

1R - 487

Annual GW Mon. REPORTS

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

RE: 2010 MONITOR WELL REPORT
GROUNDWATER REMEDIATION/MONITORING
N-6 PIPELINE LEAK, WEST COUNTY ROAD SITE (1R-487)
HOBBS SWD SYSTEM
Unit N SEC. 5 & 6, T19S, R38E, LEA COUNTY, NEW MEXICO

Mr. Hansen:

On behalf of Rice Operating Company (ROC) ARCADIS is submitting this 2010 Monitor Well Report for the Hobbs Salt Water Disposal (SWD) System N-6 Release Site. The site is located immediately south of the intersection of Highway 62-180 and the South Loop of the Hobbs West County Road Bypass (see attached map).

ROC was the service provider (agent) for the Hobbs SWD System and has no ownership of any portion of the pipeline, well or facility. The Hobbs SWD System was owned by a consortium of oil producers, System Parties, who provide operating capital on a percentage ownership/usage basis. The Hobbs SWD System has been abandoned.

Groundwater Sampling

Wells are sampled quarterly in accordance with NMOCD guidelines. The attached tables summarize the analytical results from groundwater samples collected from the monitor wells in 2010 and depth to water, total depth of the well, volume of water in the wellbore and volume of water purged from the well.

A monitor well (MW-3R) was drilled on November 15, 2010. The well was drilled to a depth of 56 feet below ground surface adjacent to existing deep well MW-3 (see attached well location figure and monitor well log). The well was drilled as a replacement and comparison well to MW-3. Chloride, TDS and sulfate

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March 30, 2011

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MT000821.0001

Imagine the result

concentrations in MW-3 are markedly higher than in replacement well MW-3R and the other wells at the site, and are strongly indicative of naturally occurring geochemical conditions at the base of the Ogallala where it overlies the Triassic red-beds.

Free Product Removal

In 1994, a leak was discovered in a buried SWD pipeline. An assessment program was completed and a free product recovery program initiated. The free product has historically been collected from Monitor Well 1 (MW-1), initially in 1996 in conjunction with groundwater recovery, and then beginning in 2000 with product recovery only.

A biosparge well designed to maximize in-situ biodegradation and minimize volatilization of hydrocarbons was installed at the site and became operational in August 2005. Four borings were drilled on November 8 and 9, 2006 in order to evaluate hydrocarbon occurrence in the vadose zone. Based on drilling observations a second biosparge well was installed approximately 30 feet east of the original biosparge well. The second biosparge well became operational in March 2007. In November of 2007 an additional eight soil borings (piezometers) were drilled and a third biosparge well was installed SE of the pump house. These soil borings were located in areas between previous sampling points, outside of the previously identified core source area, and as close as possible to previous (2006) soil borings from which samples had been collected and tested for total petroleum hydrocarbons (TPH) and total organic compounds (TOC).

In November of 2010, the air sparge system at the site was tested by collection of soil gas samples during a cycled shut down. A similar test protocol was previously performed in May/June and September/October 2007, August/September 2008 and November 2009. The soil gas samples from these testing events were analyzed for methane, carbon dioxide, oxygen and benzene, toluene, ethylbenzene and xylenes (BTEX).

During 2010, phase separated hydrocarbon recovery was conducted by a weekly replacement of an absorbent sock placed in the well.

Biosparge Well Operation and Evaluation

Evaluation of the 2007, 2008, and 2009 soil gas and monitoring well data indicates that the biosparge wells are effective in the remediation of free-phase hydrocarbons at the site. Biochemical results also suggest groundwater chemistry indicative of bioremediation. The 2010 soil gas and monitoring well data is currently being evaluated. Operation of the existing biosparge wells in conjunction with use of absorbent socks and evaluation of their effectiveness is expected to continue in 2011.

Product removal from MW-1 and operation and sampling of the biosparge wells will continue in 2011.

Thank you for consideration concerning this information. Should you have any questions regarding this submission, please do not hesitate to contact Hack Conder (575 393-9174) or me.

Very truly yours,

ARCADIS

Sharon E. Hall

Sharon E. Hall
Associate Vice President

enclosures:

Summary of Analytical Results Tables
Figure of Well Locations
Monitor Well Log
Drilling Diagram
Photographs

cc: Hack Conder - ROC

ROC Hobbs N-6

MW	Depth to Water feet	Total Depth feet	Well Volume gallons	Volume Purged gallons	Sample Date	CI	TDS	Benzene	Toluene	Ethyl Benzene	Total Xylenes	Sulfate
Bio Sparge #1	40.90	65.70	16.1	25	12/6/2005	92.6	608	0.0323	0.0209	0.107	0.0825	54.4
Bio Sparge #1	43.33	65.70	14.5	45	3/1/2006	105	912	0.44	0.0357	0.168	0.1195	XXX
Bio Sparge #1	41.08	65.70	16	50	6/5/2006	171	858	0.544	0.0125	1.142	0.03479	45
Bio Sparge #1	39.90	65.70	16.8	70	9/12/2006	142	1010	1.15	0.0283	0.207	0.04044	33.2
Bio Sparge #1	39.92	63.75	15.5	50	11/15/2006	283	1450	1.06	0.0298	0.159	0.0772	28.6
Bio Sparge #1	40.47	63.74	15.1	50	3/14/2007	427	2040	1.19	0.0402	0.323	0.0958	24.2
Bio Sparge #1	42.59	63.74	13.7	50	6/12/2007	346	1580	0.569	0.00923	0.146	0.0891	24.7
Bio Sparge #1	42.45	63.74	13.8	45	9/18/2007	428	1804	1.88	0.026	0.394	0.202	13.2
Bio Sparge #1	44.18	63.74	12.7	45	12/6/2007	500	1997	1.31	0.001	0.255	0.11	66.1
Bio Sparge #1	XXX	63.74	XXX	XXX	3/4/2008	550	2070	<0.001	<0.001	<0.001	<0.003	105
Bio Sparge #1	43.29	63.74	13.3	45	5/29/2008	810	2590	0.025	0.124	0.318	0.197	99.2
Bio Sparge #1	43.40	63.74	13.2	45	9/5/2008	710	2270	0.736	0.004	0.238	0.117	58
Bio Sparge #1	43.10	63.74	13.4	45	12/15/2008	580	2070	0.347	0.004	0.188	0.09	76.8
Bio Sparge #1	43.21	63.74	13.3	XXX	3/16/2009	XXX	XXX	XXX	XXX	XXX	XXX	XXX
Bio Sparge #1	47.34	63.74	10.7	XXX	6/9/2009	XXX	XXX	XXX	XXX	XXX	XXX	XXX
Bio Sparge #1	48.20	63.74	10.1	XXX	9/15/2009	XXX	XXX	XXX	XXX	XXX	XXX	XXX
Bio Sparge #1	48.36	63.74	10	XXX	11/20/2009	XXX	XXX	XXX	XXX	XXX	XXX	XXX
Bio Sparge #1	48.47	63.74	9.9	XXX	3/18/2010	XXX	XXX	XXX	XXX	XXX	XXX	XXX
Bio Sparge #1	48.83	63.74	9.7	XXX	6/7/2010	XXX	XXX	XXX	XXX	XXX	XXX	XXX
Bio Sparge #1	47.38	63.74	10.6	XXX	9/8/2010	XXX	XXX	XXX	XXX	XXX	XXX	XXX
Bio Sparge #1	47.49	63.74	10.6	XXX	12/8/2010	XXX	XXX	XXX	XXX	XXX	XXX	XXX

All concentrations in milligrams per liter

XXX= Well contained emulsion and could not be purged/sampled

ROC Hobbs N-6

MW	Depth to Water feet	Total Depth feet	Well Volume gallons	Volume Purged gallons	Sample Date	CI	TDS	Benzene	Toluene	Ethyl Benzene	Total Xylenes	Sulfate
Bio Sparge #2	42.59	73.32	20	60	11/15/2006	81.8	522	0.0373	0.00314	0.0404	0.0994	107
Bio Sparge #2	41.4	71.59	19.6	60	3/14/2007	64.5	444	0.00274	j[0.000935]	0.00225	0.00282	74.4
Bio Sparge #2	41.8	71.59	19.4	60	6/12/2007	83.8	546	0.00179	0.00119	0.002	0.0011	75.9
Bio Sparge #2	41.65	71.59	19.5	60	9/18/2007	108	588	<0.001	<0.001	<0.001	<0.003	111
Bio Sparge #2	41.5	71.59	19.6	60	12/6/2007	108	571	0.001	<0.001	0.002	<0.003	97.5
Bio Sparge #2	41.78	71.08	19	60	3/4/2008	100	553	0.002	<0.001	0.004	<0.003	113
Bio Sparge #2	42.06	71.08	18.9	60	5/29/2008	100	605	0.002	<0.001	0.002	<0.003	99.6
Bio Sparge #2	42.35	71.08	18.7	60	9/5/2008	88	511	0.008	<0.001	0.002	<0.003	101
Bio Sparge #2	42.46	71.08	18.6	60	12/15/2008	92	568	0.005	<0.001	0.001	<0.003	96.3
Bio Sparge #2	42.81	70.83	18.2	60	3/16/2009	88	497	<0.001	<0.001	<0.001	<0.003	85.9
Bio Sparge #2	42.92	70.83	18.1	60	6/9/2009	88	530	<0.001	<0.001	<0.001	<0.003	79.8
Bio Sparge #2	43.41	70.83	17.8	60	9/15/2009	92	533	<0.001	<0.001	<0.001	<0.003	83.7
Bio Sparge #2	43.61	70.83	17.7	69	11/19/2009	92	568	<0.001	<0.001	<0.001	<0.003	76.2
Bio Sparge #2	43.85	70.83	17.5	60	3/18/2010	92	555	<0.001	<0.001	<0.001	<0.003	112
Bio Sparge #2	43.48	70.83	17.8	60	6/7/2010	84	553	<0.001	<0.001	<0.001	<0.003	94.6
Bio Sparge #2	42.38	70.83	18.5	60	9/8/2010	92	554	<0.001	<0.001	<0.001	<0.003	83.5
Bio Sparge #2	42.59	70.83	18.4	60	12/8/2010	104	496	<0.001	<0.001	<0.001	<0.003	93.6

All concentrations in milligrams per liter

ROC Hobbs N-6

MW	Depth to Water feet	Total Depth feet	Well Volume gallons	Volume Purged gallons	Sample Date	CI	TDS	Benzene	Toluene	Ethyl Benzene	Total Xylenes	Sulfate
Bio Sparge #3	41.65	70.8	18.9	65	12/5/2007	576	1553	0.062	<0.001	0.069	0.021	73.7
Bio Sparge #3	41.53	70.8	19	65	3/4/2008	500	1410	0.037	0.001	0.115	0.032	68.3
Bio Sparge #3	41.82	70.8	18.8	65	5/29/2008	384	1074	0.006	<0.001	0.005	<0.003	79.4
Bio Sparge #3	42.09	70.8	18.7	65	9/5/2008	580	1480	0.01	<0.001	0.051	<0.003	106
Bio Sparge #3	42.19	70.8	18.6	65	12/15/2008	540	1440	0.007	0.001	0.014	<0.003	69.5
Bio Sparge #3	42.45	69.58	17.6	60	3/16/2009	480	1320	0.021	<0.001	0.024	<0.003	67
Bio Sparge #3	42.64	69.58	17.5	60	6/9/2009	420	1340	0.013	<0.001	0.023	<0.003	63.3
Bio Sparge #3	42.76	69.58	17.4	60	9/15/2009	352	1160	0.02	<0.001	<0.001	<0.003	63.8
Bio Sparge #3	42.89	69.58	17.3	60	11/19/2009	400	1160	0.038	<0.001	<0.001	<0.003	61
Bio Sparge #3	43.08	69.58	17.2	60	3/18/2010	316	1030	0.023	<0.001	0.014	<0.003	86.6
Bio Sparge #3	43.24	69.58	17.1	60	6/7/2010	276	972	0.008	<0.001	0.007	<0.003	90
Bio Sparge #3	42.01	69.58	17.9	60	9/8/2010	100	514	0.001	<0.001	0.001	<0.003	85.5
Bio Sparge #3	42.23	69.58	17.8	60	12/8/2010	88	458	<0.001	<0.001	<0.001	<0.003	94.6

All concentrations in milligrams per liter

ROC Hobbs N-6 Leak

MW	Depth to Water	Total Depth	Well Volume	Volume Purged	Sample Date	Cl	TDS	Benzene	Toluene	Ethyl Benzene	Total Xylenes	Sulfate
1	43.99	55.21	7.3	25	9/15/2009	232	840	XXX	XXX	XXX	XXX	XXX
1	44.07	55.21	7.2	25	11/20/2009	200	770	XXX	XXX	XXX	XXX	XXX
1	44.07	55.21	7.2	25	11/20/2009	200	770	XXX	XXX	XXX	XXX	XXX
1	44.85	55.21	6.7	XXX	3/18/2010	XXX	XXX	XXX	XXX	XXX	XXX	XXX
1	45.05	55.21	6.6	XXX	6/7/2010	XXX	XXX	XXX	XXX	XXX	XXX	XXX
1	44.19	55.21	7.2	XXX	9/7/2010	XXX	XXX	XXX	XXX	XXX	XXX	XXX
1	44.74	55.21	6.8	XXX	12/8/2010	XXX	XXX	XXX	XXX	XXX	XXX	XXX

All concentrations in milligrams per liter
 XXX= product present, did not sample

ROC Hobbs N-6

MW	Depth to Water feet	Total Depth feet	Well Volume gallons	Volume Purged gallons	Sample Date	CI	TDS	Benzene	Toluene	Ethyl Benzene	Total Xylenes	Sulfate
2	40.2	52.18	7.78	23.36	8/14/2002	XXX	XXX	XXX	XXX	XXX	XXX	XXX
2	40.34	52.11	7.65	22.75	12/6/2002	XXX	XXX	XXX	XXX	XXX	XXX	XXX
2	40.61	52.2	7.53	22.6	3/14/2003	53	XXX	0.003	0.001	0.006	0.004	109
2	40.29	52.13	7.69	23.08	6/27/2003	41	499	<0.001	<0.001	<0.001	<0.001	112
2	40.26	52.14	7.75	23.27	9/22/2003	32	504	<0.001	<0.001	<0.001	<0.001	88.8
2	40.39	52.13	7.66	22.99	12/18/2003	44	458	<0.002	<0.002	<0.002	<0.006	37.7
2	41.53	52.13	6.92	20.76	3/15/2004	39	484	0.00458	<0.001	0.00236	0.00193	108
2	40.3	52.12	7.71	23.15	5/27/2004	32	481	0.000448	<0.001	0.000482	<0.001	89.4
2	41.69	52.24	6.86	20.57	9/8/2004	71	577	0.0289	0.00219	0.0126	0.00837	91.4
2	39.4	52.24	8.35	25.04	11/22/2004	58	XXX	0.0238	0.00269	0.0239	0.01051	90.2
2	38.73	52.24	XXX	32	3/29/2005	39	444	0.00169	<0.001	0.00151	0.00101	93.6
2	39.12	55	XXX	31.4	6/28/2005	42	515	<0.001	<0.001	<0.001	<0.001	100
2	39.21	55	XXX	31	9/6/2005	50	517	<0.001	<0.001	<0.001	<0.001	69.5
2	39.3	52.24	8.4	30	12/6/2005	58	380	0.00325	<0.001	<0.001	<0.001	107
2	39.56	52.24	8.2	25	2/28/2006	30	538	<0.001	<0.001	<0.001	<0.001	56.3
2	39.97	52.24	8	25	6/5/2006	39	552	<0.001	<0.001	<0.001	<0.001	76.6
2	39.44	52.24	8.3	25	9/11/2006	31	428	<0.001	<0.001	<0.001	<0.001	92
2	39.47	52.24	8.3	30	11/14/2006	34	442	j[0.000709]	<0.001	j[0.00609]	<0.001	91.7
2	39.89	52.24	8	30	3/13/2007	35	422	0.00134	<0.001	<0.001	<0.001	81.5
2	40.26	52.24	7.8	30	6/12/2007	33	444	j (0.000649)	0.0016	j (0.000792)	ND	77.6
2	40.22	52.24	7.8	25	9/18/2007	36	512	0.056	0.012	0.054	0.037	100
2	40.35	52.24	7.7	25	12/6/2007	40	454	<0.001	<0.001	<0.001	<0.003	92.7
2	40.71	52.24	7.5	25	3/3/2008	36	442	<0.001	<0.001	<0.001	<0.003	98.4
2	40.29	52.24	7.8	25	5/28/2008	32	523	<0.001	<0.001	<0.001	<0.003	83.2
2	40.56	52.24	7.6	25	9/8/2008	52	455	<0.001	<0.001	<0.001	<0.003	131
2	41.43	52.24	7	25	12/15/2008	40	493	0.001	<0.001	0.002	<0.003	98
2	41.61	52.55	7.1	25	3/16/2009	40	492	0.005	<0.001	0.004	<0.003	91.9
2	41.78	52.55	7	25	6/9/2009	36	516	0.003	0.001	<0.001	<0.003	81.5
2	41.87	52.55	6.9	25	9/14/2009	40	500	0.001	0.004	0.007	0.023	85
2	41.96	52.55	6.9	25	11/19/2009	40	425	<0.001	<0.001	<0.001	<0.003	75.8
2	42.08	52.55	6.8	25	3/17/2010	48	669	<0.001	<0.001	<0.001	<0.003	157
2	42.32	52.55	6.6	25	6/7/2010	40	494	<0.001	<0.001	<0.001	<0.003	80.7
2	41.15	52.55	7.4	25	9/7/2010	40	479	<0.001	<0.001	<0.001	<0.003	86
2	41.36	52.55	7.3	25	12/9/2010	56	482	<0.001	<0.001	<0.001	<0.003	87.5

ROC Hobbs N-6

MW	Depth to Water feet	Total Depth feet	Well Volume gallons	Volume Purged gallons	Sample Date	CI	TDS	Benzene	Toluene	Ethyl Benzene	Total Xylenes	Sulfate
3	40.57	156.05	7.65	225.18	8/14/2002	XXX	XXX	XXX	XXX	XXX	XXX	XXX
3	40.76	156.02	74.92	224.76	12/6/2002	XXX	XXX	XXX	XXX	XXX	XXX	XXX
3	10.95	156.02	74.79	224.38	3/14/2003	5850	XXX	0.06	0.001	0.001	0.003	888
3	40.69	156.04	74.97	224.93	6/27/2003	5320	10700	0.013	<0.001	<0.001	0.001	1120
3	40.68	156.06	75.34	226.02	9/22/2003	5320	10900	0.008	<0.001	<0.001	0.001	1050
3	40.82	156.03	75.23	225.69	12/18/2003	5398	10512	0.018	<0.002	<0.002	<0.006	399
3	41.82	156.03	74.57	223.73	3/15/2004	5140	8990	0.0354	<0.001	0.000821	0.00165	793
3	40.83	156.05	75.23	225.71	5/27/2004	5230	8060	0.0131	0.000238	0.000248	0.00098	664
3	41.93	156.15	74.27	222.73	9/8/2004	5140	8600	0.0152	<0.001	0.00184	0.00357	762
3	39.64	156.15	75.73	227.19	11/23/2004	3890	XXX	0.0281	0.000202	0.000775	0.00449	683
3	38.73	156.15	XXX	235	3/29/2005	7300	14700	0.0805	<0.001	0.00291	0.00422	1030
3	39.35	156.15	XXX	39.35	6/28/2005	7280	8930	0.00619	<0.001	<0.001	<0.001	2760
3	39.43	155.78	XXX	40	9/6/2005	4660	7070	0.00566	<0.001	0.00219	0.00455	874
3	39.52	156.15	75.8	230	12/6/2005	7130	12100	0.0529	0.000572	0.00312	<0.001	848
3	39.82	156.15	75.6	230	2/28/2006	7270	15300	0.0315	0.00264	0.00535	<0.001	829
3	40.19	156.15	75.4	230	6/5/2006	7660	13600	0.0171	j[0.000488]	0.00258	<0.001	914
3	39.8	156.15	75.6	225	9/12/2006	7390	13100	0.0107	j[0.000587]	<0.001	<0.001	939
3	39.67	156.15	75.7	230	11/14/2006	6810	12600	0.00697	j[0.000417]	j[0.000413]	<0.001	901
3	42.15	156.68	9.4	30	3/14/2007	7810	13500	0.00177	j[0.000597]	j[0.000405]	<0.001	916
3	40.48	156.15	75.2	230	6/11/2007	9390	16100	0.0139	0.00168	0.00485	0.01006	1100
3	40.43	156.15	75.2	230	9/18/2007	7298	14814	0.028	0.001	<0.001	0.009	1010
3	40.5	156.15	75.2	320	12/5/2007	2700	5870	0.052	0.001	0.001	0.003	680
3	40.76	156.15	75	250	3/4/2008	7600	14100	0.014	<0.001	<0.001	<0.003	1110
3	40.97	156.15	75	250	5/29/2008	4100	8170	0.007	0.004	0.003	<0.003	592
3	41.26	156.15	75	250	9/5/2008	7600	15200	0.011	<0.001	<0.001	<0.003	978
3	41.42	156.15	75	250	12/15/2008	4250	8710	0.006	<0.001	<0.001	<0.003	600
3	41.6	156.15	74	250	3/16/2009	3750	7570	0.004	<0.001	<0.001	<0.003	527
3	41.79	156.15	74	250	6/9/2009	3750	7600	0.001	<0.001	<0.001	<0.003	522
3	41.91	156.15	74	250	9/15/2009	3700	7480	0.002	<0.001	<0.001	<0.003	492
3	42.05	156.15	74	250	11/20/2009	3250	6560	<0.001	<0.001	<0.001	<0.003	434
3	42.17	156.15	74	250	3/18/2010	7700	14100	0.006	<0.001	<0.001	<0.003	1030
3	42.26	156.15	74	250	6/7/2010	7600	13700	0.002	<0.001	<0.001	<0.003	894
3	41.09	156.15	75	250	9/8/2010	2700	5100	0.002	<0.001	<0.001	<0.003	293
3	41.25	156.15	75	250	12/8/2010	4150	6650	0.001	<0.001	0.001	<0.003	470

ROC Hobbs N-6 Leak

MW	Depth to Water feet	Total Depth feet	Well Volume gallons	Volume Purged gallons	Sample Date	Cl	TDS	Benzene	Toluene	Ethyl Benzene	Total Xylenes	Sulfate
3R	41.10	55.9	2.4	10	12/8/2010	184	744	<0.001	<0.001	<0.001	<0.003	80.9

All concentrations in milligrams per liter

ROC Hobbs N-6 Leak

MW	Depth to Water feet	Total Depth feet	Well Volume gallons	Volume Purged gallons	Sample Date	CI	TDS	Benzene	Toluene	Ethyl Benzene	Total Xylenes	Sulfate
4	42.42	56.65	9.24	27.74	8/14/2002	XXX	XXX	XXX	XXX	XXX	XXX	XXX
4	42.6	56.66	9.14	27.42	12/6/2002	XXX	XXX	XXX	XXX	XXX	XXX	XXX
4	42.84	56.63	8.96	26.89	3/14/2003	84.2	XXX	<0.001	<0.001	<0.001	<0.001	123
4	42.58	56.65	9.14	27.43	6/27/2003	62	520	<0.001	<0.001	<0.001	0.002	138
4	42.66	56.7	9.16	27.5	9/22/2003	65	569	<0.001	<0.001	<0.001	<0.001	123
4	42.69	56.67	9.12	27.38	12/18/2003	64	547	<0.002	<0.002	<0.002	<0.006	44.8
4	43.77	56.67	8.42	25.27	3/15/2004	124	560	0.00103	<0.001	<0.001	<0.001	127
4	42.65	56.65	9.14	27.42	5/27/2004	49.6	484	<0.001	<0.001	<0.001	<0.001	107
4	43.92	56.71	8.31	24.94	9/8/2004	49.6	492	0.00142	<0.001	<0.001	<0.001	114
4	41.26	56.71	10.04	30.13	11/23/2004	55.2	XXX	<0.001	<0.001	<0.001	<0.001	99.2
4	40.85	56.71	XXX	32	3/29/2005	47	424	<0.001	<0.001	<0.001	<0.001	101
4	41.32	61.65	XXX	40	6/28/2005	44.8	519	<0.001	<0.001	<0.001	<0.001	102
4	41.42	61.65	XXX	40	9/6/2005	69.7	523	<0.001	<0.001	<0.001	<0.001	92.5
4	41.58	56.71	9.8	30	12/6/2005	40.4	370	<0.001	<0.001	<0.001	<0.001	82.2
4	41.84	56.71	9.7	30	2/28/2006	39.7	556	<0.001	<0.001	<0.001	<0.001	71.7
4	42.27	56.71	9.4	30	6/5/2006	59.2	476	<0.001	<0.001	<0.001	<0.001	76.2
4	41.66	56.71	9.8	30	9/11/2006	65.7	588	<0.001	<0.001	<0.001	<0.001	87
4	41.63	56.71	9.8	30	11/14/2006	93.4	498	<0.001	<0.001	<0.001	<0.001	90.8
4	42.15	56.68	9.4	30	3/13/2007	95.3	528	<0.001	<0.001	<0.001	<0.001	82.7
4	42.59	56.68	9.2	30	6/11/2007	69.9	516	<0.001	<0.001	<0.001	<0.001	77.6
4	42.53	56.68	9.2	30	9/18/2007	84	604	<0.001	<0.001	<0.001	<0.003	93.2
4	42.65	56.68	9.1	30	12/6/2007	120	588	<0.001	<0.001	<0.001	<0.003	99.7
4	42.98	56.68	8.9	30	3/3/2008	128	609	<0.001	<0.001	<0.001	<0.003	115
4	43.19	56.68	8.8	30	5/28/2008	84	639	<0.001	<0.001	<0.001	<0.003	98.7
4	43.47	56.68	8.6	30	9/8/2008	192	768	<0.001	<0.001	<0.001	<0.003	130
4	43.67	56.68	8.5	30	12/15/2008	152	683	<0.001	<0.001	<0.001	<0.003	90.6
4	43.84	56.72	8.4	30	3/17/2009	152	614	<0.001	<0.001	<0.001	<0.003	89.8
4	44.21	56.72	8.1	30	6/10/2009	128	646	<0.001	<0.001	<0.001	<0.003	71.1
4	44.33	56.72	8.1	30	9/14/2009	136	594	<0.001	<0.001	<0.001	<0.003	72.9
4	44.28	56.72	8.1	30	11/19/2009	132	614	<0.001	<0.001	<0.001	<0.003	68.1
4	44.43	56.71	8	30	3/17/2010	44	637	<0.001	<0.001	<0.001	<0.003	148
4	44.56	56.71	7.9	30	6/8/2010	108	552	<0.001	<0.001	<0.001	<0.003	89
4	43.12	56.71	8.8	30	9/7/2010	120	587	<0.001	<0.001	<0.001	<0.003	71.3
4	43.49	56.71	8.6	30	12/9/2010	100	468	<0.001	<0.001	<0.001	<0.003	95.7

All concentrations in milligrams per liter

ROC Hobbs N-6

MW	Depth to Water feet	Total Depth feet	Well Volume gallons	Volume Purged gallons	Sample Date	CI	TDS	Benzene	Toluene	Ethyl Benzene	Total Xylenes	Sulfate
5	38.66	51.29	8.2	24.62	8/14/2002	XXX	XXX	XXX	XXX	XXX	XXX	XXX
5	38.82	51.18	8.01	24.04	12/6/2002	XXX	XXX	XXX	XXX	XXX	XXX	XXX
5	39.04	51.18	7.89	23.67	3/14/2003	39	XXX	<0.001	<0.001	<0.001	<0.001	105
5	38.81	51.21	8.06	24.18	6/27/2003	35.4	513	<0.001	<0.001	<0.001	0.002	120
5	51.2	38.77	8.11	24.35	9/22/2003	33.7	508	<0.001	<0.001	<0.001	<0.001	88.2
5	38.91	51.19	8.01	24.05	12/18/2003	56	474	<0.002	<0.002	<0.002	<0.006	39.4
5	40	51.19	7.3	21.92	3/15/2004	762	1620	0.0107	<0.001	0.000543	0.000876	216
5	38.9	51.19	8.02	24.07	5/27/2004	33.7	473	<0.001	<0.001	<0.001	<0.001	94
5	40.18	51.31	7.23	21.7	9/8/2004	35.4	517	<0.001	<0.001	<0.001	<0.001	79.4
5	38.12	51.31	8.57	25.72	11/23/2004	57.3	XXX	<0.001	<0.001	<0.001	<0.001	85.4
5	37.3	51.31	XXX	32	3/29/2005	35	449	<0.001	<0.001	<0.001	<0.001	83.1
5	XXX	XXX	XXX	XXX	6/28/2005	38.1	504	<0.001	<0.001	<0.001	<0.001	95.8
5	37.74	51.07	XXX	26.11	9/6/2005	66.8	488	<0.001	<0.001	<0.001	<0.001	103
5	37.8	51.31	8.8	30	12/6/2005	29.6	442	0.00044	<0.001	<0.001	<0.001	67
5	38.11	51.31	8.6	30	2/28/2006	27.9	504	<0.001	<0.001	<0.001	<0.001	62.8
5	38.48	51.31	8.3	30	6/5/2006	37.8	484	<0.001	<0.001	<0.001	<0.001	69
5	38.08	51.31	8.6	30	9/11/2006	39	596	<0.001	<0.001	<0.001	<0.001	81.2
5	37.94	51.31	8.7	30	11/14/2006	30.2	430	<0.001	<0.001	<0.001	<0.001	85
5	38.33	51.30	8.4	30	3/13/2007	36.2	420	<0.001	<0.001	<0.001	<0.001	78
5	38.82	51.30	8.1	30	6/11/2007	35.2	454	<0.001	<0.001	<0.001	<0.001	71.8
5	38.78	51.30	8.1	30	9/18/2007	40	574	<0.001	<0.001	<0.001	<0.003	89.6
5	38.85	51.30	8.1	30	12/6/2007	32	484	<0.001	<0.001	<0.001	<0.003	91.4
5	39.15	51.30	7.9	30	3/4/2008	40	472	<0.001	<0.001	<0.001	<0.003	93.6
5	39.41	51.30	7.7	30	5/28/2008	40	517	<0.001	<0.001	<0.001	<0.003	90
5	39.66	51.30	7.6	30	9/8/2008	60	560	<0.001	<0.001	<0.001	<0.003	157
5	39.86	51.30	7.4	30	12/15/2008	40	538	<0.001	<0.001	<0.001	<0.003	92.8
5	39.98	51.30	7.4	30	3/16/2009	40	508	<0.001	<0.001	<0.001	<0.003	85
5	40.34	51.30	7.1	30	6/10/2009	136	607	<0.001	<0.001	<0.001	<0.003	78.3
5	40.32	51.30	7.1	30	9/14/2009	40	504	<0.001	<0.001	<0.001	<0.003	75.9
5	40.43	51.30	7.1	30	11/19/2009	40	455	<0.001	<0.001	<0.001	<0.003	65
5	40.58	51.29	7	30	3/17/2010	192	825	<0.001	<0.001	<0.001	<0.003	111
5	40.71	51.29	6.9	30	6/8/2010	40	511	<0.001	<0.001	<0.001	<0.003	91
5	39.73	51.29	7.5	30	9/7/2010	40	436	<0.001	<0.001	<0.001	<0.003	70.9
5	39.81	51.29	7.5	30	12/9/2010	36	486	<0.001	<0.001	<0.001	<0.003	95.2

All concentrations in milligrams per liter

ROC Hobbs N-6

MW	Depth to Water feet	Total Depth feet	Well Volume gallons	Volume Purged gallons	Sample Date	Cl	TDS	Benzene	Toluene	Ethyl Benzene	Total Xylenes	Sulfate
6	40.7	52.98	1.96	5.89	8/14/2002	XXX	XXX	XXX	XXX	XXX	XXX	XXX
6	40.87	53.02	1.94	5.83	12/6/2002	XXX	XXX	XXX	XXX	XXX	XXX	XXX
6	41.1	53	1.9	5.71	3/14/2003	42.5	XXX	<0.001	<0.001	<0.001	<0.001	96.6
6	40.81	53.03	1.95	5.86	6/27/2003	35.4	743	<0.001	<0.001	<0.001	<0.001	97.5
6	40.79	52.97	1.98	5.95	9/22/2003	39	484	<0.001	<0.001	<0.001	<0.001	88.4
6	40.93	53	1.96	5.9	12/18/2003	44	452	<0.002	<0.002	<0.002	<0.006	36.8
6	42.02	53	1.78	5.36	3/15/2004	222	692	0.0026	<0.001	<0.001	<0.001	94.2
6	40.91	53.01	1.97	5.91	5/27/2004	31.9	443	<0.001	<0.001	<0.001	<0.001	86.6
6	42.16	53.1	1.75	5.25	9/8/2004	53.2	488	<0.001	<0.001	<0.001	<0.001	85
6	39.62	53.1	2.16	6.47	11/23/2004	76.1	XXX	<0.001	<0.001	<0.001	<0.001	84
6	39.14	53.1	XXX	8	3/29/2005	97.8	473	<0.001	<0.001	<0.001	<0.001	81.1
6	39.6	54.49	XXX	7.6	6/28/2005	122	541	<0.001	<0.001	0.00081	0.00285	103
6	39.61	61.65	XXX	10.78	9/6/2005	40.4	442	<0.001	<0.001	<0.001	<0.001	23.4
6	39.75	53.1	2.1	7	12/6/2005	52.7	458	<0.001	<0.001	<0.001	<0.001	58.2
6	40.06	53.1	2.1	7	2/28/2006	59.2	552	<0.001	<0.001	<0.001	<0.001	67.6
6	40.53	53.1	2	10	6/5/2006	67.2	512	<0.001	<0.001	<0.001	<0.001	72.2
6	40.05	53.1	2.1	10	9/11/2006	67.6	552	<0.001	<0.001	<0.001	<0.001	101
6	39.88	53.1	2.1	8	11/14/2006	53.9	464	<0.001	<0.001	<0.001	<0.001	95.4
6	40.34	53.1	2	8	3/13/2007	57.7	466	<0.001	<0.001	<0.001	<0.001	90.3
6	40.78	53.1	2	8	6/11/2007	61.8	528	<0.001	<0.001	<0.001	<0.001	85.4
6	40.64	53.1	2	8	9/18/2007	72	566	<0.001	<0.001	<0.001	<0.002	105
6	40.85	53.10	2	8	12/6/2007	76	525	<0.001	<0.001	<0.001	<0.003	111
6	41.22	53.10	1.9	8	3/3/2008	76	536	<0.001	<0.001	<0.001	<0.003	110
6	41.47	53.10	1.9	8	5/28/2008	72	559	<0.001	<0.001	<0.001	<0.003	87.3
6	41.73	53.10	1.8	8	9/8/2008	124	668	<0.001	<0.001	<0.001	<0.003	128
6	41.91	53.10	1.8	8	12/15/2008	84	568	<0.001	<0.001	<0.001	<0.003	105
6	42.06	53.10	1.8	8	3/16/2009	76	550	<0.001	<0.001	<0.001	<0.003	98
6	42.26	53.10	1.7	8	6/9/2009	84	566	<0.001	<0.001	<0.001	<0.003	94.1
6	42.36	53.10	1.7	8	9/14/2009	72	546	<0.001	<0.001	<0.001	<0.003	81.5
6	42.49	53.10	1.7	8	11/19/2009	76	535	<0.001	<0.001	<0.001	<0.003	178
6	42.65	53.10	1.7	8	3/17/2010	48	693	<0.001	<0.001	<0.001	<0.003	160
6	42.93	55.21	2.0	XXX	6/8/2010	XXX	XXX	XXX	XXX	XXX	XXX	XXX
6	41.56	55.21	2.2	XXX	9/7/2010	XXX	XXX	XXX	XXX	XXX	XXX	XXX
6	41.82	53.10	1.8	6	12/9/2010	100	549	<0.001	<0.001	<0.001	<0.003	95.2

All concentrations in milligrams per liter
 XXX= no sample taken, product present

ROC Hobbs N-6

MW	Depth to Water feet	Total Depth feet	Well Volume gallons	Volume Purged gallons	Sample Date	CI	TDS	Benzene	Toluene	Ethyl Benzene	Total Xylenes	Sulfate
7	40.74	47.2	1.03	3.1	8/14/2002	XXX	XXX	XXX	XXX	XXX	XXX	XXX
7	40.94	47.17	0.99	2.98	12/6/2002	XXX	XXX	XXX	XXX	XXX	XXX	XXX
7	41.22	47.18	0.95	2.86	3/14/2003	266	XXX	0.001	<0.001	<0.001	<0.001	XXX
7	40.88	47.15	1	3	6/27/2003	222	802	<0.001	<0.001	<0.001	<0.001	122
7	40.86	47.11	1.01	3.05	9/22/2003	222	861	<0.001	<0.001	<0.001	<0.001	133
7	41.03	47.18	1	3	12/18/2003	208	827	<0.002	<0.002	<0.002	<0.006	110
7	42.17	47.18	0.81	2.44	3/15/2004	1080	2220	0.0131	<0.001	<0.001	<0.001	44.4
7	41	47.15	1	3	5/27/2004	213	986	<0.001	<0.001	<0.001	<0.001	220
7	42.34	47.25	0.79	2.36	9/8/2004	230	731	<0.001	<0.001	<0.001	<0.001	105
7	39.82	47.25	1.19	178.98	11/23/2004	188	XXX	<0.001	<0.001	<0.001	<0.001	111
7	39.33	47.25	XXX	4	3/29/2005	234	791	<0.001	<0.001	<0.001	<0.001	96.1
7	39.6	47	XXX	3.7	6/28/2005	216	783	<0.001	<0.001	0.00114	0.0038	96.9
7	39.86	47	XXX	3.5	9/6/2005	187	802	<0.001	<0.001	<0.001	<0.001	76.9
7	39.93	47.25	1.2	4	12/6/2005	201	670	<0.001	<0.001	<0.001	<0.001	85.2
7	40.27	47.25	1.1	4	2/28/2006	202	876	<0.001	<0.001	<0.001	<0.001	72.4
7	40.63	47.25	1.1	10	6/5/2006	225	794	<0.001	<0.001	<0.001	<0.001	74
7	40.17	47.25	1.1	10	9/11/2006	202	710	<0.001	<0.001	<0.001	<0.001	77.9
7	40.01	47.25	1.2	7	11/14/2006	223	764	<0.001	<0.001	<0.001	<0.001	86.5
7	40.53	47.31	1.1	5	3/13/2007	206	724	<0.001	<0.001	<0.001	<0.001	79.9
7	40.92	47.31	1.0	5	6/11/2007	228	846	<0.001	<0.001	<0.001	<0.001	75.9
7	40.92	47.31	1.0	5	9/18/2007	252	868	<0.001	<0.001	<0.001	<0.003	97.7
7	41.03	47.31	1.0	5	12/6/2007	256	882	<0.001	<0.001	<0.001	<0.003	105
7	41.3	47.31	1.0	5	3/3/2008	260	876	<0.001	<0.001	<0.001	<0.003	111
7	41.56	47.31	0.9	5	5/28/2008	268	962	<0.001	<0.001	<0.001	<0.003	100
7	41.85	47.31	0.9	5	9/8/2008	260	894	<0.001	<0.001	<0.001	<0.003	100
7	41.99	47.31	0.9	5	12/15/2008	260	921	<0.001	<0.001	<0.001	<0.003	96.3
7	42.18	47.35	0.8	5	3/17/2009	256	886	<0.001	<0.001	<0.001	<0.003	87.2
7	42.35	47.35	0.8	5	6/10/2009	260	885	<0.001	<0.001	<0.001	<0.003	81.1
7	42.49	47.35	0.8	5	9/14/2009	260	908	<0.001	<0.001	<0.001	<0.003	73.7
7	42.61	47.35	0.8	5	11/19/2009	252	842	<0.001	<0.001	<0.001	<0.003	70.1
7	42.77	47.35	0.7	5	3/17/2010	268	862	<0.001	<0.001	<0.001	<0.003	100
7	42.84	47.35	0.7	5	6/8/2010	248	788	<0.001	<0.001	<0.001	<0.003	54.8
7	41.42	47.35	0.9	5	9/7/2010	272	886	<0.001	<0.001	<0.001	<0.003	77.4
7	41.76	47.35	0.9	5	12/9/2010	272	899	<0.001	<0.001	<0.001	<0.003	169

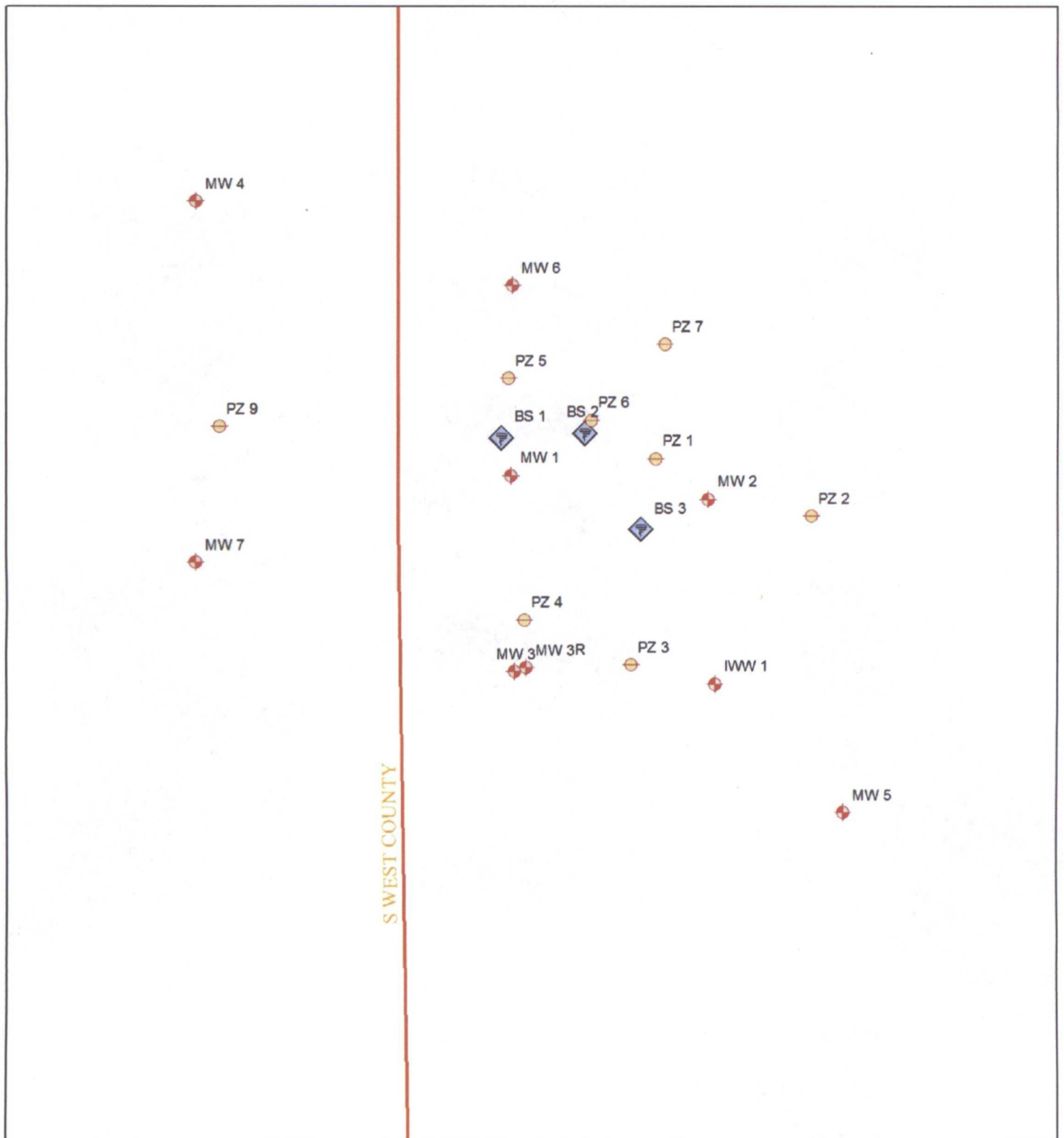
All concentrations in milligrams per liter

ROC Hobbs N-6

MW	Depth to Water feet	Total Depth feet	Well Volume gallons	Volume Purged gallons	Sample Date	CI	TDS	Benzene	Toluene	Ethyl Benzene	Total Xylenes	Sulfate
IWW	40.42	98.25	58.98	176.95	8/14/2002	XXX	XXX	XXX	XXX	XXX	XXX	XXX
IWW	40.79	98.18	37.3	111.91	3/14/2003	239	XXX	0.004	<0.001	<0.001	<0.001	110
IWW	40.45	98.24	37.56	112.69	6/27/2003	40.7	465	<0.001	<0.001	<0.001	<0.001	102
IWW	40.43	98.2	37.78	113.34	9/22/2003	42.5	493	<0.001	<0.001	<0.001	<0.001	79.6
IWW	40.33	98.23	37.8	113.42	12/18/2003	52	485	<0.002	<0.002	<0.002	<0.006	38.6
IWW	41.75	98.23	82.96	248.9	3/15/2004	48.7	1130	0.00619	<0.001	<0.001	<0.001	130
IWW	40.12	98.22	37.93	113.81	5/27/2004	40.8	474	<0.001	<0.001	<0.001	<0.001	100
IWW	41.93	98.2	57.4	172.19	9/8/2004	78	583	<0.001	<0.001	<0.001	<0.001	89.6
IWW	39.71	98.2	59.66	178.98	11/23/2004	88.3	XXX	<0.001	<0.001	<0.001	<0.001	82.5
IWW	39.01	98.2	XXX	250	3/29/2005	419	1010	<0.001	<0.001	<0.001	<0.001	81
IWW	39.39	50	XXX	21	6/28/2005	85.3	510	<0.001	<0.001	<0.001	<0.001	73.5
IWW	39.6	98.2	59.8	185	12/6/2005	49	498	<0.001	<0.001	<0.001	<0.001	64.2
IWW	39.83	98.2	59.5	180	2/28/2006	41.9	532	<0.001	<0.001	<0.001	<0.001	60.3
IWW	40.2	98.2	59.2	180	6/5/2006	44.5	494	<0.001	<0.001	<0.001	<0.001	61.1
IWW	39.76	98.2	59.6	180	9/12/2006	38.8	528	<0.001	<0.001	<0.001	<0.001	80.7
IWW	39.61	98.20	59.8	180	11/14/2006	43.7	434	<0.001	<0.001	<0.001	<0.001	78.1
IWW	40.13	97.90	58.9	180	3/14/2007	35.2	538	<0.001	<0.001	<0.001	<0.001	66.7
IWW	40.5	97.90	58.5	180	6/11/2007	40.1	490	<0.001	<0.001	<0.011	<0.001	74.7
IWW	40.49	97.90	58.6	180	9/18/2007	48	606	0.006	<0.001	<0.001	<0.003	91.9
IWW	40.58	97.90	58.5	200	12/5/2007	44	505	<0.001	<0.001	<0.001	<0.003	87.5
IWW	40.93	97.90	58.1	200	3/4/2008	40	526	<0.001	<0.001	<0.001	<0.003	90.1
IWW	41.16	97.90	57.9	200	5/29/2008	44	556	<0.001	<0.001	<0.001	<0.003	82.6
IWW	41.38	97.90	57.7	200	9/5/2008	44	534	<0.001	<0.001	<0.001	<0.003	85
IWW	41.61	97.90	57.4	200	12/16/2008	48	574	<0.001	<0.001	<0.001	<0.003	74
IWW	41.76	97.90	57.3	200	3/16/2009	40	480	<0.001	<0.001	<0.001	<0.003	82.8
IWW	41.96	97.90	55.94	200	6/9/2009	40	505	<0.001	<0.001	<0.001	<0.003	73.2
IWW	42.06	97.90	57	200	9/15/2009	88	554	<0.001	<0.001	<0.001	<0.003	75.8
IWW	42.21	97.90	56.8	200	11/20/2009	44	447	<0.001	<0.001	<0.001	<0.003	68.5
IWW	42.36	97.90	56.7	200	3/18/2010	108	577	<0.001	<0.001	<0.001	<0.003	95.1
IWW	42.49	97.90	56.5	200	6/7/2010	48	510	<0.001	<0.001	<0.001	<0.003	93.1
IWW	41.39	97.90	57.6	200	9/8/2010	40	499	<0.001	<0.001	<0.001	<0.003	73.3
IWW	41.52	97.90	57.5	200	12/8/2010	68	481	<0.001	<0.001	<0.001	<0.003	81.9

All concentrations in milligrams per liter

Monitor well 3R installation



Hobbs N-6 leak

Legals: UL/N sec. 6
T19S R38E

Case #: 1R-487



0 37.5 75 150
Feet

Drawing date: 11-1-10
Drafted by: L. Weinheimer

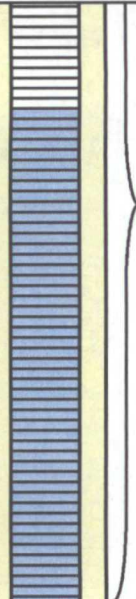
Logger:	Jordan Woodfin			
Driller:	Harrison & Cooper, Inc.			
Drilling Method:	Air rotary		Project Name:	Well ID:
Start Date:	11/15/2010		Hobbs N-6 leak	MW-3R
End Date:	11/15/2010	Project Consultant: Arcadis		
Comments: Located 6 ft east of MW-3.		Location: UL/N sec. 6 T19S R38E		
DRAFTED BY: L. Weinheimer		Lat: 32°41'26.845"N		
TD = 56 ft		Long: 103°10'44.883"W		
		County: LEA		
		State: NM		

Depth (feet)	chloride field tests	LAB	PID	Description	Lithology	Well Construction
1 ft						
5 ft						
10 ft						
15 ft						
20 ft						
25 ft						
30 ft						
35 ft						

NO SAMPLES TAKEN

2 in PVC

bentonite seal

Depth (feet)	chloride field tests	LAB	PID	Description		Lithology		Well Construction		
40 ft									sand pack	
45 ft										
50 ft										
55 ft										
56 ft										

Client:	Rice Operating		Well Description:	Schematic Drawing of Well Construction for Monitoring Well
Project Name:				
Location:	Hobbs N-6 Leak			

Depth (feet)	Comments:		Material Descriptions:
0.0	Borehole Diameter - 5"		Cement, 0'-2', 7 bags
2.0			
	Surface Completion - 4"x4" Steel Upright w/ 2'x2' Concrete Pad		
34.0			
36.0			
56.0			
56.0			

Harrison & Cooper, Inc. P.O. Box 96 Wolfforth, Texas 79382	MW-3R	15-Nov-10
	Monitoring Well	

Hobbs N-6 leak
MW-3R installation



Drilling the monitor well



Inserting the casing



Adding the sand pack



Adding the bentonite seal



Concreting the flush mount



Relationship between MW-3R and
MW-3



Completed MW-3R