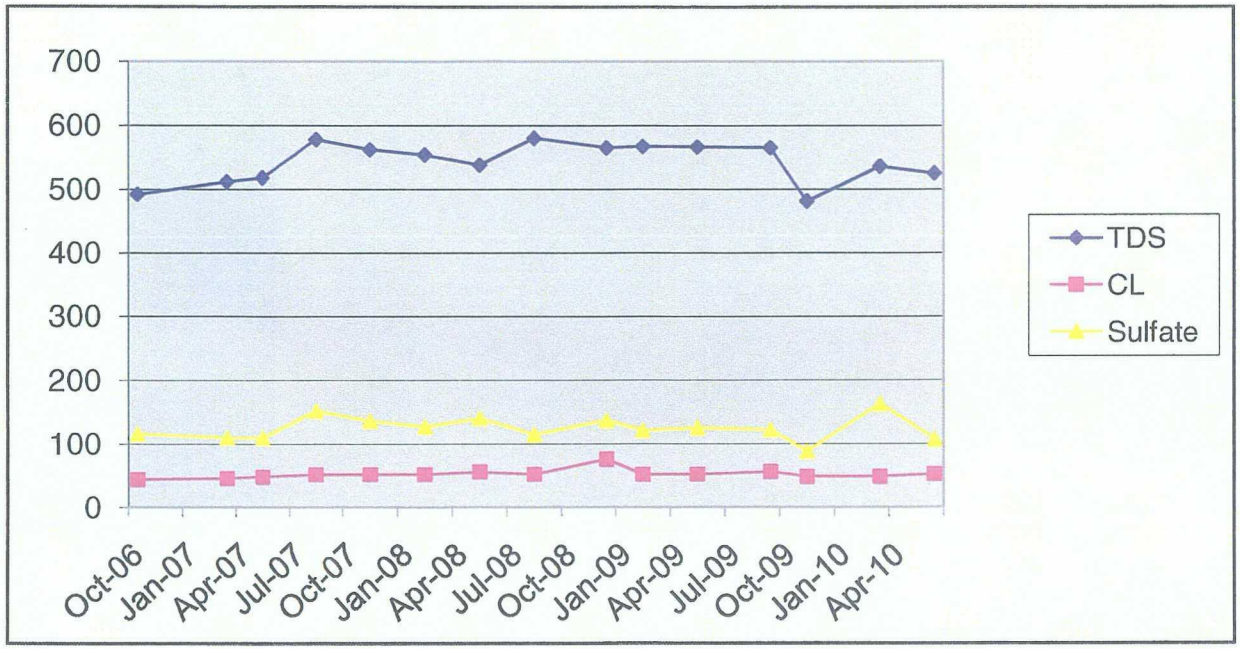
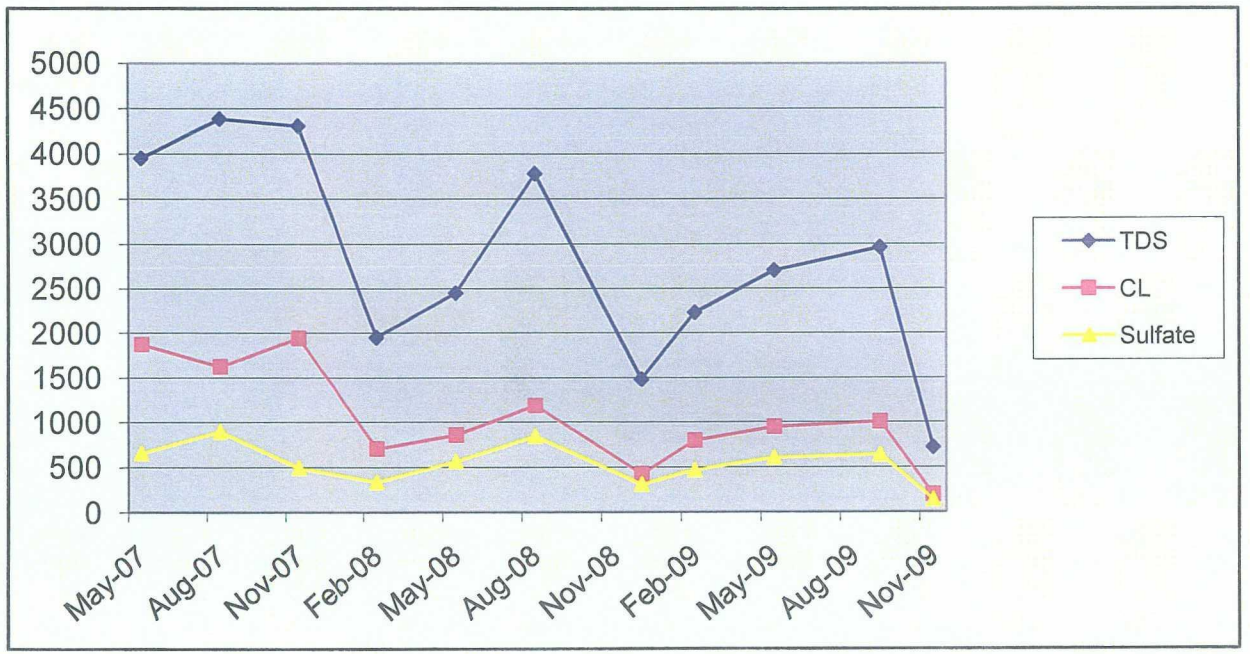


Table 5
Rice Operating Company
Justis L-1
Lea County, New Mexico

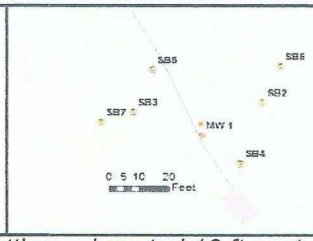
MW	Depth to Water	Total Depth	Well Volume	Volume Purged	Sample Date	Cl	TDS	Benzene	Toluene	Ethyl Benzene	Total Xylenes	Sulfate	Comments
5	75.94	87.20	1.80	8	05/15/07	1870	3950	<0.001	<0.001	<0.001	<0.001	655	Clear no odor
5	75.61	87.20	1.90	8	08/29/07	1619	4386	<0.002	<0.002	<0.002	<0.006	894	Clear no odor
5	75.44	87.20	1.90	8	11/14/07	1940	4306	<0.002	<0.002	<0.002	<0.006	490	Clear no odor
5	75.24	87.70	2.00	8	02/27/08	700	1950	<0.002	<0.002	<0.002	<0.006	333	Clear no odor
5	75.00	87.70	2.00	8	05/23/08	850	2450	<0.002	<0.002	<0.002	<0.006	560	Clear no odor
5	74.94	87.70	2.00	8	08/28/08	1180	3780	<0.001	<0.001	<0.001	<0.003	842	Clear no odor
5	74.76	87.70	2.10	8	12/17/08	416	1480	<0.001	<0.001	<0.001	<0.003	307	Clear no odor
5	74.52	88.19	2.20	8	02/23/09	790	2230	<0.001	<0.001	<0.001	<0.003	466	Clear no odor
5	74.38	88.19	2.20	8	05/28/09	940	2700	<0.001	<0.001	<0.001	<0.003	600	Clear no odor
5	74.14	88.19	2.20	8	09/09/09	1000	2960	<0.001	<0.001	<0.001	<0.003	635	Sand to clear
5	74.00	88.19	2.30	8	11/18/09	188	718	<0.001	<0.001	<0.001	<0.003	134	Sand to clear
5	73.79	88.20	2.30	8	03/09/10	980	2940	<0.001	<0.001	<0.001	<0.003	801	Sand to clear
5	73.60	88.20	2.30	8	06/03/10	920	2570	<0.001	<0.001	<0.001	<0.003	530	Sand to clear

Graph 5
Rice Operating Company
MW-5
Justis L-1
Lea County, New Mexico



BORING LOGS

Logger:	Jeff Kindley
Driller:	Harrison & Cooper, Inc. Drilling
Consultant:	Tetra Tech
Drilling Method:	Air rotary
Start Date:	6/9/2010
End Date:	6/9/2010



RICE OPERATING COMPANY ROC SINCE 1955

Project Name: Justis L-1 boot **Well ID:** SB-2

Location: UL/L sec. 1 T25S R37E
Lat: 32°9'24.992"N **County:** Lea
Long: 103°7'23.571"W **State:** NM

Comments: All samples from cuttings. Located 19 ft east of the former juction box site.

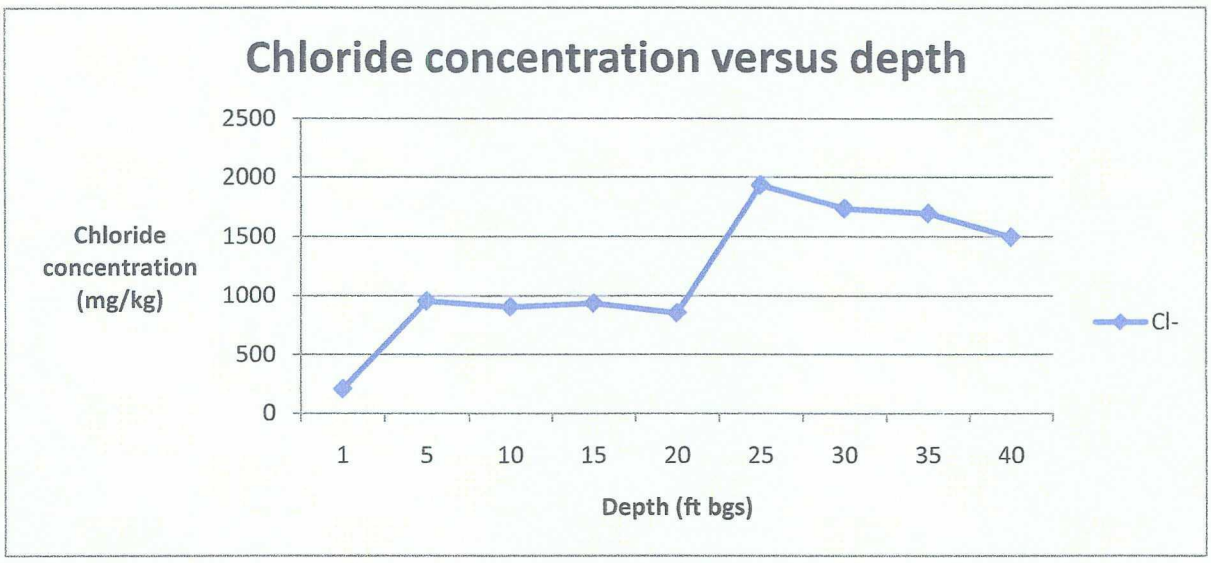
Drafted by: Lara Weinheimer

TD = 40 ft DGW = 75 ft

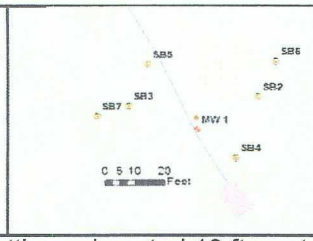
Depth (feet)	chloride field tests	LAB	PID	Description
				0 - 1 ft
				SILT AND LIMESTONE
1 ft	206		0	brown
				1 - 5 ft
				FINE GRAIN SAND
5 ft	954		0	tan
				5 - 10 ft
				FINE GRAIN CALCAREOUS SAND
10 ft	903		0	tan
				10 - 15 ft
				CALCAREOUS FINE GRAIN SAND
15 ft	935		0	tan to buff
				15 - 20 ft
				FINE GRAIN SAND
20 ft	851		0	tan to red
				20 - 25 ft
				CALCAREOUS FINE GRAIN SAND
25 ft	1931	Cl- 2160	0	tan to buff
		GRO <10		25 - 30 ft
		DRO <10		CALCAREOUS FINE GRAIN SAND
30 ft	1736		0	tan
				30 - 35 ft
				FINE GRAIN SAND
35 ft	1695		0	tan to red
				35 - 40 ft
				FINE GRAIN SAND WITH SANDSTONE
40 ft	1495	Cl- 1490	0	tan
		GRO <10		
		DRO <10		

Lithology

Well Construction: bentonite seal


Chloride concentration versus depth
Chloride concentration (mg/kg)
2500
2000
1500
1000
500
0
1
5
10
15
20
25
30
35
40
Depth (ft bgs)
Cl-

Logger:	Jeff Kindley
Driller:	Harrison & Cooper, Inc. Drilling
Consultant:	Tetra Tech
Drilling Method:	Air rotary
Start Date:	6/9/2010
End Date:	6/9/2010



RICE OPERATING COMPANY
ROC
SINCE 1955

Project Name: Justis L-1 boot **Well ID:** SB-3

Location: UL/L sec. 1 T25S R37E
Lat: 32°9'24.951"N **County:** Lea
Long: 103°7'23.997"W **State:** NM

Comments: All samples from cuttings. Located 19 ft west of the former junction box site.

Drafted by: Lara Weinheimer

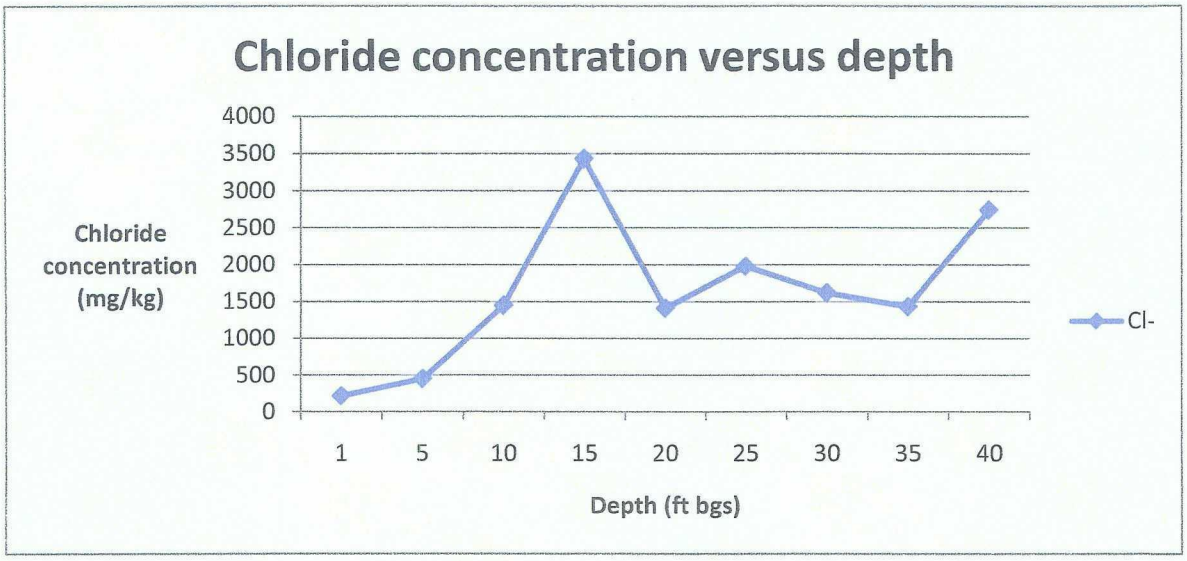
TD = 40 ft DGW = 75 ft

Depth (feet)	chloride field tests	LAB	PID	Description
				0 - 5 ft
				SILT WITH LIMESTONE
1 ft	213		0	brown
5 ft	448		0	
				5 - 10 ft
				SILTY SAND
10 ft	1446		0	tan brown
				10 - 15 ft
				FINE GRAIN SANDY LIMESTONE
15 ft	3431	Cl- 4800	0	buff
		GRO <10		15 - 20 ft
		DRO <10		FINE GRAIN SAND
20 ft	1409		0	tan to red
				20 - 25 ft
				FINE GRAIN CALCAREOUS SAND
25 ft	1975		0	tan to buff
				25 - 30 ft
				FINE GRAIN CALCAREOUS SAND
30 ft	1617		0	tan
				30 - 35 ft
				FINE GRAINED SAND
35 ft	1430		0	tan to red
				35 - 40 ft
40 ft	2744	Cl- 3020	0	FINE GRAIN SAND WITH LIMESTONE
		GRO <10		tan
		DRO <10		

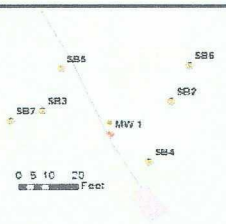
Lithology

Well Construction

bentonite seal


Chloride concentration versus depth
Chloride concentration (mg/kg)
4000
3500
3000
2500
2000
1500
1000
500
0
1
5
10
15
20
25
30
35
40
Depth (ft bgs)
Cl-

Logger:	Jeff Kindley
Driller:	Harrison & Cooper, Inc. Drilling
Consultant:	Tetra Tech
Drilling Method:	Air rotary
Start Date:	6/9/2010
End Date:	6/9/2010



RICE OPERATING COMPANY ROC SINCE 1955

Project Name: Justis L-1 boot **Well ID:** SB-4

Location: UL/L sec. 1 T25S R37E
Lat: 32°9'24.759"N **County:** Lea
Long: 103°7'23.645"W **State:** NM

Comments: All samples from cuttings. Located 18 ft SE of the former junction box site.

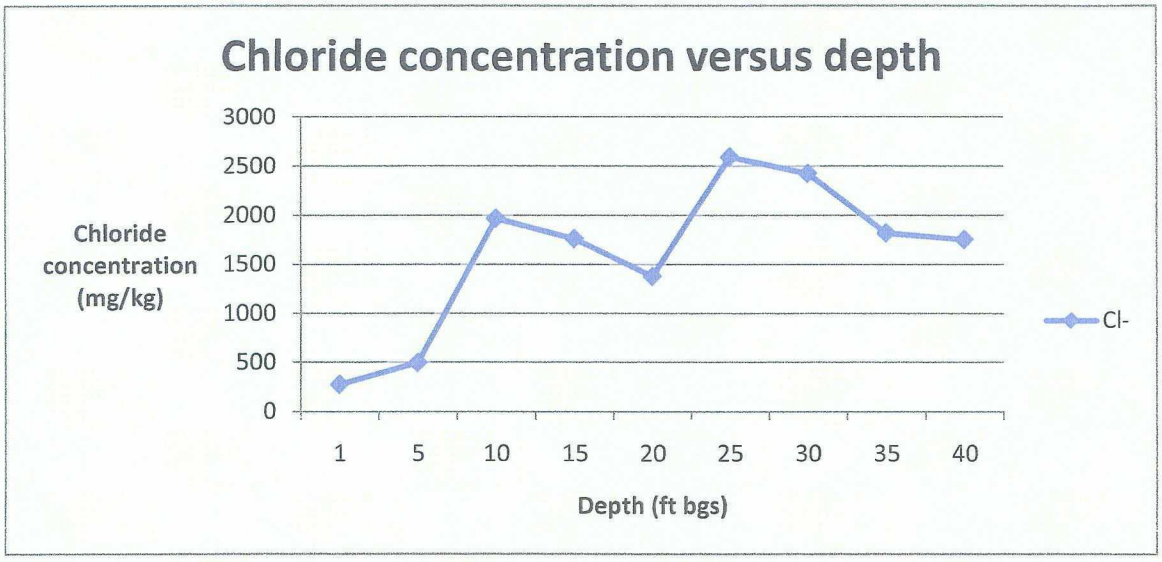
Drafted by: Lara Weinheimer

TD = 40 ft DGW = 75 ft

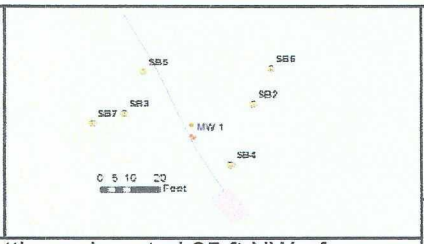
Depth (feet)	chloride field tests	LAB	PID	Description
				0 - 1 ft
				SILT
1 ft	274		0	brown
				1 - 5 ft
				FINE GRAIN CALCAREOUS SAND
5 ft	494		0	tan
10 ft	1965		0	
				10 - 20 ft
				FINE GRAIN SAND
15 ft	1760		0	tan to red
20 ft	1375		0	
				20 - 30 ft
				CALCAREOUS SAND
25 ft	2592	Cl- 3120	0	tan to buff
		GRO <10		
		DRO <10		
30 ft	2423		0	
				30 - 40 ft
				FINE GRAIN SAND
35 ft	1818		0	tan to red
40 ft	1751	Cl- 1780	0	
		GRO <10		
		DRO <10		

Lithology

Well Construction: bentonite seal


Chloride concentration versus depth
Chloride concentration (mg/kg)
3000
2500
2000
1500
1000
500
0
1
5
10
15
20
25
30
35
40
Depth (ft bgs)
Cl-

Logger:	Jeff Kindley
Driller:	Harrison & Cooper, Inc. Drilling
Consultant:	Tetra Tech
Drilling Method:	Air rotary
Start Date:	6/9/2010
End Date:	6/9/2010



RICE OPERATING COMPANY ROC SINCE 1955

Project Name: Justis L-1 boot **Well ID:** SB-5

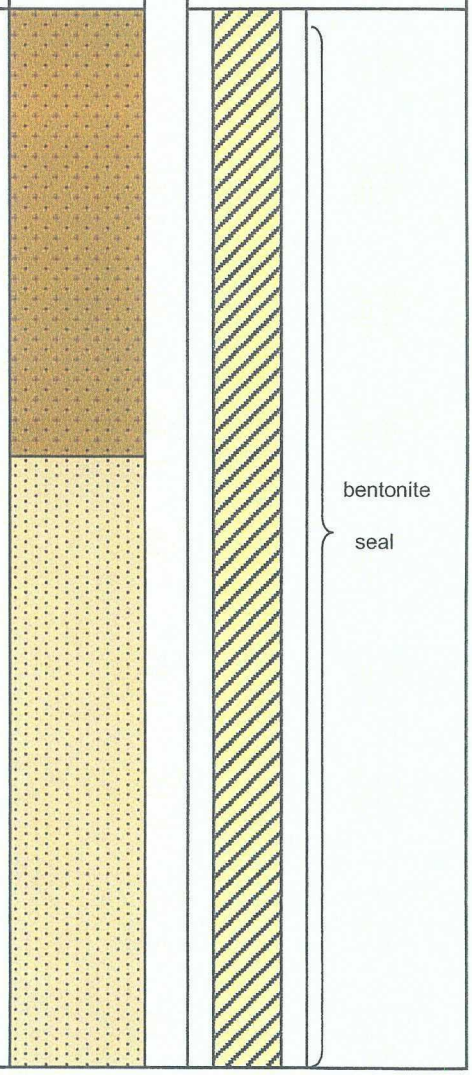
Location: UL/L sec. 1 T25S R37E
Lat: 32°9'25.109"N **County:** Lea
Long: 103°7'23.935"W **State:** NM

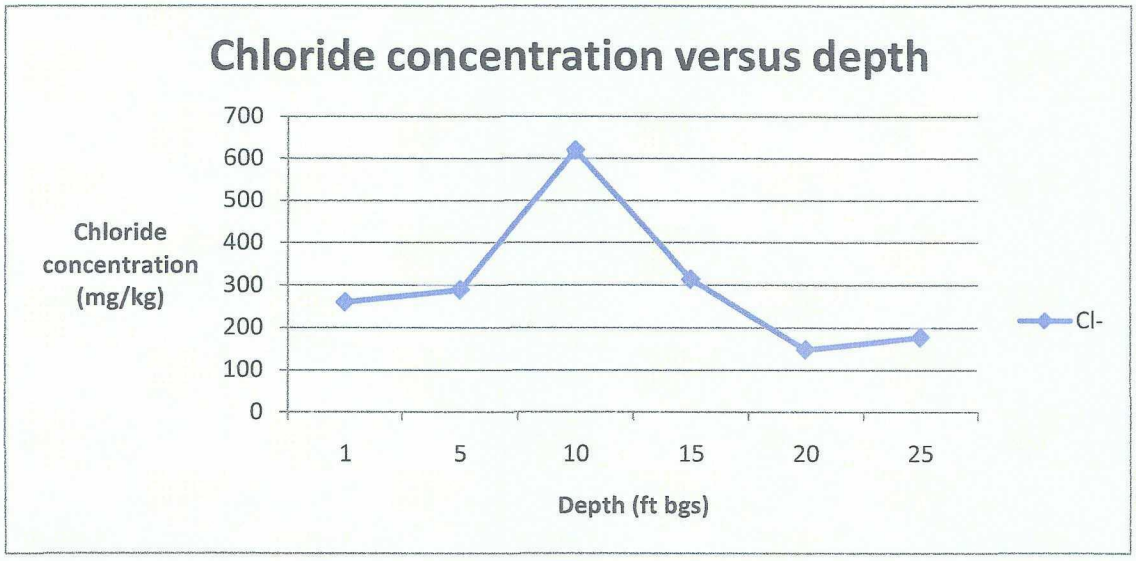
Comments: All samples from cuttings. Located 25 ft NW of the former junction box site.

Drafted by: Lara Weinheimer

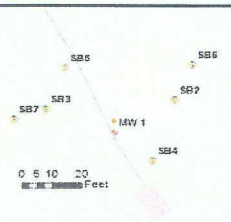
TD = 25 ft DGW = 75 ft

Depth (feet)	chloride field tests	LAB	PID	Description
				0 - 10 ft SILT WITH LIMESTONE brown
1 ft	260		0	
5 ft	289		0	
10 ft	620		0	
15 ft	314	Cl- 240	0	10 - 25 ft FINE GRAIN CALCAREOUS SAND tan
		GRO <10		
		DRO <10		
20 ft	148		0	
25 ft	177	Cl- 48	0	
		GRO <10		
		DRO <10		




Chloride concentration versus depth
Chloride concentration (mg/kg)
700
600
500
400
300
200
100
0
1
5
10
15
20
25
Depth (ft bgs)
Cl-

Logger:	Jeff Kindley
Driller:	Harrison & Cooper, Inc. Drilling
Consultant:	Tetra Tech
Drilling Method:	Air rotary
Start Date:	6/10/2010
End Date:	6/10/2010



RICE OPERATING COMPANY ROC SINCE 1955

Project Name: Justis L-1 boot **Well ID:** SB-6

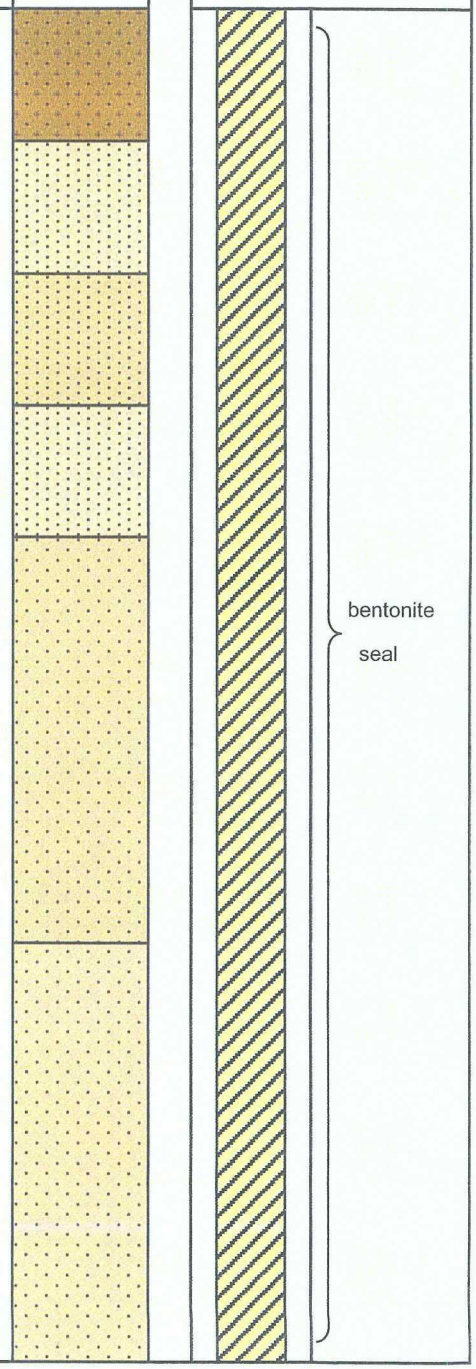
Location: UL/L sec. 1 T25S R37E
Lat: 32°9'25.121"N **County:** Lea
Long: 103°7'23.511"W **State:** NM

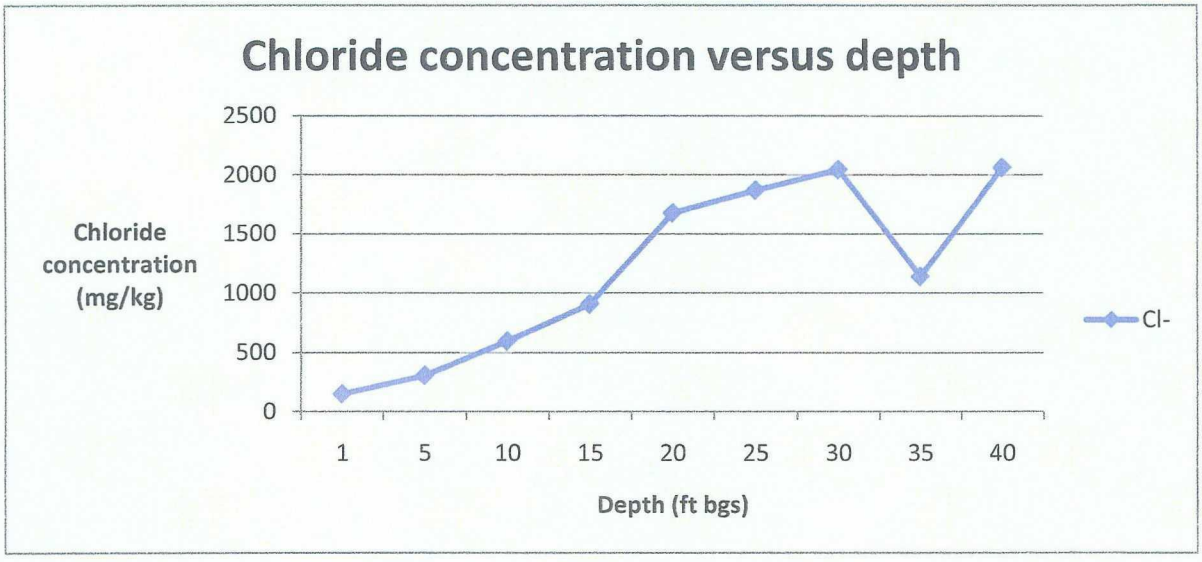
Comments: All samples from cuttings. Located 31 ft NE of the former junction box site.

Drafted by: Lara Weinheimer

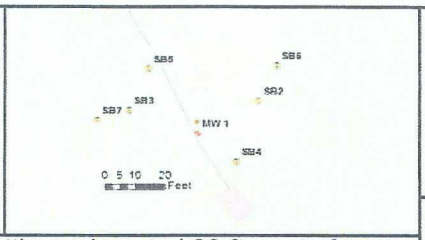
TD = 40 ft DGW = 75 ft

Depth (feet)	chloride field tests	LAB	PID	Description
				0 - 1 ft
				SILT
1 ft	150		1.2	brown
				1 - 5 ft
				FINE GRAIN SAND LIMESTONE
5 ft	306		1.2	buff
				5 - 10 ft
				CALCAREOUS FINE GRAIN SAND
10 ft	596		1.3	tan
				10 - 15 ft
				FINE GRAIN SAND LIMESTONE
15 ft	906		1.3	buff
20 ft	1677		1.4	15 - 30 ft
				FINE GRAIN SAND
				tan
25 ft	1868		1.6	
30 ft	2043	Cl- 1710	1.6	
		GRO <10		30 - 40 ft
		DRO <10		FINE GRAIN SAND
35 ft	1137		1.3	tan to red
40 ft	2061	Cl- 2080	1.2	
		GRO <10		
		DRO <10		




Chloride concentration versus depth
Chloride concentration (mg/kg)
2500
2000
1500
1000
500
0
1
5
10
15
20
25
30
35
40
Depth (ft bgs)
Cl-

Logger:	Jeff Kindley
Driller:	Harrison & Cooper, Inc. Drilling
Consultant:	Tetra Tech
Drilling Method:	Air rotary
Start Date:	6/10/2010
End Date:	6/10/2010



RICE OPERATING COMPANY ROC SINCE 1955

Project Name: Justis L-1 boot **Well ID:** SB-7

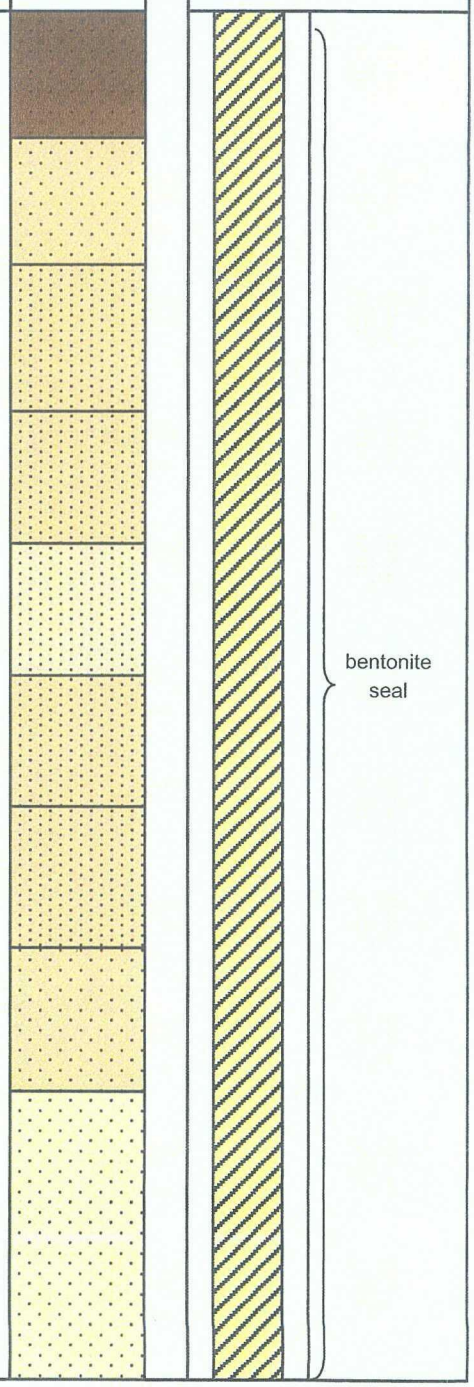
Location: UL/L sec. 1 T25S R37E
Lat: 32°9'24.914"N **County:** Lea
Long: 103°7'24.105"W **State:** NM

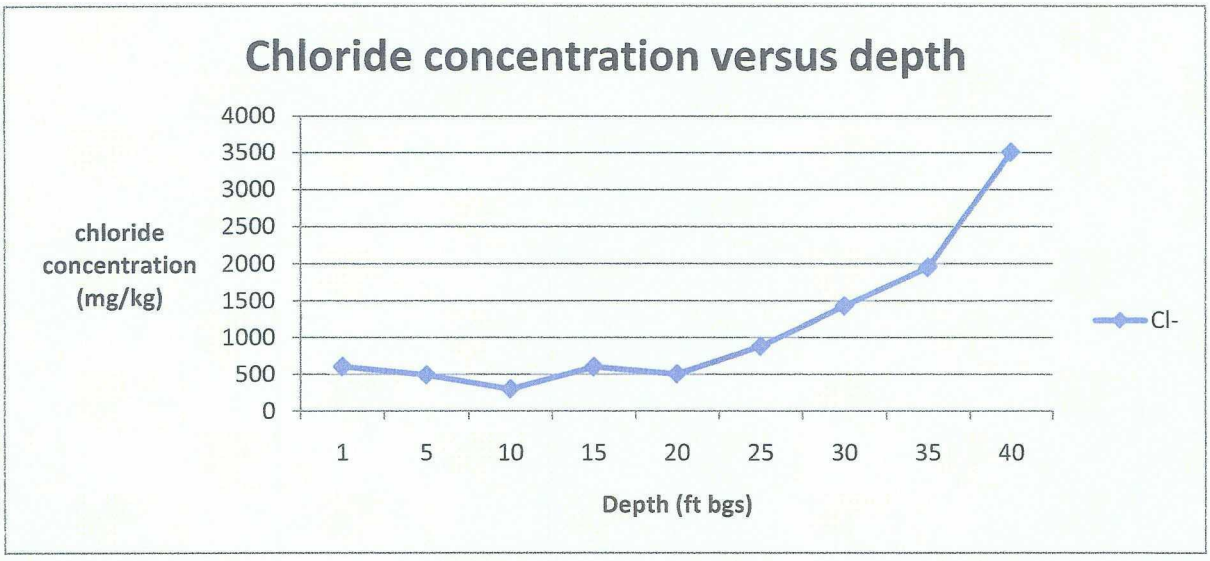
Comments: All samples from cuttings. Located 29 ft west of the former junction box site.

Drafted by: Lara Weinheimer

TD = 40 ft DGW = 75

Depth (feet)	chloride field tests	LAB	PID	Description
				0 - 1 ft
				SILT
1 ft	608		1.5	dark brown
				1 - 5 ft
				CALCAREOUS FINE GRAIN SAND
5 ft	494		1.4	tan
				5 - 10 ft
				CALCAREOUS FINE TO MEDIUM GRAIN SAND
10 ft	301		1.5	tan
				10 - 15 ft
				FINE GRAIN CALCAREOUS SAND
15 ft	604		1.1	tan
				15 - 20 ft
				FINE GRAIN SANDY LIMESTONE
20 ft	507		0.9	buff
				20 - 25 ft
				FINE GRAIN CALCAREOUS SAND
25 ft	882		0.9	tan
				25 - 30 ft
				FINE TO MEDIUM GRAIN CALCAREOUS SAND
30 ft	1433		1	tan
				30 - 35 ft
				FINE GRAIN SAND
35 ft	1951	Cl- 1140	1	tan
		GRO <10		35 - 40 ft
		DRO <10		FINE GRAIN SAND
40 ft	3504	Cl- 4480	0.7	light tan
		GRO <10		
		DRO <10		




Chloride concentration versus depth
chloride concentration (mg/kg)
4000
3500
3000
2500
2000
1500
1000
500
0
1
5
10
15
20
25
30
35
40
Depth (ft bgs)
Cl-