

GW - 44

MONITORING REPORTS

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September 15, 2004

Mr. Stephen Weathers
Duke Energy Field Services, LP
370 Seventeenth Street, Suite 2500
Denver, Colorado 80202

Subject: 2003-2004 Annual Summary for the Hobbs Booster Station,
Hobbs, New Mexico, Discharge Plan GW-044
(Units C and D Section 4, Township 19 South, Range 38 East)

Dear Steve:

This letter summarizes the groundwater monitoring activities completed between July 2003 and June 2004 at the Hobbs Booster Station Facility in Hobbs New Mexico. In a September 5, 2002 letter, Duke Energy Field Services, LP (DEFS) voluntarily committed to providing basic information in three quarterly groundwater monitoring reports. An annual report that includes supplemental summary tables, conclusions and interpretations, and recommended program modifications, as necessary, is to be provided after the June monitoring episode. This annual report includes the 2003-2004 reporting period.

The remainder of this letter includes background information, a summary of data collected to date, conclusions, and recommended changes to the monitoring program.

BACKGROUND INFORMATION

Forty-Four wells have been installed at the site. Well elevation and construction data is summarized in Table 1. John West Surveying of Hobbs, New Mexico (West) established the elevations and locations of both types of wells through surveying. This information was used to accurately locate the wells on the figures contained in this document and to calculate the water-table elevations.

The monitoring wells are used for two purposes. Wells MW-1 through MW-22 (including MW-19D) are included in the groundwater-monitoring program (Figure 1). Wells MW-15, MW-16, MW-17, MW-19, MW-19d, MW-20, MW-21 and MW-22 are boundary wells, and they are sampled on a quarterly basis. The remaining wells that do not contain free phase hydrocarbons (FPH) are sampled annually in June.

Wells TW-A through TW-W (Figure 2) are FPH characterization wells that were installed to better delineate the thickness and extent of the FPH in conjunction with the monitoring wells described in the previous paragraph. The depths to water and FPH (if present) are measured in both the monitor wells and the FPH characterization wells on a quarterly basis. Wells TW-T, TW-U, TW-V and TW-W were installed in April 2004. All four new wells were installed using the historical field protocols.

DEFS contractors installed a groundwater sparging system approved by the New Mexico Oil Conservation Division (OCD) along the southern site boundary in January 2004. The locations of the sparge points are shown in Figure 2. The system began operating the week of January 20, 2004, and it has operated in a near-continuous fashion since then.

GROUNDWATER MONITORING ACTIVITIES SUMMARY

Groundwater monitoring activities were completed at the site on September 17, 2003, December 30, 2003, March 19, 2004, and June 9, 2004. All field activities were coordinated by Trident Environmental of Midland Texas. Additional sampling activities were completed on January 14, 2004 and January 27, 2004 to evaluate anomalous results in wells MW-19D and MW-22 as described below.

The groundwater samples were collected in the following manner:

1. The depths to FPH (where present) and water were measured in each well.
2. Casing volumes were then calculated for the wells scheduled for sampling based upon the gauging data, casing diameters and the well depths included in Table 1.
3. Representative samples were then collected by purging each well with a disposable bailer for a minimum of three casing volumes. Samples were then collected after the stabilization of the field parameters temperature, pH and conductivity. A sample could not be collected from MW-7 in June 2004 because of a kink, separation, or obstruction in the well casing.
4. Each sample was placed in an ice-filled cooler immediately upon collection. The samples were delivered by Trident directly to Environmental Labs of Texas in Midland Texas for analysis for benzene, toluene, ethylbenzene and total xylenes (BTEX). Sample integrity was maintained using standard chain-of-custody procedures.

The sample results were evaluated upon receipt to identify quality assurance/quality control (QA/QC) issues. Resampling was completed as necessary until all QA/QC issues were resolved. The QA/QC issues are discussed in the conclusion section.

DATA SUMMARY

The corrected groundwater elevations for all four 2003-2004 monitoring episodes are shown on Table 2 for the monitor wells and Table 3 for the FPH characterization wells along with the historical data. The water-table elevations for the wells containing FPH were estimated using the following formula:

$$GWE_{\text{corr}} = MGWE + (PT * PD); \text{ where}$$

- GWE_{corr} is the corrected groundwater elevation
- MGWE is the actual measured groundwater elevation;
- PT is the measured free-phase hydrocarbon thickness; and
- PD is the free phase hydrocarbon density
(assumed 0.74 or 0.817 depending upon the well location).

This correction provides an accurate estimate of the water table elevation if FPH are not present in the well.

Figure 3 includes hydrographs for the six wells with the longest periods of record. Examination of Figure 3 indicates that the wells all behave in a hydraulically-similar fashion. This similarity indicates that a continuous, equilibrated system is present in the uppermost-saturated materials. Figure 3 also shows that heavy rains between March 2004 and June 2004 temporarily reversed the trend in the historic water-table decline.

All of the FPH thickness measurements are summarized in Table 4. Figure 4 and Figure 5 graph the changes of FPH over time in select wells with the wells in Figure 4 exhibiting lower FPH thicknesses than those shown in Figure 5. Some of the wells in both figures showed continuing increases in FPH thickness over the 2003-2004 reporting period while the thickness in other wells remained essentially constant. Many of the thickness values decreased between March 2004 and June 2004 as the rebounding water table resaturated the overlying materials. The FPH thickness will be measured at least one more time before the installation of the recovery system prohibits easy access to many of the site wells.

Contour maps of the corrected water-table elevations were generated for each sampling event. The maps were contoured using the program Surfer with a kriging option. The maps include September 2003 (Figure 6), December 2003 (Figure 7), March 2004 (Figure 8) and June 2004 (Figure 9). The groundwater flow direction measured during all four episodes continues to be almost due east. This direction has remained essentially unchanged over the duration of the project.

The 2003-2004 BTEX results are summarized in Table 5 for the annual wells and Table 6 for the quarterly wells. The values that exceeded the New Mexico Water Quality Control Commission (NMWQCC) groundwater standards are bolded on Tables 5 and 6. The BTEX results for all monitoring episodes are summarized in Table 7 for benzene, Table 8 for toluene, Table 9 ethylbenzene, and Table 10 for total xylenes.

CONCLUSIONS

Evaluation of the data contained in Table 5 through Table 10 results in the following conclusions:

1. None of the samples from the 2003-2004 sampling episodes contained toluene, ethylbenzene or total xylenes at concentrations that were within one order of magnitude of the NMWQCC groundwater standards. There were some detects of these constituents but they were typically at or slightly above the laboratory reporting limit.
2. Benzene was not detected in MW-14 and MW-15 during the September 2003, December 2003 and June 2004 sampling episodes. Benzene was detected in both MW-14 and MW-15 in March 2004 at concentrations above the NMWQCC groundwater standard. The historical concentrations for these wells are plotted on Figure 10. Both MW-14 and MW-15 generally exhibit elevated benzene concentrations in the spring of each year. This trend was repeated in 2004 but the increases in concentration were far lower than was measured in the past. This decrease in amplitude is believed to have resulted from operation of the air sparge system.
3. Benzene was detected in well MW-16 during the December 2003 and June 2004 sampling episodes at concentrations slightly above the reporting limits. The values of 0.0013 mg/l in December 2003 and 0.0036 in June 2004 are below the NMWQCC groundwater standard.
4. Benzene was not detected in the down-gradient boundary wells MW-19, MW-20 and MW-21 during the 2003-2004 reporting period.
5. The December 2003 analytical results included anomalous BTEX concentrations in wells MW-19D and MW-22. These two wells were resampled on January 14, 2004. The results for MW-19D remained elevated so this well was resampled a third time to ensure the validity of the results. The third sample, collected January 27, 2004 did not contain detectable BTEX constituents; however, the reporting limit remained elevated at 0.005 mg/l. The June 2004 concentrations in both these wells were below 0.001 mg/l laboratory reporting limit.

6. The March 2004 sample from MW-22 also contained benzene at a concentration above the NMWQCC groundwater standard. Benzene was not detected at the 0.001 mg/l reporting limit during the June 2004 sampling.
7. The dissolved phase plume did not expand during the reporting period. This conclusion is primarily based upon well MW-18. MW-18 is approximately 150 directly down gradient from well MW-17, and MW-17 contained between 0.22 and 0.34 feet of FPH during the 2003-2004 reporting period. The BTEX concentrations measured in MW-18 remained within their historic range (Tables 7, 8, 9 and 10). This constituent stability indicates that dispersion and insitu bioremediation and continues to effectively reduce the BTEX constituent levels between these two wells.
8. The monitoring results also indicate that the dissolved phase BTEX constituents did not migrate off site down-gradient to the east during the 2003-2004 reporting period. Resampling in January 2004 resolved the December 2003 detections in MW-19D and MW-22. Benzene was also detected in MW-22 in March 2004, but it was not detected in June 2004. The FPH and benzene distribution as of June 2004 is shown in Figure 11.

RECOMMENDED PROGRAM MODIFICATIONS

There are no recommended changes to the groundwater monitoring program for the 2004-2005 sampling period. The following wells cannot be easily accessed after installation of the FPH removal pumps so they may not be available for fluid-level measurements during subsequent monitoring episodes:

- Groundwater monitoring wells MW-4, MW-8, MW-11 and MW-13
- FPH characterization wells TW-A, TW-B, TW-C, TW-D, TW-G, TW-I, TW-J, TW-L, TW-M, TW-O, TW-P, TW-R, TW-S

Eleven new FPH collection wells are also being installed but they will also not be available for routine FPH thickness measurements because of access issues.

Thank you for allowing us to complete this project. Do not hesitate to contact me if you have any questions or comments on this report or any other aspects of the projects.

Sincerely,
REMEDIACON INCORPORATED

Michael H. Stewart

Michael H. Stewart, PE
Principal Engineer

attachment

TABLES

Table 1 – Summary of Hobbs Booster Station Well Construction Information

Well	Top of Casing Elevation	Total Well Depth	Screen Interval	Gravel Interval	Well	Top of Casing Elevation	Total Well Depth	Screen Interval	Gravel Interval
MW-1	3,626.06	57	37-57	34-57	MW-22	3,625.16	60	45-60	43-60
MW-2	3,623.14	53	33-53	30-53	TW-A	3,626.74	57	42-57	40-57
MW-3	3,623.01	53	33-53	30-53	TW-B	3,626.96	57	44-59	42-59
MW-4	3,624.29	57	37-57	34-57	TW-C	3,626.85	60	45-60	43-60
MW-5	3,629.16	57	37-57	34-57	TW-D	3,628.12	50	35-50	33-50
MW-6	3,626.93	53	33-53	30-53	TW-G	3,623.62	54	39-54	34-54
MW-7	3,621.40	56	33-53	31-56	TW-H	3,622.30	51	36-51	34-51
MW-8	3,623.62	58	36-56	34-58	TW-I	3,629.44	60	45-60	43-60
MW-9	3,625.21	63	43-63	40-63	TW-J	3,628.99	60	45-60	43-60
MW-10	3,621.07	58	36-56	34-58	TW-K	3,628.95	60	45-60	43-60
MW-11	3,625.88	63	43-63	41-63	TW-L	3,628.75	60	45-60	43-60
MW-12	3,626.60	65	40-60	38-65	TW-M	3,629.62	60	45-60	43-60
MW-13	3,626.30	69	44-64	38-64	TW-N	3,631.98	60	45-60	43-60
MW-14	3,621.42	66	42-62	34-66	TW-O	3,631.60	60	45-60	42-60
MW-15	3,619.39	59	37-57	31-59	TW-P	3,629.68	60	45-60	42-60
MW-16	3,621.87	58	34-54	30-56	TW-Q	3,627.90	58	53-58	41-58
MW-17	3,623.94	66	41-61	37-63	TW-R	3,627.34	60	45-60	43-45
MW-18	3,624.30	68	44-64	35-65	TW-S	3,628.77	60	45-60	43-45
MW-19	3,624.12	68	43-63	40-65	TW-T	3,628.62	60	45-60	43-45
MW-19D	3,623.79	83	71-76	69-76	TW-U	3,628.67	60	45-60	43-45
MW-20	3,621.49	59	59-44	59-42	TW-V	3,628.54	60	45-60	43-45
MW-21	3,624.25	61	61-46	61-44	TW-W	3,626.88	60	45-60	43-45

Notes: All units in feet

Wells TW-E and TW-F were plugged and abandoned in July 2

A natural sand pack is present in well MW-19D between 72 and 76 feet below ground surface (bgs). Artificially graded sand is present between 69 and 72 feet bgs.

Table 2 – Summary of Corrected Groundwater Elevations for the Groundwater Monitoring Wells

Well	Jul-99	May-00	Aug-00	Oct-00	Feb-01	May-01	Aug-01	Oct-01	Mar-02	Jun-02	Sep-02	Dec-02	Mar-03	Jun-03	Sep-03	Dec-03	Mar-04	Jun-04
MW-1	3,580.50	3,580.13	3,580.19	3,579.96	3,579.89	3,579.64	3,579.65	3,579.62	3,579.00	3,578.72	3,578.55	3,578.72	3,578.46	3,578.23	3,577.87	3,577.47	3,577.17	3,577.38
MW-2	3,582.63	3,582.04	3,582.33	3,581.95	3,581.90	3,581.67	3,581.43	3,581.33	3,580.88	3,580.65	3,580.45	3,580.81	3,580.36	3,580.16	3,579.84	3,579.55	3,580.05	3,579.61
MW-3	3,582.25	3,581.68	3,582.05	3,581.64	3,581.57	3,581.36	3,581.11	3,580.97	3,580.48	3,580.29	3,580.11	3,580.52	3,580.06	3,579.79	3,579.46	3,579.08	3,578.87	3,579.16
MW-4	3,579.95	3,579.27	3,579.12	3,579.00	3,578.96	3,578.82	3,578.60	3,578.39	3,577.96	3,577.77	3,577.62	3,577.87	3,577.63	3,577.24	3,576.85	3,576.46	3,576.16	3,576.52
MW-5	3,581.01	3,580.89	3,580.66	3,580.58	3,580.59	3,580.27	3,580.68	3,580.74	3,579.81	3,579.44	3,579.32	3,579.49	3,579.16	3,579.08	3,578.79	3,578.38	3,578.15	3,578.15
MW-6	3,582.98	3,582.61	3,582.72	3,582.45	3,582.38	3,582.15	3,581.94	3,581.94	3,581.49	3,581.17	3,580.97	3,581.16	3,580.87	3,580.74	3,580.42	3,580.08	3,579.92	3,579.99
MW-7		3,582.90	3,583.22	3,582.83	3,582.75	3,582.52	3,582.24	3,582.18	3,581.70	3,581.49	3,581.28	3,581.66	3,581.52	3,580.98	3,580.70	3,580.34	3,580.24	3,580.42
MW-8		3,579.93	3,580.12	3,579.84	3,579.80	3,579.79	3,579.73	3,579.26	3,578.83	3,578.64	3,578.50	3,578.77	3,578.48	3,578.15	3,577.77	3,577.35	3,577.08	3,577.29
MW-9		3,577.62	3,577.51	3,577.46	3,577.45	3,577.31	3,577.00	3,576.81	3,576.33	3,576.21	3,576.05	3,576.30	3,576.09	3,575.58	3,575.19	3,574.77	3,574.47	3,574.65
MW-10		3,579.43	3,579.64	3,579.28	3,579.26	3,579.08	3,578.75	3,578.51	3,578.03	3,577.99	3,577.84	3,578.15	3,577.86	3,577.34	3,576.93	3,576.48	3,576.14	3,576.43
MW-11		3,577.90	3,578.00	3,577.66	3,577.69	3,577.52	3,577.34	3,577.16	3,576.70	3,576.48	3,576.32	3,576.52	3,576.32	3,575.92	3,575.56	3,575.15	3,574.87	3,575.07
MW-12				3,578.58	3,578.58	3,578.18	3,578.18	3,577.96	3,577.73	3,577.53	3,577.21	3,577.53	3,577.39	3,576.93	3,576.63	3,576.10	3,575.98	3,576.13
MW-13				3,576.41	3,576.32	3,576.29	3,575.86	3,575.81	3,575.40	3,575.23	3,575.07	3,575.25	3,575.04	3,574.62	3,574.26	3,573.70	3,573.56	3,573.77
MW-14				3,577.51	3,577.46	3,577.35	3,576.90	3,576.56	3,576.06	3,576.26	3,576.13	3,576.42	3,576.17	3,575.39	3,574.96	3,574.49	3,574.22	3,574.48
MW-15				3,579.57	3,579.53	3,579.36	3,579.02	3,578.70	3,578.21	3,578.32	3,578.14	3,578.54	3,578.18	3,577.59	3,577.16	3,576.72	3,576.39	3,576.76
MW-16				3,581.50	3,581.42	3,581.21	3,580.96	3,580.79	3,580.28	3,580.14	3,579.96	3,580.43	3,579.93	3,579.62	3,579.29	3,578.90	3,578.69	3,579.04
MW-17				3,575.36	3,575.26	3,575.15	3,574.89	3,574.68	3,574.24	3,574.07	3,573.90	3,574.09	3,573.85	3,573.44	3,573.15	3,572.65	3,572.39	3,572.57
MW-18				3,574.66	3,574.53	3,574.43	3,574.21	3,573.98	3,573.56	3,573.38	3,573.22	3,573.42	3,573.15	3,572.76	3,572.42	3,572.01	3,571.74	3,571.93
MW-19				3,573.97	3,573.88	3,573.79	3,573.55	3,573.32	3,572.90	3,572.74	3,572.58	3,572.78	3,572.49	3,572.12	3,571.78	3,571.37	3,571.12	3,571.31
MW-20										3,572.51	3,572.36	3,572.59	3,572.28	3,571.92	3,571.56	3,571.15	3,570.89	3,571.11
MW-21										3,573.46	3,573.32	3,573.62	3,573.28	3,572.82	3,572.44	3,572.00	3,571.72	3,572.03
MW-22														3,572.08	3,571.78	3,571.39	3,571.14	3,571.29
MW-1d															3,571.55	3,571.13	3,570.88	3,571.01

All units are feet
Blank cells indicate well was not installed.

Table 3 – Summary of Corrected Groundwater Elevations for the FPH Characterization Wells

Well	Jun-02	Sep-02	Dec-02	Mar-03	Jun-03	Sep-03	Dec-03	Mar-04	Jun-04
TW-A	3,578.32	3,578.12	3,578.25	3,578.04	3,577.88	3,577.49	3,577.09	3,576.83	3,576.85
TW-B	3,577.45	3,577.28	3,577.42	3,577.25	3,577.01	3,576.62	3,576.23	3,575.96	3,576.05
TW-C	3,576.49	3,576.37	3,576.50	3,576.35	3,575.85	3,575.38	3,575.24	3,574.80	3,574.86
TW-D	3,575.85	3,576.12	3,576.15	3,576.09	3,575.78	3,575.43	3,575.02	3,574.80	3,575.00
TW-G	3,577.40	3,577.23	3,577.49	3,577.29	3,576.60	3,576.30	3,575.88	3,575.59	3,575.84
TW-H	3,579.15	3,578.99	3,614.41	3,578.96	3,578.67	3,578.27	3,577.88	3,577.59	3,577.82
TW-I	3,577.52	3,577.38	3,577.40	3,577.27	3,577.10	3,576.79	3,576.40	3,576.17	3,576.19
TW-J	3,576.50	3,576.43	3,576.45	3,576.30	3,576.07	3,575.75	3,575.38	3,575.13	3,575.21
TW-K	3,575.45	3,575.51	3,575.57	3,575.28	3,575.12	3,574.79	3,574.40	3,574.15	3,574.23
TW-L	3,574.96	3,575.07	3,575.16	3,574.98	3,574.69	3,574.37	3,574.02	3,573.74	3,573.84
TW-M		3,578.32	3,578.40	3,578.17	3,578.04	3,577.70	3,577.30	3,577.03	3,577.04
TW-N		3,577.22	3,577.13	3,576.99	3,576.88	3,576.56	3,576.18	3,575.91	3,575.90
TW-O		3,576.31	3,576.25	3,576.12	3,575.95	3,575.60	3,575.26	3,574.98	3,574.99
TW-P		3,575.20	3,575.21	3,575.08	3,574.86	3,574.56	3,574.20	3,573.94	3,574.01
TW-Q		3,579.12	3,618.98	3,579.04	3,578.89	3,578.56	3,578.19	3,577.91	3,577.99
TW-R		3,574.17	3,574.36	3,574.22	3,573.96	3,573.63	3,573.22	3,572.95	3,573.07
TW-S		3,573.90	3,618.71	3,573.76	3,573.47	3,573.13	3,572.87	3,572.79	3,572.93
TW-T									3,572.57
TW-U									3,572.28
TW-V									3,572.11
TW-W									3,573.07

Notes: A blank cell denotes that the well had not been installed at the time of the measurement
All units in feet.

Table 4 - Summary of Free Product Thickness Measurements

Well	Jun-02	Aug-02	Sep-02	Dec-02	Mar-03	Jun-03	Sep-03	Dec-03	Mar-04	Apr-04	Jun-04
MW-1	0.02	0.29	0.35	0.55	1.67	2.15	2.36	0.79	2.79	2.81	0.58
MW-2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.08		3.04	1.05
MW-4	2.86	3.38	3.36	3.11	3.39	3.40	3.43	3.46	3.5	3.08	3.16
MW-8	1.88	2.50	2.53	2.47	2.66	2.56	2.53	2.55	2.68	2.49	2.57
MW-9	0.01	0.01	0.52	0.46	0.88	1.21	1.19	1.29	1.38	1.37	0.86
MW-10	0.00	0.00	0.00	0.00	0.00	0.02	0.02	0.04	0.01	0.00	0.00
MW-11	3.09	6.57	7.21	7.45	7.41	7.91	10.38	11.52	12.17	11.36	11.41
MW-12	2.79	2.83	2.81	2.70	3.10	3.33	3.51	3.93	4.32	3.90	4.24
MW-13	7.37	8.59	8.62	8.42	8.88	8.69	8.46	9.02	8.09	8.15	8.27
MW-17	0.01	0.64	0.06	0.11	0.18	0.24	0.02	0.31	0.33	0.22	0.34
TW-A	1.15	2.70	3.41	3.67	3.96	3.93	3.93	3.99	4.09	3.89	3.79
TW-B	5.24	5.28	5.22	5.17	5.48	5.59	5.94	6.34	6.7	6.48	6.66
TW-C	9.84	10.52	10.6	10.58	11.58	2.66	2.43	12.28	0.56	11.96	12.11
TW-D	8.00	8.51	8.45	8.49	8.51	8.11	7.70	7.17	6.91	7.22	6.30
TW-G	2.29		1.84	1.75	2.09	0.49	3.44	3.77	3.67	4.01	3.73
TW-I	3.60	3.75	3.74	3.85	4.21	4.37	4.82	5.48	5.85	5.47	5.81
TW-J	1.28	5.39	6.01	6.16	6.54	6.90	7.74	8.44	8.87	8.19	8.18
TW-K	5.95	8.00	7.91	7.76	7.80	8.25	8.50	8.62	8.76	8.47	8.54
TW-L	5.34	7.91	7.88	7.79	8.05	8.09	8.23	8.30	8.39	8.19	8.24
TW-M	0.00	0.15	0.20	0.01	0.45	0.54	0.63	0.65	0.7	0.60	0.66
TW-N	0.00	0.02	0.00	0.01	0.03	0.01	0.02	0.04	0.05	0.04	0.05
TW-O	0.00	0.06	0.04	0.06	0.08	0.05	0.00	0.40	0.53	0.52	0.59
TW-P	0.00	0.00	1.33	2.53	4.21	4.91	5.42	5.90	6.36	6.46	6.65
TW-R	1.50	0.03	1.65	2.65	4.31	5.74	6.59	6.46	6.36	6.35	5.39
TW-S								1.82	5.15	5.31	5.51

All units in feet

Table 5 - Summary of 2003-2004 Results for Wells Sampled on an Annual Basis

Well	Constituent	6/9/04
MW-3	Benzene	<0.001
MW-3	Toluene	<0.001
MW-3	Ethylbenzene	0.0183
MW-3	Xylenes	0.0118
MW-5	Benzene	<0.001
MW-5	Toluene	<0.001
MW-5	Ethylbenzene	<0.001
MW-5	Xylenes	<0.001
MW-6	Benzene	<0.001
MW-6	Toluene	<0.001
MW-6	Ethylbenzene	<0.001
MW-6	Xylenes	<0.001
MW-10	Benzene	0.676
MW-10	Toluene	<0.1
MW-10	Ethylbenzene	<.1
MW-10	Xylenes	0.153
MW-18	Benzene	0.0108
MW-18	Toluene	0.003
MW-18	Ethylbenzene	0.016
MW-18	Xylenes	0.0222

All units mg/l

Bolded values exceed NMWQCC groundwater standards of 0.010 for benzene, 0.75 for ethylbenzene & toluene and 0.62 for xylenes

Table 6 - Summary of 2003-2004 Results for Wells Sampled on a Quarterly Basis

Well	Constituent	9/17/03	12/30/03	1/14/04	1/27/04	3/19/04	6/9/04
MW-14	Benzene	<0.001	<0.005			0.0212	<0.005/<0.005
MW-14	Toluene	<0.001	<0.005			<0.001	<0.005/<0.005
MW-14	Ethylbenzene	0.0133	0.014			0.0151	0.0074/0.0061
MW-14	Xylenes	0.0013	<0.005			<0.001	<0.005/<0.005
MW-15	Benzene	<0.001/<0.005	<0.001			0.0203	<0.005
MW-15	Toluene	<0.001/<0.005	<0.001			<0.01	<0.005
MW-15	Ethylbenzene	0.0597/0.0456	0.0615			0.0497	<0.005
MW-15	Xylenes	<0.001/<0.005	0.001			<0.01	<0.005
MW-16	Benzene	<0.001	0.0013			<0.005	0.0036
MW-16	Toluene	<0.001	<0.001			<0.005	<0.001
MW-16	Ethylbenzene	<0.001	<0.001			<0.005	<0.001
MW-16	Xylenes	<0.001	<0.001			<0.005	<0.001
MW-19	Benzene	<0.001	<0.001			<0.001	<0.001
MW-19	Toluene	<0.001	<0.001			<0.001	<0.001
MW-19	Ethylbenzene	<0.001	<0.001			<0.001	<0.001
MW-19	Xylenes	<0.001	0.0016			<0.001	<0.001
MW-19D	Benzene	<0.001	0.0338	0.030	<0.005	<0.001	<0.001
MW-19D	Toluene	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001
MW-19D	Ethylbenzene	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001
MW-19D	Xylenes	<0.001	0.0014	0.00100	<0.005	<0.001	<0.001
MW-20	Benzene	<0.001	<0.001			<0.001	<0.001
MW-20	Toluene	<0.001	<0.001			<0.001	<0.001
MW-20	Ethylbenzene	<0.001	<0.001			<0.001	<0.001
MW-20	Xylenes	<0.001	<0.001			<0.001	<0.001
MW-21	Benzene	<0.001	<0.001			<0.001	<0.001
MW-21	Toluene	<0.001	<0.001			<0.001	<0.001
MW-21	Ethylbenzene	<0.001	<0.001			<0.001	<0.001
MW-21	Xylenes	<0.001	<0.001			<0.001	<0.001
MW-22	Benzene	<0.001	0.0249	0.001		0.0165/.0172	<0.001
MW-22	Toluene	<0.001	<0.001	<0.001		<0.001/<0.001	<0.001
MW-22	Ethylbenzene	<0.001	0.001	0.00011		<0.001/<0.001	<0.001
MW-22	Xylenes	<0.001	<0.001	0.00240		0.001/0.001	<0.001

All units mg/l

Bolded values exceed NMOCC groundwater standards of 0.010 for benzene, 0.75 for ethylbenzene & toluene and 0.62 for xylenes

Table 7 – Summary of Benzene Concentrations in Groundwater

Well	7/8/99	5/11/00	8/22/00	10/31/00	2/5/01	5/15/2001	8/9/2001	10/19/2001	3/13/2002	6/3/2002	9/24/2002	12/10/2002	3/19/2003	6/23/2003	9/17/2003	12/30/2003	1/14/2004	1/27/2004	3/19/2004	6/9/2004
MW-1	0.232	0.191	0.181	0.197	0.570			0.144												
MW-2	0.934	1.330	1.420	1.020	2.110	0.848	1.760	1.3	0.712					0.277						
MW-3	0.262	0.202	0.011	<0.005	0.346	<0.001	0.345	0.029	<0.001	0.009				<0.001						<0.001
MW-4																				
MW-5	<0.005	<0.005	<0.005	<0.005	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001				<0.001						<0.001
MW-6	<0.005	<0.005	<0.005	<0.005	<0.005	<0.001	<0.001	<0.001	<0.001	<0.005				<0.001						<0.001
MW-7		<0.005	<0.005	<0.005	<0.005	<0.001	<0.001	<0.001	<0.001	0.0039				<0.001						
MW-8		0.824			0.950	0.294	1.230													
MW-9		0.702																		
MW-10				0.535				1.13						1.030						0.676
MW-11																				
MW-12																				
MW-13																				
MW-14				<0.005	0.041	0.002	0.034	0.029	<0.001	0.068	0.126	0.0685	0.0820	0.0414	<0.001	<0.005			0.0212	<0.005/<0.005
MW-15				<0.005	0.237	0.003	0.353	0.317	<0.001	0.358	<0.005	<0.005	<0.005	0.352	<0.001/<0.005	<0.001			0.0203	<0.005
MW-16				<0.005	0.094	0.01	0.098	0.012	<0.001	<0.005	0.0363	0.0042	<0.001	<0.001	<0.001	0.0013			<0.005	0.0036
MW-17							0.04	0.076												
MW-18				<0.005	<0.005	0.004	0.007	0.036	<0.001					<0.005						0.0108
MW-19				<0.005	<0.005	0.001	<0.005	0.035	<0.001	<0.001	<0.005	<0.001	<0.005	<0.001	<0.001	<0.001			<0.001	<0.001
MW-19D														<0.001	<0.001	0.0338	0.030	<0.005	<0.001	<0.001
MW-20											<0.001	<0.001	<0.005	<0.001	<0.001	<0.001			<0.001	<0.001
MW-21											<0.001	<0.001	<0.001	<0.001	<0.001	<0.001			<0.001	<0.001
MW-22														<0.001	<0.001	0.0249	0.001		0.0165/0.0172	<0.001

Notes: All units mg/l
Blank cells: Sample not collected

Table 8 – Summary of Toluene Concentrations in Groundwater

Well	07/08/99	05/11/00	08/22/00	10/31/00	02/05/01	5/15/2001	8/9/2001	10/19/2001	3/13/2002	6/3/2002	9/24/2002	12/10/2002	3/19/2003	6/23/2003	9/17/2003	12/30/2003	1/14/2004	1/27/2004	3/19/2004	6/9/2004
MW-1	0.029	0.034	0.035	0.028	0.020			<0.020												
MW-2	0.993	1.220	1.380	0.539	1.070	0.488	0.211	0.246	0.317					0.018						
MW-3	0.029	0.022	0.023	0.014	0.009	0.017	<.005	<0.010	<0.001	0.0072				<0.001						<0.001
MW-4																				
MW-5	<.005	<.005	<.005	<.005	<.005	<.001	<.001	<0.001	<0.001	<0.001				<0.001						<0.001
MW-6	<.005	<.005	0.008	<.005	<.005	<.001	<.001	<0.001	<0.001	<0.005				<0.001						<0.001
MW-7		<.005	0.008	<.005	<.005	<.001	<.001	<0.001	<0.001	<0.001				<0.001						
MW-8		<.005			<.005	0.008	<.01													
MW-9		0.016																		
MW-10				0.061				0.85						0.099						<0.10
MW-11																				
MW-12																				
MW-13																				
MW-14				<.005	<.005	<.001	<.005	<0.001	<0.001	<0.005	<0.02	<0.01	<0.01	<0.001	<0.001	<0.005			<0.001	<0.005/<0.005
MW-15				<.005	<.005	0.003	<.005	<0.020	<0.005	<0.005	<0.005	<0.005	<0.005	0.001	<0.001/<0.005	<0.001			<0.01	<0.005
MW-16				<.005	<.005	0.004	<.005	<0.001	<0.001	<0.005	<0.005	<0.005	<0.001	<0.001	<0.001	<0.001			<0.005	<0.001
MW-17							<.001	<0.005												
MW-18				<.005	<.005	0.003	<.001	<0.005	<0.005					<0.005						0.003
MW-19				<.005	<.005	<.001	<.005	<0.005	<0.001	<0.001	<0.005	<0.001	<0.005	<0.001	<0.001	<0.001			<0.001	<0.001
MW-19D														<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001
MW-20											<0.001	<0.001	<0.005	<0.001	<0.001	<0.001			<0.001	<0.001
MW-21											<0.001	<0.001	<0.001	<0.001	<0.001	<0.001			<0.001	<0.001
MW-22														<0.001	<0.001	<0.001	<0.001		<0.001/<0.001	<0.001

Notes: All units mg/l
Blank cells: Sample not collected

Table 9 – Summary of Ethylbenzene Concentrations in Groundwater

Well	7/8/99	5/11/00	8/22/00	10/31/00	2/5/01	5/15/2001	8/9/2001	10/19/2001	3/13/2002	6/3/2002	9/24/2002	12/10/2002	3/19/2003	6/23/2003	9/17/2003	12/30/2003	1/14/2004	1/27/2004	3/19/2004	6/9/2004
MW-1	0.168	0.344	0.273	0.285	0.287			0.236												
MW-2	0.192	0.309	0.298	0.235	0.334	0.396	0.255	0.314	0.220					0.101						
MW-3	0.222	0.245	0.218	0.203	0.259	0.324	0.277	0.207	0.0056	0.081				0.056						0.0183
MW-4																				
MW-5	<.005	<.005	<.005	<.005	<.005	<.001	<.001	<0.001	<0.001	<0.001				<0.001						<0.001
MW-6	<.005	<.005	<.005	<.005	<.005	<.001	<.001	<0.001	<0.001	<0.005				<0.001						<0.001
MW-7		<.005	<.005	<.005	<.005	<.001	<.001	<0.001	<0.001	<0.001				<0.001						
MW-8		0.375			0.173	0.226	0.201													
MW-9		0.096																		
MW-10				0.128				0.889						0.198						<0.10
MW-11																				
MW-12																				
MW-13																				
MW-14				0.007	<.005	0.004	<.005	0.018	0.0022	<0.005	<0.02	<0.01	0.020	0.0150	0.0133	0.014			0.0151	0.0074/0.0061
MW-15				<.005	<.005	0.004	<.005	<0.020	0.0376	<0.005	<0.005	<0.005	<0.005	0.005	0.0597/0.0456	0.0615			0.0497	<0.005
MW-16				<.005	<.005	0.003	<.005	0.007	<0.001	<0.005	<0.005	<0.005	<0.001	<0.001	<0.001	<0.001			<0.005	<0.001
MW-17							0.057	0.101												
MW-18				0.017	<.005	0.020	<.001	0.089	<0.005					0.006						0.016
MW-19				<.005	<.005	<.001	<.005	<0.005	<0.001	<0.001	<0.005	<0.001	<0.005	<0.001	<0.001	<0.001			<0.001	<0.001
MW-19D														<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001
MW-20											<0.001	<0.001	<0.005	<0.001	<0.001	<0.001			<0.001	<0.001
MW-21											<0.001	<0.001	<0.001	<0.001	<0.001	<0.001			<0.001	<0.001
MW-22														<0.001	<0.001	0.001	0.00011		<0.001/<0.001	<0.001

Notes: All units mg/l
Blank cells: Sample not collected

Table 10 – Summary of Total Xylenes Concentrations in Groundwater

Well	7/8/99	5/11/00	8/22/00	10/31/00	2/5/01	5/15/2001	8/9/2001	10/19/2001	3/13/2002	6/3/2002	9/24/2002	12/10/2002	3/19/2003	6/23/2003	9/17/2003	12/30/2003	1/14/2004	1/27/2004	3/19/2004	6/9/2004
MW-1	0.229	0.604	0.450	0.466	0.461			0.12												
MW-2	0.359	0.501	0.541	0.394	0.597	0.772	0.452	0.243	0.227					0.100						
MW-3	0.287	0.291	0.264	0.290	0.285	0.346	0.316	0.146	0.008	0.104				0.0719						0.0118
MW-4																				
MW-5	<.005	<.005	<.005	<.005	<.005	<.001	<.001	<0.001	<0.001	<0.001				<0.001						<0.001
MW-6	<.005	0.038	0.007	<.005	<.005	<.001	<.001	<0.001	<0.001	<0.005				<0.001						<0.001
MW-7		<.005	0.008	<.005	<.005	<.001	<.001	<0.001	<0.001	<0.001				<0.001						
MW-8		0.742			0.286	0.34	0.449													
MW-9		0.208																		
MW-10				1.280				2.38						0.307						0.153
MW-11																				
MW-12																				
MW-13																				
MW-14				<.005	<.005	<.001	<.005	<0.001	0.0016	<0.005	<0.02	<0.01	<0.01	0.0020	0.0013	<0.005			<0.001	<0.005/<0.005
MW-15				<.005	<.005	<.001	<.005	<0.020	<0.005	<0.005	<0.005	<0.005	<0.005	<0.001	<0.001/<0.005	0.001			<0.01	<0.005
MW-16				<.005	<.005	0.004	<.005	0.002	0.0024	<0.005	<0.005	<0.005	<0.001	<0.001	<0.001	<0.001			<0.005	<0.001
MW-17							0.057	0.278												
MW-18				0.143	<.005	0.009	0.030	0.238	<0.005					0.006						0.0222
MW-19				<.005	<.005	<.001	<.005	<0.005	0.0016	0.0028	<0.005	<0.001	<0.005	0.002	<0.001	0.0016			<0.001	<0.001
MW-19D														<0.001	<0.001	0.0014	0.00100	<0.005	<0.001	<0.001
MW-20											<0.001	<0.001	<0.005	<0.001	<0.001	<0.001			<0.001	<0.001
MW-21											<0.001	<0.001	<0.001	<0.001	<0.001	<0.001			<0.001	<0.001
MW-22														<0.001	<0.001	<0.001	0.00240		0.001/0.001	<0.001

Notes: All units mg/l
Blank cells: Sample not collected

FIGURES

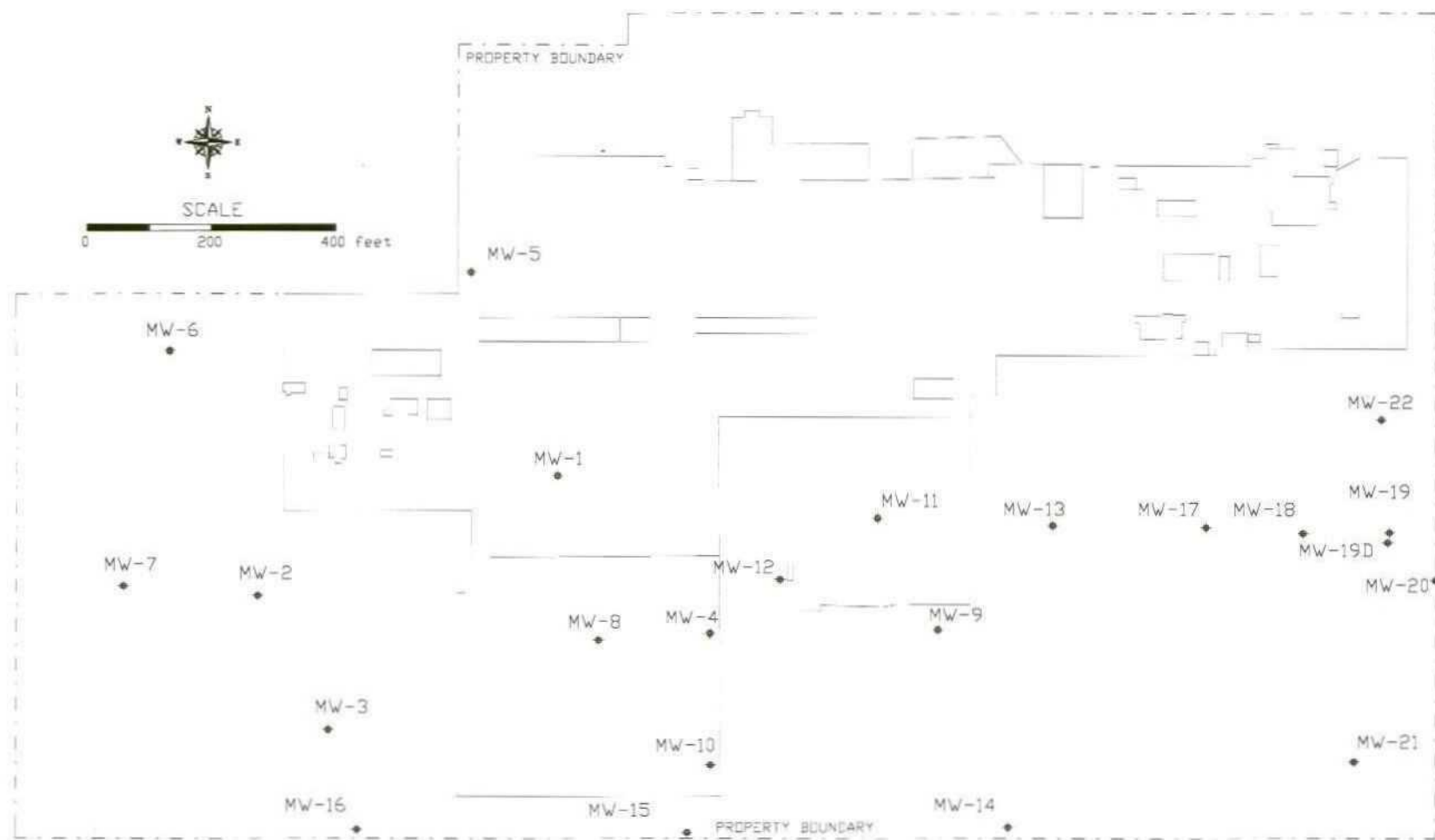


Figure 1 – Groundwater Monitoring Locations

Hobbs Booster Station

Duke Energy
Field Services.

DRAWN BY: MHS
DATE: 9/04

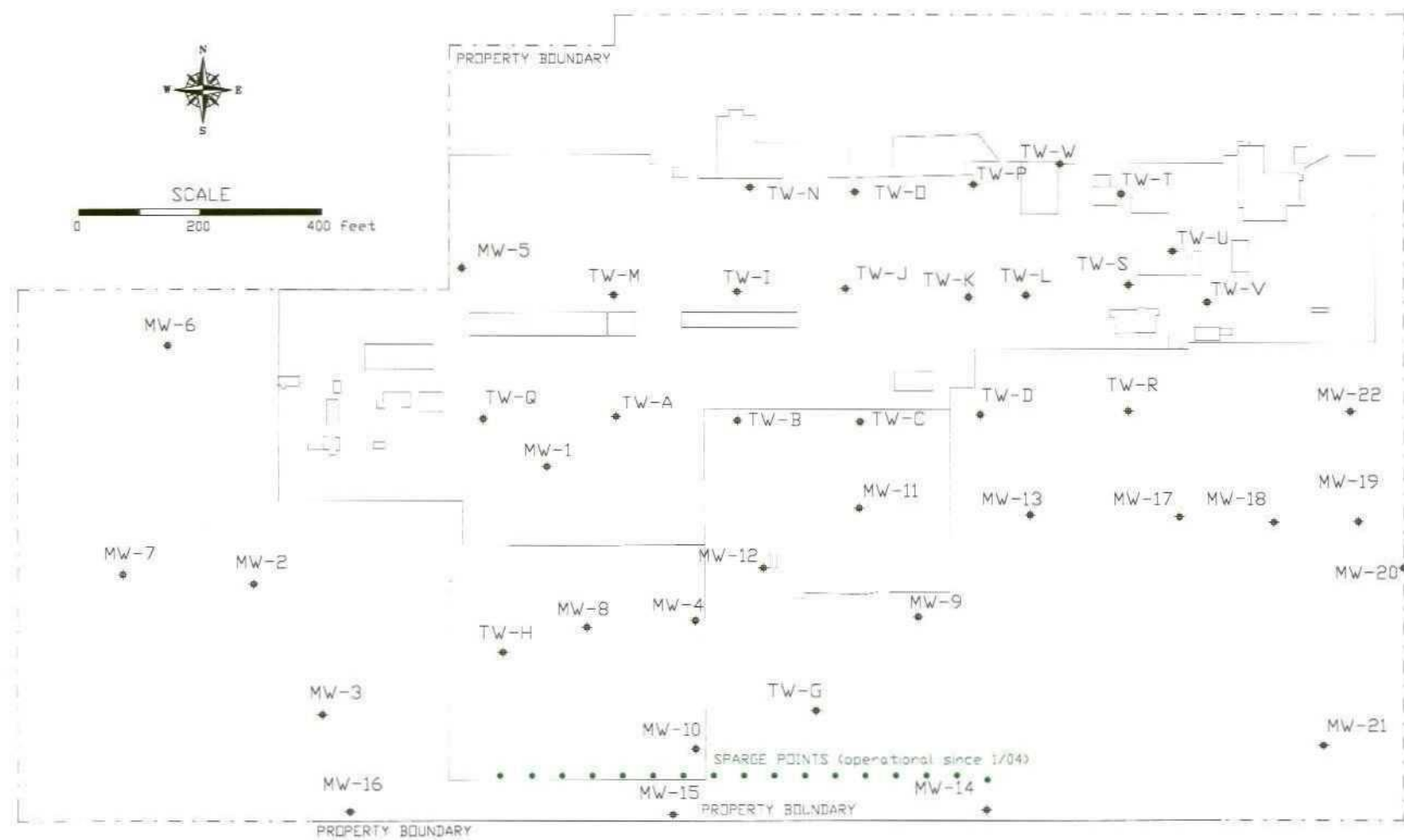


Figure 2 – Groundwater and Free Phase Hydrocarbon Measuring Wells and Sparge Point Locations

Hobbs Booster Station

Duke Energy
Field Services.

DRAWN BY: MHS
DATE: 9/04

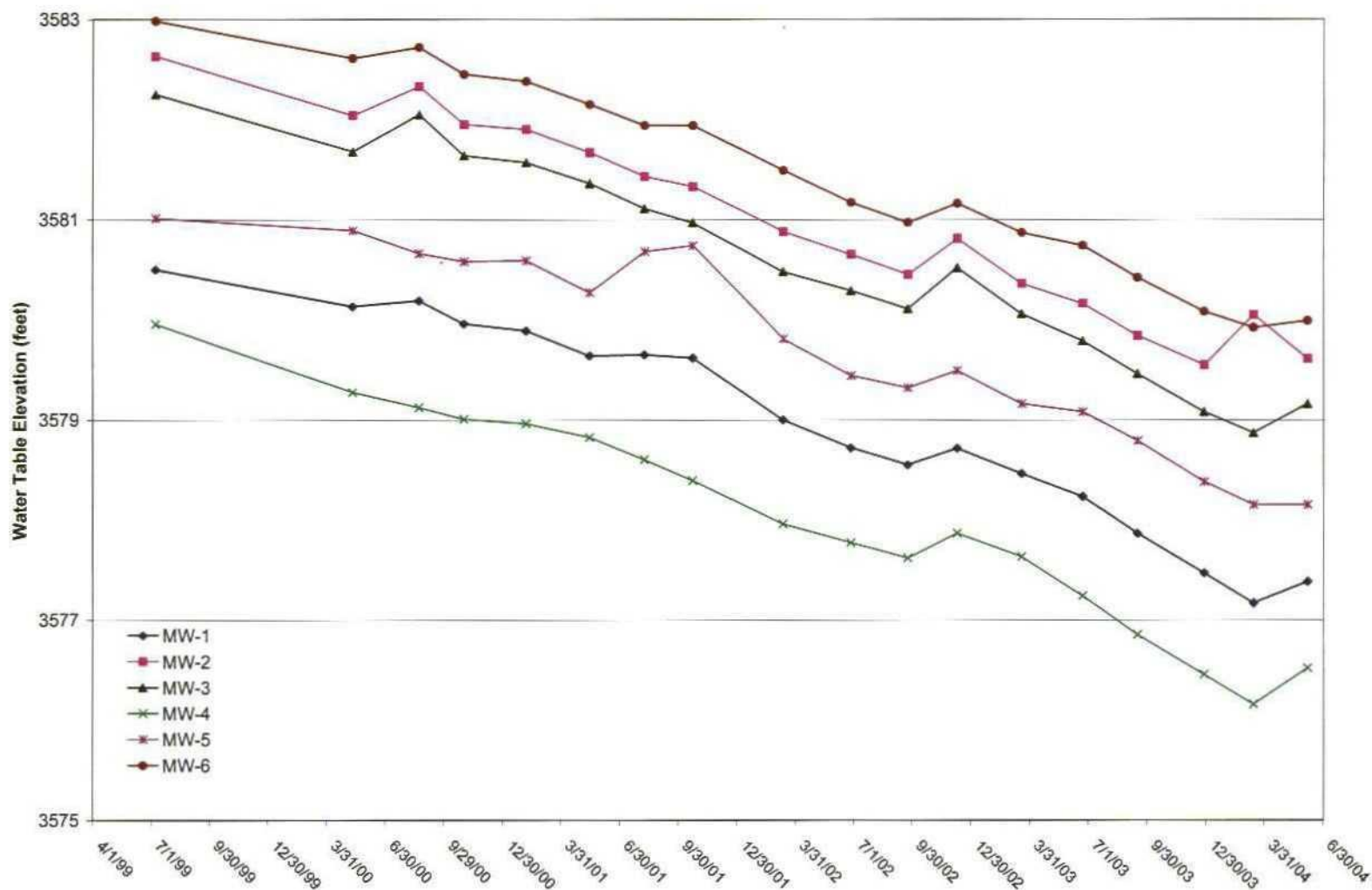


Figure 3 – Hydrographs for Wells with Long Periods of Records

Hobbs Booster Station



DRAWN BY: MHS

DATE: 9/04

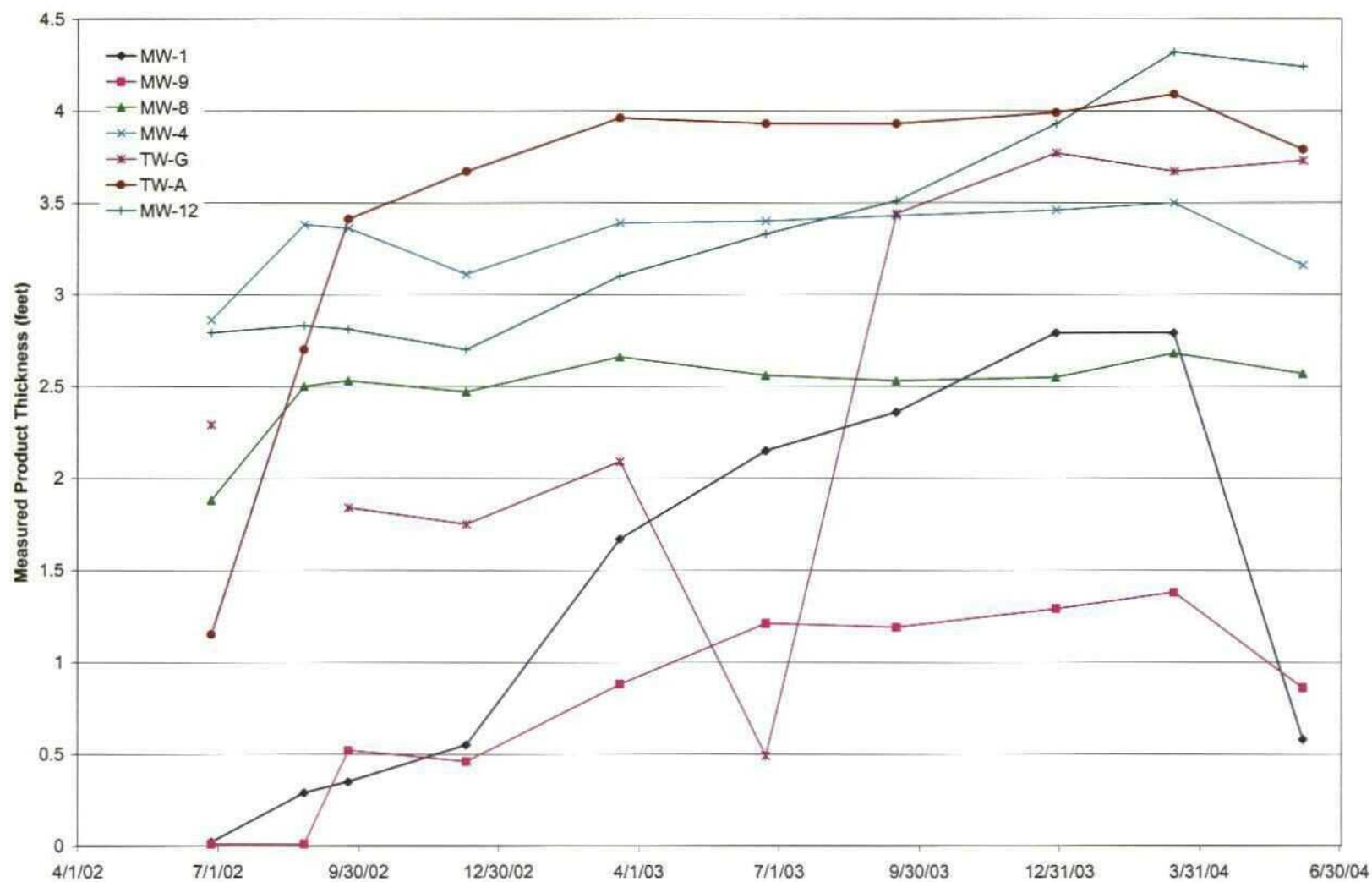


Figure 4 –Measured Free Phase Hydrocarbon Thickness Values for Select Wells

Hobbs Booster Station



DRAWN BY: MHS
DATE: 9/04

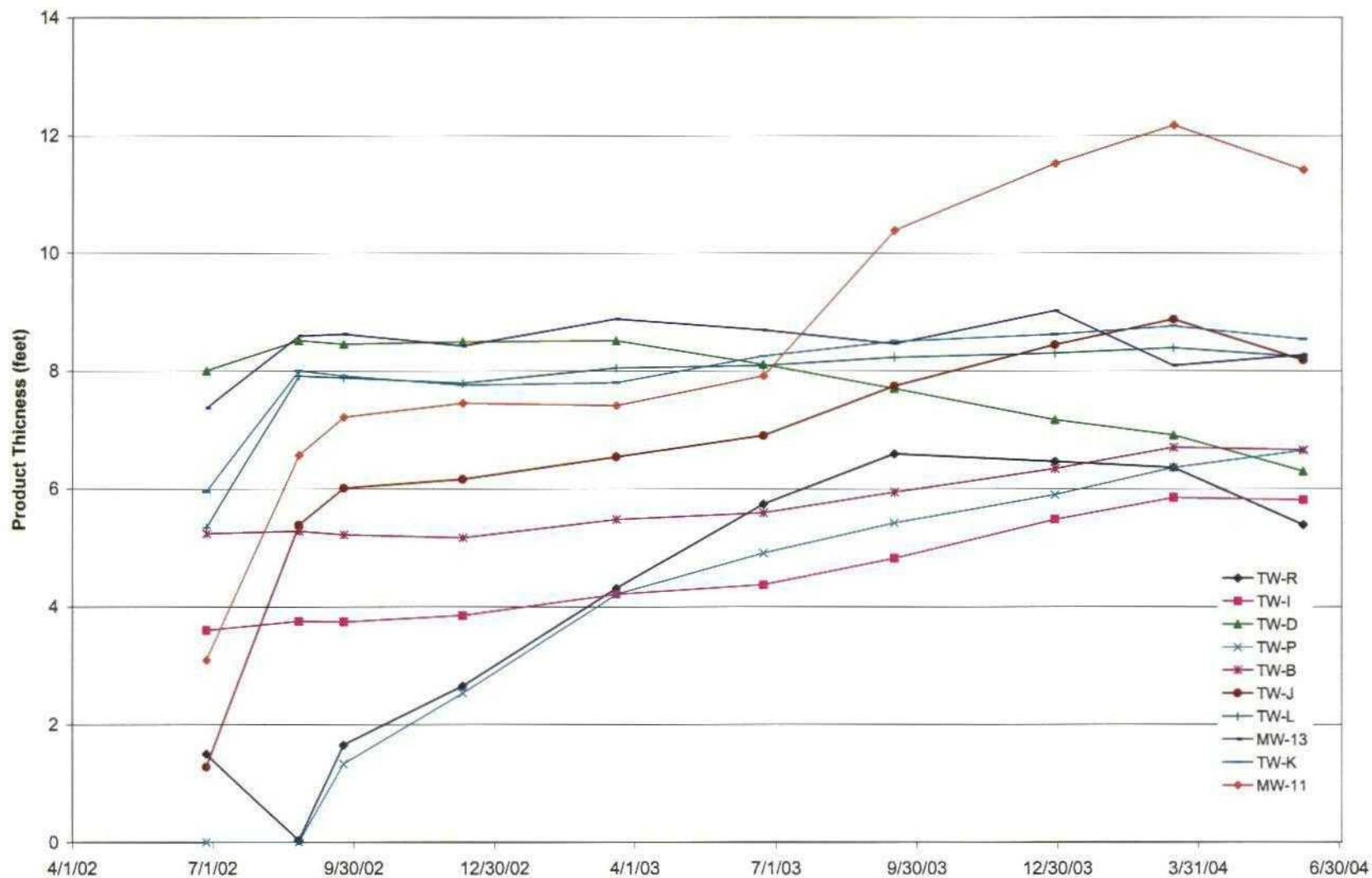


Figure 5 –Measured Free Phase Hydrocarbon Thickness Values in Other Wells

Hobbs Booster Station

Duke Energy
Field Services.

DRAWN BY: MHS
DATE: 9/04

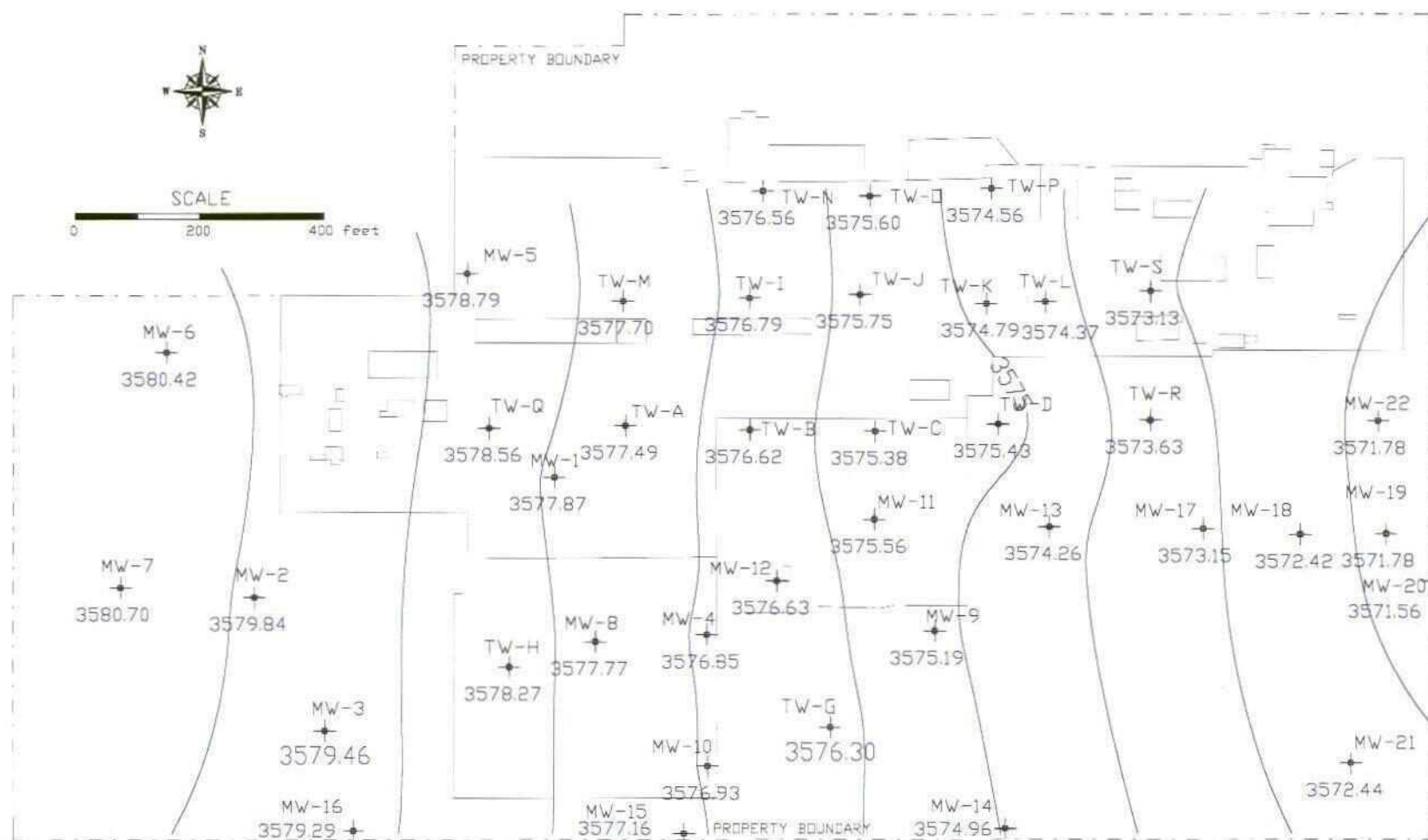


Figure 6 – Corrected Water Table Elevations
From the September 2003 Episode

Hobbs Booster Station

Duke Energy
Field Services.

DRAWN BY: MHS

DATE: 9/04

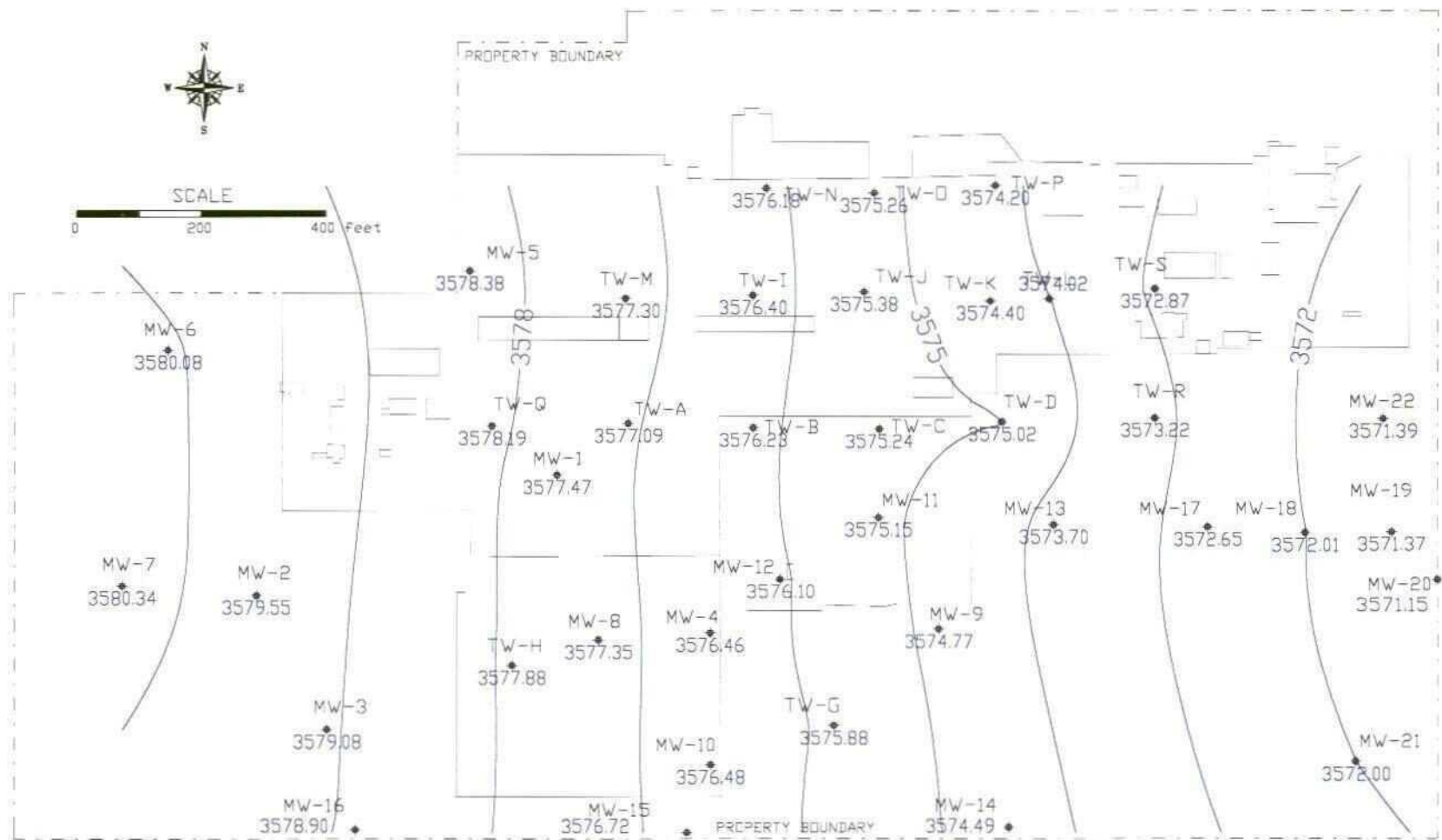
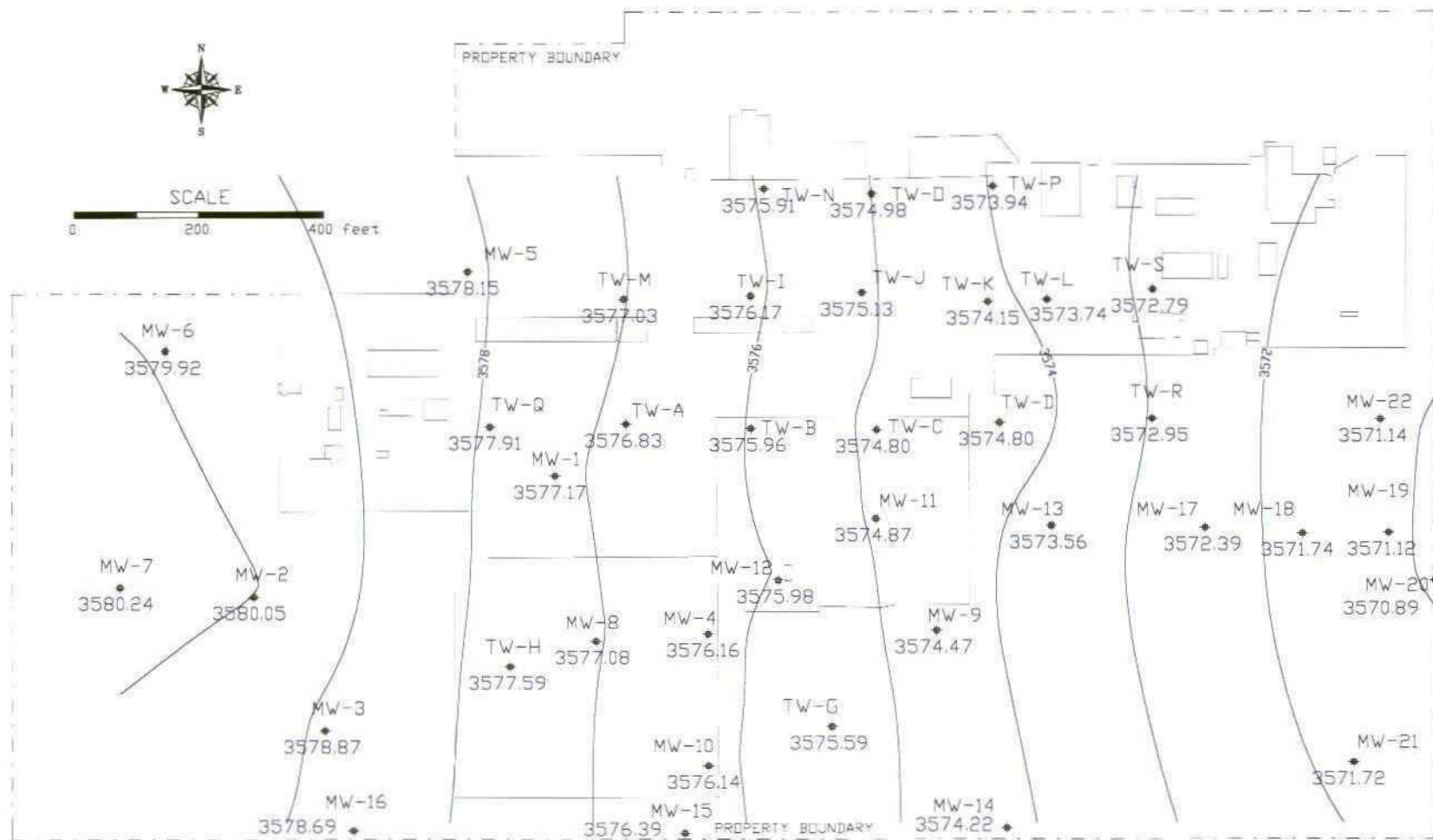


Figure 7 – Corrected Water Table Elevations
From the December 2003 Episode

Hobbs Booster Station

Duke Energy
Field Services.

DRAWN BY: MHS
DATE: 9/04



**Figure 8 – Corrected Water Table Elevations
From the March 2004 Episode**

Hobbs Booster Station



DRAWN BY: MHS
DATE: 9/04

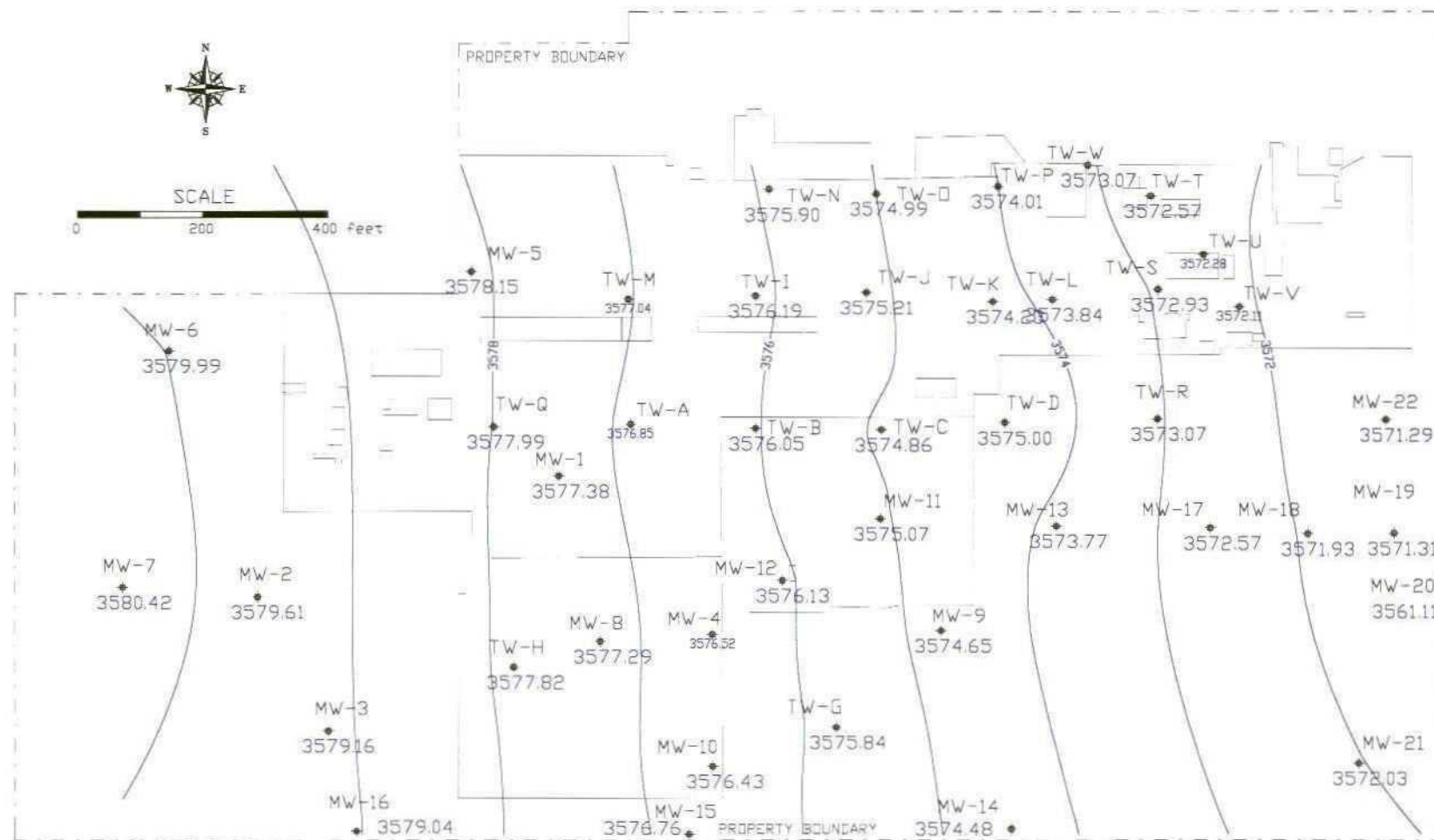


Figure 9 – Corrected Water Table Elevations
From the June 2004 Episode

Hobbs Booster Station

Duke Energy
Field Services.

DRAWN BY: MHS
DATE: 9/04

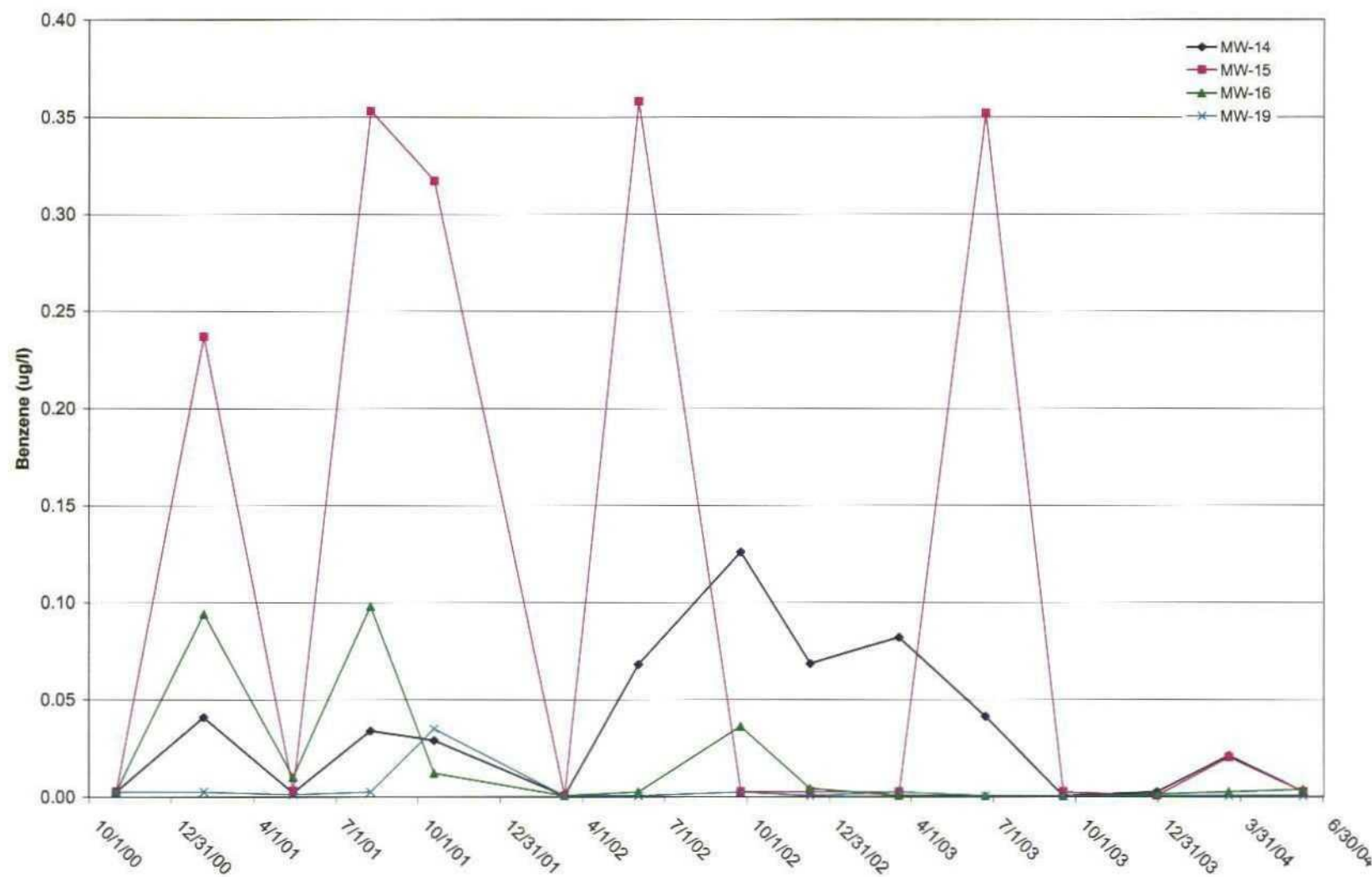
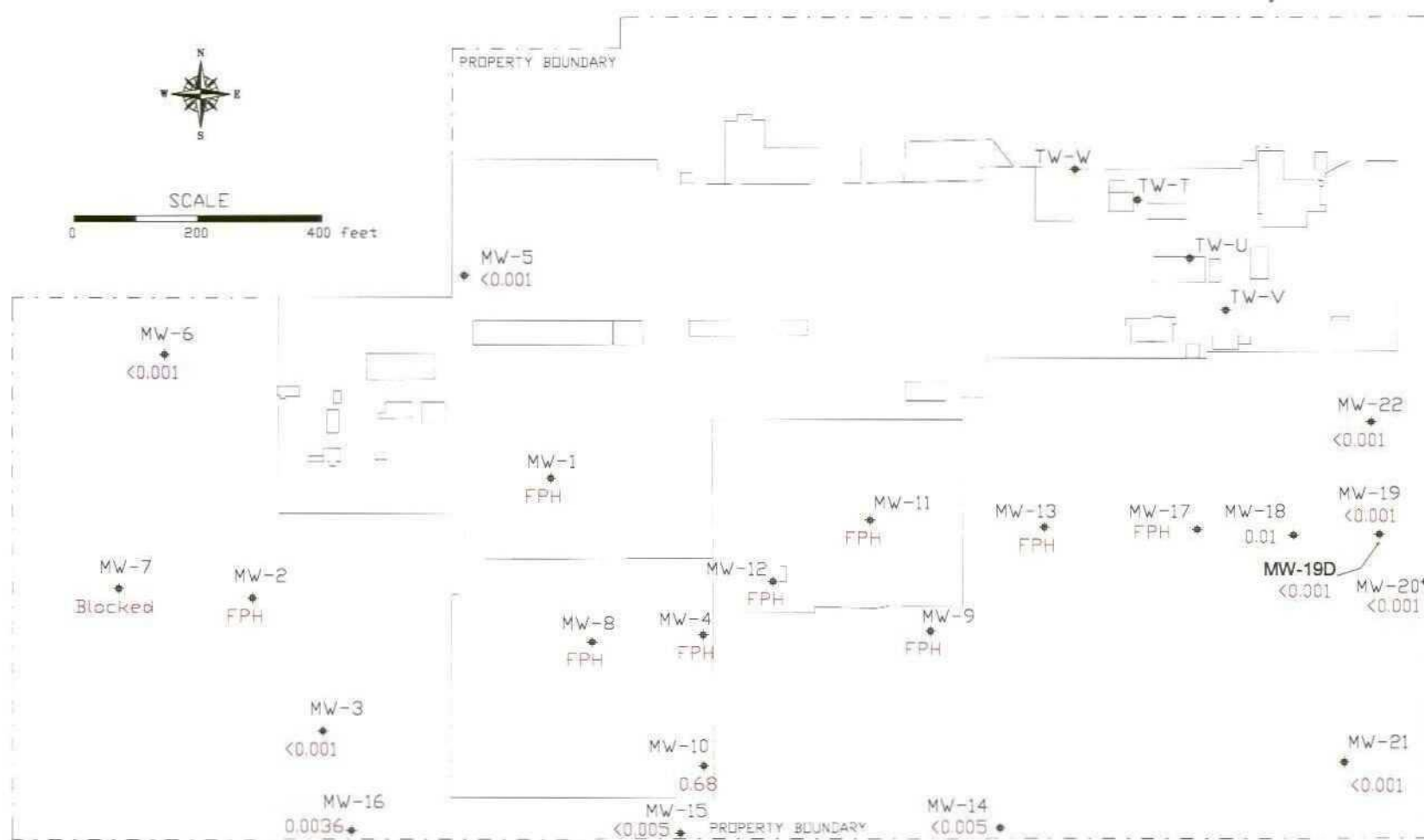


Figure 10 – Benzene Concentration History
For South Boundary Wells

Hobbs Booster Station

Duke Energy
Field Services.

DRAWN BY: MHS
DATE: 9/04



Notes: Units are mg/l
FPH free phase hydrocarbons are present.

Figure 11 – Benzene Distribution for the
June 2004 episode

Hobbs Booster Station

Duke Energy
Field Services.

DRAWN BY: MHS
DATE: 9/04

**2003-2004 REPORTING PERIOD
ANALYTICAL LABORATORY REPORTS**

Analytical and Quality Control Report

Mike Stewart
Remediacon Inc.
P.O. Box 302
Evergreen, CO 80437

Report Date: September 25, 2003

Work Order: 3091916

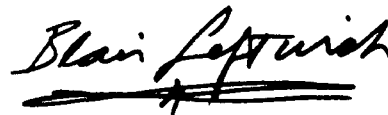
Project Location: Hobbs Booster Station
Project Name: Duke Energy Field Services
Project Number: Duke Energy Field Services

Enclosed are the Analytical Report and Quality Control Report for the following sample(s) submitted to TraceAnalysis, Inc.

Sample	Description	Matrix	Date Taken	Time Taken	Date Received
17702	(MW-19d) 0309170850	water	2003-09-17	08:50	2003-09-19
17703	(MW-19) 0309170950	water	2003-09-17	09:50	2003-09-19
17704	(MW-16) 0309171045	water	2003-09-17	10:45	2003-09-19
17705	(MW-15) 03039171130	water	2003-09-17	11:30	2003-09-19
17706	(MW-20) 0309171230	water	2003-09-17	12:30	2003-09-19
17707	(MW-22) 0309171355	water	2003-09-17	13:55	2003-09-19
17708	(MW-21) 0309171434	water	2003-09-17	14:35	2003-09-19
17709	(MW-14) 0309171515	water	2003-09-17	15:15	2003-09-19
17710	(Duplicate) 0309172000	water	2003-09-17	20:00	2003-09-19
17711	Trip Blank	water	2003-09-17	00:00	2003-09-19

These results represent only the samples received in the laboratory. The Quality Control Report is generated on a batch basis. All information contained in this report is for the analytical batch(es) in which your sample(s) were analyzed.

This report consists of a total of 9 pages and shall not be reproduced except in its entirety, without written approval of TraceAnalysis, Inc.



Dr. Blair Leftwich, Director

Analytical Report

Sample: 17702 - (MW-19d) 0309170850

Analysis: BTEX
QC Batch: 4515
Prep Batch: 4051

Analytical Method: S 8021B
Date Analyzed: 2003-09-19
Date Prepared: 2003-09-19

Prep Method: S 5030B
Analyzed By: BS
Prepared By: BS

Parameter	Flag	RL Result	Units	Dilution	RL
Benzene		<0.00100	mg/L	1	0.00100
Toluene		<0.00100	mg/L	1	0.00100
Ethylbenzene		<0.00100	mg/L	1	0.00100
Xylene (isomers)		<0.00100	mg/L	1	0.00100

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)		0.0941	mg/L	1	0.100	94	61 - 127
4-Bromofluorobenzene (4-BFB)		0.0847	mg/L	1	0.100	85	72.6 - 130

Sample: 17703 - (MW-19) 0309170950

Analysis: BTEX
QC Batch: 4515
Prep Batch: 4051

Analytical Method: S 8021B
Date Analyzed: 2003-09-19
Date Prepared: 2003-09-19

Prep Method: S 5030B
Analyzed By: BS
Prepared By: BS

Parameter	Flag	RL Result	Units	Dilution	RL
Benzene		<0.00100	mg/L	1	0.00100
Toluene		<0.00100	mg/L	1	0.00100
Ethylbenzene		<0.00100	mg/L	1	0.00100
Xylene (isomers)		<0.00100	mg/L	1	0.00100

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)		0.104	mg/L	1	0.100	104	61 - 127
4-Bromofluorobenzene (4-BFB)		0.0907	mg/L	1	0.100	91	72.6 - 130

Sample: 17704 - (MW-16) 0309171045

Analysis: BTEX
QC Batch: 4515
Prep Batch: 4051

Analytical Method: S 8021B
Date Analyzed: 2003-09-19
Date Prepared: 2003-09-19

Prep Method: S 5030B
Analyzed By: BS
Prepared By: BS

Parameter	Flag	RL Result	Units	Dilution	RL
Benzene		<0.00100	mg/L	1	0.00100
Toluene		<0.00100	mg/L	1	0.00100
Ethylbenzene		<0.00100	mg/L	1	0.00100
Xylene (isomers)		<0.00100	mg/L	1	0.00100

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)		0.0971	mg/L	1	0.100	97	61 - 127
1-Bromofluorobenzene (4-BFB)		0.112	mg/L	1	0.100	112	72.6 - 130

Sample: 17705 - (MW-15) 03039171130

Analysis: BTEX Analytical Method: S 8021B Prep Method: S 5030B
QC Batch: 4515 Date Analyzed: 2003-09-19 Analyzed By: BS
Prep Batch: 4051 Date Prepared: 2003-09-19 Prepared By: BS

Parameter	Flag	RL Result	Units	Dilution	RL
Benzene		<0.00100	mg/L	1	0.00100
Toluene		<0.00100	mg/L	1	0.00100
Ethylbenzene		0.0597	mg/L	1	0.00100
Xylene (isomers)		<0.00100	mg/L	1	0.00100

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)		0.0859	mg/L	1	0.100	86	61 - 127
4-Bromofluorobenzene (4-BFB)	¹	0.145	mg/L	1	0.100	145	72.6 - 130

Sample: 17706 - (MW-20) 0309171230

Analysis: BTEX Analytical Method: S 8021B Prep Method: S 5030B
QC Batch: 4515 Date Analyzed: 2003-09-19 Analyzed By: BS
Prep Batch: 4051 Date Prepared: 2003-09-19 Prepared By: BS

Parameter	Flag	RL Result	Units	Dilution	RL
Benzene		<0.00100	mg/L	1	0.00100
Toluene		<0.00100	mg/L	1	0.00100
Ethylbenzene		<0.00100	mg/L	1	0.00100
Xylene (isomers)		<0.00100	mg/L	1	0.00100

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)		0.120	mg/L	1	0.100	120	61 - 127
4-Bromofluorobenzene (4-BFB)		0.109	mg/L	1	0.100	109	72.6 - 130

Sample: 17707 - (MW-22) 0309171355

Analysis: BTEX Analytical Method: S 8021B Prep Method: S 5030B
QC Batch: 4515 Date Analyzed: 2003-09-19 Analyzed By: BS
Prep Batch: 4051 Date Prepared: 2003-09-19 Prepared By: BS

continued ...

¹High surrogate recovery due to peak interference.

sample 17705 continued ...

Parameter	Flag	RL Result	Units	Dilution	RL
Parameter	Flag	RL Result	Units	Dilution	RL
Benzene		<0.00100	mg/L	1	0.00100
Toluene		<0.00100	mg/L	1	0.00100
Ethylbenzene		<0.00100	mg/L	1	0.00100
Xylene (isomers)		<0.00100	mg/L	1	0.00100

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)		0.0816	mg/L	1	0.100	82	61 - 127
4-Bromofluorobenzene (4-BFB)		0.108	mg/L	1	0.100	108	72.6 - 130

Sample: 17708 - (MW-21) 0309171434

Analysis: BTEX
QC Batch: 4515
Prep Batch: 4051

Analytical Method: S 8021B
Date Analyzed: 2003-09-19
Date Prepared: 2003-09-19

Prep Method: S 5030B
Analyzed By: BS
Prepared By: BS

Parameter	Flag	RL Result	Units	Dilution	RL
Benzene		<0.00100	mg/L	1	0.00100
Toluene		<0.00100	mg/L	1	0.00100
Ethylbenzene		<0.00100	mg/L	1	0.00100
Xylene (isomers)		<0.00100	mg/L	1	0.00100

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)		0.115	mg/L	1	0.100	115	61 - 127
4-Bromofluorobenzene (4-BFB)		0.105	mg/L	1	0.100	105	72.6 - 130

Sample: 17709 - (MW-14) 0309171515

Analysis: BTEX
QC Batch: 4539
Prep Batch: 4072

Analytical Method: S 8021B
Date Analyzed: 2003-09-19
Date Prepared: 2003-09-19

Prep Method: S 5030B
Analyzed By: BS
Prepared By: BS

Parameter	Flag	RL Result	Units	Dilution	RL
Benzene		<0.00100	mg/L	1	0.00100
Toluene		<0.00100	mg/L	1	0.00100
Ethylbenzene		0.0133	mg/L	1	0.00100
Xylene (isomers)		0.00130	mg/L	1	0.00100

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)		0.107	mg/L	1	0.100	107	61 - 127
4-Bromofluorobenzene (4-BFB)		0.108	mg/L	1	0.100	108	72.6 - 130

Sample: 17710 - (Duplicate) 0309172000

Analysis: BTEX	Analytical Method: S 8021B	Prep Method: S 5030B
QC Batch: 4608	Date Analyzed: 2003-09-23	Analyzed By: BS
Prep Batch: 4097	Date Prepared: 2003-09-23	Prepared By: BS

Parameter	Flag	RL Result	Units	Dilution	RL
Benzene		<0.00500	mg/L	5	0.00100
Toluene		<0.00500	mg/L	5	0.00100
Ethylbenzene		0.0456	mg/L	5	0.00100
Xylene (isomers)		<0.00500	mg/L	5	0.00100

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)		0.416	mg/L	5	0.100	83	61 - 127
4-Bromofluorobenzene (4-BFB)		0.486	mg/L	5	0.100	97	72.6 - 130

Sample: 17711 - Trip Blank

Analysis: BTEX	Analytical Method: S 8021B	Prep Method: S 5030B
QC Batch: 4608	Date Analyzed: 2003-09-23	Analyzed By: BS
Prep Batch: 4097	Date Prepared: 2003-09-23	Prepared By: BS

Parameter	Flag	RL Result	Units	Dilution	RL
Benzene		<0.00100	mg/L	1	0.00100
Toluene		<0.00100	mg/L	1	0.00100
Ethylbenzene		<0.00100	mg/L	1	0.00100
Xylene (isomers)		<0.00100	mg/L	1	0.00100

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)		0.0959	mg/L	1	0.100	96	61 - 127
4-Bromofluorobenzene (4-BFB)		0.0873	mg/L	1	0.100	87	72.6 - 130

Method Blank (1) QC Batch: 4515

Parameter	Flag	Result	Units	RL
Benzene		<0.00100	mg/L	0.001
Toluene		<0.00100	mg/L	0.001
Ethylbenzene		<0.00100	mg/L	0.001
Xylene (isomers)		<0.00100	mg/L	0.001

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)		0.108	mg/L	1	0.100	108	61 - 127
4-Bromofluorobenzene (4-BFB)		0.0980	mg/L	1	0.100	98	72.6 - 130

Method Blank (1) QC Batch: 4539

Parameter	Flag	Result	Units	RL
Benzene		<0.00100	mg/L	0.001
Toluene		<0.00100	mg/L	0.001
Ethylbenzene		<0.00100	mg/L	0.001
Xylene (isomers)		<0.00100	mg/L	0.001

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)		0.108	mg/L	1	0.100	108	61 - 127
4-Bromofluorobenzene (4-BFB)		0.102	mg/L	1	0.100	102	72.6 - 130

Method Blank (1) QC Batch: 4608

Parameter	Flag	Result	Units	RL
Benzene		<0.00100	mg/L	0.001
Toluene		<0.00100	mg/L	0.001
Ethylbenzene		<0.00100	mg/L	0.001
Xylene (isomers)		<0.00100	mg/L	0.001

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)		0.0966	mg/L	1	0.100	97	61 - 127
4-Bromofluorobenzene (4-BFB)		0.0875	mg/L	1	0.100	88	72.6 - 130

Laboratory Control Spike (LCS-1) QC Batch: 4515

Param	LCS Result	LCSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	RPD	Rec. Limit	RPD Limit
Benzene	0.0987	0.0996	mg/L	1	0.100	<0.000350	99	1	81.2 - 118	20
Toluene	0.0986	0.100	mg/L	1	0.100	<0.000550	99	1	81.2 - 118	20
Ethylbenzene	0.0996	0.101	mg/L	1	0.100	<0.000690	100	1	80.7 - 122	20
Xylene (isomers)	0.296	0.299	mg/L	1	0.300	<0.000610	99	1	79.8 - 118	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Surrogate	LCS Result	LCSD Result	Units	Dil.	Spike Amount	LCS Rec.	LCSD Rec.	Rec. Limit
Trifluorotoluene (TFT)	0.107	0.105	mg/L	1	0.100	107	105	69.5 - 125
4-Bromofluorobenzene (4-BFB)	0.102	0.101	mg/L	1	0.100	102	101	66.2 - 129

Laboratory Control Spike (LCS-1) QC Batch: 4539

Param	LCS Result	LCSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	RPD	Rec. Limit	RPD Limit
Benzene	0.107	0.102	mg/L	1	0.100	<0.000350	107	4	81.2 - 118	20
Benzene	0.107	0.102	mg/L	1	0.100	<0.000350	107	4	81.2 - 118	20
Toluene	0.106	0.102	mg/L	1	0.100	<0.000550	106	4	81.2 - 118	20
Toluene	0.106	0.102	mg/L	1	0.100	<0.000550	106	4	81.2 - 118	20

continued ...

control spikes continued ...

Param	LCS Result	LCSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	RPD	Rec. Limit	RPD Limit
Ethylbenzene	0.106	0.104	mg/L	1	0.100	0.000690	106	2	80.7 - 122	20
Ethylbenzene	0.106	0.104	mg/L	1	0.100	<0.000690	106	2	80.7 - 122	20
Xylene (isomers)	0.313	0.305	mg/L	1	0.300	<0.000610	104	2	79.8 - 118	20
Xylene (isomers)	0.313	0.305	mg/L	1	0.300	<0.000610	104	2	79.8 - 118	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Surrogate	LCS Result	LCSD Result	Units	Dil.	Spike Amount	LCS Rec.	LCSD Rec.	Rec. Limit
Trifluorotoluene (TFT)	0.111	0.106	mg/L	1	0.100	111	106	69.5 - 125
Trifluorotoluene (TFT)	0.111	0.106	mg/L	1	0.100	111	106	69.5 - 125
4-Bromofluorobenzene (4-BFB)	0.110	0.104	mg/L	1	0.100	110	104	66.2 - 129
4-Bromofluorobenzene (4-BFB)	0.110	0.104	mg/L	1	0.100	110	104	66.2 - 129

Laboratory Control Spike (LCS-1) QC Batch: 4608

Param	LCS Result	LCSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	RPD	Rec. Limit	RPD Limit
Benzene	0.0972	0.0987	mg/L	1	0.100	<0.000350	97	2	81.2 - 118	20
Benzene	0.0972	0.0987	mg/L	1	0.100	<0.000350	97	2	81.2 - 118	20
Toluene	0.0969	0.0985	mg/L	1	0.100	<0.000550	97	2	81.2 - 118	20
Toluene	0.0969	0.0985	mg/L	1	0.100	<0.000550	97	2	81.2 - 118	20
Ethylbenzene	0.0975	0.0988	mg/L	1	0.100	<0.000690	98	1	80.7 - 122	20
Ethylbenzene	0.0975	0.0988	mg/L	1	0.100	<0.000690	98	1	80.7 - 122	20
Xylene (isomers)	0.289	0.294	mg/L	1	0.300	<0.000610	96	2	79.8 - 118	20
Xylene (isomers)	0.289	0.294	mg/L	1	0.300	<0.000610	96	2	79.8 - 118	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Surrogate	LCS Result	LCSD Result	Units	Dil.	Spike Amount	LCS Rec.	LCSD Rec.	Rec. Limit
Trifluorotoluene (TFT)	0.0964	0.0962	mg/L	1	0.100	96	96	69.5 - 125
Trifluorotoluene (TFT)	0.0964	0.0962	mg/L	1	0.100	96	96	69.5 - 125
4-Bromofluorobenzene (4-BFB)	0.0954	0.0941	mg/L	1	0.100	95	94	66.2 - 129
4-Bromofluorobenzene (4-BFB)	0.0954	0.0941	mg/L	1	0.100	95	94	66.2 - 129

Standard (CCV-1) QC Batch: 4515

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Benzene		mg/L	0.100	0.107	107	85 - 115	2003-09-19
Toluene		mg/L	0.100	0.107	107	85 - 115	2003-09-19
Ethylbenzene		mg/L	0.100	0.108	108	85 - 115	2003-09-19
Xylene (isomers)		mg/L	0.300	0.319	106	85 - 115	2003-09-19

Standard (CCV-2) QC Batch: 4515

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Benzene		mg/L	0.100	0.108	108	85 - 115	2003-09-19
Toluene		mg/L	0.100	0.108	108	85 - 115	2003-09-19
Ethylbenzene		mg/L	0.100	0.108	108	85 - 115	2003-09-19
Xylene (isomers)		mg/L	0.300	0.323	108	85 - 115	2003-09-19

Standard (ICV-1) QC Batch: 4539

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Benzene		mg/L	0.100	0.107	107	85 - 115	2003-09-19
Toluene		mg/L	0.100	0.107	107	85 - 115	2003-09-19
Ethylbenzene		mg/L	0.100	0.108	108	85 - 115	2003-09-19
Xylene (isomers)		mg/L	0.300	0.319	106	85 - 115	2003-09-19

Standard (CCV-1) QC Batch: 4539

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Benzene		mg/L	0.100	0.103	103	85 - 115	2003-09-19
Toluene		mg/L	0.100	0.104	104	85 - 115	2003-09-19
Ethylbenzene		mg/L	0.100	0.104	104	85 - 115	2003-09-19
Xylene (isomers)		mg/L	0.300	0.312	104	85 - 115	2003-09-19

Standard (ICV-1) QC Batch: 4608

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Benzene		mg/L	0.100	0.0991	99	85 - 115	2003-09-23
Toluene		mg/L	0.100	0.0989	99	85 - 115	2003-09-23
Ethylbenzene		mg/L	0.100	0.0997	100	85 - 115	2003-09-23
Xylene (isomers)		mg/L	0.300	0.298	99	85 - 115	2003-09-23

Standard (CCV-1) QC Batch: 4608

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Benzene		mg/L	0.100	0.0984	98	85 - 115	2003-09-23
Toluene		mg/L	0.100	0.0982	98	85 - 115	2003-09-23
Ethylbenzene		mg/L	0.100	0.0973	97	85 - 115	2003-09-23
Xylene (isomers)		mg/L	0.300	0.288	96	85 - 115	2003-09-23

Page Number: 9 of 9
Hobbs Booster Station

Work Order: 3091916
Duke Energy Field Services

Report Date: September 25, 2003
Duke Energy Field Services

6701 Aberdeen Avenue, Ste. 9 Lubbock, Texas 79424 Tel (806) 794-1296 Fax (806) 794-1298 I (800) 378-1296		TraceAnalysis, Inc. 155 McCutcheon, Suite H El Paso, Texas 79932 Tel (915) 585-3443 Fax (915) 585-4944 I (888) 588-3443		CHAIN-OF-CUSTODY AND ANALYSIS REQUEST LAB Order ID # <u>3091916</u>				
Company Name: <u>Remediation Inc.</u> Phone #: <u>303-674-4370</u> Address: (Street, City, Zip) <u>P.O. Box 302, Evergreen, CO 80437</u> Fax #: <u>720-528-8132</u> Contact Person: <u>Mike Stewart</u> Invoice to: <u>Steve Weathers</u> (If different from above) <u>Duke Energy Field Services</u> Project #: _____ Project Name: <u>Duke Energy Field Services</u> Project Location: <u>Hobbs Booster</u> Sampler Signature: <u>[Signature]</u>		ANALYSIS REQUEST (Circle or Specify Method No.)						
LAB # (LAB USE ONLY)	FIELD CODE	# CONTAINERS	Volume/Amount	MATRIX WATER SOIL AIR SLUDGE	PRESERVATIVE METHOD HCl HNO ₃ H ₂ SO ₄ NaOH ICE NONE	SAMPLING DATE TIME	MTBE 8021B/602 BTEX 8021B/602 TPH 418 1/1X1005 PAH 8270C Total Metals Ag As Ba Cd Cr Pb Se Hg 6010B/2007 TCLP Metals Ag As Ba Cd Cr Pb Se Hg TCLP Volatiles TCLP Semi Volatiles TCLP Pesticides RCI GC/MS Vol 8260B/624 GC/MS Semi Vol 8270C/625 PCB's 8082/608 Pesticides 8081A/608 BOD TSS pH	Turn Around Time if different from standard Hold
17702	(MW-19d) 0309170850	2	40mL	✓	✓	9/17/03 0850	✓	
03	(MW-19) 0309170950	2	40mL	✓	✓	9/17/03 0950	✓	
04	(MW-16) 0309171045	2	40mL	✓	✓	9/17/03 1045	✓	
05	(MW-15) 0309171130	2	40mL	✓	✓	9/17/03 1130	✓	
06	(MW-20) 0309171230	2	40mL	✓	✓	9/17/03 1230	✓	
07	(MW-22) 0309171355	2	40mL	✓	✓	9/17/03 1355	✓	
08	(MW-21) 0309171435	2	40mL	✓	✓	9/17/03 1435	✓	
09	(MW-14) 0309171515	2	40mL	✓	✓	9/17/03 1515	✓	
10	(Duplicate) 0309172000	2	40mL	✓	✓	9/17/03 2000	✓	
11	Trip Blank	2	40mL	✓	✓		✓	
Relinquished by: <u>[Signature]</u> Date: <u>9/18/03</u> Time: <u>1430</u> Relinquished by: <u>[Signature]</u> Date: <u>9/18/03</u> Time: <u>1730</u> Relinquished by: _____ Date: _____ Time: _____ Received at Laboratory by: <u>[Signature]</u> Date: <u>9-19-03</u> Time: <u>12:33</u>		Received by: <u>[Signature]</u> Date: <u>9/18/03</u> Time: <u>1430</u> Received by: _____ Date: _____ Time: _____ Received by: _____ Date: _____ Time: _____		LAB USE ONLY Intact ☒ Y ☐ N Headspace ☒ Y ☐ N Temp <u>4°C</u> Log-in Review <u>MA</u> Carrier # <u>Grayhound 617 (46-130) 464-5</u>		REMARKS: ☐ Check if Special Reporting Limits Are Needed		

Submittal of samples constitutes agreement to Terms and Conditions listed on reverse side of C.O.C.

ORIGINAL COPY

Analytical and Quality Control Report

Mike Stewart
Remediation Inc.
P.O. Box 302
Evergreen, CO 80437

Report Date: January 5, 2004

Work Order: 1010206

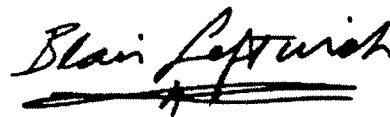
Project Location: Hobbs Booster Station
Project Name: Duke Energy Field Services
Project Number: Duke Energy Field Services

Enclosed are the Analytical Report and Quality Control Report for the following sample(s) submitted to TraceAnalysis, Inc.

Sample	Description	Matrix	Date Taken	Time Taken	Date Received
24239	MW-19D	water	2003-12-30	08:58	2004-01-02
24240	MW-19	water	2003-12-30	09:12	2004-01-02
24241	MW-22	water	2003-12-30	10:00	2004-01-02
24242	MW-21	water	2003-12-30	10:40	2004-01-02
24243	MW-20	water	2003-12-30	11:10	2004-01-02
24244	MW-14	water	2003-12-30	12:10	2004-01-02
24245	MW-15	water	2003-12-30	12:42	2004-01-02
24246	MW-16	water	2003-12-30	13:30	2004-01-02
24247	Duplicate	water	2003-12-30	20:00	2004-01-02
24248	Trip Blank	water	2003-12-30	00:00	2004-01-02

These results represent only the samples received in the laboratory. The Quality Control Report is generated on a batch basis. All information contained in this report is for the analytical batch(es) in which your sample(s) were analyzed.

This report consists of a total of 8 pages and shall not be reproduced except in its entirety, without written approval of TraceAnalysis, Inc.



Dr. Blair Leftwich, Director

Analytical Report

Sample: 24239 - MW-19D

Analysis: BTEX
QC Batch: 6660
Prep Batch: 5956

Analytical Method: S 8021B
Date Analyzed: 2004-01-02
Date Prepared: 2004-01-02

Prep Method: S 5030B
Analyzed By: BS
Prepared By: BS

Parameter	Flag	RL Result	Units	Dilution	RL
Benzene		0.0338	mg/L	1	0.00100
Toluene		<0.00100	mg/L	1	0.00100
Ethylbenzene		<0.00100	mg/L	1	0.00100
Xylene (isomers)		0.00140	mg/L	1	0.00100

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)		0.106	mg/L	1	0.100	106	65.5 - 119
4-Bromofluorobenzene (4-BFB)		0.107	mg/L	1	0.100	107	68.6 - 120

Sample: 24240 - MW-19

Analysis: BTEX
QC Batch: 6660
Prep Batch: 5956

Analytical Method: S 8021B
Date Analyzed: 2004-01-02
Date Prepared: 2004-01-02

Prep Method: S 5030B
Analyzed By: BS
Prepared By: BS

Parameter	Flag	RL Result	Units	Dilution	RL
Benzene		<0.00100	mg/L	1	0.00100
Toluene		<0.00100	mg/L	1	0.00100
Ethylbenzene		<0.00100	mg/L	1	0.00100
Xylene (isomers)		0.00160	mg/L	1	0.00100

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)		0.106	mg/L	1	0.100	106	65.5 - 119
4-Bromofluorobenzene (4-BFB)		0.106	mg/L	1	0.100	106	68.6 - 120

Sample: 24241 - MW-22

Analysis: BTEX
QC Batch: 6660
Prep Batch: 5956

Analytical Method: S 8021B
Date Analyzed: 2004-01-02
Date Prepared: 2004-01-02

Prep Method: S 5030B
Analyzed By: BS
Prepared By: BS

Parameter	Flag	RL Result	Units	Dilution	RL
Benzene		0.0249	mg/L	1	0.00100
Toluene		<0.00100	mg/L	1	0.00100
Ethylbenzene		0.00100	mg/L	1	0.00100
Xylene (isomers)		<0.00100	mg/L	1	0.00100

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)		0.0962	mg/L	1	0.100	96	65.5 - 119
4-Bromofluorobenzene (4-BFB)		0.113	mg/L	1	0.100	113	68.6 - 120

Sample: 24242 - MW-21

Analysis: BTEX
QC Batch: 6660
Prep Batch: 5956

Analytical Method: S 8021B
Date Analyzed: 2004-01-02
Date Prepared: 2004-01-02

Prep Method: S 5030B
Analyzed By: BS
Prepared By: BS

Parameter	Flag	RL Result	Units	Dilution	RL
Benzene		<0.00100	mg/L	1	0.00100
Toluene		<0.00100	mg/L	1	0.00100
Ethylbenzene		<0.00100	mg/L	1	0.00100
Xylene (isomers)		<0.00100	mg/L	1	0.00100

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)		0.102	mg/L	1	0.100	102	65.5 - 119
4-Bromofluorobenzene (4-BFB)		0.105	mg/L	1	0.100	105	68.6 - 120

Sample: 24243 - MW-20

Analysis: BTEX
QC Batch: 6660
Prep Batch: 5956

Analytical Method: S 8021B
Date Analyzed: 2004-01-02
Date Prepared: 2004-01-02

Prep Method: S 5030B
Analyzed By: BS
Prepared By: BS

Parameter	Flag	RL Result	Units	Dilution	RL
Benzene		<0.00100	mg/L	1	0.00100
Toluene		<0.00100	mg/L	1	0.00100
Ethylbenzene		<0.00100	mg/L	1	0.00100
Xylene (isomers)		<0.00100	mg/L	1	0.00100

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)		0.0942	mg/L	1	0.100	94	65.5 - 119
4-Bromofluorobenzene (4-BFB)		0.108	mg/L	1	0.100	108	68.6 - 120

Sample: 24244 - MW-14

Analysis: BTEX
QC Batch: 6660
Prep Batch: 5956

Analytical Method: S 8021B
Date Analyzed: 2004-01-02
Date Prepared: 2004-01-02

Prep Method: S 5030B
Analyzed By: BS
Prepared By: BS

Parameter	Flag	RL Result	Units	Dilution	RL
Benzene		<0.00500	mg/L	5	0.00100

continued ...

sample 24244 continued

Parameter	Flag	RL Result	Units	Dilution	RL
Toluene		<0.00500	mg/L	5	0.00100
Ethylbenzene		0.0137	mg/L	5	0.00100
Xylene (isomers)		<0.00500	mg/L	5	0.00100

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)		0.503	mg/L	5	0.100	101	65.5 - 119
4-Bromofluorobenzene (4-BFB)		0.535	mg/L	5	0.100	107	68.6 - 120

Sample: 24245 - MW-15

Analysis: BTEX
QC Batch: 6660
Prep Batch: 5956

Analytical Method: S 8021B
Date Analyzed: 2004-01-02
Date Prepared: 2004-01-02

Prep Method: S 5030B
Analyzed By: BS
Prepared By: BS

Parameter	Flag	RL Result	Units	Dilution	RL
Benzene		<0.00100	mg/L	1	0.00100
Toluene		<0.00100	mg/L	1	0.00100
Ethylbenzene		0.0615	mg/L	1	0.00100
Xylene (isomers)		0.00100	mg/L	1	0.00100

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)		0.0991	mg/L	1	0.100	99	65.5 - 119
4-Bromofluorobenzene (4-BFB)	¹	0.132	mg/L	1	0.100	132	68.6 - 120

Sample: 24246 - MW-16

Analysis: BTEX
QC Batch: 6660
Prep Batch: 5956

Analytical Method: S 8021B
Date Analyzed: 2004-01-02
Date Prepared: 2004-01-02

Prep Method: S 5030B
Analyzed By: BS
Prepared By: BS

Parameter	Flag	RL Result	Units	Dilution	RL
Benzene		0.00130	mg/L	1	0.00100
Toluene		<0.00100	mg/L	1	0.00100
Ethylbenzene		<0.00100	mg/L	1	0.00100
Xylene (isomers)		<0.00100	mg/L	1	0.00100

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)		0.0998	mg/L	1	0.100	100	65.5 - 119
4-Bromofluorobenzene (4-BFB)		0.106	mg/L	1	0.100	106	68.6 - 120

Sample: 24247 - Duplicate

¹High surrogate recovery due to peak interference.

Analysis: BTEX
QC Batch: 6660
Prep Batch: 5956

Analytical Method: S 8021B
Date Analyzed: 2004-01-02
Date Prepared: 2004-01-02

Prep Method: S 5030B
Analyzed By: BS
Prepared By: BS

Parameter	Flag	RL Result	Units	Dilution	RL
Benzene		<0.00100	mg/L	1	0.00100
Toluene		<0.00100	mg/L	1	0.00100
Ethylbenzene		0.0613	mg/L	1	0.00100
Xylene (isomers)		0.00120	mg/L	1	0.00100

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)		0.101	mg/L	1	0.100	101	65.5 - 119
4-Bromofluorobenzene (4-BFB)	²	0.131	mg/L	1	0.100	131	68.6 - 120

Sample: 24248 - Trip Blank

Analysis: BTEX
QC Batch: 6661
Prep Batch: 5957

Analytical Method: S 8021B
Date Analyzed: 2004-01-02
Date Prepared: 2004-01-02

Prep Method: S 5030B
Analyzed By: BS
Prepared By: BS

Parameter	Flag	RL Result	Units	Dilution	RL
Benzene		<0.00100	mg/L	1	0.00100
Toluene		<0.00100	mg/L	1	0.00100
Ethylbenzene		<0.00100	mg/L	1	0.00100
Xylene (isomers)		0.00110	mg/L	1	0.00100

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)		0.104	mg/L	1	0.100	104	65.5 - 119
4-Bromofluorobenzene (4-BFB)		0.106	mg/L	1	0.100	106	68.6 - 120

Method Blank (1) QC Batch: 6660

Parameter	Flag	Result	Units	RL
Benzene		<0.00100	mg/L	0.001
Toluene		<0.00100	mg/L	0.001
Ethylbenzene		<0.00100	mg/L	0.001
Xylene (isomers)		<0.00100	mg/L	0.001

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)		0.0973	mg/L	1	0.100	97	70 - 130
4-Bromofluorobenzene (4-BFB)		0.104	mg/L	1	0.100	104	70 - 130

Method Blank (1) QC Batch: 6661

²High surrogate recovery due to peak interference.

Parameter	Flag	Result	Units	RL
Benzene		<0.00100	mg/L	0.001
Toluene		<0.00100	mg/L	0.001
Ethylbenzene		<0.00100	mg/L	0.001
Xylene (isomers)		<0.00100	mg/L	0.001

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)		0.0997	mg/L	1	0.100	100	70 - 130
4-Bromofluorobenzene (4-BFB)		0.101	mg/L	1	0.100	104	70 - 130

Laboratory Control Spike (LCS-1) QC Batch: 6660

Param	LCS Result	LCSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	RPD	Rec. Limit	RPD Limit
Benzene	0.0986	0.104	mg/L	1	0.100	<0.000410	99	5	79.7 - 110	20
Toluene	0.105	0.100	mg/L	1	0.100	<0.000760	105	4	81.7 - 108	20
Ethylbenzene	0.105	0.100	mg/L	1	0.100	<0.00100	105	4	80.4 - 109	20
Xylene (isomers)	0.314	0.301	mg/L	1	0.300	<0.00100	105	4	81 - 109	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Surrogate	LCS Result	LCSD Result	Units	Dil.	Spike Amount	LCS Rec.	LCSD Rec.	Rec. Limit
Trifluorotoluene (TFT)	0.107	0.101	mg/L	1	0.100	107	101	65.5 - 119
4-Bromofluorobenzene (4-BFB)	0.110	0.106	mg/L	1	0.100	110	106	68.6 - 120

Laboratory Control Spike (LCS-1) QC Batch: 6661

Param	LCS Result	LCSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	RPD	Rec. Limit	RPD Limit
Benzene	0.104	0.104	mg/L	1	0.100	<0.000410	104	0	79.7 - 110	20
Toluene	0.102	0.101	mg/L	1	0.100	<0.000760	102	0	81.7 - 108	20
Ethylbenzene	0.101	0.100	mg/L	1	0.100	<0.00100	101	1	80.4 - 109	20
Xylene (isomers)	0.302	0.301	mg/L	1	0.300	<0.00100	101	0	81 - 109	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Surrogate	LCS Result	LCSD Result	Units	Dil.	Spike Amount	LCS Rec.	LCSD Rec.	Rec. Limit
Trifluorotoluene (TFT)	0.0990	0.0951	mg/L	1	0.100	99	95	65.5 - 119
4-Bromofluorobenzene (4-BFB)	0.106	0.101	mg/L	1	0.100	106	101	68.6 - 120

Standard (CCV-1) QC Batch: 6660

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Benzene		mg/L	0.100	0.108	108	85 - 115	2004-01-02
Toluene		mg/L	0.100	0.104	104	85 - 115	2004-01-02
Ethylbenzene		mg/L	0.100	0.104	104	85 - 115	2004-01-02

continued ...

standard continued ...

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Xylene (isomers)		mg/L	0.300	0.312	104	85 - 115	2004-01-02

Standard (CCV-2) QC Batch: 6660

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Benzene		mg/L	0.100	0.106	106	85 - 115	2004-01-02
Toluene		mg/L	0.100	0.103	103	85 - 115	2004-01-02
Ethylbenzene		mg/L	0.100	0.103	103	85 - 115	2004-01-02
Xylene (isomers)		mg/L	0.300	0.307	102	85 - 115	2004-01-02

Standard (ICV-1) QC Batch: 6661

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Benzene		mg/L	0.100	0.0965	96	85 - 115	2004-01-02
Toluene		mg/L	0.100	0.103	103	85 - 115	2004-01-02
Ethylbenzene		mg/L	0.100	0.102	102	85 - 115	2004-01-02
Xylene (isomers)		mg/L	0.300	0.306	102	85 - 115	2004-01-02

Standard (CCV-1) QC Batch: 6661

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Benzene		mg/L	0.100	0.0964	96	85 - 115	2004-01-02
Toluene		mg/L	0.100	0.102	102	85 - 115	2004-01-02
Ethylbenzene		mg/L	0.100	0.101	101	85 - 115	2004-01-02
Xylene (isomers)		mg/L	0.300	0.304	101	85 - 115	2004-01-02

Page 1 of 1

6701 Aberdeen Avenue, Ste. 9 Lubbock, Texas 79424 Tel (806) 794-1296 Fax (806) 794-1298 1 (800) 378-1296		TraceAnalysis, Inc.		155 McCutcheon, Suite H El Paso, Texas 79932 Tel (915) 585-3443 Fax (915) 585-4944 1 (888) 588-3443		CHAIN-OF-CUSTODY AND ANALYSIS REQUEST	
Company Name: <u>Remediation</u>		Phone #: <u>303-674-4370</u>				LAB Order ID # <u>4010206</u>	
Address: (Street, City, Zip) <u>264 Blue Spruce Dr., Evergreen CO 80439</u>		Fax #: <u>720-528-8132</u>				ANALYSIS REQUEST (Circle or Specify Method No.)	
Contact Person: <u>Mike Stewart</u>							
Invoice to: (If different from above) <u>Steve Weathers, Duke Energy, PO Box 5493, Denver, CO 80217</u>		Project Name: <u>Duke Energy Field Services</u>					
Project #: <u>Hobbs Booster Station</u>		Sample Signature: <u>[Signature]</u>					
LAB #	FIELD CODE	# CONTAINERS	Volume/Amount (mL)	MATRIX	PRESERVATIVE METHOD	SAMPLING	
(LAB USE ONLY)				WATER SOIL AIR SLUDGE	HCl HNO ₃ H ₂ SO ₄ NaOH ICE NONE	DATE TIME	
24239	MW-19D	2	40	✓	✓	12/30 0850	MTBE 8021B/602
24240	MW-19	2	40	✓	✓	12/30 0912	BTEX 8021B/602
24241	MW-22	2	40	✓	✓	12/30 1000	TPH 418 1/7X1005
24242	MW-21	2	40	✓	✓	12/30 1040	PAH 8270C
24243	MW-20	2	40	✓	✓	12/30 1110	Total Metals Ag As Ba Cd Cr Pb Se Hg 6010B/2007
24244	MW-14	2	40	✓	✓	12/30 1210	TCLP Metals Ag As Ba Cd Cr Pb Se Hg
24245	MW-15	2	40	✓	✓	12/30 1242	TCLP Volatiles
24246	MW-16	2	40	✓	✓	12/30 1330	TCLP Semi Volatiles
24247	Duplicate	2	40	✓	✓	12/30 2000	TCLP Pesticides
24248	Trip Blank	2	40	✓	✓	12/18	HCl
							GC/MS Vol 8260B/624
							GC/MS Semi Vol 8270C/625
							PCBs 8082/608
							Pesticides 8081A/604
							BOD TSS pH
							Turn Around Time if different from standard
							Hold
Relinquished by: <u>[Signature]</u> Date: <u>12/30/03</u> Time: <u>6:12P</u>		Received by: <u>Danore Runyon</u> Date: <u>12-31-03</u> Time: <u>12:22p</u>		LAB USE ONLY		REMARKS:	
Relinquished by: <u>Danore Runyon</u> Date: <u>12/31/03</u> Time: <u>4:35p</u>		Received by: _____ Date: _____ Time: _____		Intact <u>(Y)</u> / <u>(N)</u>		☐ Check if Special Reporting Limits Are Needed	
Relinquished by: _____ Date: _____ Time: _____		Received at Laboratory by: <u>Brenda Ward</u> Date: <u>1/2/04</u> Time: <u>10:21</u>		Headspace <u>(Y)</u> / <u>(N)</u>			
				Temp <u>4°C</u>			
				Log-in Review <u>[Signature]</u>			
				Carrier # <u>Gregg [Signature] 261-130494-2</u>			

Submittal of samples constitutes agreement to Terms and Conditions listed on reverse side of C.O.C.

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Analytical and Quality Control Report

Mike Stewart
Remediacon Inc.
P.O. Box 302
Evergreen, CO 80437

Report Date: January 20, 2004

Work Order: 4011603

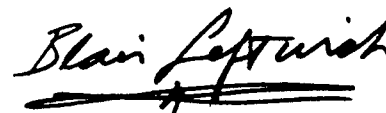
Project Location: Hobbs Booster Station
Project Name: Duke Energy Field Services
Project Number: Duke Energy Field Services

Enclosed are the Analytical Report and Quality Control Report for the following sample(s) submitted to TraceAnalysis, Inc.

Sample	Description	Matrix	Date Taken	Time Taken	Date Received
25138	MW-22 (0401141455)	water	2004-01-14	14:55	2004-01-16
25139	MW-190 (0401141600)	water	2004-01-14	16:00	2004-01-16

These results represent only the samples received in the laboratory. The Quality Control Report is generated on a batch basis. All information contained in this report is for the analytical batch(es) in which your sample(s) were analyzed.

This report consists of a total of 4 pages and shall not be reproduced except in its entirety, without written approval of TraceAnalysis, Inc.



Dr. Blair Leftwich, Director

Analytical Report

Sample: 25138 - MW-22 (0401141455)

Analysis: BTEX
QC Batch: 6973
Prep Batch: 6237

Analytical Method: S 8021B
Date Analyzed: 2004-01-17
Date Prepared: 2004-01-17

Prep Method: S 5030B
Analyzed By: MT
Prepared By: MT

Parameter	Flag	RL Result	Units	Dilution	RL
Benzene		<0.00100	mg/L	1	0.00100
Toluene		<0.00100	mg/L	1	0.00100
Ethylbenzene		0.00110	mg/L	1	0.00100
Xylene		0.00240	mg/L	1	0.00100

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)		0.0861	mg/L	1	0.100	86	71.2 - 115
4-Bromofluorobenzene (4-BFB)		0.0831	mg/L	1	0.100	83	76.5 - 116

Sample: 25139 - MW-190 (0401141600)

Analysis: BTEX
QC Batch: 6973
Prep Batch: 6237

Analytical Method: S 8021B
Date Analyzed: 2004-01-17
Date Prepared: 2004-01-17

Prep Method: S 5030B
Analyzed By: MT
Prepared By: MT

Parameter	Flag	RL Result	Units	Dilution	RL
Benzene		0.0303	mg/L	1	0.00100
Toluene		<0.00100	mg/L	1	0.00100
Ethylbenzene		<0.00100	mg/L	1	0.00100
Xylene		0.00100	mg/L	1	0.00100

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)		0.0881	mg/L	1	0.100	88	71.2 - 115
4-Bromofluorobenzene (4-BFB)		0.0766	mg/L	1	0.100	77	76.5 - 116

Method Blank (1) QC Batch: 6973

Parameter	Flag	Result	Units	RL
Benzene		<0.00100	mg/L	0.001
Toluene		<0.00100	mg/L	0.001
Ethylbenzene		<0.00100	mg/L	0.001
Xylene		<0.00100	mg/L	0.001

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)		0.0865	mg/L	1	0.100	86	64.1 - 117
4-Bromofluorobenzene (4-BFB)		0.0763	mg/L	1	0.100	76	72.2 - 118

Laboratory Control Spike (LCS-1) QC Batch: 6973

Param	LCS Result	LCSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	RPD	Rec. Limit	RPD Limit
Benzene	0.0875	0.0904	mg/L	1	0.100	<0.000410	88	3	79.2 - 113	20
Toluene	0.0849	0.0870	mg/L	1	0.100	<0.000760	85	2	78.8 - 114	20
Ethylbenzene	0.0818	0.0839	mg/L	1	0.100	<0.00100	82	2	79.8 - 112	20
Xylene	0.242	0.251	mg/L	1	0.300	<0.00100	81	4	76.8 - 114	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Surrogate	LCS Result	LCSD Result	Units	Dil.	Spike Amount	LCS Rec.	LCSD Rec.	Rec. Limit
Trifluorotoluene (TFT)	0.0839	0.0826	mg/L	1	0.100	84	83	71.2 - 115
4-Bromofluorobenzene (4-BFB)	0.0782	0.0797	mg/L	1	0.100	78	80	76.5 - 116

Standard (ICV-1) QC Batch: 6973

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Benzene		mg/L	0.100	0.0890	89	85 - 115	2004-01-17
Toluene		mg/L	0.100	0.0863	86	85 - 115	2004-01-17
Ethylbenzene	1	mg/L	0.100	0.0832	83	85 - 115	2004-01-17
Xylene	2	mg/L	0.300	0.248	83	85 - 115	2004-01-17

Standard (CCV-1) QC Batch: 6973

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Benzene		mg/L	0.100	0.0883	88	85 - 115	2004-01-17
Toluene		mg/L	0.100	0.0863	86	85 - 115	2004-01-17
Ethylbenzene	3	mg/L	0.100	0.0837	84	85 - 115	2004-01-17
Xylene	4	mg/L	0.300	0.248	83	85 - 115	2004-01-17

¹Ethylbenzene outside normal limits in ICV/CCV. Average of ICV/CCV components within acceptable range.

²Xylene outside normal limits in ICV/CCV. Average of ICV/CCV components within acceptable range.

³Ethylbenzene outside normal limits in ICV/CCV. Average of ICV/CCV components within acceptable range.

⁴Xylene outside normal limits in ICV/CCV. Average of ICV/CCV components within acceptable range.

Copy signed original form for Tride
Lone Star PC-74097

Analytical and Quality Control Report

Mike Stewart
Remediacon Inc.
P.O. Box 302
Evergreen, CO 80437

Report Date: February 9, 2004

Work Order: 4020428

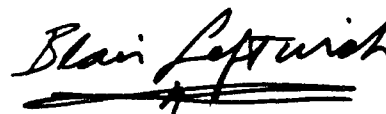
Project Location: Hobbs Booster Station
Project Name: Duke Energy Field Services
Project Number: Duke Energy Field Services

Enclosed are the Analytical Report and Quality Control Report for the following sample(s) submitted to TraceAnalysis, Inc.

Sample	Description	Matrix	Date Taken	Time Taken	Date Received
26709	(MW-19d)040130 1650	water	2004-01-27	16:50	2004-02-04

These results represent only the samples received in the laboratory. The Quality Control Report is generated on a batch basis. All information contained in this report is for the analytical batch(es) in which your sample(s) were analyzed.

This report consists of a total of 4 pages and shall not be reproduced except in its entirety, without written approval of TraceAnalysis, Inc.



Dr. Blair Leftwich, Director

Analytical Report

Sample: 26709 - (MW-19d)040130 1650

Analysis: BTEX
QC Batch: 7385
Prep Batch: 6618

Analytical Method: S 8021B
Date Analyzed: 2001-02-06
Date Prepared: 2001-02-06

Prep Method: S 5030B
Analyzed By: BS
Prepared By: BS

Parameter	Flag	RL Result	Units	Dilution	RL
Benzene		<0.00500	mg/L	5	0.00100
Toluene		<0.00500	mg/L	5	0.00100
Ethylbenzene		<0.00500	mg/L	5	0.00100
Xylene (isomers)		<0.00500	mg/L	5	0.00100

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)		0.415	mg/L	5	0.100	83	78.4 - 118
4-Bromofluorobenzene (4-BFB)		0.476	mg/L	5	0.100	95	53.1 - 149

Method Blank (1) QC Batch: 7385

Parameter	Flag	Result	Units	RL
Benzene		<0.00100	mg/L	0.001
Toluene		<0.00100	mg/L	0.001
Ethylbenzene		<0.00100	mg/L	0.001
Xylene (isomers)		<0.00100	mg/L	0.001

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)		0.0827	mg/L	1	0.100	83	79.3 - 117
4-Bromofluorobenzene (4-BFB)		0.0933	mg/L	1	0.100	93	43.7 - 132

Laboratory Control Spike (LCS-1) QC Batch: 7385

Param	LCS Result	LCSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	RPD	Rec. Limit	RPD Limit
Benzene	¹ 0.0882	0.0856	mg/L	1	0.100	<0.000350	88	3	86.2 - 113	20
Toluene	0.0939	0.0913	mg/L	1	0.100	<0.000550	94	3	85 - 114	20
Ethylbenzene	0.0934	0.0907	mg/L	1	0.100	<0.000690	93	3	83.6 - 116	20
Xylene (isomers)	0.282	0.273	mg/L	1	0.300	<0.000610	94	3	82 - 115	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Surrogate	LCS Result	LCSD Result	Units	Dil.	Spike Amount	LCS Rec.	LCSD Rec.	Rec. Limit
Trifluorotoluene (TFT)	0.0847	0.0876	mg/L	1	0.100	85	88	78.4 - 118
4-Bromofluorobenzene (4-BFB)	0.0912	0.0894	mg/L	1	0.100	91	89	53.1 - 149

¹Benzene within acceptable range.

Standard (ICV-1) QC Batch: 7385

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Benzene		mg/L	0.100	0.0870	87	85 - 115	2004-02-06
Toluene		mg/L	0.100	0.0912	91	85 - 115	2004-02-06
Ethylbenzene		mg/L	0.100	0.0875	88	85 - 115	2004-02-06
Xylene (isomers)		mg/L	0.300	0.274	91	85 - 115	2004-02-06

Standard (CCV-1) QC Batch: 7385

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Benzene		mg/L	0.100	0.0846	85	85 - 115	2004-02-06
Toluene		mg/L	0.100	0.0898	90	85 - 115	2004-02-06
Ethylbenzene		mg/L	0.100	0.0900	90	85 - 115	2004-02-06
Xylene (isomers)		mg/L	0.300	0.272	91	85 - 115	2004-02-06

TraceAnalysis, Inc.

CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

LAB Order ID # 4020428

Company Name: <u>Remediacon, Inc.</u>		Phone #: <u>303-674-4370</u>
Address: (Street, City, Zip) <u>P.O. Box 302, Evergreen, CO 80437</u>		Fax #: <u>720-528-8132</u>
Contact Person: <u>Mike Stewart</u>		
Invoice to: (If different from above) <u>Duke Energy Field Services</u> <u>Attn: Steve Weather</u>		
Project #:		Project Name: <u>Duke Energy Field Services</u>
Project Location: <u>Hobbs Booster Station</u>		Sampler Signature: <u>John Long</u>

(Circle or Specify Method No.)

[illegible]

Relinquished by:	Date:	Time:	Received by:	Date:	Time:
<i>John Ferguson</i>	2/2/04	1410	<i>William C. Shelton</i>	2/02/04	1410
Relinquished by:	Date:	Time:	Received by:	Date:	Time:
<i>William C. Shelton</i>	2/03/04	1730			
Relinquished by:	Date:	Time:	Received at Laboratory by:	Date:	Time:
			<i>William C. Shelton</i>	2-4-04	11:54

LAB USE ONLY

REMARKS:

Intact Y N
Headspace Y N
Temp 4°C
Log-in Review [Signature]

☐ Check If Special Reporting Limits Are Needed

Carrier # 2444 GL11661305085

Submittal of samples constitutes agreement to Terms and Conditions listed on reverse side of C.O.C. 2 samples - HS

ORIGINAL COPY

Analytical and Quality Control Report

Mike Stewart
Remediacon Inc.
P.O. Box 302
Evergreen, CO 80437

Report Date: March 26, 2004

Work Order: 4031906

Project Location: Hobbs Booster Station
Project Name: Duke Energy Field Services
Project Number: Duke Energy Field Services

Enclosed are the Analytical Report and Quality Control Report for the following sample(s) submitted to TraceAnalysis, Inc.

Sample	Description	Matrix	Date Taken	Time Taken	Date Received
29746	(MW-16) 0403160825	water	2004-03-16	08:25	2004-03-19
29747	(MW-15) 0403160900	water	2004-03-16	09:00	2004-03-19
29748	(MW-14) 0403160945	water	2004-03-16	09:45	2004-03-19
29749	(MW-21) 0403161025	water	2004-03-16	10:25	2004-03-19
29750	(MW-19d) 0403161120	water	2004-03-16	11:20	2004-03-19
29751	(MW-19) 0403161205	water	2004-03-16	12:05	2004-03-19
29752	(MW-22) 0403161245	water	2004-03-16	12:45	2004-03-19
29753	(MW-20) 0403161330	water	2004-03-16	13:30	2004-03-19
29754	(Duplicate) 0403162000	water	2004-03-16	20:00	2004-03-19
29755	Trip Blank	water	2004-03-16	00:00	2004-03-19

These results represent only the samples received in the laboratory. The Quality Control Report is generated on a batch basis. All information contained in this report is for the analytical batch(es) in which your sample(s) were analyzed.

This report consists of a total of 9 pages and shall not be reproduced except in its entirety, without written approval of TraceAnalysis, Inc.



Dr. Blair Leftwich, Director

Analytical Report

Sample: 29746 - (MW-16) 0403160825

Analysis: BTEX
QC Batch: 8521
Prep Batch: 7593

Analytical Method: S 8021B
Date Analyzed: 2004-03-25
Date Prepared: 2004-03-25

Prep Method: S 5030B
Analyzed By: MS
Prepared By: MS

Parameter	Flag	RL Result	Units	Dilution	RL
Benzene		<0.00500	mg/L	5	0.00100
Toluene		<0.00500	mg/L	5	0.00100
Ethylbenzene		<0.00500	mg/L	5	0.00100
Xylene		<0.00500	mg/L	5	0.00100

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)	1	0.0265	mg/L	5	0.100	5	79.7 - 119
4-Bromofluorobenzene (4-BFB)	2	0.0160	mg/L	5	0.100	3	65.6 - 141

Sample: 29747 - (MW-15) 0403160900

Analysis: BTEX
QC Batch: 8455
Prep Batch: 7529

Analytical Method: S 8021B
Date Analyzed: 2004-03-23
Date Prepared: 2004-03-23

Prep Method: S 5030B
Analyzed By: MS
Prepared By: MS

Parameter	Flag	RL Result	Units	Dilution	RL
Benzene		0.0203	mg/L	10	0.00100
Toluene		<0.0100	mg/L	10	0.00100
Ethylbenzene		0.0497	mg/L	10	0.00100
Xylene		<0.0100	mg/L	10	0.00100

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)		1.00	mg/L	10	0.100	100	79.7 - 119
4-Bromofluorobenzene (4-BFB)		0.809	mg/L	10	0.100	81	65.6 - 141

Sample: 29748 - (MW-14) 0403160945

Analysis: BTEX
QC Batch: 8455
Prep Batch: 7529

Analytical Method: S 8021B
Date Analyzed: 2004-03-23
Date Prepared: 2004-03-23

Prep Method: S 5030B
Analyzed By: MS
Prepared By: MS

Parameter	Flag	RL Result	Units	Dilution	RL
Benzene		0.0212	mg/L	1	0.00100
Toluene		<0.00100	mg/L	1	0.00100
Ethylbenzene		0.0151	mg/L	1	0.00100
Xylene		<0.00100	mg/L	1	0.00100

¹Low surrogate recovery due to matrix interference. ICV/CCV show the method to be in control.

²Low surrogate recovery due to matrix interference. ICV/CCV show the method to be in control.

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)		0.0960	mg/L	1	0.100	96	79.7 - 119
4-Bromofluorobenzene (4-BFB)		0.0881	mg/L	1	0.100	88	65.6 - 141

Sample: 29749 - (MW-21) 0403161025

Analysis: BTEX
QC Batch: 8455
Prep Batch: 7529

Analytical Method: S 8021B
Date Analyzed: 2004-03-23
Date Prepared: 2004-03-23

Prep Method: S 5030B
Analyzed By: MS
Prepared By: MS

Parameter	Flag	RL Result	Units	Dilution	RL
Benzene		<0.00100	mg/L	1	0.00100
Toluene		<0.00100	mg/L	1	0.00100
Ethylbenzene		<0.00100	mg/L	1	0.00100
Xylene		<0.00100	mg/L	1	0.00100

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)		0.0981	mg/L	1	0.100	98	79.7 - 119
4-Bromofluorobenzene (4-BFB)		0.0793	mg/L	1	0.100	79	65.6 - 141

Sample: 29750 - (MW-19d) 0403161120

Analysis: BTEX
QC Batch: 8455
Prep Batch: 7529

Analytical Method: S 8021B
Date Analyzed: 2004-03-23
Date Prepared: 2004-03-23

Prep Method: S 5030B
Analyzed By: MS
Prepared By: MS

Parameter	Flag	RL Result	Units	Dilution	RL
Benzene		<0.00100	mg/L	1	0.00100
Toluene		<0.00100	mg/L	1	0.00100
Ethylbenzene		<0.00100	mg/L	1	0.00100
Xylene		<0.00100	mg/L	1	0.00100

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)		0.0985	mg/L	1	0.100	98	79.7 - 119
4-Bromofluorobenzene (4-BFB)		0.0824	mg/L	1	0.100	82	65.6 - 141

Sample: 29751 - (MW-19) 0403161205

Analysis: BTEX
QC Batch: 8455
Prep Batch: 7529

Analytical Method: S 8021B
Date Analyzed: 2004-03-23
Date Prepared: 2004-03-23

Prep Method: S 5030B
Analyzed By: MS
Prepared By: MS

Parameter	Flag	RL Result	Units	Dilution	RL
Benzene		<0.00100	mg/L	1	0.00100

continued ...

sample 29751 continued ...

Parameter	Flag	RL Result	Units	Dilution	RL
Toluene		<0.00100	mg/L	1	0.00100
Ethylbenzene		<0.00100	mg/L	1	0.00100
Xylene		<0.00100	mg/L	1	0.00100

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)		0.101	mg/L	1	0.100	101	79.7 - 119
4-Bromofluorobenzene (4-BFB)		0.0840	mg/L	1	0.100	84	65.6 - 141

Sample: 29752 - (MW-22) 0403161245

Analysis: BTEX	Analytical Method: S 8021B	Prep Method: S 5030B
QC Batch: 8455	Date Analyzed: 2004-03-23	Analyzed By: MS
Prep Batch: 7529	Date Prepared: 2004-03-23	Prepared By: MS

Parameter	Flag	RL Result	Units	Dilution	RL
Benzene		0.0165	mg/L	1	0.00100
Toluene		<0.00100	mg/L	1	0.00100
Ethylbenzene		<0.00100	mg/L	1	0.00100
Xylene		0.00100	mg/L	1	0.00100

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)		0.0968	mg/L	1	0.100	97	79.7 - 119
4-Bromofluorobenzene (4-BFB)		0.0933	mg/L	1	0.100	93	65.6 - 141

Sample: 29753 - (MW-20) 0403161330

Analysis: BTEX	Analytical Method: S 8021B	Prep Method: S 5030B
QC Batch: 8455	Date Analyzed: 2004-03-23	Analyzed By: MS
Prep Batch: 7529	Date Prepared: 2004-03-23	Prepared By: MS

Parameter	Flag	RL Result	Units	Dilution	RL
Benzene		<0.00100	mg/L	1	0.00100
Toluene		<0.00100	mg/L	1	0.00100
Ethylbenzene		<0.00100	mg/L	1	0.00100
Xylene		<0.00100	mg/L	1	0.00100

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)		0.101	mg/L	1	0.100	101	79.7 - 119
4-Bromofluorobenzene (4-BFB)		0.0840	mg/L	1	0.100	84	65.6 - 141

Sample: 29754 - (Duplicate) 0403162000

Analysis: BTEX
QC Batch: 8455
Prep Batch: 7529

Analytical Method: S 8021B
Date Analyzed: 2004-03-23
Date Prepared: 2004-03-23

Prep Method: S 5030B
Analyzed By: MS
Prepared By: MS

Parameter	Flag	RL Result	Units	Dilution	RL
Benzene		0.0172	mg/L	1	0.00100
Toluene		<0.00100	mg/L	1	0.00100
Ethylbenzene		<0.00100	mg/L	1	0.00100
Xylene		0.00100	mg/L	1	0.00100

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)		0.0945	mg/L	1	0.100	94	79.7 - 119
4-Bromofluorobenzene (4-BFB)		0.0910	mg/L	1	0.100	91	65.6 - 141

Sample: 29755 - Trip Blank

Analysis: BTEX
QC Batch: 8458
Prep Batch: 7530

Analytical Method: S 8021B
Date Analyzed: 2004-03-23
Date Prepared: 2004-03-23

Prep Method: S 5030B
Analyzed By: MS
Prepared By: MS

Parameter	Flag	RL Result	Units	Dilution	RL
Benzene		<0.00100	mg/L	1	0.00100
Toluene		<0.00100	mg/L	1	0.00100
Ethylbenzene		<0.00100	mg/L	1	0.00100
Xylene		<0.00100	mg/L	1	0.00100

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)		0.100	mg/L	1	0.100	100	79.7 - 119
4-Bromofluorobenzene (4-BFB)		0.0786	mg/L	1	0.100	79	65.6 - 141

Method Blank (1) QC Batch: 8455

Parameter	Flag	Result	Units	RL
Benzene		<0.00100	mg/L	0.001
Toluene		<0.00100	mg/L	0.001
Ethylbenzene		<0.00100	mg/L	0.001
Xylene		<0.00100	mg/L	0.001

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)		0.0999	mg/L	1	0.100	100	76.2 - 119
4-Bromofluorobenzene (4-BFB)		0.0789	mg/L	1	0.100	79	58.5 - 136

Method Blank (1) QC Batch: 8458

Parameter	Flag	Result	Units	RL
Benzene		<0.00100	mg/L	0.001
Toluene		<0.00100	mg/L	0.001
Ethylbenzene		<0.00100	mg/L	0.001
Xylene		<0.00100	mg/L	0.001

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)		0.104	mg/L	1	0.100	104	76.2 - 119
4-Bromofluorobenzene (4-BFB)		0.0841	mg/L	1	0.100	84	58.5 - 136

Method Blank (1) QC Batch: 8521

Parameter	Flag	Result	Units	RL
Benzene		<0.00100	mg/L	0.001
Toluene		<0.00100	mg/L	0.001
Ethylbenzene		<0.00100	mg/L	0.001
Xylene		<0.00100	mg/L	0.001

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)		0.105	mg/L	1	0.100	105	76.2 - 119
4-Bromofluorobenzene (4-BFB)		0.0899	mg/L	1	0.100	90	58.5 - 136

Laboratory Control Spike (LCS-1) QC Batch: 8455

Param	LCS Result	LCSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	RPD	Rec. Limit	RPD Limit
Benzene	0.101	0.107	mg/L	1	0.100	<0.000338	101	6	84.6 - 117	20
Toluene	0.0977	0.103	mg/L	1	0.100	<0.000299	98	5	80.9 - 115	20
Ethylbenzene	0.0958	0.101	mg/L	1	0.100	<0.000469	96	5	77.6 - 119	20
Xylene	0.286	0.301	mg/L	1	0.300	<0.000787	95	5	76.2 - 122	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Surrogate	LCS Result	LCSD Result	Units	Dil.	Spike Amount	LCS Rec.	LCSD Rec.	Rec. Limit
Trifluorotoluene (TFT)	0.0999	0.106	mg/L	1	0.100	100	106	79.7 - 119
4-Bromofluorobenzene (4-BFB)	0.0913	0.0971	mg/L	1	0.100	91	97	65.6 - 141

Laboratory Control Spike (LCS-1) QC Batch: 8458

Param	LCS Result	LCSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	RPD	Rec. Limit	RPD Limit
Benzene	0.111	0.111	mg/L	1	0.100	<0.000338	111	0	84.6 - 117	20
Toluene	0.107	0.104	mg/L	1	0.100	<0.000299	107	2	80.9 - 115	20
Ethylbenzene	0.105	0.102	mg/L	1	0.100	<0.000469	105	3	77.6 - 119	20
Xylene	0.314	0.319	mg/L	1	0.300	<0.000787	105	2	76.2 - 122	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Surrogate	LCS Result	LCSD Result	Units	Dil.	Spike Amount	LCS Rec.	LCSD Rec.	Rec. Limit
Trifluorotoluene (TFT)	0.107	0.111	mg/L	1	0.100	107	111	79.7 - 119
4-Bromofluorobenzene (4-BFB)	0.0981	0.102	mg/L	1	0.100	98	102	65.6 - 141

Laboratory Control Spike (LCS-1) QC Batch: 8521

Param	LCS Result	LCSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	RPD	Rec. Limit	RPD Limit
Benzene	0.0979	0.0983	mg/L	1	0.100	<0.000338	98	0	84.6 - 117	20
Toluene	0.0953	0.0962	mg/L	1	0.100	<0.000299	95	1	80.9 - 115	20
Ethylbenzene	0.0927	0.0941	mg/L	1	0.100	<0.000469	93	1	77.6 - 119	20
Xylene	0.278	0.281	mg/L	1	0.300	<0.000787	92	1	76.2 - 122	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Surrogate	LCS Result	LCSD Result	Units	Dil.	Spike Amount	LCS Rec.	LCSD Rec.	Rec. Limit
Trifluorotoluene (TFT)	0.102	0.0975	mg/L	1	0.100	102	98	79.7 - 119
4-Bromofluorobenzene (4-BFB)	0.0921	0.0914	mg/L	1	0.100	92	91	65.6 - 141

Standard (ICV-1) QC Batch: 8455

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Benzene		mg/L	0.100	0.106	106	85 - 115	2004-03-23
Toluene		mg/L	0.100	0.102	102	85 - 115	2004-03-23
Ethylbenzene		mg/L	0.100	0.100	100	85 - 115	2004-03-23
Xylene		mg/L	0.300	0.298	99	85 - 115	2004-03-23

Standard (CCV-1) QC Batch: 8455

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Benzene		mg/L	0.100	0.110	110	85 - 115	2004-03-23
Toluene		mg/L	0.100	0.105	105	85 - 115	2004-03-23
Ethylbenzene		mg/L	0.100	0.103	103	85 - 115	2004-03-23
Xylene		mg/L	0.300	0.307	102	85 - 115	2004-03-23

Standard (CCV-2) QC Batch: 8455

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Benzene		mg/L	0.100	0.110	110	85 - 115	2004-03-23
Toluene		mg/L	0.100	0.107	107	85 - 115	2004-03-23
Ethylbenzene		mg/L	0.100	0.104	104	85 - 115	2004-03-23
Xylene		mg/L	0.300	0.323	108	85 - 115	2004-03-23

Standard (ICV-1) QC Batch: 8458

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Benzene		mg/L	0.100	0.108	108	85 - 115	2004-03-23
Toluene		mg/L	0.100	0.105	105	85 - 115	2004-03-23
Ethylbenzene		mg/L	0.100	0.104	104	85 - 115	2004-03-23
Xylene		mg/L	0.300	0.307	102	85 - 115	2004-03-23

Standard (CCV-1) QC Batch: 8458

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Benzene		mg/L	0.100	0.110	110	85 - 115	2004-03-23
Toluene		mg/L	0.100	0.106	106	85 - 115	2004-03-23
Ethylbenzene		mg/L	0.100	0.103	103	85 - 115	2004-03-23
Xylene		mg/L	0.300	0.316	105	85 - 115	2004-03-23

Standard (CCV-1) QC Batch: 8521

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Benzene		mg/L	0.100	0.0990	99	85 - 115	2004-03-25
Toluene		mg/L	0.100	0.0955	96	85 - 115	2004-03-25
Ethylbenzene		mg/L	0.100	0.0910	91	85 - 115	2004-03-25
Xylene		mg/L	0.300	0.272	91	85 - 115	2004-03-25

Standard (CCV-2) QC Batch: 8521

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Benzene		mg/L	0.100	0.0967	97	85 - 115	2004-03-25
Toluene		mg/L	0.100	0.0924	92	85 - 115	2004-03-25
Ethylbenzene		mg/L	0.100	0.0902	90	85 - 115	2004-03-25
Xylene		mg/L	0.300	0.266	89	85 - 115	2004-03-25

6701 Aberdeen Avenue, Ste. 9 Lubbock, Texas 79424 Tel (806) 794-1296 Fax (806) 794-1298 1 (800) 378-1296		TraceAnalysis, Inc.		155 McCutcheon, Suite H El Paso, Texas 79932 Tel (915) 585-3443 Fax (915) 585-4944 1 (888) 588-3443																									
Company Name: <u>Remediacon, Inc</u>		Phone #: <u>303-674-4370</u>		CHAIN-OF-CUSTODY AND ANALYSIS REQUEST LAB Order ID # <u>4031906</u>																									
Address: (Street, City, Zip) <u>P.O. Box 302, Evergreen, CO 80437</u>		Fax #:																											
Contact Person: <u>Mike Stewart</u>		Project Name: <u>Duke Energy Field Services</u>		ANALYSIS REQUEST (Circle or Specify Method No.)																									
Invoice to: <u>Duke Energy Field Services</u> (If different from above) <u>Attn: Steve Weathers</u>		Project #:																											
Project Location: <u>Hobbs Booster Station</u>		Sampler Signature: <u>John Ferguson</u>		<table border="1" style="width:100%; border-collapse: collapse; font-size: 8px;"> <tr> <td style="width:10%;">MTBE 8021B/602</td> <td style="width:10%;">Total Metals Ag As Ba Cd Cr Pb Se Hg 60108/2007</td> <td style="width:10%;">TCLP Volatiles</td> <td style="width:10%;">TCLP Semi Volatiles</td> <td style="width:10%;">TCLP Pesticides</td> <td style="width:10%;">RCI</td> <td style="width:10%;">GC/MS Vol 8260B/624</td> <td style="width:10%;">GC/MS Semi Vol 8270C/625</td> <td style="width:10%;">PCBs 8082/608</td> <td style="width:10%;">Pesticides 8081A/608</td> <td style="width:10%;">BOD TSS pH</td> <td style="width:10%;">Turn Around Time if different from standard</td> </tr> <tr> <td>BTX 8021B/602</td> <td>TPH 418 1/TX 1005</td> <td>PAH 8270C</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </table>		MTBE 8021B/602	Total Metals Ag As Ba Cd Cr Pb Se Hg 60108/2007	TCLP Volatiles	TCLP Semi Volatiles	TCLP Pesticides	RCI	GC/MS Vol 8260B/624	GC/MS Semi Vol 8270C/625	PCBs 8082/608	Pesticides 8081A/608	BOD TSS pH	Turn Around Time if different from standard	BTX 8021B/602	TPH 418 1/TX 1005	PAH 8270C									
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BTX 8021B/602	TPH 418 1/TX 1005	PAH 8270C																											
LAB # (LAB USE ONLY)	FIELD CODE	# CONTAINERS	Volume/Amount	MATRIX	PRESERVATIVE METHOD	SAMPLING																							
				WATER SOIL AIR SLUDGE	HCl HNO ₃ H ₂ SO ₄ NaOH ICE NONE	DATE TIME																							
29746	(MW-16) 0403160825	2	40ml	✓	✓	3/16 0825	✓																						
747	(MW-15) 0403160900	2	40ml	✓	✓	3/16 0900	✓																						
748	(MW-14) 0403160945	2	40ml	✓	✓	3/16 0945	✓																						
749	(MW-21) 0403161025	2	40ml	✓	✓	3/16 1025	✓																						
29750	(MW-19d) 0403161120	2	40ml	✓	✓	3/16 1120	✓																						
751	(MW-19) 0403161205	2	40ml	✓	✓	3/16 1205	✓																						
752	(MW-22) 0403161245	2	40ml	✓	✓	3/16 1245	✓																						
753	(MW-20) 0403161330	2	40ml	✓	✓	3/16 1330	✓																						
754	(Duplicate) 0403162000	2	40ml	✓	✓	3/16 2000	✓																						
755	Trip Blank	2	40ml	✓	✓		✓																						
Relinquished by: <u>John Ferguson</u>		Date: <u>3/18/04</u>	Time: <u>1340</u>	Received by: <u>Helen Shelton</u>		Date: <u>3/18/04</u>	Time: <u>1340</u>	LAB USE ONLY Intact <u>(Y)</u> N Headspace <u>(Y)</u> N Temp <u>4°C</u> Log-in Review <u>aw</u> ☐ Check if Special Reporting Limits Are Needed																					
Relinquished by: <u>Helen Shelton</u>		Date: <u>3/18/04</u>	Time: <u>1730</u>	Received by:		Date:	Time:																						
Relinquished by:		Date:	Time:	Received at Laboratory by: <u>Brenda Ward</u>		Date: <u>3/19/04</u>	Time: <u>10:21</u>																						
Submittal of samples constitutes agreement to Terms and Conditions listed on reverse side of C.O.C. <u>20 samples HS</u>																													

ORIGINAL COPY

Analytical and Quality Control Report

Mike Stewart
Remediacon Inc.
P.O. Box 302
Evergreen, CO 80437

Report Date: June 16, 2004

Work Order: 4061409

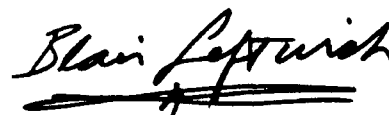
Project Location: Hobbs Booster Station
Project Name: Duke Energy Field Services
Project Number: Duke Energy Field Services

Enclosed are the Analytical Report and Quality Control Report for the following sample(s) submitted to TraceAnalysis, Inc.

Sample	Description	Matrix	Date Taken	Time Taken	Date Received
36312	0406081500 (MW-15)	water	2004-06-08	15:00	2004-06-12
36313	0406081536 (MW-6)	water	2004-06-08	15:36	2004-06-12
36314	0406081620 (MW-16)	water	2004-06-08	16:20	2004-06-12
36315	0406090715 (MW-3)	water	2004-06-09	07:15	2004-06-12
36316	0406090745 (MW-15)	water	2004-06-09	07:45	2004-06-12
36317	0406090945 (MW-14)	water	2004-06-09	09:45	2004-06-12
36318	0406091010 (MW-18)	water	2004-06-09	10:10	2004-06-12
36319	0406091040 (MW-10)	water	2004-06-09	10:40	2004-06-12
36320	0406091115 (MW-22)	water	2004-06-09	11:15	2004-06-12
36321	0406091135 (MW-19d)	water	2004-06-09	11:35	2004-06-12
36322	0406091137 (MW-19)	water	2004-06-09	11:37	2004-06-12
36323	0406091205 (MW-20)	water	2004-06-09	12:05	2004-06-12
36324	0406091155 (MW-21)	water	2004-06-09	11:55	2004-06-12
36325	0406092000 (Duplicate)	water	2004-06-09	20:00	2004-06-12
36326	Trip Blank	water	2004-06-09	00:00	2004-06-12

These results represent only the samples received in the laboratory. The Quality Control Report is generated on a batch basis. All information contained in this report is for the analytical batch(es) in which your sample(s) were analyzed.

This report consists of a total of 12 pages and shall not be reproduced except in its entirety, without written approval of TraceAnalysis, Inc.



Dr. Blair Leftwich, Director

Analytical Report

Sample: 36312 - 0406081500 (MW-15)

Analysis: BTEX
QC Batch: 10419
Prep Batch: 9214

Analytical Method: S 8021B
Date Analyzed: 2004-06-14
Date Prepared: 2004-06-14

Prep Method: S 5030B
Analyzed By: MS
Prepared By: MS

Parameter	Flag	RL Result	Units	Dilution	RL
Benzene		<0.00100	mg/L	1	0.00100
Toluene		<0.00100	mg/L	1	0.00100
Ethylbenzene		<0.00100	mg/L	1	0.00100
Xylene		<0.00100	mg/L	1	0.00100

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)		0.0873	mg/L	1	0.100	87	71.2 - 115
4-Bromofluorobenzene (4-BFB)	1	0.0734	mg/L	1	0.100	73	76.5 - 116

Sample: 36313 - 0406081536 (MW-6)

Analysis: BTEX
QC Batch: 10419
Prep Batch: 9214

Analytical Method: S 8021B
Date Analyzed: 2004-06-14
Date Prepared: 2004-06-14

Prep Method: S 5030B
Analyzed By: MS
Prepared By: MS

Parameter	Flag	RL Result	Units	Dilution	RL
Benzene		<0.00100	mg/L	1	0.00100
Toluene		<0.00100	mg/L	1	0.00100
Ethylbenzene		<0.00100	mg/L	1	0.00100
Xylene		<0.00100	mg/L	1	0.00100

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)		0.0914	mg/L	1	0.100	91	71.2 - 115
4-Bromofluorobenzene (4-BFB)	2	0.0759	mg/L	1	0.100	76	76.5 - 116

Sample: 36314 - 0406081620 (MW-16)

Analysis: BTEX
QC Batch: 10419
Prep Batch: 9214

Analytical Method: S 8021B
Date Analyzed: 2004-06-14
Date Prepared: 2004-06-14

Prep Method: S 5030B
Analyzed By: MS
Prepared By: MS

Parameter	Flag	RL Result	Units	Dilution	RL
Benzene		0.00360	mg/L	1	0.00100
Toluene		<0.00100	mg/L	1	0.00100
Ethylbenzene		<0.00100	mg/L	1	0.00100
Xylene		<0.00100	mg/L	1	0.00100

¹Low BFB surrogate recovery due to matrix interference. TFT surrogate recovery shows the method to be in control.

²Value falls within acceptable range.

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)		0.0874	mg/L	1	0.100	87	71.2 - 115
4-Bromofluorobenzene (4-BFB)		0.0778	mg/L	1	0.100	78	76.5 - 116

Sample: 36315 - 0406090715 (MW-3)

Analysis: BTEX
QC Batch: 10419
Prep Batch: 9214

Analytical Method: S 8021B
Date Analyzed: 2004-06-14
Date Prepared: 2004-06-14

Prep Method: S 5030B
Analyzed By: MS
Prepared By: MS

Parameter	Flag	RL Result	Units	Dilution	RL
Benzene		<0.00100	mg/L	1	0.00100
Toluene		<0.00100	mg/L	1	0.00100
Ethylbenzene		0.0183	mg/L	1	0.00100
Xylene		0.0118	mg/L	1	0.00100

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)		0.0845	mg/L	1	0.100	84	71.2 - 115
4-Bromofluorobenzene (4-BFB)	³	0.0764	mg/L	1	0.100	76	76.5 - 116

Sample: 36316 - 0406090745 (MW-15)

Analysis: BTEX
QC Batch: 10437
Prep Batch: 9228

Analytical Method: S 8021B
Date Analyzed: 2004-06-15
Date Prepared: 2004-06-15

Prep Method: S 5030B
Analyzed By: MS
Prepared By: MS

Parameter	Flag	RL Result	Units	Dilution	RL
Benzene		<0.00500	mg/L	5	0.00100
Toluene		<0.00500	mg/L	5	0.00100
Ethylbenzene		<0.00500	mg/L	5	0.00100
Xylene		<0.00500	mg/L	5	0.00100

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)	⁴	0.392	mg/L	5	0.100	78	78.4 - 118
4-Bromofluorobenzene (4-BFB)		0.365	mg/L	5	0.100	73	53.1 - 149

Sample: 36317 - 0406090945 (MW-14)

Analysis: BTEX
QC Batch: 10437
Prep Batch: 9228

Analytical Method: S 8021B
Date Analyzed: 2004-06-15
Date Prepared: 2004-06-15

Prep Method: S 5030B
Analyzed By: MS
Prepared By: MS

³Value falls within acceptable range.

⁴TFT surrogate recovery within limits.

Parameter	Flag	RL Result	Units	Dilution	RL
Benzene		<0.00500	mg/L	5	0.00100
Toluene		<0.00500	mg/L	5	0.00100
Ethylbenzene		0.00740	mg/L	5	0.00100
Xylene		<0.00500	mg/L	5	0.00100

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)	⁵	0.360	mg/L	5	0.100	72	78.4 - 118
4-Bromofluorobenzene (4-BFB)		0.364	mg/L	5	0.100	73	53.1 - 149

Sample: 36318 - 0406091010 (MW-18)

Analysis: BTEX	Analytical Method: S 8021B	Prep Method: S 5030B
QC Batch: 10422	Date Analyzed: 2004-06-14	Analyzed By: MS
Prep Batch: 9215	Date Prepared: 2004-06-14	Prepared By: MS

Parameter	Flag	RL Result	Units	Dilution	RL
Benzene		0.0108	mg/L	1	0.00100
Toluene		0.00300	mg/L	1	0.00100
Ethylbenzene		0.0155	mg/L	1	0.00100
Xylene		0.0222	mg/L	1	0.00100

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)		0.0914	mg/L	1	0.100	91	71.2 - 115
4-Bromofluorobenzene (4-BFB)		0.0853	mg/L	1	0.100	85	76.5 - 116

Sample: 36319 - 0406091040 (MW-10)

Analysis: BTEX	Analytical Method: S 8021B	Prep Method: S 5030B
QC Batch: 10422	Date Analyzed: 2004-06-14	Analyzed By: MS
Prep Batch: 9215	Date Prepared: 2004-06-14	Prepared By: MS

Parameter	Flag	RL Result	Units	Dilution	RL
Benzene		0.676	mg/L	100	0.00100
Toluene		<0.100	mg/L	100	0.00100
Ethylbenzene		<0.100	mg/L	100	0.00100
Xylene		0.153	mg/L	100	0.00100

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)		7.98	mg/L	100	0.100	80	71.2 - 115
4-Bromofluorobenzene (4-BFB)	⁶	7.41	mg/L	100	0.100	74	76.5 - 116

Sample: 36320 - 0406091115 (MW-22)

⁵Low TFT surrogate recovery due to matrix interference. BFB surrogate recovery shows the method to be in control.

⁶Low BFB surrogate recovery due to matrix interference. TFT surrogate recovery shows the method to be in control.

Analysis: BTEX
QC Batch: 10422
Prep Batch: 9215

Analytical Method: S 8021B
Date Analyzed: 2004-06-14
Date Prepared: 2004-06-14

Prep Method: S 5030B
Analyzed By: MS
Prepared By: MS

Parameter	Flag	RL Result	Units	Dilution	RL
Benzene		<0.00100	mg/L	1	0.00100
Toluene		<0.00100	mg/L	1	0.00100
Ethylbenzene		<0.00100	mg/L	1	0.00100
Xylene		<0.00100	mg/L	1	0.00100

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)		0.0916	mg/L	1	0.100	92	71.2 - 115
4-Bromofluorobenzene (4-BFB)		0.0816	mg/L	1	0.100	82	76.5 - 116

Sample: 36321 - 0406091135 (MW-19d)

Analysis: BTEX
QC Batch: 10422
Prep Batch: 9215

Analytical Method: S 8021B
Date Analyzed: 2004-06-14
Date Prepared: 2004-06-14

Prep Method: S 5030B
Analyzed By: MS
Prepared By: MS

Parameter	Flag	RL Result	Units	Dilution	RL
Benzene		<0.00100	mg/L	1	0.00100
Toluene		<0.00100	mg/L	1	0.00100
Ethylbenzene		<0.00100	mg/L	1	0.00100
Xylene		<0.00100	mg/L	1	0.00100

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)		0.0853	mg/L	1	0.100	85	71.2 - 115
4-Bromofluorobenzene (4-BFB)		0.0795	mg/L	1	0.100	80	76.5 - 116

Sample: 36322 - 0406091137 (MW-19)

Analysis: BTEX
QC Batch: 10422
Prep Batch: 9215

Analytical Method: S 8021B
Date Analyzed: 2004-06-14
Date Prepared: 2004-06-14

Prep Method: S 5030B
Analyzed By: MS
Prepared By: MS

Parameter	Flag	RL Result	Units	Dilution	RL
Benzene		<0.00100	mg/L	1	0.00100
Toluene		<0.00100	mg/L	1	0.00100
Ethylbenzene		<0.00100	mg/L	1	0.00100
Xylene		<0.00100	mg/L	1	0.00100

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)		0.0865	mg/L	1	0.100	86	71.2 - 115
4-Bromofluorobenzene (4-BFB)		0.0789	mg/L	1	0.100	79	76.5 - 116

Sample: 36323 - 0406091205 (MW-20)

Analysis: BTEX
QC Batch: 10422
Prep Batch: 9215

Analytical Method: S 8021B
Date Analyzed: 2004-06-14
Date Prepared: 2004-06-14

Prep Method: S 5030B
Analyzed By: MS
Prepared By: MS

Parameter	Flag	RL Result	Units	Dilution	RL
Benzene		<0.00100	mg/L	1	0.00100
Toluene		<0.00100	mg/L	1	0.00100
Ethylbenzene		<0.00100	mg/L	1	0.00100
Xylene		<0.00100	mg/L	1	0.00100

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)		0.0943	mg/L	1	0.100	94	71.2 - 115
4-Bromofluorobenzene (4-BFB)		0.0790	mg/L	1	0.100	79	76.5 - 116

Sample: 36324 - 0406091155 (MW-21)

Analysis: BTEX
QC Batch: 10422
Prep Batch: 9215

Analytical Method: S 8021B
Date Analyzed: 2004-06-14
Date Prepared: 2004-06-14

Prep Method: S 5030B
Analyzed By: MS
Prepared By: MS

Parameter	Flag	RL Result	Units	Dilution	RL
Benzene		<0.00100	mg/L	1	0.00100
Toluene		<0.00100	mg/L	1	0.00100
Ethylbenzene		<0.00100	mg/L	1	0.00100
Xylene		<0.00100	mg/L	1	0.00100

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)		0.0885	mg/L	1	0.100	88	71.2 - 115
4-Bromofluorobenzene (4-BFB)	⁷	0.0738	mg/L	1	0.100	74	76.5 - 116

Sample: 36325 - 0406092000 (Duplicate)

Analysis: BTEX
QC Batch: 10437
Prep Batch: 9228

Analytical Method: S 8021B
Date Analyzed: 2004-06-15
Date Prepared: 2004-06-15

Prep Method: S 5030B
Analyzed By: MS
Prepared By: MS

Parameter	Flag	RL Result	Units	Dilution	RL
Benzene		<0.00500	mg/L	5	0.00100
Toluene		<0.00500	mg/L	5	0.00100
Ethylbenzene		0.00610	mg/L	5	0.00100
Xylene		<0.00500	mg/L	5	0.00100

⁷Low BFB surrogate recovery due to matrix interference. TFT surrogate recovery shows the method to be in control.

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)	⁸	0.363	mg/L	5	0.100	73	78.4 - 118
4-Bromofluorobenzene (4-BFB)		0.357	mg/L	5	0.100	71	53.1 - 149

Sample: 36326 - Trip Blank

Analysis: BTEX
QC Batch: 10422
Prep Batch: 9215

Analytical Method: S 8021B
Date Analyzed: 2004-06-14
Date Prepared: 2004-06-14

Prep Method: S 5030B
Analyzed By: MS
Prepared By: MS

Parameter	Flag	RL Result	Units	Dilution	RL
Benzene		<0.00100	mg/L	1	0.00100
Toluene		<0.00100	mg/L	1	0.00100
Ethylbenzene		<0.00100	mg/L	1	0.00100
Xylene		<0.00100	mg/L	1	0.00100

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)		0.0926	mg/L	1	0.100	93	71.2 - 115
4-Bromofluorobenzene (4-BFB)	⁹	0.0757	mg/L	1	0.100	76	76.5 - 116

Method Blank (1) QC Batch: 10419

Parameter	Flag	Result	Units	RL
Benzene		<0.00100	mg/L	0.001
Toluene		<0.00100	mg/L	0.001
Ethylbenzene		<0.00100	mg/L	0.001
Xylene		<0.00100	mg/L	0.001

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)		0.0955	mg/L	1	0.100	96	70 - 130
4-Bromofluorobenzene (4-BFB)		0.0806	mg/L	1	0.100	81	70 - 130

Method Blank (1) QC Batch: 10422

Parameter	Flag	Result	Units	RL
Benzene		<0.00100	mg/L	0.001
Toluene		<0.00100	mg/L	0.001
Ethylbenzene		<0.00100	mg/L	0.001
Xylene		<0.00100	mg/L	0.001

⁸Low TFT surrogate recovery due to matrix interference. BFB surrogate recovery shows the method to be in control.

⁹BFB surrogate recovery within limits.

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)		0.0912	mg/L	1	0.100	91	70 - 130
4-Bromofluorobenzene (4-BFB)		0.0731	mg/L	1	0.100	73	70 - 130

Method Blank (1) QC Batch: 10437

Parameter	Flag	Result	Units	RL
Benzene		<0.00100	mg/L	0.001
Toluene		<0.00100	mg/L	0.001
Ethylbenzene		<0.00100	mg/L	0.001
Xylene		<0.00100	mg/L	0.001

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)		0.0990	mg/L	1	0.100	99	70 - 130
4-Bromofluorobenzene (4-BFB)		0.0826	mg/L	1	0.100	83	70 - 130

Laboratory Control Spike (LCS-1) QC Batch: 10419

Param	LCS Result	LCSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	RPD	Rec. Limit	RPD Limit
Benzene	0.0985	0.100	mg/L	1	0.100	<0.000255	98	2	70 - 130	20
Toluene	0.0997	0.102	mg/L	1	0.100	<0.000153	100	2	70 - 130	20
Ethylbenzene	0.102	0.104	mg/L	1	0.100	<0.000226	102	2	70 - 130	20
Xylene	0.310	0.316	mg/L	1	0.300	<0.000531	103	2	70 - 130	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Surrogate	LCS Result	LCSD Result	Units	Dil.	Spike Amount	LCS Rec.	LCSD Rec.	Rec. Limit
Trifluorotoluene (TFT)	0.0961	0.0920	mg/L	1	0.100	96	92	70 - 130
4-Bromofluorobenzene (4-BFB)	0.0942	0.0906	mg/L	1	0.100	94	91	70 - 130

Laboratory Control Spike (LCS-1) QC Batch: 10422

Param	LCS Result	LCSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	RPD	Rec. Limit	RPD Limit
Benzene	0.0984	0.0975	mg/L	1	0.100	<0.000255	98	1	70 - 130	20
Toluene	0.0995	0.0984	mg/L	1	0.100	<0.000153	100	1	70 - 130	20
Ethylbenzene	0.101	0.100	mg/L	1	0.100	<0.000226	101	0	70 - 130	20
Xylene	0.306	0.304	mg/L	1	0.300	<0.000531	102	0	70 - 130	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Surrogate	LCS Result	LCSD Result	Units	Dil.	Spike Amount	LCS Rec.	LCSD Rec.	Rec. Limit
Trifluorotoluene (TFT)	0.0926	0.0913	mg/L	1	0.100	93	91	70 - 130
4-Bromofluorobenzene (4-BFB)	0.0911	0.0882	mg/L	1	0.100	91	88	70 - 130

Laboratory Control Spike (LCS-1) QC Batch: 10437

Param	LCS Result	LCSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	RPD	Rec. Limit	RPD Limit
Benzene	0.0962	0.0893	mg/L	1	0.100	<0.000136	96	7	70 - 130	20
Toluene	0.0966	0.0900	mg/L	1	0.100	<0.000247	97	7	70 - 130	20
Ethylbenzene	0.0997	0.0924	mg/L	1	0.100	<0.000550	100	8	70 - 130	20
Xylene	0.302	0.282	mg/L	1	0.300	<0.00156	100	7	70 - 130	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Surrogate	LCS Result	LCSD Result	Units	Dil.	Spike Amount	LCS Rec.	LCSD Rec.	Rec. Limit
Trifluorotoluene (TFT)	0.0983	0.0923	mg/L	1	0.100	98	92	70 - 130
4-Bromofluorobenzene (4-BFB)	0.0981	0.0942	mg/L	1	0.100	98	94	70 - 130

Standard (CCV-1) QC Batch: 10419

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Benzene		mg/L	0.100	0.0956	96	85 - 115	2004-06-14
Toluene		mg/L	0.100	0.0966	97	85 - 115	2004-06-14
Ethylbenzene		mg/L	0.100	0.0991	99	85 - 115	2004-06-14
Xylene		mg/L	0.300	0.299	100	85 - 115	2004-06-14

Standard (CCV-2) QC Batch: 10419

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Benzene		mg/L	0.100	0.0993	99	85 - 115	2004-06-14
Toluene		mg/L	0.100	0.100	100	85 - 115	2004-06-14
Ethylbenzene		mg/L	0.100	0.102	102	85 - 115	2004-06-14
Xylene		mg/L	0.300	0.310	103	85 - 115	2004-06-14

Standard (ICV-1) QC Batch: 10422

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Benzene		mg/L	0.100	0.0994	99	85 - 115	2004-06-14
Toluene		mg/L	0.100	0.100	100	85 - 115	2004-06-14
Ethylbenzene		mg/L	0.100	0.102	102	85 - 115	2004-06-14
Xylene		mg/L	0.300	0.309	103	85 - 115	2004-06-14

Standard (CCV-1) QC Batch: 10422

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Benzene		mg/L	0.100	0.0993	99	85 - 115	2004-06-14

continued ...

standard continued ...

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Toluene		mg/L	0.100	0.100	100	85 - 115	2004-06-14
Ethylbenzene		mg/L	0.100	0.102	102	85 - 115	2004-06-14
Xylene		mg/L	0.300	0.309	103	85 - 115	2004-06-14

Standard (CCV-1) QC Batch: 10437

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Benzene		mg/L	0.100	0.0941	94	85 - 115	2004-06-15
Toluene		mg/L	0.100	0.0963	96	85 - 115	2004-06-15
Ethylbenzene		mg/L	0.100	0.0974	97	85 - 115	2004-06-15
Xylene		mg/L	0.300	0.294	98	85 - 115	2004-06-15

Standard (CCV-2) QC Batch: 10437

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Benzene		mg/L	0.100	0.0932	93	85 - 115	2004-06-15
Toluene		mg/L	0.100	0.0955	96	85 - 115	2004-06-15
Ethylbenzene		mg/L	0.100	0.0969	97	85 - 115	2004-06-15
Xylene		mg/L	0.300	0.293	98	85 - 115	2004-06-15

LAB # (LAB USE ONLY)		FIELD CODE	# CONTAINERS	Volume/Amount	MATRIX				PRESERVATIVE METHOD				SAMPLING		CHAIN-OF-CUSTODY AND ANALYSIS REQUEST																								
					WATER	SOIL	AIR	SLUDGE	HCl	HNO ₃	H ₂ SO ₄	NaOH	ICE	NONE	DATE	TIME	ANALYSIS REQUEST (Circle or Specify Method No.)																						
																		MTBE 8021B/602	BTEX 8021B/602	TPH 418 1/7X1005	PAH 8270C	Total Metals Ag As Ba Cd Cr Pb Se Hg 6010B/2007	TCLP Metals Ag As Ba Cd Cr Pb Se Hg	TCLP Volatiles	TCLP Semi Volatiles	TCLP Pesticides	RCI	GC/MS Vol 8260B/624	GC/MS Semi Vol 8270C/625	PCBs 8082/608	Pesticides 8081A/608	BOD TSS pH	Turn Around Time if different from standard	Hold					
3/3/2		0406081500 (MW-5)	2	80ml	✓				✓				✓			6/8	1500	✓																					
13		0406081536 (MW-6)	2	80ml	✓				✓				✓			6/8	1536	✓																					
14		0406081620 (MW-14)	2	80	✓				✓				✓			6/8	1620	✓																					
15		0406090715 (MW-3)	2	80	✓				✓				✓			6/9	0715	✓																					
16		0406090745 (MW-15)	2	80	✓				✓				✓			6/9	0745	✓																					
17		0406090945 (MW-14)	2	80	✓				✓				✓			6/9	0945	✓																					
18		0406091010 (MW-18)	2	80	✓				✓				✓			6/9	1010	✓																					
19		0406091040 (MW-10)	2	80	✓				✓				✓	✓		6/9	1040	✓																					
20		0406091115 (MW-22)	2	80	✓				✓				✓			6/9	1115	✓																					
21		0406091135 (MW-19d)	2	80	✓				✓				✓			6/9	1135	✓																					
22		0406091137 (MW-19)	2	80	✓				✓				✓			6/9	1137	✓																					

Relinquished by: <u>[Signature]</u> Date: <u>6/11/04</u> Time: <u>11:05</u>	Received by: <u>[Signature]</u> Date: <u>6/11/04</u> Time: <u>16:15</u>	LAB USE ONLY Intact <u>DO</u> / N Headspace <u>Y</u> / N Temp <u>1</u> ° Log-in Review <u>NA</u> Carrier # <u>Grayhound ALI 166 130 5349</u>
Relinquished by: <u>[Signature]</u> Date: <u>6/11/04</u> Time: <u>17:30</u>	Received by: <u>[Signature]</u> Date: <u>6/12/04</u> Time: <u>9:55</u>	
Relinquished by: <u>[Signature]</u> Date: <u>6/12/04</u> Time: <u>9:55</u>	Received at Laboratory by: <u>[Signature]</u> Date: <u>6/12/04</u> Time: <u>9:55</u>	

Relinquished by: [Signature] Date: 6/12/04 Time: 9:55

Received at Laboratory by: [Signature] Date: 6/12/04 Time: 9:55

Carrier # Grayhound ALI 166 130 5349

ORIGINAL COPY

6701 Aberdeen Avenue, Ste. 9
Lubbock, Texas 79424
Tel (806) 794-1296
Fax (806) 794-1298
1 (800) 378-1296

TraceAnalysis, Inc.

155 McCutcheon, Suite H
El Paso, Texas 79932
Tel (915) 585-3443
Fax (915) 585-4944
1 (888) 588-3443

CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

LAB Order ID # 4041409

Company Name: Remediaco, Inc
Address: (Street, City, Zip) P.O. Box 302, Evergreen, CO 80437
Contact Person: Mike Stewart
Invoice to: (If different from above) Duke Energy Field Services, Attn: Steve Weathers
Project #: DEFS
Project Location: Hobbs Booster Station

Phone #: 303-674-4370
Fax #: 720-528-8132
Project Name:
Sampler Signature: [Signature]

LAB #
(LAB USE ONLY)

FIELD CODE

CONTAINERS

Volume/Amount

MATRIX

WATER

SOIL

AIR

SLUDGE

PRESERVATIVE METHOD

DATE

TIME

SAMPLING

36323 0406091205 (MW-20)

2

80ml

✓

✓

✓

6/9

1205

✓

24 0406091155 (MW-21)

2

80

✓

✓

✓

6/9

1155

✓

25 0406092000 (Duplicate)

2

80

✓

✓

✓

6/9

2000

✓

26 Trip Blank

2

80

✓

✓

✓

✓

REMARKS: Samples Marked w/No Preservative Need to Be Extracted Within 7 Days of Sample Date !!

Check If Special Reporting Limits Are Needed

Relinquished by: [Signature] Date: 6/11/04 Time: 1615
Relinquished by: [Signature] Date: 6/11/04 Time: 1730
Relinquished by: [Signature] Date: 6-12-04 Time: 9:55am

Received by: [Signature] Date: 6/11/04 Time: 1615
Received by: [Signature] Date: 6/11/04 Time: 1730
Received at Laboratory by: [Signature] Date: 6-12-04 Time: 9:55am

LAB USE ONLY
Intact (Y) / N
Headspace Y / N
Temp 1 °
Log-in Review [Signature]

Carrier # [Signature] GLT 466 130 5349

Submittal of samples constitutes agreement to Terms and Conditions listed on reverse side of C.O.C. 8 samples AS

Submittal of samples constitutes agreement to Terms and Conditions listed on reverse side of C.O.C. 8 samples - HS

ORIGINAL COPY



DUKE ENERGY FIELD SERVICES
370 17th Street
Suite 2500
Denver, CO 80202
303 595 3331

December 22 2004

Mr. Jack Ford, C.P.G.
New Mexico Oil Conservation Division
1220 S. St. Francis Dr.
Santa Fe, NM 87505

**RE: September 2004 Groundwater Sampling Report
Hobbs Booster Station, Lea County New Mexico (GW-044)
Unit C and D, Section 4, Township 19 South, Range 38 East**

Dear Mr. Ford:

Duke Energy Field Services, LP (DEFS) is pleased to submit for your review, one copy of the September 2004 Groundwater Sampling Report for the DEFS Hobbs Booster Station (GW-044) located in Lea County, New Mexico.

If you have any questions regarding this report, please call me at 303-605-1718.

Sincerely

Duke Energy Field Services, LP

A handwritten signature in black ink, appearing to read 'Stephen Weathers', written over a horizontal line.

Stephen Weathers, PG
Sr. Environmental Specialist

Enclosure

cc: Larry Johnson, OCD Hobbs District Office
Lynn Ward, DEFS Midland Office
Environmental Files

December 17, 2004

Mr. Stephen Weathers
Duke Energy Field Services, LP
370 Seventeenth Street, Suite 2500
Denver, Colorado 80202

Subject: Summary of September 2004 Groundwater Monitoring Results
Hobbs Booster Station: Hobbs, New Mexico
(Units C and D Section 4, T 19 S, R 38 E, NMPM: Discharge Plan GW-044)

Dear Steve:

This letter summarizes the activities completed and data generated during the September 2004 quarterly groundwater-sampling episode at the Hobbs Booster Station in Hobbs New Mexico (Figure 1). Forty wells have been installed at the site. The well locations are shown on Figure 2. Well elevation and construction data are summarized in Table 1.

Two types of monitoring wells are present at the site. They include groundwater-monitoring wells (MW-1 through MW-22, Figure 1) and product-characterization wells (TW-A through TW-S, excluding TW-E and TW-F Figure 2). The product characterization wells were installed to characterize the nature and extent of free product beneath the site. Some of the wells will also be used in the free product extraction system.

Trident Environmental of Midland Texas completed the sampling on September 16, 2004 using the standard protocols for this site. Copies of the well development forms are attached.

The corrected groundwater elevations as measured on September 16, 2004 are shown on Table 2 for the monitor wells and Table 3 for the product characterization wells along with the historical data. The water-table elevations for the wells containing free product were estimated using the following formula:

$$GWE_{\text{corr}} = MGWE + (PT * PD); \text{ where}$$

- MGWE is the actual measured groundwater elevation;
- PT is the measured free-phase hydrocarbon thickness; and
- PD is the free phase hydrocarbon density
(assumed 0.74 or 0.817 depending upon the well location).

This correction provides an accurate estimate of the water table elevation if free product is not present in the well.

A water-table contour map based upon the corrected values as generated by the program Surfer using their kriging option is included as Figure 3. The groundwater flow direction continues at almost due east. This direction has remained essentially unchanged over the duration of the project.

Hydrographs for the three southern boundary wells MW-14, MW-15 and MW-16 are presented on Figure 4. The water table declined at a constant rate of approximately 2 feet between December 2002 and March 2004. The water table has stabilized since then because of the frequent rain in the spring and summer of 2004.

The product thickness measurements are summarized on Table 4. A contour map of the measured free product thickness values was also generated using the Surfer program, and it is reproduced in Figure 5. The greatest measured thickness remains in the vicinity of wells TW-C and MW-11. The site-wide free product removal system is nearly constructed.

The analytical results for the monitoring episode are summarized in Table 5. The laboratory report is attached. Benzene was not detected in the down-gradient boundary wells MW-19, MW-19D, MW-20 and MW-21. Benzene was detected at 0.0091 mg/l in MW-22. This concentration is below the New Mexico Water Quality Control Commission's groundwater standard of 0.01 mg/l

Benzene was not detected in south (cross-gradient) well MW-15 at a reporting limit of 0.005 mg/l. Benzene was detected in MW-14 at 0.0648 mg/l and in MW-16 at 0.0064 mg/l.

Ethylbenzene and xylenes were measured in MW-14 at concentrations of 0.010 and 0.0029 respectively. None of the other wells contained ethylbenzene or xylenes. None of the wells contained toluene.

All of the analytical results for benzene, toluene, ethylbenzene and xylenes are summarized in Tables 6 through 9 respectively. The concentration-time distributions for southern boundary wells MW-14, MW-15 and MW-16 are graphed on Figure 6.

An air sparge system supplies additional oxygen to groundwater upgradient from MW-14, MW-15 and MW-16. Preliminary data indicates that the system has helped to decrease the concentrations along the south boundary. The system has not operated continuously since the summer of 2004 due to logistical problems. In addition, the abnormal precipitation that started in March 2004 may also be disturbing the equilibration of the hydrogeologic system.

The sparge system's logistical problems are currently being reconciled by replacing the PVC supply pipe with welded Schedule 40 iron pipe. The system should be back online by the end of 2004. Data collected during subsequent monitoring episodes will provide additional information on its effectiveness.

Mr. Stephen Weathers
December 17, 2004
Page 3

Well MW-22 is also graphed on Figure 6 because benzene has been measured close to or above the New Mexico Water Quality Control Commission's groundwater standard two of the six times that it has been sampled. This well will be evaluated and discussed each quarter since it is located near to (approximately 90 feet upgradient) the DEFS property boundary.

The next sampling episode is scheduled for December 2004. Do not hesitate to contact me if you have any questions or comments on this report or any other aspects of the projects.

Sincerely,
AMERICAN ENVIRONMENTAL CONSULTING, LLC

A handwritten signature in black ink, appearing to read "Michael H. Stewart".

Michael H. Stewart, PE
Principal Engineer

MHS/tbm

attachment

TABLES

Table 1 – Summary of Hobbs Booster Station Well Construction Information

Well	Top of Casing Elevation	Total Well Depth	Screen Interval	Gravel Interval	Well	Top of Casing Elevation	Total Well Depth	Screen Interval	Gravel Interval
MW-1	3,626.06	57	37-57	34-57	MW-22	3,625.16	60	45-60	43-60
MW-2	3,623.14	53	33-53	30-53	TW-A	3,626.74	57	42-57	40-57
MW-3	3,623.01	53	33-53	30-53	TW-B	3,626.96	57	44-59	42-59
MW-4	3,624.29	57	37-57	34-57	TW-C	3,626.85	60	45-60	43-60
MW-5	3,629.16	57	37-57	34-57	TW-D	3,628.12	50	35-50	33-50
MW-6	3,626.93	53	33-53	30-53	TW-G	3,623.62	54	39-54	34-54
MW-7	3,621.40	56	33-53	31-56	TW-H	3,622.30	51	36-51	34-51
MW-8	3,623.62	58	36-56	34-58	TW-I	3,629.44	60	45-60	43-60
MW-9	3,625.21	63	43-63	40-63	TW-J	3,628.99	60	45-60	43-60
MW-10	3,621.07	58	36-56	34-58	TW-K	3,628.95	60	45-60	43-60
MW-11	3,625.88	63	43-63	41-63	TW-L	3,628.75	60	45-60	43-60
MW-12	3,626.60	65	40-60	38-65	TW-M	3,629.62	60	45-60	43-60
MW-13	3,626.30	69	44-64	38-64	TW-N	3,631.98	60	45-60	43-60
MW-14	3,621.42	66	42-62	34-66	TW-O	3,631.60	60	45-60	42-60
MW-15	3,619.39	59	37-57	31-59	TW-P	3,629.68	60	45-60	42-60
MW-16	3,621.87	58	34-54	30-56	TW-Q	3,627.90	58	53-58	41-58
MW-17	3,623.94	66	41-61	37-63	TW-R	3,627.34	60	45-60	43-45
MW-18	3,624.30	68	44-64	35-65	TW-S	3,628.77	60	45-60	43-45
MW-19	3,624.12	68	43-63	40-65	TW-T	3,628.62	60	45-60	43-45
MW-19D	3,623.79	83	71-76	69-76	TW-U	3,628.67	60	45-60	43-45
MW-20	3,621.49	59	59-44	59-42	TW-V	3,628.54	60	45-60	43-45
MW-21	3,624.25	61	61-46	61-44	TW-W	3,626.88	60	45-60	43-45

Notes: All units in feet

A natural sand pack is present in well MW-19D between 72 and 76 feet below ground surface (bgs). Artificially graded sand is present between 69 and 72 feet bgs.

Table 2 – Summary of Corrected Groundwater Elevations for the Groundwater Monitoring Wells

Well	Jul-99	May-00	Aug-00	Oct-00	Feb-01	May-01	Aug-01	Oct-01	Mar-02	Jun-02	Sep-02	Dec-02	Mar-03	Jun-03	Sep-03	Dec-03	Mar-04	Jun-04	Sep-04
MW-1	3,580.50	3,580.13	3,580.19	3,579.96	3,579.89	3,579.64	3,579.65	3,579.62	3,579.00	3,578.72	3,578.55	3,578.72	3,578.46	3,578.23	3,577.87	3,577.47	3,577.17	3,577.38	3,577.26
MW-2	3,582.63	3,582.04	3,582.33	3,581.95	3,581.90	3,581.67	3,581.43	3,581.33	3,580.88	3,580.65	3,580.45	3,580.81	3,580.36	3,580.16	3,579.84	3,579.55	3,580.05	3,579.61	3,579.79
MW-3	3,582.25	3,581.68	3,582.05	3,581.64	3,581.57	3,581.36	3,581.11	3,580.97	3,580.48	3,580.29	3,580.11	3,580.52	3,580.06	3,579.79	3,579.46	3,579.08	3,578.87	3,579.16	3,579.05
MW-4	3,579.95	3,579.27	3,579.12	3,579.00	3,578.96	3,578.82	3,578.60	3,578.39	3,577.96	3,577.77	3,577.62	3,577.87	3,577.63	3,577.24	3,576.85	3,576.46	3,576.16	3,576.52	3,576.35
MW-5	3,581.01	3,580.89	3,580.66	3,580.58	3,580.59	3,580.27	3,580.68	3,580.74	3,579.81	3,579.44	3,579.32	3,579.49	3,579.16	3,579.08	3,578.79	3,578.38	3,578.15	3,578.15	3,578.09
MW-6	3,582.98	3,582.61	3,582.72	3,582.45	3,582.38	3,582.15	3,581.94	3,581.94	3,581.49	3,581.17	3,580.97	3,581.16	3,580.87	3,580.74	3,580.42	3,580.08	3,579.92	3,579.99	3,580.02
MW-7		3,582.90	3,583.22	3,582.83	3,582.75	3,582.52	3,582.24	3,582.18	3,581.70	3,581.49	3,581.28	3,581.66	3,581.52	3,580.98	3,580.70	3,580.34	3,580.24	3,580.42	3,580.43
MW-8		3,579.93	3,580.12	3,579.84	3,579.80	3,579.79	3,579.73	3,579.26	3,578.83	3,578.64	3,578.50	3,578.77	3,578.48	3,578.15	3,577.77	3,577.35	3,577.08	3,577.29	3,577.14
MW-9		3,577.62	3,577.51	3,577.46	3,577.45	3,577.31	3,577.00	3,576.81	3,576.33	3,576.21	3,576.05	3,576.30	3,576.09	3,575.58	3,575.19	3,574.77	3,574.47	3,574.65	3,574.47
MW-10		3,579.43	3,579.64	3,579.28	3,579.26	3,579.08	3,578.75	3,578.51	3,578.03	3,577.99	3,577.84	3,578.15	3,577.86	3,577.34	3,576.93	3,576.48	3,576.14	3,576.43	3,576.28
MW-11		3,577.90	3,578.00	3,577.66	3,577.69	3,577.52	3,577.34	3,577.16	3,576.70	3,576.48	3,576.32	3,576.52	3,576.32	3,575.92	3,575.56	3,575.15	3,574.87	3,575.07	3,574.87
MW-12				3,578.58	3,578.58	3,578.18	3,578.18	3,577.96	3,577.73	3,577.53	3,577.21	3,577.53	3,577.39	3,576.93	3,576.63	3,576.10	3,575.98	3,576.13	3,575.83
MW-13				3,576.41	3,576.32	3,576.29	3,575.86	3,575.81	3,575.40	3,575.23	3,575.07	3,575.25	3,575.04	3,574.62	3,574.26	3,573.70	3,573.56	3,573.77	3,573.55
MW-14				3,577.51	3,577.46	3,577.35	3,576.90	3,576.56	3,576.06	3,576.26	3,576.13	3,576.42	3,576.17	3,575.39	3,574.96	3,574.49	3,574.22	3,574.48	3,574.27
MW-15				3,579.57	3,579.53	3,579.36	3,579.02	3,578.70	3,578.21	3,578.32	3,578.14	3,578.54	3,578.18	3,577.59	3,577.16	3,576.72	3,576.39	3,576.76	3,576.60
MW-16				3,581.50	3,581.42	3,581.21	3,580.96	3,580.79	3,580.28	3,580.14	3,579.96	3,580.43	3,579.93	3,579.62	3,579.29	3,578.90	3,578.69	3,579.04	3,578.94
MW-17				3,575.36	3,575.26	3,575.15	3,574.89	3,574.68	3,574.24	3,574.07	3,573.90	3,574.09	3,573.85	3,573.44	3,573.15	3,572.65	3,572.39	3,572.57	3,572.39
MW-18				3,574.66	3,574.53	3,574.43	3,574.21	3,573.98	3,573.56	3,573.38	3,573.22	3,573.42	3,573.15	3,572.76	3,572.42	3,572.01	3,571.74	3,571.93	3,571.76
MW-19				3,573.97	3,573.88	3,573.79	3,573.55	3,573.32	3,572.90	3,572.74	3,572.58	3,572.78	3,572.49	3,572.12	3,571.78	3,571.37	3,571.12	3,571.31	3,571.15
MW-20										3,572.51	3,572.36	3,572.59	3,572.28	3,571.92	3,571.56	3,571.15	3,570.89	3,571.11	3,570.94
MW-21										3,573.46	3,573.32	3,573.62	3,573.28	3,572.82	3,572.44	3,572.00	3,571.72	3,572.03	3,571.82
MW-22														3,572.08	3,571.78	3,571.39	3,571.14	3,571.29	3,571.15
MW-1d															3,571.55	3,571.13	3,570.88	3,571.01	3,570.86

All units are feet
Blank cells indicate well was not installed.

Table 3 – Summary of Corrected Groundwater Elevations for the FPH Characterization Wells

Well	Jun-02	Sep-02	Dec-02	Mar-03	Jun-03	Sep-03	Dec-03	Mar-04	Jun-04	Sep-04
TW-A	3,578.32	3,578.12	3,578.25	3,578.04	3,577.88	3,577.49	3,577.09	3,576.83	3,576.85	3,576.79
TW-B	3,577.45	3,577.28	3,577.42	3,577.25	3,577.01	3,576.62	3,576.23	3,575.96	3,576.05	3,575.88
TW-C	3,576.49	3,576.37	3,576.50	3,576.35	3,575.85	3,575.38	3,575.24	3,574.80	3,574.86	3,574.72
TW-D	3,575.85	3,576.12	3,576.15	3,576.09	3,575.78	3,575.43	3,575.02	3,574.80	3,575.00	3,573.72
TW-G	3,577.40	3,577.23	3,577.49	3,577.29	3,576.60	3,576.30	3,575.88	3,575.59	3,575.84	3,575.68
TW-H	3,579.15	3,578.99	3,614.41	3,578.96	3,578.67	3,578.27	3,577.88	3,577.59	3,577.82	3,577.70
TW-I	3,577.52	3,577.38	3,577.40	3,577.27	3,577.10	3,576.79	3,576.40	3,576.17	3,576.19	3,576.07
TW-J	3,576.50	3,576.43	3,576.45	3,576.30	3,576.07	3,575.75	3,575.38	3,575.13	3,575.21	3,575.05
TW-K	3,575.45	3,575.51	3,575.57	3,575.28	3,575.12	3,574.79	3,574.40	3,574.15	3,574.23	3,574.06
TW-L	3,574.96	3,575.07	3,575.16	3,574.98	3,574.69	3,574.37	3,574.02	3,573.74	3,573.84	3,573.37
TW-M		3,578.32	3,578.40	3,578.17	3,578.04	3,577.70	3,577.30	3,577.03	3,577.04	3,576.93
TW-N		3,577.22	3,577.13	3,576.99	3,576.88	3,576.56	3,576.18	3,575.91	3,575.90	3,575.79
TW-O		3,576.31	3,576.25	3,576.12	3,575.95	3,575.60	3,575.26	3,574.98	3,574.99	3,574.87
TW-P		3,575.20	3,575.21	3,575.08	3,574.86	3,574.56	3,574.20	3,573.94	3,574.01	3,573.82
TW-Q		3,579.12	3,618.98	3,579.04	3,578.89	3,578.56	3,578.19	3,577.91	3,577.99	3,577.90
TW-R		3,574.17	3,574.36	3,574.22	3,573.96	3,573.63	3,573.22	3,572.95	3,573.07	3,572.64
TW-S		3,573.90	3,618.71	3,573.76	3,573.47	3,573.13	3,572.87	3,572.79	3,572.93	3,572.73
TW-T									3,572.57	3,572.42
TW-U									3,572.28	3,572.13
TW-V									3,572.11	3,571.97
TW-W									3,573.07	3,572.93

Notes: A blank cell denotes that the well had not been installed at the time of the measurement

All units in feet

Wells TW-E and TW-F were plugged and abandoned in July 2002

Table 4 - Summary of Free Product Thickness Measurements

Well	Jun-02	Aug-02	Sep-02	Dec-02	Mar-03	Jun-03	Sep-03	Dec-03	Mar-04	Apr-04	Jun-04	Sep-04
MW-1	0.02	0.29	0.35	0.55	1.67	2.15	2.36	0.79	2.79	2.81	0.58	0.85
MW-2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.08		3.04	1.05	3
MW-4	2.86	3.38	3.36	3.11	3.39	3.40	3.43	3.46	3.5	3.08	3.16	3.28
MW-8	1.88	2.50	2.53	2.47	2.66	2.56	2.53	2.55	2.68	2.49	2.57	2.53
MW-9	0.01	0.01	0.52	0.46	0.88	1.21	1.19	1.29	1.38	1.37	0.86	1.13
MW-10	0.00	0.00	0.00	0.00	0.00	0.02	0.02	0.04	0.01	0.00	0.00	0.0
MW-11	3.09	6.57	7.21	7.45	7.41	7.91	10.38	11.52	12.17	11.36	11.41	11.59
MW-12	2.79	2.83	2.81	2.70	3.10	3.33	3.51	3.93	4.32	3.90	4.24	4.44
MW-13	7.37	8.59	8.62	8.42	8.88	8.69	8.46	9.02	8.09	8.15	8.27	6.39
MW-17	0.01	0.64	0.06	0.11	0.18	0.24	0.02	0.31	0.33	0.22	0.34	0.37
TW-A	1.15	2.70	3.41	3.67	3.96	3.93	3.93	3.99	4.09	3.89	3.79	3.74
TW-B	5.24	5.28	5.22	5.17	5.48	5.59	5.94	6.34	6.7	6.48	6.66	6.72
TW-C	9.84	10.52	10.6	10.58	11.58	2.66	2.43	12.28	0.56	11.96	12.11	11.95
TW-D	8.00	8.51	8.45	8.49	8.51	8.11	7.70	7.17	6.91	7.22	6.30	0.34
TW-G	2.29		1.84	1.75	2.09	0.49	3.44	3.77	3.67	4.01	3.73	3.93
TW-I	3.60	3.75	3.74	3.85	4.21	4.37	4.82	5.48	5.85	5.47	5.81	5.95
TW-J	1.28	5.39	6.01	6.16	6.54	6.90	7.74	8.44	8.87	8.19	8.18	8.32
TW-K	5.95	8.00	7.91	7.76	7.80	8.25	8.50	8.62	8.76	8.47	8.54	8.45
TW-L	5.34	7.91	7.88	7.79	8.05	8.09	8.23	8.30	8.39	8.19	8.24	5.59
TW-M	0.00	0.15	0.20	0.01	0.45	0.54	0.63	0.65	0.7	0.60	0.66	0.7
TW-N	0.00	0.02	0.00	0.01	0.03	0.01	0.02	0.04	0.05	0.04	0.05	0.0
TW-O	0.00	0.06	0.04	0.06	0.08	0.05	0.00	0.40	0.53	0.52	0.59	0.64
TW-P	0.00	0.00	1.33	2.53	4.21	4.91	5.42	5.90	6.36	6.46	6.65	6.42
TW-R	1.50	0.03	1.65	2.65	4.31	5.74	6.59	6.46	6.36	6.35	5.39	0.12
TW-S								1.82	5.15	5.31	5.51	5.22

All units in feet

Table 5 – September 17, 2004 Groundwater Monitoring Results

	Benzene	Toluene	Ethylbenzene	Xylenes
MW-14	0.0648	<0.001	0.010	0.0029
MW-15	<0.005/ <0.005	<0.005/ <0.005	<0.005/ <0.005	<0.005/ <0.005
MW-16	0.0064	<0.001	<0.001	<0.001
MW-19	<0.001	<0.001	<0.001	<0.001
MW-19D	<0.001	<0.001	<0.001	<0.001
MW-20	<0.005	<0.005	<0.005	<0.005
MW-21	<0.001	<0.001	<0.001	<0.001
MW-22	0.0091	<0.001	<0.001	<0.001

All units mg/l

Table 6 – Summary of Benzene Concentrations in Groundwater

Well	7/8/99	5/11/00	8/22/00	10/31/00	2/5/01	5/15/2001	8/9/2001	10/19/2001	3/13/2002	6/3/2002	9/24/2002	12/10/2002	3/19/2003	6/23/2003	9/17/2003	12/30/2003	1/14/2004	1/27/2004	3/19/2004	6/9/2004	9/17/0004
MW-1	0.232	0.191	0.181	0.197	0.570			0.144													
MW-2	0.934	1.330	1.420	1.020	2.110	0.848	1.760	1.3	0.712					0.277							
MW-3	0.262	0.202	0.011	<.005	0.346	<.001	0.345	0.029	<.001	0.009				<.001						<.001	
MW-4																					
MW-5	<.005	<.005	<.005	<.005	<.005	<.001	<.001	<.001	<.001	<.001				<.001						<.001	
MW-6	<.005	<.005	<.005	<.005	<.005	<.001	<.001	<.001	<.001	<.005				<.001						<.001	
MW-7		<.005	<.005	<.005	<.005	<.001	<.001	<.001	<.001	0.0039				<.001							
MW-8		0.824			0.950	0.294	1.230														
MW-9		0.702																			
MW-10				0.535				1.13						1.030						0.676	
MW-11																					
MW-12																					
MW-13																					
MW-14				<.005	0.041	0.002	0.034	0.029	<.001	0.068	0.126	0.0685	0.0820	0.0414	<.001	<.005			0.0212	<.005/<.005	0.0648
MW-15				<.005	0.237	0.003	0.353	0.317	<.001	0.358	<.005	<.005	<.005	0.352	<.001/<.005	<.001			0.0203	<.005	<.005/<.005
MW-16				<.005	0.094	0.01	0.098	0.012	<.001	<.005	0.0363	0.0042	<.001	<.001	<.001	0.0013			<.005	0.0036	0.0064
MW-17							0.04	0.076													
MW-18				<.005	<.005	0.004	0.007	0.036	<.001					<.005						0.0108	
MW-19				<.005	<.005	0.001	<.005	0.035	<.001	<.001	<.005	<.001	<.005	<.001	<.001	<.001			<.001	<.001	<.001
MW-19D														<.001	<.001	0.0338	0.030	<.005	<.001	<.001	<.001
MW-20											<.001	<.001	<.005	<.001	<.001	<.001			<.001	<.001	<.005
MW-21											<.001	<.001	<.001	<.001	<.001	<.001			<.001	<.001	<.001
MW-22														<.001	<.001	0.0249	0.001		0.0165/.0172	<.001	0.0091

Notes: All units mg/l
Blank cells: Sample not collected

Table 7 – Summary of Toluene Concentrations in Groundwater

Well	07/08/99	05/11/00	08/22/00	10/31/00	02/05/01	5/15/2001	8/9/2001	10/19/2001	3/13/2002	6/3/2002	9/24/2002	12/10/2002	3/19/2003	6/23/2003	9/17/2003	12/30/2003	1/14/2004	1/27/2004	3/19/2004	6/9/2004	9/17/2004
MW-1	0.029	0.034	0.035	0.028	0.020			<0.020													
MW-2	0.993	1.220	1.380	0.539	1.070	0.488	0.211	0.246	0.317					0.018							
MW-3	0.029	0.022	0.023	0.014	0.009	0.017	<.005	<0.010	<0.001	0.0072				<0.001						<0.001	
MW-4																					
MW-5	<.005	<.005	<.005	<.005	<.005	<.001	<.001	<0.001	<0.001	<0.001				<0.001						<0.001	
MW-6	<.005	<.005	0.008	<.005	<.005	<.001	<.001	<0.001	<0.001	<0.005				<0.001						<0.001	
MW-7		<.005	0.008	<.005	<.005	<.001	<.001	<0.001	<0.001	<0.001				<0.001							
MW-8		<.005			<.005	0.008	<.01														
MW-9		0.016																			
MW-10				0.061				0.85						0.099						<0.10	
MW-11																					
MW-12																					
MW-13																					
MW-14				<.005	<.005	<.001	<.005	<0.001	<0.001	<0.005	<0.02	<0.01	<0.01	<0.001	<0.001	<0.005			<0.001	<0.005/<0.005	<0.001
MW-15				<.005	<.005	0.003	<.005	<0.020	<0.005	<0.005	<0.005	<0.005	<0.005	0.001	<0.001/<0.005	<0.001			<0.01	<0.005	<0.005/<0.005
MW-16				<.005	<.005	0.004	<.005	<0.001	<0.001	<0.005	<0.005	<0.005	<0.001	<0.001	<0.001	<0.001			<0.005	<0.001	<0.001
MW-17							<.001	<0.005													
MW-18				<.005	<.005	0.003	<.001	<0.005	<0.005					<0.005						0.003	
MW-19				<.005	<.005	<.001	<.005	<0.005	<0.001	<0.001	<0.005	<0.001	<0.005	<0.001	<0.001	<0.001			<0.001	<0.001	<0.001
MW-19D														<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001
MW-20											<0.001	<0.001	<0.005	<0.001	<0.001	<0.001			<0.001	<0.001	<0.005
MW-21											<0.001	<0.001	<0.001	<0.001	<0.001	<0.001			<0.001	<0.001	<0.001
MW-22														<0.001	<0.001	<0.001	<0.001		<0.001/<0.001	<0.001	<0.001

Notes: All units mg/l
Blank cells: Sample not collected

Table 8 – Summary of Ethylbenzene Concentrations in Groundwater

Well	7/8/99	5/11/00	8/22/00	10/31/00	2/5/01	5/15/2001	8/9/2001	10/19/2001	3/13/2002	6/3/2002	9/24/2002	12/10/2002	3/19/2003	6/23/2003	9/17/2003	12/30/2003	1/14/2004	1/27/2004	3/19/2004	6/9/2004	9/17/2004
MW-1	0.168	0.344	0.273	0.285	0.287			0.236													
MW-2	0.192	0.309	0.298	0.235	0.334	0.396	0.255	0.314	0.220					0.101							
MW-3	0.222	0.245	0.218	0.203	0.259	0.324	0.277	0.207	0.0056	0.081				0.056						0.0183	
MW-4																					
MW-5	<.005	<.005	<.005	<.005	<.005	<.001	<.001	<0.001	<0.001	<0.001				<0.001						<0.001	
MW-6	<.005	<.005	<.005	<.005	<.005	<.001	<.001	<0.001	<0.001	<0.005				<0.001						<0.001	
MW-7		<.005	<.005	<.005	<.005	<.001	<.001	<0.001	<0.001	<0.001				<0.001							
MW-8		0.375			0.173	0.226	0.201														
MW-9		0.096																			
MW-10				0.128				0.889						0.198						<0.10	
MW-11																					
MW-12																					
MW-13																					
MW-14				0.007	<.005	0.004	<.005	0.018	0.0022	<0.005	<0.02	<0.01	0.020	0.0150	0.0133	0.014			0.0151	0.0074/0.0061	0.010
MW-15				<.005	<.005	0.004	<.005	<0.020	0.0376	<0.005	<0.005	<0.005	<0.005	0.005	0.0597/0.0456	0.0615			0.0497	<0.005	<0.005/<0.005
MW-16				<.005	<.005	0.003	<.005	0.007	<0.001	<0.005	<0.005	<0.005	<0.001	<0.001	<0.001	<0.001			<0.005	<0.001	<0.001
MW-17							0.057	0.101													
MW-18				0.017	<.005	0.020	<.001	0.089	<0.005					0.006						0.016	
MW-19				<.005	<.005	<.001	<.005	<0.005	<0.001	<0.001	<0.005	<0.001	<0.005	<0.001	<0.001	<0.001			<0.001	<0.001	<0.001
MW-19D														<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001
MW-20											<0.001	<0.001	<0.005	<0.001	<0.001	<0.001			<0.001	<0.001	<0.005
MW-21											<0.001	<0.001	<0.001	<0.001	<0.001	<0.001			<0.001	<0.001	<0.001
MW-22														<0.001	<0.001	0.001	0.00011		<0.001/<0.001	<0.001	<0.001

Notes: All units mg/l
Blank cells: Sample not collected

Table 9 – Summary of Total Xylenes Concentrations in Groundwater

Well	7/8/99	5/11/00	8/22/00	10/31/00	2/5/01	5/15/2001	8/9/2001	10/19/2001	3/13/2002	6/3/2002	9/24/2002	12/10/2002	3/19/2003	6/23/2003	9/17/2003	12/30/2003	1/14/2004	1/27/2004	3/19/2004	6/9/2004	9/17/2004
MW-1	0.229	0.604	0.450	0.466	0.461			0.12													
MW-2	0.359	0.501	0.541	0.394	0.597	0.772	0.452	0.243	0.227					0.100							
MW-3	0.287	0.291	0.264	0.290	0.285	0.346	0.316	0.146	0.008	0.104				0.0719						0.0118	
MW-4																					
MW-5	<.005	<.005	<.005	<.005	<.005	<.001	<.001	<0.001	<0.001	<0.001				<0.001						<0.001	
MW-6	<.005	0.038	0.007	<.005	<.005	<.001	<.001	<0.001	<0.001	<0.005				<0.001						<0.001	
MW-7		<.005	0.008	<.005	<.005	<.001	<.001	<0.001	<0.001	<0.001				<0.001							
MW-8		0.742			0.286	0.34	0.449														
MW-9		0.208																			
MW-10				1.280				2.38						0.307						0.153	
MW-11																					
MW-12																					
MW-13																					
MW-14				<.005	<.005	<.001	<.005	<0.001	0.0016	<0.005	<0.02	<0.01	<0.01	0.0020	0.0013	<0.005			<0.001	<0.005/<0.005	0.0029
MW-15				<.005	<.005	<.001	<.005	<0.020	<0.005	<0.005	<0.005	<0.005	<0.005	<0.001	<0.001/<0.005	0.001			<0.01	<0.005	<0.005/<0.005
MW-16				<.005	<.005	0.004	<.005	0.002	0.0024	<0.005	<0.005	<0.005	<0.001	<0.001	<0.001	<0.001			<0.005	<0.001	<0.001
MW-17							0.057	0.278													
MW-18				0.143	<.005	0.009	0.030	0.238	<0.005					0.006						0.0222	
MW-19				<.005	<.005	<.001	<.005	<0.005	0.0016	0.0028	<0.005	<0.001	<0.005	0.002	<0.001	0.0016			<0.001	<0.001	<0.001
MW-19D														<0.001	<0.001	0.0014	0.00100	<0.005	<0.001	<0.001	<0.001
MW-20											<0.001	<0.001	<0.005	<0.001	<0.001	<0.001			<0.001	<0.001	<0.005
MW-21											<0.001	<0.001	<0.001	<0.001	<0.001	<0.001			<0.001	<0.001	<0.001
MW-22														<0.001	<0.001	<0.001	0.00240		0.001/0.001	<0.001	<0.001

Notes: All units mg/l
Blank cells: Sample not collected

FIGURES

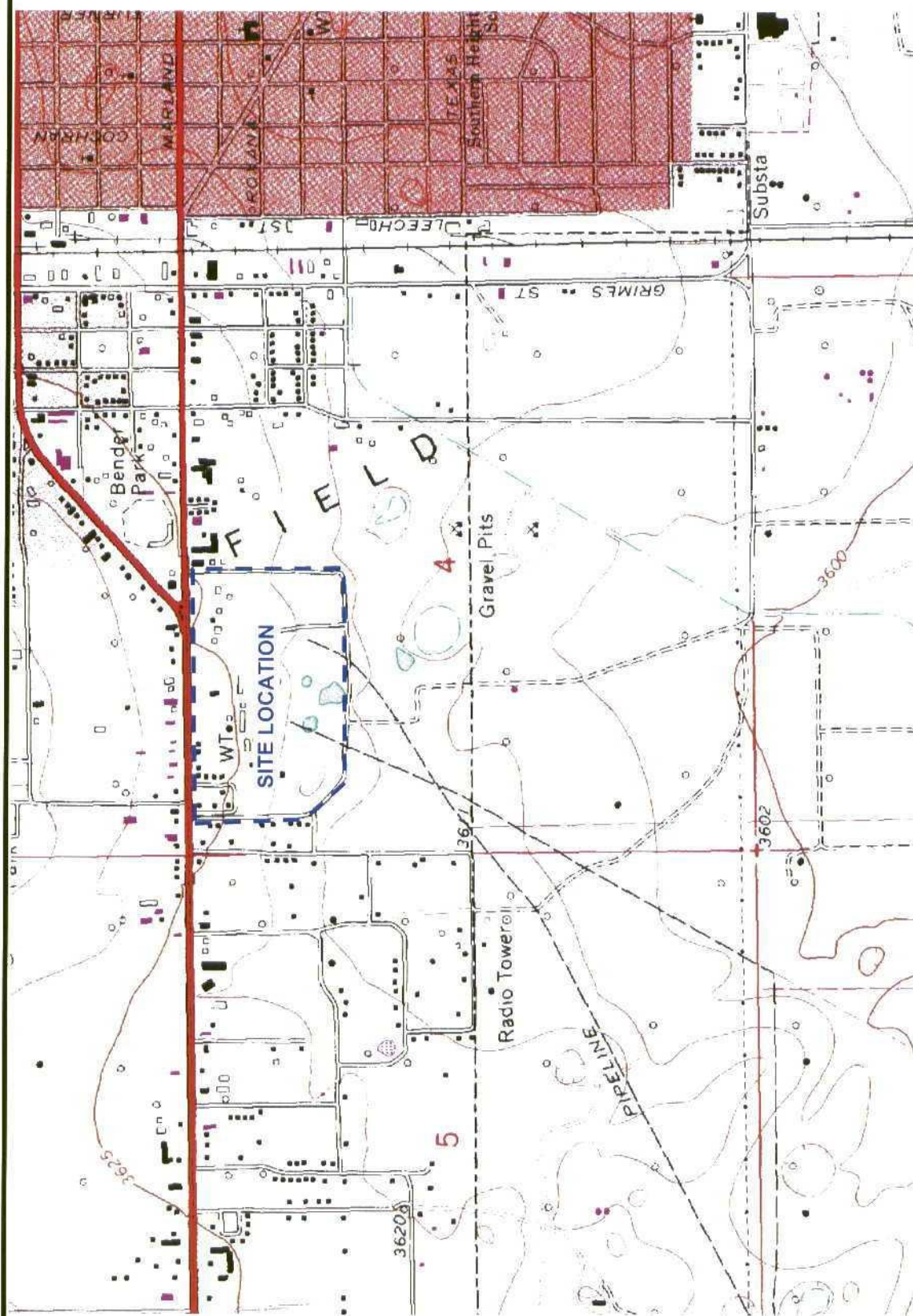


Figure 1 – DEFS Hobbs Booster Station Location

Hobbs Booster Station	
Duke Energy Field Services	DRAWN BY: MHS
	DATE: 3/04

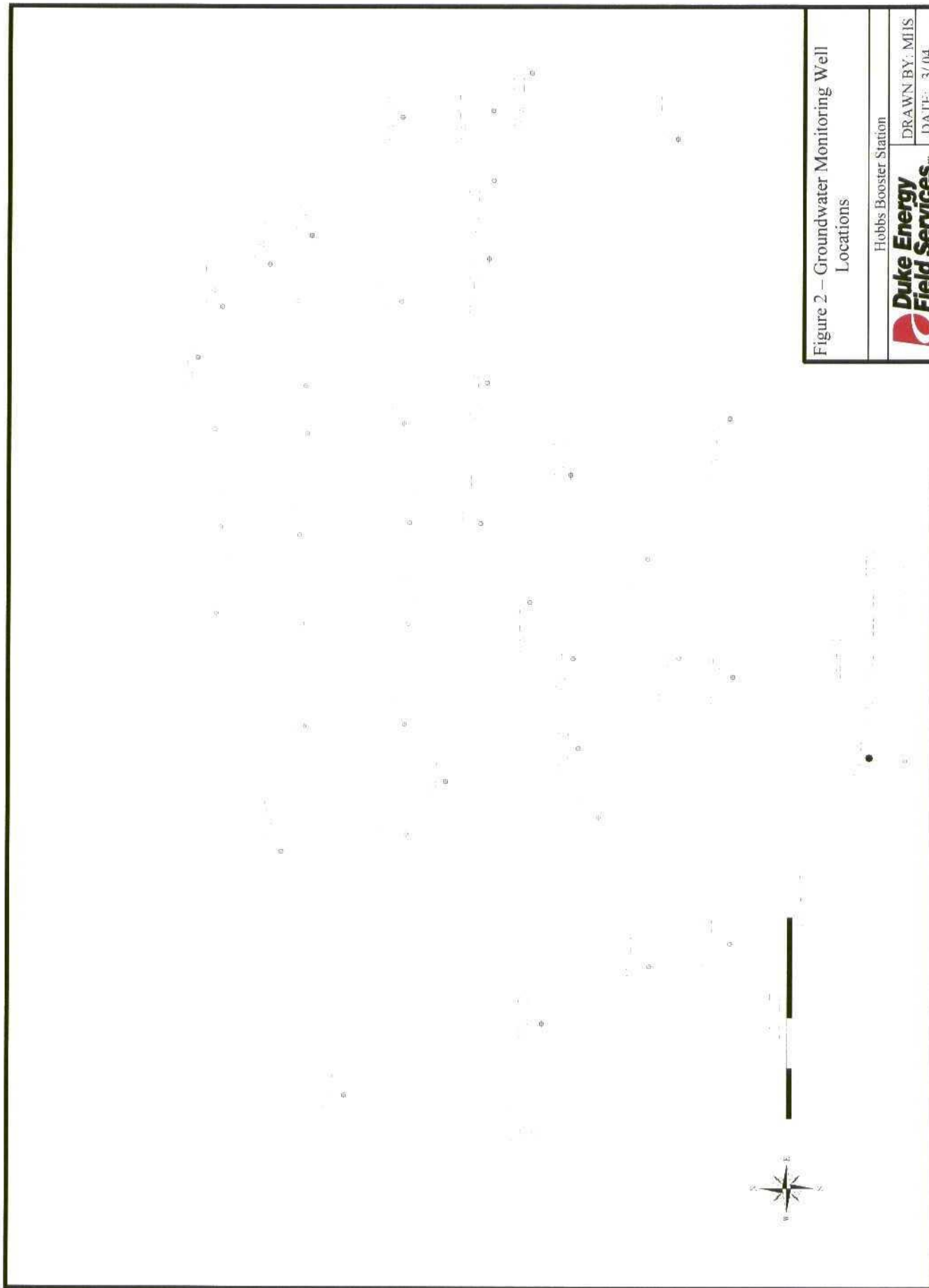


Figure 2 – Groundwater Monitoring Well Locations

Hobbs Booster Station

Duke Energy
Field Services

DRAWN BY: MHS

DATE: 3/04

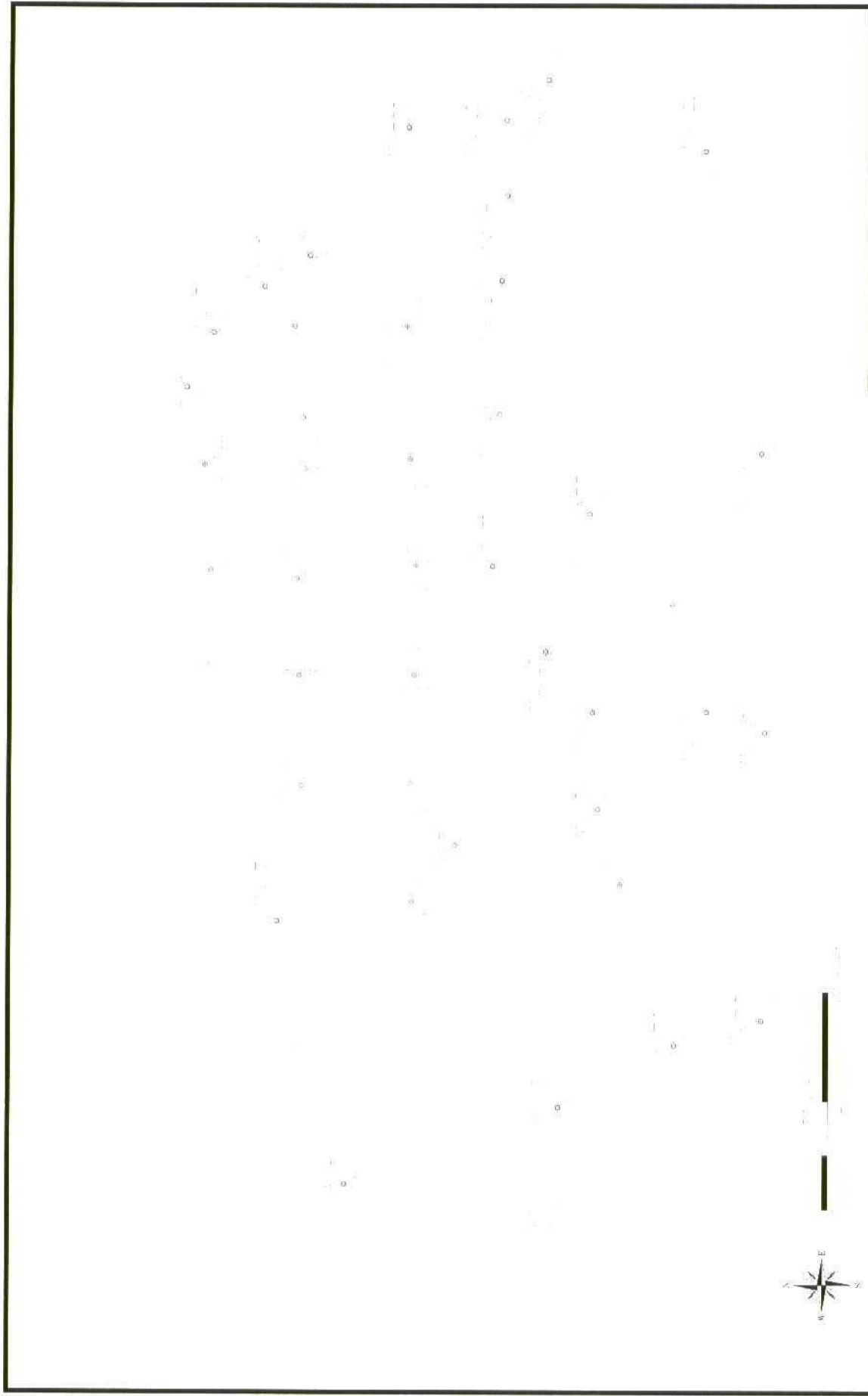


Figure 3 -September 2004 Water Table
Contours (feet)

Hobbs Booster Station



DRAWN BY: MHS

DATE: 12/04

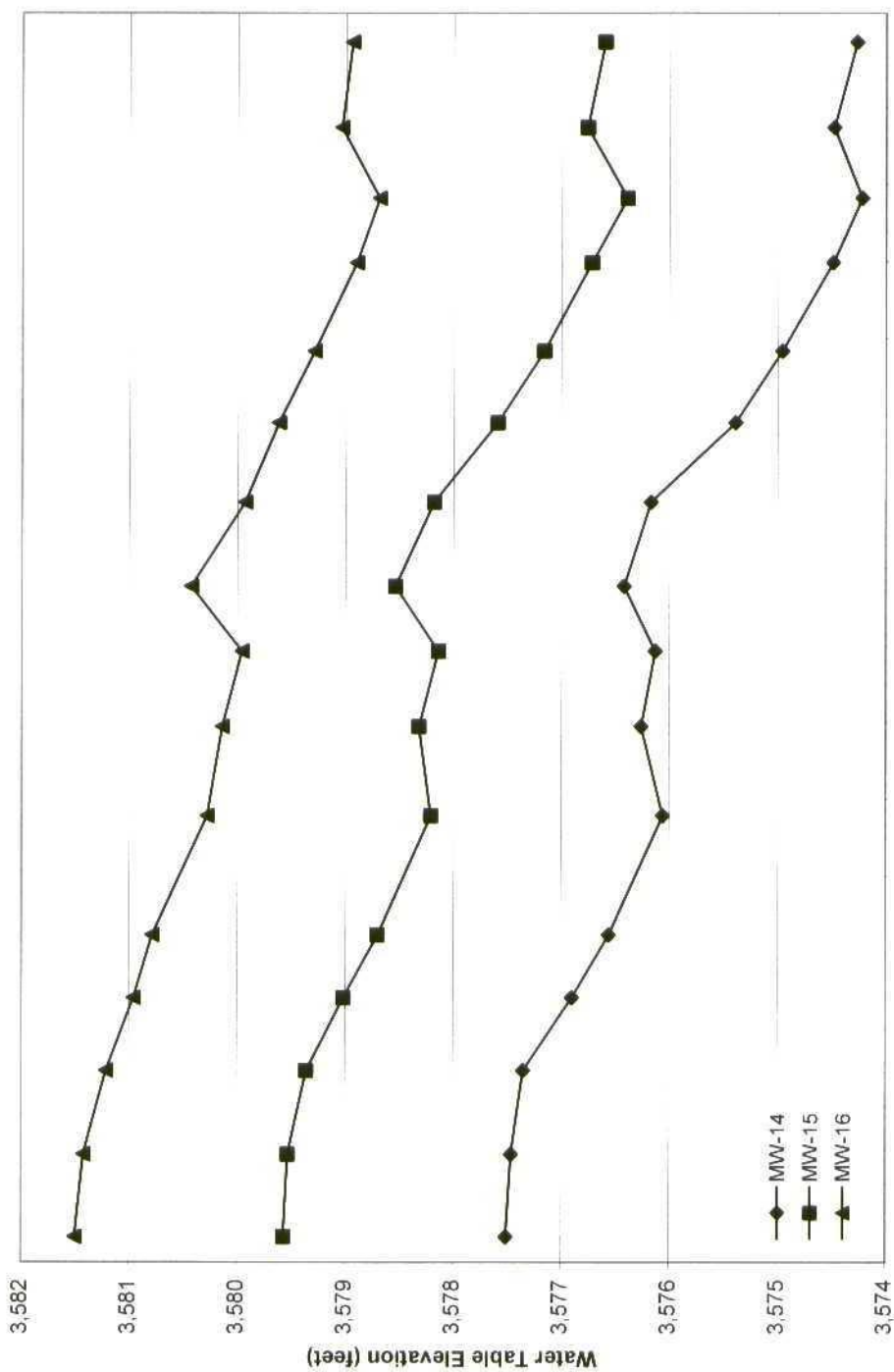


Figure 4 - Hydrographs for the Three Southern Boundary Wells

Hobbs Booster Station

Duke Energy
Field Services

DRAWN BY: MHS

DATE: 12/04



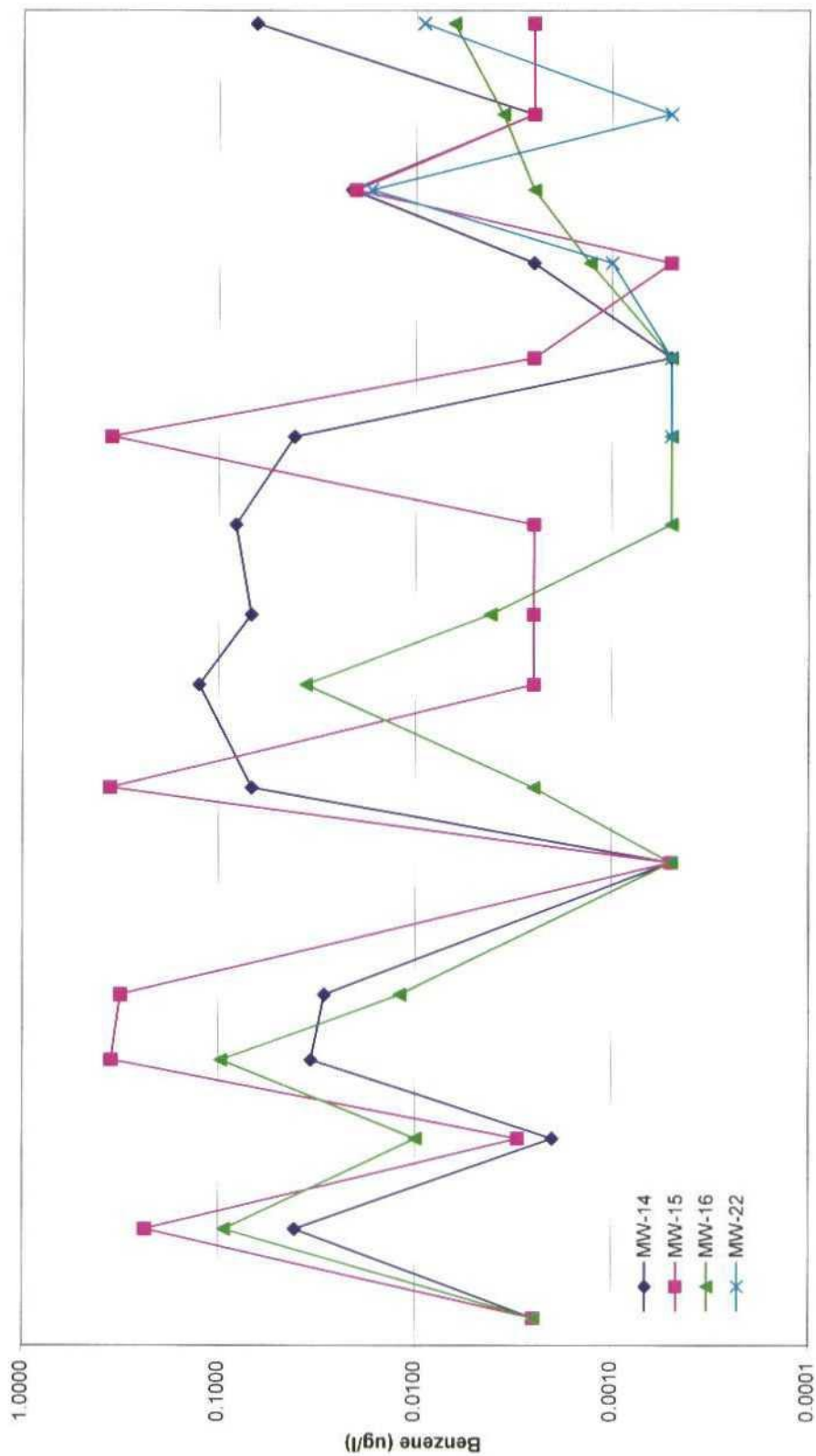
Figure 5 – Contour of September 2004
Measured Product Thickness (feet)

Hobbs Booster Station



DRAWN BY: MHS

DATE: 12/04



Values that are shown at 0.0005 mg/l are nondetects

Figure 6 – Benzene concentrations (mg/l) in South Boundary Wells

Hobbs Booster Station

Duke Energy
Field Services

DRAWN BY: MHS

DATE: 12/04

**WELL DEVELOPMENT FORMS AND
ANALYTICAL REPORT**

WELL SAMPLING DATA FORM

CLIENT: Duke Energy Field Services
 SITE NAME: Hobbs Booster
 PROJECT NO. F-105

WELL ID: MW-14
 DATE: 9/17/2004
 SAMPLER: D. Littlejohn

PURGING METHOD: ☒ Hand Bailed ☐ Pump If Pump, Type: _____

SAMPLING METHOD: ☒ Disposable Bailer ☐ Direct from Discharge Hose ☐ Other: _____

DESCRIBE EQUIPMENT DECONTAMINATION METHOD BEFORE SAMPLING THE WELL:

☒ Gloves ☐ Alconox ☐ Distilled Water Rinse ☐ Other: _____

DISPOSAL METHOD OF PURGE WATER: ☐ Surface Discharge ☐ Drums ☒ Disposal Facility

TOTAL DEPTH OF WELL: 63.07 Feet
 DEPTH TO WATER: 47.15 Feet
 HEIGHT OF WATER COLUMN: 15.92 Feet
 WELL DIAMETER: 2.0 Inch

7.8 Minimum Gallons to
 purge 3 well volumes
 (Water Column Height x 0.49)

TIME	VOLUME PURGED	TEMP. °C	COND. mS/cm	pH	DO mg/L	Turb	PHYSICAL APPEARANCE AND REMARKS
9:30	0	-	-	-	-	-	Begin Hand Bailing
9:40	2	23.9	2.62	7.36	0.0	-	
9:46	4	24.4	2.44	7.37	0.1	-	
9:54	6	24.7	2.39	7.40	0.1	-	
9:59	8	24.4	2.38	7.41	0.1	-	
0:29 :Total Time (hr:min)		8 :Total Vol (gal)		0.27 :Flow Rate (gal/min)			

SAMPLE NO.: Collected Sample No.: 040917 1010

ANALYSES: BTEX (8021-B)

COMMENTS: _____

WELL SAMPLING DATA FORM

CLIENT: Duke Energy Field Services
 SITE NAME: Hobbs Booster
 PROJECT NO. F-105

WELL ID: MW-15
 DATE: 9/17/2004
 SAMPLER: D. Littlejohn

PURGING METHOD: ☒ Hand Bailed ☐ Pump If Pump, Type: _____

SAMPLING METHOD: ☒ Disposable Bailer ☐ Direct from Discharge Hose ☐ Other: _____

DESCRIBE EQUIPMENT DECONTAMINATION METHOD BEFORE SAMPLING THE WELL:

☒ Gloves ☐ Alconox ☐ Distilled Water Rinse ☐ Other: _____

DISPOSAL METHOD OF PURGE WATER: ☐ Surface Discharge ☐ Drums ☒ Disposal Facility

TOTAL DEPTH OF WELL: 58.36 Feet
 DEPTH TO WATER: 42.79 Feet
 HEIGHT OF WATER COLUMN: 15.57 Feet
 WELL DIAMETER: 2.0 Inch

7.6 Minimum Gallons to
 purge 3 well volumes
 (Water Column Height x 0.49)

TIME	VOLUME PURGED	TEMP. °C	COND. m S/cm	pH	DO mg/L	Turb	PHYSICAL APPEARANCE AND REMARKS
10:26	0	-	-	-	-	-	Begin Hand Bailing
10:31	2	22.5	1.36	7.10	0.0	-	
10:37	4	24.8	1.40	7.10	0.0	-	
10:45	6	26.0	1.43	7.10	0.0	-	
0:19 :Total Time (hr:min)		6 :Total Vol (gal)		0.31 :Flow Rate (gal/min)			

SAMPLE NO.: Collected Sample No.: 040917 1050

ANALYSES: BTEX (8021-B)

COMMENTS: Collected Duplicate No.: 0409172000

WELL SAMPLING DATA FORM

CLIENT: Duke Energy Field Services

SITE NAME: Hobbs Booster

PROJECT NO. F-105

WELL ID: MW-16

DATE: 9/17/2004

SAMPLER: D. Littlejohn

PURGING METHOD: ☒ Hand Bailed ☐ Pump If Pump, Type: _____

SAMPLING METHOD: ☒ Disposable Bailer ☐ Direct from Discharge Hose ☐ Other: _____

DESCRIBE EQUIPMENT DECONTAMINATION METHOD BEFORE SAMPLING THE WELL:

☒ Gloves ☐ Alconox ☐ Distilled Water Rinse ☐ Other: _____

DISPOSAL METHOD OF PURGE WATER: ☐ Surface Discharge ☐ Drums ☒ Disposal Facility

TOTAL DEPTH OF WELL: 56.70 Feet

DEPTH TO WATER: 42.93 Feet

HEIGHT OF WATER COLUMN: 13.77 Feet

WELL DIAMETER: 2.0 Inch

6.7 Minimum Gallons to
purge 3 well volumes
(Water Column Height x 0.49)

TIME	VOLUME PURGED	TEMP. °C	COND. m S/cm	pH	DO mg/L	Turb	PHYSICAL APPEARANCE AND REMARKS
11:13	0	-	-	-	-	-	Begin Hand Bailing
11:20	2	24.2	1.54	7.10	0.0	-	
11:25	4	24.2	1.56	7.11	0.1	-	
11:33	6	24.9	1.74	7.10	0.6	-	
11:38	8	24.2	1.48	7.16	0.3	-	
0:25 :Total Time (hr:min)		8 :Total Vol (gal)		0.32 :Flow Rate (gal/min)			

SAMPLE NO.: Collected Sample No.: 040917 1145

ANALYSES: BTEX (8021-B)

COMMENTS: _____

WELL SAMPLING DATA FORM

CLIENT: Duke Energy Field Services

SITE NAME: Hobbs Booster

PROJECT NO. F-105

WELL ID: MW-19

DATE: 9/17/2004

SAMPLER: D. Littlejohn

PURGING METHOD: ☒ Hand Bailed ☐ Pump If Pump, Type: _____

SAMPLING METHOD: ☒ Disposable Bailer ☐ Direct from Discharge Hose ☐ Other: _____

DESCRIBE EQUIPMENT DECONTAMINATION METHOD BEFORE SAMPLING THE WELL:

☒ Gloves ☐ Alconox ☐ Distilled Water Rinse ☐ Other: _____

DISPOSAL METHOD OF PURGE WATER: ☐ Surface Discharge ☐ Drums ☒ Disposal Facility

TOTAL DEPTH OF WELL: 65.60 Feet

DEPTH TO WATER: 52.97 Feet

HEIGHT OF WATER COLUMN: 12.63 Feet

WELL DIAMETER: 2.0 Inch

6.2 Minimum Gallons to
purge 3 well volumes
(Water Column Height x 0.49)

TIME	VOLUME PURGED	TEMP. °C	COND. mS/cm	pH	DO mg/L	Turb	PHYSICAL APPEARANCE AND REMARKS
7:43	0	-	-	-	-	-	Begin Hand Bailing
7:49	2	19.5	2.21	7.04	0.2	-	
7:56	4	19.0	2.19	7.05	0.3	-	
8:02	6	19.1	2.13	7.07	0.2	-	
8:08	8	19.2	2.09	7.08	0.1	-	
0:25 :Total Time (hr:min)		8 :Total Vol (gal)		0.32 :Flow Rate (gal/min)			

SAMPLE NO.: Collected Sample No.: 040917 0810

ANALYSES: BTEX (8021-B)

COMMENTS: _____

WELL SAMPLING DATA FORM

CLIENT: Duke Energy Field Services
 SITE NAME: Hobbs Booster
 PROJECT NO. F-105

WELL ID: MW-19d
 DATE: 9/17/2004
 SAMPLER: D. Littlejohn

PURGING METHOD: ☒ Hand Bailed ☐ Pump If Pump, Type: _____

SAMPLING METHOD: ☒ Disposable Bailer ☐ Direct from Discharge Hose ☐ Other: _____

DESCRIBE EQUIPMENT DECONTAMINATION METHOD BEFORE SAMPLING THE WELL:

☒ Gloves ☐ Alconox ☐ Distilled Water Rinse ☐ Other: _____

DISPOSAL METHOD OF PURGE WATER: ☐ Surface Discharge ☐ Drums ☒ Disposal Facility

TOTAL DEPTH OF WELL: 79.12 Feet
 DEPTH TO WATER: 52.93 Feet
 HEIGHT OF WATER COLUMN: 26.19 Feet
 WELL DIAMETER: 2.0 Inch

12.8 Minimum Gallons to
 purge 3 well volumes
 (Water Column Height x 0.49)

TIME	VOLUME PURGED	TEMP. °C	COND. m S/cm	pH	DO mg/L	Turb	PHYSICAL APPEARANCE AND REMARKS
8:28	0	-	-	-	-	-	Begin Hand Bailing
8:39	4	21.3	2.51	7.26	0.4	-	
8:52	8	22.2	2.51	7.24	0.6	-	
9:05	12	22.1	2.49	7.25	0.6	-	
0:37 :Total Time (hr:min)			12 :Total Vol (gal)			0.32 :Flow Rate (gal/min)	

SAMPLE NO.: Collected Sample No.: 040917 0910
 ANALYSES: BTEX (8021-B)
 COMMENTS: _____

WELL SAMPLING DATA FORM

CLIENT: Duke Energy Field Services
 SITE NAME: Hobbs Booster
 PROJECT NO. F-105

WELL ID: MW-20
 DATE: 9/16/2004
 SAMPLER: D. Littlejohn

PURGING METHOD: ☒ Hand Bailed ☐ Pump If Pump, Type: _____

SAMPLING METHOD: ☒ Disposable Bailer ☐ Direct from Discharge Hose ☐ Other: _____

DESCRIBE EQUIPMENT DECONTAMINATION METHOD BEFORE SAMPLING THE WELL:

☒ Gloves ☐ Alconox ☐ Distilled Water Rinse ☐ Other: _____

DISPOSAL METHOD OF PURGE WATER: ☐ Surface Discharge ☐ Drums ☒ Disposal Facility

TOTAL DEPTH OF WELL: 60.72 Feet
 DEPTH TO WATER: 50.55 Feet
 HEIGHT OF WATER COLUMN: 10.17 Feet
 WELL DIAMETER: 2.0 Inch

5.0 Minimum Gallons to
 purge 3 well volumes
 (Water Column Height x 0.49)

TIME	VOLUME PURGED	TEMP. °C	COND. m S/cm	pH	DO mg/L	Turb	PHYSICAL APPEARANCE AND REMARKS
17:27	0	-	-	-	-	-	Begin Hand Bailing
17:31	2	22.8	1.73	6.98	2.8	-	
17:38	4	22.9	2.07	6.93	1.1	-	
17:45	6	22.7	1.84	6.97	2.4	-	
17:51	8	22.3	1.71	7.01	3.2	-	
17:58	10	21.9	1.68	7.02	3.3	-	
0:31 :Total Time (hr:min)		10 :Total Vol (gal)		0.32 :Flow Rate (gal/min)			

SAMPLE NO.: Collected Sample No.: 040916 1810
 ANALYSES: BTEX (8021-B)
 COMMENTS: Collected MS/MSD Samples

WELL SAMPLING DATA FORM

CLIENT: Duke Energy Field Services

SITE NAME: Hobbs Booster

PROJECT NO. F-105

WELL ID: MW-21

DATE: 9/16/2004

SAMPLER: D. Littlejohn

PURGING METHOD: ☒ Hand Bailed ☐ Pump If Pump, Type: _____

SAMPLING METHOD: ☒ Disposable Bailer ☐ Direct from Discharge Hose ☐ Other: _____

DESCRIBE EQUIPMENT DECONTAMINATION METHOD BEFORE SAMPLING THE WELL:

☒ Gloves ☐ Alconox ☐ Distilled Water Rinse ☐ Other: _____

DISPOSAL METHOD OF PURGE WATER: ☐ Surface Discharge ☐ Drums ☒ Disposal Facility

TOTAL DEPTH OF WELL: 62.74 Feet

DEPTH TO WATER: 52.43 Feet

HEIGHT OF WATER COLUMN: 10.31 Feet

WELL DIAMETER: 2.0 Inch

5.0 Minimum Gallons to
purge 3 well volumes
(Water Column Height x 0.49)

TIME	VOLUME PURGED	TEMP. °C	COND. m S/cm	pH	DO mg/L	Turb	PHYSICAL APPEARANCE AND REMARKS
18:33	0	-	-	-	-	-	Begin Hand Bailing
18:39	2	21.0	2.38	6.98	0.0	-	
18:46	4	20.7	2.36	6.99	0.2	-	
18:53	6	20.4	2.44	6.98	0.5	-	
18:58	8	20.2	2.34	6.99	0.3	-	
0:25 :Total Time (hr:min)			8 :Total Vol (gal)			0.32 :Flow Rate (gal/min)	

SAMPLE NO.: Collected Sample No.: 040916 1900

ANALYSES: _____

COMMENTS: _____

WELL SAMPLING DATA FORM

CLIENT: Duke Energy Field Services

SITE NAME: Hobbs Booster

PROJECT NO. F-105

WELL ID: MW-22

DATE: 9/17/2004

SAMPLER: D. Littlejohn

PURGING METHOD: ☒ Hand Bailed ☐ Pump If Pump, Type: _____

SAMPLING METHOD: ☒ Disposable Bailer ☐ Direct from Discharge Hose ☐ Other: _____

DESCRIBE EQUIPMENT DECONTAMINATION METHOD BEFORE SAMPLING THE WELL:

☒ Gloves ☐ Alconox ☐ Distilled Water Rinse ☐ Other: _____

DISPOSAL METHOD OF PURGE WATER: ☐ Surface Discharge ☐ Drums ☒ Disposal Facility

TOTAL DEPTH OF WELL: 62.33 Feet

DEPTH TO WATER: 54.01 Feet

HEIGHT OF WATER COLUMN: 8.32 Feet

WELL DIAMETER: 2.0 Inch

4.1 Minimum Gallons to
purge 3 well volumes
(Water Column Height x 0.49)

TIME	VOLUME PURGED	TEMP. °C	COND. m S/cm	pH	DO mg/L	Turb	PHYSICAL APPEARANCE AND REMARKS
6:58	0	-	-	-	-	-	Begin Hand Bailing
7:05	2	17.8	1.76	7.21	0.2	-	
7:16	4	17.5	1.73	7.24	0.2	-	
7:24	6	18.2	1.75	7.24	0.1	-	
0:26 :Total Time (hr:min)		6 :Total Vol (gal)			0.23 :Flow Rate (gal/min)		

SAMPLE NO.: Collected Sample No.: 040917 0750

ANALYSES: BTEX (8021-B)

COMMENTS: _____

Analytical and Quality Control Report

Mike Stewart
Remediacon Inc.
P.O. Box 302
Evergreen, CO 80437

Report Date: September 27, 2004

Work Order: 4092105

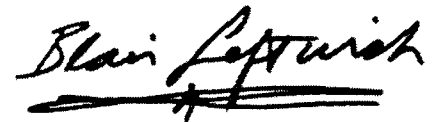
Project Location: Hobbs Booster Station
Project Name: Duke Energy Field Services
Project Number: Duke Energy Field Services

Enclosed are the Analytical Report and Quality Control Report for the following sample(s) submitted to TraceAnalysis, Inc.

Sample	Description	Matrix	Date Taken	Time Taken	Date Received
44072	MW-20 (0409161810)	water	2004-09-16	18:10	2004-09-21
44074	MW-21 (0409161900)	water	2004-09-16	19:00	2004-09-21
44075	MW-22 (0409170730)	water	2004-09-16	07:30	2004-09-21
44076	MW-19 (0409170810)	water	2004-09-17	08:10	2004-09-21
44077	MW19D (0409170910)	water	2004-09-17	09:10	2004-09-21
44078	MW-14 (0409171010)	water	2004-09-17	10:10	2004-09-21
44079	MW-15 (0409171050)	water	2004-09-17	10:50	2004-09-21
44080	MW-16 (0409171145)	water	2004-09-17	11:45	2004-09-21
44081	Duplicate (0409172000)	water	2004-09-17	20:00	2004-09-21
44082	Trip Blank	water	2004-09-17	00:00	2004-09-21

These results represent only the samples received in the laboratory. The Quality Control Report is generated on a batch basis. All information contained in this report is for the analytical batch(es) in which your sample(s) were analyzed.

This report consists of a total of 11 pages and shall not be reproduced except in its entirety, without written approval of TraceAnalysis, Inc.



Dr. Blair Leftwich, Director

Analytical Report

Sample: 44072 - MW-20 (0409161810)

Analysis:	BTEX	Analytical Method:	S 8021B	Prep Method:	S 5030B
QC Batch:	12887	Date Analyzed:	2004-09-25	Analyzed By:	MT
Prep Batch:	11395	Date Prepared:	2004-09-25	Prepared By:	MT

Parameter	Flag	RL Result	Units	Dilution	RL
Benzene	1	<0.00500	mg/L	5	0.00100
Toluene		<0.00500	mg/L	5	0.00100
Ethylbenzene		<0.00500	mg/L	5	0.00100
Xylene		<0.00500	mg/L	5	0.00100

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)		0.500	mg/L	5	0.100	100	78.4 - 118
4-Bromofluorobenzene (4-BFB)		0.423	mg/L	5	0.100	85	53.1 - 149

Sample: 44074 - MW-21 (0409161900)

Analysis:	BTEX	Analytical Method:	S 8021B	Prep Method:	S 5030B
QC Batch:	12809	Date Analyzed:	2004-09-21	Analyzed By:	MT
Prep Batch:	11326	Date Prepared:	2004-09-21	Prepared By:	MT

Parameter	Flag	RL Result	Units	Dilution	RL
Benzene		<0.00100	mg/L	1	0.00100
Toluene		<0.00100	mg/L	1	0.00100
Ethylbenzene		<0.00100	mg/L	1	0.00100
Xylene		<0.00100	mg/L	1	0.00100

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)		0.0937	mg/L	1	0.100	94	79.7 - 119
4-Bromofluorobenzene (4-BFB)		0.0732	mg/L	1	0.100	73	65.6 - 141

Sample: 44075 - MW-22 (0409170730)

Analysis:	BTEX	Analytical Method:	S 8021B	Prep Method:	S 5030B
QC Batch:	12809	Date Analyzed:	2004-09-21	Analyzed By:	MT
Prep Batch:	11326	Date Prepared:	2004-09-21	Prepared By:	MT

Parameter	Flag	RL Result	Units	Dilution	RL
Benzene		0.00910	mg/L	1	0.00100
Toluene		<0.00100	mg/L	1	0.00100
Ethylbenzene		<0.00100	mg/L	1	0.00100
Xylene		<0.00100	mg/L	1	0.00100

¹ Sample was reanalyzed upon request.

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)		0.0868	mg/L	1	0.100	87	79.7 - 119
4-Bromofluorobenzene (4-BFB)		0.0694	mg/L	1	0.100	69	65.6 - 141

Sample: 44076 - MW-19 (0409170810)

Analysis: BTEX	Analytical Method: S 8021B	Prep Method: S 5030B
QC Batch: 12812	Date Analyzed: 2004-09-21	Analyzed By: MT
Prep Batch: 11330	Date Prepared: 2004-09-21	Prepared By: MT

Parameter	Flag	RL Result	Units	Dilution	RL
Benzene		<0.00100	mg/L	1	0.00100
Toluene		<0.00100	mg/L	1	0.00100
Ethylbenzene		<0.00100	mg/L	1	0.00100
Xylene		<0.00100	mg/L	1	0.00100

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)		0.0930	mg/L	1	0.100	93	79.7 - 119
4-Bromofluorobenzene (4-BFB)		0.0745	mg/L	1	0.100	74	65.6 - 141

Sample: 44077 - MW19D (0409170910)

Analysis: BTEX	Analytical Method: S 8021B	Prep Method: S 5030B
QC Batch: 12812	Date Analyzed: 2004-09-21	Analyzed By: MT
Prep Batch: 11330	Date Prepared: 2004-09-21	Prepared By: MT

Parameter	Flag	RL Result	Units	Dilution	RL
Benzene		<0.00100	mg/L	1	0.00100
Toluene		<0.00100	mg/L	1	0.00100
Ethylbenzene		<0.00100	mg/L	1	0.00100
Xylene		<0.00100	mg/L	1	0.00100

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)		0.0951	mg/L	1	0.100	95	79.7 - 119
4-Bromofluorobenzene (4-BFB)		0.0747	mg/L	1	0.100	75	65.6 - 141

Sample: 44078 - MW-14 (0409171010)

Analysis: BTEX	Analytical Method: S 8021B	Prep Method: S 5030B
QC Batch: 12812	Date Analyzed: 2004-09-21	Analyzed By: MT
Prep Batch: 11330	Date Prepared: 2004-09-21	Prepared By: MT

Parameter	Flag	RL Result	Units	Dilution	RL
Benzene		0.0648	mg/L	1	0.00100

continued...

sample 44078 continued ...

Parameter	Flag	RL Result	Units	Dilution	RL
Toluene		<0.00100	mg/L	1	0.00100
Ethylbenzene		0.0102	mg/L	1	0.00100
Xylene		0.00290	mg/L	1	0.00100

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)	²	0.0719	mg/L	1	0.100	72	79.7 - 119
4-Bromofluorobenzene (4-BFB)	³	0.0581	mg/L	1	0.100	58	65.6 - 141

Sample: 44079 - MW-15 (0409171050)

Analysis: BTEX	Analytical Method: S 8021B	Prep Method: S 5030B
QC Batch: 12830	Date Analyzed: 2004-09-22	Analyzed By: MT
Prep Batch: 11344	Date Prepared: 2004-09-22	Prepared By: MT

Parameter	Flag	RL Result	Units	Dilution	RL
Benzene	⁴	<0.00500	mg/L	5	0.00100
Toluene		<0.00500	mg/L	5	0.00100
Ethylbenzene		<0.00500	mg/L	5	0.00100
Xylene		<0.00500	mg/L	5	0.00100

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)		0.501	mg/L	5	0.100	100	79.7 - 119
4-Bromofluorobenzene (4-BFB)		0.404	mg/L	5	0.100	81	65.6 - 141

Sample: 44080 - MW-16 (0409171145)

Analysis: BTEX	Analytical Method: S 8021B	Prep Method: S 5030B
QC Batch: 12812	Date Analyzed: 2004-09-21	Analyzed By: MT
Prep Batch: 11330	Date Prepared: 2004-09-21	Prepared By: MT

Parameter	Flag	RL Result	Units	Dilution	RL
Benzene		0.00640	mg/L	1	0.00100
Toluene		<0.00100	mg/L	1	0.00100
Ethylbenzene		<0.00100	mg/L	1	0.00100
Xylene		<0.00100	mg/L	1	0.00100

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)		0.0799	mg/L	1	0.100	80	79.7 - 119
4-Bromofluorobenzene (4-BFB)	⁵	0.0636	mg/L	1	0.100	64	65.6 - 141

²Low TFT surrogate recovery due to matrix interference. ICV/CCV surrogate recovery shows the method to be in control.

³Low BFB surrogate recovery due to matrix interference. ICV/CCV surrogate recovery shows the method to be in control.

⁴RR due to no benzene hit at previous dilution.

⁵Low BFB surrogate recovery due to matrix interference. TFT surrogate recovery shows the method to be in control.

Sample: 44081 - Duplicate (0409172000)

Analysis: BTEX	Analytical Method: S 8021B	Prep Method: S 5030B
QC Batch: 12830	Date Analyzed: 2004-09-22	Analyzed By: MT
Prep Batch: 11344	Date Prepared: 2004-09-22	Prepared By: MT

Parameter	Flag	RL Result	Units	Dilution	RL
Benzene	6	<0.00500	mg/L	5	0.00100
Toluene		<0.00500	mg/L	5	0.00100
Ethylbenzene		<0.00500	mg/L	5	0.00100
Xylene		<0.00500	mg/L	5	0.00100

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)		0.502	mg/L	5	0.100	100	79.7 - 119
4-Bromofluorobenzene (4-BFB)		0.403	mg/L	5	0.100	81	65.6 - 141

Sample: 44082 - Trip Blank

Analysis: BTEX	Analytical Method: S 8021B	Prep Method: S 5030B
QC Batch: 12812	Date Analyzed: 2004-09-21	Analyzed By: MT
Prep Batch: 11330	Date Prepared: 2004-09-21	Prepared By: MT

Parameter	Flag	RL Result	Units	Dilution	RL
Benzene		<0.00100	mg/L	1	0.00100
Toluene		<0.00100	mg/L	1	0.00100
Ethylbenzene		<0.00100	mg/L	1	0.00100
Xylene		<0.00100	mg/L	1	0.00100

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)		0.105	mg/L	1	0.100	105	79.7 - 119
4-Bromofluorobenzene (4-BFB)		0.0785	mg/L	1	0.100	78	65.6 - 141

Method Blank (1) QC Batch: 12809

Parameter	Flag	Result	Units	RL
Benzene		<0.00100	mg/L	0.001
Toluene		<0.00100	mg/L	0.001
Ethylbenzene		<0.00100	mg/L	0.001
Xylene		<0.00100	mg/L	0.001

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)	7	0.0750	mg/L	1	0.100	75	76.2 - 119
4-Bromofluorobenzene (4-BFB)	8	0.0583	mg/L	1	0.100	58	58.5 - 136

⁶RR due to no benzene hit at previous dilution.

⁷Low surrogate recovery due to unknown anomaly. ICV/CCV show the method to be in control.

⁸Surrogate recovery within acceptable limits.

Method Blank (1) QC Batch: 12812

Parameter	Flag	Result	Units	RL
Benzene		<0.00100	mg/L	0.001
Toluene		<0.00100	mg/L	0.001
Ethylbenzene		<0.00100	mg/L	0.001
Xylene		<0.00100	mg/L	0.001

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)		0.0909	mg/L	1	0.100	91	76.2 - 119
4-Bromofluorobenzene (4-BFB)		0.0690	mg/L	1	0.100	69	58.5 - 136

Method Blank (1) QC Batch: 12830

Parameter	Flag	Result	Units	RL
Benzene		<0.00100	mg/L	0.001
Toluene		<0.00100	mg/L	0.001
Ethylbenzene		<0.00100	mg/L	0.001
Xylene		<0.00100	mg/L	0.001

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)		0.0857	mg/L	1	0.100	86	76.2 - 119
4-Bromofluorobenzene (4-BFB)		0.0661	mg/L	1	0.100	66	58.5 - 136

Method Blank (1) QC Batch: 12887

Parameter	Flag	Result	Units	RL
Benzene		<0.00100	mg/L	0.001
Toluene		<0.00100	mg/L	0.001
Ethylbenzene		<0.00100	mg/L	0.001
Xylene		<0.00100	mg/L	0.001

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)		0.0990	mg/L	1	0.100	99	70 - 130
4-Bromofluorobenzene (4-BFB)		0.0836	mg/L	1	0.100	84	70 - 130

Laboratory Control Spike (LCS-1) QC Batch: 12809

Param	LCS Result	LCSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	RPD	Rec. Limit	RPD Limit
Benzene	0.0933	0.0870	mg/L	1	0.100	<0.000338	93	7	84.6 - 117	20
Toluene	⁹ 0.0873	0.0805	mg/L	1	0.100	<0.000299	87	8	80.9 - 115	20

continued ...

⁹Toluene outside normal limits in LCSD. The LCS and the RPD show the method to be in control.

control spikes continued...

Param	LCS Result	LCSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	RPD	Rec. Limit	RPD Limit
Ethylbenzene ¹⁰	0.0848	0.0769	mg/L	1	0.100	<0.000469	85	10	77.6 - 119	20
Xylene ¹¹	0.249	0.229	mg/L	1	0.300	<0.000787	83	8	76.2 - 122	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Surrogate	LCS Result	LCSD Result	Units	Dil.	Spike Amount	LCS Rec.	LCSD Rec.	Rec. Limit
Trifluorotoluene (TFT)	0.0995	0.100	mg/L	1	0.100	100	100	79.7 - 119
4-Bromofluorobenzene (4-BFB)	0.0813	0.0823	mg/L	1	0.100	81	82	65.6 - 141

Laboratory Control Spike (LCS-1) QC Batch: 12812

Param	LCS Result	LCSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	RPD	Rec. Limit	RPD Limit
Benzene	0.0980	0.101	mg/L	1	0.100	<0.000338	98	3	84.6 - 117	20
Toluene	0.0929	0.0949	mg/L	1	0.100	<0.000299	93	2	80.9 - 115	20
Ethylbenzene	0.0911	0.0926	mg/L	1	0.100	<0.000469	91	2	77.6 - 119	20
Xylene	0.267	0.272	mg/L	1	0.300	<0.000787	89	2	76.2 - 122	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Surrogate	LCS Result	LCSD Result	Units	Dil.	Spike Amount	LCS Rec.	LCSD Rec.	Rec. Limit
Trifluorotoluene (TFT)	0.0997	0.102	mg/L	1	0.100	100	102	79.7 - 119
4-Bromofluorobenzene (4-BFB)	0.0819	0.0848	mg/L	1	0.100	82	85	65.6 - 141

Laboratory Control Spike (LCS-1) QC Batch: 12830

Param	LCS Result	LCSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	RPD	Rec. Limit	RPD Limit
Benzene	0.0966	0.104	mg/L	1	0.100	<0.000338	97	7	84.6 - 117	20
Toluene	0.0921	0.0965	mg/L	1	0.100	<0.000299	92	5	80.9 - 115	20
Ethylbenzene	0.0876	0.0937	mg/L	1	0.100	<0.000469	88	7	77.6 - 119	20
Xylene	0.261	0.277	mg/L	1	0.300	<0.000787	87	6	76.2 - 122	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Surrogate	LCS Result	LCSD Result	Units	Dil.	Spike Amount	LCS Rec.	LCSD Rec.	Rec. Limit
Trifluorotoluene (TFT)	0.100	0.101	mg/L	1	0.100	100	101	79.7 - 119
4-Bromofluorobenzene (4-BFB)	0.0837	0.0876	mg/L	1	0.100	84	88	65.6 - 141

Laboratory Control Spike (LCS-1) QC Batch: 12887

Param	LCS Result	LCSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	RPD	Rec. Limit	RPD Limit
Benzene	0.0922	0.0895	mg/L	1	0.100	<0.000136	92	3	70 - 130	20

continued...

¹⁰Ethylbenzene outside normal limits in LCSD. The LCS and the RPD show the method to be in control.

¹¹Xylene outside normal limits in LCSD. The LCS and the RPD show the method to be in control.

control spikes continued ...

Param	LCS Result	LCSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	RPD	Rec. Limit	RPD Limit
Toluene	0.0955	0.0927	mg/L	1	0.100	<0.000247	96	3	70 - 130	20
Ethylbenzene	0.0997	0.0965	mg/L	1	0.100	<0.000550	100	3	70 - 130	20
Xylene	0.325	0.315	mg/L	1	0.300	<0.00156	108	3	70 - 130	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Surrogate	LCS Result	LCSD Result	Units	Dil.	Spike Amount	LCS Rec.	LCSD Rec.	Rec. Limit
Trifluorotoluene (TFT)	0.0984	0.0983	mg/L	1	0.100	98	98	70 - 130
4-Bromofluorobenzene (4-BFB)	0.104	0.104	mg/L	1	0.100	104	104	70 - 130

Matrix Spike (MS-1) QC Batch: 12887

Param	MS Result	MSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	RPD	Rec. Limit	RPD Limit
Benzene	0.452	0.441	mg/L	5	0.100	<0.000680	90	2	70 - 130	20
Toluene	0.472	0.458	mg/L	5	0.100	<0.00124	94	3	70 - 130	20
Ethylbenzene	0.487	0.477	mg/L	5	0.100	<0.00275	97	2	70 - 130	20
Xylene	1.59	1.56	mg/L	5	0.300	<0.00780	106	2	70 - 130	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Surrogate	MS Result	MSD Result	Units	Dil.	Spike Amount	MS Rec.	MSD Rec.	Rec. Limit
Trifluorotoluene (TFT)	0.494	0.496	mg/L	5	0.1	99	99	70 - 130
4-Bromofluorobenzene (4-BFB)	0.521	0.522	mg/L	5	0.1	104	104	70 - 130

Standard (CCV-1) QC Batch: 12809

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Benzene		mg/L	0.100	0.0922	92	85 - 115	2004-09-21
Toluene		mg/L	0.100	0.0866	87	85 - 115	2004-09-21
Ethylbenzene	¹²	mg/L	0.100	0.0837	84	85 - 115	2004-09-21
Xylene	¹³	mg/L	0.300	0.243	81	85 - 115	2004-09-21

Standard (CCV-2) QC Batch: 12809

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Benzene		mg/L	0.100	0.0971	97	85 - 115	2004-09-21
Toluene		mg/L	0.100	0.0919	92	85 - 115	2004-09-21
Ethylbenzene		mg/L	0.100	0.0960	96	85 - 115	2004-09-21
Xylene		mg/L	0.300	0.262	87	85 - 115	2004-09-21

Standard (ICV-1) QC Batch: 12812

¹²Ethylbenzene outside normal limits in ICV/CCV. Average of ICV/CCV components within acceptable range.

¹³Xylene outside normal limits in ICV/CCV. Average of ICV/CCV components within acceptable range.

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Benzene		mg/L	0.100	0.0975	98	85 - 115	2004-09-21
Toluene		mg/L	0.100	0.0927	93	85 - 115	2004-09-21
Ethylbenzene		mg/L	0.100	0.0917	92	85 - 115	2004-09-21
Xylene		mg/L	0.300	0.267	89	85 - 115	2004-09-21

Standard (CCV-1) QC Batch: 12812

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Benzene		mg/L	0.100	0.0961	96	85 - 115	2004-09-21
Toluene		mg/L	0.100	0.0898	90	85 - 115	2004-09-21
Ethylbenzene		mg/L	0.100	0.0872	87	85 - 115	2004-09-21
Xylene	¹⁴	mg/L	0.300	0.253	84	85 - 115	2004-09-21

Standard (ICV-1) QC Batch: 12830

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Benzene		mg/L	0.100	0.0998	100	85 - 115	2004-09-22
Toluene		mg/L	0.100	0.0951	95	85 - 115	2004-09-22
Ethylbenzene		mg/L	0.100	0.0932	93	85 - 115	2004-09-22
Xylene		mg/L	0.300	0.273	91	85 - 115	2004-09-22

Standard (CCV-1) QC Batch: 12830

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Benzene		mg/L	0.100	0.0992	99	85 - 115	2004-09-22
Toluene		mg/L	0.100	0.0926	93	85 - 115	2004-09-22
Ethylbenzene		mg/L	0.100	0.0943	94	85 - 115	2004-09-22
Xylene		mg/L	0.300	0.274	91	85 - 115	2004-09-22

Standard (ICV-1) QC Batch: 12887

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Benzene		mg/L	0.100	0.0916	92	85 - 115	2004-09-25
Toluene		mg/L	0.100	0.0952	95	85 - 115	2004-09-25
Ethylbenzene		mg/L	0.100	0.0988	99	85 - 115	2004-09-25
Xylene		mg/L	0.300	0.323	108	85 - 115	2004-09-25

Standard (CCV-1) QC Batch: 12887

¹⁴ Analyte outside normal limits in CCV-1. Average of CCV components fall within acceptable range.

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Benzene		mg/L	0.100	0.0878	88	85 - 115	2004-09-25
Toluene		mg/L	0.100	0.0892	89	85 - 115	2004-09-25
Ethylbenzene		mg/L	0.100	0.0940	94	85 - 115	2004-09-25
Xylene		mg/L	0.300	0.308	103	85 - 115	2004-09-25

CHAIN-OF-CUSTODY and ANALYSIS REQUEST

plur Signature: Cal7 Kottigsh

Submission of samples constitutes agreement to Terms and Conditions on this COC.

35 September 1955

HOBBS BOOSTER STATION FREE PHASE RECOVERY SYSTEM AS-BUILT DRAWINGS

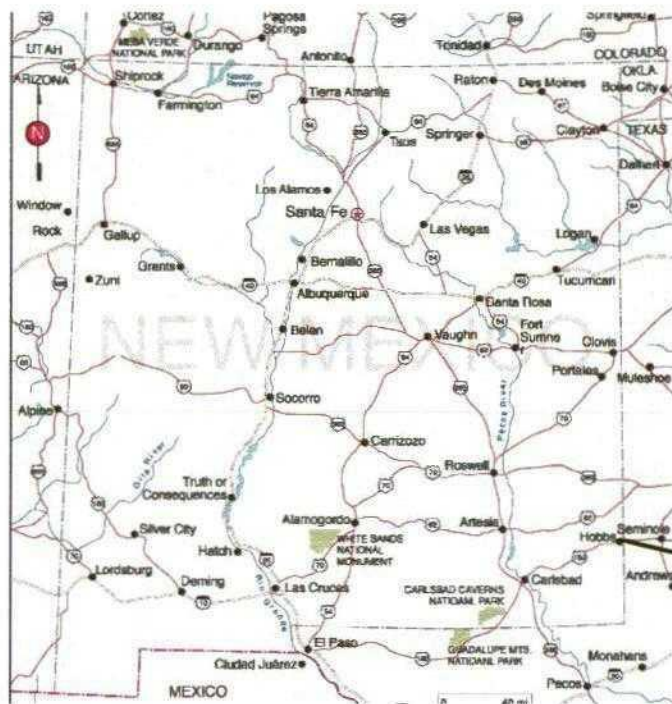
HOBBS, NEW MEXICO

Prepared For

Duke Energy Field Services, Lp
370 Seventeenth Street, Suite 2500
Denver, Colorado 80202

Prepared By;

American Environmental Consulting, LLC
6685 S. Marshall, Suite 3
Littleton, Colorado 80128



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Data Zoom 12:0

Sheet	Description
1	Title Sheet
2	Free Phase Recovery System Layout
3	Design Details 1 and 2
4	Design Details 3A and 3B
5	Design Details 4 and 5
Attachment	Basin Surveys As-Built Plot

Sheet 1 – Title Sheet

Hobbs Booster Station Product Recovery System
Duke Energy
Field Services
DRAWN BY: MHS
DATE: 11/04



Notes:

1. See Detail 1 for main trench cross section.
2. See Detail 2 for secondary trench cross section.
3. See Details 3A and 3B for manhole completion (blue circles).
4. See Detail 4 for crossing manway completion details (green circles).
5. See Detail 5 for equipment area layout.
6. FPH collection locations and trench alignment surveyed by Basin Surveying of Hobbs, New Mexico (see Attachment).



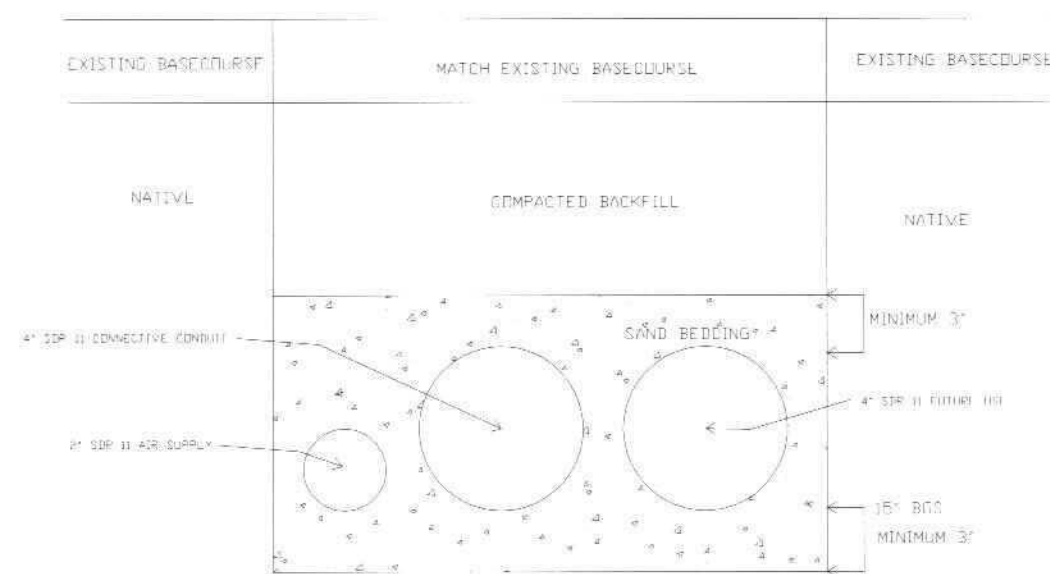
Sheet 2 – FPH Collection Locations and Trench Alignment

Hobbs Booster Station Product Recovery System

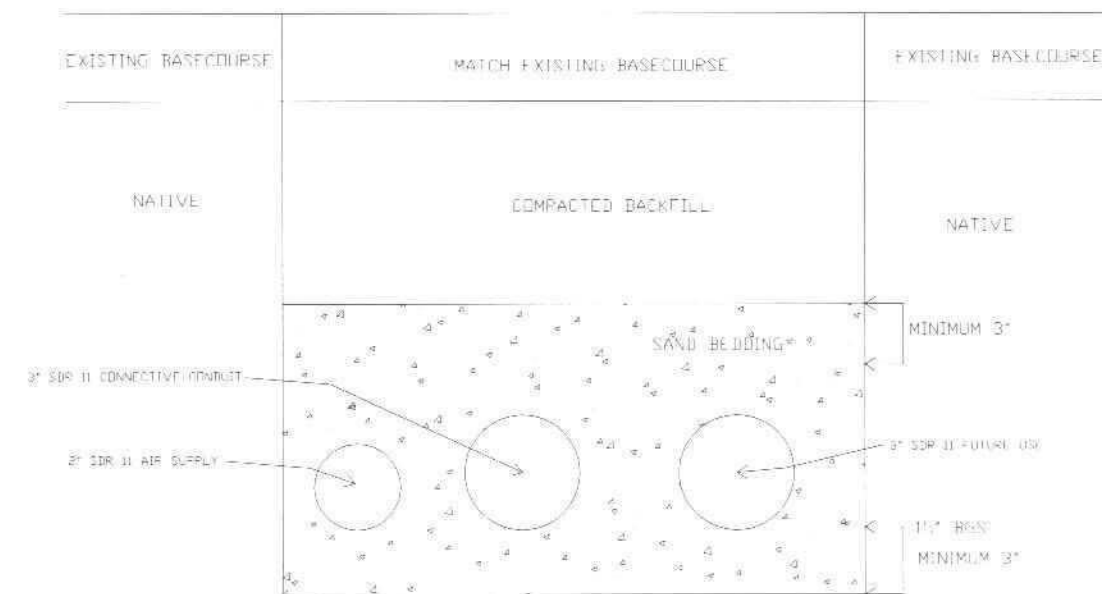
Duke Energy
Field Services.

DRAWN BY: MHS
DATE: 11/04

DETAIL 1 - MAIN TRENCH CROSS SECTION



DETAIL 2 - SECONDARY TRENCH CROSS SECTION



Sheet 3 - Design Details 1 and 2

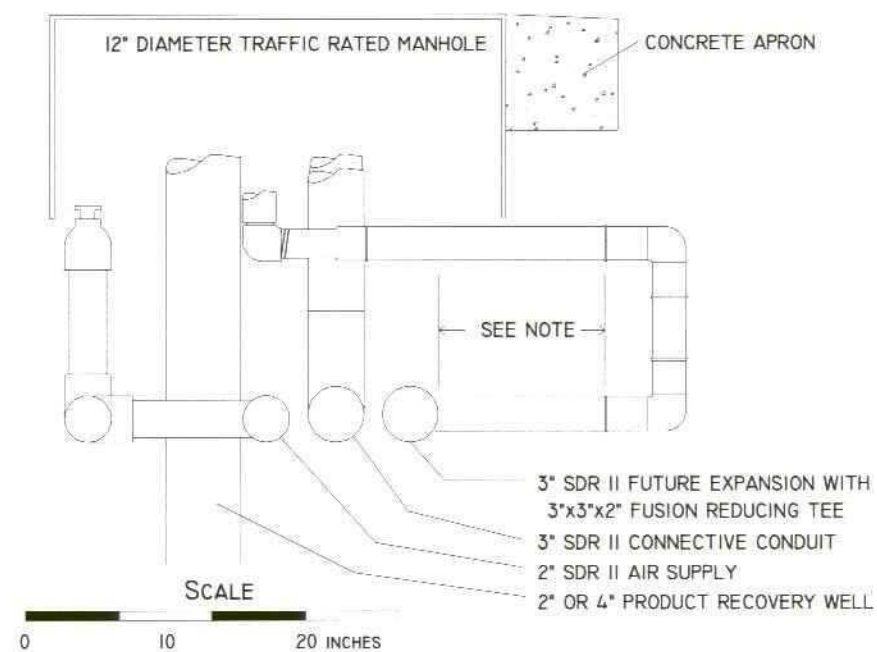
Hobbs Booster Station Product Recovery System

Duke Energy
Field Services

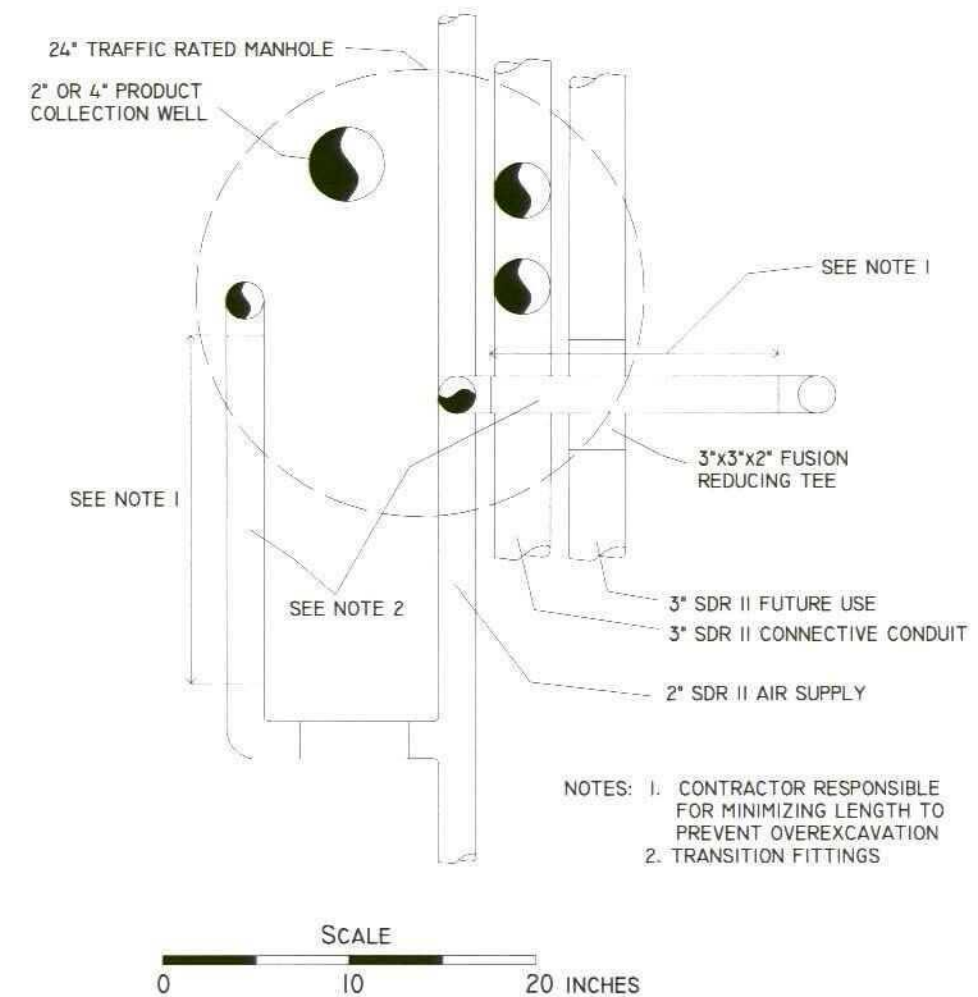
DRAWN BY: MHS
DATE: 11/04

AS BUILT DRAWING

DETAIL 3A - MANHOLE COMPLETION (SIDE VIEW)



DETAIL 3B - MANHOLE COMPLETION (TOP VIEW)



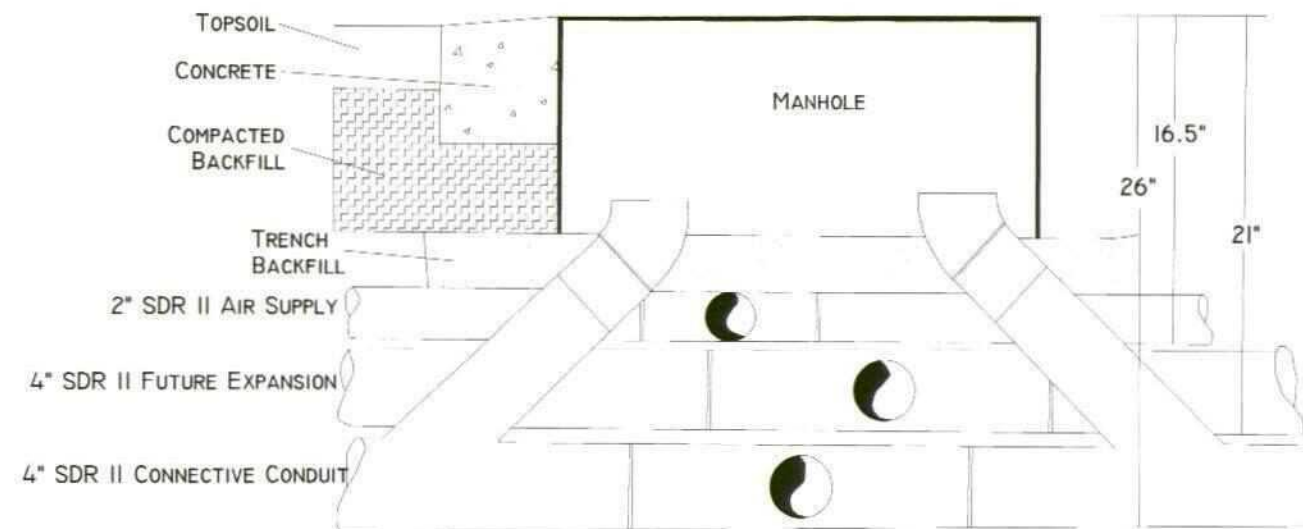
Sheet 4 - Design Details 3A and 3B

Hobbs Booster Station Product Recovery System

Duke Energy
Field Services

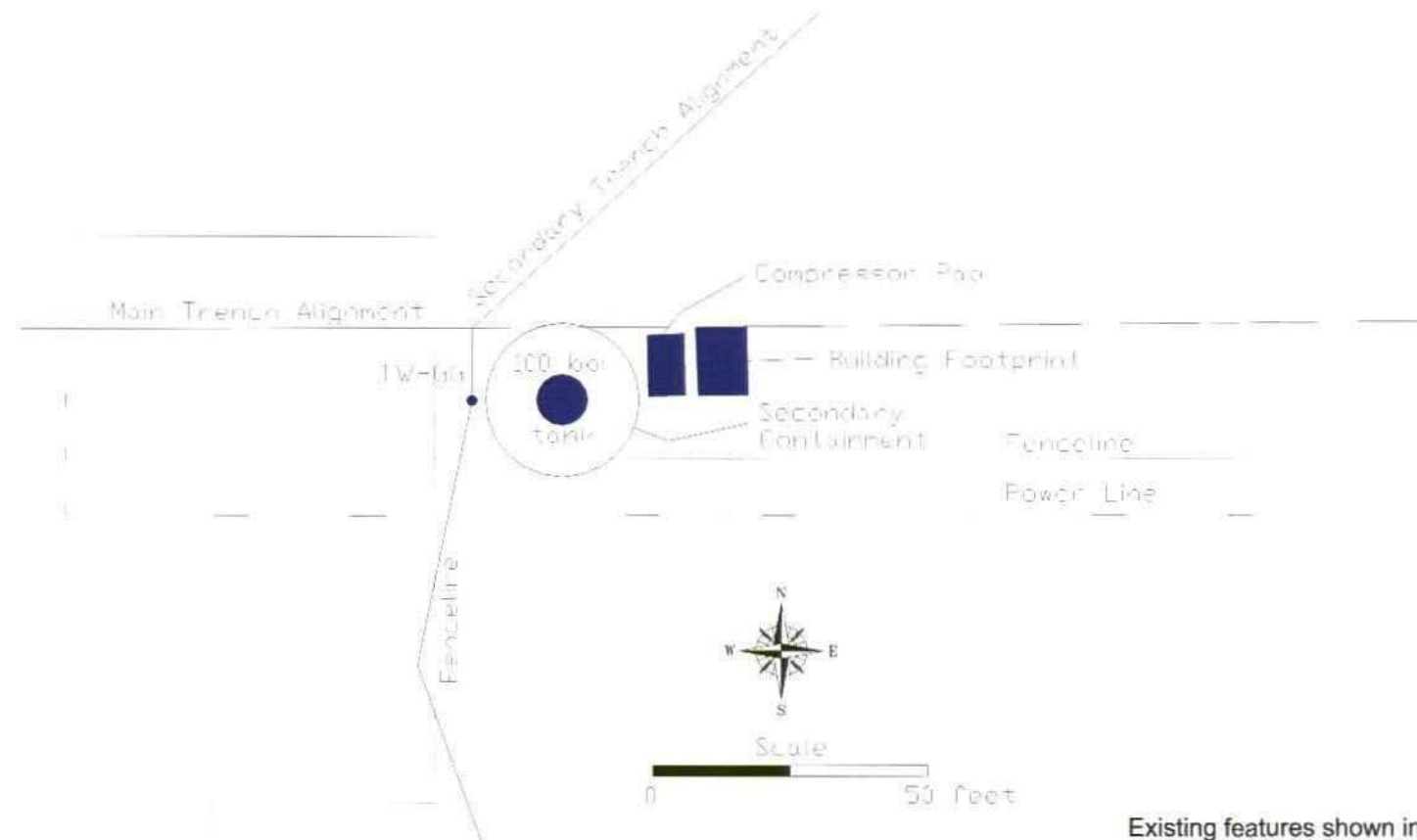
DRAWN BY: MHS
DATE: 11/04

DETAIL 4 – CROSSING MANWAY



Note: Laterals entering the Future Expansion and Connective Conduit are 3" SDR 11 pipe.

DETAIL 5 - EQUIPMENT AREA LAYOUT



Existing features shown in black. FPH components shown in blue.

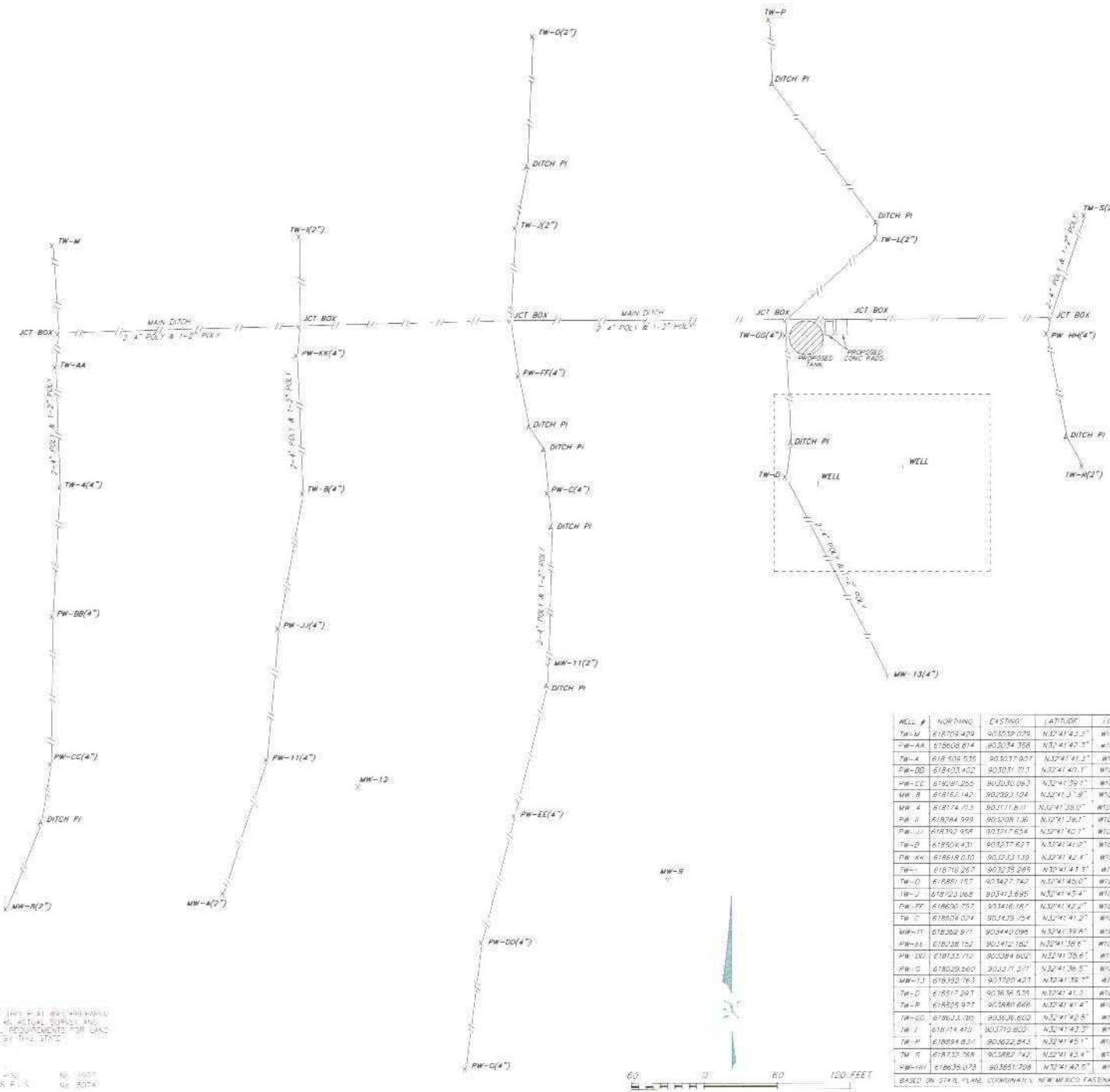
Sheet 5 - Design Details 4 and 5

Hobbs Booster Station Product Recovery System

Duke Energy
Field Services

DRAWN BY: MHS
DATE: 11/04

MONITOR WELLS AT HOBBS STATION
SECTION 4, TOWNSHIP 19 SOUTH, RANGE 38 EAST,
N.M.P.M., LEA COUNTY, NEW MEXICO.



REFER TO PLAN OF THE HOBBS STATION FROM THE NOTES OF THE ACTUAL SURVEY AND THE RECORDS OF THE LEA COUNTY ENGINEER. THE SURVEY WAS MADE BY THE LEA COUNTY ENGINEER IN 1904.

WELL #	NORTHING	EASTING	DEPTH	CONC. TYP.	REMARKS
TW-1	618709.429	803019.075	N. 12° 41' 42.1"	W. 10.000 27.4"	2628.0'
TW-2	618709.429	803019.075	N. 12° 41' 42.1"	W. 10.000 27.4"	2628.0'
TW-3	618709.429	803019.075	N. 12° 41' 42.1"	W. 10.000 27.4"	2628.0'
TW-4	618709.429	803019.075	N. 12° 41' 42.1"	W. 10.000 27.4"	2628.0'
TW-5	618709.429	803019.075	N. 12° 41' 42.1"	W. 10.000 27.4"	2628.0'
TW-6	618709.429	803019.075	N. 12° 41' 42.1"	W. 10.000 27.4"	2628.0'
TW-7	618709.429	803019.075	N. 12° 41' 42.1"	W. 10.000 27.4"	2628.0'
TW-8	618709.429	803019.075	N. 12° 41' 42.1"	W. 10.000 27.4"	2628.0'
TW-9	618709.429	803019.075	N. 12° 41' 42.1"	W. 10.000 27.4"	2628.0'
TW-10	618709.429	803019.075	N. 12° 41' 42.1"	W. 10.000 27.4"	2628.0'
TW-11	618709.429	803019.075	N. 12° 41' 42.1"	W. 10.000 27.4"	2628.0'
TW-12	618709.429	803019.075	N. 12° 41' 42.1"	W. 10.000 27.4"	2628.0'
TW-13	618709.429	803019.075	N. 12° 41' 42.1"	W. 10.000 27.4"	2628.0'
PW-1	618709.429	803019.075	N. 12° 41' 42.1"	W. 10.000 27.4"	2628.0'
PW-2	618709.429	803019.075	N. 12° 41' 42.1"	W. 10.000 27.4"	2628.0'
PW-3	618709.429	803019.075	N. 12° 41' 42.1"	W. 10.000 27.4"	2628.0'
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PW-12	618709.429	803019.075	N. 12° 41' 42.1"	W. 10.000 27.4"	2628.0'
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MW-1	618709.429	803019.075	N. 12° 41' 42.1"	W. 10.000 27.4"	2628.0'
MW-2	618709.429	803019.075	N. 12° 41' 42.1"	W. 10.000 27.4"	2628.0'
MW-3	618709.429	803019.075	N. 12° 41' 42.1"	W. 10.000 27.4"	2628.0'
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MW-5	618709.429	803019.075	N. 12° 41' 42.1"	W. 10.000 27.4"	2628.0'
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MW-13	618709.429	803019.075	N. 12° 41' 42.1"	W. 10.000 27.4"	2628.0'

Duke Energy
Field Services

BASIN SURVEYS

Drawn By: K. Good
Survey Date: 11-19-2004
Drawing No.: 11-19-2004

File Name: HOBBS MW.DWG
Checked By: G.L.J.
Date: 11-24-2004
Sheet 1 of 1

Task No.: KJG #3
Last Rev. Date:

DUKE ENERGY
FIELD SERVICES

March 21, 2003

Mr. Jack Ford
New Mexico Oil Conservation Division
1220 S. St. Francis Dr.
Santa Fe, NM 87505

**RE: December 2002 Groundwater Sampling Event
Duke Energy Field Services Hobbs Booster Station (GW-044)
Lea County New Mexico**

Dear Mr. Ford:

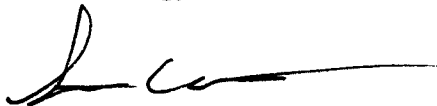
Duke Energy Field Services, LP (DEFS) is pleased to submit for your review, one copy of the following the following report:

- **Summary of December 2002 Groundwater Monitoring Event at the Duke Energy Field Services Hobbs Booster Station, Lea County New Mexico (GW-044).**

If you have any questions regarding the above mentioned report, please call me at 303-605-1718.

Sincerely

Duke Energy Field Services, LP



Stephen Weathers
Sr. Environmental Specialist

Enclosure

cc: Larry Johnson, OCD Hobbs District
Environmental Files

Remediacon Incorporated

Geological and Engineering Services
remediacon@yahoo.com

PO Box 302, Evergreen, Colorado 80437

Telephone: 303.674.4370

Facsimile: 720.528.8132

December 30, 2002

Mr. Stephen Weathers
Duke Energy Field Services, LP
370 17th Street, Suite 900
Denver, CO 80202

Re: Summary of December 2002 Groundwater Monitoring Event at the Duke Energy
Field Services Hobbs Booster Station, Lea County New Mexico
(Discharge Plan GW-044)

Dear Stephen:

This letter presents the results of the December 2002 groundwater monitoring event at the Duke Energy Field Services (DEFS) Hobbs Booster Station. Remediacon presented a groundwater monitoring and reporting schedule in its September 5, 2002 letter to DEFS that was approved by the New Mexico Oil Conservation Division (OCD). Based upon that letter, the September, December and March summary reports must include the following information:

- A discussion of the sampling procedures including any deviations from the standard sampling protocol;
- A summary of the resulting depth to water and free-phase hydrocarbon measurements along with the calculated groundwater elevations;
- A water table contour map for that sampling event;
- A summary of the equilibrated field parameters for each well;
- Presentation of the resulting laboratory analytical results for the sampling event; and
- A discussion of the field duplicate results.

SAMPLING SUMMARY

The groundwater monitoring program includes 21 monitoring wells. Nineteen free product characterization wells are also present at the site but are not included in the groundwater monitoring program. The monitor well locations are shown on Figure 1 and pertinent information is summarized in Table 1. The wells are sampled according to the schedule provided in Table 2.

The routine monitoring activities include measuring depths to free-phase hydrocarbons (if present) and water, purging the scheduled wells that do not have free phase hydrocarbons to a constant temperature, pH and conductivity and then collecting samples for analyses. The wells that contained free phase hydrocarbons are not sampled. The groundwater samples are analyzed for benzene, toluene, ethylbenzene, and total xylenes (BTEX).

Trident Environmental (Trident) completed the monitoring activities on December 9 and 10, 2002. Trident gauged all of the wells on December 9 and purged and sampled wells MW-14, MW-15, MW-16, MW-19, MW-20 and MW-21 on December 10, 2002. Trident collected a field duplicate from MW-16. There were no deviations from the standard monitoring protocols.

The measured depths to water, depths to product (if present), product thicknesses and calculated groundwater elevations as measured on December 9, 2002 are listed in Table 3. Table 4 summarizes the measured product thickness values in both the monitoring wells and the free product characterization wells.

Table 3 includes the actual groundwater elevations for those wells that either contained no free-phase hydrocarbons or had a negligible thickness. The groundwater elevation values for those wells containing free-phase hydrocarbons were corrected using the following formula (all values in feet):

$$GWE_{\text{corr}} = MGWE + (PT \cdot PD): \text{ where}$$

MGWE is the actual measured groundwater elevation;
PT is the measured free-phase hydrocarbon thickness, and
PD is the free phase hydrocarbon density.

The free phase densities are from actual hydrocarbon samples from MW-4 and MW-11.

A water table contour map based upon the calculated December 2002 water table elevations is included as Figure 2. The contours were generated using the Surfer® program with a kriging option. The calculated groundwater flow direction shown on Figure 2 has been consistent toward the east since monitoring began in 1999.

The stabilized field parameters are included in Table 5. The well sampling data forms are attached. The analytical results are presented in Table 6. The analytical laboratory report is attached. Table 7 summarizes the benzene concentrations in the quarterly groundwater monitoring wells beginning with the October 2001 sampling episode. The December 2002 benzene concentrations are shown on Figure 3.

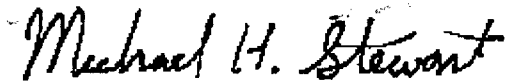
A field duplicate sample was collected from well MW-16. MW-16 was selected because it had historically contained measurable benzene concentrations. Neither the original or the field duplicate contained detectable concentrations of toluene, ethylbenzene or xylenes. The benzene concentrations measured in the two samples were .0048 and .0035 mg/l respectively. These values produce a relative percentage difference of 31 percent; however, the measured concentrations are so close to the 0.001 method detection limit that variations are expected.

The recent precipitation in the Hobbs area resulted in the first rise in water table elevations since repeated measurements began in May 2000. The water table rose in all of the wells an average of 0.26 feet with a standard deviation of 0.094 feet.

Mr. Stephen Weathers
December 30, 2002
Page 3

The next groundwater monitoring event is scheduled for March 2002 according to the schedule contained in Table 2. Do not hesitate to contact me if you have any questions or comments.

Respectfully Submitted,
REMEDIACOM INCORPORATED

A handwritten signature in black ink that reads "Michael H. Stewart". The signature is written in a cursive style with a large, stylized 'M' and 'S'.

Michael H. Stewart, P.E.
Principal Engineer

MHS/tbm

attachments

TABLES

Table 1 – Summary of Hobbs Booster Station Well Construction Information

Well	Ground Elevation	Top Of Casing Elevation	Total Well Depth	Well Diameter	Screen Interval	Gravel Interval
MW-1	3,623.60	3,626.06	57	2	37-57	34-57
MW-2	3,620.65	3,623.14	53	2	33-53	30-53
MW-3	3,620.08	3,623.01	53	2	33-53	30-53
MW-4	3,621.66	3,624.29	57	2	37-57	34-57
MW-5	3,626.30	3,629.16	57	2	37-57	34-57
MW-6	3,624.14	3,626.93	53	2	33-53	30-53
MW-7	3,618.93	3,621.40	56	2	33-53	31-56
MW-8	3,620.84	3,623.62	58	2	36-56	34-58
MW-9	3,622.60	3,625.21	63	2	43-63	40-63
MW-10	3,618.30	3,621.07	58	2	36-56	34-58
MW-11	3,623.05	3,625.88	63	2	43-63	41-63
MW-12	3,623.95	3,626.60	65	4	40-60	38-65
MW-13	3,623.53	3,626.30	69	4	44-64	38-64
MW-14	3,618.76	3,621.42	66	2	42-62	34-66
MW-15	3,616.79	3,619.39	59	2	37-57	31-59
MW-16	3,619.10	3,621.87	58	2	34-54	30-56
MW-17	3,621.36	3,623.94	66	4	41-61	37-63
MW-18	3,621.96	3,624.30	68	4	44-64	35-65
MW-19	3,621.42	3,624.12	68	2	43-63	40-65
MW-20	3,621.62	3,621.49	59	2	59-44	59-42
MW-21	3,621.78	3,624.25	61	2	61-46	61-44

Table 2 – Hobbs Booster Station Groundwater Monitoring Program

Well	Proposed Monitoring Frequency
MW-1	None (Free phase hydrocarbons present)
MW-2	None (Free phase hydrocarbons present)
MW-3	Annually in June
MW-4	None (Free phase hydrocarbons present)
MW-5	Annually in June
MW-6	Annually in June
MW-7	Annually in June
MW-8	None (Free phase hydrocarbons present)
MW-9	None (Free phase hydrocarbons present)
MW-10	None (Free phase hydrocarbons present)
MW-11	None (Free phase hydrocarbons present)
MW-12	None (Free phase hydrocarbons present)
MW-13	None (Free phase hydrocarbons present)
MW-14	Quarterly (March, June September and December)
MW-15	Quarterly (March, June September and December)
MW-16	Quarterly (March, June September and December)
MW-17	None (Free phase hydrocarbons present)
MW-18	Annually in June
MW-19	Quarterly (March, June September and December)
MW-20	Quarterly (March, June September and December)
MW-21	Quarterly (March, June September and December)

Notes: 1) Samples will be analyzed for benzene, toluene, ethylbenzene and xylenes
2) A minimum of one blind field duplicate will be collected for each sampling episode.

Table 3 – Summary of December 10, 2002 Groundwater Gauging Data

Well	Depth To Water	Depth To Product	Product Thickness	Corrected Groundwater Elevation	Notes
MW-1	47.77	47.22	0.55	3578.72	
MW-2	42.33	42.33	0.00	3580.81	Sheen present
MW-3	42.49	-	-	3580.52	
MW-4	48.83	45.72	3.11	3577.87	
MW-5	49.67	-	-	3579.49	
MW-6	45.77	-	-	3581.16	
MW-7	39.74	-	-	3581.66	
MW-8	46.87	44.40	2.47	3578.66	
MW-9	49.29	48.83	0.46	3576.28	
MW-10	42.92	-	-	3578.15	
MW-11	55.44	47.99	7.45	3576.21	
MW-12	51.27	48.57	2.7	3577.42	
MW-13	57.92	49.50	8.42	3574.90	
MW-14	45.00	-	-	3576.42	
MW-15	40.85	-	-	3578.54	
MW-16	41.44	-	-	3580.43	
MW-17	49.94	49.83	0.11	3574.09	
MW-18	50.88	-	-	3573.42	
MW-19	51.34	-	-	3572.78	
MW-20	48.90	-	-	3572.59	
MW-21	50.63	-	-	3573.62	
TW-A	51.49	47.82	3.67	3578.09	
TW-B	53.76	48.59	5.17	3577.22	
TW-C	58.99	48.41	10.58	3576.05	
TW-D	58.9	50.41	8.49		Minimum thickness, product to bottom of well
TW-G	47.56	45.81	1.75	3577.41	
TW-H	43.00	-	-	3579.30	

All units in feet

See text for corrected elevation formula

Table 4 – Summary of Measured Product Thickness Values

Well	10/00	2/01	5/01	8/01	10/01	3/02	6/02	8/02	9/02	12/02
MW-1	NR	NR	0.01	0.01	0.005	0	0.02	0.290	0.35	0.55
MW-4	2.68	2.92	2.82	2.60	2.64	2.62	2.86	3.380	3.36	3.11
MW-8	Sheen	0.00	0.27	0.40	0.06	0.72	1.88	2.500	2.53	2.47
MW-9	NR	0.01	NR	Sheen	0.01	0.15	Sheen	0.010	0.52	0.46
MW-11	4.45	5.42	5.47	5.97	6.26	7	3.09	6.570	7.21	7.45
MW-12	0.08	1.05	0.96	2.04	1.71	2.79	2.79	2.830	2.81	2.7
MW-13	0.17	0.76	0.84	5.22	5.69	7.62	7.37	8.590	8.62	8.42
MW-17	0.01	0.02	0.01	0.03	Sheen	0.03	0.01	0.640	0.06	0.11
TW-A	---	---	---	---	---	---	0.78	2.70	3.41	3.67
TW-B	---	---	---	---	---	---	5.17	5.28	5.22	5.17
TW-C	---	---	---	---	---	---	7.32	10.52	10.6	10.58
TW-D	---	---	---	---	---	---	7.93	8.51	8.45	8.49
TW-G	---	---	---	---	---	---	2.29	NR	1.84	1.75
TW-I	---	---	---	---	---	---	2.24	3.75	3.74	3.85
TW-J	---	---	---	---	---	---	0.06	5.39	6.01	6.16
TW-K	---	---	---	---	---	---	1.05	8.00	7.91	7.76
TW-L	---	---	---	---	---	---	0.88	7.91	7.88	7.79
TW-M	---	---	---	---	---	---	---	0.15	0.2	0.01
TW-N	---	---	---	---	---	---	---	0.02	0	0.01
TW-O	---	---	---	---	---	---	---	0.06	0.04	0.06
TW-P	---	---	---	---	---	---	---	0.00	1.33	2.53
TW-R	---	---	---	---	---	---	---	0.03	1.65	2.65

NR value not recorded, product recovery system in well

--- well not installed

All units in feet

Table 5 – Summary of Equilibrated Field Parameters from the December 2002
Groundwater Monitoring Episode

Well	Temperature (°C)	Conductivity (mS/cm)	PH (pH units)	Dissolved Oxygen (mg/l)
MW-14	20.3	2.54	7.50	0.25
MW-15	20.2	1.66	7.16	0.22
MW-16	19.5	1.41	7.37	0.81
MW-19	19.2	2.94	7.02	0.60
MW-20	19.1	2.27	6.94	1.25
MW-21	19.6	2.50	7.01	0.41

Table 6 – Analytical Results for the December 2002 Groundwater Monitoring Episode

Well	Benzene	Toluene	Ethylbenzene	Xylenes
MW-14	0.0685	<0.010	<0.010	<0.010
MW-15	<0.005	<0.005	<0.005	<0.005
MW-16	0.0048	<0.005	<0.005	<0.005
MW-16 dup	0.0035	<0.005	<0.005	<0.005
MW-19	<0.001	<0.001	<0.001	<0.001
MW-20	<0.001	<0.001	<0.001	<0.001
MW-21	<0.001	<0.001	<0.001	<0.001
Trip blank	<0.001	<0.001	<0.001	<0.001

All units are mg/l

Table 7 – Summary of Measured Benzene Concentrations for Quarterly Monitoring Wells

Benzene	10/31/00	2/5/01	5/15/01	8/9/01	10/19/01	3/13/02	6/3/02	9/24/02	12/10/02
MW-14	<.005	0.041	0.002	0.034	0.029	<0.001	0.068	0.126	0.0685
MW-15	<.005	0.237	0.003	0.353	0.317	<0.001	0.358	<0.005	<0.005
MW-16	<.005	0.094	0.01	0.098	0.012	<0.001	<0.005	0.036	0.0048
MW-19	<.005	<.005	0.001	<.005	0.035	<0.001	<0.001	<0.005	<0.001
MW-20	NM	NM	NM	NM	NM	NM	<0.002	<0.005	<0.001
MW-21	NM	NM	NM	NM	NM	NM	<0.001	<0.005	<0.001

All units are mg/l

FIGURES

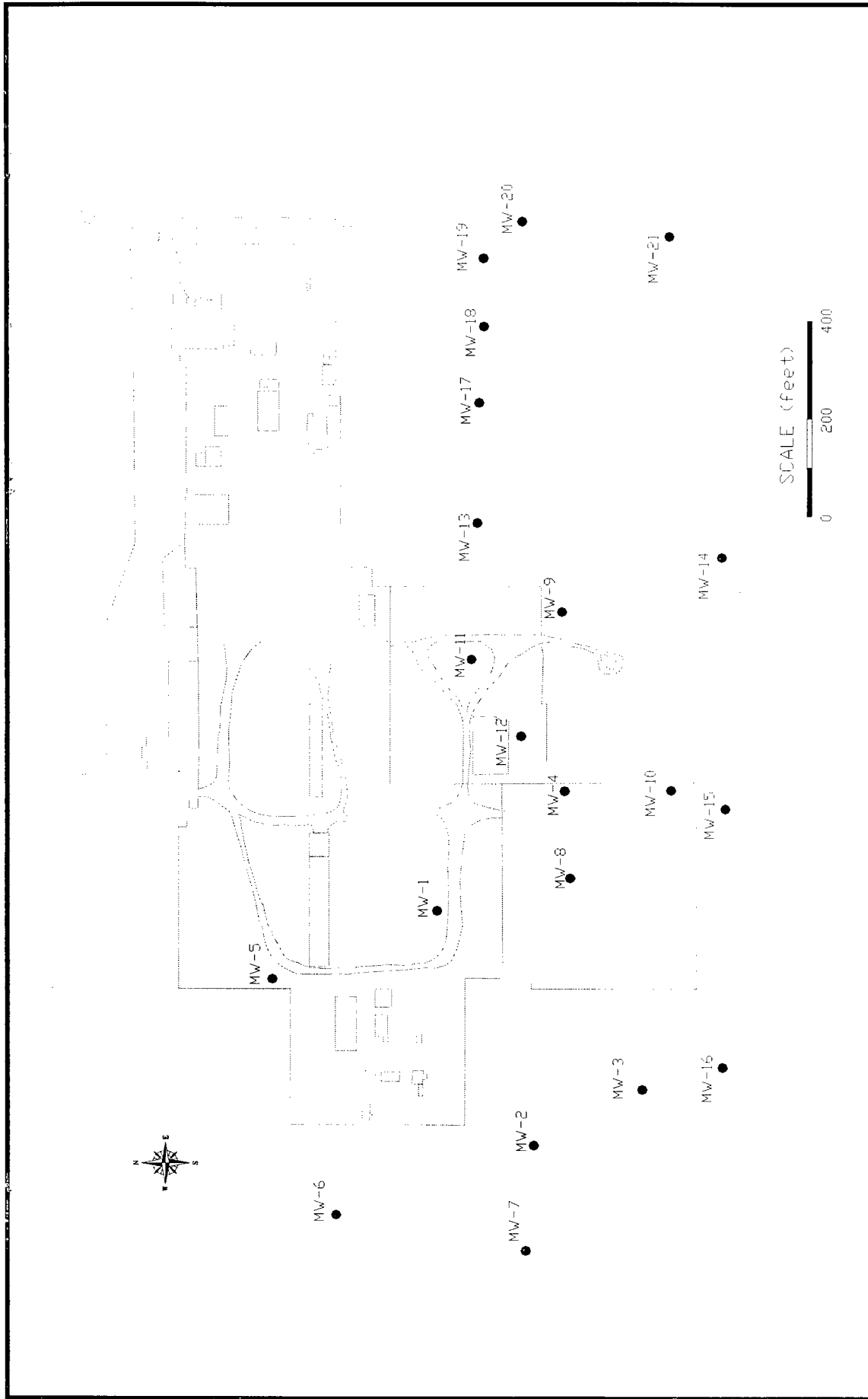
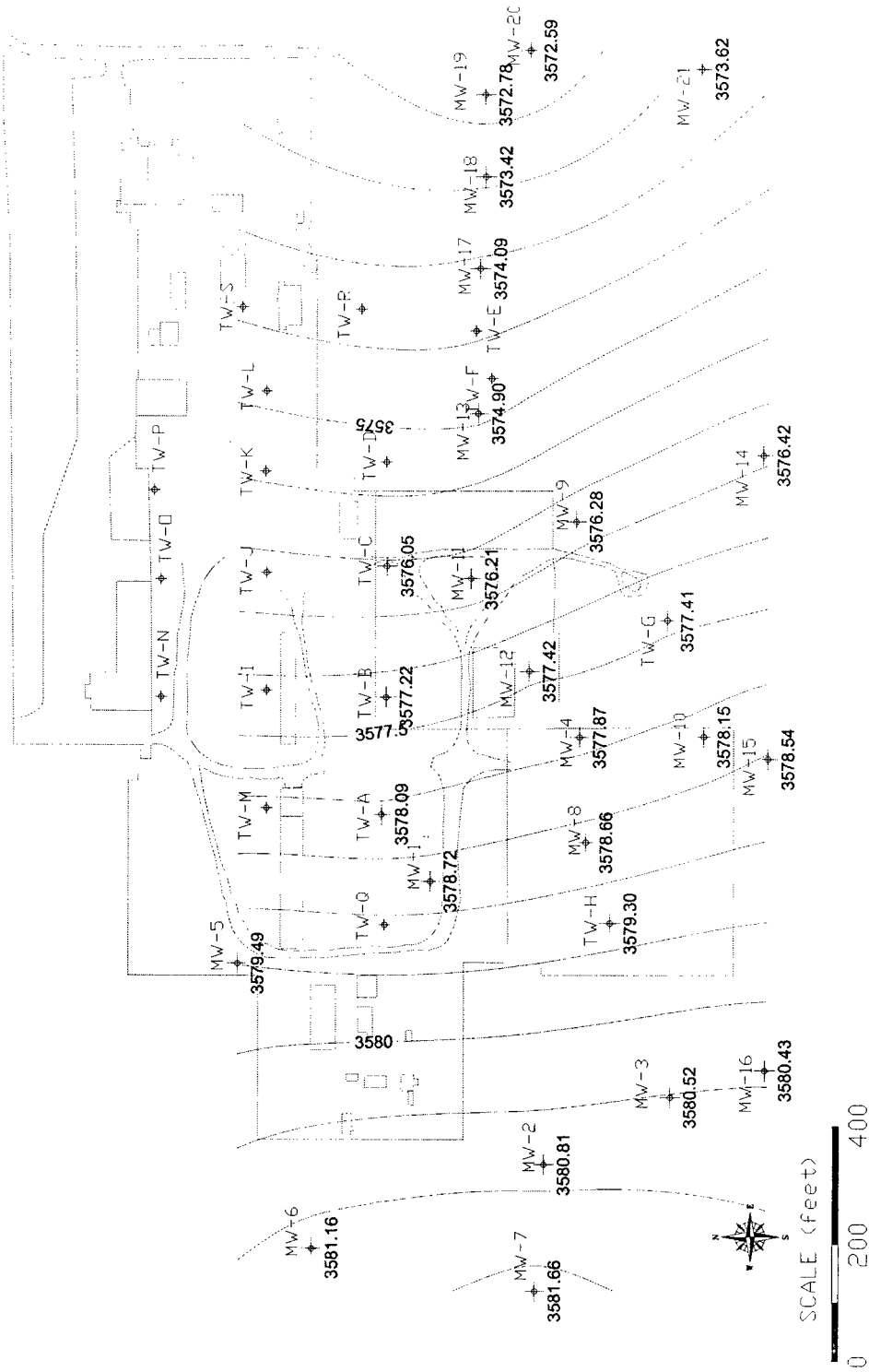


Figure 1 – Hobbs Booster Station Monitoring Well Locations

Hobbs Booster Station, Lea County New Mexico	
Duke Energy Field Services	DRAWN BY: MHS
	DATE: July 2002



NOTE: LOCATIONS WITH NO ELEVATION VALUES
WERE NOT USED IN CALCULATIONS

Figure 2 – December 2002 Corrected Water
Table Elevation Contours

Hobbs Booster Station, Lea County New Mexico



DRAWN BY: MHS

DATE: Dec 2002

**FIELD FORMS AND
LABORATORY ANALYTICAL REPORT**

WELL SAMPLING DATA FORM

CLIENT: Duke Energy Field Services
 SITE NAME: Hobbs Booster Station
 PROJECT NO. F-105

WELL ID: MW-14
 DATE: 12/11/2002
 SAMPLER: Van Deventer

PURGING METHOD: ☒ Hand Bailed ☐ Pump If Pump, Type: _____

SAMPLING METHOD: ☒ Disposable Bailer ☐ Direct from Discharge Hose ☐ Other: _____

DESCRIBE EQUIPMENT DECONTAMINATION METHOD BEFORE SAMPLING THE WELL:

☒ Gloves ☒ Alconox ☒ Distilled Water Rinse ☐ Other: _____

DISPOSAL METHOD OF PURGE WATER: ☐ Surface Discharge ☐ Drums ☒ Disposal Facility

TOTAL DEPTH OF WELL: 63.00 Feet

DEPTH TO WATER: 45.00 Feet

HEIGHT OF WATER COLUMN: 18.00 Feet

WELL DIAMETER: 2.0 Inch

8.8 Minimum Gallons to purge 3 well volumes

TIME	VOLUME PURGED	TEMP. °C	COND. mS/cm	pH	DO mg/L	Turb	PHYSICAL APPEARANCE AND REMARKS
1453	2	20.4	2.70	7.36	0.26	102	Sal =0.13%
1500	4	20.4	2.67	7.39	0.31	237	Sal =0.13%
1504	6	20.2	2.60	7.46	0.66	240	Sal =0.12%
1510	8	20.3	2.54	7.50	0.25	51	Sal =0.12%
							Collected sample at 1515 MST
							Placed sample in two 40-ml VOAs (BTEX)

COMMENTS: _____

WELL SAMPLING DATA FORM

CLIENT: Duke Energy Field Services
 SITE NAME: Hobbs Booster Station
 PROJECT NO. F-105

WELL ID: MW-15
 DATE: 12/11/2002
 SAMPLER: Van Deventer

PURGING METHOD: ☒ Hand Bailed ☐ Pump If Pump, Type: _____

SAMPLING METHOD: ☒ Disposable Bailer ☐ Direct from Discharge Hose ☐ Other: _____

DESCRIBE EQUIPMENT DECONTAMINATION METHOD BEFORE SAMPLING THE WELL:

☒ Gloves ☒ Alconox ☒ Distilled Water Rinse ☐ Other: _____

DISPOSAL METHOD OF PURGE WATER: ☐ Surface Discharge ☐ Drums ☒ Disposal Facility

TOTAL DEPTH OF WELL: 58.00 Feet

DEPTH TO WATER: 40.85 Feet

HEIGHT OF WATER COLUMN: 17.15 Feet

WELL DIAMETER: 2.0 Inch

8.4 Minimum Gallons to purge 3 well volumes

TIME	VOLUME PURGED	TEMP. °C	COND. mS/cm	pH	DO mg/L	Turb	PHYSICAL APPEARANCE AND REMARKS
1358	2	20.3	1.63	7.15	0.19		Sal =0.08%
1403	4	20.1	1.64	7.15	0.11		Sal =0.07%
1409	6	20.2	1.66	7.15	0.22		Sal =0.07%
1413	8	20.2	1.66	7.16	0.22		Sal =0.07%
1420							Collected sample at 1420 MST
							Placed sample in two 40-ml VOAs

COMMENTS: _____

WELL SAMPLING DATA FORM

CLIENT: Duke Energy Field Services
 SITE NAME: Hobbs Booster Station
 PROJECT NO. F-105

WELL ID: MW-16
 DATE: 12/11/2002
 SAMPLER: Van Deventer

PURGING METHOD: ☒ Hand Bailed ☐ Pump If Pump, Type: _____

SAMPLING METHOD: ☒ Disposable Bailer ☐ Direct from Discharge Hose ☐ Other: _____

DESCRIBE EQUIPMENT DECONTAMINATION METHOD BEFORE SAMPLING THE WELL:

☒ Gloves ☒ Alconox ☒ Distilled Water Rinse ☐ Other: _____

DISPOSAL METHOD OF PURGE WATER: ☐ Surface Discharge ☐ Drums ☒ Disposal Facility

TOTAL DEPTH OF WELL: 55.00 Feet

DEPTH TO WATER: 41.44 Feet

HEIGHT OF WATER COLUMN: 13.56 Feet

WELL DIAMETER: 2.0 Inch

6.6 Minimum Gallons to purge 3 well volumes

TIME	VOLUME PURGED	TEMP. °C	COND. mS/cm	pH	DO mg/L	Turb	PHYSICAL APPEARANCE AND REMARKS
1250	2	19.7	1.42	7.38	0.55	141	Sal =0.06%
1254	4	19.7	1.41	7.36	0.75	174	Sal =0.06%
1259	6	19.6	1.42	7.37	0.69	168	Sal =0.06%
1303	8	19.5	1.41	7.37	0.81	240	Sal =0.06%
1307							Collected sample at 1307
							Placed sample in two 40-ml VOAs (BTEX)
							Also collected Duplicate sample (2 VOAs)
							and entered time of 0000 on COC

COMMENTS: _____

WELL SAMPLING DATA FORM

CLIENT: Duke Energy Field Services
 SITE NAME: Hobbs Booster Station
 PROJECT NO. F-105

WELL ID: MW-19
 DATE: 12/11/2002
 SAMPLER: Van Deventer

PURGING METHOD: ☒ Hand Bailed ☐ Pump If Pump, Type: _____

SAMPLING METHOD: ☒ Disposable Bailer ☐ Direct from Discharge Hose ☐ Other: _____

DESCRIBE EQUIPMENT DECONTAMINATION METHOD BEFORE SAMPLING THE WELL:

☒ Gloves ☒ Alconox ☒ Distilled Water Rinse ☐ Other: _____

DISPOSAL METHOD OF PURGE WATER: ☐ Surface Discharge ☐ Drums ☒ Disposal Facility

TOTAL DEPTH OF WELL: 64.00 Feet

DEPTH TO WATER: 51.34 Feet

HEIGHT OF WATER COLUMN: 12.66 Feet

WELL DIAMETER: 2.0 Inch

6.2 Minimum Gallons to purge 3 well volumes

TIME	VOLUME PURGED	TEMP. °C	COND. mS/cm	pH	DO mg/L	Turb	PHYSICAL APPEARANCE AND REMARKS
1148	0	-	-	-	-	-	Began bailing
1157	2	19.1	2.94	6.97	0.66	516	Sal =0.14%
1204	4	19.2	2.95	7.00	0.84	722	Sal =0.14%
1208	7	19.2	2.94	7.02	0.60	578	Sal =0.14%
1215							Collected sample at 1215 MST
							Placed sample in two 40-ml VOAs

COMMENTS: _____

WELL SAMPLING DATA FORM

CLIENT: DUKE ENERGY FIELD SERVICES
 SITE NAME: Hobbs Booster Station
 PROJECT NO. F-105

WELL ID: MW-20
 DATE: 12/11/2002
 SAMPLER: Van Deventer

PURGING METHOD: ☒ Hand Bailed ☐ Pump If Pump, Type: _____

SAMPLING METHOD: ☒ Disposable Bailer ☐ Direct from Discharge Hose ☐ Other: _____

DESCRIBE EQUIPMENT DECONTAMINATION METHOD BEFORE SAMPLING THE WELL:

☐ Gloves ☒ Alconox ☒ Distilled Water Rinse ☐ Other: _____

DISPOSAL METHOD OF PURGE WATER: ☐ Surface Discharge ☐ Drums ☒ Disposal Facility

TOTAL DEPTH OF WELL: 60.00 Feet

DEPTH TO WATER: 48.90 Feet

HEIGHT OF WATER COLUMN: 11.10 Feet

WELL DIAMETER: 2.0 Inch

5.4 Minimum Gallons to purge 3 well volumes
 (Water Column Height x 1.96)

TIME	VOLUME PURGED	TEMP. °C / °F	COND. mS/cm	pH	DO mg/L	Turb	PHYSICAL APPEARANCE AND REMARKS
1106	2	18.9	2.30	6.92	1.31	735	Sal =0.12%
1110	4	18.8	1.82	7.08	3.14	999	Sal =0.08%
1119	6	19.0	2.11	6.98	2.05	999	Sal =0.10%
1125	8	19.1	2.29	6.93	1.43	621	Sal =0.11%
1130	10	19.1	2.27	6.94	1.25	383	Sal =0.10%
1135							Collected sample at 1135 MST
							Placed sample in two 40-ml VOAs (BTEX)

COMMENTS:

WELL SAMPLING DATA FORM

CLIENT: DUKE ENERGY FIELD SERVICES
 SITE NAME: Hobbs Booster Station
 PROJECT NO. F-105

WELL ID: MW-21
 DATE: 12/11/2002
 SAMPLER: Van Deventer

PURGING METHOD: ☒ Hand Bailed ☐ Pump If Pump, Type: _____

SAMPLING METHOD: ☒ Disposable Bailer ☐ Direct from Discharge Hose ☐ Other: _____

DESCRIBE EQUIPMENT DECONTAMINATION METHOD BEFORE SAMPLING THE WELL:

☐ Gloves ☒ Alconox ☒ Distilled Water Rinse ☐ Other: _____

DISPOSAL METHOD OF PURGE WATER: ☐ Surface Discharge ☐ Drums ☒ Disposal Facility

TOTAL DEPTH OF WELL: 60.00 Feet

DEPTH TO WATER: 50.63 Feet

HEIGHT OF WATER COLUMN: 9.37 Feet

WELL DIAMETER: 2.0 Inch

4.6 Minimum Gallons to purge 3 well volumes
 (Water Column Height x 1.96)

TIME	VOLUME PURGED	TEMP. °C / °F	COND. m S/cm	pH	DO mg/L	Turb	PHYSICAL APPEARANCE AND REMARKS
1000	0	-	-	-	-	-	Began bailing
1007	3	18.9	2.54	6.86	0.37	315	Sal =0.12%
1015	5	19.7	2.51	6.99	0.37	122	Sal =0.12%
1020	7	19.6	2.51	7.01	1.77	317	Sal =0.12%
1025	9	19.6	2.50	7.01	0.41	293	Sal =0.12%
1033							Collected sample at 1033 MST
							Placed sample in two 40-ml VOAs (BTEX)

COMMENTS:

Analytical and Quality Control Report

Gil Van Deventer
Trident Environmental
P.O. Box 7624
Midland, Tx. 79708

Report Date: December 17, 2002

Order ID Number: A02121326

Project Number: CC # V-103
Project Name: Duke Energy Field services
Project Location: Hobbs Booster

Enclosed are the Analytical Results and Quality Control Data Reports for the following samples submitted to Trace-Analysis, Inc.

Sample	Description	Matrix	Date Taken	Time Taken	Date Received
215878	MW-21	Water	12/11/02	10:33	12/13/02
215879	MW-20	Water	12/11/02	11:35	12/13/02
215880	MW-19	Water	12/11/02	12:15	12/13/02
215881	MW-16	Water	12/11/02	12:15	12/13/02
215882	MW-15	Water	12/11/02	13:07	12/13/02
215883	MW-14	Water	12/11/02	14:20	12/13/02
215884	Duplicate	Water	12/11/02	15:15	12/13/02
215885	Trip Blank	Water	12/11/02	:	12/13/02

These results represent only the samples received in the laboratory. The Quality Control Report is generated on a batch basis. All information contained in this report is for the analytical batch(es) in which your sample(s) were analyzed. Note: the RDL is equal to MQL for all organic analytes including TPH.

The test results contained within this report meet all requirements of LAC 33:I unless otherwise noted.

This report consists of a total of 7 pages and shall not be reproduced except in its entirety including the chain of custody (COC), without written approval of TraceAnalysis, Inc.

Note: Samples will be disposed of 30 days from the report date unless the lab is contacted before the 30 days has past.



Dr. Blair Leftwich, Director

Analytical Report

Sample: 215878 - MW-21

Analysis: BTEX Analytical Method: S 8021B QC Batch: QC25576 Date Analyzed: 12/13/02
Analyst: CG Preparation Method: S 5030B Prep Batch: PB23711 Date Prepared: 12/13/02

Param	Flag	Result	Units	Dilution	RDL
Benzene		<0.001	mg/L	1	0.001
Toluene		<0.001	mg/L	1	0.001
Ethylbenzene		<0.001	mg/L	1	0.001
M,P,O-Xylene		<0.001	mg/L	1	0.001
Total BTEX		<0.001	mg/L	1	0.001

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
TFT		0.108	mg/L	1	0.10	108	70 - 130
4-BFB		0.106	mg/L	1	0.10	106	70 - 130

Sample: 215879 - MW-20

Analysis: BTEX Analytical Method: S 8021B QC Batch: QC25576 Date Analyzed: 12/13/02
Analyst: CG Preparation Method: S 5030B Prep Batch: PB23711 Date Prepared: 12/13/02

Param	Flag	Result	Units	Dilution	RDL
Benzene		<0.001	mg/L	1	0.001
Toluene		<0.001	mg/L	1	0.001
Ethylbenzene		<0.001	mg/L	1	0.001
M,P,O-Xylene		<0.001	mg/L	1	0.001
Total BTEX		<0.001	mg/L	1	0.001

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
TFT		0.105	mg/L	1	0.10	105	70 - 130
4-BFB		0.103	mg/L	1	0.10	103	70 - 130

Sample: 215880 - MW-19

Analysis: BTEX Analytical Method: S 8021B QC Batch: QC25576 Date Analyzed: 12/13/02
Analyst: CG Preparation Method: S 5030B Prep Batch: PB23711 Date Prepared: 12/13/02

Param	Flag	Result	Units	Dilution	RDL
Benzene		<0.001	mg/L	1	0.001
Toluene		<0.001	mg/L	1	0.001
Ethylbenzene		<0.001	mg/L	1	0.001
M,P,O-Xylene		<0.001	mg/L	1	0.001
Total BTEX		<0.001	mg/L	1	0.001

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
TFT		0.101	mg/L	1	0.10	101	70 - 130
4-BFB		0.106	mg/L	1	0.10	106	70 - 130

Sample: 215881 - MW-16

Analysis: BTEX Analytical Method: S 8021B QC Batch: QC25576 Date Analyzed: 12/13/02
Analyst: CG Preparation Method: S 5030B Prep Batch: PB23711 Date Prepared: 12/13/02

Param	Flag	Result	Units	Dilution	RDL
Benzene		0.0048	mg/L	1	0.001
Toluene		<0.001	mg/L	1	0.001
Ethylbenzene		<0.001	mg/L	1	0.001
M,P,O-Xylene		<0.001	mg/L	1	0.001
Total BTEX		0.0048	mg/L	1	0.001

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
TFT		0.105	mg/L	1	0.10	105	70 - 130
4-BFB		0.107	mg/L	1	0.10	107	70 - 130

Sample: 215882 - MW-15

Analysis: BTEX Analytical Method: S 8021B QC Batch: QC25616 Date Analyzed: 12/16/02
Analyst: CG Preparation Method: S 5030B Prep Batch: PB23740 Date Prepared: 12/16/02

Param	Flag	Result	Units	Dilution	RDL
Benzene		<0.005	mg/L	5	0.001
Toluene		<0.005	mg/L	5	0.001
Ethylbenzene		<0.005	mg/L	5	0.001
M,P,O-Xylene		<0.005	mg/L	5	0.001
Total BTEX		<0.005	mg/L	5	0.001

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
TFT		0.105	mg/L	5	0.10	105	70 - 130
4-BFB		0.085	mg/L	5	0.10	85	70 - 130

Sample: 215883 - MW-14

Analysis: BTEX Analytical Method: S 8021B QC Batch: QC25576 Date Analyzed: 12/13/02
Analyst: CG Preparation Method: S 5030B Prep Batch: PB23711 Date Prepared: 12/13/02

Param	Flag	Result	Units	Dilution	RDL
Benzene		0.0685	mg/L	10	0.001
Toluene		<0.010	mg/L	10	0.001
Ethylbenzene		<0.010	mg/L	10	0.001
M,P,O-Xylene		<0.010	mg/L	10	0.001
Total BTEX		0.0685	mg/L	10	0.001

Report Date: December 17, 2002
CC # V-103

Order Number: A02121326
Duke Energy Field services

Page Number: 4 of 7
Hobbs Booster

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
TFT		0.1	mg/L	10	0.10	100	70 - 130
4-BFB		0.101	mg/L	10	0.10	101	70 - 130

Sample: 215884 - Duplicate

Analysis: BTEX Analytical Method: S 8021B QC Batch: QC25576 Date Analyzed: 12/13/02
Analyst: CG Preparation Method: S 5030B Prep Batch: PB23711 Date Prepared: 12/13/02

Param	Flag	Result	Units	Dilution	RDL
Benzene		0.0035	mg/L	1	0.001
Toluene		<0.001	mg/L	1	0.001
Ethylbenzene		<0.001	mg/L	1	0.001
M,P,O-Xylene		<0.001	mg/L	1	0.001
Total BTEX		0.0035	mg/L	1	0.001

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
TFT		0.101	mg/L	1	0.10	101	70 - 130
4-BFB		0.105	mg/L	1	0.10	105	70 - 130

Sample: 215885 - Trip Blank

Analysis: BTEX Analytical Method: S 8021B QC Batch: QC25576 Date Analyzed: 12/13/02
Analyst: CG Preparation Method: S 5030B Prep Batch: PB23711 Date Prepared: 12/13/02

Param	Flag	Result	Units	Dilution	RDL
Benzene		<0.001	mg/L	1	0.001
Toluene		<0.001	mg/L	1	0.001
Ethylbenzene		<0.001	mg/L	1	0.001
M,P,O-Xylene		<0.001	mg/L	1	0.001
Total BTEX		<0.001	mg/L	1	0.001

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
TFT		0.0975	mg/L	1	0.10	98	70 - 130
4-BFB		0.101	mg/L	1	0.10	101	70 - 130

Quality Control Report Method Blank

Method Blank QCBatch: QC25576

Param	Flag	Results	Units	Reporting Limit
Benzene		<0.001	mg/L	0.001
Toluene		<0.001	mg/L	0.001
Ethylbenzene		<0.001	mg/L	0.001
M,P,O-Xylene		<0.001	mg/L	0.001
Total BTEX		<0.001	mg/L	0.001

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
TFT		0.0972	mg/L	1	0.10	97	70 - 130
4-BFB		0.0969	mg/L	1	0.10	97	70 - 130

Method Blank QCBatch: QC25616

Param	Flag	Results	Units	Reporting Limit
Benzene		<0.001	mg/L	0.001
Toluene		<0.001	mg/L	0.001
Ethylbenzene		<0.001	mg/L	0.001
M,P,O-Xylene		<0.001	mg/L	0.001
Total BTEX		<0.001	mg/L	0.001

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
TFT		0.102	mg/L	1	0.10	102	70 - 130
4-BFB		0.0861	mg/L	1	0.10	86	70 - 130

Quality Control Report Lab Control Spikes and Duplicate Spikes

Laboratory Control Spikes QCBatch: QC25576

Param	LCS Result	LCSD Result	Units	Dil.	Spike Amount Added	Matrix Result	% Rec	RPD	% Rec Limit	RPD Limit
MTBE	0.107	0.107	mg/L	1	0.10	<0.001	107	0	70 - 130	20
Benzene	0.0973	0.0983	mg/L	1	0.10	<0.001	97	1	70 - 130	20
Toluene	0.0974	0.0988	mg/L	1	0.10	<0.001	97	1	70 - 130	20
Ethylbenzene	0.0986	0.100	mg/L	1	0.10	<0.001	99	1	70 - 130	20
M,P,O-Xylene	0.296	0.301	mg/L	1	0.30	<0.001	99	2	70 - 130	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Surrogate	LCS Result	LCSD Result	Units	Dilution	Spike Amount	LCS % Rec	LCSD % Rec	Recovery Limits
TFT	0.0944	0.0951	mg/L	1	0.10	94	95	70 - 130
4-BFB	0.101	0.102	mg/L	1	0.10	101	102	70 - 130

Laboratory Control Spikes

QCBatch: QC25616

Param	LCS Result	LCSD Result	Units	Dil.	Spike Amount Added	Matrix Result	% Rec	RPD	% Rec Limit	RPD Limit
MTBE	0.1	0.102	mg/L	1	0.10	<0.001	100	1	70 - 130	20
Benzene	0.103	0.0984	mg/L	1	0.10	<0.001	103	4	70 - 130	20
Toluene	0.0996	0.0993	mg/L	1	0.10	<0.001	100	0	70 - 130	20
Ethylbenzene	0.0994	0.0984	mg/L	1	0.10	<0.001	99	1	70 - 130	20
M,P,O-Xylene	0.303	0.299	mg/L	1	0.30	<0.001	101	1	70 - 130	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Surrogate	LCS Result	LCSD Result	Units	Dilution	Spike Amount	LCS % Rec	LCSD % Rec	Recovery Limits
TFT	0.103	0.103	mg/L	1	0.10	103	103	70 - 130
4-BFB	0.0889	0.0895	mg/L	1	0.10	89	90	70 - 130

Quality Control Report Continuing Calibration Verification Standards

CCV (1)

QCBatch: QC25576

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
MTBE		mg/L	0.10	0.108	108	85 - 115	12/13/02
Benzene		mg/L	0.10	0.0985	98	85 - 115	12/13/02
Toluene		mg/L	0.10	0.0978	98	85 - 115	12/13/02
Ethylbenzene		mg/L	0.10	0.0987	99	85 - 115	12/13/02
M,P,O-Xylene		mg/L	0.30	0.296	99	85 - 115	12/13/02

CCV (2)

QCBatch: QC25576

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
MTBE		mg/L	0.10	0.103	103	85 - 115	12/13/02
Benzene		mg/L	0.10	0.097	97	85 - 115	12/13/02
Toluene		mg/L	0.10	0.097	97	85 - 115	12/13/02
Ethylbenzene		mg/L	0.10	0.098	98	85 - 115	12/13/02
M,P,O-Xylene		mg/L	0.30	0.293	97	85 - 115	12/13/02

ICV (1) QCBatch: QC25576

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
MTBE		mg/L	0.10	0.108	108	85 - 115	12/13/02
Benzene		mg/L	0.10	0.0993	99	85 - 115	12/13/02
Toluene		mg/L	0.10	0.0996	100	85 - 115	12/13/02
Ethylbenzene		mg/L	0.10	0.100	100	85 - 115	12/13/02
M,P,O-Xylene		mg/L	0.30	0.300	100	85 - 115	12/13/02

CCV (1) QCBatch: QC25616

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
MTBE		mg/L	0.10	0.102	102	85 - 115	12/16/02
Benzene		mg/L	0.10	0.110	110	85 - 115	12/16/02
Toluene		mg/L	0.10	0.109	109	85 - 115	12/16/02
Ethylbenzene		mg/L	0.10	0.108	108	85 - 115	12/16/02
M,P,O-Xylene		mg/L	0.30	0.326	108	85 - 115	12/16/02

CCV (2) QCBatch: QC25616

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
MTBE		mg/L	0.10	0.099	99	85 - 115	12/16/02
Benzene		mg/L	0.10	0.106	106	85 - 115	12/16/02
Toluene		mg/L	0.10	0.105	105	85 - 115	12/16/02
Ethylbenzene		mg/L	0.10	0.105	105	85 - 115	12/16/02
M,P,O-Xylene		mg/L	0.30	0.317	105	85 - 115	12/16/02

ICV (1) QCBatch: QC25616

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
MTBE		mg/L	0.10	0.101	101	85 - 115	12/16/02
Benzene		mg/L	0.10	0.106	106	85 - 115	12/16/02
Toluene		mg/L	0.10	0.104	104	85 - 115	12/16/02
Ethylbenzene		mg/L	0.10	0.102	102	85 - 115	12/16/02
M,P,O-Xylene		mg/L	0.30	0.313	104	85 - 115	12/16/02

Remediacon Incorporated

Geological and Engineering Services
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Facsimile: 720.528.8132

October 2, 2003

Mr. Stephen Weathers
Duke Energy Field Services, LP
370 Seventeenth Street, Suite 900
Denver, Colorado 80202

Subject: Annual Summary for the Hobbs Booster Station Hobbs, New Mexico
(Units C and D Section 4, Township 19 South, Range 38 East, NMPM:
Discharge Plan GW-044)

Dear Steve:

This letter provides the annual summary of the groundwater monitoring results for the Hobbs Booster Station in Hobbs New Mexico. This letter includes the information that was originally proposed in the September 5, 2002 letter from Duke Energy Field Services, LP (DEFS) to the New Mexico Oil Conservation Division (OCD). In that letter, DEFS voluntarily committed to providing basic information in three quarterly groundwater monitoring reports and an annual report that included supplemental summary tables, conclusions and interpretations, and recommendations for future work. The annual report will always be provided after the June monitoring episode.

The remainder of this letter includes background information, a summary of data collected to date, conclusions and interpretations, and recommended changes to the monitoring program.

BACKGROUND INFORMATION

Forty wells have been installed at the site. The well locations are shown on Figure 1. Well elevation and construction data is summarized in Table 1.

Two types of monitoring wells are present at the site. Twenty-Three wells are included in the groundwater monitoring program (MW-1 through MW-22, Figure 1). Two new wells were installed in June 2003. Well MW-19D was installed adjacent to MW-19 to measure the vertical groundwater gradient and to test for the presence of a "diving" dissolved-phase plume in the groundwater. Well MW-22 was installed on the eastern perimeter to establish the northern boundary of the dissolved-phase plume. Both wells were installed using the historical field protocols. Both well locations and elevations were surveyed by John West Surveying of Hobbs, New Mexico (West).

Seventeen product-characterization wells are also present at the site (TW-A through TW-S, Figure 1). These wells were installed to characterize the nature and extent of free product beneath the site. Some of the wells will also be used in the free product extraction system. The locations and elevations of product-characterization wells TW-D

through TW-S were also established by West in July 2003 so that the depth to water measurements could be used to expand the area of the measured water table.

Groundwater monitoring activities were completed at the site on September 24, 2002, December 10, 2002, March 19, 2003, and June 23, 2003. All field activities were completed by Trident Environmental of Midland Texas. Quarterly summary reports were provided to OCD for the first three monitoring episodes.

The data for the June 2003 sampling event are included in this report. Wells MW-19D and MW-22 were developed following completion using the historic project protocols. All samples were also collected using the historical groundwater purge-and-sample protocols. The single deviation in this episode was inadvertently not measuring the equilibrated depth to water in well MW-19.

DATA SUMMARY

The groundwater elevations as corrected for free product for all sampling episodes are compiled on Table 2. The water table contour map for the June 2003 measurements is shown on Figure 2. Note that the area that was evaluated was extended to the north following the surveying of all of the product-characterization wells.

The June 2003 water table differed by approximately 8 feet between MW-2 and MW-19, resulting in a very-shallow groundwater gradient of 0.0044 feet per foot. The groundwater flow direction remains almost due east. Both the groundwater flow direction and gradient have remained essentially unchanged over the duration of the project.

A hydrograph for the six oldest wells is include as Figure 3. The water table has steadily declined between 1.9 and 2.7 feet in wells MW-1 through MW-6 over the duration of the project. Overall, the decline rate averages approximately 0.5 feet per year.

The historical chemical data is summarized in four tables:

- Table 3 contains the historical benzene data, including the June 2003 results
- Table 4 contains the historical toluene data, including the June 2003 results
- Table 5 contains the historical ethylbenzene data, including the June 2003 results
- Table 6 contains the historical total xylenes data, including the June 2003 results

Benzene, toluene, ethybenzene and xylenes (BTEX) were not detected in boundary wells MW-19, MW-20 and MW-21 during any of the 2002-2003 sampling episodes. The BTEX constituents were also not detected in the new boundaries MW-19D and MW-22 in June 2003.

Variations in the benzene concentrations are graphed in Figure 4. Benzene was not detected in MW-16 so the line is shown along the x axis. The concentrations in wells MW-14 and MW-15 continued to fluctuate. The benzene concentration in MW-15 increased from below the method detection limit to its historic high. This increase was not present in toluene, ethylbenzene or total xylenes.

The free product and dissolved-phase benzene concentration distribution is shown on Figure 5. This distribution has generally remained constant throughout the duration of the project. The pilot removal product test was completed in mid September and the results will be provided as a separate report.

CONCLUSIONS AND RECOMMENDATIONS

The only significant conclusion that resulted from the 2002-2003 monitoring data is that the dissolved phase plume has not expanded over the past year. This conclusion is based upon the lack of detectable BTEX constituents in MW-18. MW-18 is separated by approximately 150 down gradient from well MW-17, and MW-17 contained 0.24 feet of free product. This stability indicates that the system continues to operate under equilibrated conditions. The benzene concentrations in the southern boundary wells remain an issue; however, their BTEX concentrations fall within the historic range. A boundary-control system is currently being designed to alleviate the possibility of off-site hydrocarbon migration in the groundwater. This design will also be provided under separate cover.

Remediacon recommends the following changes to the groundwater monitoring program based upon the information collected over the past year:

1. Wells MW-19D and MW-22 should be added to the boundary monitoring program to ensure compliance along the down-gradient boundary.
2. The frequency of boundary monitoring should be decreased from quarterly to semi-annual. Well MW-18 is located well up gradient from the site boundary, and it should provide sufficient early warning should the hydrocarbon plume begin to expand.

Mr Stephen Weathers
October 2, 2003
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Thank you for allowing us to complete this project. Do not hesitate to contact me if you have any questions or comments on this report or any other aspects of the projects.

Sincerely,
REMEDIACON INCORPORATED

A handwritten signature in black ink, appearing to read "Michael H. Stewart". The signature is fluid and cursive, with the first name "Michael" being more prominent.

Michael H. Stewart, PE
Principal Engineer

MHS/tbm

attachments

TABLES

Table 1 – Summary of Hobbs Booster Station Well Construction Information

Well	Top of Casing Elevation	Total Well Depth	Screen Interval	Gravel Interval	Well	Top of Casing Elevation	Total Well Depth	Screen Interval	Gravel Interval
MW-1	3,626.06	57	37-57	34-57	MW-21	3,624.25	61	61-46	61-44
MW-2	3,623.14	53	33-53	30-53	MW-22	3,625.16	60	45-60	43-60
MW-3	3,623.01	53	33-53	30-53	TW-A	3626.74	57	42-57	40-57
MW-4	3,624.29	57	37-57	34-57	TW-B	3,626.96	57	44-59	42-59
MW-5	3,629.16	57	37-57	34-57	TW-C	3,626.85	60	45-60	43-60
MW-6	3,626.93	53	33-53	30-53	TW-D	3,628.12	50	35-50	33-50
MW-7	3,621.40	56	33-53	31-56	TW-G	3,623.62	54	39-54	34-54
MW-8	3,623.62	58	36-56	34-58	TW-H	3,622.30	51	36-51	34-51
MW-9	3,625.21	63	43-63	40-63	TW-I	3,629.44	60	45-60	43-60
MW-10	3,621.07	58	36-56	34-58	TW-J	3,628.99	60	45-60	43-60
MW-11	3,625.88	63	43-63	41-63	TW-K	3,628.95	60	45-60	43-60
MW-12	3,626.60	65	40-60	38-65	TW-L	3,628.75	60	45-60	43-60
MW-13	3,626.30	69	44-64	38-64	TW-M	3,629.62	60	45-60	43-60
MW-14	3,621.42	66	42-62	34-66	TW-N	3,631.98	60	45-60	43-60
MW-15	3,619.39	59	37-57	31-59	TW-O	3,631.60	60	45-60	42-60
MW-16	3,621.87	58	34-54	30-56	TW-P	3,629.68	60	45-60	42-60
MW-17	3,623.94	66	41-61	37-63	TW-Q	3,627.90	58	53-58	41-58
MW-18	3,624.30	68	44-64	35-65	TW-R	3,627.34	60	45-60	43-45
MW-19	3,624.12	68	43-63	40-65	TW-S	3,628.77	60	45-60	43-45
MW-19D	3,623.79	83	71-76	69-76	RW-I	3624.52	60	35-60	32-60
MW-20	3,621.49	59	59-44	59-42					

Notes: All units in feet

Wells TW-E and TW-F were plugged and abandoned in July 2

A natural sand pack is present in well MW-19D between 72 and 76 feet below ground surface (bgs). Artificially graded sand is present between 69 and 72 feet bgs.

Table 2 – Summary of Corrected Groundwater Elevations for the Hobbs Booster Station

Well	Jul-99	May-00	Aug-00	Oct-00	Feb-01	May-01	Aug-01	Oct-01	Mar-02	Jun-02	Sep-02	Dec-02	Mar-03	Jun-03
MW-1	3,580.50	3,580.13	3,580.19	3,579.96	3,579.89	3,579.64	3,579.65	3,579.62	3,579.00	3,578.72	3,578.55	3,578.72	3,578.46	3,578.23
MW-2	3,582.63	3,582.04	3,582.33	3,581.95	3,581.90	3,581.67	3,581.43	3,581.33	3,580.88	3,580.65	3,580.45	3,580.81	3,580.36	3,580.16
MW-3	3,582.25	3,581.68	3,582.05	3,581.64	3,581.57	3,581.36	3,581.11	3,580.97	3,580.48	3,580.29	3,580.11	3,580.52	3,580.06	3,579.79
MW-4	3,579.95	3,579.27	3,579.12	3,579.00	3,578.96	3,578.82	3,578.60	3,578.39	3,577.96	3,577.77	3,577.62	3,577.87	3,577.63	3,577.24
MW-5	3,581.01	3,580.89	3,580.66	3,580.58	3,580.59	3,580.27	3,580.68	3,580.74	3,579.81	3,579.44	3,579.32	3,579.49	3,579.16	3,579.08
MW-6	3,582.98	3,582.61	3,582.72	3,582.45	3,582.38	3,582.15	3,581.94	3,581.94	3,581.49	3,581.17	3,580.97	3,581.16	3,580.87	3,580.74
MW-7		3,582.90	3,583.22	3,582.83	3,582.75	3,582.52	3,582.24	3,582.18	3,581.70	3,581.49	3,581.28	3,581.66	3,581.52	3,580.98
MW-8		3,579.93	3,580.12	3,579.84	3,579.80	3,579.79	3,579.73	3,579.26	3,578.83	3,578.64	3,578.50	3,578.77	3,578.48	3,578.15
MW-9		3,577.62	3,577.51	3,577.46	3,577.45	3,577.31	3,577.00	3,576.81	3,576.33	3,576.21	3,576.05	3,576.30	3,576.09	3,575.58
MW-10		3,579.43	3,579.64	3,579.28	3,579.26	3,579.08	3,578.75	3,578.51	3,578.03	3,577.99	3,577.84	3,578.15	3,577.86	3,577.34
MW-11		3,577.90	3,578.00	3,577.66	3,577.69	3,577.52	3,577.34	3,577.16	3,576.70	3,576.48	3,576.32	3,576.52	3,576.32	3,575.92
MW-12				3,578.58	3,578.58	3,578.18	3,578.18	3,577.96	3,577.73	3,577.53	3,577.21	3,577.53	3,577.39	3,576.93
MW-13				3,576.41	3,576.32	3,576.29	3,575.86	3,575.81	3,575.40	3,575.23	3,575.07	3,575.25	3,575.04	3,574.62
MW-14				3,577.51	3,577.46	3,577.35	3,576.90	3,576.56	3,576.06	3,576.26	3,576.13	3,576.42	3,576.17	3,575.39
MW-15				3,579.57	3,579.53	3,579.36	3,579.02	3,578.70	3,578.21	3,578.32	3,578.14	3,578.54	3,578.18	3,577.59
MW-16				3,581.50	3,581.42	3,581.21	3,580.96	3,580.79	3,580.28	3,580.14	3,579.96	3,580.43	3,579.93	3,579.62
MW-17				3,575.36	3,575.26	3,575.15	3,574.89	3,574.68	3,574.24	3,574.07	3,573.90	3,574.09	3,573.85	3,573.44
MW-18				3,574.66	3,574.53	3,574.43	3,574.21	3,573.98	3,573.56	3,573.38	3,573.22	3,573.42	3,573.15	3,572.76
MW-19				3,573.97	3,573.88	3,573.79	3,573.55	3,573.32	3,572.90	3,572.74	3,572.58	3,572.78	3,572.49	3,572.12
MW-20										3,572.51	3,572.36	3,572.59	3,572.28	3,571.92
MW-21										3,573.46	3,573.32	3,573.62	3,573.28	3,572.82
MW-22														3,572.08
TW-A										3,578.32	3,578.12	3,578.25	3,578.04	3,577.88
TW-B										3,577.45	3,577.28	3,577.42	3,577.25	3,577.01
TW-C										3,576.49	3,576.37	3,576.50	3,576.35	3,575.85
TW-D										3,575.85	3,576.12	3,576.15	3,576.09	3,575.78
TW-G										3,577.40	3,577.23	3,577.49	3,577.29	3,576.60
TW-H										3,579.15	3,578.99	3,614.41	3,578.96	3,578.67
TW-I										3,577.52	3,577.38	3,577.40	3,577.27	3,577.10

Table 2 – Summary of Corrected Groundwater Elevations for the Hobbs Booster Station (continued)

Well	Jul-99	May-00	Aug-00	Oct-00	Feb-01	May-01	Aug-01	Oct-01	Mar-02	Jun-02	Sep-02	Dec-02	Mar-03	Jun-03
TW-J										3,576.50	3,576.43	3,576.45	3,576.30	3,576.07
TW-K										3,575.45	3,575.51	3,575.57	3,575.28	3,575.12
TW-L										3,574.96	3,575.07	3,575.16	3,574.98	3,574.69
TW-M											3,578.32	3,578.40	3,578.17	3,578.04
TW-N											3,577.22	3,577.13	3,576.99	3,576.88
TW-O											3,576.31	3,576.25	3,576.12	3,575.95
TW-P											3,575.20	3,575.21	3,575.08	3,574.86
TW-Q											3,579.12	3,618.98	3,579.04	3,578.89
TW-R											3,574.17	3,574.36	3,574.22	3,573.96
TW-S											3,573.90	3,618.71	3,573.76	3,573.47

Notes: A blank cell denotes that the location had not been installed

NS for well MW-19D indicates that it had been installed but the water level had not equilibrated when the wells were gauged.

All units in feet.

Table 3 - Historical Summary of Benzene Analytical Results

Well	7/8/99	5/11/00	8/22/00	10/31/00	2/5/01	5/15/01	8/9/01	10/19/01	3/13/02	6/3/02	9/24/02	12/10/02	3/19/03	6/23/03
MW-1	0.232	0.191	0.181	0.197	0.570	LNAPL	LNAPL	0.144	LNAPL	LNAPL				LNAPL
MW-2	0.934	1.330	1.420	1.020	2.110	0.848	1.760	1.3	0.712	LNAPL				0.277
MW-3	0.262	0.202	0.011	<.005	0.346	<.001	0.345	0.029	<.001	0.009				<.001
MW-4	LNAPL	LNAPL	LNAPL	LNAPL	LNAPL	LNAPL	LNAPL	LNAPL	LNAPL	LNAPL				LNAPL
MW-5	<.005	<.005	<.005	<.005	<.005	<.001	<.001	<.001	<.001	<.001				<.001
MW-6	<.005	<.005	<.005	<.005	<.005	<.001	<.001	<.001	<.001	<.005				<.001
MW-7		<.005	<.005	<.005	<.005	<.001	<.001	<.001	<.001	0.0039				<.001
MW-8		0.824	LNAPL	LNAPL	0.950	0.294	1.230	LNAPL	LNAPL	LNAPL				LNAPL
MW-9		0.702	LNAPL	LNAPL	LNAPL	LNAPL	LNAPL	LNAPL	LNAPL	LNAPL				LNAPL
MW-10		LNAPL	LNAPL	0.535	LNAPL	LNAPL	LNAPL	1.13	LNAPL	LNAPL				1.030
MW-11		LNAPL	LNAPL	LNAPL	LNAPL	LNAPL	LNAPL	LNAPL	LNAPL	LNAPL				LNAPL
MW-12				LNAPL	LNAPL	LNAPL	LNAPL	LNAPL	LNAPL	LNAPL				LNAPL
MW-13				LNAPL	LNAPL	LNAPL	LNAPL	LNAPL	LNAPL	LNAPL				LNAPL
MW-14				<.005	0.041	0.002	0.034	0.029	<.001	0.068	0.126	0.0685	0.0820	0.0414
MW-15				<.005	0.237	0.003	0.353	0.317	<.001	0.358	<.005	<.005	<.005	0.352
MW-16				<.005	0.094	0.01	0.098	0.012	<.001	<.005	0.0363	0.0042	<.001	<.001
MW-17						LNAPL	0.04	0.076	LNAPL	LNAPL				LNAPL
MW-18				<.005	<.005	0.004	0.007	0.036	<.001	LNAPL				<.005
MW-19				<.005	<.005	0.001	<.005	0.035	<.001	<.001	<.005	<.001	<.005	<.001
MW-19D														<.001
MW-20										<.001	<.001	<.001	<.005	<.001
MW-21										<.001	<.001	<.001	<.001	<.001
MW-22														<.001

Notes: All units mg/l

LNAPL: Light non-aqueous phase liquid (free product) present so no sample collected

Blank cell: Well not installed at sampling date

Table 4 - Historical Summary of Toluene Analytical Results

Well	7/8/99	5/11/00	8/22/00	10/31/00	2/5/01	5/15/01	8/9/01	10/19/01	3/13/02	6/3/02	9/24/02	12/10/02	3/19/03	6/23/03
MW-1	0.029	0.034	0.035	0.028	0.020	LNAPL	LNAPL	<0.020	LNAPL	LNAPL				LNAPL
MW-2	0.993	1.220	1.380	0.539	1.070	0.488	0.211	0.246	0.317	LNAPL				0.018
MW-3	0.029	0.022	0.023	0.014	0.009	0.017	<.005	<0.010	<0.001	0.0072				<0.001
MW-4	LNAPL	LNAPL	LNAPL	LNAPL	LNAPL	LNAPL	LNAPL	LNAPL	LNAPL	LNAPL				LNAPL
MW-5	<.005	<.005	<.005	<.005	<.005	<.001	<.001	<0.001	<0.001	<0.001				<0.001
MW-6	<.005	<.005	0.008	<.005	<.005	<.001	<.001	<0.001	<0.001	<0.005				<0.001
MW-7		<.005	0.008	<.005	<.005	<.001	<.001	<0.001	<0.001	<0.001				<0.001
MW-8		<.005	LNAPL	LNAPL	<.005	0.008	<.01	LNAPL	LNAPL	LNAPL				LNAPL
MW-9		0.016	LNAPL	LNAPL	LNAPL	LNAPL	LNAPL	LNAPL	LNAPL	LNAPL				LNAPL
MW-10		LNAPL	LNAPL	0.061	LNAPL	LNAPL	LNAPL	0.85	LNAPL	LNAPL				0.099
MW-11		LNAPL	LNAPL	LNAPL	LNAPL	LNAPL	LNAPL	LNAPL	LNAPL	LNAPL				LNAPL
MW-12				LNAPL	LNAPL	LNAPL	LNAPL	LNAPL	LNAPL	LNAPL				LNAPL
MW-13				LNAPL	LNAPL	LNAPL	LNAPL	LNAPL	LNAPL	LNAPL				LNAPL
MW-14				<.005	<.005	<.001	<.005	<0.001	<0.001	<0.005	<0.02	<0.01	<0.01	<0.001
MW-15				<.005	<.005	0.003	<.005	<0.020	<0.005	<0.005	<0.005	<0.005	<0.005	0.001
MW-16				<.005	<.005	0.004	<.005	<0.001	<0.001	<0.005	<0.005	<0.005	<0.001	<0.001
MW-17						LNAPL	<.001	<0.005	LNAPL	LNAPL				LNAPL
MW-18				<.005	<.005	0.003	<.001	<0.005	<0.005	LNAPL				<0.005
MW-19				<.005	<.005	<.001	<.005	<0.005	<0.001	<0.001	<0.005	<0.001	<0.005	<0.001
MW-19D														<0.001
MW-20											<0.001	<0.001	<0.005	<0.001
MW-21											<0.001	<0.001	<0.001	<0.001
MW-22														<0.001

Notes: All units mg/l

LNAPL: Light non-aqueous phase liquid (free product) present so no sample collected

Blank cell: Well not installed at sampling date

Table 5 - Historical Summary of Ethylbenzene Analytical Results

Well	7/8/99	5/11/00	8/22/00	10/31/00	2/5/01	5/15/01	8/9/01	10/19/01	3/13/02	6/3/02	9/24/02	12/10/02	3/19/03	6/23/03
MW-1	0.168	0.344	0.273	0.285	0.287	LNAPL	LNAPL	0.236	LNAPL	LNAPL				LNAPL
MW-2	0.192	0.309	0.298	0.235	0.334	0.396	0.255	0.314	0.220	LNAPL				0.101
MW-3	0.222	0.245	0.218	0.203	0.259	0.324	0.277	0.207	0.0056	0.081				0.056
MW-4	LNAPL	LNAPL	LNAPL	LNAPL	LNAPL	LNAPL	LNAPL	LNAPL	LNAPL	LNAPL				LNAPL
MW-5	<0.05	<0.05	<0.05	<0.05	<0.05	<0.01	<0.01	<0.001	<0.001	<0.001				<0.001
MW-6	<0.05	<0.05	<0.05	<0.05	<0.05	<0.01	<0.01	<0.001	<0.001	<0.005				<0.001
MW-7		<0.05	<0.05	<0.05	<0.05	<0.01	<0.01	<0.001	<0.001	<0.001				<0.001
MW-8		0.375	LNAPL	LNAPL	0.173	0.226	0.201	LNAPL	LNAPL	LNAPL				LNAPL
MW-9		0.096	LNAPL	LNAPL	LNAPL	LNAPL	LNAPL	LNAPL	LNAPL	LNAPL				LNAPL
MW-10		LNAPL	LNAPL	0.128	LNAPL	LNAPL	LNAPL	0.889	LNAPL	LNAPL				0.198
MW-11		LNAPL	LNAPL	LNAPL	LNAPL	LNAPL	LNAPL	LNAPL	LNAPL	LNAPL				LNAPL
MW-12				LNAPL	LNAPL	LNAPL	LNAPL	LNAPL	LNAPL	LNAPL				LNAPL
MW-13				LNAPL	LNAPL	LNAPL	LNAPL	LNAPL	LNAPL	LNAPL				LNAPL
MW-14				0.007	<0.05	0.004	<0.05	0.018	0.0022	<0.005	<0.02	<0.01	0.020	0.0150
MW-15				<0.05	<0.05	0.004	<0.05	<0.020	0.0376	<0.005	<0.005	<0.005	<0.005	0.005
MW-16				<0.05	<0.05	0.003	<0.05	0.007	<0.001	<0.005	<0.005	<0.005	<0.001	<0.001
MW-17						LNAPL	0.057	0.101	LNAPL	LNAPL				LNAPL
MW-18				0.017	<0.05	0.020	<0.01	0.089	<0.005	LNAPL				0.006
MW-19				<0.05	<0.05	<0.01	<0.05	<0.005	<0.001	<0.001	<0.005	<0.001	<0.005	<0.001
MW-19D														<0.001
MW-20										<0.001	<0.001	<0.001	<0.005	<0.001
MW-21										<0.001	<0.001	<0.001	<0.001	<0.001
MW-22														

Notes: All units mg/l

LNAPL: Light non-aqueous phase liquid (free product) present so no sample collected

Blank cell: Well not installed at sampling date

Table 6 - Historical Summary of Total Xylenes Analytical Results

Well	7/8/99	5/11/00	8/22/00	10/31/00	2/5/01	5/15/01	8/9/01	10/19/01	3/13/02	6/3/02	9/24/02	12/10/02	3/19/03	6/23/03
MW-1	0.229	0.604	0.450	0.466	0.461	LNAPL	LNAPL	0.12	LNAPL	LNAPL				LNAPL
MW-2	0.359	0.501	0.541	0.394	0.597	0.772	0.452	0.243	0.227	LNAPL				0.100
MW-3	0.287	0.291	0.264	0.290	0.285	0.346	0.316	0.146	0.008	0.104				0.0719
MW-4	LNAPL	LNAPL	LNAPL	LNAPL	LNAPL	LNAPL	LNAPL	LNAPL	LNAPL	LNAPL				LNAPL
MW-5	<.005	<.005	<.005	<.005	<.005	<.001	<.001	<.001	<.001	<.001				<.001
MW-6	<.005	0.038	0.007	<.005	<.005	<.001	<.001	<.001	<.001	<.005				<.001
MW-7		<.005	0.008	<.005	<.005	<.001	<.001	<.001	<.001	<.001				<.001
MW-8		0.742	LNAPL	LNAPL	0.286	0.34	0.449	LNAPL	LNAPL	LNAPL				LNAPL
MW-9		0.208	LNAPL	LNAPL	LNAPL	LNAPL	LNAPL	LNAPL	LNAPL	LNAPL				LNAPL
MW-10		LNAPL	LNAPL	1.280	LNAPL	LNAPL	LNAPL	2.38	LNAPL	LNAPL				0.307
MW-11		LNAPL	LNAPL	LNAPL	LNAPL	LNAPL	LNAPL	LNAPL	LNAPL	LNAPL				LNAPL
MW-12				LNAPL	LNAPL	LNAPL	LNAPL	LNAPL	LNAPL	LNAPL				LNAPL
MW-13				LNAPL	LNAPL	LNAPL	LNAPL	LNAPL	LNAPL	LNAPL				LNAPL
MW-14				<.005	<.005	<.001	<.005	<.001	0.0016	<.005	<.02	<.01	<.01	0.0020
MW-15				<.005	<.005	<.001	<.005	<.020	<.005	<.005	<.005	<.005	<.005	<.001
MW-16				<.005	<.005	0.004	<.005	0.002	0.0024	<.005	<.005	<.005	<.001	<.001
MW-17						LNAPL	0.057	0.278	LNAPL	LNAPL				LNAPL
MW-18				0.143	<.005	0.009	0.030	0.238	<.005	LNAPL				0.006
MW-19				<.005	<.005	<.001	<.005	<.005	0.0016	0.0028	<.005	<.001	<.005	0.002
MW-19D														<.001
MW-20											<.001	<.001	<.005	<.001
MW-21											<.001	<.001	<.001	<.001
MW-22														

Notes: All units mg/l

LNAPL: Light non-aqueous phase liquid (free product) present so no sample collected

Blank cell: Well not installed at sampling date

Table 7 – Summary of Measured Light Nonaqueous Phase Liquid (Free Product) Thicknesses

Well	Jul-99	May-00	Aug-00	Oct-00	Feb-01	May-01	Aug-01	Oct-01	Mar-02	Jun-02	Aug-02	Sep-02	Dec-02	Mar-03	Jun-03
MW-1	0	0	0	0	0	0.01	0.01	<0.01	0	0.02	0.290	0.35	0.55	1.67	2.15
MW-4	3.26	2.68	3.49	2.68	2.92	2.82	2.6	2.64	2.62	2.86	3.380	3.36	3.11	3.39	3.4
MW-8	NM	0	0	0	0	0.27	0.4	0.06	0.72	1.88	2.500	2.53	2.47	2.66	2.56
MW-9	NM	0	0	0	0.01	0	0	0.01	0.15	0.01	0.010	0.52	0.46	0.88	1.21
MW-11	NM	1.18	4.1	4.45	5.42	5.47	5.97	6.26	7	3.09	6.570	7.21	7.45	7.41	7.91
MW-12	NM	NM	NM	0.08	1.05	0.96	2.04	1.71	2.79	2.79	2.830	2.81	2.7	3.1	3.33
MW-13	NM	NM	NM	0.17	0.76	0.84	5.22	5.69	7.62	7.37	8.590	8.62	8.42	8.88	8.69
MW-17	NM	NM	NM	0.01	0.02	0.01	0.03	0.005	0.03	0.01	0.640	0.06	0.11	0.18	0.24
TW-A	NM	NM	NM	NM	NM	NM	NM	NM	NM	1.15	2.700	3.41	3.67	3.96	3.93
TW-B	NM	NM	NM	NM	NM	NM	NM	NM	NM	5.24	5.280	5.22	5.17	5.48	5.59
TW-C	NM	NM	NM	NM	NM	NM	NM	NM	NM	9.84	10.520	10.6	10.58	11.58	2.66
TW-D	NM	NM	NM	NM	NM	NM	NM	NM	NM	8	8.510	8.45	8.49	8.51	8.11
TW-G	NM	NM	NM	NM	NM	NM	NM	NM	NM	2.29	0.000	1.84	1.75	2.09	0.49
TW-I	NM	NM	NM	NM	NM	NM	NM	NM	NM	3.6	3.750	3.74	3.85	4.21	4.37
TW-J	NM	NM	NM	NM	NM	NM	NM	NM	NM	1.28	5.390	6.01	6.16	6.54	6.9
TW-K	NM	NM	NM	NM	NM	NM	NM	NM	NM	5.95	8.000	7.91	7.76	7.8	8.25
TW-L	NM	NM	NM	NM	NM	NM	NM	NM	NM	5.34	7.910	7.88	7.79	8.05	8.09
TW-M	NM	NM	NM	NM	NM	NM	NM	NM	NM	0	0.150	0.2	0.01	0.45	0.54
TW-N	NM	NM	NM	NM	NM	NM	NM	NM	NM	0	0.020	0	0.01	0.03	0.01
TW-O	NM	NM	NM	NM	NM	NM	NM	NM	NM	0	0.060	0.04	0.06	0.08	0.05
TW-P	NM	NM	NM	NM	NM	NM	NM	NM	NM	0	0.000	1.33	2.53	4.21	4.91
TW-R	NM	NM	NM	NM	NM	NM	NM	NM	NM	1.5	0.030	1.65	2.65	4.31	5.74

Notes: All units in feet

NM: Location was not installed at the date of measurement

FIGURES

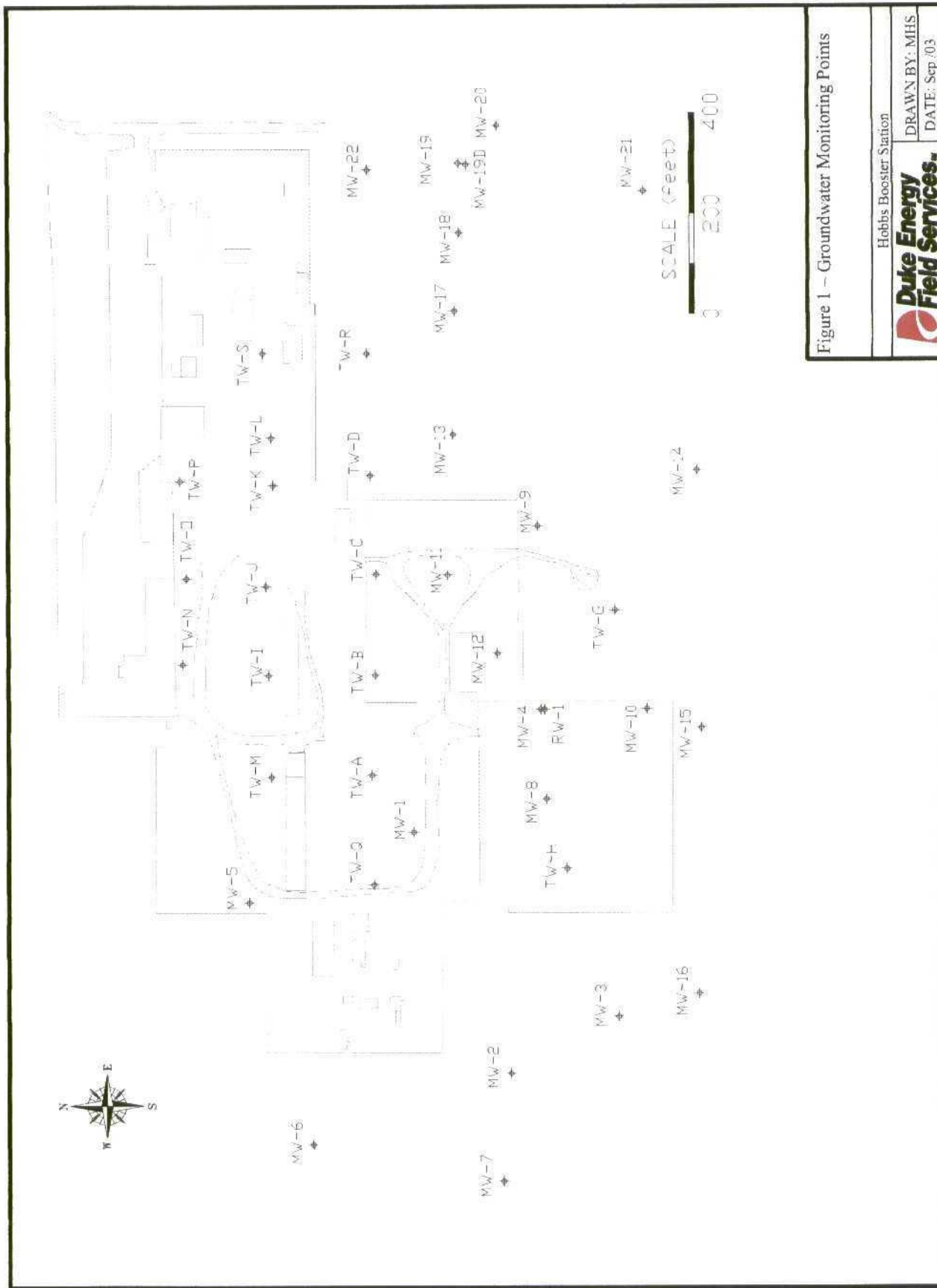




Figure 2 – June 2003 Water Table
Contours (feet)

Hobbs Booster Station
**Duke Energy
Field Services**
 DRAWN BY: MHS
 DATE: Sep /03

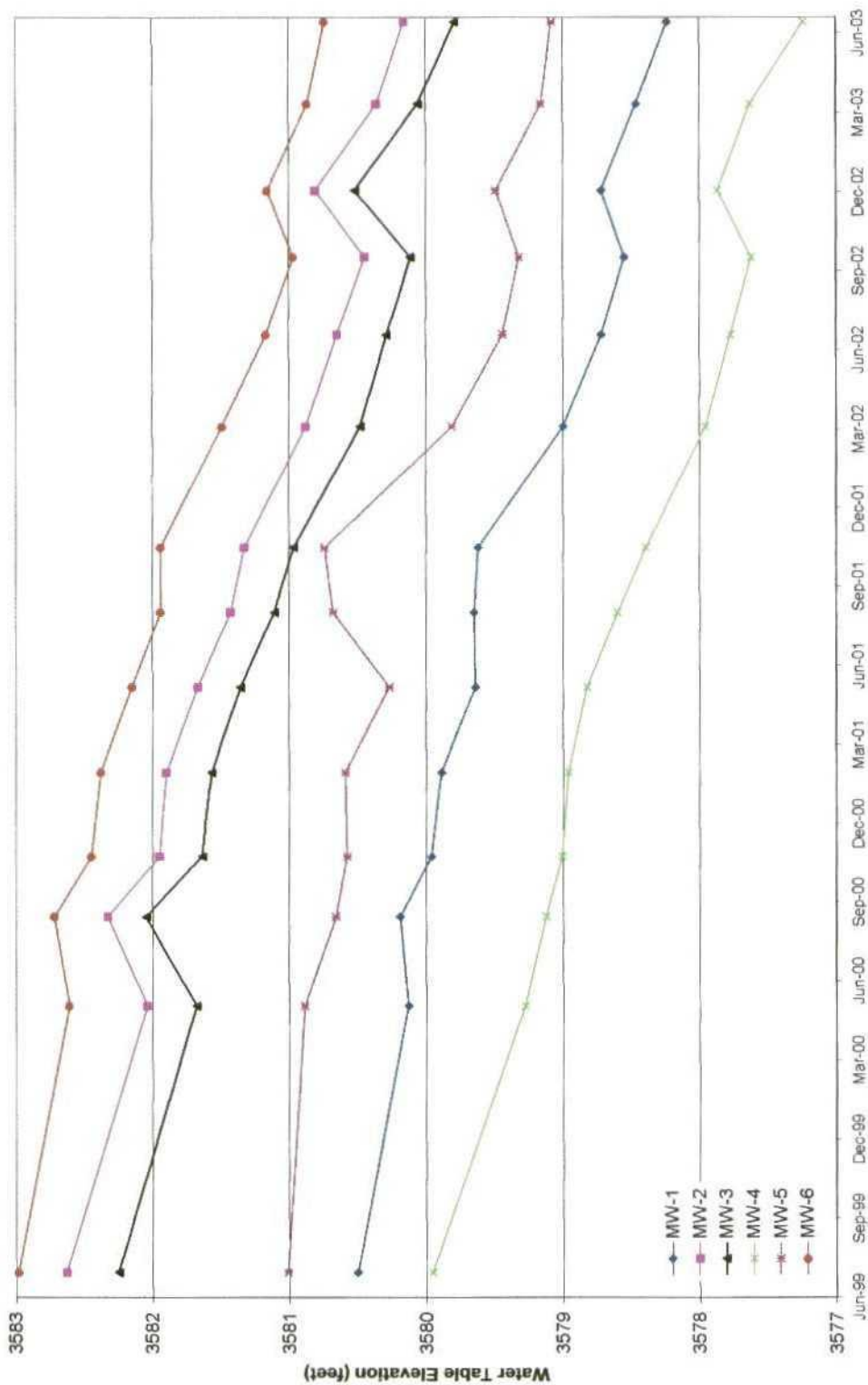


Figure 3 – Hydrographs for Select Monitoring Wells

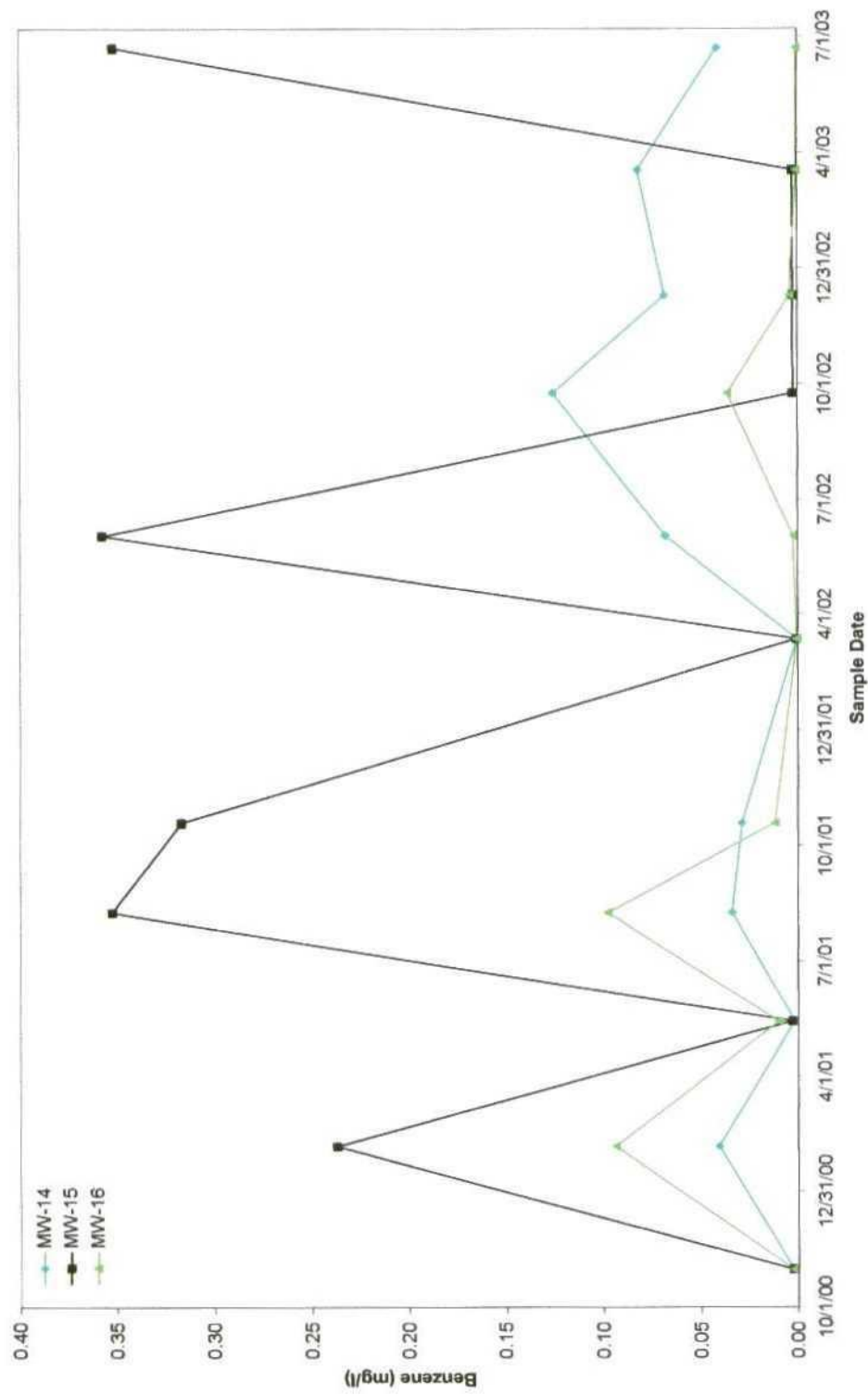


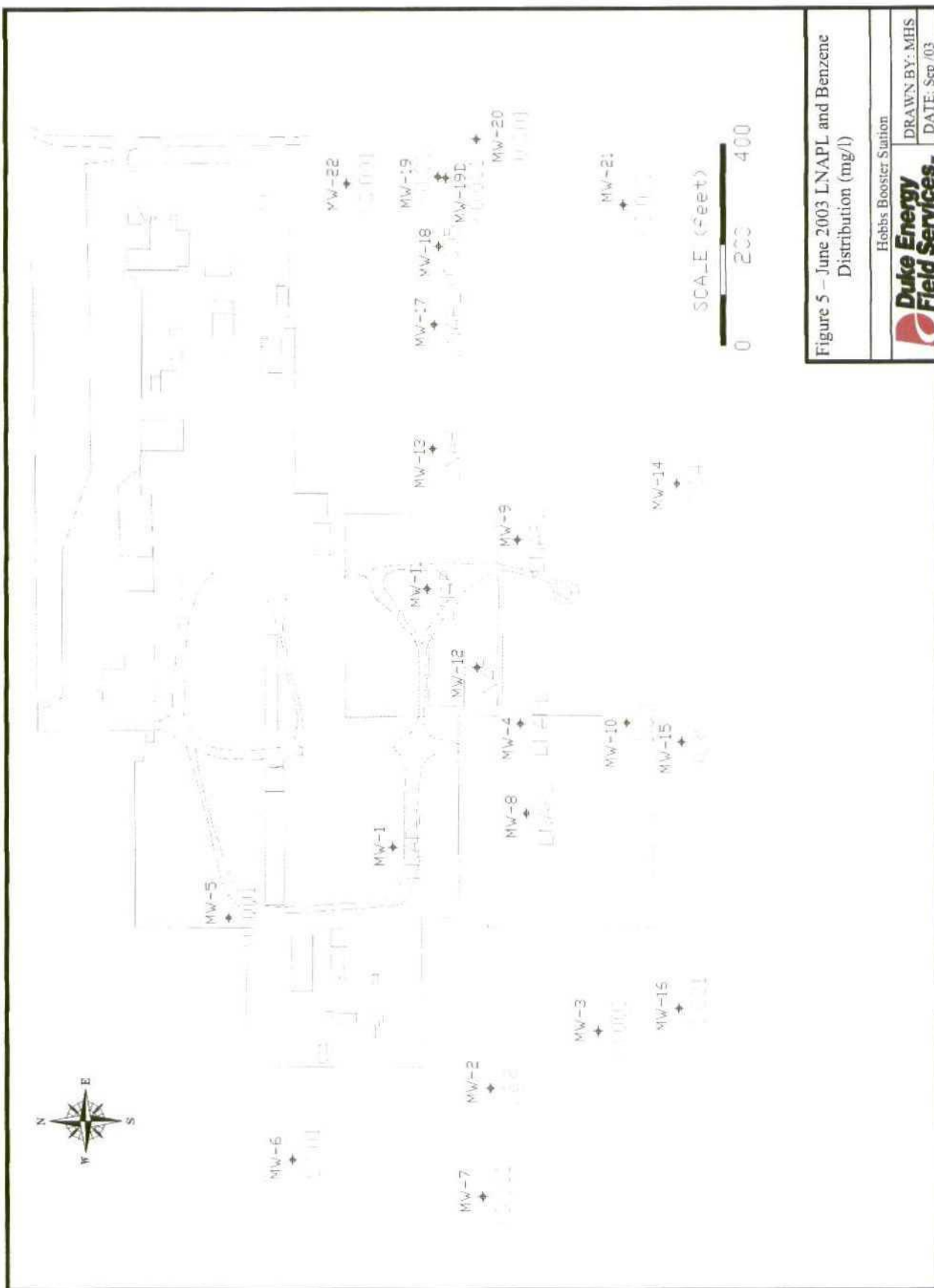
Figure 4 - Benzene Concentration History
For South Boundary Wells

Hobbs Booster Station

Duke Energy
Field Services

DRAWN BY: MHS

DATE: Sep /03



Remediacon Incorporated

Geological and Engineering Services
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PO Box 302, Evergreen, Colorado 80437

Telephone: 303.674.4370

Facsimile: 720.528.8132

April 10, 2003

Mr. Stephen Weathers
Duke Energy Field Services, LP
370 17th Street, Suite 900
Denver, CO 80202

Re: Update of Design Characterization Activities, Selection of Remediation Technologies and Proposal for Pilot-Scale Programs at the Duke Energy Field Services Hobbs Booster Station, Lea County New Mexico (Units C and D Section 4, Township 19 South, Range 38 East, NMPM: Discharge Plan GW-044)

Dear Stephen:

Duke Energy Field Services, LP (DEFS) retained Remediacon Incorporated (Remediacon) to complete remediation design characterization activities at the DEFS Hobbs Booster Station. This letter provides the following information relative to this effort:

1. Relevant background information to facilitate review without having to refer to prior documentation.
2. Review of the design characterization activities completed in the last half of 2002. Some of the activities have been described in previous correspondence; however, no comprehensive update has been prepared.
3. A brief description of a conceptual remediation program components; and
4. A description of proposed pilot scale remediation systems that will be used for final design.

BACKGROUND INFORMATION

The DEFS Hobbs Booster Station (HBS) is located at 1625 West Marland on the south side of Highway 62 in the western part of Hobbs New Mexico (Figure 1). The existing wells at the site include:

1. Twenty one monitoring wells (MW-1 to MW-21) installed over the duration of the project, with the last wells (MW-20 and MW-21) installed in June 2002.
2. Seventeen free product characterization wells (TW-A to TW-S excluding TW-E and TW-F) installed in the summer of 2002.
3. Recovery well RW-1 located approximately 5.5 feet south of MW-4, and

4. One sparge point (never used) and a vapor well located approximately 20 feet south of RW-1.

The locations of the above wells with the exception of RW-1 and the vapor well/sparge point are shown on Figure 2. Completion information on all of the wells is included in Table 1 along with the depth to the top of either the free product or the groundwater and the calculated free product thickness.

Figure 3 depicts the December 2002 water table contours. The contours on this map, as well as Figure 5, were generated using the Surfer® program with a kriging option. The water table elevations in the wells containing free product were corrected as discussed in the June, September and December 2002 groundwater monitoring reports. The near-easterly groundwater flow direction shown on Figure 3 has been consistent since monitoring began in 1999. Examination of Figure 3 establishes that MW-19, MW-20 and MW-21 are down-gradient boundary wells while MW-14, MW-15 and MW-16 lie along the cross-gradient southern boundary. These six wells are now monitored on a quarterly basis. The remaining wells that do not contain free product are monitored on an annual basis.

The benzene concentrations as measured in the HBS monitoring wells are summarized in Table 2. Neither MW-20 or MW-21 have contained detectable concentrations of hydrocarbons in the three episodes that they were measured. Well MW-19 contained 0.035 mg/l of benzene in the October 2001 monitoring episode; however, it has not produced another sample that exceeded 0.007 mg/l in the four quarterly monitoring episodes that preceded October 2001 or the four quarterly episodes subsequent to it. This pattern indicates that the October 2001 sample may not be representative and that impacts, if any, on MW-19 are limited.

The benzene concentrations from boundary wells MW-14, MW-15 and MW-16 do not exhibit any time-based pattern (Figure 4). The patterns do not reflect seasonal groundwater fluctuations because it has been steadily declining since the start of the project.

Figure 5 shows the free product thickness contours based upon the December 2002 measurements. Measurable free product is present under approximately 14 acres of the site based upon these measurements. Historic evaluations by Remediacon indicate that the actual product thickness is approximately 1/3 the thickness measured in the wells.

Figure 6 summarizes the variation free product thickness values in the older site wells. The elevation decline in the water table is the primary cause of the increase in free-phase hydrocarbon thickness in wells MW-8, MW-11, MW-12 and MW-13 as shown by the following table (all units in feet):

	Change in Measured Depth To Free Product (feet) ¹	Change in Free Product Thickness (feet) ¹
MW-4	Well	0.18
MW-8	0.86	1.88
MW-11	0.50	2.55
MW-12	0.55	2.71
MW-13	-0.14	7.20

1) Between October 2000 and June 2002

The decrease in the measured depth to free-phase hydrocarbons in wells MW-8, MW-11, MW-12 and MW-13 from October 2000 (earliest complete record) to June 2002 was substantially less than the increase in the free-phase hydrocarbon thickness. The free-phase hydrocarbons must therefore be saturating the interval that is being vacated by the declining groundwater table. Well MW-4, the exception to this trend, is very close to well RW-1 where an active free-phase hydrocarbon removal system was operational for the majority of the project.

DESIGN CHARACTERIZATION ACTIVITY UPDATE

This section summarizes the field and office activities that were specifically completed to evaluate and select appropriate free product and dissolved phase remediation programs. All of these activities except one (soil vapor extraction testing) have been completed since June 2002 or they remain ongoing. The activities completed include:

- Soil vapor extraction testing;
- Free product thickness and extent characterization;
- Saturated material testing;
- Groundwater modeling; and
- Free product modeling

Each activity is described below.

Soil Vapor Extraction Testing;

Trident Environmental (Trident) conducted a soil vapor extraction test at the HBS site on January 23, 2001. The test consisted of applying suction at rates reported by Trident of 140, 190 and 230 standard cubic feet per minute (SCFM) on well RW-1 and measuring the vacuum response at outlying vapor monitoring points. The distances and measured vacuums at each monitoring point are summarized on Table 3. The distance-vacuum distributions for each of the three tests are shown on a semi-log rhythmic plot in Figure 7.

Examination of Figure 7 indicates that each test produced a vacuum in excess of 0.1 inches of water at a distance of 100 feet from source well RW-1. The 0.1 inch vacuum is often selected as the minimum effective vacuum for effective soil vapor extraction. The results indicate that a 100 foot radius of influence can be reasonably expected if a soil vapor extraction system is installed at the HBS.

Free Product Characterization

Nineteen wells (TW-A to TW-S) were installed in June and July 2002 at the locations shown in Figure 2. These wells were installed to complete delineation of the free product beneath the site. These wells were assigned a different numbering system to differentiate them from the site monitoring wells. The completion information is summarized in Table 1. The information from these wells and the groundwater monitoring wells was used to generate the free product thickness map shown on Figure 5.

Six product samples were collected and submitted for physical and chemical analysis. Two samples were submitted in 2001 (MW-4 and MW-11) for density and speciation analyses. Four samples were submitted in June 2002 (MW-1, MW-10, MW-11 and MW-13) for measurement of density and viscosity. The results are summarized in Table 4.

Five product bail down tests were also completed. These tests involve removing the free product from a well and then measuring its recovery over time. The results are depicted in two figures. Figure 8 shows the recovery results for MW-4 and RW-1. Figure 9 depicts the results for wells MW-11, MW-12 and MW-13. Note that the time after bailing ceases is shown log rhythmically on the x-axis while the percentage to full recovery is shown on the y axis. Examination of these two figures indicates that wells MW-4 and RW-1 recovered almost fully in under a day and at least half of the recovery occurred in under 3 hours. Wells MW-11, MW-12 and MW-13 exhibited only 25 to 50 percent recovery in a day and only recovered 15 to 30 percent in three hours. The lower viscosity (more fluid) in wells MW-1 and MW-10 relative to MW-11 and MW-13 (Table 4) may partially explain the differences in product recovery in the wells.

Saturated Material Testing

Pumping tests were completed on RW-1 (MW-4) and MW-13 to measure the hydraulic conductivity of the saturated materials. The procedure used for both tests are described below.

The first pumping test was completed at the MW-4/RW-1 location on December 9, 2001. Water was extracted from well RW-1 for 520 minutes. Drawdown was measured manually in MW-4 during pumping. Recovery was measured in RW-1 after pumping ceased.

The second pumping test was completed using MW-13 on June 8th and 9th, 2002. The test commenced at 1240 hours on June 8, 2002 and ceased after 24 hours. The water was pumped from well MW-13. Drawdown was measured manually in temporary piezometer MW-13a (located 20 feet southwest of MW-13) and in temporary product wells TW-E and TW-F. Water levels were automatically measured every 20 seconds in an inactive, historic water well that is 13 feet north of TW-E.

The drawdown data from the historic water well did not show any correlation to the pumping of MW-13. Instead, it exhibited a cyclical pattern that appeared to be related to minor changes in the barometric pressure. This information indicates that this historic water well taps a deeper, confined zone that may be hydraulically isolated from the uppermost groundwater evaluated in this program.

The drawdown data from both pumping tests was analyzed using the program Aqtesolv™. Each data set was evaluated using the three options for unconfined aquifers (Theis, Cooper-Jacob, Newman). The recovery test from the two pumping wells were interpreted using the Theis recovery method. The results are summarized in Table 5.

Examination of Table 5 indicates that the transmissivity values for MW-13 and RW-1 that were calculated using the Theis recovery method are more that one order of magnitude lower than the calculated values for the observation wells. This discrepancy results from the assumption of a confined system that is inherent to Theis recovery method. These results were discarded.

There was generally good agreement between the calculated results for the each of the three evaluation techniques used on the observation wells. The Newman technique is the most recent and involves the most sophisticated analysis; however, the agreement between the techniques was sufficiently close to permit averaging rather than selecting an individual technique as the most representative. The average transmissivity values are shown in the far right-hand column of the top part of Table 5.

The bottom half of Table 5 includes the values that were converted from transmissivity to hydraulic conductivities by dividing them by their respective saturated thicknesses. The values are then report in three standard sets of units. Examination of the hydraulic conductivity values indicates that they are almost an order of magnitude higher at the eastern (MW-13) site that the western (RW-1) location.

Groundwater Modeling

Groundwater flow modeling was completed using the publicly-available MODFLOW finite difference model. The objective of the modeling was to estimate the rate of groundwater extraction necessary to generate cones of depression that would be suitable for use in a dual phase (water and free product) extraction system.

The grid for this simulation is shown on Figure 10. The grid has a 3,700 foot north-south axis and a 5,200 foot east-west axis that extends well beyond the site boundaries to negate potential edge effects. The grid begins on a 50-foot spacing that increases to a 5-foot by 5-foot spacing in the area of interest to increase the accuracy of the results.

The calibrated no-pumping simulation is shown on Figure 11. North-south constant-head line boundaries were used on the eastern and western boundaries to establish the primary flow gradients. Areas of constant head nodes were also placed at the two existing closed depressions in the south-central part of the model area to simulate their influence on the regional groundwater table.

The calibrated model was then used to simulate a groundwater extraction system. The simulation included 16 groundwater extraction wells and 30 groundwater injection wells. More injection wells were included because of the difficulties in reinjecting water and to simulate a system capable of sustained extraction and reinjection during routine maintenance.

The extraction and injection well locations are shown on Figure 12. The goal of the pattern was to produce a water table configuration that would maximize free product collection using separate groundwater and product pumps. The extraction wells were placed in three east-west lines to produce linear drawdown patterns. Wells IW-3(15) and RW-14 were located in the southern part of the site to simulate product removal in more restricted areas. Free product would flow and accumulate in the resulting groundwater depressions where it would be removed using product-only pumps.

The injection wells were placed in two configurations. The single north-south alignment at the western (up-gradient) boundary of the free product would both steepen the flow gradient to the east toward the recovery wells and deflect unimpacted, up-gradient groundwater away from the region where dissolved-phase hydrocarbons are present. The two east-west alignments of injection wells would increase the potential flow rates of the free product toward the extraction wells by substantially steepening the groundwater gradients.

A simulation that is based upon 425 gallon per minute extraction and reinjection rates is shown on Figure 13. The extraction and injection rates are summarized on Table 6. Examination of Figure 13 indicates that groundwater is deflected in the planned patterns.

Modeling was terminated after establishing that: 1) the groundwater flow patterns could be modified to facilitate a dual pump removal system; and 2) an extraction rate of approximately 400 gallons per minute would be needed to form a well-defined control area. Further modeling will be conducted if a dual pump systems is adopted for use for some or all of the free-product removal system.

Free Product Modeling

The final design phase characterization activity involved the modeling of free product behavior using site specific data. The modeling was completed by Groundwater Science and Engineering Inc. (GSE) of Golden Colorado. GSE completed the following activities as a part of this effort:

- Derive representative modeling parameters based upon site specific information;
- Use the multi-phase, finite element model BIOSLURP to generate a representative simulation of current the free product distribution;
- Use the calibrated BIOSLURP model to simulate the potential for long-term product migration away from the current area; and
- Use the calibrated BIOSLURP model to simulate the removal of free product from a single well over an extended period to evaluate the potential use of a free-product-removal-only system.

A copy of the GSE memorandum summarizing its activities is attached. The major conclusions that resulted from their effort include:

1. The system could be accurately calibrated based upon the historic data.
2. The model results indicate that approximately 1,100,000 gallons of free product are present between the vadose and saturated zones.
3. The plume will not migrate away from its current footprint under natural conditions.
4. A continued decline in the groundwater elevations will result in a decrease in the volume of mobile free phase product.
5. The model predicts that extraction at a rate of 56 gallons per day will result in a capture zone with a 200-foot north-south dimension (Figure 14)

The results from the GSE modeling effort were used in the design of the free-product pilot program discussed below.

CONCEPTUAL REMEDIATION PROGRAM

This section presents the conceptual remediation program for the HBS. The program was derived based upon the following assumptions:

1. The dissolved phase hydrocarbon plume is aligned from west to east parallel to the direction of groundwater flow shown in Figure 3. The data collected during the groundwater monitoring episodes indicates that the plume in the direction of groundwater flow is restricted to property owned by DEFS. The plume in this area needs to be monitored for evidence of further expansion but does not need to be treated.
2. The hydrocarbons present in southern boundary wells MW-14, MW-15 and MW-16 must be controlled because mechanical dispersion or an unidentified material anisotropy may be moving the dissolved phase hydrocarbons across the southern boundary.
3. The free product across the site exists in the relatively continuous manner shown on Figures 5 and 14.
4. The free product is not migrating any significant distance outside its current boundary nor does further substantial lateral migration appear to be likely.

The remediation program includes the three components detection level groundwater monitoring, dissolved phase boundary control and free product removal. The selection rationale and component status are presented below in separate sections.

Detection Level Groundwater Monitoring

The first component is groundwater monitoring at down-gradient monitoring wells MW-19, MW-20 and MW-21. Detection level monitoring is completed at these wells because they are directly down gradient from the dissolved hydrocarbon sources.

Two additional groundwater monitoring wells should be installed to complete the down gradient network (Figure 15). The first well should be installed north of the existing wells immediately west of the access road (MW-22, Figure 15). This well will tap the uppermost 10 to 15 feet of saturated materials. The second well would be installed adjacent to well MW-19 (total depth 68 feet) to tap deeper saturated materials to evaluate the potential of a vertical groundwater flow component causing the plume to "dive" beneath the existing monitoring network. This well would tap the interval from 70 to 80 feet below ground surface (bgs).

Monitoring of the detection level wells will continue on a quarterly basis. This program will continue in until permission is received from the OCD to either decrease the quarterly sampling frequency or to cease monitoring activities.

Dissolved Phase Boundary Control

The second remediation component is dissolved phase hydrocarbon control along the southern boundary. The approximate alignment of the dissolved phase boundary control system is shown on Figure 15. The alignment lies approximately 35 feet north of the existing monitoring wells and approximately 50 feet north of the property boundary.

Air sparge was selected as the south boundary control treatment technology for the following reasons:

- The system is a proven technology with minimal operation and maintenance requirements.
- Hydrocarbons, specifically benzene, are the constituents of concern. These compounds can be volatilized with the air sparge technology. They are also best biodegraded under the aerobic conditions that can be maintained by injecting air into the groundwater.
- The saturated, hydrocarbon-affected materials possess a moderate-to-high hydraulic conductivity. Higher-permeability materials have a greater capacity to equally distribute the injected throughout the porous media rather than along discrete fractures. This distribution results in enhanced volatilization and more extensive oxygenation.
- The system would be installed in a secure area with readily-available power that decreases capital costs and minimizes operation expenses.
- The system can be design with sufficient flexibility to increase or decrease air flow rates to specific areas to balance oxygen needs with spatial and temporal changes in hydrocarbon concentrations.

A pilot test must be conducted to derive the critical design parameters of well spacing, air flow and injection pressure. The test will be conducted at an extraction well that will be installed north of MW-15 (Figure 16). The effects will be measured at the two existing monitoring wells and the five additional vapor monitoring points shown on Figure 16. Each of the five vapor monitoring points will consist of a piezometer that is installed approximately 5 feet below the top of the water table and a vapor probe that is installed into or immediately above the vadose zone.

The test will be conducted by injecting air at increasing pressures and measuring the resulting injection flow rates as well as the pressure/dissolved oxygen levels in the piezometers, vapor probes and monitor wells. The test will be conducted for a sufficient amount of time to produce quasi-equilibrated conditions for one or all of the injection scenarios.

Free Product Collection

The final remediation component proposed in this letter is the free product collection system. The BIOSLURP modeling completed by GSE indicates that use of a product-only remediation system to remove the majority of the free product is a potentially viable technology to remove the majority of free product beneath the site before either a vacuum is applied to the system or groundwater is extracted to increase the removal efficiency.

A pilot test will also be conducted to verify the viability of a product-only remediation system as well as provide additional information to refine the BIOSLURP model results to maximize the efficiency of the final system design.

The test will be conducted using TW-C as the product extraction well. Nine additional product measurement wells will be installed at the locations shown on Figure 17. Each well will be installed so that it spans the full thickness of product at the location that it taps. A product only collection system will be installed in TW-C and set to remove the maximum volume of product possible. Both the sustained product extraction rate and the resulting response in the monitor wells will then be measured over a 180 day interval.

The results of the pilot test will be used to:

- Refine the estimate of the product volume.
- Improve the calibration of the BIOSLURP. The model can then be used to optimize an extraction well spacing for the product only removal option in order to evaluate whether it is economically feasible.
- Calculate a total system annual extraction rate to estimate the duration for the product only removal phase if a product only system appears to be viable.
- Identify additional data needs to further evaluate the system to assess whether upgrading the system to either a bioslurp or dual fluid system will expedite cleanup and/or decrease the project life cycle costs.

PROJECT SCHEDULE

The three remediation components are all on separate schedules that depend upon their current implementation status and the length of time to complete design activities. The proposed schedule for each activity is presented below. The final schedules will depend upon subcontractor and equipment availability.

Detection Level Groundwater Monitoring

Detection level groundwater monitoring began in June 2002 and continues on a quarterly basis. This component will not be modified unless changes in the hydrocarbon distribution within groundwater regime are detected. The new wells would be installed during the field activities for the pilot tests described below.

Dissolved Phase Boundary Control

Planning for the dissolved phase pilot program will begin immediately upon New Mexico Oil Conservation Division (OCD) approval. The pilot program can be completed within four weeks of approval. Design, installation and testing of the final system will take an additional eight weeks; therefore the air-sparge system should be fully functional within 12 weeks (3 months) of OCD approval barring weather delays and subcontractor scheduling.

Free Product Collection

Planning for the free phase pilot program will begin immediately upon OCD approval. The pilot program can be initiated within four weeks of approval but will take approximately 180 days to complete.

Final design will be postponed until completion of the pilot program. During this interim period, DEFS will install product-only collection pumps in the 4-inch diameter wells that contain more than 1 foot of free product to facilitate removal of free product. This configuration will be modified as necessary once the final design is completed.

Thank you for the opportunity to complete this work. Do not hesitate to contact if you have any questions, require clarification or have additional needs related to the information contained in this document.

Respectfully Submitted,
REMEDIACOM INCORPORATED



Michael H. Stewart, P.E.
Principal Engineer

MHS/tbm

attachments

TABLES

Table 1 – Summary of Hobbs Booster Station Well Construction and Liquids Information

Well	Total Well Depth	Screen Interval	Gravel Interval	12/02 Depth to Top of Product or Water	12/02 Free Product Thickness
MW-1	57	37-57	34-57	44.76	0.55
MW-2	53	33-53	30-53	39.84	0.00
MW-3	53	33-53	30-53	39.56	Not present
MW-4	57	37-57	34-57	43.09	3.11
MW-5	57	37-57	34-57	46.81	Not present
MW-6	53	33-53	30-53	42.98	Not present
MW-7	56	33-53	31-56	37.27	Not present
MW-8	58	36-56	34-58	41.62	2.47
MW-9	63	43-63	40-63	46.22	0.46
MW-10	58	36-56	34-58	40.15	Not present
MW-11	63	43-63	41-63	45.16	7.45
MW-12	65	40-60	38-65	45.92	2.7
MW-13	69	44-64	38-64	46.73	8.42
MW-14	66	42-62	34-66	42.34	Not present
MW-15	59	37-57	31-59	38.25	Not present
MW-16	58	34-54	30-56	38.67	Not present
MW-17	66	41-61	37-63	47.25	0.11
MW-18	68	44-64	35-65	48.54	Not present
MW-19	68	43-63	40-65	48.64	Not present
MW-20	59	59-44	59-42	49.03	Not present
MW-21	61	61-46	61-44	48.16	Not present
TW-A	57	42-57	40-57	45.76	3.67
TW-B	57	44-59	42-59	45.63	5.17
TW-C	60	45-60	43-60	45.80	10.58
TW-D	50	35-50	33-50	49.36	8.49
TW-G	54	39-54	34-54	42.49	1.75
TW-H	51	36-51	34-51	39.86	Not present
TW-I	60	45-60	43-60	48.33	3.85
TW-J	60	45-60	43-60	48.41	6.16
TW-K	60	45-60	43-60	48.96	7.76
TW-L	60	45-60	43-60	49.16	7.79
TW-M	60	45-60	43-60	48.22	0.01
TW-N	60	45-60	43-60	51.85	0.01
TW-O	60	45-60	42-60	52.34	0.06
TW-P	60	45-60	42-60	51.01	2.53
TW-Q	58	53-58	41-58	45.63	Not present
TW-R	60	45-60	43-45	49.49	2.65
TW-S	60	45-60	43-45	51.81	Not present
RW-1	60	35-60	32-60	45.76	3.07

All units in feet

Wells TW-E and TW-F were plugged and abandoned in July 2002

Table 2 – Summary of Benzene Concentrations from the Hobbs Booster Station Monitoring Wells

	7/8/99	5/11/00	8/22/00	10/31/00	2/5/01	5/15/01	8/9/01	10/19/01	3/13/02	6/3/02	9/24/02	12/10/02
MW-1	0.232	0.191	0.181	0.197	0.570	LNAPL	LNAPL	0.144	LNAPL	LNAPL		
MW-2	0.934	1.330	1.420	1.020	2.110	0.848	1.760	1.3	0.712	LNAPL		
MW-3	0.262	0.202	0.011	<.005	0.346	<.001	0.345	0.029	<0.001	0.009		
MW-4	LNAPL	LNAPL	LNAPL	LNAPL	LNAPL	LNAPL	LNAPL	LNAPL	LNAPL	LNAPL		
MW-5	<.005	<.005	<.005	<.005	<.005	<.001	<.001	<0.001	<0.001	<0.001		
MW-6	<.005	<.005	<.005	<.005	<.005	<.001	<.001	<0.001	<0.001	<0.005		
MW-7		<.005	<.005	<.005	<.005	<.001	<.001	<0.001	<0.001	0.0039		
MW-8		0.824	LNAPL	LNAPL	0.950	0.294	1.230	LNAPL	LNAPL	LNAPL		
MW-9		0.702	LNAPL	LNAPL	LNAPL	LNAPL	LNAPL	LNAPL	LNAPL	LNAPL		
MW-10		LNAPL	LNAPL	0.535	LNAPL	LNAPL	LNAPL	1.13	LNAPL	LNAPL		
MW-11		LNAPL	LNAPL	LNAPL	LNAPL	LNAPL	LNAPL	LNAPL	LNAPL	LNAPL		
MW-12				LNAPL	LNAPL	LNAPL	LNAPL	LNAPL	LNAPL	LNAPL		
MW-13				LNAPL	LNAPL	LNAPL	LNAPL	LNAPL	LNAPL	LNAPL		
MW-14				<.005	0.041	0.002	0.034	0.029	<0.001	0.068	0.126	0.0685
MW-15				<.005	0.237	0.003	0.353	0.317	<0.001	0.358	<0.005	<0.005
MW-16				<.005	0.094	0.01	0.098	0.012	<0.001	<0.005	0.036	0.0041
MW-17						LNAPL	0.04	0.076	LNAPL	LNAPL		
MW-18				<.005	<.005	0.004	0.007	0.036	<0.001	LNAPL		
MW-19				<.005	<.005	0.001	<.005	0.035	<0.001	<0.001	<0.005	<0.001
MW-20										<0.002	<0.001	<0.001
MW-21										<0.001	<0.001	<0.001

Note: All concentrations are mg/l

LNAPL indicates that light nonaqueous phase liquid (hydrocarbon) present in well.

Table 3 – Trident Environmental Reported January 2001 Vacuum Extraction Test Results

Vapor Monitoring Point	Distance from Source (feet)	Vacuum at 230 SCFM (inches water)	Vacuum at 190 SCFM (inches water)	Vacuum at 140 SCFM (inches water)
RW-1	Source	25	42	66
MW-4	7.4	3.5	6.4	8.5
AS/VE-1	18.5	0.62	1.25	1.70
VE-2	37	0.45	0.81	1.00
VE-3	53	0.25	0.42	0.54
MW-12	147	0.04	0.01	0.01
MW-8	178	0.05	0.05	0.02
MW-10	203	0.02	0.02	0.02

Notes: All wells except AS/VE-1, VE-2 and VE-3 are shown on Figure 2.

AS/VE-1 is located south of RW-1.

VE-2 and VE-3 were installed west of RW-1 and were subsequently abandoned

Table 4 - Summary of Free Product Property Measurements

Product Density

Well	Density
MW-1	0.78
MW-4	0.77
MW-10	0.79
MW-11	0.81
MW-13	0.82

Product Viscosity

Well	Kinematic Viscosity (centipoise)	Dynamic Viscosity (centipoise)
MW-1	1.35	2.02
MW-10	1.34	1.06
MW-11	2.21	1.05
MW-13	2.46	1.79

Product Composition

Constituent	MW-4	MW-11
SG-60	0.774	0.8165
API-60	51.31	41.8
Methane	0	0
Ethane	0	0
Propane	0.011	0.175
Butanes	1.685	2.996
Pentanes	9.675	8.583
Hexanes	16.122	10.731
Deptanes	18.349	7.206
Octanes	14.954	4.222
Nonanes	13.99	4.627
Decanes	7.586	3.252
C11	3.889	3.854
C12	2.536	4.32
C13	2.5	6.434
C14	3.216	11.211
C15	2.075	11.864
C16	0.763	9.239

Constituent	MW-4	MW-11
C17	0.286	4.392
C18	0.102	1.682
C19	0.061	1.028
C20	0.056	0.653
C21	0.03	0.218
C22	0.023	0.044
C23	0.037	0
C24	NR	0
C25	NR	0
C26	NR	0
Total	97.946	96.731

NR: Value not reported

Table 5 – Summary of Pumping Test Results

Well	Transmissivity			
	Theis (ft ² /min)	Cooper-Jacob (ft ² /min)	Newman (ft ² /min)	Average (ft ² /min)
MW-13 (recovery)		0.025		
MW-13a	0.88	0.86	0.49	0.74
TW-E	1.23	1.49	1.34	1.36
TW-F	2.03	2.32	2.14	2.16
MW-4	0.17	0.1	0.16	0.17
RW-1 (recovery)		0.0097		

Well	Average Transmissivity (ft ² /min)	Thickness (feet)	Hydraulic Conductivity		
			(ft/min)	(ft/day)	cm/sed
MW-13a	0.74	21	0.0354	51.0	1.5x10 ⁻³
TW-E	1.36	21	0.0646	93.0	2.7x10 ⁻³
TW-F	2.16	21	0.1029	148.2	4.4x10 ⁻³
MW-4	0.17	14.75	0.0116	16.6	0.49x10 ⁻³

Table 6 – Simulated Injection and Extraction Rates for the Modflow 415
Gallon Per Minute Scenarion

Well	Injection Rate
IW-3	15
IW-3(10)	12.5
IW-3(11)	12.5
IW-3(14)	15
IW-3(16)	15
IW-3(17)	15
IW-3(19)	15
IW-3(2)	15
IW-3(20)	15
IW-3(21)	15
IW-3(22)	15
IW-3(23)	12.5
IW-3(24)	12.5
IW-3(25)	15
IW-3(28)	12.5
IW-3(29)	12.5
IW-3(30)	15
IW-3(31)	15
IW-3(32)	15
IW-3(34)	12.5
IW-3(5)	15
IW-3(6)	12.5
IW-3(7)	12.5
RW-1	15
RW-1(2)	12.5
RW-5	15
RW-9	15
RW-9(2)	15
RW-9(3)	15
RW-9(4)	15

Well	Extraction Rate
IW-3(15)	-30
RW-1(3)	-25
RW-10	-25
RW-11	-25
RW-12	-30
RW-14	-30
RW-2	-25
RW-2(2)	-25
RW-2(3)	-25
RW-3	-25
RW-3(2)	-25
RW-3(3)	-25
RW-4	-30
RW-6	-25
RW-7	-25
RW-8	-30

FIGURES

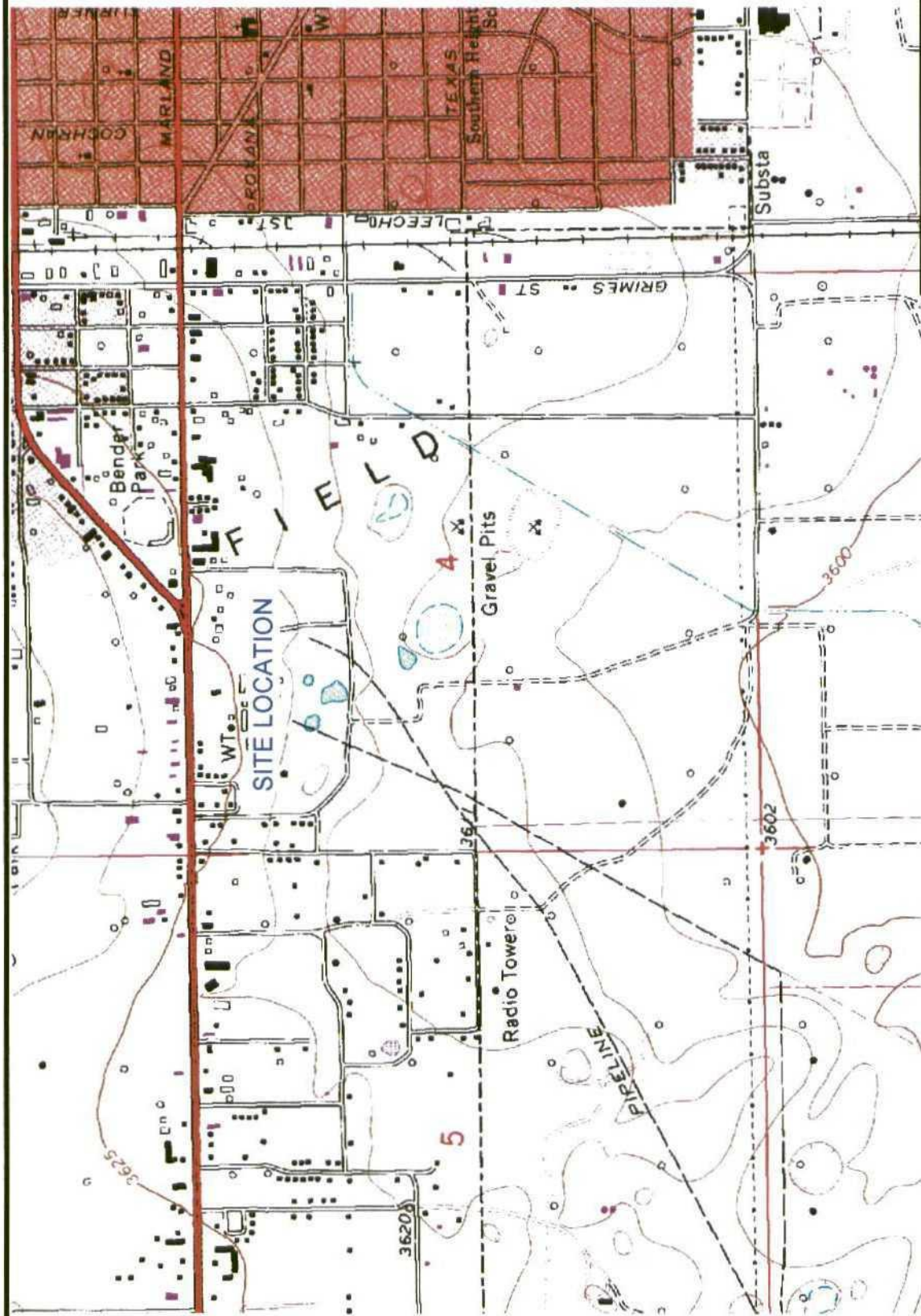


Figure 1 - DEFS Hobbs Booster Station

Location

SCALE

1 mile

0

Hobbs Booster Station

Duke Energy
Field Services

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DATE: Mar 03

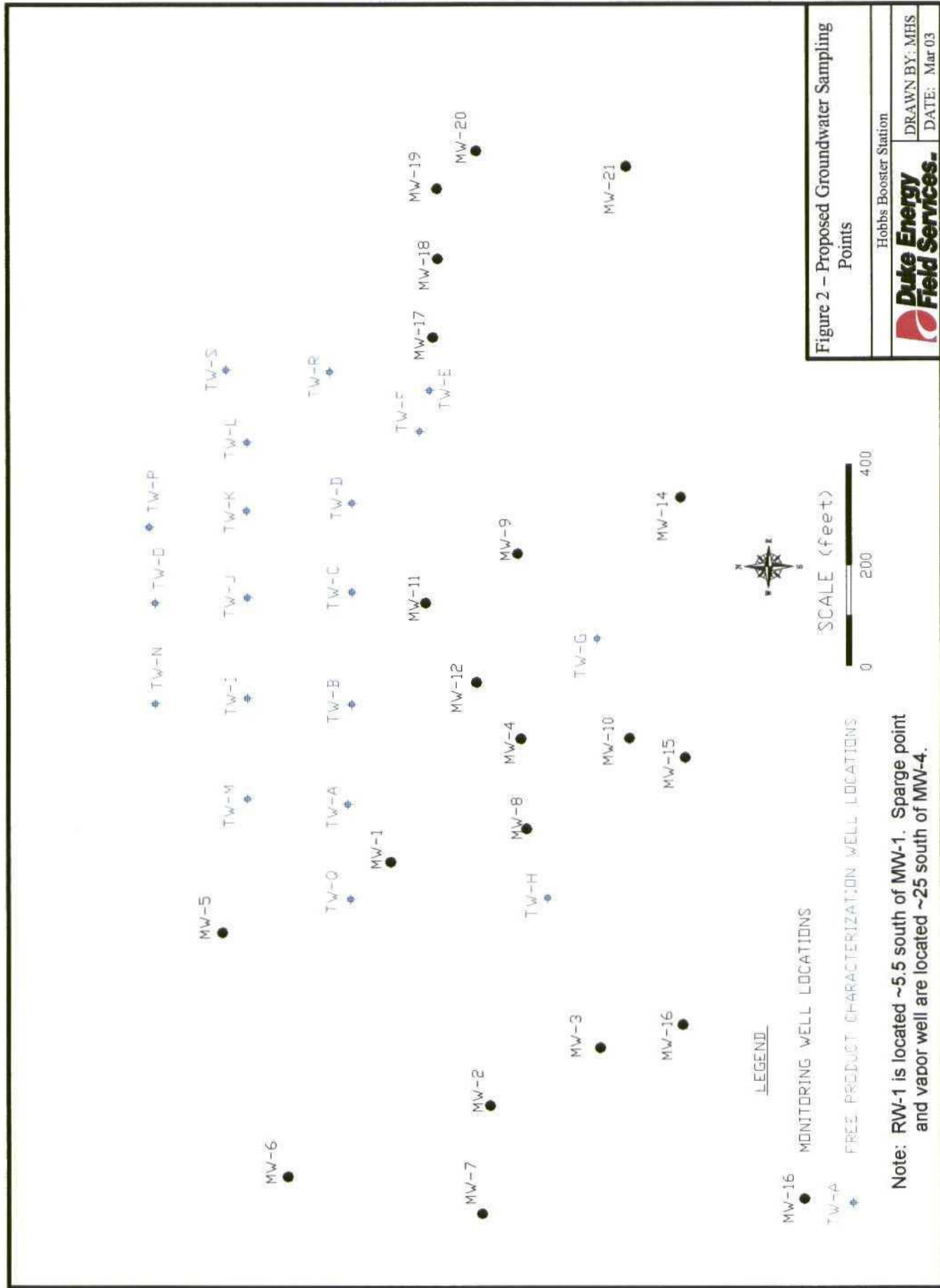


Figure 2 – Proposed Groundwater Sampling Points

Hobbs Booster Station

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DATE: Mar 03

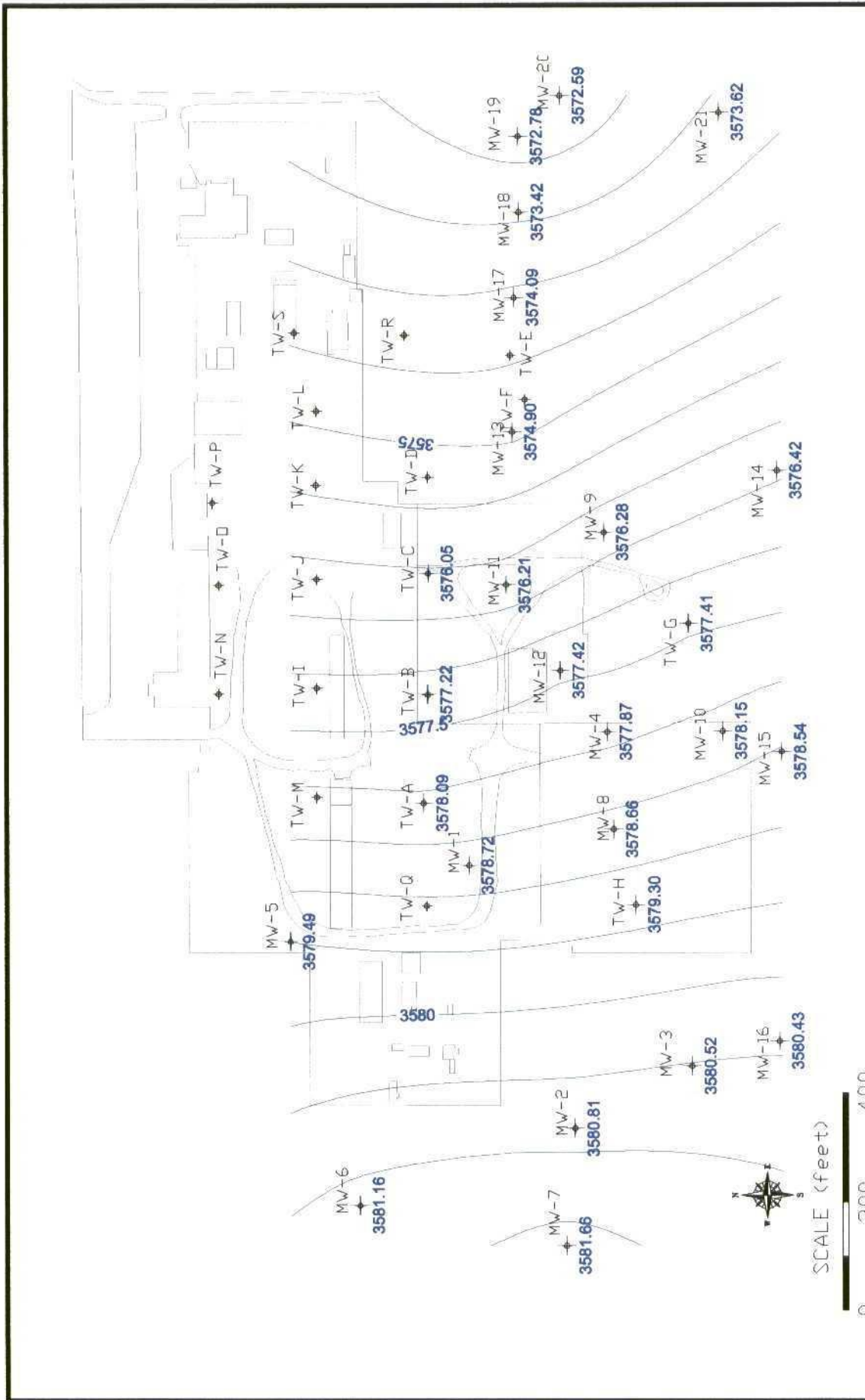


Figure 3 – December 2002 Water Table Contours

Hobbs Booster Station

Duke Energy Field Services.

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DATE: Mar /03

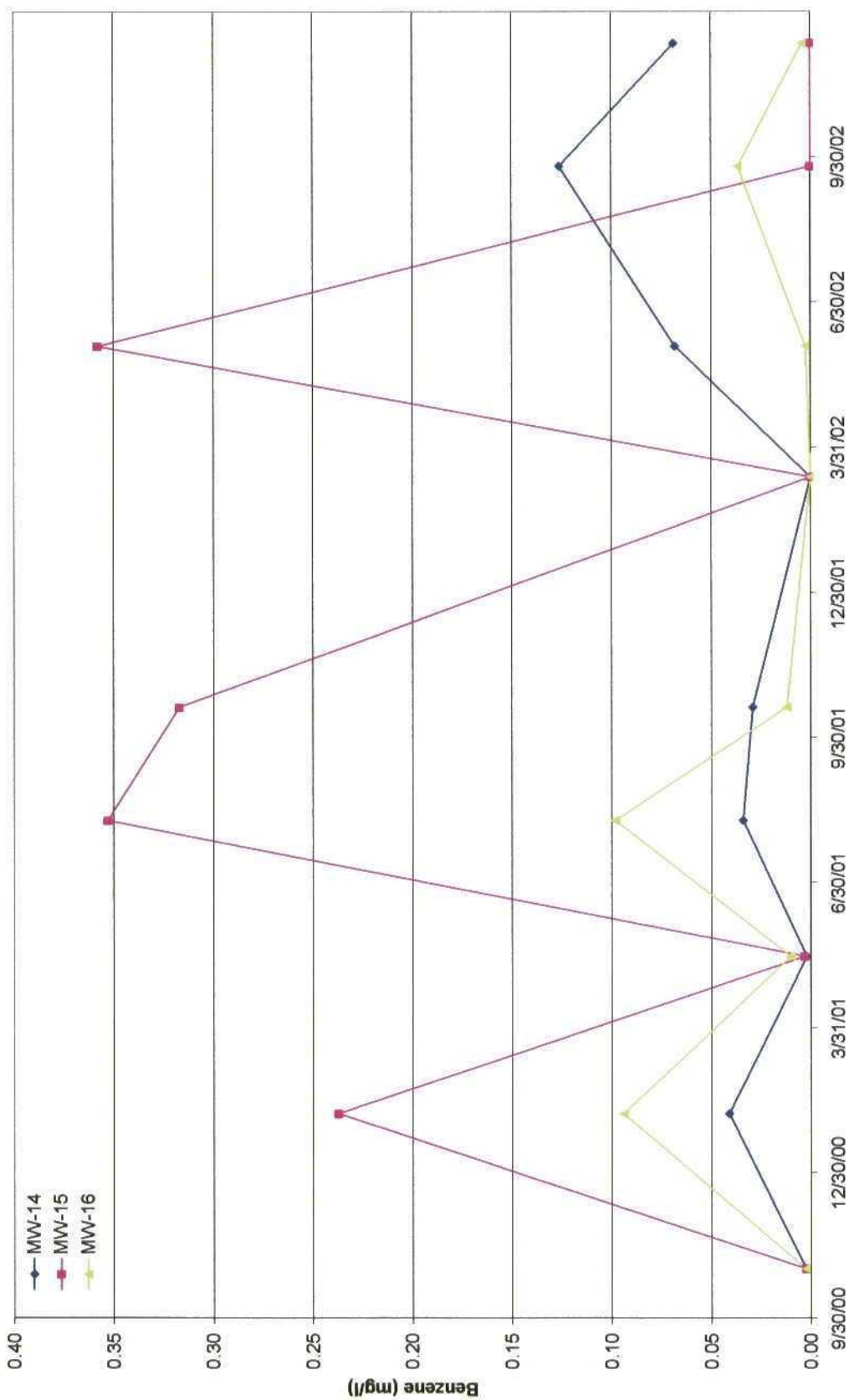


Figure 4 – Benzene concentrations (mg/l) in
South Boundary Wells

Hobbs Booster Station

**Duke Energy
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DATE: Mar 03

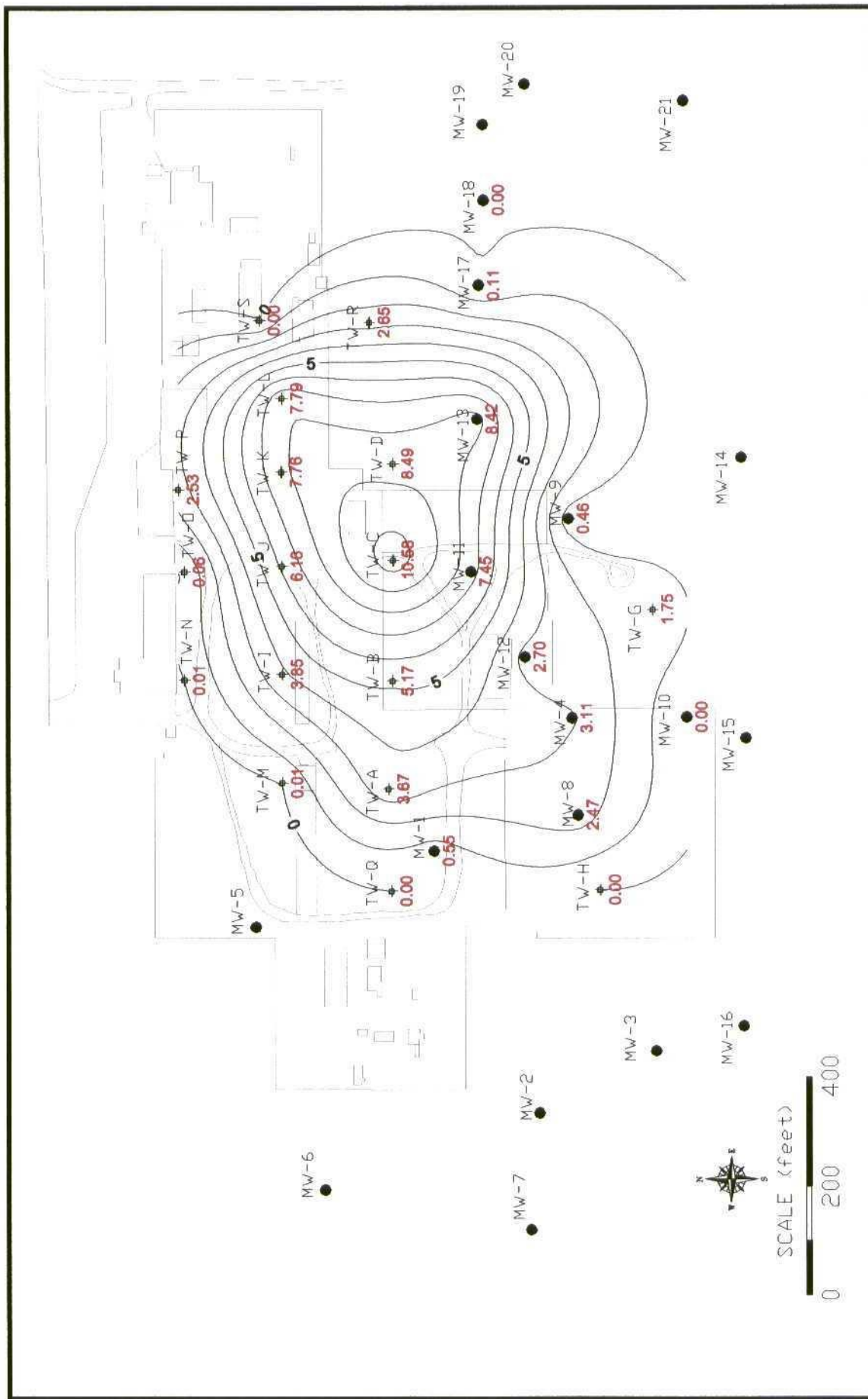


Figure 5 – December 2002 Free Product
Contours (feet)

Hobbs Booster Station

Duke Energy
Field Services

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DATE: Mar 03

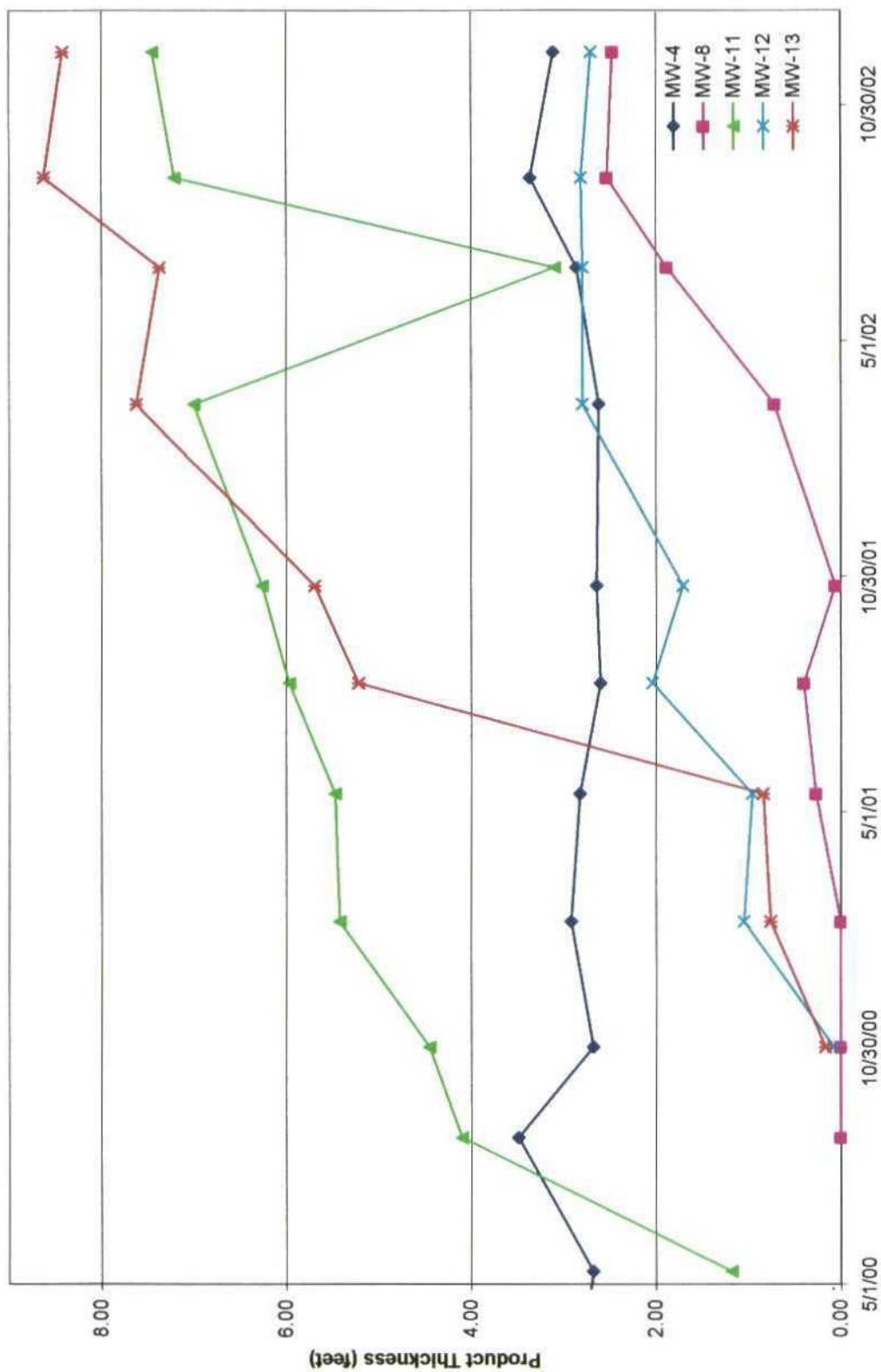


Figure 6 - Temporal Free Product Thickness Variations

Hobbs Booster Station

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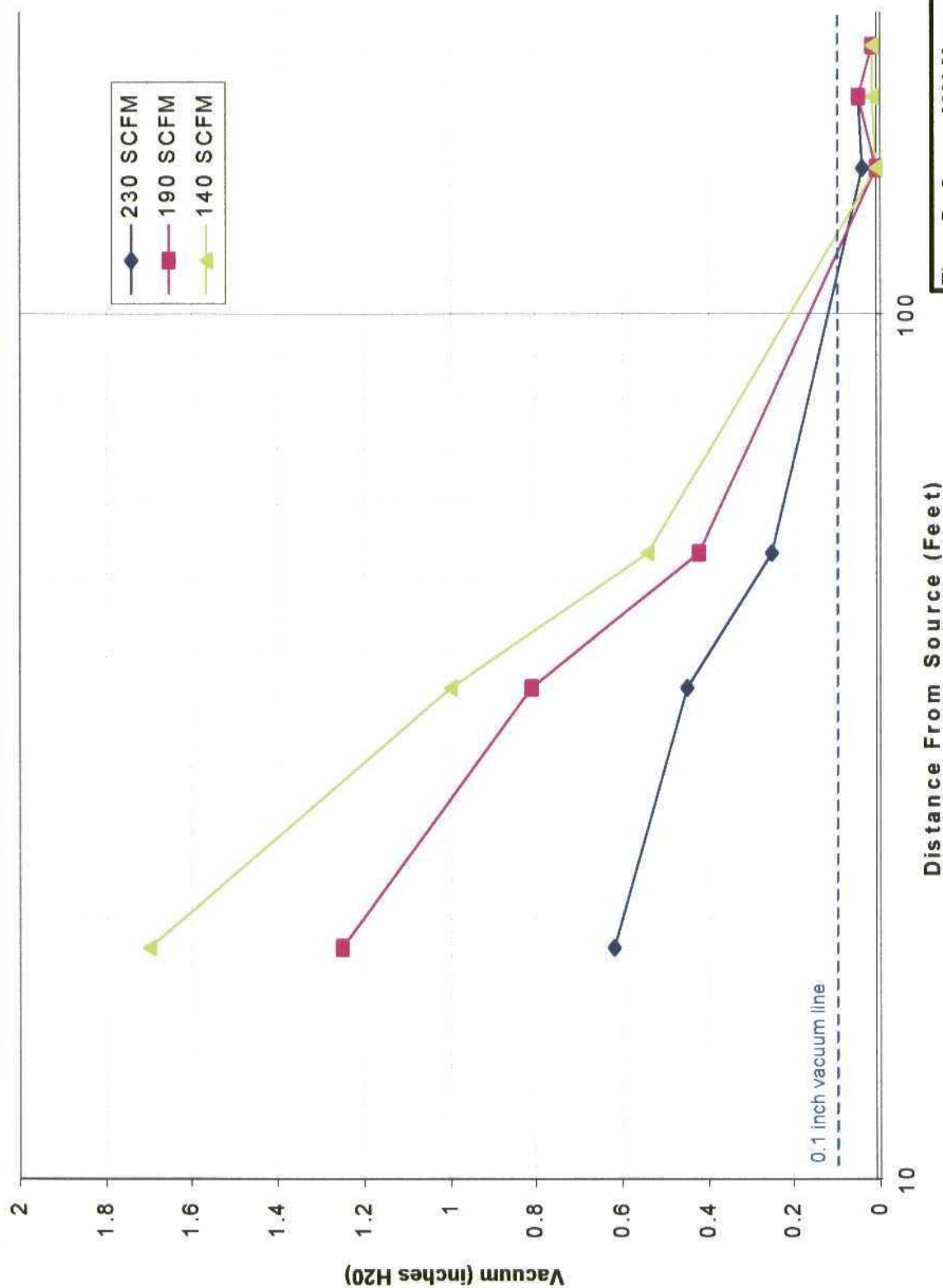


Figure 7 – January 2001 Vacuum Readings
at Vapor Monitoring Points

Hobbs Booster Station

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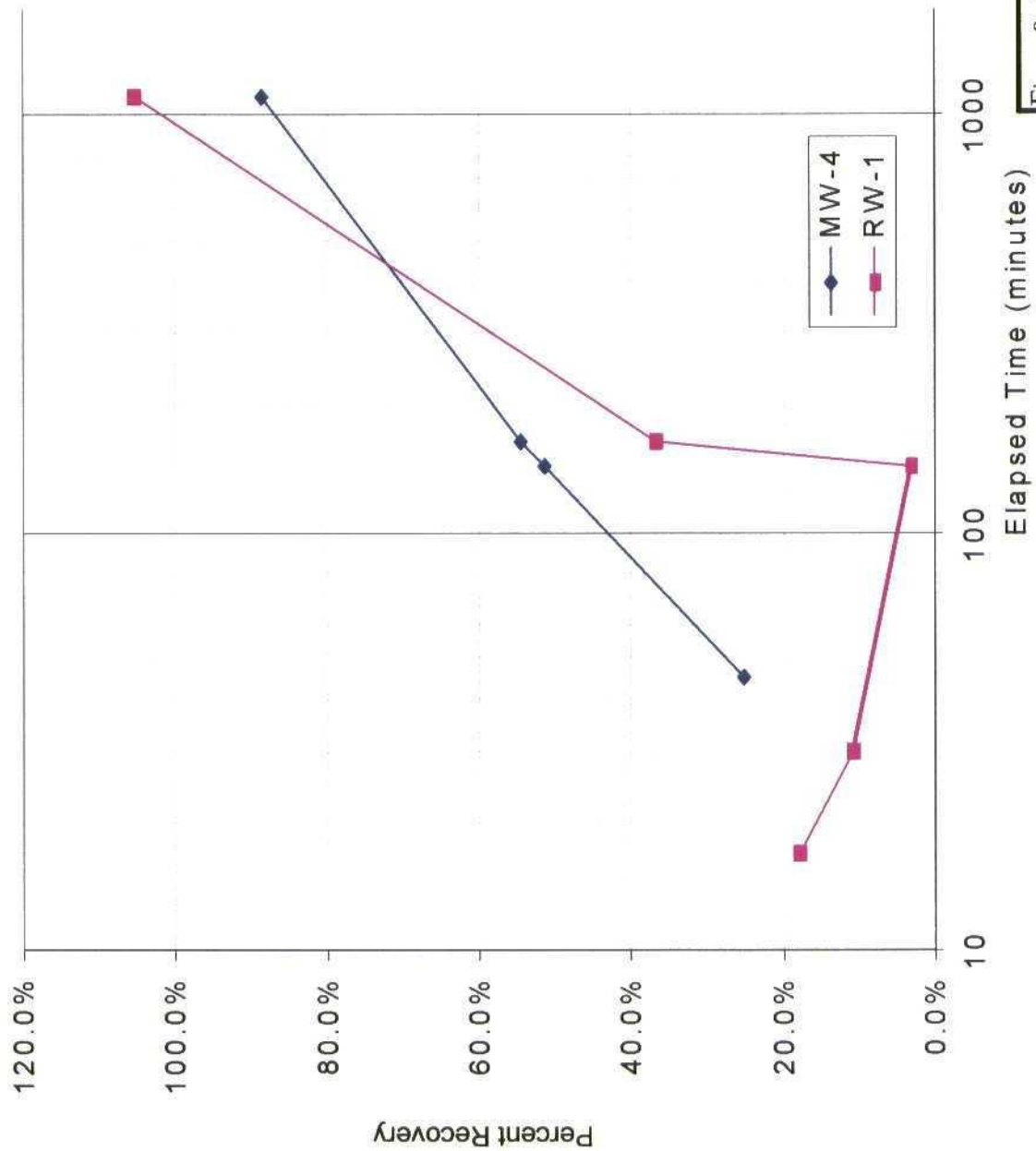


Figure 8 – Bail Down Test Results for Wells
MW-4 and RW-1

Hobbs Booster Station

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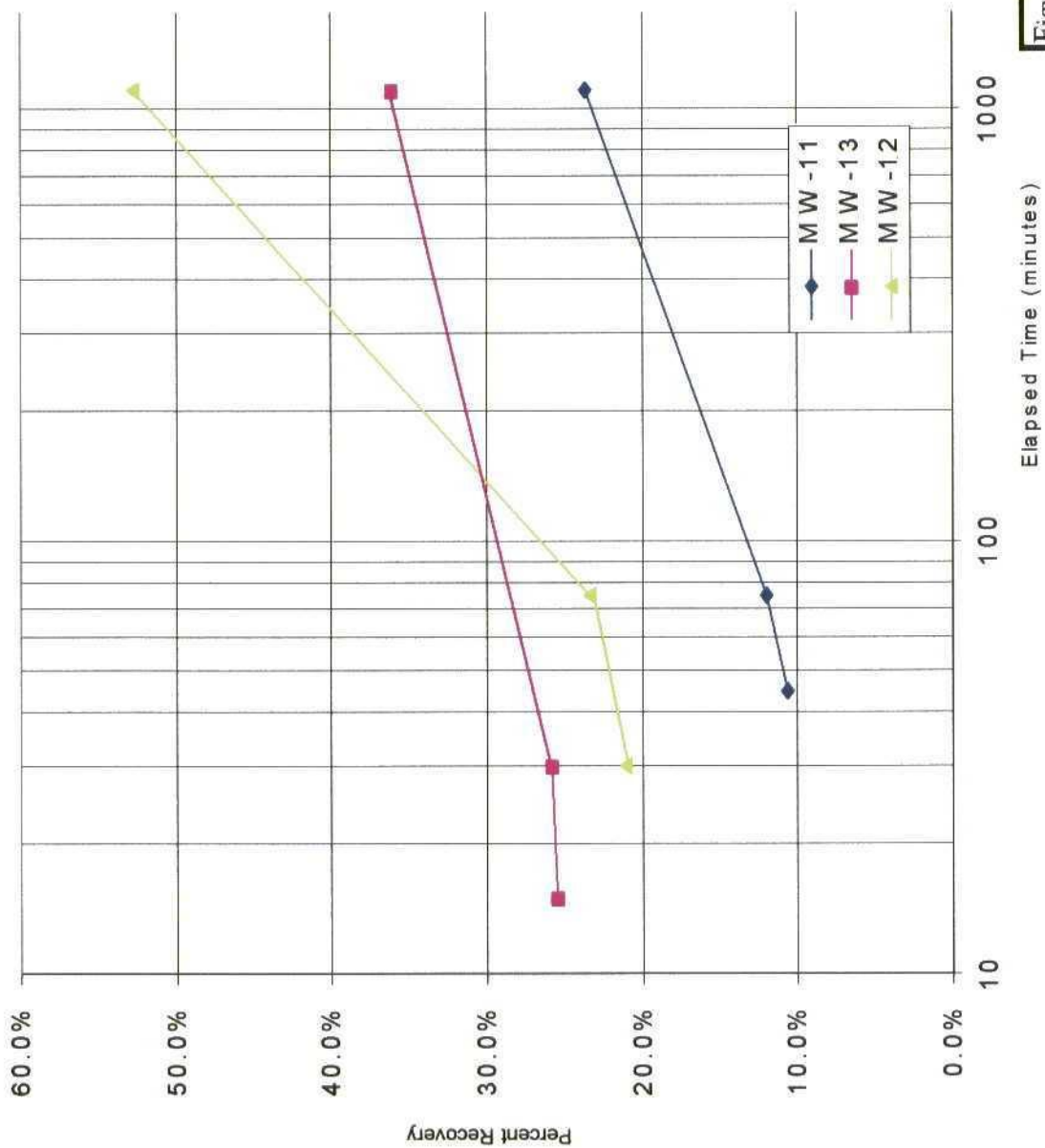


Figure 9 – Bail Down Test Results for Wells
MW-11, MW-2 and MW-13

Hobbs Booster Station

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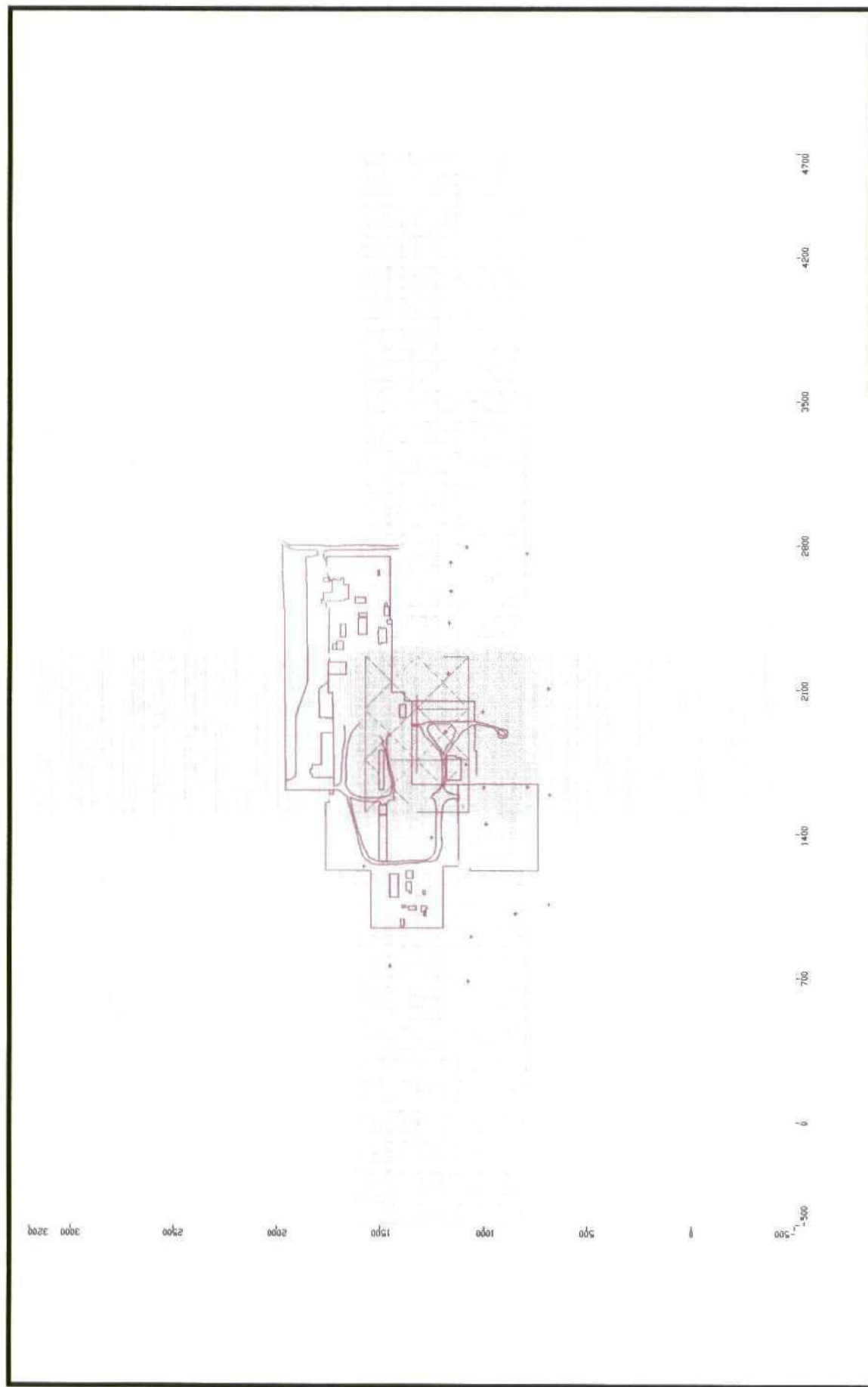


Figure 10 – MODFLOW Model Domain and Grid

Hobbs Booster Station

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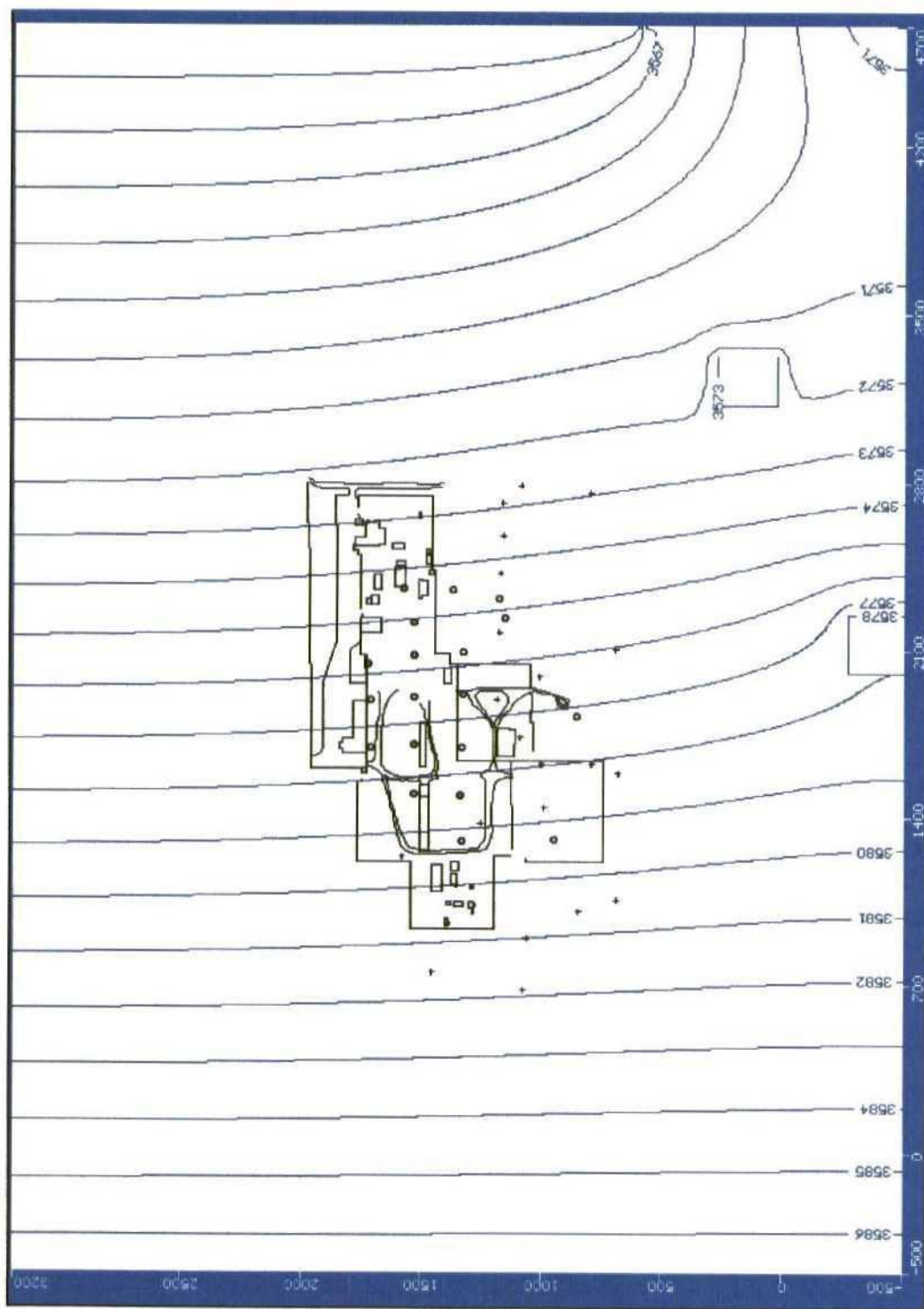


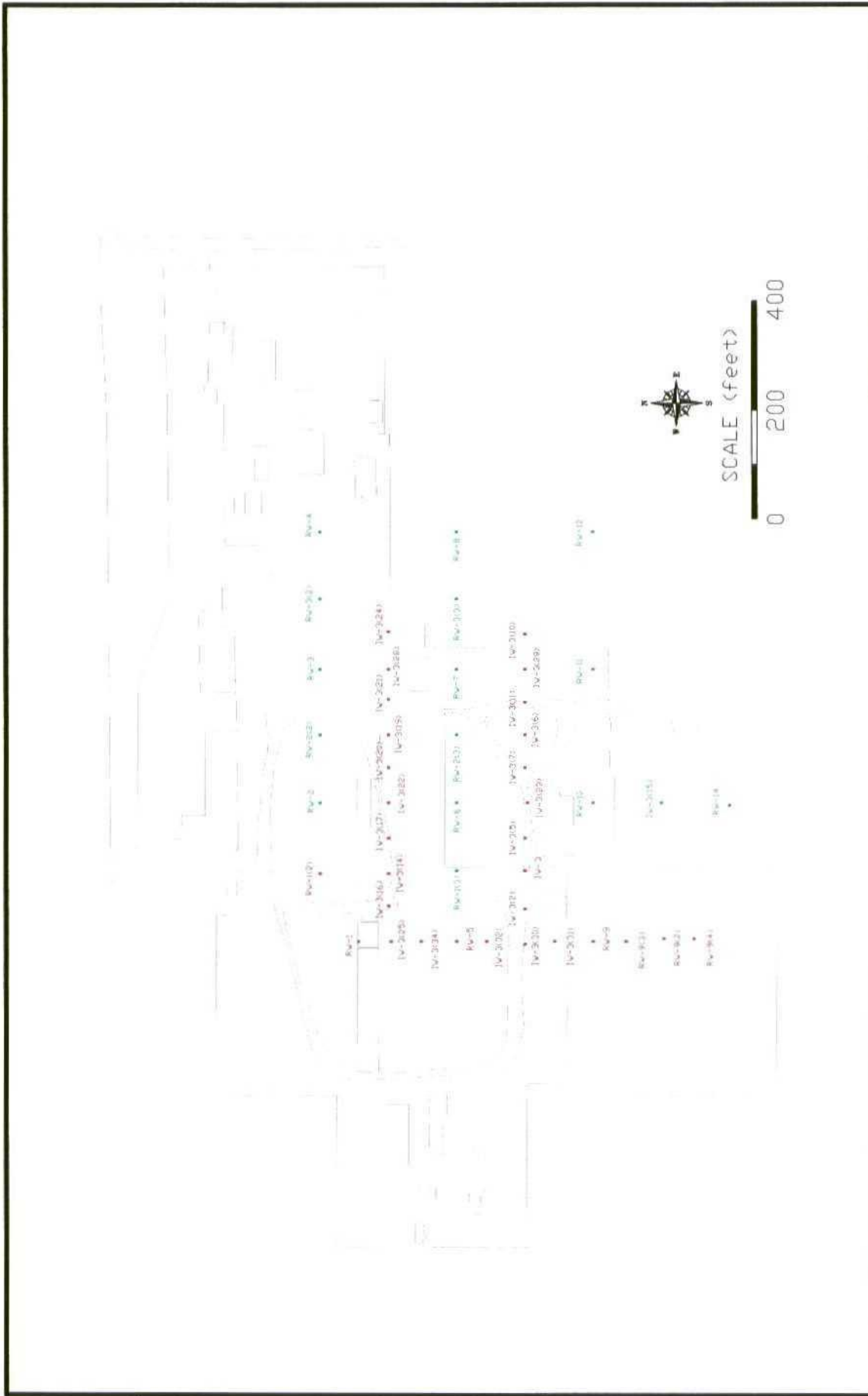
Figure 11 – Bail Down Test Results for Wells
MW-11, MW-2 and MW-13

Hobbs Booster Station

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Field Services

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DATE: Mar 03



Note: Extraction well locations are turquoise
Injection well locations are pink

Figure 12 – Extraction and Injection Well Locations for MODFLOW Simulation

Hobbs Booster Station

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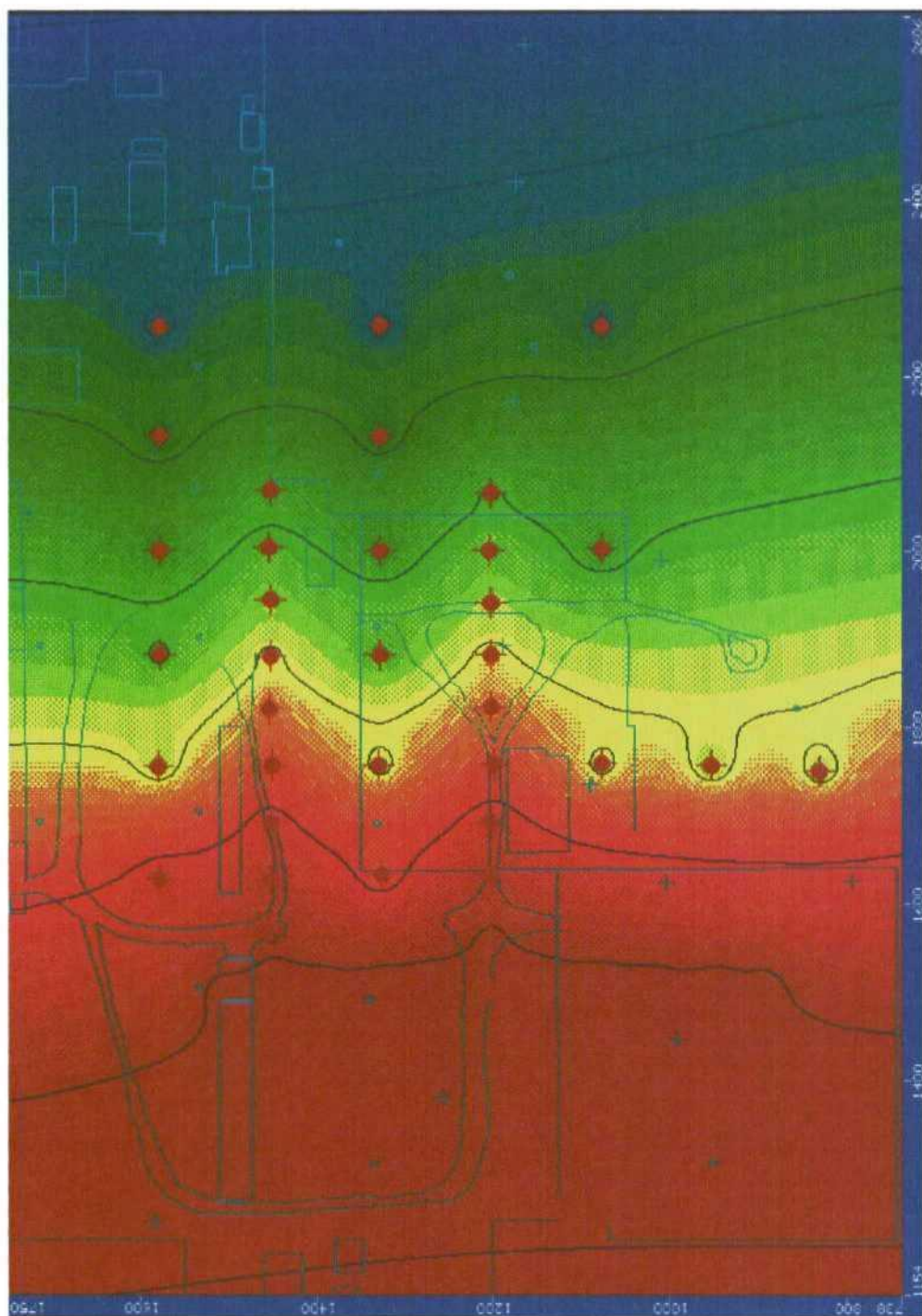


Figure 13 – MODFLOW 425 Gallon Per
Minute Simulation Results

Hobbs Booster Station



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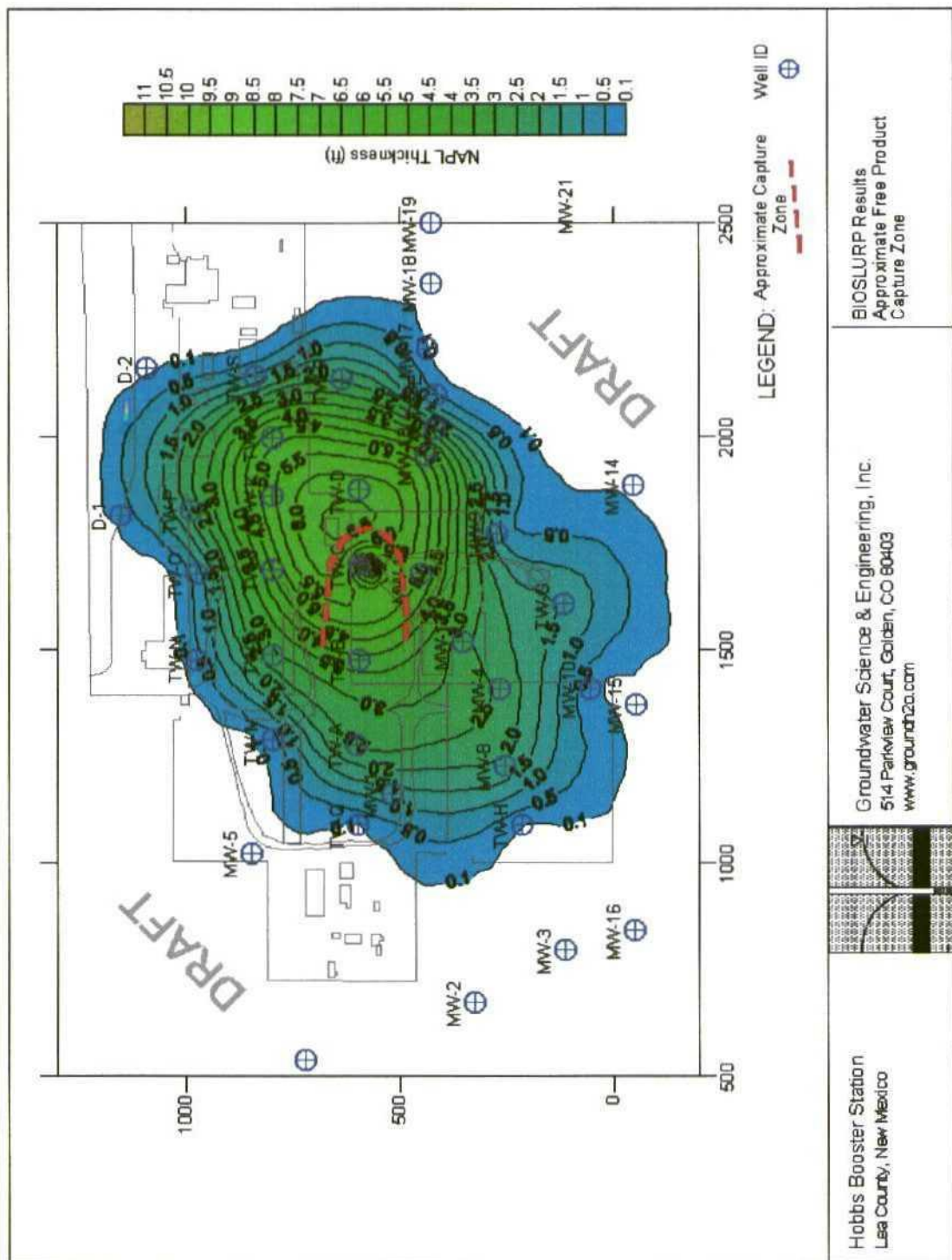
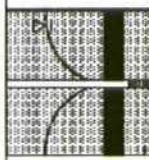


Figure 14 – Approximate Capture Zone for Free Product Only Option

Groundwater Science & Engineering, Inc.
514 Parkview Court, Golden, CO 80403
www.groundh2o.com



Hobbs Booster Station
Lea County, New Mexico

BIOSLURP Results
Approximate Free Product
Capture Zone

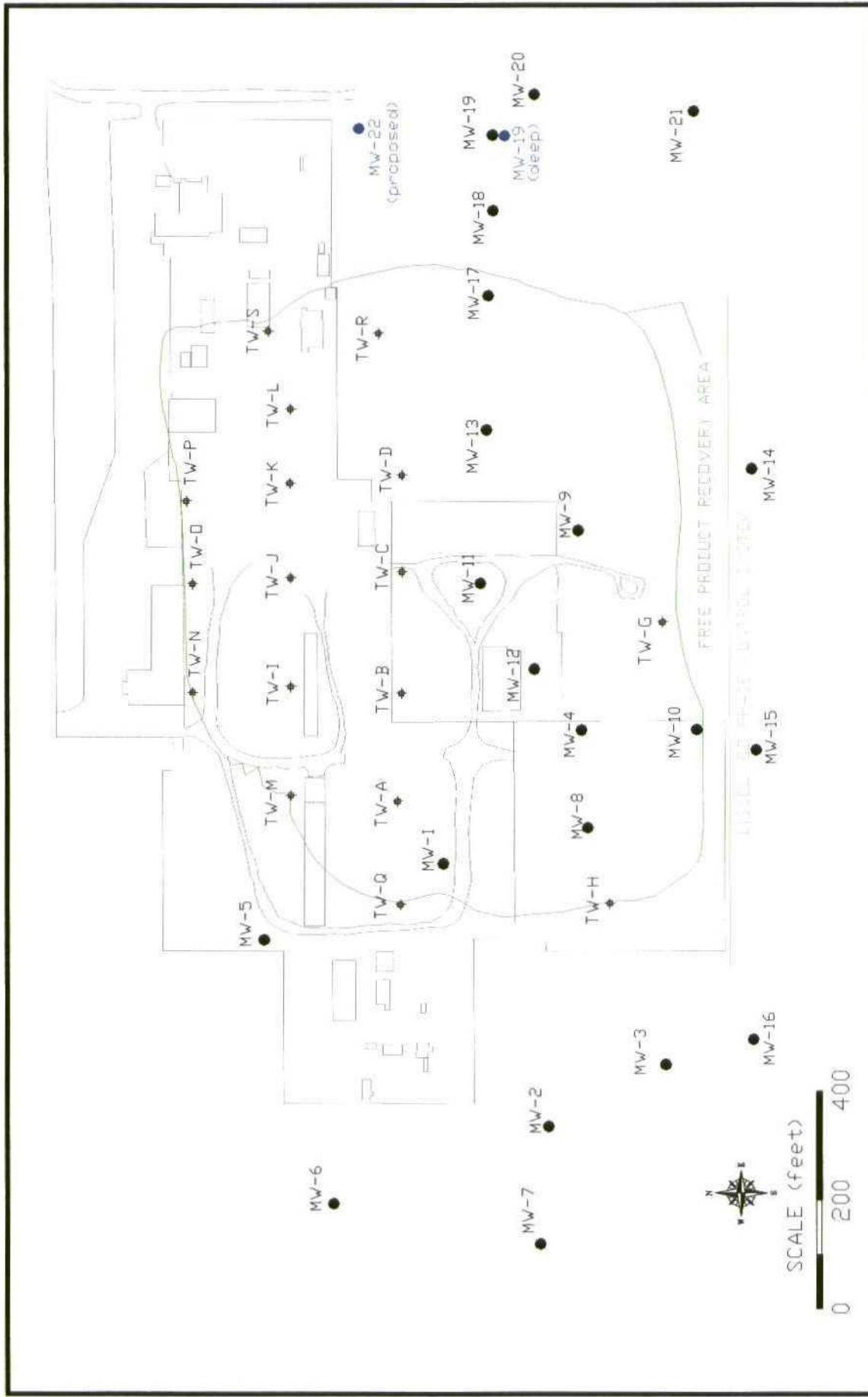


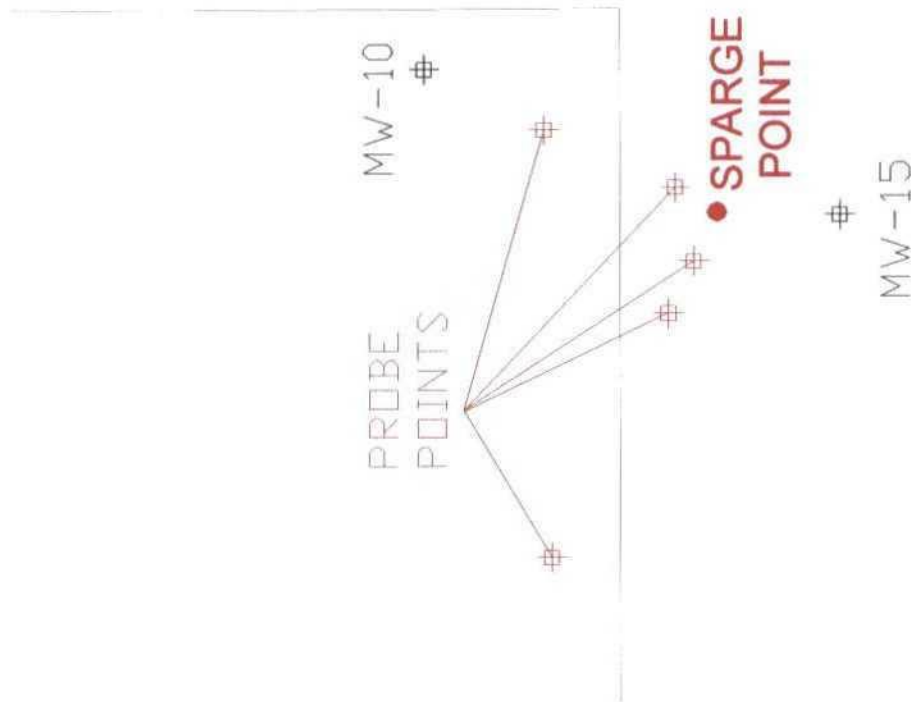
Figure 15 – Proposed Remediation Locations

Hobbs Booster Station



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TW-G



SCALE



Figure 16 – Proposed Air Sparge Pilot Test Locations

Hobbs Booster Station

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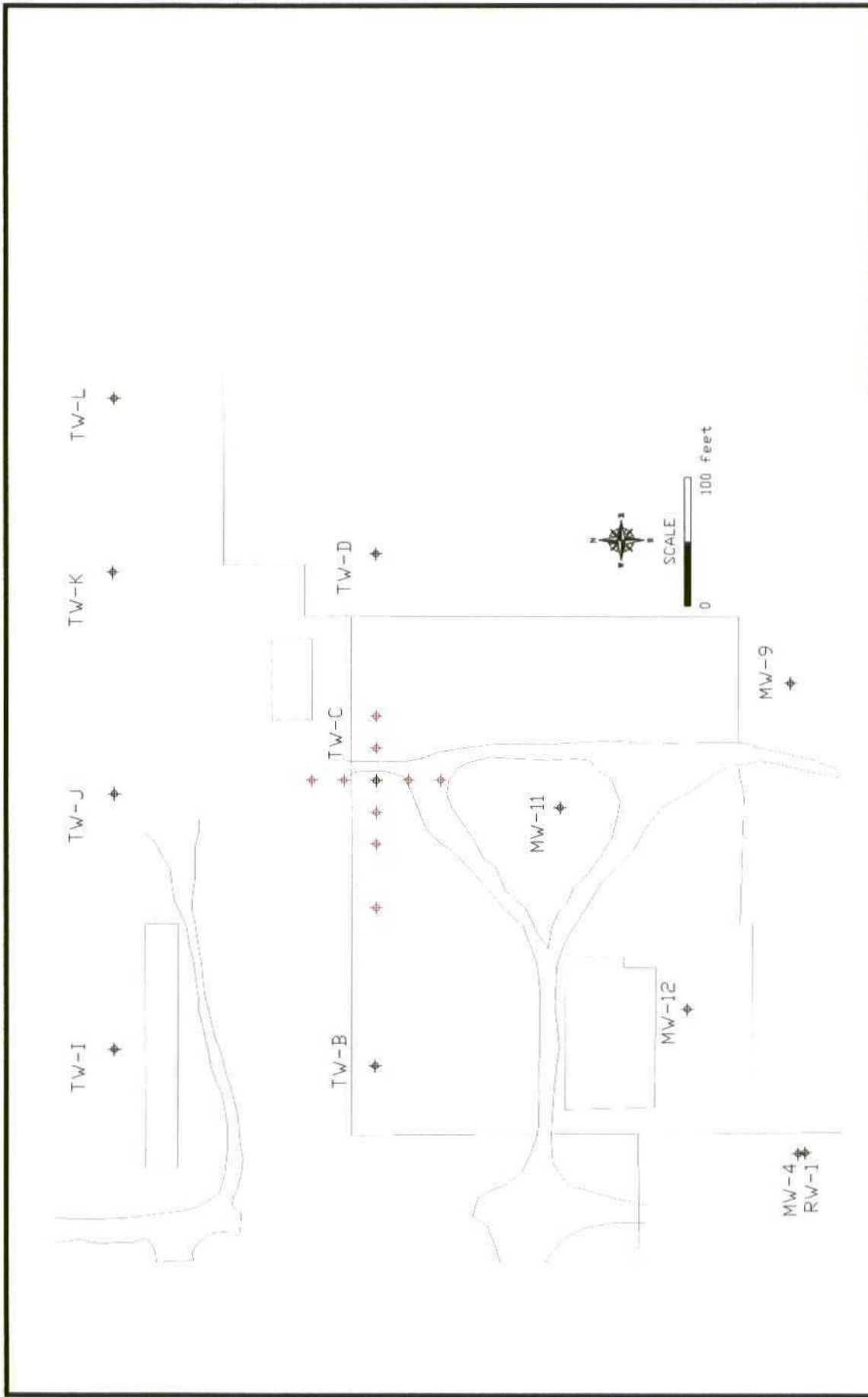


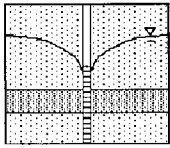
Figure 17 – Proposed Free Product Pilot Test Locations

Hobbs Booster Station

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DATE: Mar 03



**GROUNDWATER SCIENCE AND ENGINEERING
BIOSLURP MODELING REPORT**



Groundwater Science & Engineering Inc.
514 Parkview Court
Golden, CO 80403

April 8, 2003

Mr. Michael Stewart, P.E.
Remediacon Incorporated
P.O. Box 302
Evergreen, CO 80437
Email: remediacon@yahoo.com

Subject: Free Product Numerical Modeling
Field Services Hobbs Booster Station
Lea County, New Mexico

Dear Mike:

Groundwater Science and Engineering (GSE) is pleased to submit the results of the free product numerical modeling of the Hobbs Booster Station.

1 EXECUTIVE SUMMARY

GSE used a multiphase modeling program called "BIOSLURP" to develop a model of the Hobbs Booster Station plume and develop predictions of the plume behavior with and without free product extraction. The modeling effort suggested the following results:

- The Hobbs booster station plume is not significantly mobile; and,
- Free product extraction wells with pneumatic product only extraction pumps can be utilized to effectively remove free product from the plume.

2 PURPOSE

The purpose of this modeling effort was to develop a numerical model that can predict possible future behavior of the NAPL plume and assess the effectiveness of free product extraction. This report presents the results of two scenarios: 1) simulating the effect of a single extraction well at the area of maximum free product thickness; and 2) product migration with no free product extraction. The model may also be used as a remediation design tool to evaluate various extraction well configurations. The model may be updated as additional site data becomes available.

The numerical modeling was performed using BIOSLURP developed by Resources & Systems International, Inc. BIOSLURP is a multiphase, aerial, organic vacuum-enhanced recovery and multi-component transport simulator. BIOSLURP uses the Galerkin finite element method to simulate three-phase (water, oil, and gas) flow and multi-component (5 species) transport in groundwater and gas phases. BIOSLURP can model recovery and migration of light, non-aqueous phase liquids (NAPL) with (or without) vacuum enhanced recovery in unconfined, heterogeneous aquifers. BIOSLURP can also simulate multi-species, dissolved-phase (groundwater) and gas-phase (unsaturated zone) transport.

As with most numerical modeling, this model is based on limited available direct and indirect site-

specific data. Therefore, the results are limited by the availability of site-specific data. Due to the subsurface heterogeneity and the resulting complications with multiphase flow, the results of this modeling effort should be considered with these limitations in mind.

3 METHODOLOGY

The development of the Model involved the following steps:

- Data evaluation and parameter estimation;
- Model construction; and,
- Forward predictive simulations.

3.1 DATA EVALUATION

Pump test data from aquifer testing was provided by Remediacon. These values are presented in Table 1. The average hydraulic conductivity from the aquifer testing was used in the numerical model. The average calculated hydraulic conductivity is 88.9 ft/day.

Table 1
Aquifer Hydraulic Conductivities

Well ID	Hydraulic Conductivity (ft/day)
MW-13a	81
TW-E	93
TW-F	148.2
Average	88.9

Sieve analysis results from a soil sample acquired during well installation were analyzed using the method presented by Araya and Paris¹ to estimate porosity and capillary moisture versus capillary pressure. This method was applied to the less than 2-millimeter particle fraction. The results were then corrected for the presence of the coarse fraction greater than 2 millimeters. This correction assumes that the coarse fraction does not contribute to porosity. The moisture versus pressure data points were then used as input to the computer program RETC² to estimate Van Genuchten parameters. Van Genuchten parameters are used to generate the moisture characteristic curve (pressure versus moisture content) as a continuous function. BIOSLURP uses the Van Genuchten parameters to calculate NAPL volume and transmissivity as a function of NAPL surface height above the oil-water interface. The calculated moisture characteristic curve is presented in Figure 1, and the soil properties are summarized in Table 2.

¹ Araya, L.M., and J.F. Paris. 1981. A physicoemperical model to predict the soil moisture characteristic from soil particle-size distribution and bulk density data. *Soil Sci. Soc. Am. J.* 45:1023-1030.

² Van Genuchten, M. Th., F.J. Jeij, and S.R. Yates. 1991. The RETC Code for Quantifying the Hydraulic Functions of Unsaturated Soils. EPA/600/2-91/065.

Table 2
Araya Paris Calculated Parameters

Parameter	Value
Porosity (%)	30.5
Alpha (1/ft)	2.15
"n"	1.2
Residual Moisture (%)	0.0

3.2 MODEL CONSTRUCTION

BIOSLURP solves for model-specific parameters, such as fluid levels, at discrete locations throughout the model domain.

- *Nodes* represent each discrete location, and each node exerts an influence on neighboring nodes.
- A *Mesh* is a network of nodes throughout the modeling domain

The Model consisted of 4900 nodes with equal spacing of approximately 35-feet in the X and Y dimensions. The model domain was large enough to extend beyond the plume to prevent violating the boundary conditions. The model domain is presented in Figure 2. North is to the top of the page in all plan view site figures.

Fixed groundwater head boundary conditions were assigned to each perimeter node around the modeling domain. Fixed NAPL flux boundary conditions were used to simulate the NAPL pumping. Conservative free product extraction rates were based on GSE's experience with pneumatic free product pumps that are likely to be used at the Hobbs site. The free product extraction rate was set to 56 gallons per day. The model consisted of a homogeneous aquifer with the parameters presented in the previous section.

The model initial conditions were the groundwater and NAPL plume configurations measured in December 2002. The initial condition free product distribution predicted by the model is presented in Figure 3.

4 FORWARD MODELING

Forward simulations were performed using the following two scenarios:

1. No free product extraction; and,
2. Free product using a single extraction well.

Each of the above scenarios was simulated for a period of five years. The purpose of modeling extraction using a single well was to evaluate the effectiveness of free product removal and estimate

the radius of influence from free product removal. These modeling results will be compared to field data acquired during pilot testing at a later date. This comparison may result in the need to calibrate the model to the field observations.

4.1 FREE PRODUCT VOLUME

As part of the model output, BIOSLURP calculates the amount of free product within the model domain. The free product volume is calculated using the plume thickness, the parameters used to generate the moisture characteristic curve, and the free product physical properties. Based on the model results, the plume contains approximately 1,100,000 gallons. The simulations presented in this report do not consider any product that may be trapped in the vadose and saturated zones.

4.2 NO FREE PRODUCT RECOVERY SIMULATION RESULTS

The simulated results of this scenario indicate that the plume will not significantly migrate downgradient. Figures 4 and 5 show the free product plume after one year and five years respectively. As shown in these figures, the free product does not show significant downgradient migration in that four-year period. This lack of mobility is consistent with field observations and is due primarily to the low NAPL transmissivity of the leading edge of the plume. This simulation also assumed that there is no regional decline in groundwater elevations. The constant groundwater elevation used in this simulation will not result in NAPL trapping due to regional groundwater fluctuations. Therefore, it is a conservative estimation of plume mobility. If groundwater elevations continue to decrease, the free NAPL volumes will decrease due to trapping in the vadose zone. Decreasing free NAPL volumes will result in decreasing the plume mobility.

4.3 FREE PRODUCT RECOVERY SIMULATION RESULTS

Free product extraction using a single well was simulated for a period of five years to evaluate the potential effectiveness of free product only pumping. The free product extraction rate was set to 56 gallons per day at the point of maximum plume thickness (Well TW-C). The resulting free product capture zone is presented in Figure 6. The predominant free product flow direction is from west to east. Based on the model predictions, a single pneumatic free product extraction well can remove product from a capture zone extending approximately 200 feet in the north-south direction. The modeling effort also suggests that a single extraction can reduce the maximum free product thickness from approximately 11 feet to 6 feet in five years. The simulated plume distribution after 1 through 5 years are presented in Figures 7 through 11 respectively.

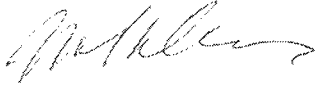
5 RECOMMENDATIONS

The results of the numerical modeling suggest that using free product only pneumatic pumps can effectively remediate the free product plume without significant down-gradient migration of the plume. GSE recommends a long-term pilot test to obtain field data to validate the model predictions. The pilot test should utilize a single pneumatic free product extraction pump and multiple monitoring wells within the predicted capture zone. Monitoring wells should be screened over the full plume thickness. We recommend that the free product is extracted at the maximum rate that can be obtained using the selected pneumatic pump. We recommend that the test be conducted for a period of 90 to 180 days. The resulting data will be compared to the numerical model predictions. If the model fails to simulate the observed response in the plume, the model will be calibrated to the field observations. It is also recommended that soil samples are obtained for pressure plate analyses to develop additional moisture characteristic curves and Van Genuchten parameters.

Thank you for this opportunity. If you have any questions or require more information, please do not hesitate to contact us at (303) 384-3581.

Best regards,

GROUNDWATER SCIENCE AND ENGINEERING, INC.

A handwritten signature in black ink, appearing to read 'Nick Kiusalaas', with a stylized flourish at the end.

Nick Kiusalaas. P.E., P.G.
Principal Hydrogeologist

Cc: Steve Weathers, Duke Energy

FIGURES

FIGURE 1

RETC Model Results: Hobbs, NM Sieve Analysis
Van Genuchten fit of Calculated Moisture Characteristic Data
[$\alpha = 2.15 \text{ (ft}^{-1}\text{)}$, $n = 1.2$, residual moisture content = 0.0]

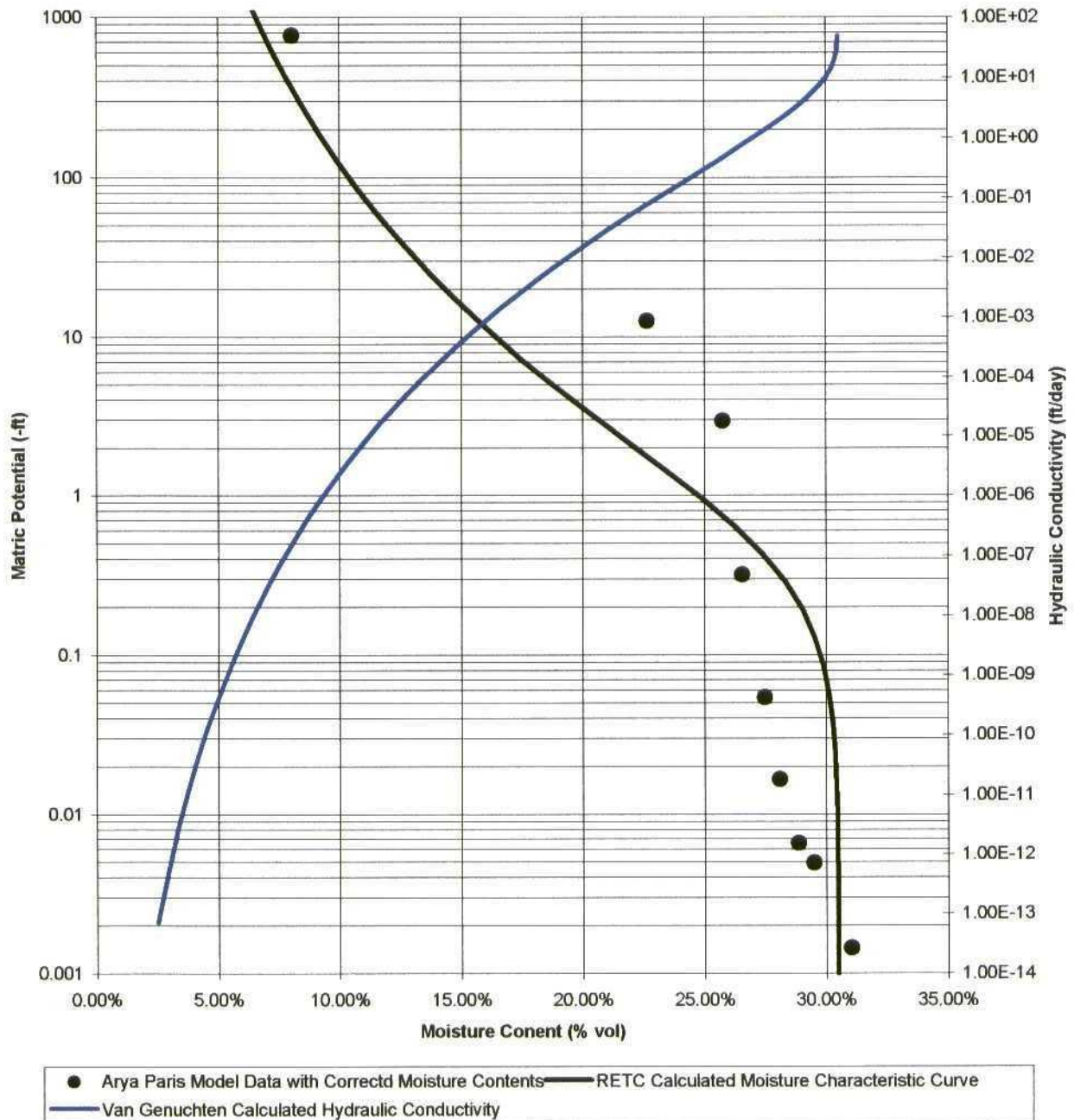
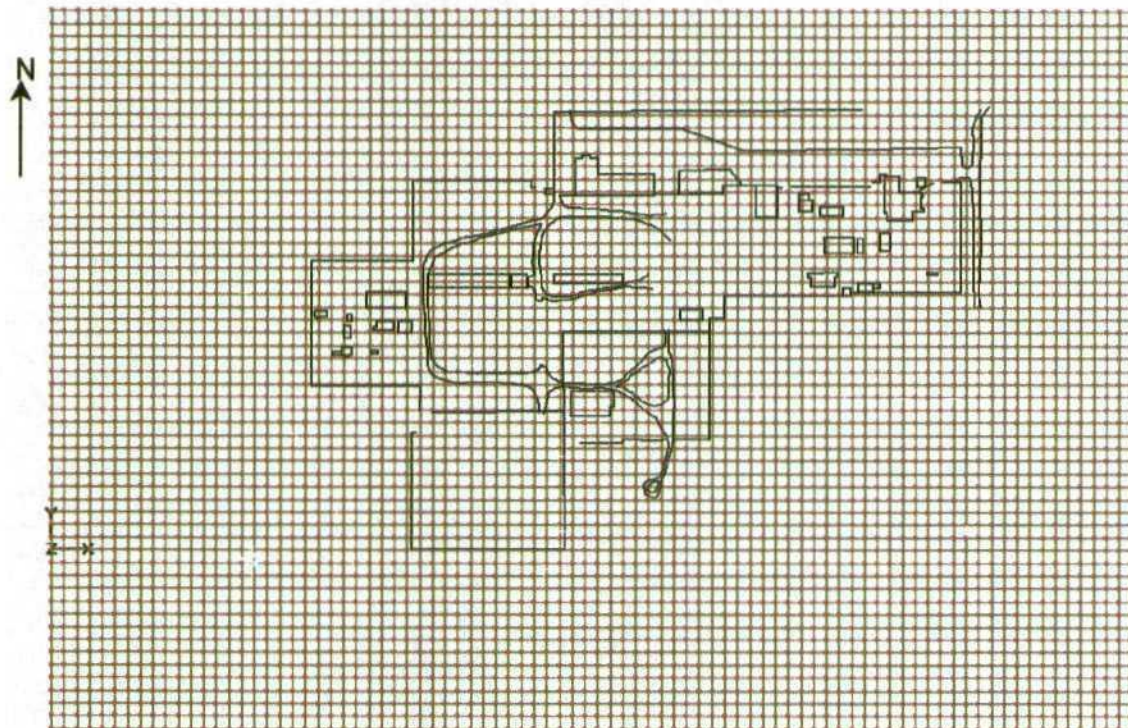


FIGURE 2
Model Domain and Node/Element Locations



Note: The model grid spacing is approximately 35 feet

FIGURE 3
Model Free Product Initial Conditions

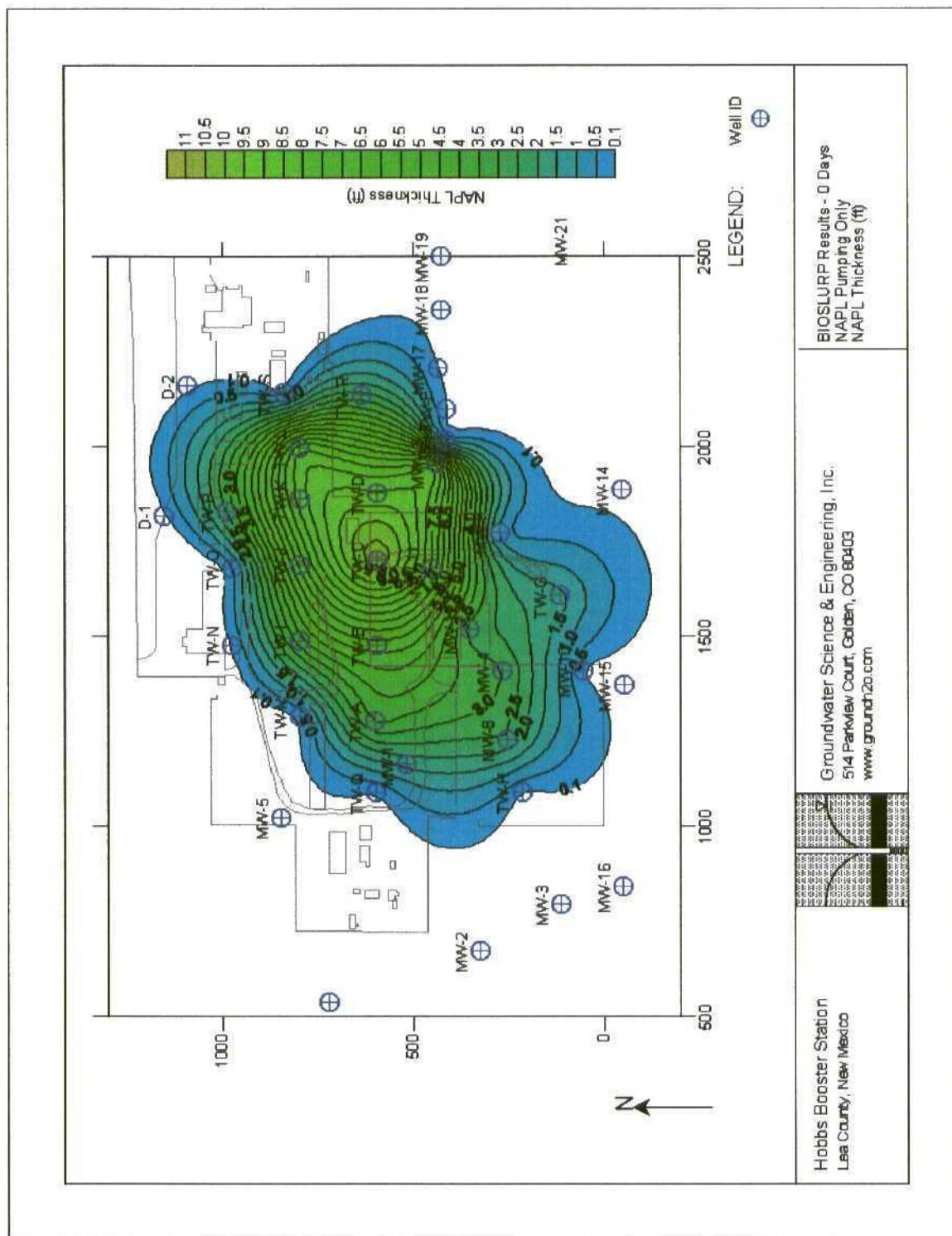


FIGURE 4
Free Product Distribution – 1 year

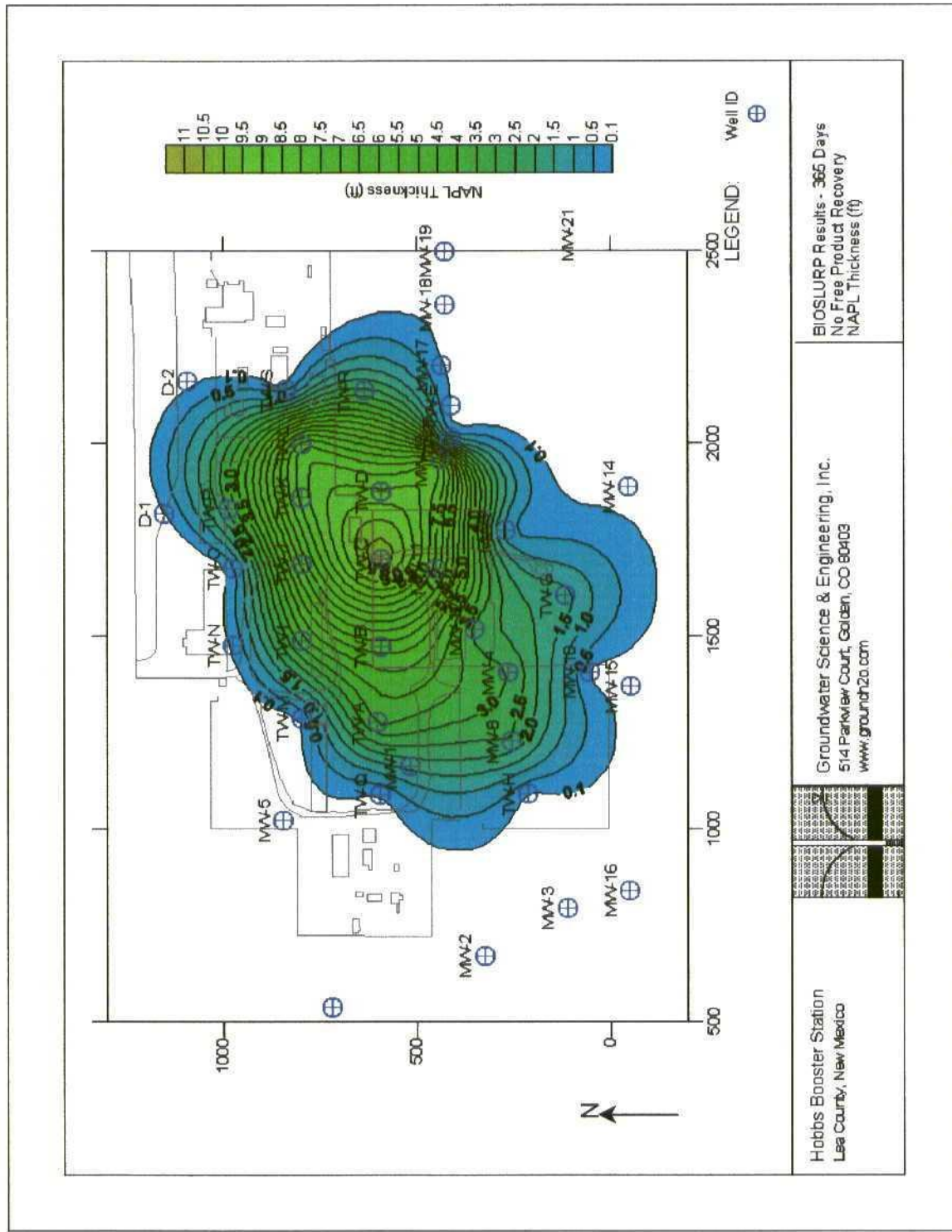


FIGURE 5
Free Product Distribution – 5 years

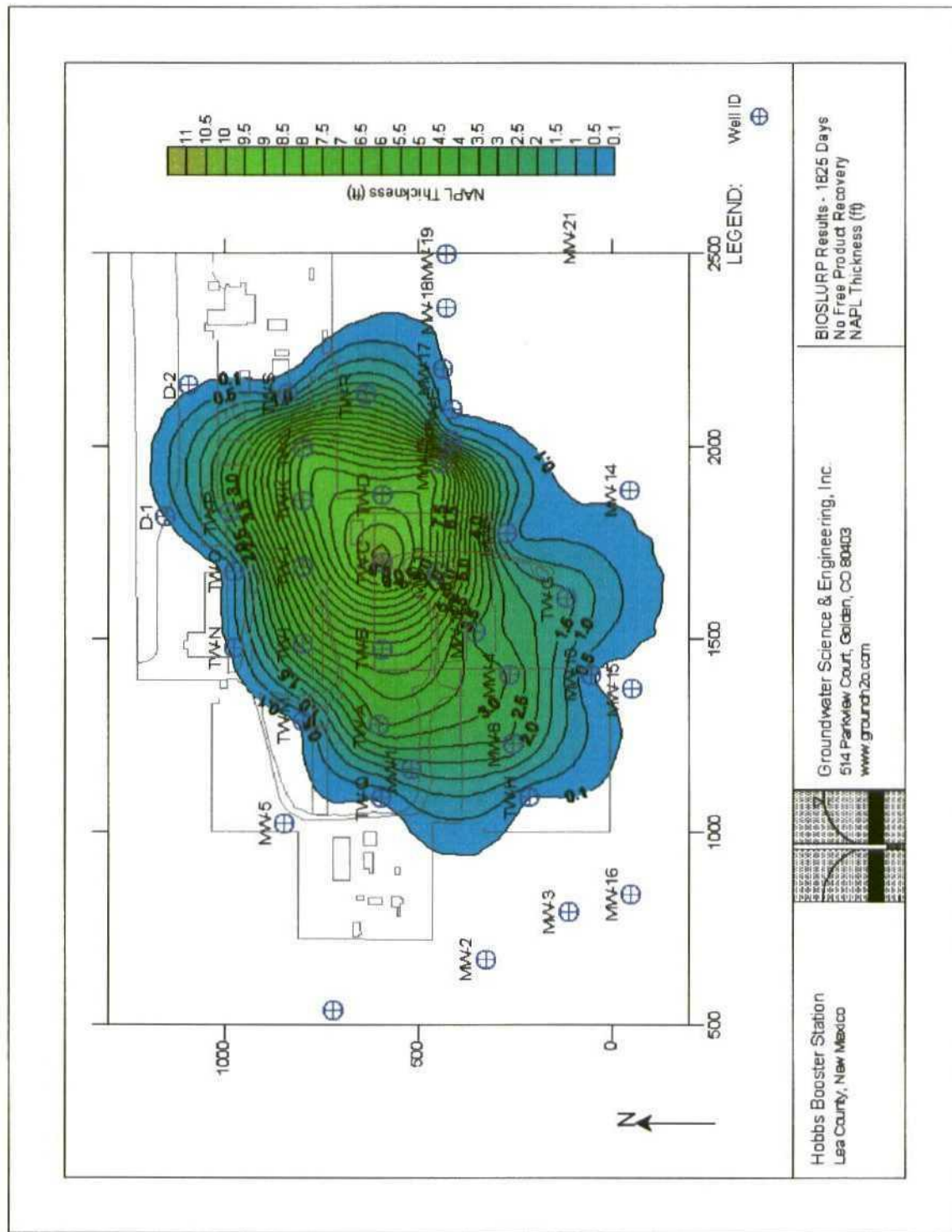


FIGURE 6
Approximate Free Product Capture Zone

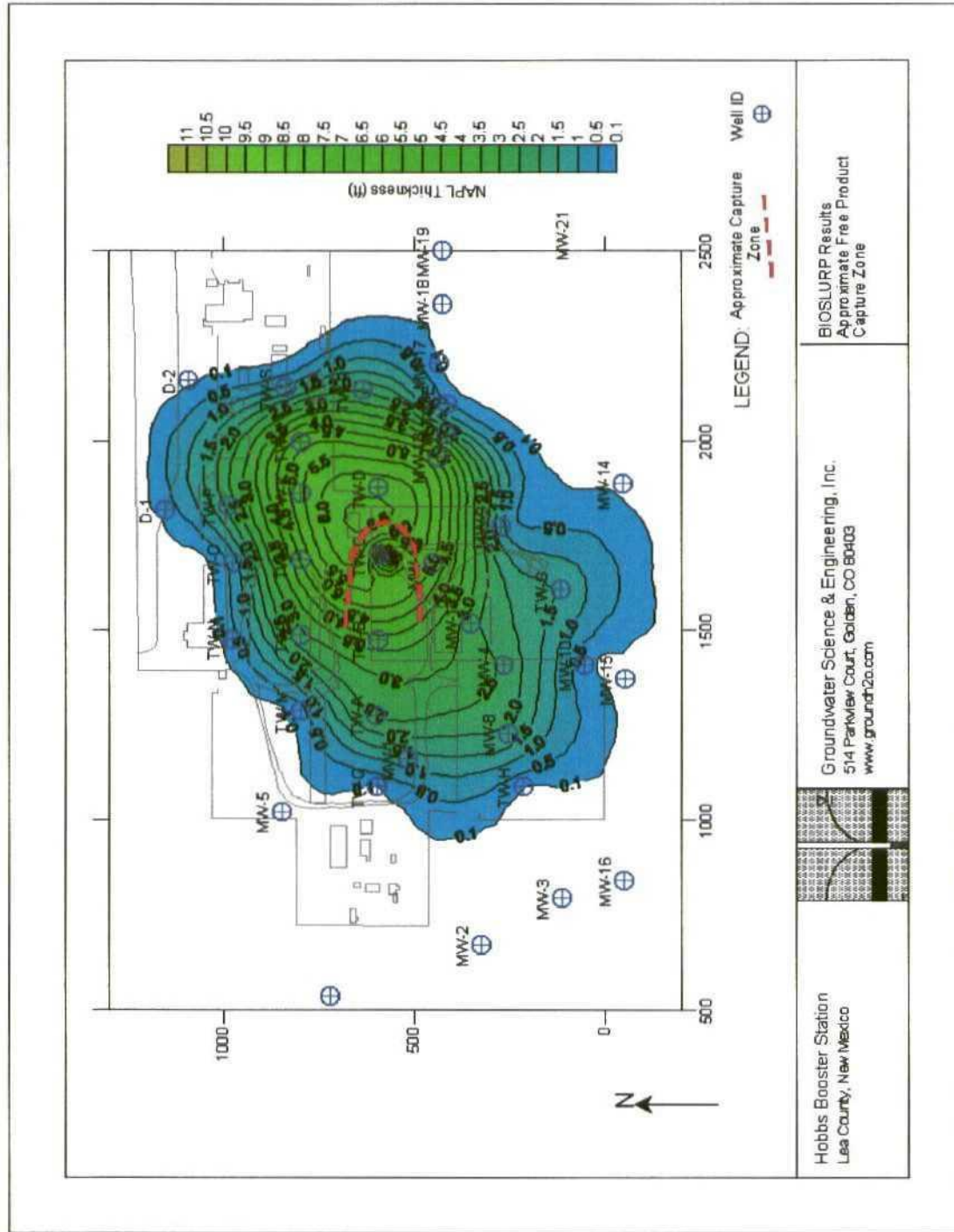


FIGURE 7
Simulated Free Product Distribution – 1 year

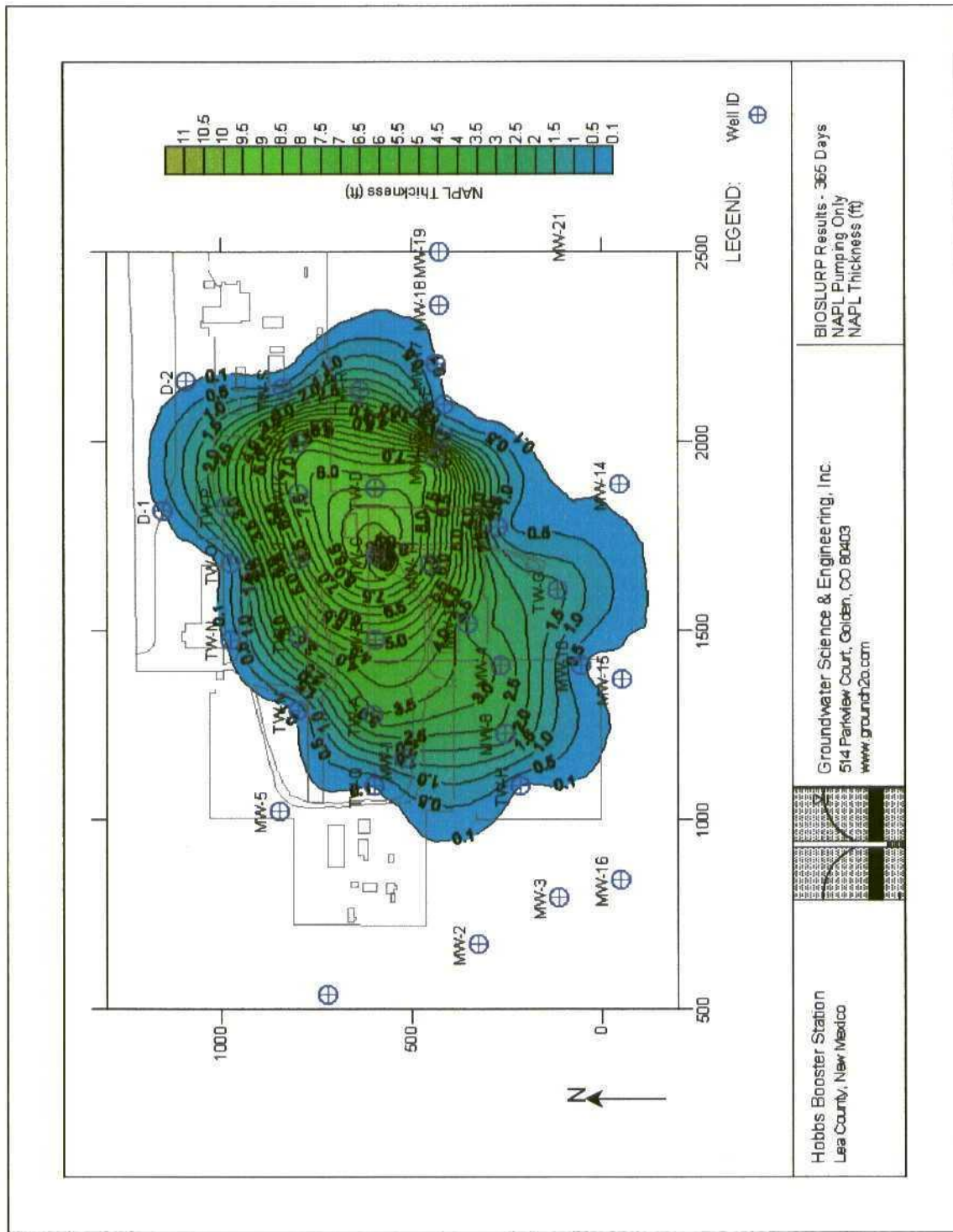


FIGURE 8
Simulated Free Product Distribution – 2 years

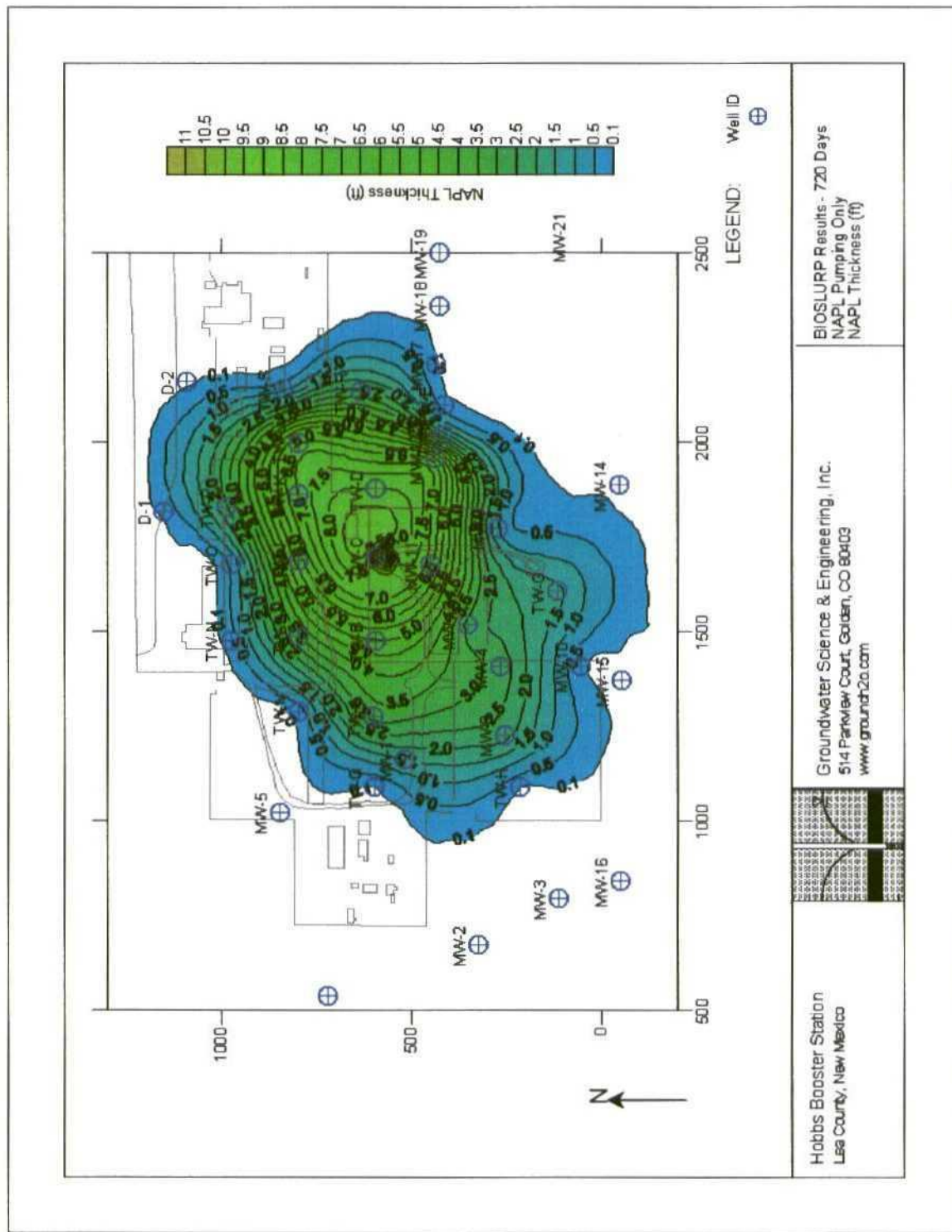


FIGURE 9
Simulated Free Product Distribution – 3 years

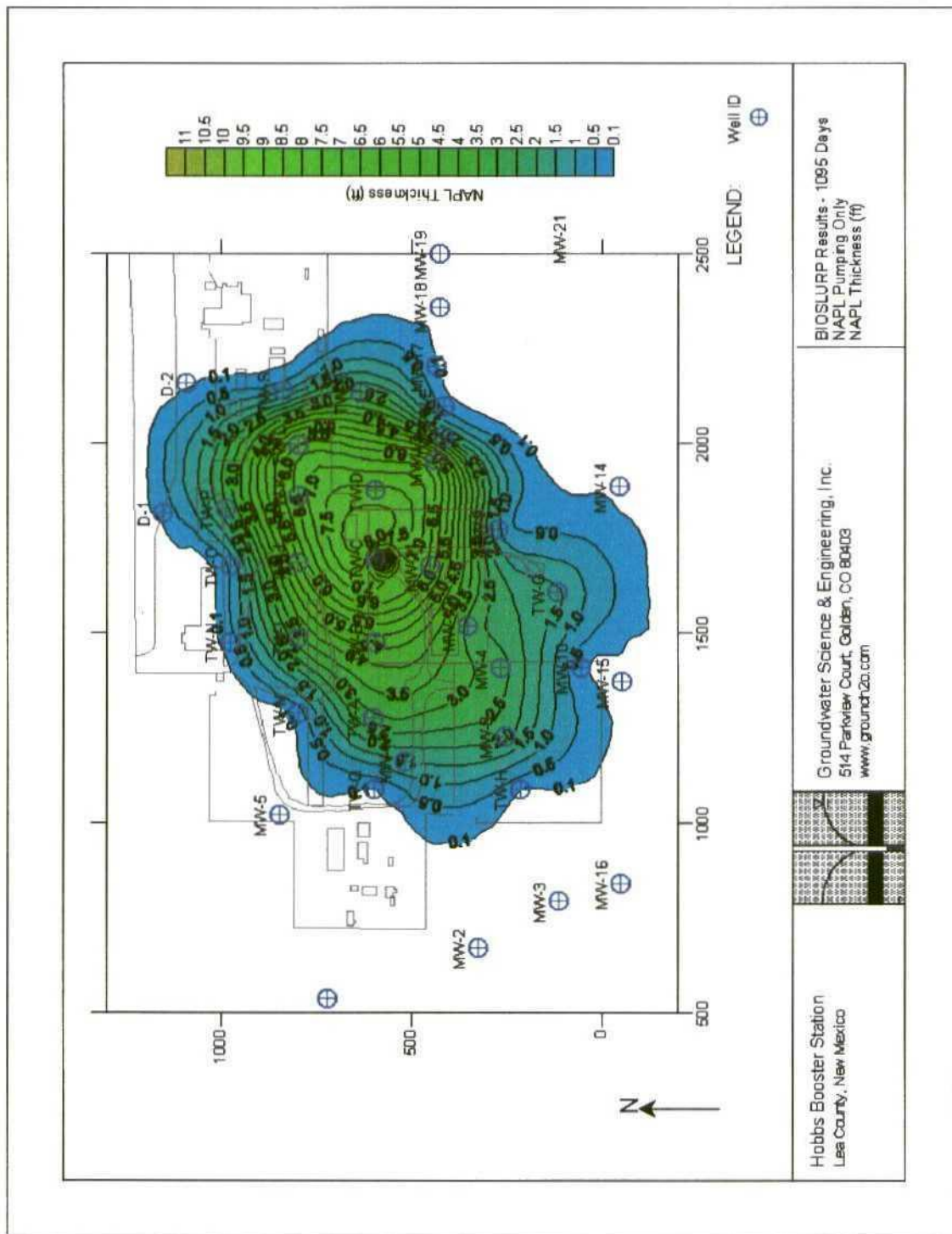


FIGURE 10
Simulated Free Product Distribution – 4 years

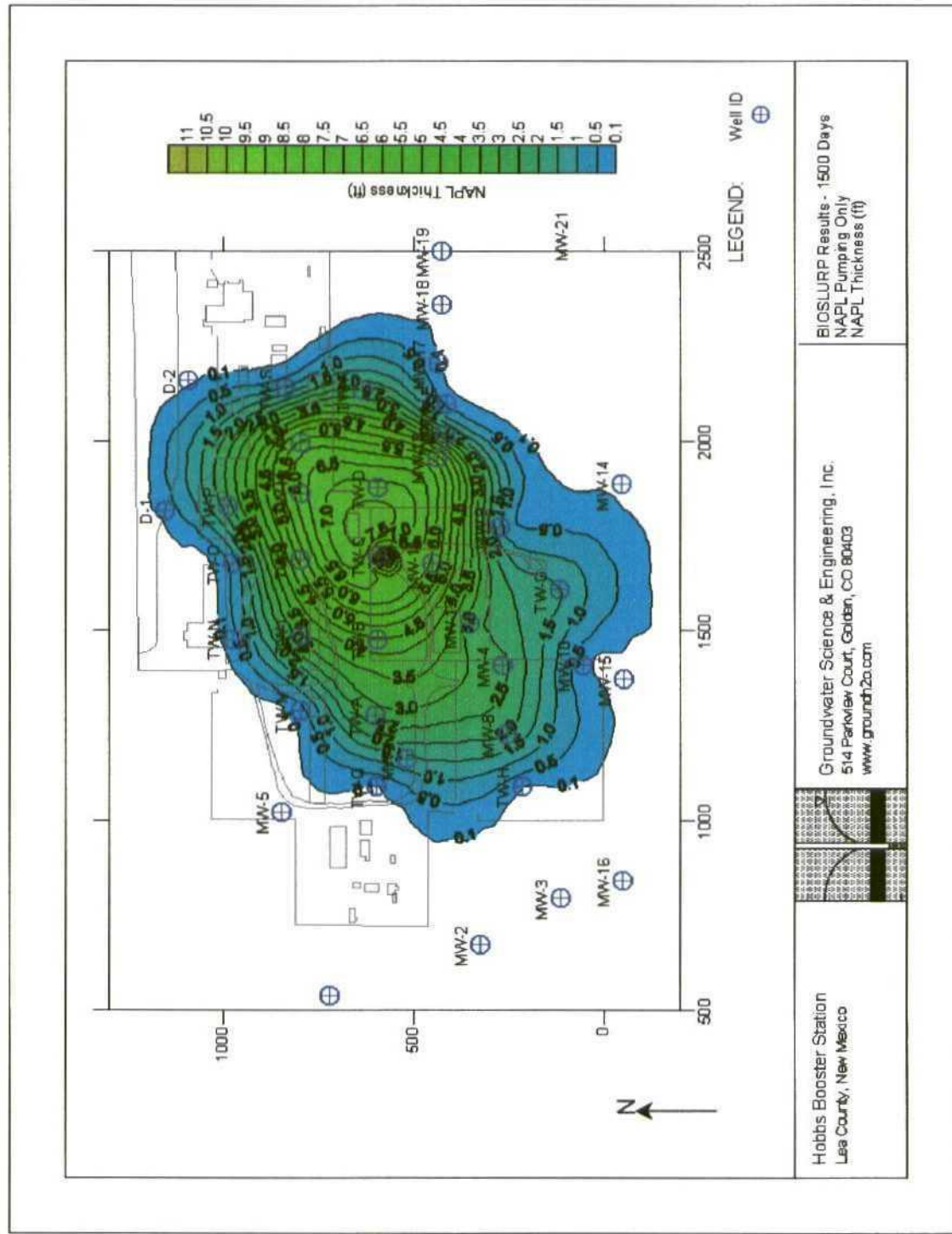
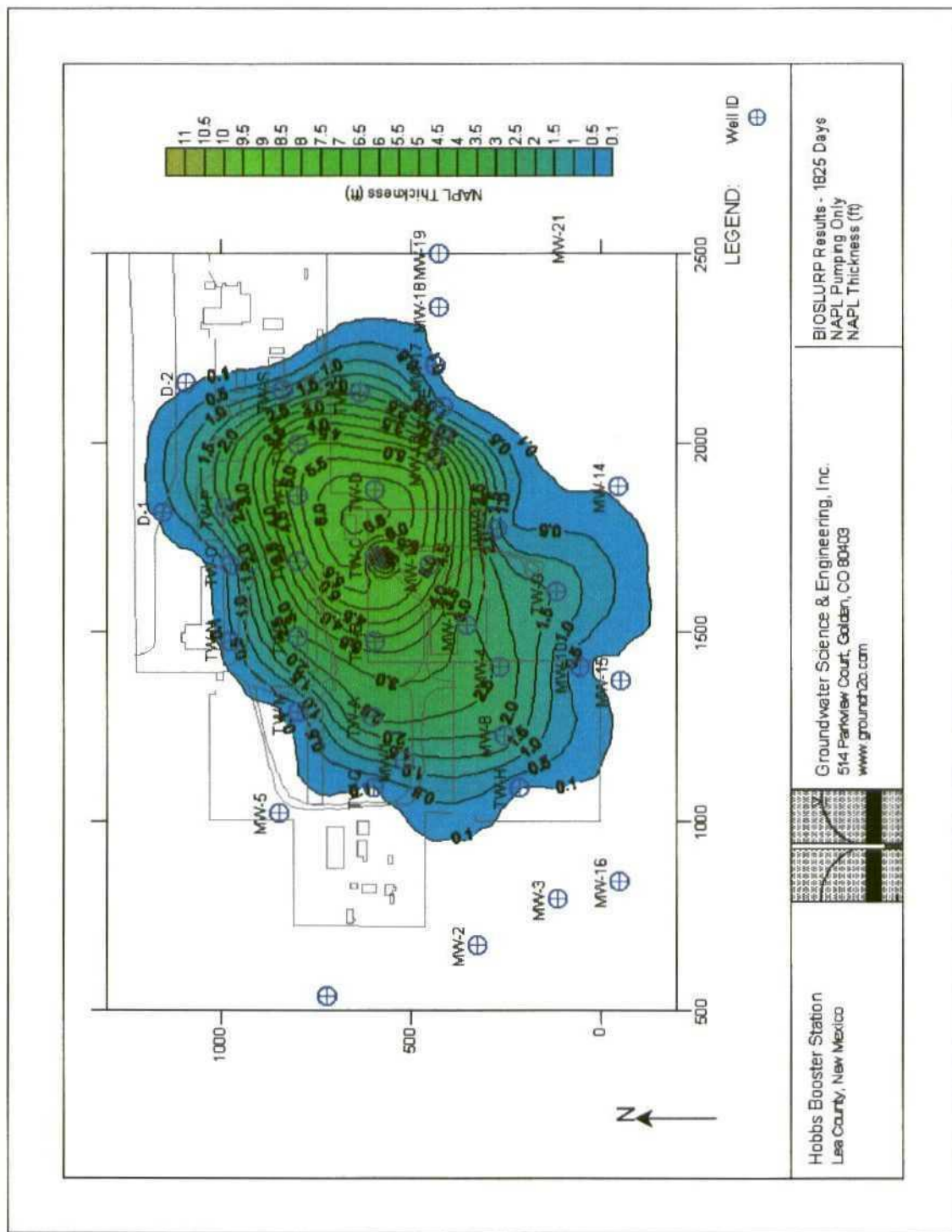


FIGURE 11
Simulated Free Product Distribution – 5 years



February 6, 2002

William C. Olson
New Mexico Oil Conservation Division
1220 S. St. Francis Dr.
Santa Fe, NM 87505

Certified Letter 7001 1140 0003 5926 3462

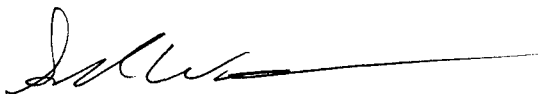
**RE: 2001 Annual Groundwater Report for the Monument Booster Station, Lea
County New Mexico**

Dear Mr. Olsen:

Duke Energy Field Services, LP (DEFS) is pleased to submit for your review, one copy of the 2001 Annual Groundwater Report for the Monument Booster Station located in Lea County, New Mexico. The annual groundwater report incorporates the two semiannual sampling events that were completed this year.

If you have any questions regarding the 2001 Annual Groundwater Report, please call me at 303-605-1718.

Sincerely
Duke Energy Field Services, LP



Stephen Weathers
Environmental Specialist

Enclosure

cc: Paul Sheeley, OCD Hobbs District
Environmental Files

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FEB 13 2002

**ENVIRONMENTAL BUREAU
OIL CONSERVATION DIVISION**

**2001 Annual Groundwater Monitoring
and Remediation Performance Report
Duke Energy Field Services
Monument Booster Station
Lea County, New Mexico**

JANUARY 29, 2002

Prepared For:

**Duke Energy Field Services
P. O. Box 5493
Denver, Colorado 80217**

RECEIVED

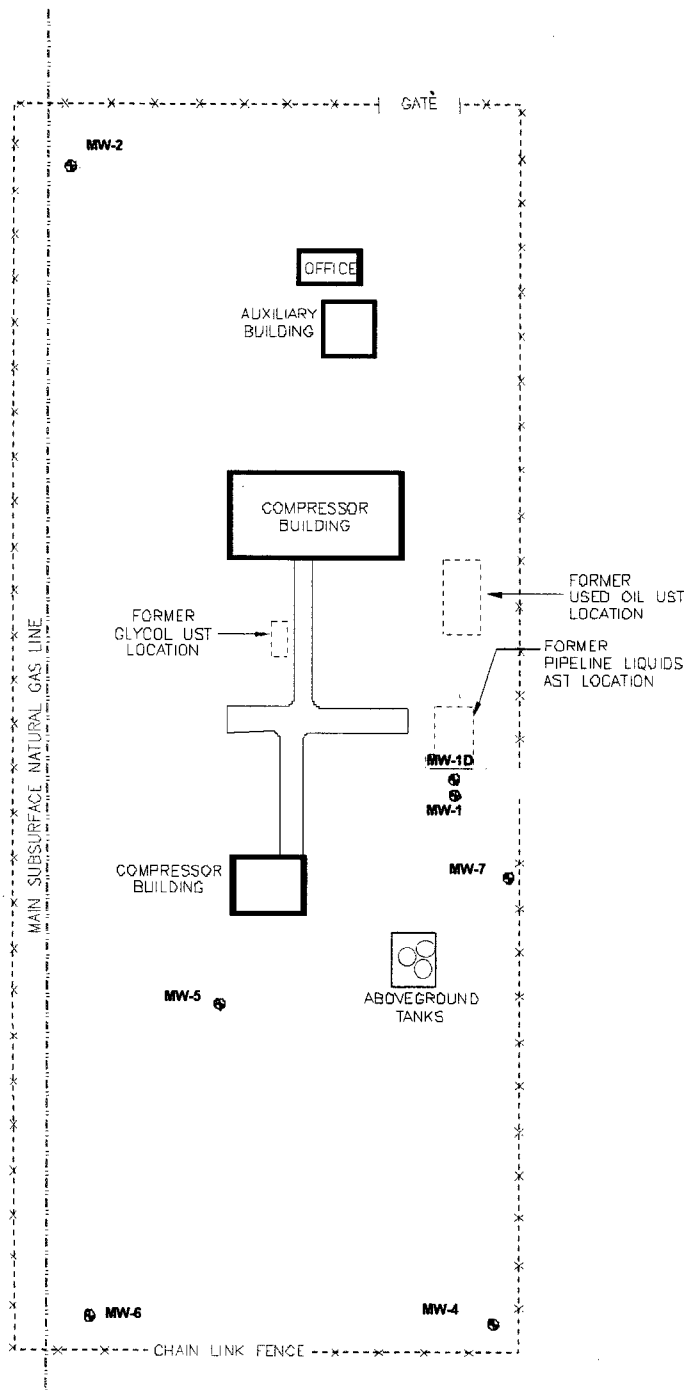
FEB 13 2002

**ENVIRONMENTAL BUREAU
OIL CONSERVATION DIVISION**

Prepared By:



**P O Box 7624
Midland, Texas 79708**



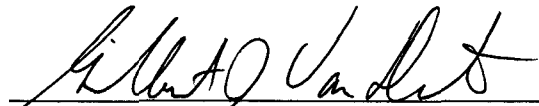
**2001 Annual Groundwater Monitoring Report
Duke Energy Field Services
Monument Booster Station
Lea County, New Mexico**

Prepared by:

*Trident
Environmental
P O Box 7624
Midland, Texas 79708
(915) 682-0808
FAX (915) 682-0727*

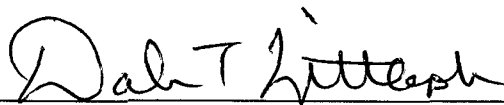
SUBMITTED BY:

DATE:



Gilbert J. Van Deventer, REM
Project Manager

1-29-02



Dale T. Littlejohn
Quality Assurance Officer

1-29-02

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1.0 Executive Summary

Trident Environmental (Trident) was retained by Duke Energy Field Services Inc. (DEFS) to perform the groundwater monitoring operations at the Monument Booster Station. This 2001 annual report documents the two semi-annual groundwater sampling events performed by Trident at the DEFS Monument Booster Station on February 8 through 9, 2001 and July 30, 2001. The report also contains the historical groundwater elevation and analytical data since the beginning of the project in May 1995. The monitoring and sampling program was conducted in accordance with the guidelines specified by Mr. Bill Olson of the New Mexico Oil Conservation Division (OCD) in his letter dated December 9, 1999.

Based on the groundwater monitoring and remediation system performance data to date, the following conclusions at the Monument Booster Station are evident:

- Benzene, toluene, ethylbenzene, and xylenes (BTEX) concentrations in monitoring wells MW-1D, MW-2, MW-3, MW-4, and MW-6 are presently below New Mexico Water Quality Control Commission (WQCC) standards. With the exception of the August 1999 sample recovered from MW-2 and the August 1999 and February 2000 samples recovered from MW-3, the BTEX concentrations in each of these wells have remained below the WQCC standard levels since 1995.
- Only the benzene concentrations from the current and historic groundwater samples recovered from MW-7 exceed the WQCC standard. These levels however appear to be decreasing over the last five semi-annual monitoring events with short-term fluctuations that seem to correspond to changes in the water table elevation.
- As of September 10, 2001, a total of approximately 146 gallons of light non-aqueous phase liquids (LNAPL) has been removed from monitoring wells MW-1 and MW-5 using a combination of gravity siphoning, hand bailing, passive skimmer, adsorbent sock, and pneumatic pump recovery methods.
- The presence and trends of biological parameters (dissolved oxygen, nitrate, sulfate, and iron) indicate that biodegradation has been taking place on site. The biodegradation capacity of electron acceptors and metabolic byproducts (33.36 mg/L) far exceeds the highest benzene concentration (1.13 mg/L) observed on site by a ratio of 30 to 1. This indicates that the biodegradation process has been active. Continued semi-annual monitoring is necessary to demonstrate the effectiveness of intrinsic bioremediation in limiting the migration of the dissolved hydrocarbon plume.

The following recommendations are suggested for the remediation system and monitoring operations at the Monument Booster Station.

- Continue LNAPL recovery operations utilizing absorbent socks in MW-1 and MW-5. This method appears to have been effective in recovering free product over the last two annual monitoring periods.
- Discontinue analyses for aluminum, arsenic, and chromium since those constituents have been below the WQCC standards for over five years.
- Continue the groundwater-monitoring program on a semi-annual basis. The next sampling event is scheduled during the first quarter of 2002.

2.0 Chronology of Events

July 1992	Benge Construction Company of Lovington, New Mexico removed three underground storage tanks (USTs) near the main compressor building for ENRON at the Hobbs Compressor Station #2). The USTs formally contained used oil and pipeline liquids (oil and/or natural gas liquid condensate). Hydrocarbon-impacted soils were removed from the used oil and pipeline liquids UST tank holds.
February 4, 1994	Geoscience Consultants Ltd (GCL) installed two monitoring wells (MW-1 and MW-2) during a subsurface investigation for ENRON. Hydrocarbon-impacted groundwater was confirmed in MW-1.
May 17, 1994	Benge Construction Company returned during a subsurface investigation conducted by Daniel B. Stevens and Associates (DBS&A) and removed an additional amount of hydrocarbon-impacted soils from the pipeline liquids and used oil UST tank holds. The amount of hydrocarbon-impacted soils removed from the used oil and pipeline liquids UST tank holds in 1992 and 1994 was not well documented, however it was estimated by DBS&A that a total of 1,064 cubic yards were excavated from the two tank holds based on the amount of backfill required to fill the excavations.
May 16-19, 1994	Six soil borings (SB-1 through SB-6) were completed as temporary drive point wells for ENRON by DBS&A to delineate the horizontal extent of hydrocarbon-impacted soils and groundwater.
October 7, 1994	The OCD requested ENRON to provide a work plan to completely define the extent of groundwater contamination at the Hobbs Compressor Station #2 site.
November 1994	GPM Gas Corporation (GPM) acquired ownership and operation of the Monument Booster Station (formerly Hobbs Compressor Station #2) from ENRON.
February 23, 1995	GPM submitted a subsurface investigation work plan to the OCD to address the groundwater conditions at Monument Booster Station.
April 5, 1995	The OCD approved the subsurface investigation work plan for Monument Booster Station.
May 8-10, 1995	GCL completed a subsurface investigation for GPM to delineate the extent of the hydrocarbon-impacted groundwater. The investigation included the installation and sampling of four monitoring wells (MW-1D, MW-3, MW-4, and MW-5) and one soil boring (SB-7).
July 28, 1995	GPM submitted the <i>Subsurface Investigation and Preliminary Remedial Response</i> report for the Monument Booster Station to the OCD.

August 24, 1995	The OCD approved GPM's recommendations for remedial action. The OCD requested a work plan for an additional monitoring well, new recovery well and product recovery system.
September 29, 1995	GPM submitted the <i>Remediation and Monitoring Work Plan for the Monument Booster Station</i> to the OCD.
October 25, 1995	The OCD approved the remediation and monitoring work plan for Monument Booster Station.
November 14-16, 1995	GCL installed two additional monitoring wells (MW-6 and MW-7) and conducted the fourth quarter 1995 sampling event at Monument Booster Station.
January 18, 1996	GCL conducted the first quarter 1996 sampling event at Monument Booster Station.
April 24, 1996	GCL conducted the annual (second quarter 1996) sampling event at Monument Booster Station. The annual report included recommendations to the OCD for remedial response.
January 22, 1997	BDM International, Inc. (formerly GCL) conducted the first quarter 1997 sampling event at Monument Booster Station.
January 31, 1997	The OCD completed the review of the annual report for the second quarter 1996 sampling event and approved the groundwater monitoring modifications for Monument Booster Station.
January 31, 1997	BDM International, Inc. (BDM) and GPM installed an automated pneumatic product recovery pump system in monitoring wells MW-1 and MW-5 to replace the hand bailing and gravity siphoning techniques used previously.
August 11, 1997	BDM conducted the annual (third quarter 1997) sampling event at Monument Booster Station.
January 23, 1998	TRW conducted the semi-annual (first quarter 1998) sampling event at Monument Booster Station.
August 3, 1998	TRW conducted the annual (third quarter 1998) sampling event at Monument Booster Station.
February 10, 1999	TRW conducted the semi-annual (first quarter 1999) sampling event at Monument Booster Station.
August 17, 1999	TRW conducted the annual (third quarter 1999) sampling event at Monument Booster Station.

September 14, 1999	TRW conducted O & M on Xitech product recovery system (MW-1) checked and/or replaced absorbent sock and hand bailed excess product from MW-5.
October 26, 1999	TRW conducted O & M on Xitech system and manual product removal.
November 5, 1999	TRW conducted manual product removal from MW-5.
November 22, 1999	TRW conducted O & M on Xitech system and manual product removal.
December 20, 1999	TRW removed the Xitech pump for update and repair. An absorbent sock was installed in MW-1 and replaced in MW-5. Excess product was removed from MW-5 using a hand bailer.
January 26, 2000	TRW measured product thickness and installed new absorbent socks in MW-1 and MW-5.
February 17-18, 2000	TRW conducted the semi-annual (first quarter 2000) sampling event and product removal operations. Groundwater samples were recovered from MW-1D, MW-2, MW-3, MW-4, MW-6 and MW-7.
April 4, 2000	TRW measured product thickness, installed new absorbent socks in MW-1 and MW-5, and removed excess product using a hand bailer.
April 24, 2000	TRW measured product thickness and check and/or replaced absorbent socks in MW-1 and MW-5.
June 15, 2000	TRW measured product thickness and installed new absorbent socks in MW-1 and MW-5.
July 19, 2000	TRW measured product thickness and installed new absorbent socks in MW-1 and MW-5.
August 23, 2000	TRW conducted the annual (third quarter 2000) sampling event and product removal operations. Groundwater samples were recovered from MW-1D, MW-2, MW-3, MW-4, MW-6 and MW-7.
October 3, 2000	TRW measured product thickness and installed new absorbent socks in MW-1 and MW-5.
December 14, 2001	TRW measured product thickness and installed new absorbent socks in MW-1 and MW-5.
January 23, 2001	TRW measured product thickness and installed new absorbent socks in MW-1 and MW-5.

February 8-9, 2001	TRW conducted the semi-annual (first quarter 2001) sampling event and product removal operations. Groundwater samples were recovered from MW-1D, MW-2, MW-3, MW-4, MW-6 and MW-7.
April 4, 2001	TRW measured product thickness and installed new absorbent socks in MW-1 and MW-5.
May 1, 2001	Trident Environmental acquired the Midland Texas resources of TRW, Inc.
May 16, 2001	Trident measured product thickness and installed new absorbent socks in MW-1 and MW-5.
June 19, 2001	Trident measured product thickness and installed new absorbent socks in MW-1 and MW-5.
July 20, 2001	Trident measured product thickness and installed new absorbent socks in MW-1 and MW-5.
July 30, 2001	Trident conducted the annual (third quarter 2001) sampling event and product removal operations. Groundwater samples were recovered from MW-1D, MW-2, MW-3, MW-4, MW-6 and MW-7.
September 10, 2001	Trident measured product thickness and installed new absorbent socks in MW-1 and MW-5.

3.0 Procedures

Prior to sampling, all monitoring wells (MW-1 through MW-7) were gauged for depth to groundwater using a Heron Model H.01L oil/water interface probe. Each monitoring well designated for groundwater sampling was purged using a clean, decontaminated submersible pump. Groundwater parameters, including pH, conductivity, temperature, turbidity, and dissolved oxygen (DO) were measured during the purging operation using a Horiba Model U10 multiparameter meter, and Hanna Model 9143 DO meter. A total of 286 gallons of water was purged from monitoring wells MW-1D, MW-2, MW-3, MW-4, MW-6, and MW-7 during the February 8-9, 2001 and July 30, 2001 sampling events. Groundwater samples were obtained following the purging operation using a new, decontaminated, disposable bailer.

The first sets were transferred into airtight, septum-sealed, 40-ml glass VOA sample vials with zero headspace for analysis of BTEX using EPA Method 8021B. A duplicate sample of MW-7 was collected during both sampling events. The second set of water samples were transferred into appropriately preserved containers for analysis of nitrate (NO₃) and sulfate (SO₄), to assess the efficacy of intrinsic bioremedial activity currently taking place. During the annual sampling event conducted on July 30, 2001, a third and fourth set of water samples were transferred into appropriately preserved containers for analysis of major ions (chloride, fluoride, and total dissolved solids) and WQCC metals (aluminum, arsenic, boron, chromium, iron, and manganese). A summary of purging and sampling methods is provided in Table 1 below. Chain-of-custody (COC) forms documenting sample identification numbers, collection times, and delivery times to the laboratories were completed for each set of samples. A monitoring well sampling data sheet was prepared for each well to document the parameter readings during the purge operation. The water samples were placed in an ice-filled cooler immediately after collection and shipped to Trace Analysis, Inc. of Lubbock, Texas for laboratory analysis.

Table 1					
Summary of Purging and Sampling Methods					
Monitoring Well No.	Sample Date	Purge Method	Purge Volume (gallons)	Sampling Method	Groundwater Analytes
MW-1D	02/08/01	Pump	6*	Disposable bailer	BTEX and Bio-indicators
	07/30/01	Pump	15*	Disposable bailer	BTEX, Metals, Ions, Bio-indicators
MW-2	02/08/01	Pump	30	Disposable bailer	BTEX and Bio-indicators
	07/30/01	Pump	25	Disposable bailer	BTEX, Metals, Ions, Bio-indicators
MW-3	02/08/01	Pump	30	Disposable bailer	BTEX and Bio-indicators
	07/30/01	Pump	25	Disposable bailer	BTEX, Metals, Ions, Bio-indicators
MW-4	02/08/01	Pump	25	Disposable bailer	BTEX and Bio-indicators
	07/30/01	Pump	25	Disposable bailer	BTEX, Metals, Ions, Bio-indicators
MW-6	02/08/01	Pump	30	Disposable bailer	BTEX and Bio-indicators
	07/30/01	Pump	25	Disposable bailer	BTEX, Metals, Ions, Bio-indicators
MW-7	02/09/01	Pump	25	Disposable bailer	BTEX and Bio-indicators
	07/30/01	Pump	25	Disposable bailer	BTEX, Metals, Ions, Bio-indicators
* Indicates monitoring well was bailed dry or pumped off. BTEX - benzene, toluene, ethylbenzene, xylenes WQCC Metals - Al, As, B, Cr, Fe, and Mn Ions - F, Cl, NO ₃ , SO ₄ , and TDS Bio-indicators - DO, NO ₃ , SO ₄ MW-1 and MW-5 not sampled due to presence of product.					

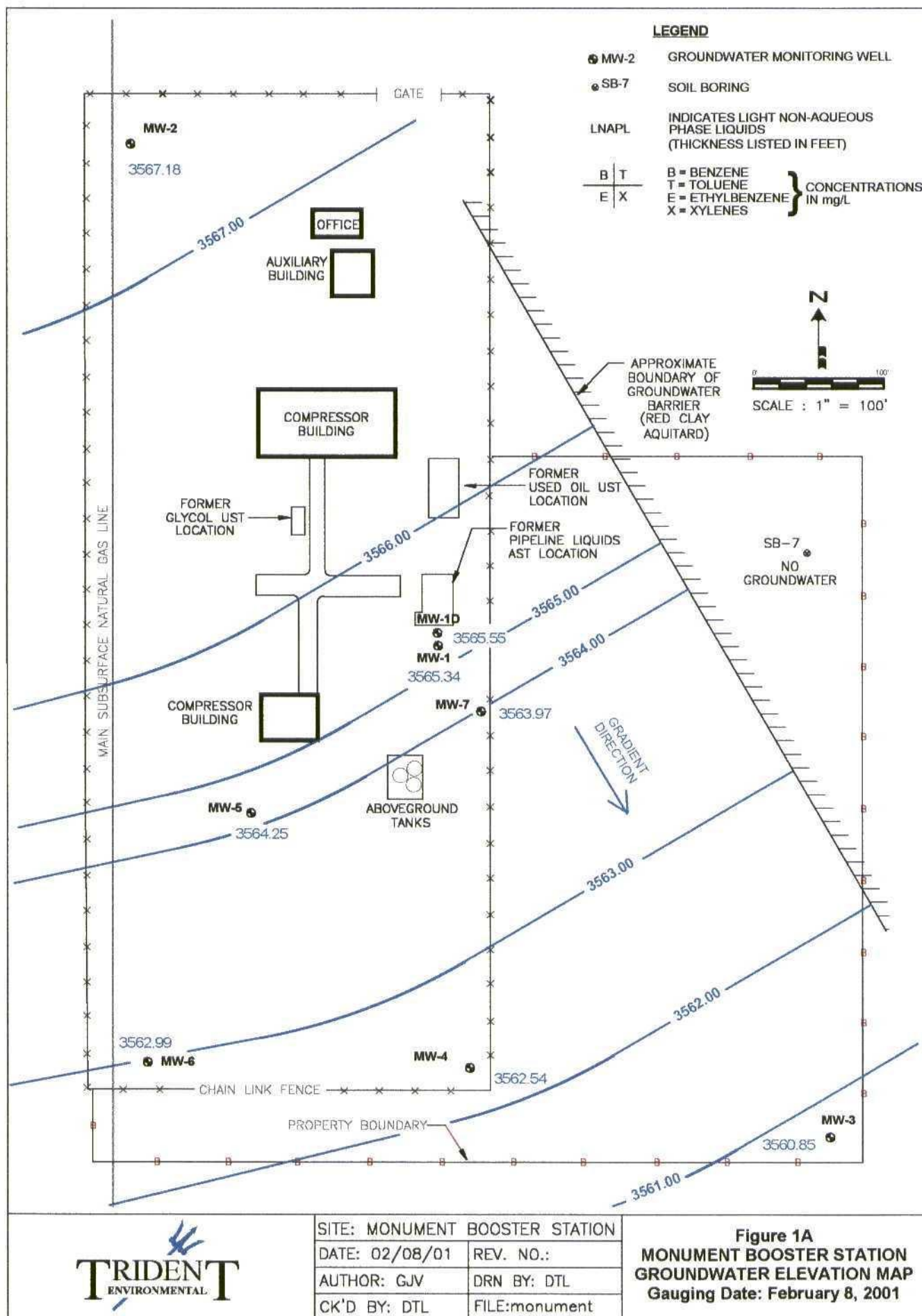
4.0 Groundwater Elevations, Hydraulic Gradient and Flow Direction

Based on the most recent gauging data collected by Trident on July 30, 2001, the groundwater conditions at the Monument Booster Station are characterized below.

- The depth to the water table across the site varies from approximately 21 to 27 feet below ground surface
- The hydraulic gradient is approximately 0.007 feet/foot
- The direction of groundwater flow is to the southeast

The direction of groundwater flow and hydraulic gradient has remained consistent for the past six and one-half years. Groundwater elevation maps depicting the water table elevation and direction of groundwater flow using the gauging data obtained during the two 2001 sampling events are presented in Figure 1A (February 8, 2001) and Figure 1B (July 30, 2001).

Figure 2 depicts the changes in groundwater elevations in monitoring wells MW-1 through MW-7 with time. Historical groundwater elevations and depth to water measurements are summarized in Table 2.



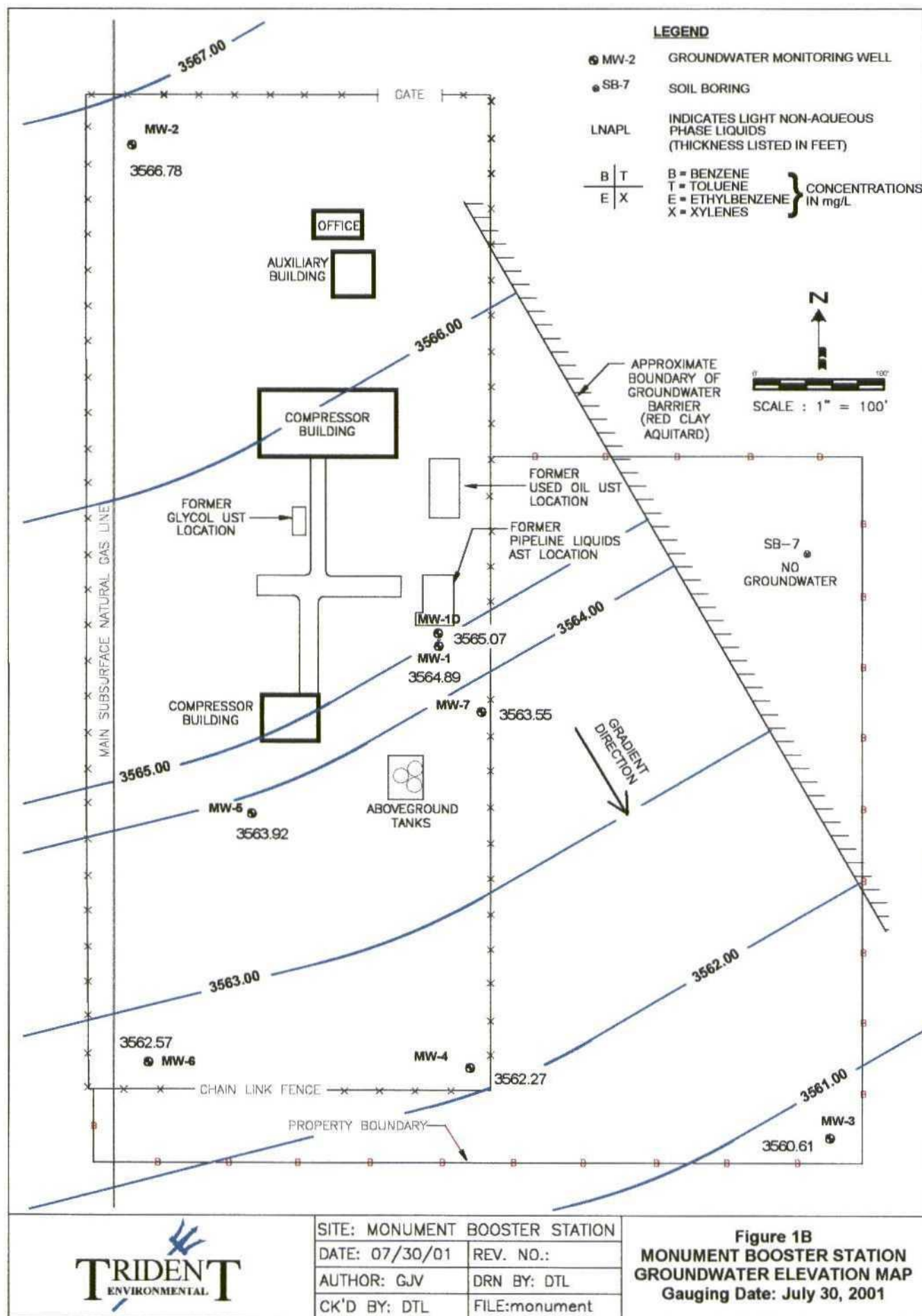
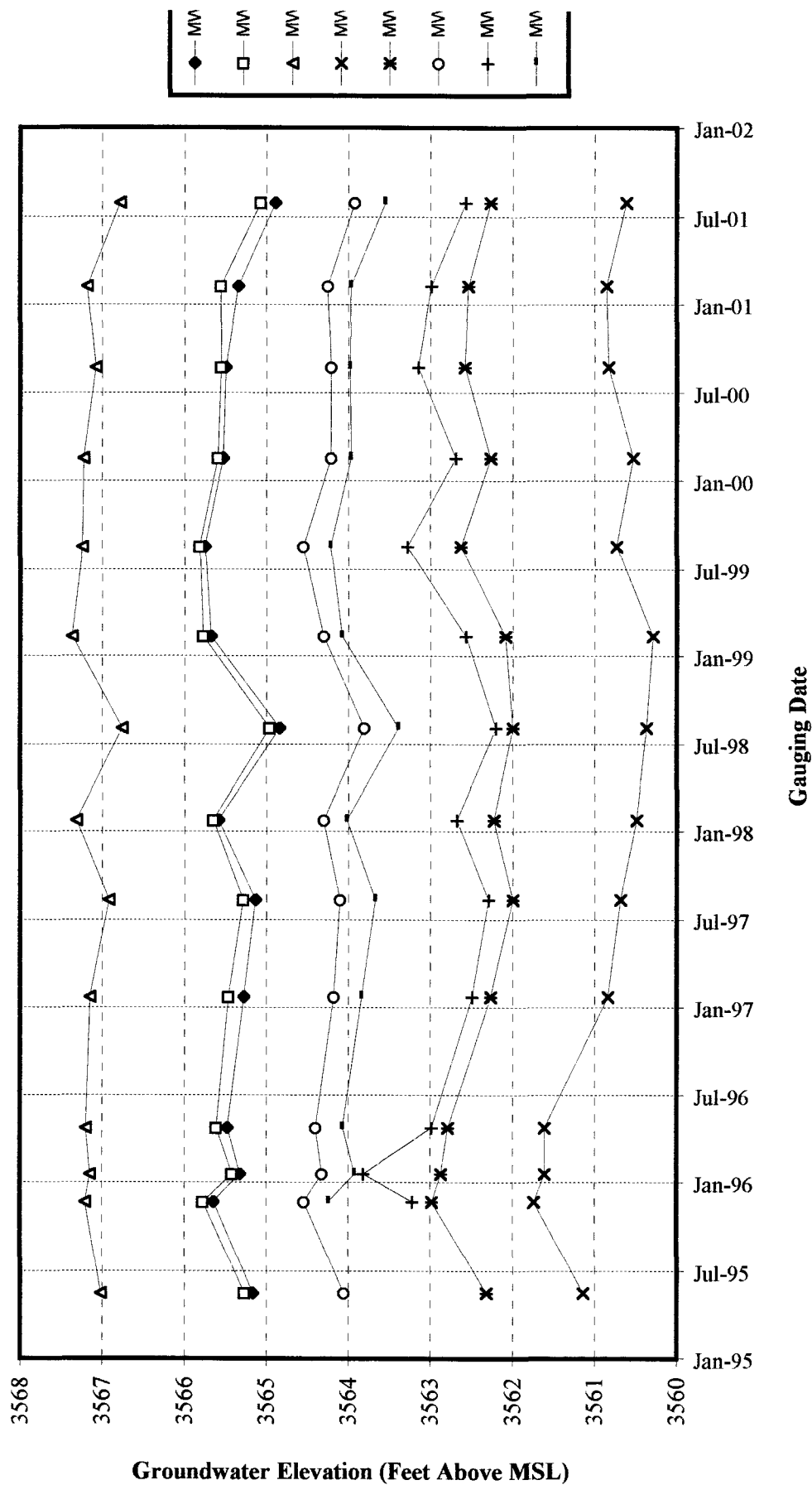


Figure 2
 Groundwater Elevation Versus Time



**Table 2
Summary of Groundwater Elevations
Monument Booster Station**

Monitoring Well Number	Gauging Date	Ground Surface Elevations (Feet)	Top of Casing Elevations (Feet)	Groundwater Depth Below Top of Casing (Feet)	Groundwater Elevation (Feet)	LNAPL Thickness (Feet)
MW-1	05/16/95	3588.85	3591.15	28.05	3565.17	2.52
	11/21/95	3588.85	3591.15	27.03	3565.65	1.86
	01/18/96	3588.85	3591.15	27.62	3565.32	2.18
	04/24/96	3588.85	3591.15	27.39	3565.47	2.09
	01/22/97	3588.85	3591.15	27.68	3565.27	2.20
	08/11/97	3588.85	3591.15	26.03	3565.14	0.02
	01/23/98	3588.85	3591.15	25.63	3565.59	0.08
	08/03/98	3588.85	3591.15	26.32	3564.84	0.01
	02/10/99	3588.85	3591.15	25.55	3565.67	0.09
	08/17/99	3588.85	3591.15	25.41	3565.75	0.01
	02/17/00	3588.85	3591.15	25.69	3565.53	0.08
	08/23/00	3588.85	3591.15	25.73	3565.49	0.09
	02/08/01	3588.85	3591.15	26.32	3565.34	0.62
	07/30/01	3588.85	3591.15	26.26	3564.89	0.10
MW-1D	05/16/95	3589.06	3591.31	26.04	3565.27	0.00
	11/21/95	3589.06	3591.31	25.54	3565.77	0.00
	01/18/96	3589.06	3591.31	25.89	3565.42	0.00
	04/24/96	3589.06	3591.31	25.70	3565.61	0.00
	01/22/97	3589.06	3591.31	25.85	3565.46	0.00
	08/11/97	3589.06	3591.31	26.03	3565.28	0.00
	01/23/98	3589.06	3591.31	25.66	3565.65	0.00
	08/03/98	3589.06	3591.31	26.35	3564.96	0.00
	02/10/99	3589.06	3591.31	25.54	3565.77	0.00
	08/17/99	3589.06	3591.31	25.50	3565.81	0.00
	02/17/00	3589.06	3591.31	25.72	3565.59	0.00
	08/23/00	3589.06	3591.31	25.76	3565.55	0.00
	02/08/01	3589.06	3591.31	25.76	3565.55	0.00
	07/30/01	3589.06	3591.31	26.24	3565.07	0.00
MW-2	05/16/95	3594.13	3596.30	29.28	3567.02	0.00
	11/21/95	3594.13	3596.30	29.09	3567.21	0.00
	01/18/96	3594.13	3596.30	29.15	3567.15	0.00
	04/24/96	3594.13	3596.30	29.10	3567.20	0.00
	01/22/97	3594.13	3596.30	29.15	3567.15	0.00
	08/11/97	3594.13	3596.30	29.38	3566.92	0.00
	01/23/98	3594.13	3596.30	28.98	3567.32	0.00
	08/03/98	3594.13	3596.30	29.54	3566.76	0.00
	02/10/99	3594.13	3596.30	28.93	3567.37	0.00
	08/17/99	3594.13	3596.30	29.06	3567.24	0.00
	02/17/00	3594.13	3596.30	29.07	3567.23	0.00
	08/23/00	3594.13	3596.30	29.22	3567.08	0.00
	02/08/01	3594.13	3596.30	29.12	3567.18	0.00
	07/30/01	3594.13	3596.30	29.52	3566.78	0.00

* Elevations initially surveyed by John W. West Engineering Company of Hobbs, NM.

The monitoring well casings were marked on the north side to provide consistent reference points for future gauging operations.

** Groundwater Elev. Corrected for LNAPL = Top of Casing Elev. - [Groundwater Depth - (SG x LNAPL Thickness)].

Groundwater direction is to the southeast with a hydraulic gradient of approximately 0.008 feet/foot.

**Table 2 (continued)
Summary of Groundwater Elevations
Monument Booster Station**

Monitoring Well Number	Gauging Date	Ground Surface Elevations (Feet)	Top of Casing Elevations (Feet)	Groundwater Depth Below Top of Casing (Feet)	Groundwater Elevation (Feet)	LNAPL Thickness (Feet)
MW-3	05/16/95	3581.46	3583.86	22.72	3561.14	0.00
	11/21/95	3581.46	3583.86	22.12	3561.74	0.00
	01/18/96	3581.46	3583.86	22.25	3561.61	0.00
	04/24/96	3581.46	3583.86	22.25	3561.61	0.00
	01/22/97	3581.46	3583.86	23.02	3560.84	0.00
	08/11/97	3581.46	3583.86	23.18	3560.68	0.00
	01/23/98	3581.46	3583.86	23.37	3560.49	0.00
	08/03/98	3581.46	3583.86	23.49	3560.37	0.00
	02/10/99	3581.46	3583.86	23.57	3560.29	0.00
	08/17/99	3581.46	3583.86	23.13	3560.73	0.00
	02/17/00	3581.46	3583.86	23.33	3560.53	0.00
	08/23/00	3581.46	3583.86	23.03	3560.83	0.00
	02/08/01	3581.46	3583.86	23.01	3560.85	0.00
	07/30/01	3581.46	3583.86	23.25	3560.61	0.00
MW-4	05/16/95	3586.10	3588.77	26.45	3562.32	0.00
	11/21/95	3586.10	3588.77	25.79	3562.98	0.00
	01/18/96	3586.10	3588.77	25.90	3562.87	0.00
	04/24/96	3586.10	3588.77	25.98	3562.79	0.00
	01/22/97	3586.10	3588.77	26.50	3562.27	0.00
	08/11/97	3586.10	3588.77	26.77	3562.00	0.00
	01/23/98	3586.10	3588.77	26.54	3562.23	0.00
	08/03/98	3586.10	3588.77	26.77	3562.00	0.00
	02/10/99	3586.10	3588.77	26.68	3562.09	0.00
	08/17/99	3586.10	3588.77	26.14	3562.63	0.00
	02/17/00	3586.10	3588.77	26.50	3562.27	0.00
	08/23/00	3586.10	3588.77	26.19	3562.58	0.00
	02/08/01	3586.10	3588.77	26.23	3562.54	0.00
	07/30/01	3586.10	3588.77	26.50	3562.27	0.00
MW-5	05/16/95	3589.62	3592.16	28.10	3564.06	0.00
	11/21/95	3589.62	3592.16	28.24	3564.54	0.76
	01/18/96	3589.62	3592.16	28.45	3564.33	0.75
	04/24/96	3589.62	3592.16	28.41	3564.40	0.79
	01/22/97	3589.62	3592.16	28.45	3564.18	0.57
	08/11/97	3589.62	3592.16	28.13	3564.10	0.09
	01/23/98	3589.62	3592.16	27.89	3564.30	0.04
	08/03/98	3589.62	3592.16	28.79	3563.80	0.53
	02/10/99	3589.62	3592.16	28.48	3564.30	0.76
	08/17/99	3589.62	3592.16	27.93	3564.55	0.39
	02/17/00	3589.62	3592.16	28.03	3564.21	0.10
	08/23/00	3589.62	3592.16	28.07	3564.21	0.15
	02/08/01	3589.62	3592.16	27.92	3564.25	0.01
	07/30/01	3589.62	3592.16	28.24	3563.92	0.02

* Elevations initially surveyed by John W. West Engineering Company of Hobbs, NM.

The monitoring well casings were marked on the north side to provide consistent reference points for future gauging operations.

** Groundwater Elev. Corrected for LNAPL = Top of Casing Elev. - [Groundwater Depth - (SG x LNAPL Thickness)].

Groundwater direction is to the southeast with a hydraulic gradient of approximately 0.008 feet/foot.

**Table 2 (continued)
Summary of Groundwater Elevations
Monument Booster Station**

Monitoring Well Number	Gauging Date	Ground Surface Elevations (Feet)	Top of Casing Elevations (Feet)	Groundwater Depth Below Top of Casing (Feet)	Groundwater Elevation (Feet)	LNAPL Thickness (Feet)
MW-6	11/16/95	3586.15	3587.93	24.71	3563.22	0.00
	01/18/96	3586.15	3587.93	24.11	3563.82	0.00
	04/24/96	3586.15	3587.93	24.94	3562.99	0.00
	01/22/97	3586.15	3587.93	25.44	3562.49	0.00
	08/11/97	3586.15	3587.93	25.64	3562.29	0.00
	01/23/98	3586.15	3587.93	25.25	3562.68	0.00
	08/03/98	3586.15	3587.93	25.73	3562.20	0.00
	02/10/99	3586.15	3587.93	25.36	3562.57	0.00
	08/17/99	3586.15	3587.93	24.65	3563.28	0.00
	02/17/00	3586.15	3587.93	25.24	3562.69	0.00
	08/23/00	3586.15	3587.93	24.78	3563.15	0.00
	02/08/01	3586.15	3587.93	24.94	3562.99	0.00
	07/30/01	3586.15	3587.93	25.36	3562.57	0.00
MW-7	11/21/95	3588.06	3589.40	25.16	3564.24	0.00
	01/18/96	3588.06	3589.40	25.48	3563.92	0.00
	04/24/96	3588.06	3589.40	25.33	3564.07	0.00
	01/22/97	3588.06	3589.40	25.56	3563.84	0.00
	08/11/97	3588.06	3589.40	25.73	3563.67	0.00
	01/23/98	3588.06	3589.40	25.38	3564.02	0.00
	08/03/98	3588.06	3589.40	26.01	3563.39	0.00
	02/10/99	3588.06	3589.40	25.32	3564.08	0.00
	08/17/99	3588.06	3589.40	25.19	3564.21	0.00
	02/17/00	3588.06	3589.40	25.43	3563.97	0.00
	08/23/00	3588.06	3589.40	25.42	3563.98	0.00
	02/08/01	3588.06	3589.40	25.43	3563.97	0.00
	07/30/01	3588.06	3589.40	25.85	3563.55	0.00

* Elevations initially surveyed by John W. West Engineering Company of Hobbs, NM.

The monitoring well casings were marked on the north side to provide consistent reference points for future gauging operations.

** Groundwater Elev. Corrected for LNAPL = Top of Casing Elev. - [Groundwater Depth - (SG x LNAPL Thickness)].

Groundwater direction is to the southeast with a hydraulic gradient of approximately 0.008 feet/foot.

5.0 Groundwater Quality Conditions

5.1 Distribution of Hydrocarbons in Groundwater

A historical listing of BTEX concentrations obtained from the sampled monitoring wells is summarized in Table 3. Hydrocarbon concentration maps depicting the BTEX concentrations for the two 2001 sampling events are presented in Figure 3A (February 8-9, 2001) and Figure 3B (July 30, 2001). Figure 4 is a graph that depicts the historic benzene concentrations in the groundwater versus time over the life of the monitoring project. Figure 5 is a graph that depicts the historic BTEX concentrations in the groundwater versus time at MW-7. Based on the most recent analytical data for samples collected by Trident on July 30, 2001, the distribution of hydrocarbons at the Monument Booster Station is described below.

- BTEX concentrations in monitoring wells MW-1D, MW-2, MW-3, MW-4, and MW-6 are presently below the New Mexico WQCC standards. With the exception of the August 1999 sample recovered from MW-2 and the August 1999 and February 2000 samples recovered from MW-3, the BTEX concentrations in each of these wells have remained below the WQCC standard levels since 1995.
- Only the benzene concentrations from the current and historic groundwater samples recovered from MW-7 exceed the WQCC standard. These levels however appear to be decreasing over the last five semi-annual monitoring events with short-term fluctuations that seem to correspond to changes in the water table elevation.

5.2 Distribution of Dissolved WQCC Metals and Ions in Groundwater

Historical groundwater sample analytical results for metals and ions are presented in Tables 4. The WQCC standards are listed in the tables for comparison and constituents with concentrations above the WQCC standards are highlighted in boldface type. The laboratory reports and COC documentation are included in Appendix A. A graph that depicts the historic concentrations of total dissolved solids (TDS) versus time is provided in Figures 6.

The WQCC metal results for the 2001 annual sampling event indicate no constituents exceeded the WQCC standards with the exception of manganese in MW-1D, MW-6, and MW-7, and iron in MW-7. These elevated levels may be due to the reduced chemical environment caused by the presence of dissolved hydrocarbons. Under this condition, certain metal ions (particularly manganese and iron) have a greater affinity to go into the dissolved state. In addition, iron and manganese are byproducts from natural biodegradation processes, thus resulting in higher concentrations. In contrast, monitoring wells MW-2, MW-3, and MW-4 contain very low concentrations of iron or manganese. Based on the results of the metal analyses during the 2001 annual sampling event, the groundwater in the site area is not adversely affected or impacted with dissolved metals.

The major ion analyses for the 2001 annual sampling event indicate that no constituents exceeded the WQCC standards with the exception of chloride in MW-2, fluoride in MW-1D, MW-2, MW-3, MW-4, MW-6, and MW-7, and TDS in MW-2. Fluoride concentrations during the 2001 annual sampling event remain near (or slightly above) the WQCC standard of 1.6 mg/L. Since fluoride is not a constituent for the gas processing activities on site, its presence is likely due to natural conditions as it is a common naturally

occurring compound in groundwater (USGS Water-Supply Paper 2254, 1989, pgs.120-123). Chloride and TDS concentrations in MW-2 have increased since August 1998 and may indicate a potential upgradient release of produced water northwest of the Monument Booster Station.

Table 3
Summary of Dissolved BTEX Concentrations
Monument Booster Station

Monitoring Well	Sampling Date	Benzene (mg/L)	Toluene (mg/L)	Ethylbenzene (mg/L)	Xylenes (mg/L)
MW-1D	05/16/95	0.018	0.006	0.015	0.016
	11/15/95	0.003	<0.001	0.002	0.001
	01/18/96	0.004	<0.001	0.003	0.009
	04/24/96	<0.001	<0.001	<0.001	<0.001
	01/22/97	0.001	<0.001	0.001	<0.001
	08/11/97	<0.001	<0.001	<0.001	<0.001
	01/23/98	<0.001	<0.001	<0.001	<0.001
	08/03/98	<0.001	<0.001	<0.001	<0.001
	02/10/99	<0.001	<0.001	<0.001	<0.001
	08/17/99	<0.001	<0.001	<0.001	<0.001
	02/18/00	0.002	<0.001	0.003	0.001
	08/23/00	<0.005	<0.005	<0.005	<0.005
	02/09/01	<0.001	<0.001	<0.001	0.001
	07/30/01	<0.001	<0.001	<0.001	<0.001
MW-2	05/16/95	<0.001	<0.001	<0.001	<0.001
	11/15/95	0.044*	0.002*	0.006*	0.009*
	01/18/96	<0.001	<0.001	<0.001	<0.001
	04/24/96	<0.001	<0.001	<0.001	<0.001
	01/22/97	<0.001	<0.001	<0.001	<0.001
	08/11/97	<0.001	<0.001	<0.001	<0.001
	01/23/98	<0.001	<0.001	<0.001	<0.001
	08/03/98	<0.001	<0.001	<0.001	<0.001
	02/10/99	<0.001	<0.001	<0.001	<0.001
	08/17/99	0.017	0.013	0.002	0.003
	02/18/00	<0.001	<0.001	<0.001	<0.001
	08/23/00	<0.001	<0.001	<0.001	<0.001
	02/08/01	<0.001	<0.001	<0.001	<0.001
	07/30/01	<0.001	<0.001	<0.001	<0.001
MW-3	05/16/95	<0.001	<0.001	<0.001	<0.001
	11/15/95	<0.001	<0.001	<0.001	<0.001
	01/18/96	<0.001	<0.001	<0.001	<0.001
	04/24/96	<0.001	<0.001	<0.001	<0.001
	01/22/97	<0.001	<0.001	<0.001	<0.001
	08/11/97	<0.001	<0.001	<0.001	<0.001
	01/23/98	<0.001	<0.001	<0.001	<0.001
	08/03/98	0.007	<0.001	<0.001	<0.001
	02/10/99	<0.005	<0.005	<0.005	<0.005
	08/17/99	0.043	<0.005	<0.005	<0.005
	02/17/00	0.021	<0.005	<0.005	<0.005
	08/23/00	0.006	<0.005	<0.005	<0.005
	02/08/01	0.004	0.002	0.001	0.005
	07/30/01	0.002	<0.001	<0.001	<0.001
WQCC Standards		0.010	0.75	0.75	0.62

Analyses performed by Trace Analysis, Inc., Lubbock, Texas.
 All samples analyzed for BTEX using EPA Method 8020 except for samples obtained on May 16, 1995 (EPA Method 8240).
 Values listed in **boldface** type indicate concentrations exceed New Mexico Water Quality Control Commission (WQCC) standards.
 Monitoring wells MW-1 and MW-5 (after May 16, 1995) were not sampled (due to presence of LNAPL).
 * BTEX cross-contamination occurred on samples obtained from monitoring wells MW-2 & MW-4 during the 11/15/95 sampling event.

**Table 3 (continued)
Summary of Dissolved BTEX Concentrations
Monument Booster Station**

Monitoring Well	Sampling Date	Benzene (mg/L)	Toluene (mg/L)	Ethylbenzene (mg/L)	Xylenes (mg/L)
MW-4	05/16/95	<0.001	<0.001	<0.001	<0.001
	11/15/95	0.045*	0.002*	0.006*	0.010*
	01/18/96	0.003	<0.001	<0.001	<0.001
	04/24/96	<0.002	<0.002	<0.002	<0.002
	01/22/97	0.002	<0.001	<0.001	<0.001
	08/11/97	0.001	<0.001	<0.001	<0.001
	01/23/98	<0.001	<0.001	<0.001	<0.001
	08/03/98	<0.001	<0.001	<0.001	<0.001
	02/10/99	<0.001	<0.001	<0.001	<0.001
	08/17/99	<0.001	<0.001	<0.001	0.001
	02/18/00	<0.005	<0.005	<0.005	<0.005
	08/23/00	<0.005	<0.005	<0.005	<0.005
	02/08/01	0.002	<0.001	<0.001	0.002
	07/30/01	<0.001	<0.001	<0.001	<0.001
MW-5	05/16/95	0.265	0.009	0.261	0.050
MW-6	11/16/95	0.003	<0.001	0.001	0.003
	01/17/96	0.002	<0.001	<0.001	<0.001
	04/24/96	<0.001	<0.001	<0.001	<0.001
	01/22/97	0.001	<0.001	<0.001	<0.001
	08/11/97	<0.001	<0.001	<0.001	0.001
	01/23/98	<0.001	<0.001	<0.001	<0.001
	08/03/98	<0.001	<0.001	<0.001	<0.001
	02/10/99	<0.001	<0.001	<0.001	0.014
	08/17/99	0.002	<0.001	<0.001	0.012
	02/18/00	<0.001	<0.001	0.004	0.006
	08/23/00	<0.001	<0.001	0.004	0.011
	02/08/01	<0.001	<0.001	<0.001	0.011
	07/30/01	<0.001	<0.001	<0.001	<0.001
MW-7	11/15/95	0.465	<0.001	0.205	0.163
	01/17/96	1.130	0.003	0.476	0.365
	04/24/96	0.585	<0.002	0.251	0.013
	01/22/97	0.896	<0.005	0.240	0.330
	08/11/97	0.317	0.020	0.155	0.049
	01/23/98	0.876	<0.005	0.486	0.181
	08/03/98	0.094	<0.005	0.064	0.007
	02/10/99	0.597	<0.005	0.440	0.120
	08/17/99	0.705	<0.005	0.060	0.556
	02/18/00	0.573	<0.005	0.490	0.226
	08/23/00	0.546	0.006	0.484	0.177
	02/09/01	0.355	<0.005	0.424	0.052
	07/30/01	0.017	<0.005	0.058	<0.005
WQCC Standards		0.010	0.75	0.75	0.62

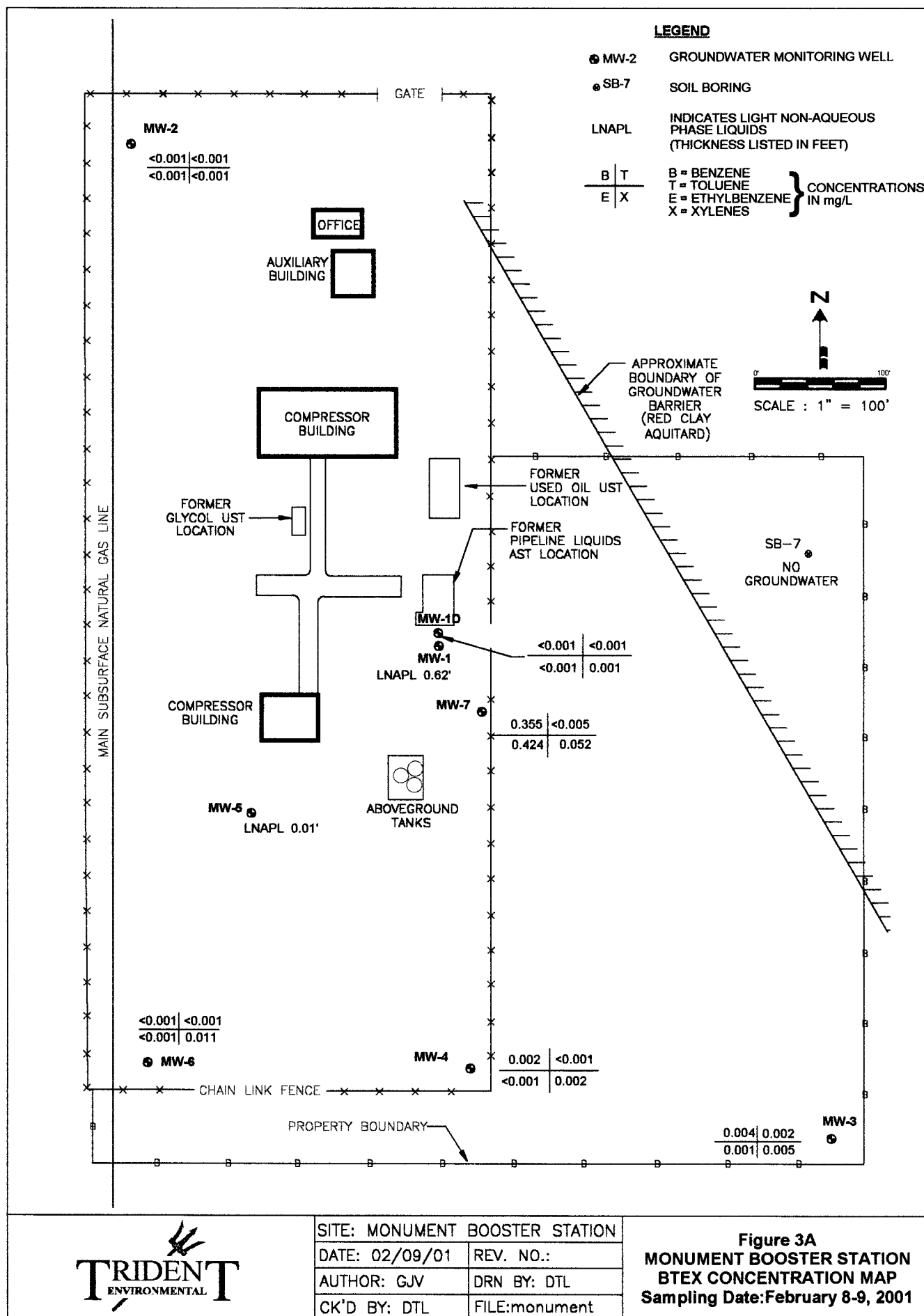
Analyses performed by Trace Analysis, Inc., Lubbock, Texas.

All samples analyzed for BTEX using EPA Method 8020 except for samples obtained on May 16, 1995 (EPA Method 8240).

Values listed in **boldface** type indicate concentrations exceed New Mexico Water Quality Control Commission (WQCC) standards.

Monitoring wells MW-1 and MW-5 (after May 16, 1995) were not sampled (due to presence of LNAPL).

* BTEX cross-contamination occurred on samples obtained from monitoring wells MW-2 & MW-4 during the 11/15/95 sampling event.



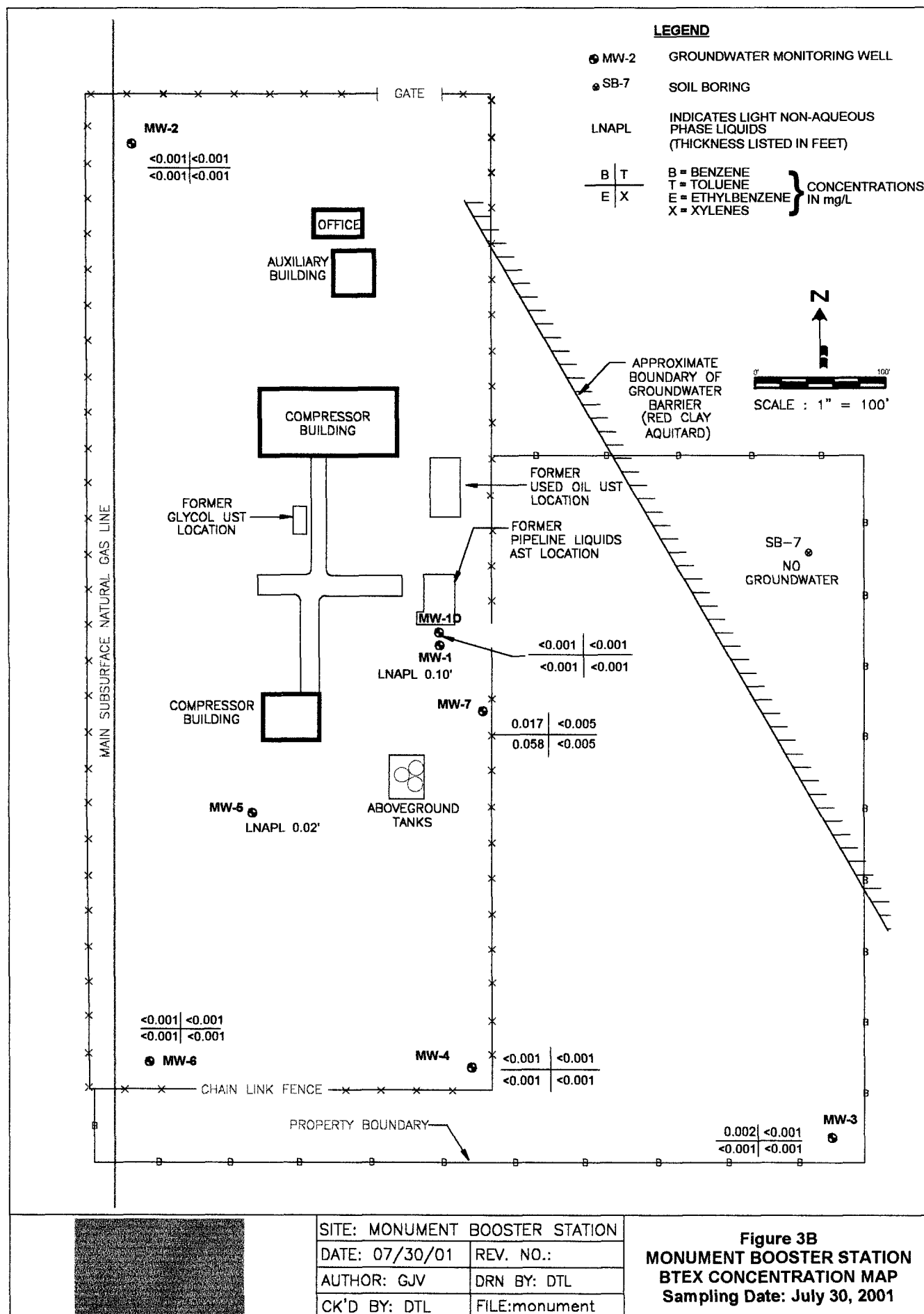


Figure 4
 Benzene Versus Time

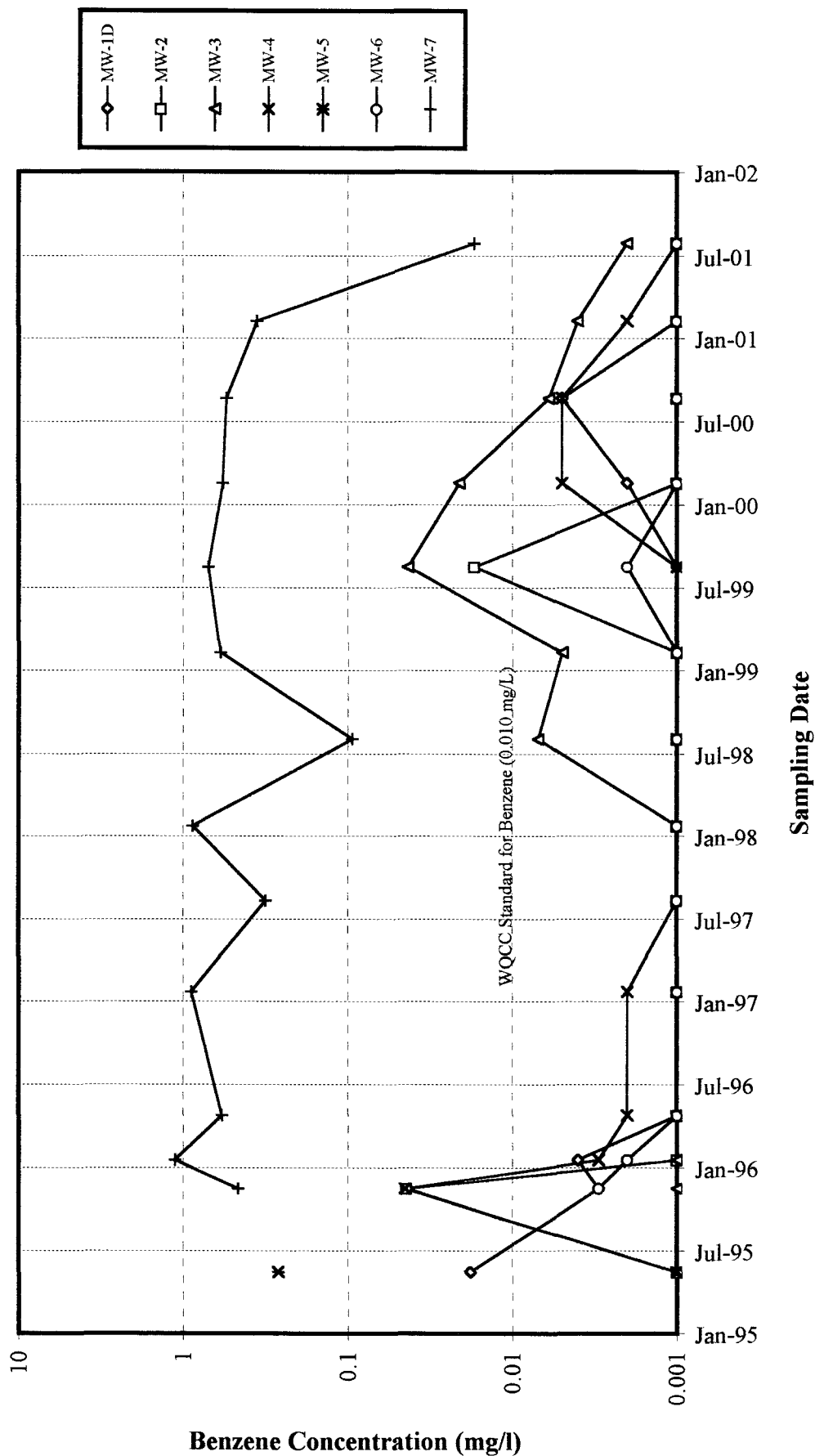


Figure 5
 BTEX Concentrations and Groundwater Elevation vs Time (MW-7)

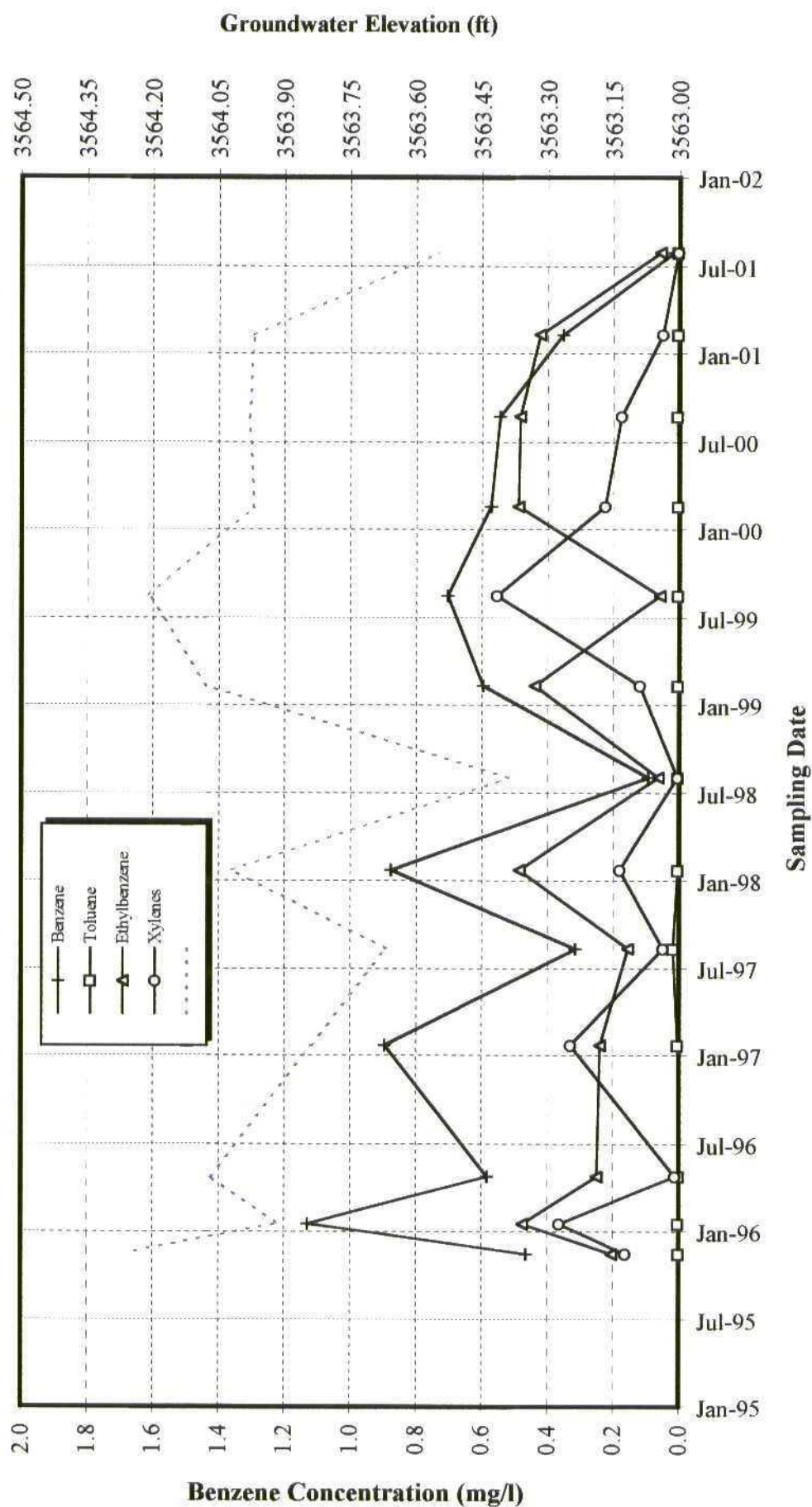


Table 4
Summary of Metal and Major Ion Analytical Results

Constituent	Date	MW-1 (mg/L)	MW-1D (mg/L)	MW-2 (mg/L)	MW-3 (mg/L)	MW-4 (mg/L)	MW-5 (mg/L)	MW-6 (mg/L)	MW-7 (mg/L)	WQCC Standards (mg/L)
Aluminum (Al)	05-16-96	0.55	1.34	13.10	0.88	8.04	0.24	---	---	5
	04-24-96	NS	0.2	<0.2	<0.2	<0.2	NS	0.2	0.3	
	08-11-97	NS	<0.2	0.32	<0.2	<0.2	NS	0.23	<0.2	
	08-03-98	NS	<0.1	0.17	1.7	0.10	NS	<0.1	0.14	
	08-17-99	NS	<0.1	<0.1	<0.1	<0.1	NS	<0.1	<0.1	
	08-23-00	NS	<0.2	<0.2	<0.2	<0.2	NS	<0.2	<0.2	
	07-30-01	NS	<0.1	<0.1	<0.1	<0.1	NS	<0.1	<0.1	
Arsenic (As)	05-16-96	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	---	---	0.1
	04-24-96	NS	0.012	0.011	0.019	0.008	NS	0.238	0.004	
	08-11-97	NS	<0.1	<0.1	<0.1	<0.1	NS	<0.1	<0.1	
	08-03-98	NS	<0.1	<0.1	<0.1	<0.1	NS	<0.1	<0.1	
	08-17-99	NS	<0.1	<0.1	<0.1	<0.1	NS	<0.1	<0.1	
	08-23-00	NS	<0.05	<0.05	<0.05	<0.05	NS	<0.05	0.06	
	07-30-01	NS	<0.05	<0.05	<0.05	<0.05	NS	<0.05	0.07	
Boron (B)	05-16-96	0.85	0.22	0.37	0.09	0.14	0.39	---	---	0.75
	04-24-96	NS	0.11	0.38	<0.03	0.06	NS	0.22	0.6	
	08-11-97	NS	<0.2	<0.2	<0.2	<0.2	NS	0.79	<0.2	
	08-03-98	NS	<0.75	<0.75	<0.75	<0.75	NS	<0.75	<0.75	
	08-17-99	NS	0.15	0.23	0.19	0.21	NS	0.38	0.85	
	07-30-01	NS	0.14	0.18	0.16	0.18	NS	0.38	0.35	

Analyses performed by Trace Analysis, Inc. using EPA Methods 200.7, 239.2, 270.2, 272.2, 6010B, 160.1 and 300.

Standards **Bold** values indicate concentrations exceed WQCC groundwater standards as listed as specified in Regulation 3-103.

NS Indicates monitoring well was not sampled (due to presence of free product).

--- Indicates monitoring well was installed after this sampling date.

Samples were not filtered on 05-17-95, therefore results indicate total (dissolved and undissolved) metal concentrations.

Samples were filtered with a 45 mm element between 04-24-96 and 07-31-01 therefore results indicate dissolved metal concentrations.

Table 4 (continued)
Summary of Metal and Major Ion Analytical Results

Table 4 (continued)										
Summary of Metal and Major Ion Analytical Results										
Constituent	Date	MW-1 (mg/L)	MW-1D (mg/L)	MW-2 (mg/L)	MW-3 (mg/L)	MW-4 (mg/L)	MW-5 (mg/L)	MW-6 (mg/L)	MW-7 (mg/L)	WQCC Standards (mg/L)
Chromium (Cr)	05-16-96	0.01	<0.01	0.02	0.01	0.02	0.02	---	---	0.05
	04-24-96	NS	<0.05	0.06	<0.05	<0.05	NS	0.06	<0.05	
	08-11-97	NS	<0.05	<0.05	<0.05	<0.05	NS	<0.05	<0.05	
	08-03-98	NS	<0.05	<0.05	<0.05	<0.05	NS	<0.05	<0.05	
	08-17-99	NS	<0.05	<0.05	<0.05	<0.05	NS	<0.05	<0.05	
	08-23-00	NS	<0.01	0.02	<0.01	<0.01	NS	<0.01	<0.01	
	07-30-01	NS	<0.01	0.02	<0.01	<0.01	NS	<0.01	<0.01	
Iron (Fe)	05-16-96	25.58	4.6	5.82	0.53	4.68	1.75	---	---	1
	04-24-96	NS	0.06	0.07	0.17	0.08	NS	0.15	<0.03	
	08-11-97	NS	0.28	0.24	0.14	0.08	NS	0.21	0.43	
	08-03-98	NS	<0.1	<0.1	0.55	<0.1	NS	0.26	6.1	
	08-17-99	NS	0.19	<0.1	<0.1	<0.1	NS	0.42	8.1	
	08-23-00	NS	0.20	<0.05	<0.05	<0.05	NS	<0.05	7.4	
	07-30-01	NS	0.21	<0.05	<0.05	<0.05	NS	0.36	5.3	
Manganese (Mn)	05-16-96	0.67	0.31	0.12	0.08	0.11	0.58	---	---	0.2
	04-24-96	NS	0.37	<0.01	<0.01	<0.01	NS	0.28	0.38	
	08-11-97	NS	0.35	<0.01	<0.01	<0.01	NS	0.30	0.37	
	08-03-98	NS	0.22	<0.1	<0.1	<0.1	NS	0.36	0.41	
	08-17-99	NS	0.18	<0.1	<0.1	<0.1	NS	0.27	0.19	
	08-23-00	NS	0.20	<0.01	<0.01	0.03	NS	0.34	0.22	
	07-30-01	NS	0.20	<0.025	0.03	0.07	NS	0.34	0.33	
Analyses performed by Trace Analysis, Inc. using EPA Methods 200.7, 239.2, 270.2, 272.2, 6010B, 160.1 and 300.										
Standards Bold values indicate concentrations exceed WQCC groundwater standards as listed as specified in Regulation 3-103.										
NS Indicates monitoring well was not sampled (due to presence of free product).										
--- Indicates monitoring well was installed after this sampling date.										
Samples were not filtered on 05-17-95, therefore results indicate total (dissolved and undissolved) metal concentrations.										
Samples were filtered with a 45 mm element between 04-24-96 and 07-30-01 therefore results indicate dissolved metal concentrations.										

Table 4 (continued)
Summary of Metal and Major Ion Analytical Results

Constituent	Date	MW-1 (mg/L)	MW-1D (mg/L)	MW-2 (mg/L)	MW-3 (mg/L)	MW-4 (mg/L)	MW-5 (mg/L)	MW-6 (mg/L)	MW-7 (mg/L)	WQCC Standards (mg/L)
Chloride (Cl)	05-16-95	NS	77	812	188	152	80	---	---	250
	04-24-96	NS	124	314	134	167	NS	186	143	
	08-11-97	NS	180	200	140	140	NS	160	180	
	08-03-98	NS	120	240	160	160	NS	150	160	
	08-17-99	NS	91	1,000	190	170	NS	160	120	
	08-23-00	NS	65	1,800	190	150	NS	140	74	
	07-30-01	NS	59	1,790	183	146	NS	123	67	
Fluoride (F)	05-16-95	NS	1.8	1.1	1.8	1.2	1.4	---	---	1.6
	04-24-96	NS	1.6	1.1	1.5	1.1	NS	0.9	1.8	
	08-11-97	NS	1.9	1.3	1.5	1.1	NS	0.85	1.8	
	08-03-98	NS	2.4	1.8	1.6	1.3	NS	1.3	1.8	
	08-17-99	NS	2.7	1.7	2.0	1.5	NS	1.5	2.7	
	08-23-00	NS	2.9	1.8	2.0	1.8	NS	1.8	2.7	
	07-30-01	NS	3.0	1.9	2.1	1.9	NS	2.0	2.5	
Nitrate (NO ₃ -N)	05-16-95	NS	1.37	7.42	5.62	3.69	0.56	---	---	10.0
	04-24-96	NS	<0.1	0.3	0.3	0.1	NS	<0.1	<0.1	
	08-11-97	NS	<1.0	9	9.4	<1.0	NS	<1.0	<1.0	
	01-23-98	NS	2.8	30	15	1	NS	0.28	0.39	
	08-03-98	NS	4.0	4.0	4.0	2.9	NS	<1.0	<1.0	
	08-17-99	NS	3.8	4.0	3.5	2.5	NS	<1.0	<1.0	
	08-23-00	NS	3.4	2.0	3.3	2.6	NS	<0.1	<1.0	
	07-30-01	NS	2.1	2.6	1.8	1.1	NS	<1.0	<1.0	

Analyses performed by Trace Analysis, Inc. using EPA Methods 200.7, 239.2, 270.2, 272.2, 6010B, 160.1 and 300.

Standards **Bold** values indicate concentrations exceed WQCC groundwater standards as listed as specified in Regulation 3-103.

NS Indicates monitoring well was not sampled (due to presence of free product).

--- Indicates monitoring well was installed after this sampling date.

Samples were not filtered on 05-17-95, therefore results indicate total (dissolved and undissolved) metal concentrations.

Samples were filtered with a 45 mm element between 04-24-96 and 07-30-01 therefore results indicate dissolved metal concentrations.

Table 4 (continued)
Summary of Metal and Major Ion Analytical Results

Constituent	Date	MW-1 (mg/L)	MW-1D (mg/L)	MW-2 (mg/L)	MW-3 (mg/L)	MW-4 (mg/L)	MW-5 (mg/L)	MW-6 (mg/L)	MW-7 (mg/L)	WQCC Standards (mg/L)
Sulfate (SO ₄)	05-16-95	NS	174	509	115	136	67	---	---	600
	04-24-96	NS	169	443	95	115	NS	70	149	
	08-11-97	NS	110	290	75	96	NS	37	76	
	01-23-98	NS	190	230	240	180	NS	230	180	
	08-03-98	NS	100	220	80	100	NS	45	90	
	08-17-99	NS	120	150	84	120	NS	82	14	
	08-23-00	NS	98	110	72	100	NS	57	19	
	07-30-01	NS	93	116	67	92	NS	63	66	
Total Dissolved Solids (TDS)	05-16-95	NS	634	1,478	516	716	692	---	---	1,000
	04-24-96	NS	702	1,318	598	759	NS	929	828	
	08-11-97	NS	770	1,100	670	800	NS	810	860	
	08-03-98	NS	640	930	640	750	NS	870	800	
	08-17-99	NS	790	2,700	830	790	NS	920	850	
	08-23-00	NS	560	3,300	770	780	NS	900	790	
	07-30-01	NS	548	4,420	844	791	NS	907	658	

Analyses performed by Trace Analysis, Inc. using EPA Methods 200.7, 239.2, 270.2, 272.2, 6010B, 160.1 and 300.

Standards **Bold** values indicate concentrations exceed WQCC groundwater standards as listed as specified in Regulation 3-103.

NS Indicates monitoring well was not sampled (due to presence of free product).

--- Indicates monitoring well was installed after this sampling date.

Samples were not filtered on 05-17-95, therefore results indicate total (dissolved and undissolved) metal concentrations.

Samples were filtered with a 45 mm element between 04-24-96 and 07-30-01 therefore results indicate dissolved metal concentrations.

Figure 6
 TDS, Chloride, and Sulfate Concentrations Versus Time (MW-2)

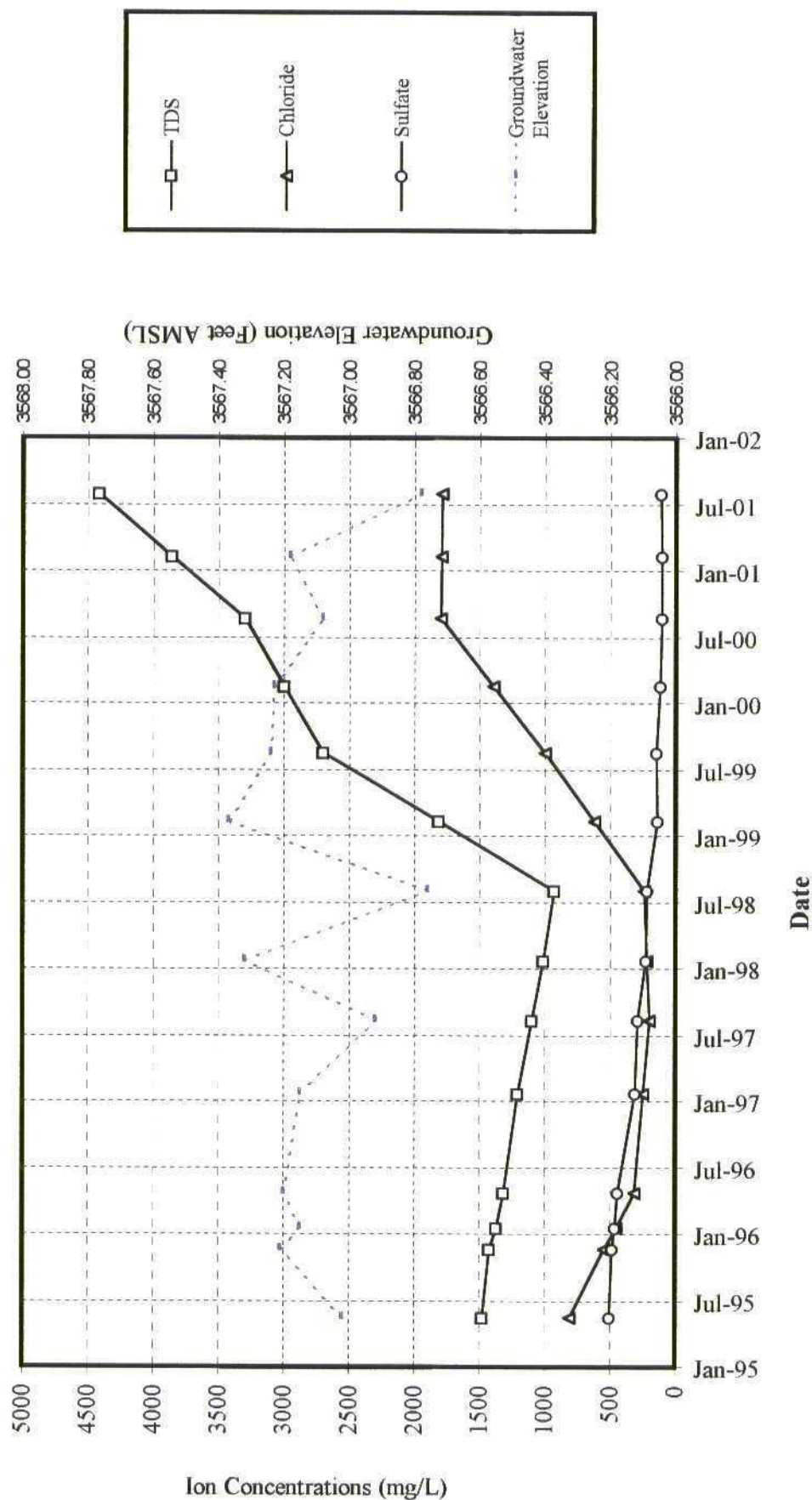


Figure 7
 Dissolved Oxygen Concentrations Versus Time

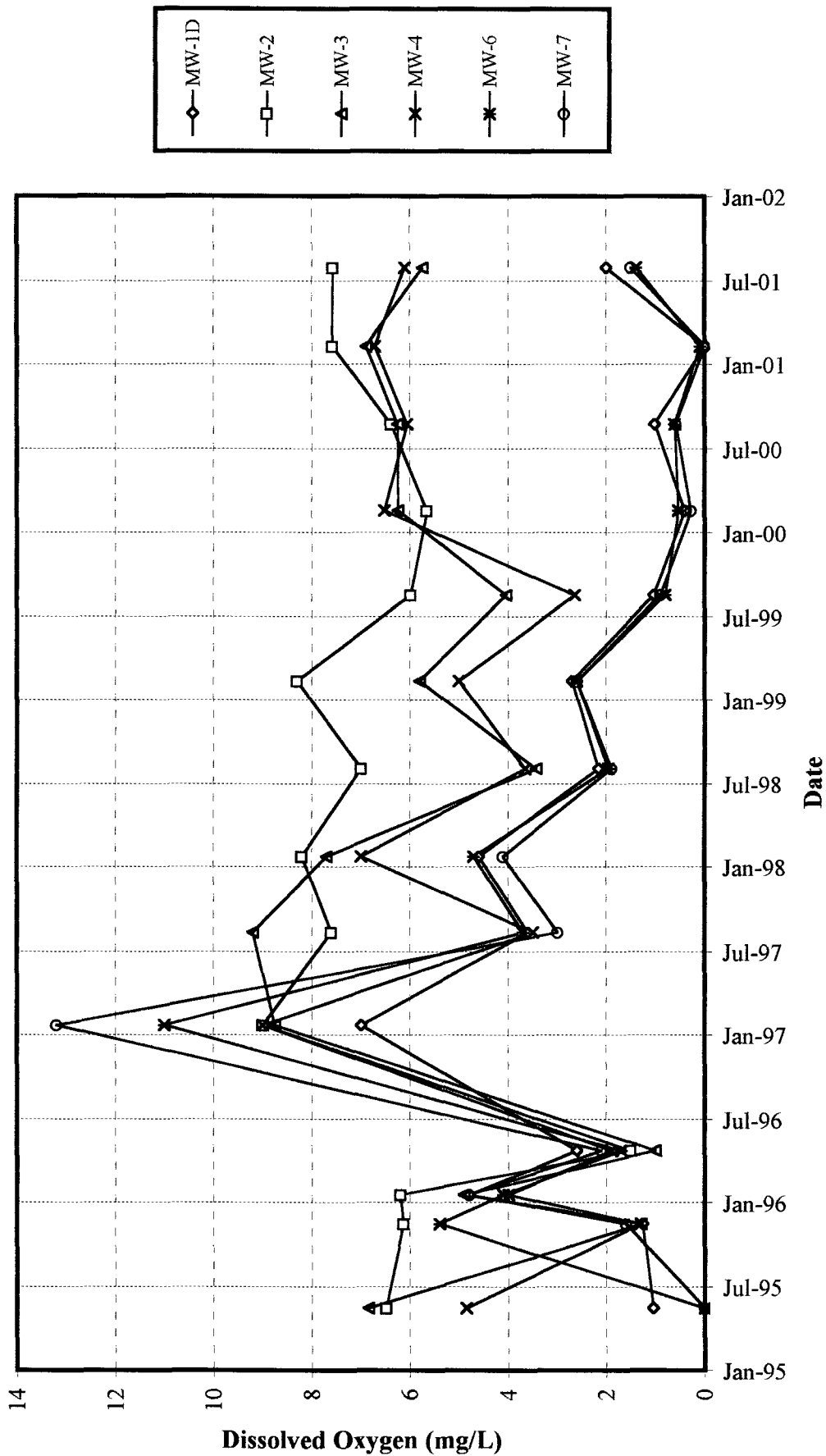


Figure 8
 Nitrate Concentrations Versus Time

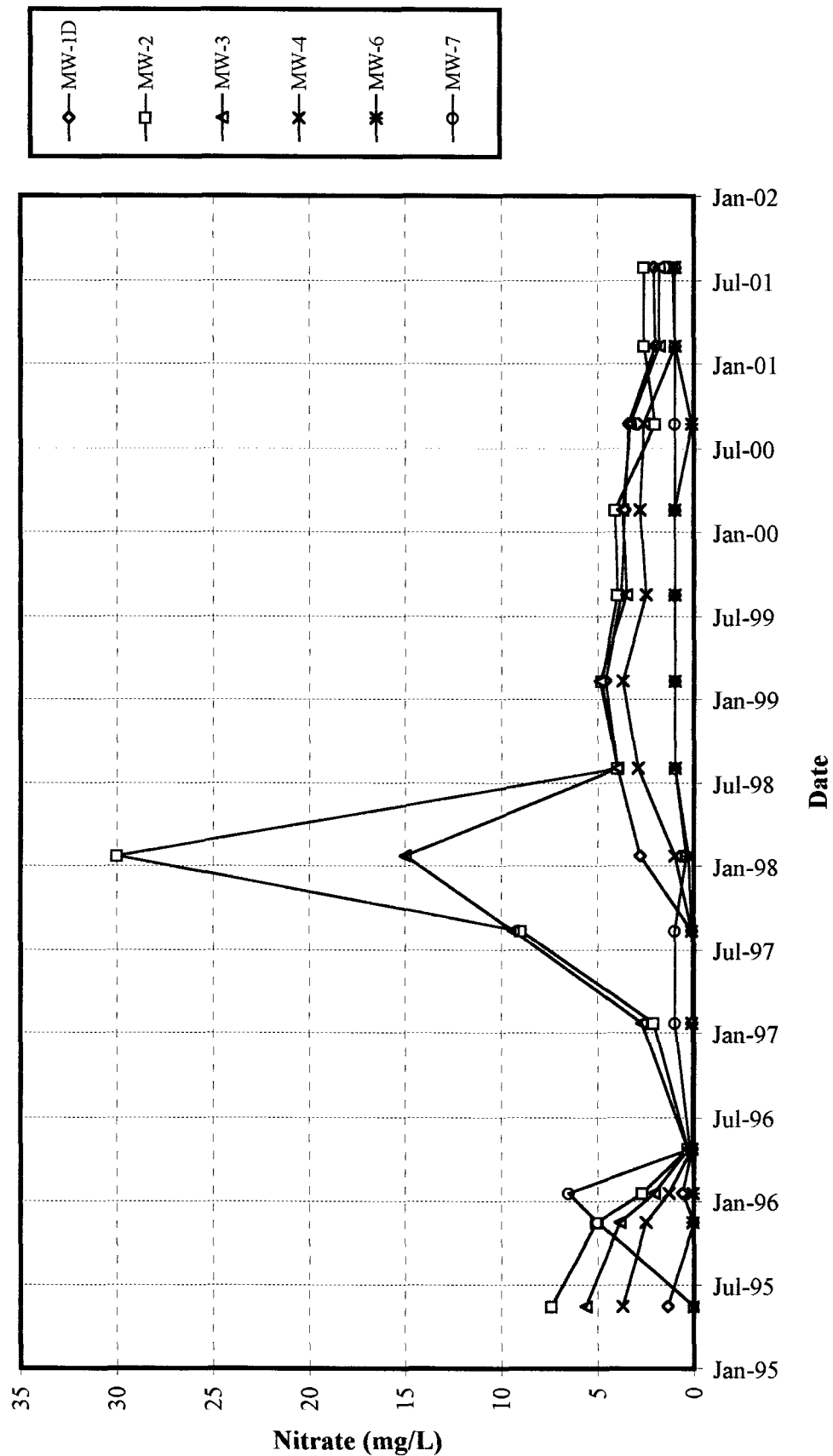


Figure 9
 Sulfate Concentrations Versus Time

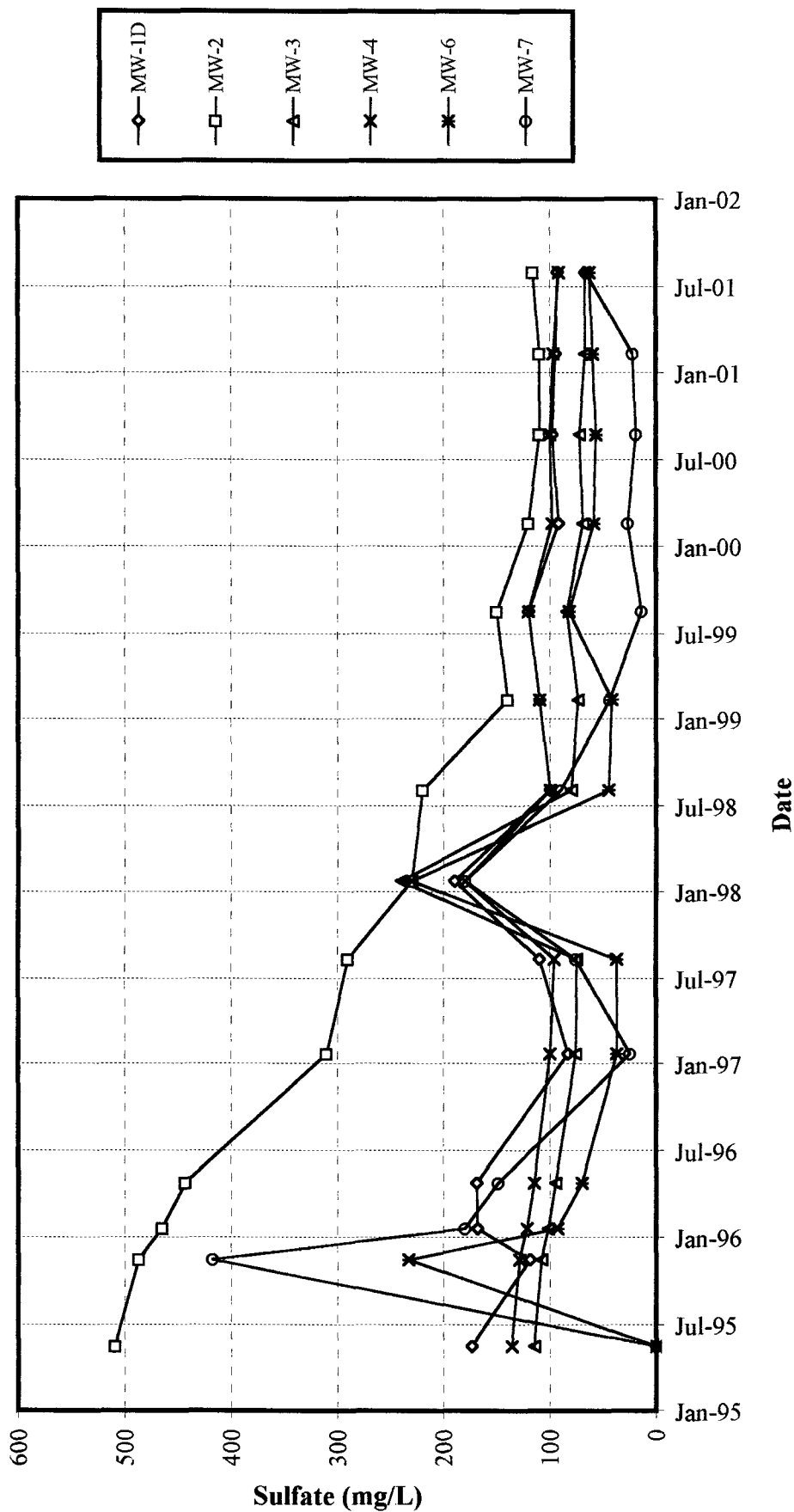


Figure 10
 Total Dissolved Iron Concentrations Versus Time

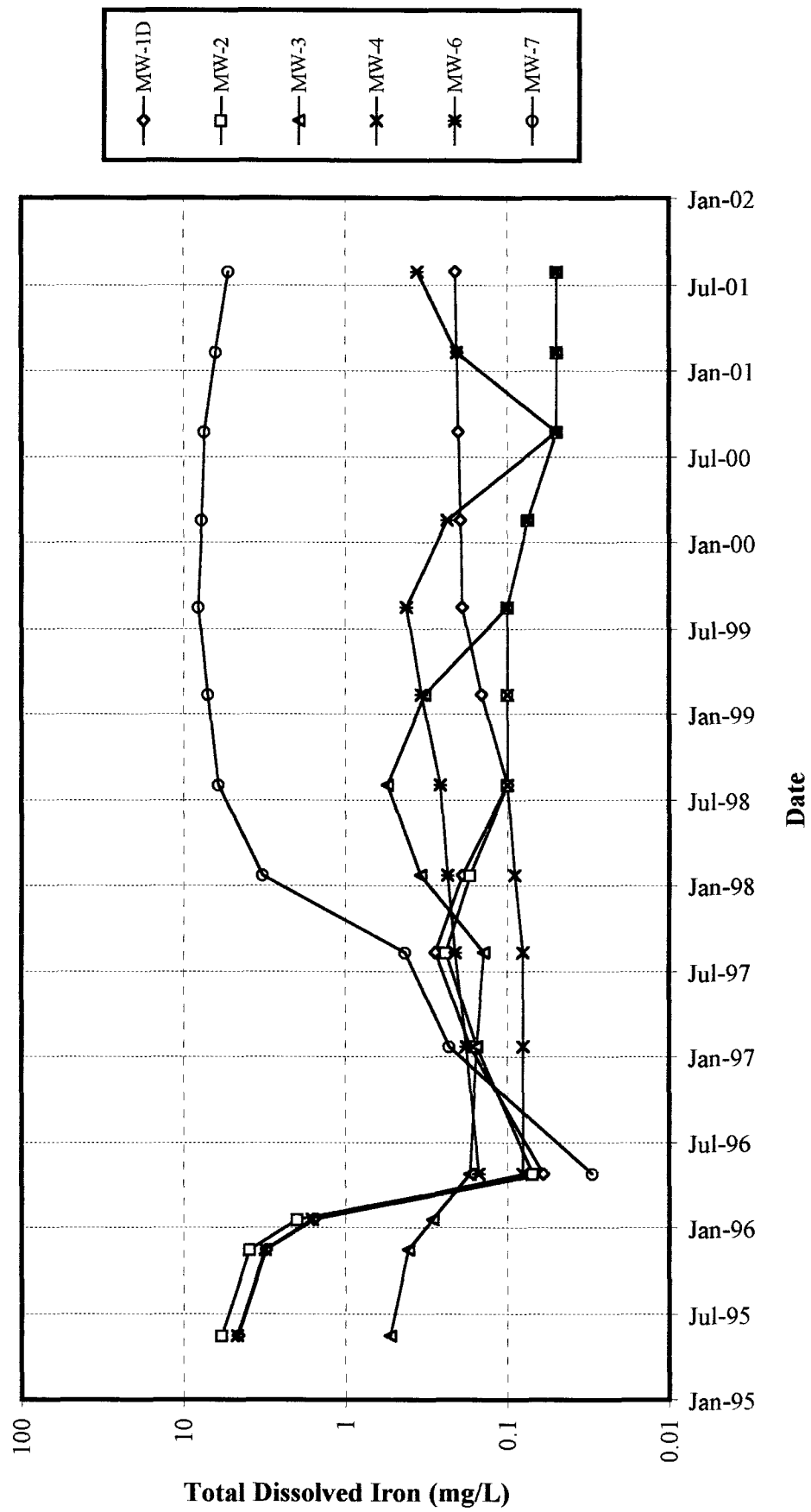
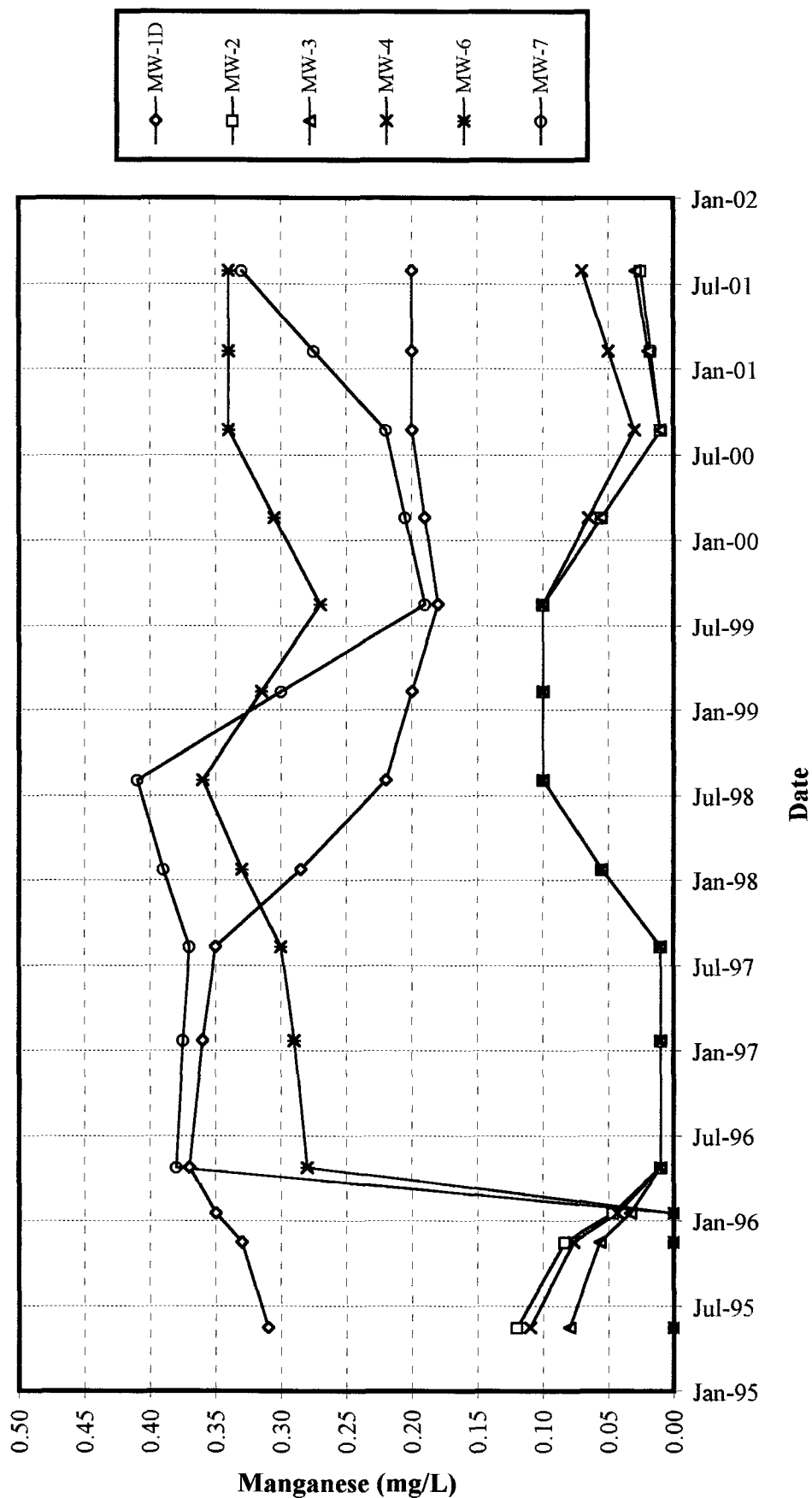


Figure 11
 Manganese Concentrations Versus Time



6.0 Intrinsic Bioremediation Assessment

The following assessment for intrinsic bioremediation occurring on site is identical to last year's annual report and is being repeated because the same trends and conditions are present.

During biodegradation, dissolved BTEX is ultimately transformed into carbon dioxide, methane, and water. Biodegradation of BTEX dissolved in groundwater results in a reduction of contaminant concentration (and mass) and slowing (retardation) of the contaminant relative to the average advective groundwater flow velocity. Indigenous hydrocarbon-degrading microorganisms transform available nutrients into forms useful for energy and cell reproduction by facilitating the transfer of electrons from donors to acceptors. This results in oxidation of the electron donor and reduction of the electron acceptor. Electron donors include natural organic material and petroleum hydrocarbons. Electron acceptors are elements or compounds that occur in relatively oxidized states. The more important electron acceptors in groundwater, in order of utilization, include dissolved oxygen, (DO), nitrate (NO_3), ferric iron (Fe^{3+}), sulfate (SO_4), and carbon dioxide (CO_2).

Biodegradation causes measurable changes in groundwater geochemistry. During aerobic respiration, oxygen is reduced to water, and dissolved oxygen concentrations decrease. In anaerobic systems where nitrate is the electron acceptor, the nitrate is reduced (denitrification) to NO_2^- , N_2O , NO , NH_4^+ , or N_2 , and nitrate concentrations decrease. In anaerobic systems where ferric iron (Fe^{3+}) is the electron acceptor, it is reduced (iron reduction) to ferrous iron (Fe^{2+}), and Fe^{2+} concentrations increase. In anaerobic systems where sulfate is the electron acceptor, it is reduced to hydrogen sulfide (H_2S), and sulfate concentrations decrease (sulfate reduction). In anaerobic systems where CO_2 is used as an electron acceptor, methanogenic bacteria reduce it (methanogenesis) to methane (CH_4).

Using the stoichiometric derivations, the mass of benzene degraded per unit mass of electron acceptor utilized and metabolic byproduct produced was calculated to determine the biodegradation capacity of these constituents relative to the highest observed benzene concentration on site. A conservative approach was taken in this analysis in that microbial cell mass production was not taken into account for nitrate or sulfate and only average concentrations of electron acceptors and metabolic byproducts were used. The table below summarizes this comparison.

Electron Acceptor/ Byproduct	Terminal Electron Accepting Process (in order of preferred utilization)	Trend in Analyte Concentration During Biodegradation	Mass of benzene Degraded per unit mass of Electron Acceptor Utilized	Mass of benzene Degraded per unit mass of Metabolic Byproduct Produced	Average Concentrations of Electron Acceptors/ Byproducts (mg/L)	Biodegradation Capacity of Electron Acceptors/ Byproducts (mg/L)
DO	Aerobic Respiration	Decreases	0.97	---	4.54	4.40
NO_3^*	Denitrification	Decreases	0.21	---	2.60	0.55
Fe^{2+}	Ferric Iron Reduction	Increases	---	0.046	1.18	0.05
SO_4^*	Sulfate Reduction	Decreases	0.22	---	129	28.36
Total Biodegradation Capacity						33.36
Highest Observed Benzene Concentration						1.13

* Conservative assumption (does not take into account microbial cell mass production)

Our suite of biological parameters included dissolved oxygen, nitrate, sulfate, dissolved iron, and manganese. These electron acceptor results are summarized in Table 5. Changes in dissolved oxygen, nitrate, sulfate, iron, and manganese concentrations with time are depicted in Figures 7, 8, 9, 10, and 11, respectively.

Hydrocarbon-impacted wells (MW-1D and MW-7) are compared against upgradient and downgradient wells (MW-2, MW-3, MW-4, and MW-6) to observe whether or not significant differences are observed in electron acceptor concentrations that may be related to subsurface biodegradation. The relationships in the electron acceptor data are observed:

- Generally, dissolved oxygen levels have been lower within the hydrocarbon-impacted plume area compared to the downgradient and upgradient wells indicating active aerobic biodegradation conditions.
- Nitrate concentrations fluctuate over time therefore no trend relationship is noted. However, the presence of nitrate as an electron acceptor indicates its availability for by microorganisms in the course of hydrocarbon degradation.
- Generally, sulfate concentrations have decreased with time indicating its utilization as an electron acceptor under anaerobic conditions.
- Increased concentrations of the metabolic byproducts iron and manganese in monitoring well MW-7 indicates iron and manganese reduction conditions that are the result of anaerobic biodegradation processes.
- The biodegradation capacity of electron acceptors and metabolic byproducts (33.36 mg/L) far exceeds the highest benzene concentration (1.13 mg/L) observed on site by a ratio of 30 to 1. This indicates that the biodegradation process will continue.

Table 5
Summary of Biological Parameter Results
Monument Booster Station

Monitoring Well	Sampling Date	DO (mg/L)	Nitrate (mg/L)	Sulfate (mg/L)	Iron (Fe ²⁺ / Fe ³⁺) (mg/L)	Manganese (mg/L)
MW-1D	05/16/95	1.05	1.37	174	4.6	0.3
	11/15/95	1.26	<0.01	119	---	---
	01/18/96	4.8	0.6	168	---	---
	04/24/96	2.6	<0.1	169	0.06	0.37
	01/22/97	7.0	<0.1	83	---	---
	08/11/97	3.6	<0.1	110	0.28	0.35
	01/23/98	4.6	2.8	190	---	---
	08/03/98	2.16	4.0	100	<0.1	0.22
	02/10/99	2.7	4.6	110	---	---
	08/17/99	1.03	3.8	120	0.19	0.18
	02/18/00	0.41	3.6	92	---	---
	08/23/00	1.01	3.4	98	0.20	0.20
	02/09/01	0.00	2.0	95	---	---
	07/30/01	2.00	2.1	93	0.21	0.20
MW-2	05/16/95	6.48	7.42	509	5.82	0.12
	11/15/95	6.13	---	---	---	---
	01/18/96	6.2	---	---	---	---
	04/24/96	1.5	0.3	443	0.07	<0.01
	01/22/97	9.0	2.1	310	---	---
	08/11/97	7.6	9.0	290	0.24	<0.01
	01/23/98	8.2	30.0	230	---	---
	08/03/98	7.00	4.0	220	<0.1	<0.1
	02/10/99	8.3	4.8	140	---	---
	08/17/99	5.98	4.0	150	<0.1	<0.1
	02/18/00	5.65	4.1	120	---	---
	08/23/00	6.39	2.0	110	<0.05	<0.01
	02/08/01	7.58	2.6	110	---	---
	07/30/01	7.57	2.6	116	<0.05	<0.025
MW-3	05/16/95	6.85	5.62	115	0.53	0.08
	11/15/95	1.29	---	---	---	---
	01/18/96	4.9	---	---	---	---
	04/24/96	1.0	0.3	95	0.17	<0.01
	01/22/97	8.75	2.7	76	---	---
	08/11/97	9.2	9.4	75	0.14	<0.01
	01/23/98	7.7	15.0	240	---	---
	08/03/98	3.43	4.0	80	0.55	<0.1
	02/10/99	5.80	4.9	74	---	---
	08/17/99	4.04	3.5	84	<0.1	<0.1
	02/17/00	6.24	3.7	69	---	---
	08/23/00	6.25	3.3	72	<0.05	<0.01
	02/08/01	6.90	1.8	67	---	---
	07/30/01	5.75	1.8	67	<0.05	0.029
MW-4	05/16/95	4.85	3.69	136	4.68	0.11
	11/15/95	1.30	---	---	---	---
	01/18/96	4.0	---	---	---	---
	04/24/96	1.9	0.1	115	0.08	<0.01
	01/22/97	9.0	<0.1	100	---	---

Analyses performed by Trace Analysis, Inc., Lubbock, Texas.

Dissolved oxygen (DO) readings obtained with Hanna Model 9143 DO meter or comparable model.

Monitoring wells MW-6 and MW-7 installed on November 15, 1995.

Monitoring wells MW-1 and MW-5 were not analyzed due to presence of light non-aqueous phase liquids (LNAPL).

Table 5 (continued) Summary of Biological Parameter Results Monument Booster Station						
Monitoring Well	Sampling Date	DO (mg/L)	Nitrate (mg/L)	Sulfate (mg/L)	Iron (Fe ²⁺ / Fe ³⁺) (mg/L)	Manganese (mg/L)
MW-4 (cont)	08/11/97	3.5	<0.1	96	0.08	<0.01
	01/23/98	7.0	1.0	180	---	---
	08/03/98	3.66	2.9	100	<0.1	<0.1
	02/10/99	5.0	3.7	110	---	---
	08/17/99	2.64	2.5	120	<0.1	<0.1
	02/18/00	6.51	2.8	98	---	---
	08/23/00	6.06	2.6	100	<0.05	0.03
	02/08/01	6.72	<1.0	97	---	---
	07/30/01	6.11	1.1	92	<0.05	0.07
MW-6	05/16/95	---	---	---	---	---
	11/16/95	5.40	0.06	233	---	---
	01/18/96	4.1	<0.05	93	---	---
	04/24/96	1.7	<0.1	70	0.15	0.28
	01/22/97	11.0	<0.1	37	---	---
	08/11/97	3.7	<0.1	37	0.21	0.30
	01/23/98	4.7	0.3	230	---	---
	08/03/98	1.96	<1.0	45	0.26	0.36
	02/10/99	2.6	<1.0	42	---	---
	08/17/99	0.8	<1.0	82	0.42	0.27
	02/18/00	0.53	<1.0	59	---	---
	08/23/00	0.61	<0.1	57	<0.05	0.34
	02/08/01	0.10	<1.0	60	---	---
	07/30/01	1.40	<1.0	63	0.36	0.34
MW-7	05/16/95	---	---	---	---	---
	11/15/95	1.6	5.00	418	---	---
	01/18/96	4.8	6.54	180	---	---
	04/24/96	2.1	0.2	149	<0.03	0.38
	01/22/97	13.2	<0.1	25	---	---
	08/11/97	3.0	<0.1	76	0.43	0.37
	01/23/98	4.1	0.4	180	---	---
	08/03/98	1.9	<1.0	90	6.1	0.41
	02/10/99	2.6	<1.0	44	---	---
	08/17/99	0.9	<1.0	14	8.1	0.19
	02/18/00	0.28	<1.0	27	---	---
	08/23/00	0.59	<1.0	19	7.4	0.22
	02/09/01	0.00	<1.0	22	---	---
	07/30/01	1.50	<1.0	66	5.3	0.33
Analyses performed by Trace Analysis, Inc., Lubbock, Texas.						
Dissolved oxygen (DO) readings obtained with Hanna Model 9143 DO meter or comparable model.						
Monitoring wells MW-6 and MW-7 installed on November 15, 1995.						
Monitoring wells MW-1 and MW-5 were not analyzed due to presence of light non-aqueous phase liquids (LNAPL).						

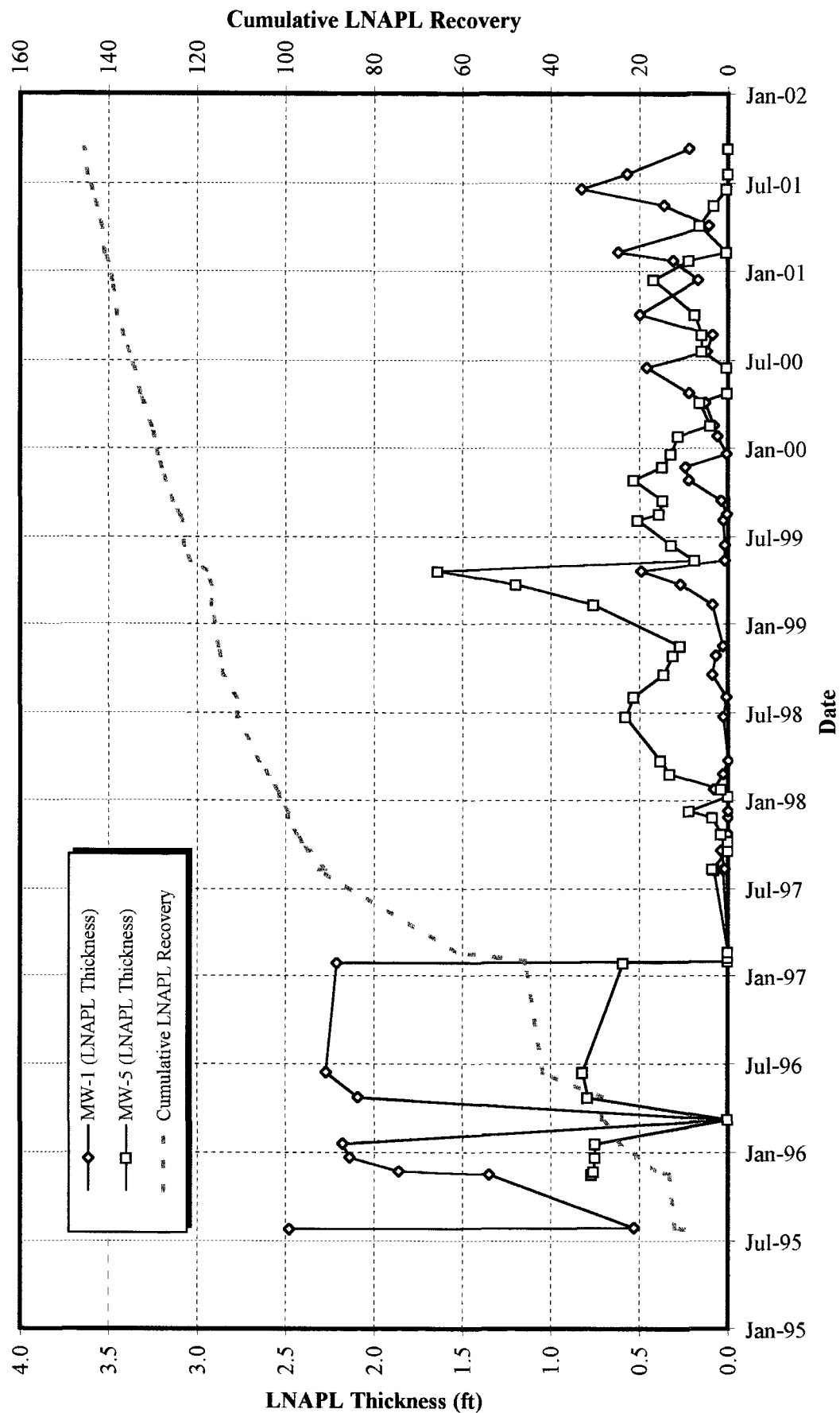
7.0 Remediation System Performance

LNAPL remediation at the Monument Booster Station is presently being conducted utilizing hydrophobic absorbent socks in both MW-1 and MW-5. Xitech product recovery pumps were initially installed in monitoring wells MW-1 and MW-5 on January 31, 1997 to replace the hand bailing and gravity siphoning techniques used previously. On March 13, 1998 the Xitech pump in MW-5 was replaced with a passive bailer. On April 20, 1999, the passive bailer in MW-5 was replaced with a hydrophobic adsorbent sock. On December 20, 1999 the Xitech pump in MW-1 was removed and replaced with an adsorbent sock. As of September 10, 2001, a total of approximately 146 gallons of LNAPL (condensate) have been removed from monitoring wells MW-1 and MW-5. Product recovery volumes are listed below in Table 6. A graph of LNAPL thickness measurements from each of the impacted wells and the cumulative LNAPL recovery versus time is provided in Figure 12.

Table 6 LNAPL Recovery Volumes Duke Energy Field Services - Monument Booster Station						
Date	LNAPL Thickness (feet)		LNAPL Recovered (gallons)			Cumulative LNAPL Recovered (gallons)
	MW-1	MW-5	MW-1		MW-5	
07/24/95	2.48	---	10	HB	---	10
07/27/95	0.53	---	2	SWAP	---	12
11/15/95	1.35	0.77	1.4	SWAP	---	13.4
11/21/95	1.86	0.76			---	
12/20/95	2.14	0.75			---	
01/18/96	2.18	0.75			---	
03/08/96	---	---	15	Pump	---	28.4
04/24/96	2.09	0.79				28.4
06/14/96	2.27	0.82	12	Pump	1.5 HB	41.9
01/27/97	2.21	0.59	4	Pump	0 Pump	45.9
01/31/97	---	---		Pump	0	45.9
02/07/97	---	---	4	Pump	2 Pump	51.9
02/19/97	---	---	10	Pump	0 Pump	61.9
08/11/97	0.02	0.09	23	Pump	6 Pump	90.9
08/09/97	0.03	0.08	1.5	Pump	0 Pump	92.4
09/18/97	0.04	---	2.5	Pump	0 Pump	94.9
10/07/97	---	---	1.5	Pump	0 Pump	96.4
10/22/97	---	0.04	1	Pump	0 Pump	97.4
11/25/97	---	0.09	1.5	Pump	0.5 Pump	99.4
12/09/97	---	0.22	0.0	Pump	0 Pump	99.4
01/09/98	---	---	2	Pump	0.0 Pump	101.4
01/23/98	0.08	0.04	0.0	Pump	0.5 Pump	101.9
02/24/98	0.03	0.33	2	Pump	0.00 PB	103.9
03/23/98	0.00	0.38	2	Pump	0.07 PB	106.0
06/23/98	0.03	0.58	5	Pump	0.04 PB	111.0
08/03/98	0.01	0.53	0.0	Pump	0.05 PB	111.1
09/18/98	0.09	0.36	3	Pump	0.16 PB	114.2
10/28/98	0.07	0.31	0.5	Pump	0.00 PB	114.7
11/17/98	0.03	0.27	0.5	Pump	0.01 PB	115.2
02/10/99	0.09	0.76	1.5	Pump	0.01 PB	116.7
03/24/99	0.27	1.20		Pump		116.7
04/20/99	0.49	1.64	0.5	Pump	0.9 PB	118.1
05/13/99	0.02	0.19	3	Pump	0.4 PB	121.5
06/14/99	0.02	0.32	1	Pump	0.5 Sock	123.0
LNAPL recovery methods used: HB: Hand bailing using PVC bailer SWAP: Gravity siphon demonstration Pump: Xitech ADJ 1000 Smart Skimmer (Product Recovery System) PB: Passive bailer with hydrophobic filter Sock: Hydrophobic (oil adsorbent) sock						

Table 6 (continued)							
LNAPL Recovery Volumes							
Duke Energy Field Services - Monument Booster Station							
Date	LNAPL Thickness (feet)		LNAPL Recovered (gallons)				Cumulative LNAPL Recovered (gallons)
	MW-1	MW-5	MW-1		MW-5		
08/04/99	0.03	0.51	0.0	Pump	0.4	Sock	123.4
08/17/99	0.01	0.39	0.0	Pump	0.5	Sock	123.9
09/14/99	0.04	0.37	1	Pump	0.6	Sock	125.5
10/26/99	0.22	0.53	1	Pump	0.5	Sock	127.0
11/22/99	0.24	0.37	0.5	Pump	0.5	Sock	128.0
12/20/99	0.01	0.32	0.5	Pump	0.4	Sock	128.9
01/26/00	0.06	0.28	0.4	Sock	0.4	Sock	129.7
02/17/00	0.08	0.10	0.4	Sock	0.2	Sock	130.3
04/04/00	0.13	0.16	0.6	Sock	1.2	Sock	132.1
04/24/00	0.22	0.01	0.5	Sock	0.4	Sock	132.9
06/15/00	0.46	0.01	1.1	Sock	0.3	Sock	134.3
07/19/00	0.12	0.15	0.6	Sock	0.6	Sock	135.5
08/23/00	0.09	0.15	0.5	Sock	0.7	Sock	136.7
10/03/00	0.50	0.19	1.1	Sock	0.4	Sock	138.3
12/14/00	0.17	0.42	0.5	Sock	0.5	Sock	139.2
01/23/01	0.31	0.22	0.5	Sock	0.3	Sock	140.0
02/09/01	0.62	0.01	0.8	Sock	0.2	Sock	141.0
04/04/01	0.11	0.16	0.4	Sock	0.3	Sock	141.7
05/16/01	0.36	0.08	0.7	Sock	0.3	Sock	142.7
06/19/01	0.83	0.01	0.9	Sock	0.1	Sock	143.7
07/20/01	0.57	0.00	1.2	Sock	0.0	Sock	144.9
09/10/01	0.22	0.00	0.8	Sock	0.1	Sock	145.7
Total Volume of Product Recovered:			124.3	(MW-1)	21.4	(MW-5)	145.7
LNAPL recovery methods used:							
HB: Hand bailing using PVC bailer							
SWAP: Gravity siphon demonstration							
Pump: Xitech ADJ 1000 Smart Skimmer (Product Recovery System)							
PB: Passive bailer with hydrophobic filter							
Sock: Hydrophobic (oil adsorbent) sock							

Figure 12
 LNAPL Recovery Versus Time



8.0 Conclusions

Conclusions relevant to groundwater conditions and the remediation performance at the Monument Booster Station are presented below.

- BTEX concentrations in monitoring wells MW-1D, MW-2, MW-3, MW-4, and MW-6 are presently below New Mexico WQCC standards. With the exception of the August 1999 sample recovered from MW-2 and the August 1999 and February 2000 samples recovered from MW-3, the BTEX concentrations in each of these wells have remained below the WQCC standard levels since 1995.
- Only the benzene concentrations from the current and historic groundwater samples recovered from MW-7 exceed the WQCC standard. These levels however appear to be decreasing over the last five semi-annual monitoring events with short-term fluctuations that seem to correspond to changes in the water table elevation.
- As of September 10, 2001, a total of approximately 146 gallons of LNAPL (condensate) has been removed from monitoring wells MW-1 and MW-5 using a combination of gravity siphoning, hand bailing, passive skimmer, adsorbent sock, and pneumatic pump recovery methods.
- The presence and trends of biological parameters (dissolved oxygen, nitrate, sulfate, and iron) indicate that biodegradation has been taking place on site. The biodegradation capacity of electron acceptors and metabolic byproducts (33.36 mg/L) far exceeds the highest benzene concentration (1.13 mg/L) observed on site by a ratio of 30 to 1. This indicates that the biodegradation process has been active. Continued semi-annual monitoring is necessary to demonstrate the effectiveness of intrinsic bioremediation in limiting the migration of the dissolved hydrocarbon plume.

9.0 Recommendations

The following recommendations are proposed for the remediation system and monitoring operations at the Monument Booster Station.

- Continue LNAPL recovery operations utilizing absorbent socks in MW-1 and MW-5. This system appears to have been effective in recovering LNAPL over the last two annual monitoring periods.
- Discontinue analyses for aluminum, arsenic, and chromium since those constituents have been below the WQCC standards for over five years.
- Continue the groundwater-monitoring program on a semi-annual basis. The next sampling event is scheduled during the first quarter of 2002.

APPENDIX A

LABORATORY ANALYTICAL REPORTS AND
CHAIN-OF-CUSTODY DOCUMENTATION

Report Date: August 14, 2001 Order Number: A01080112

Page Number: 1 of 3

Duke Energy Field Services

V-104

Monument Booster

Summary Report

Gil Van Deventer
Trident Environmental
P.O. Box 7624
Midland, Tx. 79708

Report Date: August 14, 2001

Order ID Number: A01080112

Project Number: Duke Energy Field Services
Project Name: V-104
Project Location: Monument Booster

Sample	Description	Matrix	Date Taken	Time Taken	Date Received
176105	MW-3	Water	7/30/01	12:45	8/1/01
176106	MW-6	Water	7/30/01	14:10	8/1/01
176107	MW-4	Water	7/30/01	15:20	8/1/01
176108	MW-2	Water	7/30/01	16:10	8/1/01
176109	MW-1D	Water	7/30/01	17:00	8/1/01
176110	MW-7	Water	7/30/01	18:20	8/1/01
176111	Duplicate	Water	7/30/01	:	8/1/01
176112	Rinsate	Water	7/30/01	18:40	8/1/01
176113	Trip Blank	Water	7/30/01	:	8/1/01

This report consists of a total of 3 page(s) and is intended only as a summary of results for the sample(s) listed above.

Sample - Field Code	BTEX				
	Benzene (ppm)	Toluene (ppm)	Ethylbenzene (ppm)	M,P,O-Xylene (ppm)	Total BTEX (ppm)
176105 - MW-3	0.002	<0.001	<0.001	<0.001	0.002
176106 - MW-6	<0.001	<0.001	<0.001	<0.001	<0.001
176107 - MW-4	<0.001	<0.001	<0.001	<0.001	<0.001
176108 - MW-2	<0.001	<0.001	<0.001	<0.001	<0.001
176109 - MW-1D	<0.001	<0.001	<0.001	<0.001	<0.001
176110 - MW-7	0.017	<0.005	0.058	<0.005	0.075
176111 - Duplicate	0.023	<0.001	0.041	<0.001	0.064
176112 - Rinsate	<0.001	<0.001	<0.001	<0.001	<0.001
176113 - Trip Blank	<0.001	<0.001	<0.001	<0.001	<0.001

Sample: 176105 - MW-3

Param	Flag	Result	Units
CL		183	mg/L
Fluoride		2.13	mg/L
Nitrate-N		1.82	mg/L
Sulfate		67.2	mg/L
Total Dissolved Solids		844	mg/L
Total Aluminum		<0.1	mg/L
Total Arsenic		<0.05	mg/L
Total Boron		0.159	mg/L
Total Chromium		<0.01	mg/L

Continued on next page ...

Report Date: August 14, 2001 Order Number: A01080112

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Duke Energy Field Services

V-104

Monument Booster

Sample 176105 continued ...

Param	Flag	Result	Units
Total Iron		<0.05	mg/L
Total Manganese		0.0291	mg/L

Sample: 176106 - MW-6

Param	Flag	Result	Units
CL		123	mg/L
Fluoride		2.03	mg/L
Nitrate-N		<1.0	mg/L
Sulfate		63.1	mg/L
Total Dissolved Solids		907	mg/L
Total Aluminum		<0.1	mg/L
Total Arsenic		<0.05	mg/L
Total Boron		0.376	mg/L
Total Chromium		<0.01	mg/L
Total Iron		0.364	mg/L
Total Manganese		0.335	mg/L

Sample: 176107 - MW-4

Param	Flag	Result	Units
CL		146	mg/L
Fluoride		1.87	mg/L
Nitrate-N		1.07	mg/L
Sulfate		92.0	mg/L
Total Dissolved Solids		791	mg/L
Total Aluminum		<0.1	mg/L
Total Arsenic		<0.05	mg/L
Total Boron		0.181	mg/L
Total Chromium		<0.01	mg/L
Total Iron		<0.05	mg/L
Total Manganese		0.0692	mg/L

Sample: 176108 - MW-2

Param	Flag	Result	Units
CL		1790	mg/L
Fluoride		1.91	mg/L
Nitrate-N		2.63	mg/L
Sulfate		116	mg/L
Total Dissolved Solids		4420	mg/L
Total Aluminum		<0.1	mg/L
Total Arsenic		<0.05	mg/L
Total Boron		0.176	mg/L
Total Chromium		0.0235	mg/L
Total Iron		<0.05	mg/L
Total Manganese		<0.025	mg/L

Report Date: August 14, 2001Order Number: A01080112

Duke Energy Field Services

V-104

Page Number: 3 of 3

Monument Booster

Sample: 176109 - MW-1D

Param	Flag	Result	Units
CL		59.2	mg/L
Fluoride		3.01	mg/L
Nitrate-N		2.11	mg/L
Sulfate		92.8	mg/L
Total Dissolved Solids		548	mg/L
Total Aluminum		<0.1	mg/L
Total Arsenic		<0.05	mg/L
Total Boron		0.136	mg/L
Total Chromium		<0.01	mg/L
Total Iron		0.208	mg/L
Total Manganese		0.199	mg/L

Sample: 176110 - MW-7

Param	Flag	Result	Units
CL		66.7	mg/L
Fluoride		2.50	mg/L
Nitrate-N		<1.0	mg/L
Sulfate		66.2	mg/L
Total Dissolved Solids		658	mg/L
Total Aluminum		<0.1	mg/L
Total Arsenic		0.0654	mg/L
Total Boron		0.351	mg/L
Total Chromium		<0.01	mg/L
Total Iron		5.28	mg/L
Total Manganese		0.327	mg/L

TRACE ANALYSIS, INC.

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Analytical and Quality Control Report

Gil Van Deventer
Trident Environmental
P.O. Box 7624
Midland, Tx. 79708

Report Date: August 14, 2001

Order ID Number: A01080112

Project Number: Duke Energy Field Services
Project Name: V-104
Project Location: Monument Booster

Enclosed are the Analytical Results and Quality Control Data Reports for the following samples submitted to Trace-Analysis, Inc.

Sample	Description	Matrix	Date Taken	Time Taken	Date Received
176105	MW-3	Water	7/30/01	12:45	8/1/01
176106	MW-6	Water	7/30/01	14:10	8/1/01
176107	MW-4	Water	7/30/01	15:20	8/1/01
176108	MW-2	Water	7/30/01	16:10	8/1/01
176109	MW-1D	Water	7/30/01	17:00	8/1/01
176110	MW-7	Water	7/30/01	18:20	8/1/01
176111	Duplicate	Water	7/30/01	:	8/1/01
176112	Rinsate	Water	7/30/01	18:40	8/1/01
176113	Trip Blank	Water	7/30/01	:	8/1/01

These results represent only the samples received in the laboratory. The Quality Control Report is generated on a batch basis. All information contained in this report is for the analytical batch(es) in which your sample(s) were analyzed.

This report consists of a total of 13 pages and shall not be reproduced except in its entirety including the chain of custody (COC), without written approval of TraceAnalysis, Inc.



Dr. Blair Leftwich, Director

Analytical Report

Sample: 176105 - MW-3

Analysis: BTEX Analytical Method: S 8021B QC Batch: QC13020 Date Analyzed: 8/1/01
Analyst: CG Preparation Method: E 5030B Prep Batch: PB11125 Date Prepared: 8/1/01

Param	Flag	Result	Units	Dilution	RDL
Benzene		0.002	mg/L	1	0.001
Toluene		<0.001	mg/L	1	0.001
Ethylbenzene		<0.001	mg/L	1	0.001
M,P,O-Xylene		<0.001	mg/L	1	0.001
Total BTEX		0.002	mg/L	1	0.001

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
TFT		0.103	mg/L	1	0.10	103	72 - 128
4-BFB		0.0899	mg/L	1	0.10	90	72 - 128

Sample: 176105 - MW-3

Analysis: Ion Chromatography (IC) Analytical Method: E 300.0 QC Batch: QC13037 Date Analyzed: 8/1/01
Analyst: JS Preparation Method: N/A Prep Batch: PB11145 Date Prepared: 8/1/01

Param	Flag	Result	Units	Dilution	RDL
CL		183	mg/L	5	0.50
Fluoride		2.13	mg/L	5	0.20
Nitrate-N		1.82	mg/L	5	0.20
Sulfate		67.2	mg/L	5	0.50

Sample: 176105 - MW-3

Analysis: TDS Analytical Method: E 160.1 QC Batch: QC13220 Date Analyzed: 8/10/01
Analyst: JS Preparation Method: N/A Prep Batch: PB11292 Date Prepared: 8/9/01

Param	Flag	Result	Units	Dilution	RDL
Total Dissolved Solids		844	mg/L	1	10

Sample: 176105 - MW-3

Analysis: Total Metals Analytical Method: S 6010B QC Batch: QC13087 Date Analyzed: 8/6/01
Analyst: RR Preparation Method: E 3010A Prep Batch: PB11135 Date Prepared: 8/2/01

Param	Flag	Result	Units	Dilution	RDL
Total Aluminum		<0.1	mg/L	1	0.10
Total Arsenic		<0.05	mg/L	1	0.05
Total Boron		0.159	mg/L	10	0.01
Total Chromium		<0.01	mg/L	1	0.01
Total Iron		<0.05	mg/L	10	0.05
Total Manganese		0.0291	mg/L	1	0.02

Sample: 176106 - MW-6

Analysis: BTEX Analytical Method: S 8021B QC Batch: QC13020 Date Analyzed: 8/1/01
Analyst: CG Preparation Method: E 5030B Prep Batch: PB11125 Date Prepared: 8/1/01

Param	Flag	Result	Units	Dilution	RDL
Benzene		<0.001	mg/L	1	0.001
Toluene		<0.001	mg/L	1	0.001
Ethylbenzene		<0.001	mg/L	1	0.001
M,P,O-Xylene		<0.001	mg/L	1	0.001
Total BTEX		<0.001	mg/L	1	0.001

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
TFT		0.115	mg/L	1	0.10	115	72 - 128
4-BFB		0.0984	mg/L	1	0.10	98	72 - 128

Sample: 176106 - MW-6

Analysis: Ion Chromatography (IC) Analytical Method: E 300.0 QC Batch: QC13037 Date Analyzed: 8/1/01
Analyst: JS Preparation Method: N/A Prep Batch: PB11145 Date Prepared: 8/1/01

Param	Flag	Result	Units	Dilution	RDL
CL		123	mg/L	5	0.50
Fluoride		2.03	mg/L	5	0.20
Nitrate-N		<1.0	mg/L	5	0.20
Sulfate		63.1	mg/L	5	0.50

Sample: 176106 - MW-6

Analysis: TDS Analytical Method: E 160.1 QC Batch: QC13220 Date Analyzed: 8/10/01
Analyst: JS Preparation Method: N/A Prep Batch: PB11292 Date Prepared: 8/9/01

Param	Flag	Result	Units	Dilution	RDL
Total Dissolved Solids		907	mg/L	1	10

Sample: 176106 - MW-6

Analysis: Total Metals Analytical Method: S 6010B QC Batch: QC13087 Date Analyzed: 8/6/01
Analyst: RR Preparation Method: E 3010A Prep Batch: PB11135 Date Prepared: 8/2/01

Param	Flag	Result	Units	Dilution	RDL
Total Aluminum		<0.1	mg/L	1	0.10
Total Arsenic		<0.05	mg/L	1	0.05
Total Boron		0.376	mg/L	10	0.01
Total Chromium		<0.01	mg/L	1	0.01
Total Iron		0.364	mg/L	1	0.05
Total Manganese		0.335	mg/L	1	0.02

Sample: 176107 - MW-4

Analysis: BTEX Analytical Method: S 8021B QC Batch: QC13020 Date Analyzed: 8/1/01
Analyst: CG Preparation Method: E 5030B Prep Batch: PB11125 Date Prepared: 8/1/01

Param	Flag	Result	Units	Dilution	RDL
Benzene		<0.001	mg/L	1	0.001
Toluene		<0.001	mg/L	1	0.001
Ethylbenzene		<0.001	mg/L	1	0.001
M,P,O-Xylene		<0.001	mg/L	1	0.001
Total BTEX		<0.001	mg/L	1	0.001

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
TFT		0.0916	mg/L	1	0.10	92	72 - 128
4-BFB		0.0795	mg/L	1	0.10	80	72 - 128

Sample: 176107 - MW-4

Analysis: Ion Chromatography (IC) Analytical Method: E 300.0 QC Batch: QC13037 Date Analyzed: 8/1/01
Analyst: JS Preparation Method: N/A Prep Batch: PB11145 Date Prepared: 8/1/01

Param	Flag	Result	Units	Dilution	RDL
CL		146	mg/L	5	0.50
Fluoride		1.87	mg/L	5	0.20
Nitrate-N		1.07	mg/L	5	0.20
Sulfate		92.0	mg/L	5	0.50

Sample: 176107 - MW-4

Analysis: TDS Analytical Method: E 160.1 QC Batch: QC13220 Date Analyzed: 8/10/01
Analyst: JS Preparation Method: N/A Prep Batch: PB11292 Date Prepared: 8/9/01

Param	Flag	Result	Units	Dilution	RDL
Total Dissolved Solids		791	mg/L	1	10

Sample: 176107 - MW-4

Analysis: Total Metals Analytical Method: S 6010B QC Batch: QC13087 Date Analyzed: 8/6/01
Analyst: RR Preparation Method: E 3010A Prep Batch: PB11135 Date Prepared: 8/2/01

Param	Flag	Result	Units	Dilution	RDL
Total Aluminum		<0.1	mg/L	1	0.10
Total Arsenic		<0.05	mg/L	1	0.05
Total Boron		0.181	mg/L	10	0.01
Total Chromium		<0.01	mg/L	1	0.01
Total Iron		<0.05	mg/L	1	0.05
Total Manganese		0.0692	mg/L	1	0.02

Sample: 176108 - MW-2

Analysis: BTEX Analytical Method: S 8021B QC Batch: QC13020 Date Analyzed: 8/1/01
Analyst: CG Preparation Method: E 5030B Prep Batch: PB11125 Date Prepared: 8/1/01

Param	Flag	Result	Units	Dilution	RDL
Benzene		<0.001	mg/L	1	0.001

Continued ...

... Continued Sample: 176108 Analysis: BTEX

Param	Flag	Result	Units	Dilution	RDL
Toluene		<0.001	mg/L	1	0.001
Ethylbenzene		<0.001	mg/L	1	0.001
M,P,O-Xylene		<0.001	mg/L	1	0.001
Total BTEX		<0.001	mg/L	1	0.001

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
TFT		0.0752	mg/L	1	0.10	75	72 - 128
4-BFB	¹	0.0673	mg/L	1	0.10	67	72 - 128

Sample: 176108 - MW-2

Analysis: Ion Chromatography (IC) Analytical Method: E 300.0 QC Batch: QC13037 Date Analyzed: 8/1/01
Analyst: JS Preparation Method: N/A Prep Batch: PB11145 Date Prepared: 8/1/01

Param	Flag	Result	Units	Dilution	RDL
CL		1790	mg/L	100	0.50
Fluoride		1.91	mg/L	5	0.20
Nitrate-N		2.63	mg/L	5	0.20
Sulfate		116	mg/L	5	0.50

Sample: 176108 - MW-2

Analysis: TDS Analytical Method: E 160.1 QC Batch: QC13220 Date Analyzed: 8/10/01
Analyst: JS Preparation Method: N/A Prep Batch: PB11292 Date Prepared: 8/9/01

Param	Flag	Result	Units	Dilution	RDL
Total Dissolved Solids		4420	mg/L	5	10

Sample: 176108 - MW-2

Analysis: Total Metals Analytical Method: S 6010B QC Batch: QC13087 Date Analyzed: 8/6/01
Analyst: RR Preparation Method: E 3010A Prep Batch: PB11135 Date Prepared: 8/2/01

Param	Flag	Result	Units	Dilution	RDL
Total Aluminum		<0.1	mg/L	1	0.10
Total Arsenic		<0.05	mg/L	1	0.05
Total Boron		0.176	mg/L	10	0.01
Total Chromium		0.0235	mg/L	1	0.01
Total Iron		<0.05	mg/L	1	0.05
Total Manganese		<0.025	mg/L	1	0.02

Sample: 176109 - MW-1D

Analysis: BTEX Analytical Method: S 8021B QC Batch: QC13020 Date Analyzed: 8/1/01
Analyst: CG Preparation Method: E 5030B Prep Batch: PB11125 Date Prepared: 8/1/01

¹Low surrogate recovery due to lack of mixing.

Param	Flag	Result	Units	Dilution	RDL
Benzene		<0.001	mg/L	1	0.001
Toluene		<0.001	mg/L	1	0.001
Ethylbenzene		<0.001	mg/L	1	0.001
M,P,O-Xylene		<0.001	mg/L	1	0.001
Total BTEX		<0.001	mg/L	1	0.001

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
TFT		0.0854	mg/L	1	0.10	85	72 - 128
4-BFB		0.0761	mg/L	1	0.10	76	72 - 128

Sample: 176109 - MW-1D

Analysis: Ion Chromatography (IC) Analytical Method: E 300.0 QC Batch: QC13037 Date Analyzed: 8/1/01
Analyst: JS Preparation Method: N/A Prep Batch: PB11145 Date Prepared: 8/1/01

Param	Flag	Result	Units	Dilution	RDL
CL		59.2	mg/L	5	0.50
Fluoride		3.01	mg/L	5	0.20
Nitrate-N		2.11	mg/L	5	0.20
Sulfate		92.8	mg/L	5	0.50

Sample: 176109 - MW-1D

Analysis: TDS Analytical Method: E 160.1 QC Batch: QC13220 Date Analyzed: 8/10/01
Analyst: JS Preparation Method: N/A Prep Batch: PB11292 Date Prepared: 8/9/01

Param	Flag	Result	Units	Dilution	RDL
Total Dissolved Solids		548	mg/L	1	10

Sample: 176109 - MW-1D

Analysis: Total Metals Analytical Method: S 6010B QC Batch: QC13087 Date Analyzed: 8/6/01
Analyst: RR Preparation Method: E 3010A Prep Batch: PB11135 Date Prepared: 8/2/01

Param	Flag	Result	Units	Dilution	RDL
Total Aluminum		<0.1	mg/L	1	0.10
Total Arsenic		<0.05	mg/L	1	0.05
Total Boron		0.136	mg/L	10	0.01
Total Chromium		<0.01	mg/L	1	0.01
Total Iron		0.208	mg/L	1	0.05
Total Manganese		0.199	mg/L	1	0.02

Sample: 176110 - MW-7

Analysis: BTEX Analytical Method: S 8021B QC Batch: QC13020 Date Analyzed: 8/1/01
Analyst: CG Preparation Method: E 5030B Prep Batch: PB11125 Date Prepared: 8/1/01

Param	Flag	Result	Units	Dilution	RDL
Benzene		0.017	mg/L	5	0.001

Continued ...

... Continued Sample: 176110 Analysis: BTEX

Param	Flag	Result	Units	Dilution	RDL
Toluene		<0.005	mg/L	5	0.001
Ethylbenzene		0.058	mg/L	5	0.001
M,P,O-Xylene		<0.005	mg/L	5	0.001
Total BTEX		0.075	mg/L	5	0.001

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
TFT		0.492	mg/L	5	0.10	98	72 - 128
4-BFB		0.437	mg/L	5	0.10	87	72 - 128

Sample: 176110 - MW-7

Analysis: Ion Chromatography (IC) Analytical Method: E 300.0 QC Batch: QC13037 Date Analyzed: 8/1/01
Analyst: JS Preparation Method: N/A Prep Batch: PB11145 Date Prepared: 8/1/01

Param	Flag	Result	Units	Dilution	RDL
CL		66.7	mg/L	5	0.50
Fluoride		2.50	mg/L	5	0.20
Nitrate-N		<1.0	mg/L	5	0.20
Sulfate		66.2	mg/L	5	0.50

Sample: 176110 - MW-7

Analysis: TDS Analytical Method: E 160.1 QC Batch: QC13220 Date Analyzed: 8/10/01
Analyst: JS Preparation Method: N/A Prep Batch: PB11292 Date Prepared: 8/9/01

Param	Flag	Result	Units	Dilution	RDL
Total Dissolved Solids		658	mg/L	1	10

Sample: 176110 - MW-7

Analysis: Total Metals Analytical Method: S 6010B QC Batch: QC13087 Date Analyzed: 8/6/01
Analyst: RR Preparation Method: E 3010A Prep Batch: PB11135 Date Prepared: 8/2/01

Param	Flag	Result	Units	Dilution	RDL
Total Aluminum		<0.1	mg/L	1	0.10
Total Arsenic		0.0654	mg/L	1	0.05
Total Boron		0.351	mg/L	10	0.01
Total Chromium		<0.01	mg/L	1	0.01
Total Iron		5.28	mg/L	10	0.05
Total Manganese		0.327	mg/L	1	0.02

Sample: 176111 - Duplicate

Analysis: BTEX Analytical Method: S 8021B QC Batch: QC13020 Date Analyzed: 8/1/01
Analyst: CG Preparation Method: E 5030B Prep Batch: PB11125 Date Prepared: 8/1/01

Param	Flag	Result	Units	Dilution	RDL
Benzene		0.023	mg/L	1	0.001

Continued ...

... Continued Sample: 176111 Analysis: BTEX

Param	Flag	Result	Units	Dilution	RDL
Toluene		<0.001	mg/L	1	0.001
Ethylbenzene		0.041	mg/L	1	0.001
M,P,O-Xylene		<0.001	mg/L	1	0.001
Total BTEX		0.064	mg/L	1	0.001

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
TFT		0.111	mg/L	1	0.10	111	72 - 128
4-BFB		0.1	mg/L	1	0.10	91	72 - 128

Sample: 176112 - Rinsate

Analysis: BTEX Analytical Method: S 8021B QC Batch: QC13020 Date Analyzed: 8/1/01
Analyst: CG Preparation Method: E 5030B Prep Batch: PB11125 Date Prepared: 8/1/01

Param	Flag	Result	Units	Dilution	RDL
Benzene		<0.001	mg/L	1	0.001
Toluene		<0.001	mg/L	1	0.001
Ethylbenzene		<0.001	mg/L	1	0.001
M,P,O-Xylene		<0.001	mg/L	1	0.001
Total BTEX		<0.001	mg/L	1	0.001

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
TFT		0.108	mg/L	1	0.10	108	72 - 128
4-BFB		0.0934	mg/L	1	0.10	93	72 - 128

Sample: 176113 - Trip Blank

Analysis: BTEX Analytical Method: S 8021B QC Batch: QC13020 Date Analyzed: 8/1/01
Analyst: CG Preparation Method: E 5030B Prep Batch: PB11125 Date Prepared: 8/1/01

Param	Flag	Result	Units	Dilution	RDL
Benzene		<0.001	mg/L	1	0.001
Toluene		<0.001	mg/L	1	0.001
Ethylbenzene		<0.001	mg/L	1	0.001
M,P,O-Xylene		<0.001	mg/L	1	0.001
Total BTEX		<0.001	mg/L	1	0.001

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
TFT		0.11	mg/L	1	0.10	110	72 - 128
4-BFB		0.0949	mg/L	1	0.10	95	72 - 128

Quality Control Report Method Blank

Method Blank QCBatch: QC13020

Param	Flag	Results	Units	Reporting Limit
Benzene		<0.001	mg/L	0.001
Toluene		<0.001	mg/L	0.001
Ethylbenzene		<0.001	mg/L	0.001
M,P,O-Xylene		<0.001	mg/L	0.001
Total BTEX		<0.001	mg/L	0.001

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
TFT		0.104	mg/L	1	0.10	104	72 - 128
4-BFB		0.0904	mg/L	1	0.10	90	72 - 128

Method Blank QCBatch: QC13037

Param	Flag	Results	Units	Reporting Limit
CL		<2.0	mg/L	0.50
Fluoride		<0.2	mg/L	0.20
Nitrate-N		<0.2	mg/L	0.20
Sulfate		<2.0	mg/L	0.50

Method Blank QCBatch: QC13087

Param	Flag	Results	Units	Reporting Limit
Total Aluminum		<0.1	mg/L	0.10
Total Arsenic		<0.05	mg/L	0.05
Total Boron		<0.01	mg/L	0.01
Total Chromium		<0.01	mg/L	0.01
Total Iron		<0.05	mg/L	0.05
Total Manganese		<0.025	mg/L	0.02

Method Blank QCBatch: QC13220

Param	Flag	Results	Units	Reporting Limit
Total Dissolved Solids		<10	mg/L	10

Quality Control Report Duplicate Samples

Duplicate QCBatch: QC13220

Param	Flag	Duplicate Result	Sample Result	Units	Dilution	RPD	RPD Limit
Total Dissolved Solids		1118	1120	mg/L	1	0	14

Quality Control Report Lab Control Spikes and Duplicate Spikes

Laboratory Control Spikes QCBatch: QC13020

Param	LCS Result	LCSD Result	Units	Dil.	Spike Amount Added	Matrix Result	% Rec	RPD	% Rec Limit	RPD Limit
MTBE	0.102	0.102	mg/L	1	0.10	<0.001	102	0	80 - 120	20
Benzene	0.106	0.11	mg/L	1	0.10	<0.001	106	3	80 - 120	20
Toluene	0.097	0.100	mg/L	1	0.10	<0.001	97	3	80 - 120	20
Ethylbenzene	0.097	0.099	mg/L	1	0.10	<0.001	97	2	80 - 120	20
M,P,O-Xylene	0.273	0.276	mg/L	1	0.30	<0.001	91	1	80 - 120	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Surrogate	LCS Result	LCSD Result	Units	Dilution	Spike Amount	LCS % Rec	LCSD % Rec	Recovery Limits
TFT	0.103	0.107	mg/L	1	0.10	103	107	72 - 128
4-BFB	0.094	0.096	mg/L	1	0.10	94	96	72 - 128

Laboratory Control Spikes QCBatch: QC13037

Param	LCS Result	LCSD Result	Units	Dil.	Spike Amount Added	Matrix Result	% Rec	RPD	% Rec Limit	RPD Limit
CL	11.59	11.62	mg/L	1	12.50	<2.0	92	0	90 - 110	20
Fluoride	2.36	2.54	mg/L	1	2.50	<0.2	94	7	90 - 110	20
Nitrate-N	2.38	2.40	mg/L	1	2.50	<0.2	95	0	90 - 110	20
Sulfate	11.92	11.80	mg/L	1	12.50	<2.0	95	1	90 - 110	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Laboratory Control Spikes QCBatch: QC13087

Param	LCS Result	LCSD Result	Units	Dil.	Spike Amount Added	Matrix Result	% Rec	RPD	% Rec Limit	RPD Limit
Total Aluminum	1.07	1.03	mg/L	1	1	<0.1	107	3	75 - 125	20
Total Arsenic	0.515	0.516	mg/L	1	0.50	<0.05	103	0	75 - 125	20
Total Boron	0.052	0.0511	mg/L	1	0.05	<0.01	104	1	75 - 125	20
Total Chromium	0.097	0.0975	mg/L	1	0.10	<0.01	97	0	75 - 125	20
Total Iron	0.498	0.511	mg/L	1	0.50	<0.05	99	2	75 - 125	20
Total Manganese	0.25	0.251	mg/L	1	0.25	<0.025	100	0	75 - 125	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Quality Control Report

Matrix Spikes and Duplicate Spikes

Matrix Spikes QCBatch: QC13037

Param	MS Result	MSD Result	Units	Dil.	Spike Amount Added	Matrix Result	% Rec	RPD	% Rec Limit	RPD Limit
CL	124.93	125.37	mg/L	1	62.50	66.7	93	0	52 - 131	20
Fluoride	13.93	14.26	mg/L	1	12.50	2.50	91	2	80 - 113	20
Nitrate-N	12.59	12.29	mg/L	1	12.50	<1.0	100	2	86 - 110	20
Sulfate	125.34	124.01	mg/L	1	62.50	66.2	94	2	71 - 121	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Matrix Spikes QCBatch: QC13087

Param	MS Result	MSD Result	Units	Dil.	Spike Amount Added	Matrix Result	% Rec	RPD	% Rec Limit	RPD Limit
Total Aluminum	1.05	1.12	mg/L	1	1	<0.1	105	6	75 - 125	20
Total Arsenic	0.525	0.531	mg/L	1	0.50	<0.05	105	1	75 - 125	20
Total Boron	0.208	0.226	mg/L	10	0.05	0.159	98	31	75 - 125	20
Total Chromium	0.0983	0.0997	mg/L	1	0.10	<0.01	98	1	75 - 125	20
Total Iron	0.501	0.511	mg/L	10	0.50	<0.05	98	4	75 - 125	20
Total Manganese	0.273	0.281	mg/L	1	0.25	0.0291	109	2	75 - 125	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Quality Control Report Continuing Calibration Verification Standards

CCV (1) QCBatch: QC13020

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
MTBE		mg/L	0.10	0.097	97	85 - 115	8/1/01
Benzene		mg/L	0.10	0.104	104	85 - 115	8/1/01
Toluene		mg/L	0.10	0.094	94	85 - 115	8/1/01
Ethylbenzene		mg/L	0.10	0.093	93	85 - 115	8/1/01
M,P,O-Xylene		mg/L	0.30	0.26	86	85 - 115	8/1/01

CCV (2) QCBatch: QC13020

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
MTBE		mg/L	0.10	0.098	98	85 - 115	8/1/01
Benzene		mg/L	0.10	0.103	103	85 - 115	8/1/01

Continued ...

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Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Toluene		mg/L	0.10	0.095	95	85 - 115	8/1/01
Ethylbenzene		mg/L	0.10	0.095	95	85 - 115	8/1/01
M.P.O-Xylene		mg/L	0.30	0.265	88	85 - 115	8/1/01

ICV (1) QCBatch: QC13020

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
MTBE		mg/L	0.10	0.11	110	85 - 115	8/1/01
Benzene		mg/L	0.10	0.117	117	85 - 115	8/1/01
Toluene		mg/L	0.10	0.106	106	85 - 115	8/1/01
Ethylbenzene		mg/L	0.10	0.106	106	85 - 115	8/1/01
M,P,O-Xylene		mg/L	0.30	0.296	98	85 - 115	8/1/01

CCV (1) QCBatch: QC13037

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Bromide		mg/L	2.50	2.49	99	90 - 110	8/1/01
CL		mg/L	12.50	11.69	93	90 - 110	8/1/01
Fluoride		mg/L	2.50	2.49	99	90 - 110	8/1/01
Nitrate-N		mg/L	2.50	2.39	95	90 - 110	8/1/01
Sulfate		mg/L	12.50	12.07	96	90 - 110	8/1/01

ICV (1) QCBatch: QC13037

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Bromide		mg/L	2.50	2.45	98	90 - 110	8/1/01
CL		mg/L	12.50	11.66	93	90 - 110	8/1/01
Fluoride		mg/L	2.50	2.48	99	90 - 110	8/1/01
Nitrate-N		mg/L	2.50	2.38	95	90 - 110	8/1/01
Sulfate		mg/L	12.50	12.14	97	90 - 110	8/1/01

CCV (1) QCBatch: QC13087

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Total Aluminum		mg/L	2	2.19	109	90 - 110	8/6/01
Total Arsenic		mg/L	1	1.03	103	90 - 110	8/6/01

Continued ...

... Continued

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Total Boron		mg/L	0.10	0.0991	99	90 - 110	8/6/01
Total Chromium		mg/L	0.20	0.209	104	90 - 110	8/6/01
Total Iron		mg/L	1	0.959	95	90 - 110	8/6/01
Total Manganese		mg/L	0.50	0.498	99	90 - 110	8/6/01

ICV (1) QCBatch: QC13087

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Total Aluminum		mg/L	2	2.04	102	90 - 110	8/6/01
Total Arsenic		mg/L	1	1.03	103	90 - 110	8/6/01
Total Boron		mg/L	0.10	0.106	106	90 - 110	8/6/01
Total Chromium		mg/L	0.20	0.201	100	90 - 110	8/6/01
Total Iron		mg/L	1	1.02	102	90 - 110	8/6/01
Total Manganese		mg/L	0.50	0.494	98	90 - 110	8/6/01

CCV (1) QCBatch: QC13220

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Total Dissolved Solids		mg/L	1000	1017	101	90 - 110	8/10/01

ICV (1) QCBatch: QC13220

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Total Dissolved Solids		mg/L	1000	970	97	90 - 110	8/10/01

17105

7-30-01

Trident Environmental
P.O. Box 7624
Midland, Texas 79708
(915) 682-0808
(915) 682-0727 (Fax)



V-104-0701-1

Chain of Custody

Date 7-30-01 Page 1 of 1

Lab Name: Environmental Lab of Texas				Analysis Request														Relinquished By:			
Address: 12600 W I-20 East																		(3) (Company)			
Telephone: (915) 563-1800																		(Printed Name)			
Sample Type: G - Grab, C - Composite																		(Signature)			
Sample Identification				Matrix	Date	Time	MTBE (EPA 8021B)	SVOC (EPA 8270)	PAH (EPA 8270)	VOC (EPA 8260)	TPH (EPA 418.1)	TPH (TX-1005)	TPH (TX-1006)	GRO (EPA 8015G)	DRO (EPA 8015D)	TDS (EPA 160.1)	Anions/Cations	TCLP Metals	Total Metals: Al, As, B, Cr, Fe, & Mn	Ions: SO ₄ , NO ₃ , Cl, F, & TDS	Number of Containers
MW-3	Water	7-30-01	1245	✓								176	105						✓	✓	4
MW-6	Water	7-30-01	1410	✓								106							✓	✓	4
MW-4	Water	7-30-01	1530	✓								107							✓	✓	4
MW-2	Water	7-30-01	1610	✓								108							✓	✓	4
MW-1d	Water	7-30-01	1700	✓								109							✓	✓	4
MW-7	Water	7-30-01	1820	✓								110							✓	✓	4
Duplicate	Water	7-30-01	0000	✓								111							✓	✓	4
Rinsate	Water	7-30-01	1840	✓								112							✓	✓	2
Trip Blank 8268773	Water	7-30-01	---	✓								113							✓	✓	2
Project Information				Sample Receipt				Relinquished By:				Relinquished By:				Relinquished By:					
Project Name: Duke Energy Field Services				Total Containers:				(1) (Company)				(2) (Company)				(3) (Company)					
Project Location: Monument Booster				COC Seals:				Trident Environmental				(Printed Name)				(Printed Name)					
Project Manager: Gil Van Deventer				Rec'd Good Cond/Cold:				Gilbert Van Deventer				(Signature)				(Signature)					
Cost Center No.: V-104				Conforms to Records:				7-31-01 0830				(Date)				(Date)					
Shipping ID No.:				Lab No.:				Received By:				Received By:				Received By:					
(1) (Company)				(1) (Company)				(2) (Company)				(2) (Company)				(3) (Company)					
Bill to (see below):				Please send invoice direct to client:				(Printed Name)				(Printed Name)				(Printed Name)					
Special Instructions/Comments:				uke Energy Field Svcs, Attn: Steve Weathers, PO Box 5493, Denver, CO 80217				(Signature)				(Signature)				(Signature)					
								(Date)				(Date)				(Date)					

Copy signed original form for Trident Environmental records
 Dgo 902674 411010 ms 812

TRACE ANALYSIS, INC.

6701 Aberdeen Avenue, Suite 9
155 McCutcheon, Suite H

Lubbock, Texas 79424 800•378•1296
El Paso, Texas 79932 888•588•3443
E-Mail: lab@traceanalysis.com

806•794•1296 FAX 806•794•1298
915•585•3443 FAX 915•585•4944

Analytical and Quality Control Report

Gil Van Deventer
TRW
415 West Wall Suite 1818
Midland, TX 79701

Report Date: February 20, 2001

Order ID Number: A01021205

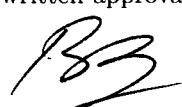
Project Number: P/6494/4AC
Project Name: Duke Energy Field Services
Project Location: Monument Booster

Enclosed are the Analytical Results and Quality Control Data Reports for the following samples submitted to Trace-Analysis, Inc.

Sample	Description	Matrix	Date Taken	Time Taken	Date Received
164782	MW-3 (010208 1415)	Water	2/8/01	14:15	2/9/01
164783	MW-2 (010208 1530)	Water	2/8/01	15:30	2/9/01
164784	MW-6 (010208 1630)	Water	2/8/01	16:30	2/9/01
164785	MW-4 (010208 1730)	Water	2/8/01	17:30	2/9/01
164786	MW11-1D (0102090955)	Water	2/9/01	9:55	2/9/01
164787	Duplicate (010209000)	Water	2/9/01	:	2/9/01
164788	MW-7 (0102091045)	Water	2/9/01	10:45	2/9/01
164789	Rinsate (0102091115)	Water	2/9/01	11:15	2/9/01

These results represent only the samples received in the laboratory. The Quality Control Report is generated on a batch basis. All information contained in this report is for the analytical batch(es) in which your sample(s) were analyzed.

This report consists of a total of 9 pages and shall not be reproduced except in its entirety, without written approval of TraceAnalysis, Inc.


Dr. Blair Leftwich, Director

Analytical Report

Sample: 164782 - MW-3 (010208 1415)

Analysis: BTEX Analytical Method: S 8021B QC Batch: QC09113 Date Analyzed: 2/15/01
Analyst: JW Preparation Method: E 5030B Prep Batch: PB07848 Date Prepared: 2/15/01

Param	Flag	Result	Units	Dilution	RDL
Benzene		0.004	mg/L	1	0.001
Toluene		0.002	mg/L	1	0.001
Ethylbenzene		0.001	mg/L	1	0.001
M,P,O-Xylene		0.005	mg/L	1	0.001
Total BTEX		0.012	mg/L	1	0.001

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
TFT		0.085	mg/L	1	0.10	85	72 - 128
4-BFB		0.1	mg/L	1	0.10	100	72 - 128

Sample: 164782 - MW-3 (010208 1415)

Analysis: Ion Chromatography (IC) Analytical Method: E 300.0 QC Batch: QC09000 Date Analyzed: 2/10/01
Analyst: JS Preparation Method: N/A Prep Batch: PB07756 Date Prepared: 2/10/01

Param	Flag	Result	Units	Dilution	RDL
Nitrate-N	¹	1.8	mg/L	5	0.20
Sulfate		67	mg/L	5	0.50

Sample: 164783 - MW-2 (010208 1530)

Analysis: BTEX Analytical Method: S 8021B QC Batch: QC09113 Date Analyzed: 2/15/01
Analyst: JW Preparation Method: E 5030B Prep Batch: PB07848 Date Prepared: 2/15/01

Param	Flag	Result	Units	Dilution	RDL
Benzene		<0.001	mg/L	1	0.001
Toluene		<0.001	mg/L	1	0.001
Ethylbenzene		<0.001	mg/L	1	0.001
M,P,O-Xylene		<0.001	mg/L	1	0.001
Total BTEX		<0.001	mg/L	1	0.001

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
TFT		0.105	mg/L	1	0.10	105	72 - 128
4-BFB		0.103	mg/L	1	0.10	103	72 - 128

Sample: 164783 - MW-2 (010208 1530)

Analysis: Ion Chromatography (IC) Analytical Method: E 300.0 QC Batch: QC09000 Date Analyzed: 2/10/01
Analyst: JS Preparation Method: N/A Prep Batch: PB07756 Date Prepared: 2/10/01

¹Sample out of hold time for NO3.

Param	Flag	Result	Units	Dilution	RDL
Nitrate-N		2.6	mg/L	5	0.20
Sulfate		110	mg/L	5	0.50

Sample: 164784 - MW-6 (010208 1630)

Analysis: BTEX Analytical Method: S 8021B QC Batch: QC09113 Date Analyzed: 2/15/01
Analyst: JW Preparation Method: E 5030B Prep Batch: PB07848 Date Prepared: 2/15/01

Param	Flag	Result	Units	Dilution	RDL
Benzene		<0.001	mg/L	1	0.001
Toluene		<0.001	mg/L	1	0.001
Ethylbenzene		<0.001	mg/L	1	0.001
M.P.O-Xylene		0.011	mg/L	1	0.001
Total BTEX		0.011	mg/L	1	0.001

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
TFT		0.112	mg/L	1	0.10	112	72 - 128
4-BFB		0.119	mg/L	1	0.10	119	72 - 128

Sample: 164784 - MW-6 (010208 1630)

Analysis: Ion Chromatography (IC) Analytical Method: E 300.0 QC Batch: QC09000 Date Analyzed: 2/10/01
Analyst: JS Preparation Method: N/A Prep Batch: PB07756 Date Prepared: 2/10/01

Param	Flag	Result	Units	Dilution	RDL
Nitrate-N		<1.0	mg/L	5	0.20
Sulfate		60	mg/L	5	0.50

Sample: 164785 - MW-4 (010208 1730)

Analysis: BTEX Analytical Method: S 8021B QC Batch: QC09113 Date Analyzed: 2/15/01
Analyst: JW Preparation Method: E 5030B Prep Batch: PB07848 Date Prepared: 2/15/01

Param	Flag	Result	Units	Dilution	RDL
Benzene		0.002	mg/L	1	0.001
Toluene		<0.001	mg/L	1	0.001
Ethylbenzene		<0.001	mg/L	1	0.001
M.P.O-Xylene		0.002	mg/L	1	0.001
Total BTEX		0.003	mg/L	1	0.001

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
TFT		0.108	mg/L	1	0.10	108	72 - 128
4-BFB		0.111	mg/L	1	0.10	111	72 - 128

Sample: 164785 - MW-4 (010208 1730)

Analysis: Ion Chromatography (IC) Analytical Method: E 300.0 QC Batch: QC09000 Date Analyzed: 2/10/01
Analyst: JS Preparation Method: N/A Prep Batch: PB07756 Date Prepared: 2/10/01

Param	Flag	Result	Units	Dilution	RDL
Nitrate-N		<1.0	mg/L	5	0.20
Sulfate		97	mg/L	5	0.50

Sample: 164786 - MW11-1D (0102090955)

Analysis: BTEX Analytical Method: S 8021B QC Batch: QC09113 Date Analyzed: 2/15/01
Analyst: JW Preparation Method: E 5030B Prep Batch: PB07848 Date Prepared: 2/15/01

Param	Flag	Result	Units	Dilution	RDL
Benzene		<0.001	mg/L	1	0.001
Toluene		<0.001	mg/L	1	0.001
Ethylbenzene		<0.001	mg/L	1	0.001
M,P,O-Xylene		0.001	mg/L	1	0.001
Total BTEX		0.001	mg/L	1	0.001

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
TFT		0.111	mg/L	1	0.10	111	72 - 128
4-BFB		0.115	mg/L	1	0.10	115	72 - 128

Sample: 164786 - MW11-1D (0102090955)

Analysis: Ion Chromatography (IC) Analytical Method: E 300.0 QC Batch: QC09000 Date Analyzed: 2/10/01
Analyst: JS Preparation Method: N/A Prep Batch: PB07756 Date Prepared: 2/10/01

Param	Flag	Result	Units	Dilution	RDL
Nitrate-N		2.0	mg/L	5	0.20
Sulfate		95	mg/L	5	0.50

Sample: 164787 - Duplicate (010209000)

Analysis: BTEX Analytical Method: S 8021B QC Batch: QC09113 Date Analyzed: 2/15/01
Analyst: JW Preparation Method: E 5030B Prep Batch: PB07848 Date Prepared: 2/15/01

Param	Flag	Result	Units	Dilution	RDL
Benzene		0.341	mg/L	5	0.001
Toluene		<0.005	mg/L	5	0.001
Ethylbenzene		0.404	mg/L	5	0.001
M,P,O-Xylene		0.052	mg/L	5	0.001
Total BTEX		0.797	mg/L	5	0.001

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
TFT		0.47	mg/L	1	0.10	94	72 - 128
4-BFB		0.559	mg/L	1	0.10	111	72 - 128

Sample: 164788 - MW-7 (0102091045)

Analysis: BTEX Analytical Method: S 8021B QC Batch: QC09113 Date Analyzed: 2/15/01
Analyst: JW Preparation Method: E 5030B Prep Batch: PB07848 Date Prepared: 2/15/01

Param	Flag	Result	Units	Dilution	RDL
Benzene		0.355	mg/L	5	0.001
Toluene		<0.005	mg/L	5	0.001
Ethylbenzene		0.424	mg/L	5	0.001
M.P.O-Xylene		0.052	mg/L	5	0.001
Total BTEX		0.831	mg/L	5	0.001

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
TFT		0.508	mg/L	1	0.10	101	72 - 128
4-BFB		0.587	mg/L	1	0.10	117	72 - 128

Sample: 164788 - MW-7 (0102091045)

Analysis: Ion Chromatography (IC) Analytical Method: E 300.0 QC Batch: QC09000 Date Analyzed: 2/10/01
Analyst: JS Preparation Method: N/A Prep Batch: PB07756 Date Prepared: 2/10/01

Param	Flag	Result	Units	Dilution	RDL
Nitrate-N		<1.0	mg/L	5	0.20
Sulfate		22	mg/L	5	0.50

Sample: 164789 - Rinsate (0102091115)

Analysis: BTEX Analytical Method: S 8021B QC Batch: QC09113 Date Analyzed: 2/15/01
Analyst: JW Preparation Method: E 5030B Prep Batch: PB07848 Date Prepared: 2/15/01

Param	Flag	Result	Units	Dilution	RDL
Benzene		<0.005	mg/L	5	0.001
Toluene		<0.005	mg/L	5	0.001
Ethylbenzene		<0.005	mg/L	5	0.001
M.P.O-Xylene		<0.005	mg/L	5	0.001
Total BTEX		<0.005	mg/L	5	0.001

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
TFT		0.467	mg/L	1	0.10	93	72 - 128
4-BFB		0.519	mg/L	1	0.10	103	72 - 128

Quality Control Report Method Blank

Method Blank QCBatch: QC09000

Param	Flag	Results	Units	Reporting Limit
Nitrate-N		<0.2	mg/L	0.20
Sulfate		<0.5	mg/L	0.50

Method Blank QCBatch: QC09113

Param	Flag	Results	Units	Reporting Limit
Benzene		<0.001	mg/L	0.001
Toluene		<0.001	mg/L	0.001
Ethylbenzene		<0.001	mg/L	0.001
M.P.O-Xylene	2	0.001	mg/L	0.001
Total BTEX		0.001	mg/L	0.001

Surrogate	Flag	Result	Units	Spike Amount	Percent Recovery	Recovery Limit
TFT		0.101	mg/L	0.10	101	72 - 128
4-BFB		0.097	mg/L	0.10	97	72 - 128

Quality Control Report Lab Control Spikes and Duplicate Spikes

LCS QC Batch: QC09000

Param	Flag	Sample Result	Units	Dil.	Spike Amount Added	Matrix Result	% Rec.	RPD	% Rec. Limit	RPD Limit
Nitrate-N		2.34	mg/L	1	2.50	<0.2	93		80 - 120	20
Sulfate		11.84	mg/L	1	12.50	<0.5	94		80 - 120	20

LCSD QC Batch: QC09000

Param	Flag	Sample Result	Units	Dil.	Spike Amount Added	Matrix Result	% Rec.	RPD	% Rec. Limit	RPD Limit
Nitrate-N		2.34	mg/L	1	2.50	<0.2	93	0	80 - 120	20
Sulfate		11.90	mg/L	1	12.50	<0.5	95	0	80 - 120	20

²M.P.O-XYLENES TOOK AT HIT AT .001 PPM POSSIBLY DUE TO RESIDUAL CARRYOVER

LCS QC Batch: QC09113

Param	Flag	Sample Result	Units	Dil.	Spike Amount Added	Matrix Result	% Rec.	RPD	% Rec. Limit	RPD Limit
MTBE		0.104	mg/L	1	0.10	<0.001	104		80 - 120	20
Benzene		0.084	mg/L	1	0.10	<0.001	84		80 - 120	20
Toluene		0.084	mg/L	1	0.10	<0.001	84		80 - 120	20
Ethylbenzene		0.089	mg/L	1	0.10	<0.001	89		80 - 120	20
M.P.O-Xylene		0.258	mg/L	1	0.30	0.001	86		80 - 120	20

Surrogate	Flag	Result	Units	Dil.	Spike Amount	% Rec.	% Rec. Limit
TFT		0.091	mg/L	1	0.10	91	72 - 128
4-BFB		0.098	mg/L	1	0.10	98	72 - 128

LCSD QC Batch: QC09113

Param	Flag	Sample Result	Units	Dil.	Spike Amount Added	Matrix Result	% Rec.	RPD	% Rec. Limit	RPD Limit
MTBE		0.102	mg/L	1	0.10	<0.001	102	2	80 - 120	20
Benzene		0.089	mg/L	1	0.10	<0.001	89	6	80 - 120	20
Toluene		0.09	mg/L	1	0.10	<0.001	90	7	80 - 120	20
Ethylbenzene		0.092	mg/L	1	0.10	<0.001	92	3	80 - 120	20
M.P.O-Xylene		0.272	mg/L	1	0.30	0.001	90	5	80 - 120	20

Surrogate	Flag	Result	Units	Dil.	Spike Amount	% Rec.	% Rec. Limit
TFT		0.096	mg/L	1	0.10	96	72 - 128
4-BFB		0.102	mg/L	1	0.10	102	72 - 128

Quality Control Report Matrix Spikes and Duplicate Spikes

MS QC Batch: QC09000

Param	Flag	Sample Result	Units	Dil.	Spike Amount Added	Matrix Result	% Rec.	RPD	% Rec. Limit	RPD Limit
Nitrate-N		12.18	mg/L	1	12.50	<1.0	97		80 - 120	20
Sulfate		81.33	mg/L	1	62.50	22	94		80 - 120	20

MSD QC Batch: QC09000

Param	Flag	Sample Result	Units	Dil.	Spike Amount Added	Matrix Result	% Rec.	RPD	% Rec. Limit	RPD Limit
Nitrate-N		12.09	mg/L	1	12.50	<1.0	96	1	80 - 120	20
Sulfate		79.69	mg/L	1	62.50	22	92	3	80 - 120	20

Quality Control Report Continuing Calibration Verification Standards

CCV (1) QC Batch: QC09000

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Bromide		mg/L	2.50	2.42	96	80 - 120	2/10/01
CL		mg/L	12.50	11.55	92	80 - 120	2/10/01
Fluoride		mg/L	2.50	2.36	94	80 - 120	2/10/01
Nitrate-N		mg/L	2.50	2.34	93	80 - 120	2/10/01
Sulfate		mg/L	12.50	11.88	95	80 - 120	2/10/01

ICV (1) QC Batch: QC09000

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Bromide		mg/L	2.50	2.38	95	80 - 120	2/10/01
CL		mg/L	12.50	11.79	94	80 - 120	2/10/01
Fluoride		mg/L	2.50	2.37	94	80 - 120	2/10/01
Nitrate-N		mg/L	2.50	2.34	93	80 - 120	2/10/01
Sulfate		mg/L	12.50	11.81	94	80 - 120	2/10/01

CCV (1) QC Batch: QC09113

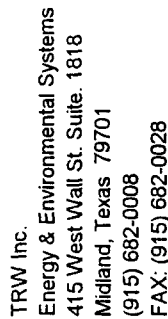
Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
MTBE		mg/L	0.10	0.108	108	85 - 115	2/15/01
Benzene		mg/L	0.10	0.094	94	85 - 115	2/15/01
Toluene		mg/L	0.10	0.093	93	85 - 115	2/15/01
Ethylbenzene		mg/L	0.10	0.096	96	85 - 115	2/15/01
M,P,O-Xylene		mg/L	0.30	0.282	94	85 - 115	2/15/01

CCV (2) QC Batch: QC09113

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
MTBE		mg/L	0.10	0.102	102	85 - 115	2/15/01
Benzene		mg/L	0.10	0.101	101	85 - 115	2/15/01
Toluene		mg/L	0.10	0.101	101	85 - 115	2/15/01
Ethylbenzene		mg/L	0.10	0.103	103	85 - 115	2/15/01
M,P,O-Xylene		mg/L	0.30	0.307	102	85 - 115	2/15/01

ICV (1) QC Batch: QC09113

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
MTBE		mg/L	0.10	0.106	106	85 - 115	2/15/01
Benzene		mg/L	0.10	0.087	87	85 - 115	2/15/01
Toluene		mg/L	0.10	0.089	89	85 - 115	2/15/01
Ethylbenzene		mg/L	0.10	0.092	92	85 - 115	2/15/01
M,P,O-Xylene		mg/L	0.30	0.2710	90	85 - 115	2/15/01



Chain of Custody

Date 2/9/01 Page 1 of 1

Analysis Request

Lab Name: <u>TRACE ANALYTICS, INC.</u>			
Address: <u>6701 Aberdeen</u>			
<u>Lubbock, Texas 79424</u>			
Telephone: <u>800-378-1296</u>			
Samplers (SIGNATURES)			
<u>John Zeng</u>			
Sample Identification	Matrix	Date	Time
NW-3 (010208 1415)	Water	2/8/01	1415
NW-2 (010208 1530)	Water	2/8/01	1530
NW-6 (010208 1630)	Water	2/8/01	1630
NW-4 (010208 1730)	Water	2/8/01	1730
MW-11-1d (010209 0955)	Water	2/9/01	0955
MW-11-1d (010209 0955)	Water	2/9/01	0955
MW-7 (010209 1045)	Water	2/9/01	1045
MW-11-1d (010209 1115)	Water	2/9/01	1115
Project Information		Sample Receipt	
Project Name: <u>Duke Energy Field Servs</u>		Total Containers:	
Project Location: <u>Monument Booster Station</u>		COC Seals:	
Project Manager: <u>G.I. Van Deventer</u>		Rec'd Good Cond/Cold:	
Cost Center No.: <u>P1649414 AC</u>		Conforms to Records:	
Shipping ID No.: <u>BYS 9025506853</u>		Lab No.:	
P O No.:			
Special Instructions/Comments: <u>Bill direct to: Duke Energy Field Servs</u>			
Attn: <u>Steve Weathers</u>			

Distribution: White Canyon, 1 chorotensis, 1 hill, 1 town.

APPENDIX B

MONITORING WELL
SAMPLING DATA SHEETS

WELL SAMPLING DATA FORM

CLIENT: DUKE ENERGY FIELD SERVICES
 SITE NAME: MONUMENT BOOSTER STATION
 PROJECT NO. V-104

WELL ID: MW-1D
 DATE: 7/30/01
 SAMPLER: Ferguson / Van Deventer

PURGING METHOD: ☐ Hand Bailed ☒ Pump If Pump, Type: 3" Grundfos Pump

SAMPLING METHOD: ☒ Disposable Bailer ☐ Direct from Discharge Hose ☐ Other: _____

DESCRIBE EQUIPMENT DECONTAMINATION METHOD BEFORE SAMPLING THE WELL:

☒ Gloves ☒ Alconox ☒ Distilled Water Rinse ☐ Other: _____

DISPOSAL METHOD OF PURGE WATER: ☐ Surface Discharge ☐ Drums ☒ Disposal Facility

TOTAL DEPTH OF WELL: 36.12 Feet

DEPTH TO WATER: 26.24 Feet

HEIGHT OF WATER COLUMN: 9.88 Feet

WELL DIAMETER: 2.0 Inch

4.8 Minimum Gallons to purge 3 well volumes
 (Water Column Height x 1.96)

TIME	VOLUME PURGED	TEMP. °C / °F	COND. mS/cm	pH	DO mg/L	Turb	PHYSICAL APPEARANCE AND REMARKS
1631	0	-	-	-	-	-	Pump On!
1634	3	22.5	928	7.73		15	
1637	6	21.5	901	7.64	1.94	4	
1641	9	21.2	875	7.58	1.83	3	
1644	12	21.1	876	7.58	2.02	1	
1648	15	21.1	876	7.60	1.96	0	Pump Off!
							Flow Rate = 0.88 gal/min

COMMENTS: Collected Sample #0107301700 for BTEX 8021B and Cl, F, NO3-N, SO4, TDS,
Al, As, B, Cr, Fe, Mn.

WELL SAMPLING DATA FORM

CLIENT: DUKE ENERGY FIELD SERVICES
 SITE NAME: MONUMENT BOOSTER STATION
 PROJECT NO. V-104

WELL ID: MW-2
 DATE: 7/30/01
 SAMPLER: Ferguson / Van Deventer

PURGING METHOD: ☐ Hand Bailed ☒ Pump If Pump, Type: 3" Grundfos Pump

SAMPLING METHOD: ☒ Disposable Bailer ☐ Direct from Discharge Hose ☐ Other: _____

DESCRIBE EQUIPMENT DECONTAMINATION METHOD BEFORE SAMPLING THE WELL:

☒ Gloves ☒ Alconox ☒ Distilled Water Rinse ☐ Other: _____

DISPOSAL METHOD OF PURGE WATER: ☐ Surface Discharge ☐ Drums ☒ Disposal Facility

TOTAL DEPTH OF WELL: 43.06 Feet

DEPTH TO WATER: 29.52 Feet

HEIGHT OF WATER COLUMN: 13.54 Feet

WELL DIAMETER: 4.0 Inch

26.5 Minimum Gallons to purge 3 well volumes
 (Water Column Height x 1.96)

TIME	VOLUME PURGED	TEMP. °C / °F	COND. mS/cm	pH	DO mg/L	Turb	PHYSICAL APPEARANCE AND REMARKS
1538	0	-	-	-	-	-	Pump On!
1542	5	21.7	710	7.26	7.32	1	
1546	10	21.0	534	7.35	7.56	21	
1551	15	20.7	562	7.33	7.65	17	
1556	20	20.8	583	7.35	7.65	8	
1602	25	21.0	614	7.33	7.57	12	Pump Off!
							Flow Rate = 1.04 gal/min

COMMENTS: Collected Sample #0107301610 for BTEX 8021B and Cl, F, NO3-N, SO4, TDS,
Al, As, B, Cr, Fe, Mn.

WELL SAMPLING DATA FORM

CLIENT: DUKE ENERGY FIELD SERVICES
 SITE NAME: MONUMENT BOOSTER STATION
 PROJECT NO. V-104

WELL ID: MW-3
 DATE: 7/30/01
 SAMPLER: Ferguson / Van Deventer

PURGING METHOD: ☐ Hand Bailed ☒ Pump If Pump, Type: 3" Grundfos Pump

SAMPLING METHOD: ☒ Disposable Bailer ☐ Direct from Discharge Hose ☐ Other: _____

DESCRIBE EQUIPMENT DECONTAMINATION METHOD BEFORE SAMPLING THE WELL:

☒ Gloves ☒ Alconox ☒ Distilled Water Rinse ☐ Other: _____

DISPOSAL METHOD OF PURGE WATER: ☐ Surface Discharge ☐ Drums ☒ Disposal Facility

TOTAL DEPTH OF WELL: 35.47 Feet

DEPTH TO WATER: 23.25 Feet

HEIGHT OF WATER COLUMN: 12.22 Feet

WELL DIAMETER: 4.0 Inch

23.9 Minimum Gallons to purge 3 well volumes
 (Water Column Height x 1.96)

TIME	VOLUME PURGED	TEMP. °C / °F	COND. mS/cm	pH	DO mg/L	Turb	PHYSICAL APPEARANCE AND REMARKS
1226	0	-	-	-	-	-	Pump On!
1230	5	22.3	1340	7.32	2.17	-	
1234	10	21.5	1350	7.26	1.80	-	
1239	15	21.7	1290	7.23	2.15	20	
1246	20	22.0	1250	7.36	4.69	74	
1302	25	24.0	1250	7.38	5.75	39	Pump Off!
1305							Flow Rate = 0.69 gal/min

COMMENTS: Collected Sample #0107301245 for BTEX 8021B and Cl, F, NO3-N, SO4, TDS,
Al, As, B, Cr, Fe, Mn.

WELL SAMPLING DATA FORM

CLIENT: DUKE ENERGY FIELD SERVICES
 SITE NAME: MONUMENT BOOSTER STATION
 PROJECT NO. V-104

WELL ID: MW-4
 DATE: 7/30/01
 SAMPLER: Ferguson / Van Deventer

PURGING METHOD: ☐ Hand Bailed ☒ Pump If Pump, Type: 3" Grundfos Pump

SAMPLING METHOD: ☒ Disposable Bailer ☐ Direct from Discharge Hose ☐ Other: _____

DESCRIBE EQUIPMENT DECONTAMINATION METHOD BEFORE SAMPLING THE WELL:

☒ Gloves ☒ Alconox ☒ Distilled Water Rinse ☐ Other: _____

DISPOSAL METHOD OF PURGE WATER: ☐ Surface Discharge ☐ Drums ☒ Disposal Facility

TOTAL DEPTH OF WELL: 38.71 Feet

DEPTH TO WATER: 26.5 Feet

HEIGHT OF WATER COLUMN: 12.21 Feet

WELL DIAMETER: 4.0 Inch

23.9 Minimum Gallons to purge 3 well volumes
 (Water Column Height x 1.96)

TIME	VOLUME PURGED	TEMP. °C / °F	COND. m S/cm	pH	DO mg/L	Turb	PHYSICAL APPEARANCE AND REMARKS
1431	0	-	-	-	-	-	Pump On!
1435	5	21.9	1350	7.28	1.36	9	
1440	10	21.2	1330	7.26	1.46	3	
1448	15	22.1	1290	7.34	3.61	46	
1454	20	23.3	1290	7.26	6.03	19	
1515	25	24.2	1290	7.28	6.11	6	Pump Off!
							Flow Rate = 0.57 gal/min

COMMENTS: Collected Sample #0107301520 for BTEX 8021B and Cl, F, NO3-N, SO4, TDS,
Al, As, B, Cr, Fe, Mn.

WELL SAMPLING DATA FORM

CLIENT: DUKE ENERGY FIELD SERVICES
 SITE NAME: MONUMENT BOOSTER STATION
 PROJECT NO. V-104

WELL ID: MW-6
 DATE: 7/30/01
 SAMPLER: Ferguson / Van Deventer

PURGING METHOD: ☐ Hand Bailed ☒ Pump If Pump, Type: 3" Grundfos Pump

SAMPLING METHOD: ☒ Disposable Bailer ☐ Direct from Discharge Hose ☐ Other: _____

DESCRIBE EQUIPMENT DECONTAMINATION METHOD BEFORE SAMPLING THE WELL:

☒ Gloves ☒ Alconox ☒ Distilled Water Rinse ☐ Other: _____

DISPOSAL METHOD OF PURGE WATER: ☐ Surface Discharge ☐ Drums ☒ Disposal Facility

TOTAL DEPTH OF WELL: 39.30 Feet

DEPTH TO WATER: 25.36 Feet

HEIGHT OF WATER COLUMN: 13.94 Feet

WELL DIAMETER: 4.0 Inch

27.3 Minimum Gallons to purge 3 well volumes
 (Water Column Height x 1.96)

TIME	VOLUME PURGED	TEMP. °C / °F	COND. mS/cm	pH	DO mg/L	Turb	PHYSICAL APPEARANCE AND REMARKS
1340	0	-	-	-	-	-	Pump On!
1344	5	22.2	1450	7.07	1.04	70	
1348	10	21.1	1430	7.06	1.26	10	
1352	15	20.6	1450	7.06	1.43	11	
1356	20	20.6	1470	7.05	1.51	0	
1400	25	20.5	1370	7.05	1.3	8	Pump Off!
							Flow Rate = 0.80 gal/min

COMMENTS: Collected Sample #0107301410 for BTEX 8021B and Cl, F, NO3-N, SO4, TDS,
 Al, As, B, Cr, Fe, Mn.

WELL SAMPLING DATA FORM

CLIENT: DUKE ENERGY FIELD SERVICES
 SITE NAME: MONUMENT BOOSTER STATION
 PROJECT NO. V-104

WELL ID: MW-7
 DATE: 7/30/01
 SAMPLER: Ferguson / Van Deventer

PURGING METHOD: ☐ Hand Bailed ☒ Pump If Pump, Type: 3" Grundfos Pump

SAMPLING METHOD: ☒ Disposable Bailer ☐ Direct from Discharge Hose ☐ Other: _____

DESCRIBE EQUIPMENT DECONTAMINATION METHOD BEFORE SAMPLING THE WELL:

☒ Gloves ☒ Alconox ☒ Distilled Water Rinse ☐ Other: _____

DISPOSAL METHOD OF PURGE WATER: ☐ Surface Discharge ☐ Drums ☒ Disposal Facility

TOTAL DEPTH OF WELL: 36.22 Feet

DEPTH TO WATER: 25.85 Feet

HEIGHT OF WATER COLUMN: 10.37 Feet

WELL DIAMETER: 4.0 Inch

20.3 Minimum Gallons to purge 3 well volumes
 (Water Column Height x 1.96)

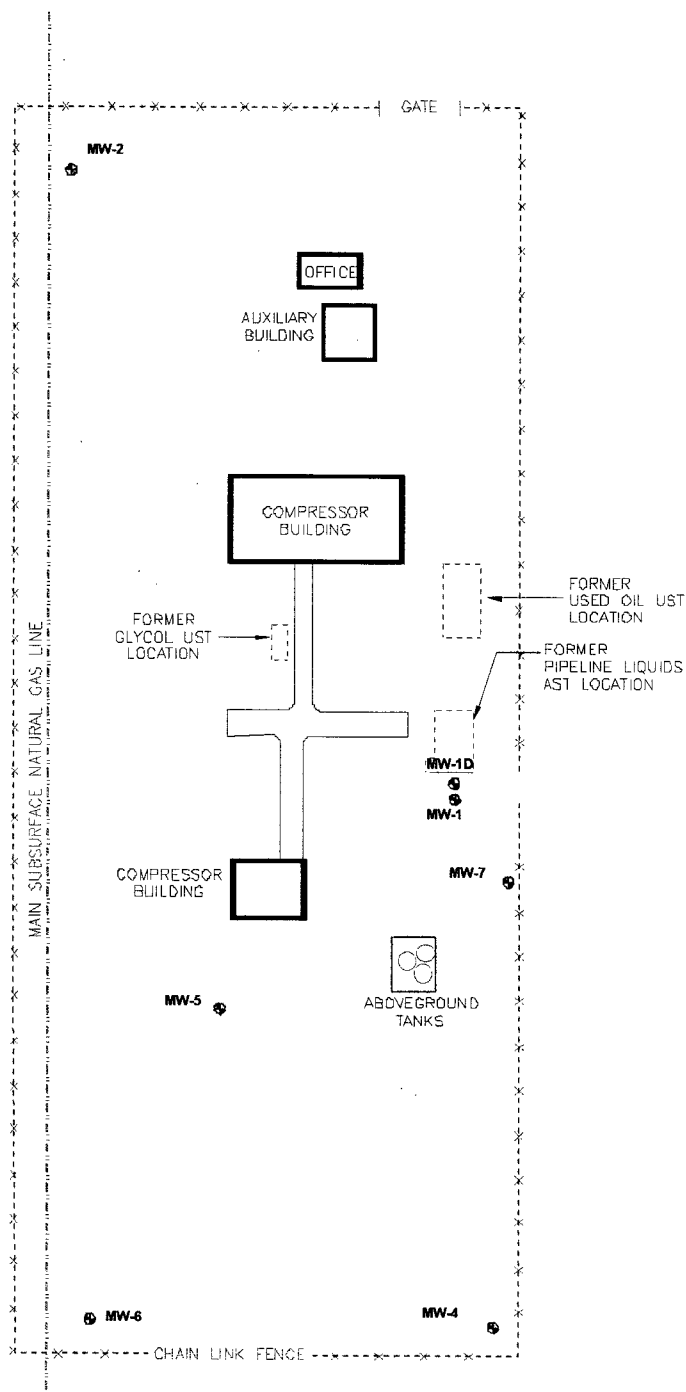
TIME	VOLUME PURGED	TEMP. °C / °F	COND. m S/cm	pH	DO mg/L	Turb	PHYSICAL APPEARANCE AND REMARKS
1727	0	-	-	-	-	-	Pump On!
1731	5	21.0	1110	7.36	0.99	32	
1736	10	19.9	1090	7.25	1.25	5	
1740	15	19.7	1160	7.22	1.40	12	
1745	20	19.6	1160	7.22	1.44	12	
1750	25	19.5	1110	7.3	1.55	6	Pump Off!
							Flow Rate = 0.92 gal/min

COMMENTS: Collected Sample #0107301820 for BTEX 8021B and Cl, F, NO3-N, SO4, TDS,
 Al, As, B, Cr, Fe, Mn.

**2001 Annual Groundwater Monitoring
and Remediation Performance Report
Duke Energy Field Services
Monument Booster Station
Lea County, New Mexico**

Prepared For:

**Duke Energy Field Services
P. O. Box 5493
Denver, Colorado 80217**



Prepared By:



**P O Box 7624
Midland, Texas 79708**

November 30, 2000

Mr. Bill Olsen
New Mexico Energy, Minerals and Natural Resources Department
Oil Conservation Division – Environmental Bureau
2040 South Pacheco Street
Santa Fe, New Mexico 87505

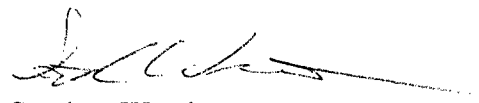
**RE: 2000 Annual Groundwater Report for the Monument Booster Station, Lea
County New Mexico**

Dear Mr. Olsen:

Duke Energy Field Services, LP (DEFS) is pleased to submit for your review, one copy of the 2000 Annual Groundwater Report for the Monument Booster Station located in Lea County, New Mexico. The annual groundwater report incorporates the two semiannual sampling events that were completed this year.

If you have any questions regarding the 2000 Annual Groundwater Report, please call me at 303-605-1718.

Sincerely
Duke Energy Field Services, LP



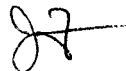
Stephen Weathers
Environmental Specialist

Enclosure

cc: Donna Williams, OCD Hobbs District
Environmental Files

1-30-01

Stephen Weathers - called - informed him that a DP was necessary on this site because of the GW problem - he indicated that he would have Karin Char get one prepared & forward.



**2000 Annual Groundwater Monitoring Report
Duke Energy Field Services
Monument Booster Station
Lea County, New Mexico**

RECEIVED

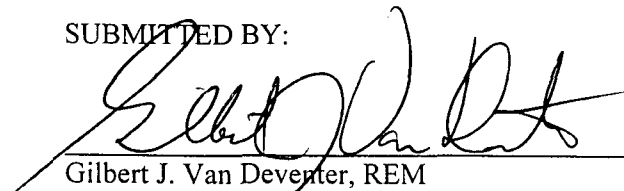
DEC 01 2000

ENVIRONMENTAL BUREAU
OIL CONSERVATION DIVISION

Prepared by:

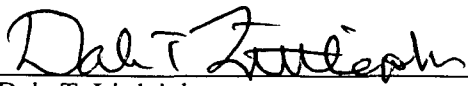
TRW Inc.
Energy & Environmental Systems
415 West Wall Street, Suite 1818
Midland, Texas 79701
(915) 682-0008
FAX (915) 682-0028

SUBMITTED BY:


Gilbert J. Van Deventer, REM
Project Manager

DATE:

11-21-00


Dale T. Littlejohn
Quality Assurance Officer

11-21-00

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1.0 Executive Summary

The Energy & Environmental Integration Services Unit of TRW Inc. (TRW), was retained by Duke Energy Field Services Inc. (DEFS) to perform the groundwater monitoring operations at the Monument Booster Station. This 2000 annual report documents the two semi-annual sampling events performed by TRW at the DEFS Monument Booster Station on February 18, 2000 and August 23, 2000. The report also contains the historical groundwater elevation and analytical data since the beginning of the project in May 1995. This monitoring and sampling program was conducted in accordance with the guidelines specified by Mr. Bill Olson of the New Mexico Oil Conservation Division (OCD) in his letter dated December 9, 1999.

Based on the groundwater monitoring and remediation system performance data to date, the following conclusions at the Monument Booster Station are evident:

- Benzene, toluene, ethylbenzene, and xylenes (BTEX) concentrations in monitoring wells MW-1D, MW-2, MW-3, MW-4, and MW-6 are presently below New Mexico Water Quality Control Commission (WQCC) standards. With the exception of the August 1999 sample recovered from MW-2 and the August 1999 and February 2000 samples recovered from MW-3, the BTEX concentrations in each of these wells have remained below the WQCC standard levels since 1995.
- Only the benzene concentrations from the current and historic groundwater samples recovered from MW-7 exceed the WQCC standard. These levels, however appear to have stabilized between of 0.5 and 0.7 mg/L over the last four semi-annual monitoring events. There is no indication that a consistent dissolved benzene plume extends off the site to the southeast (downgradient) from the source area. Some concern for potential future off site migration is justified based on elevated benzene concentrations observed in MW-3 from groundwater samples recovered during two of the last three monitoring events. Although the benzene slug is estimated to be migrating at approximately 0.31 feet per day and attenuating at a rate of approximately one-half-life per 100 feet. At this rate the benzene slug should not represent an environmental threat to potential future receptors within 500 feet southeast of MW-3.
- As of October 3, 2000, a total of approximately 138 gallons of free product (condensate) has been removed from monitoring wells MW-1 and MW-5 using a combination of gravity siphoning, hand bailing, passive skimmer, adsorbent sock, and pneumatic pump recovery methods.
- The presence and trends of biological parameters (dissolved oxygen, nitrate, sulfate, and iron) indicate that biodegradation has been taking place on site. The biodegradation capacity of electron acceptors and metabolic byproducts (33.36 mg/L) far exceeds the highest benzene concentration (1.13 mg/L) observed on site by a ratio of 30 to 1. This indicates that the biodegradation process has been active. Continued semi-annual monitoring is necessary to demonstrate the effectiveness of intrinsic bioremediation in limiting the migration of the dissolved hydrocarbon plume.

The following recommendations are suggested for the remediation system and monitoring operations at the Monument Booster Station.

- Continue free product recovery operations utilizing absorbent socks in MW-1 and MW-5. This system appears to have been effective in recovering free product over the last annual monitoring period. However, if the thickness of the product increases beyond the removal capacity of the absorbent socks the Xitech product recovery system can be reinstalled. Additional monitoring wells have also been proposed to better define the source area and extent of the free product observed in MW-5.
- Discontinue analyses for aluminum, arsenic, and chromium since those constituents have been below the WQCC standards for over four years.
- Continue the groundwater-monitoring program on a semi-annual basis. The next sampling event is scheduled during the first quarter of 2001. If future monitoring indicates an increased potential for off-site migration of the dissolved benzene plume, then additional corrective actions will be proposed in a separate work plan.

2.0 Chronology of Events

July 1992	Benge Construction Company of Lovington, New Mexico removed three underground storage tanks (USTs) near the main compressor building for ENRON at the Hobbs Compressor Station #2). The USTs formally contained used oil and pipeline liquids (oil and/or natural gas liquid condensate). Hydrocarbon-impacted soils were removed from the used oil and pipeline liquids UST tank holds.
February 4, 1994	Geoscience Consultants Ltd (GCL) installed two monitoring wells (MW-1 and MW-2) during a subsurface investigation for ENRON. Hydrocarbon-impacted groundwater was confirmed in MW-1.
May 17, 1994	Benge Construction Company returned during a subsurface investigation conducted by Daniel B. Stevens and Associates (DBS&A) and removed an additional amount of hydrocarbon-impacted soils from the pipeline liquids and used oil UST tank holds. The amount of hydrocarbon-impacted soils removed from the used oil and pipeline liquids UST tank holds in 1992 and 1994 was not well documented, however it was estimated by DBS&A that a total of 1,064 cubic yards were excavated from the two tank holds based on the amount of backfill required to fill the excavations.
May 16-19, 1994	Six soil borings (SB-1 through SB-6) were completed as temporary drive point wells for ENRON by DBS&A to delineate the horizontal extent of hydrocarbon-impacted soils and groundwater.
October 7, 1994	The OCD requested ENRON to provide a work plan to completely define the extent of groundwater contamination at the Hobbs Compressor Station #2 site.
November 1994	GPM Gas Corporation (GPM) acquired ownership and operation of the Monument Booster Station (formerly Hobbs Compressor Station #2) from ENRON.
February 23, 1995	GPM submitted a subsurface investigation work plan to the OCD to address the groundwater conditions at Monument Booster Station.
April 5, 1995	The OCD approved the subsurface investigation work plan for Monument Booster Station.
May 8-10, 1995	GCL completed a subsurface investigation for GPM to delineate the extent of the hydrocarbon-impacted groundwater. The investigation included the installation and sampling of four monitoring wells (MW-1D, MW-3, MW-4, and MW-5) and one soil boring (SB-7).
July 28, 1995	GPM submitted the <i>Subsurface Investigation and Preliminary Remedial Response</i> report for the Monument Booster Station to the OCD.

August 24, 1995	The OCD approved GPM's recommendations for remedial action. The OCD requested a work plan for an additional monitoring well, new recovery well and product recovery system.
September 29, 1995	GPM submitted the <i>Remediation and Monitoring Work Plan for the Monument Booster Station</i> to the OCD.
October 25, 1995	The OCD approved the remediation and monitoring work plan for Monument Booster Station.
November 14-16, 1995	GCL installed two additional monitoring wells (MW-6 and MW-7) and conducted the fourth quarter 1995 sampling event at Monument Booster Station.
January 18, 1996	GCL conducted the first quarter 1996 sampling event at Monument Booster Station.
April 24, 1996	GCL conducted the annual (second quarter 1996) sampling event at Monument Booster Station. The annual report included recommendations to the OCD for remedial response.
January 22, 1997	BDM International, Inc. (formerly GCL) conducted the first quarter 1997 sampling event at Monument Booster Station.
January 31, 1997	The OCD completed the review of the annual report for the second quarter 1996 sampling event and approved the groundwater monitoring modifications for Monument Booster Station.
January 31, 1997	BDM International, Inc. (BDM) and GPM installed an automated pneumatic product recovery pump system in monitoring wells MW-1 and MW-5 to replace the hand bailing and gravity siphoning techniques used previously.
August 11, 1997	BDM conducted the annual (third quarter 1997) sampling event at Monument Booster Station.
January 23, 1998	TRW conducted the semi-annual (first quarter 1998) sampling event at Monument Booster Station.
August 3, 1998	TRW conducted the annual (third quarter 1998) sampling event at Monument Booster Station.
February 10, 1999	TRW conducted the semi-annual (first quarter 1999) sampling event at Monument Booster Station.
August 17, 1999	TRW conducted the annual (third quarter 1999) sampling event at Monument Booster Station.

September 14, 1999	TRW conducted O & M on Xitech product recovery system (MW-1) checked and/or replaced absorbent sock and hand bailed excess product from MW-5.
October 26, 1999	TRW conducted O & M on Xitech system and manual product removal.
November 5, 1999	TRW conducted manual product removal from MW-5.
November 22, 1999	TRW conducted O & M on Xitech system and manual product removal.
December 20, 1999	TRW removed the Xitech pump for update and repair. An absorbent sock was installed in MW-1 and replaced in MW-5. Excess product was removed from MW-5 using a hand bailer.
January 26, 2000	TRW measured product thickness and install new absorbent socks in MW-1 and MW-5.
February 17-18, 2000	TRW conducted the semi-annual (first quarter 2000) sampling event and product removal operations. Groundwater samples were recovered from MW-1D, MW-2, MW-3, MW-4, MW-6 and MW-7.
April 4, 2000	TRW measured product thickness, install new absorbent socks in MW-1 and MW-5, and removed excess product using a hand bailer.
April 24, 2000	TRW measured product thickness and check and/or replaced absorbent socks in MW-1 and MW-5.
June 15, 2000	TRW measured product thickness and install new absorbent socks in MW-1 and MW-5.
July 19, 2000	TRW measured product thickness and install new absorbent socks in MW-1 and MW-5.
August 23, 2000	TRW conducted the annual (third quarter 2000) sampling event and product removal operations. Groundwater samples were recovered from MW-1D, MW-2, MW-3, MW-4, MW-6 and MW-7.
October 3, 2000	TRW measured product thickness and install new absorbent socks in MW-1 and MW-5.

3.0 Procedures

Prior to sampling, all monitoring wells (MW-1 through MW-7) were gauged for depth to groundwater using a Heron Model H.01L oil/water interface probe. Each monitoring well designated for groundwater sampling was purged using a clean, decontaminated submersible (Whaler Superpurger™) pump. Groundwater parameters, including pH, conductivity, temperature, turbidity, and dissolved oxygen (DO) were measured during the purging operation using a Horiba Model U10 multiparameter meter, and Hanna Model 9143 DO meter. A total of 321 gallons of water was purged from monitoring wells MW-1D, MW-2, MW-3, MW-4, MW-6, and MW-7 during the February 18, 2000 and August 23, 2000 sampling events. Groundwater samples were obtained following the purging operation using a new, decontaminated, disposable bailer.

The first sets were transferred into airtight, septum-sealed, 40-ml glass VOA sample vials with zero headspace for analysis of BTEX using EPA Method 8021B. A duplicate sample of MW-7 was collected during both sampling events. The second set of water samples were transferred into appropriately preserved containers for analysis of nitrate (NO₃) and sulfate (SO₄), to assess the efficacy of intrinsic bioremedial activity currently taking place. During the annual sampling event conducted on August 23, 2000, a third and fourth set of water samples were transferred into appropriately preserved containers for analysis of major ions (chloride, fluoride, and total dissolved solids) and WQCC metals (aluminum, arsenic, boron, chromium, iron, and manganese). A summary of purging and sampling methods is provided in Table 1 below. Chain-of-custody (COC) forms documenting sample identification numbers, collection times, and delivery times to the laboratories were completed for each set of samples. The water samples were placed in an ice-filled cooler immediately after collection and shipped to Trace Analysis, Inc. of Lubbock, Texas for laboratory analysis.

Table 1					
Summary of Purging and Sampling Methods					
Monitoring Well No.	Sample Date	Purge Method	Purge Volume (gallons)	Sampling Method	Groundwater Analytes
MW-1D	02/18/00	Pump	20	Disposable bailer	BTEX and Bio-indicators
	08/23/00	Pump	12	Disposable bailer	BTEX, Metals, Ions, Bio-indicators
MW-2	02/18/00	Pump	40	Disposable bailer	BTEX and Bio-indicators
	08/23/00	Pump	30	Disposable bailer	BTEX, Metals, Ions, Bio-indicators
MW-3	02/17/00	Pump	23*	Disposable bailer	BTEX and Bio-indicators
	08/23/00	Pump	30	Disposable bailer	BTEX, Metals, Ions, Bio-indicators
MW-4	02/18/00	Pump	23*	Disposable bailer	BTEX and Bio-indicators
	08/23/00	Pump	18*	Disposable bailer	BTEX, Metals, Ions, Bio-indicators
MW-6	02/18/00	Pump	30	Disposable bailer	BTEX and Bio-indicators
	08/23/00	Pump	35	Disposable bailer	BTEX, Metals, Ions, Bio-indicators
MW-7	02/18/00	Pump	30	Disposable bailer	BTEX and Bio-indicators
	08/23/00	Pump	30	Disposable bailer	BTEX, Metals, Ions, Bio-indicators
* Indicates monitoring well was bailed dry or pumped off. BTEX - benzene, toluene, ethylbenzene, xylenes WQCC Metals - Al, As, B, Cr, Fe, and Mn Ions - F, Cl, NO ₃ , SO ₄ , and TDS Bio-indicators - DO, NO ₃ , SO ₄ MW-1 and MW-5 not sampled due to presence of product.					

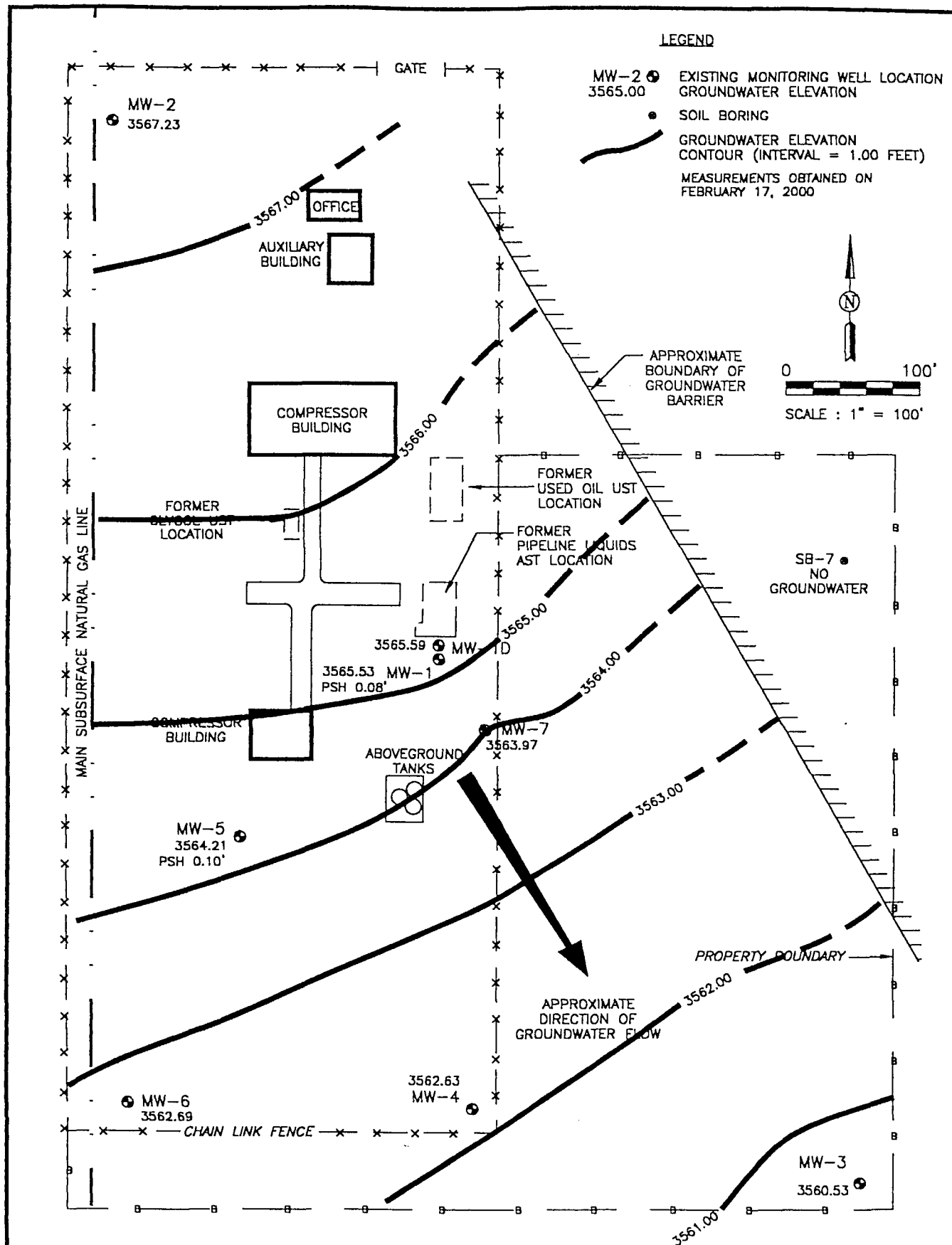
4.0 Groundwater Elevations, Hydraulic Gradient and Flow Direction

Based on the most recent gauging data collected by TRW on August 23, 2000, the groundwater conditions at the Monument Booster Station are characterized below.

- The depth to the water table across the site varies from approximately 21 to 27 feet below ground surface
- The hydraulic gradient is approximately 0.007 feet/foot
- The direction of groundwater flow is to the southeast

The direction of groundwater flow and hydraulic gradient has remained consistent for the past five and one-half years. Groundwater elevation maps depicting the water table elevation and direction of groundwater flow using the gauging data obtained during the two 2000 sampling events are presented in Figure 1A (February 17, 2000) and Figure 1B (August 23, 2000).

Figure 2 depicts the changes in groundwater elevations in monitoring wells MW-1 through MW-7 with time. Historical groundwater elevations and depth to water measurements are summarized in Table 2.



D:\DWG\TRW\GPM\Gwel0200.dwg

TRW

CLIENT: GPM GAS CORPORATION

DATE: 02/17/00

AUTHOR: GJV

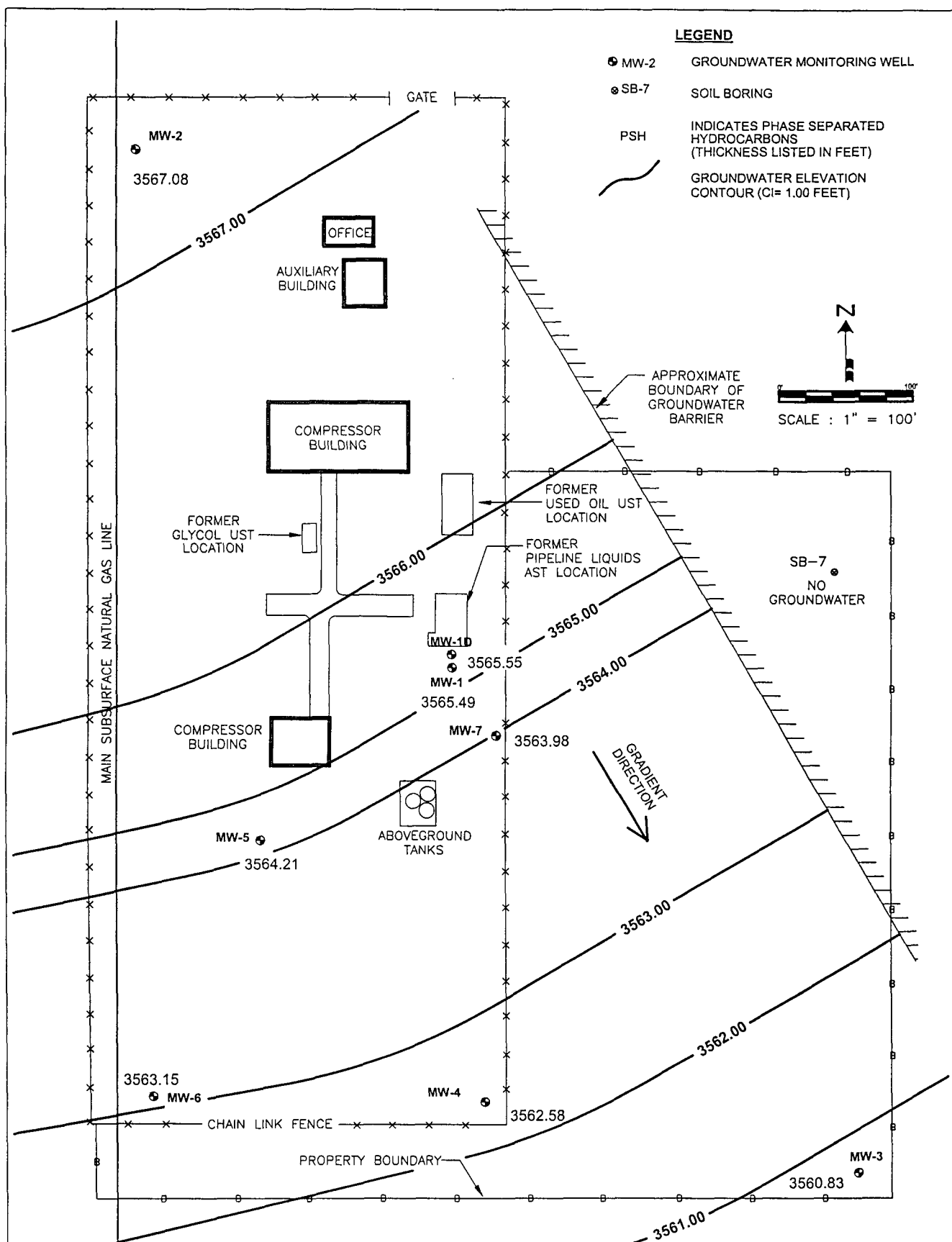
CK'D BY: DTL

REV. NO.:

DRN BY: DAG

FILE: Gwel0200

**FIGURE 1A
MONUMENT
BOOSTER STATION
GROUNDWATER ELEVATION
MAP**



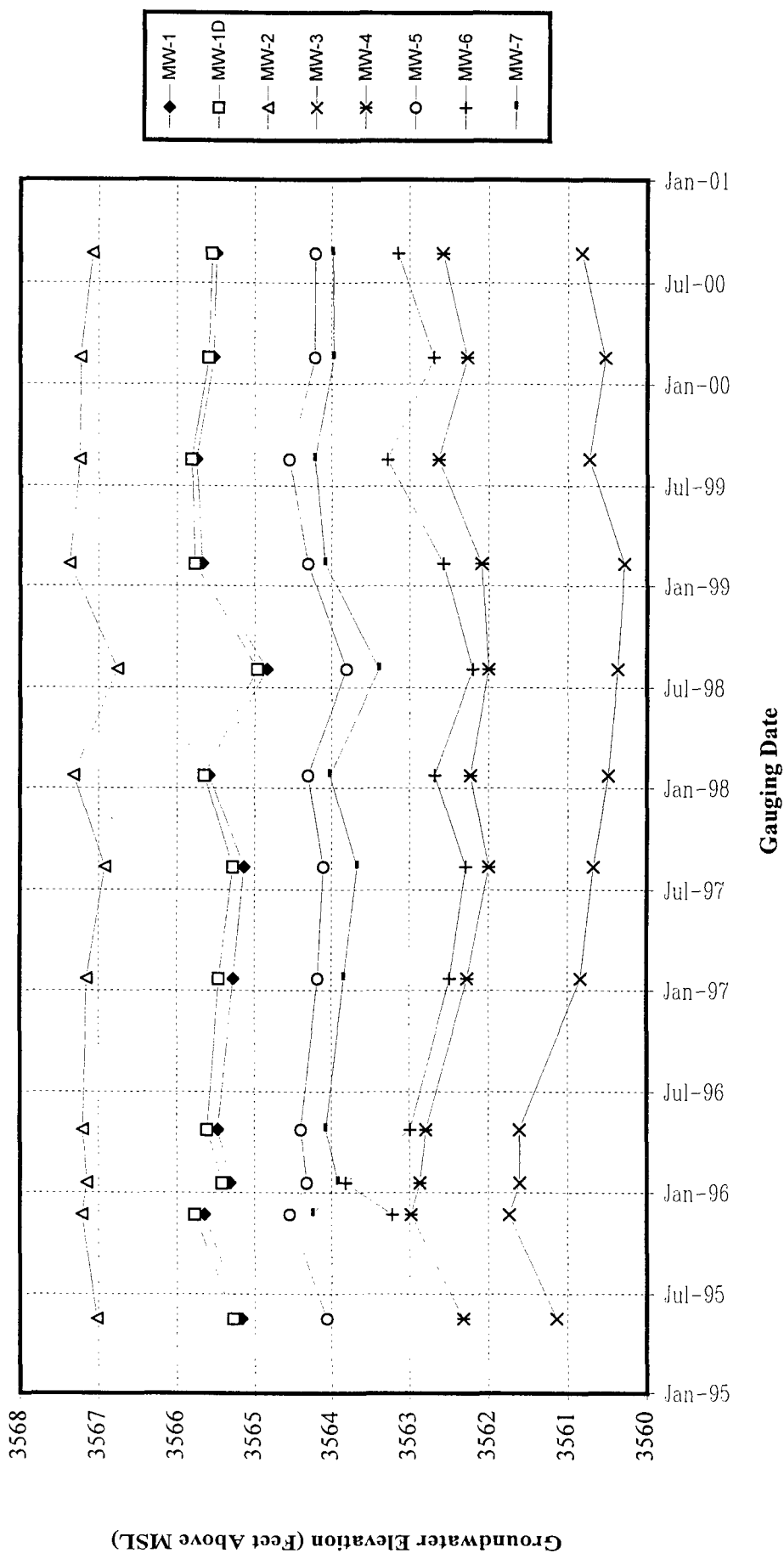
TRW

SITE: MONUMENT BOOSTER STATION	
DATE: 08/23/00	REV. NO.:
AUTHOR: GJV	DRN BY: DTL
CK'D BY: DTL	FILE:monument

Figure 1B
MONUMENT BOOSTER STATION
GROUNDWATER ELEVATION MAP
 Gauging Date: August 23, 2000



FIGURE 2
Groundwater Elevation Versus Time



**Table 2
Summary of Groundwater Elevations
Monument Booster Station**

Monitoring Well Number	Gauging Date	Ground Surface Elevations (Feet)	Top of Casing Elevations (Feet)	Groundwater Depth Below Top of Casing (Feet)	Groundwater Elevation (Feet)	PSH Thickness (Feet)
MW-1	05/16/95	3588.85	3591.15	28.05	3565.17	2.52
	11/21/95	3588.85	3591.15	27.03	3565.65	1.86
	01/18/96	3588.85	3591.15	27.62	3565.32	2.18
	04/24/96	3588.85	3591.15	27.39	3565.47	2.09
	01/22/97	3588.85	3591.15	27.68	3565.27	2.20
	08/11/97	3588.85	3591.15	26.03	3565.14	0.02
	01/23/98	3588.85	3591.15	25.63	3565.59	0.08
	08/03/98	3588.85	3591.15	26.32	3564.84	0.01
	02/10/99	3588.85	3591.15	25.55	3565.67	0.09
	08/17/99	3588.85	3591.15	25.41	3565.75	0.01
	02/17/00	3588.85	3591.15	25.69	3565.53	0.08
	08/23/00	3588.85	3591.15	25.73	3565.49	0.09
MW-1D	05/16/95	3589.06	3591.31	26.04	3565.27	0.00
	11/21/95	3589.06	3591.31	25.54	3565.77	0.00
	01/18/96	3589.06	3591.31	25.89	3565.42	0.00
	04/24/96	3589.06	3591.31	25.70	3565.61	0.00
	01/22/97	3589.06	3591.31	25.85	3565.46	0.00
	08/11/97	3589.06	3591.31	26.03	3565.28	0.00
	01/23/98	3589.06	3591.31	25.66	3565.65	0.00
	08/03/98	3589.06	3591.31	26.35	3564.96	0.00
	02/10/99	3589.06	3591.31	25.54	3565.77	0.00
	08/17/99	3589.06	3591.31	25.50	3565.81	0.00
	02/17/00	3589.06	3591.31	25.72	3565.59	0.00
	08/23/00	3589.06	3591.31	25.76	3565.55	0.00
MW-2	05/16/95	3594.13	3596.30	29.28	3567.02	0.00
	11/21/95	3594.13	3596.30	29.09	3567.21	0.00
	01/18/96	3594.13	3596.30	29.15	3567.15	0.00
	04/24/96	3594.13	3596.30	29.10	3567.20	0.00
	01/22/97	3594.13	3596.30	29.15	3567.15	0.00
	08/11/97	3594.13	3596.30	29.38	3566.92	0.00
	01/23/98	3594.13	3596.30	28.98	3567.32	0.00
	08/03/98	3594.13	3596.30	29.54	3566.76	0.00
	02/10/99	3594.13	3596.30	28.93	3567.37	0.00
	08/17/99	3594.13	3596.30	29.06	3567.24	0.00
	02/17/00	3594.13	3596.30	29.07	3567.23	0.00
	08/23/00	3594.13	3596.30	29.22	3567.08	0.00

* Elevations initially surveyed by John W. West Engineering Company of Hobbs, NM.

The monitoring well casings were marked on the north side to provide consistent reference points for future gauging operations.

** Groundwater Elev. Corrected for phase-separated hydrocarbons (PSH) = Top of Casing Elev. - [(Groundwater Depth - (SG x PSH Thickness))].
Groundwater direction is to the southeast with a hydraulic gradient of approximately 0.007 feet/foot.

Table 2 (Continued)
Summary of Groundwater Elevations
Monument Booster Station

Monitoring Well Number	Gauging Date	Ground Surface Elevations (Feet)	Top of Casing Elevations (Feet)	Groundwater Depth Below Top of Casing (Feet)	Groundwater Elevation (Feet)	PSH Thickness (Feet)
MW-3	05/16/95	3581.46	3583.86	22.72	3561.14	0.00
	11/21/95	3581.46	3583.86	22.12	3561.74	0.00
	01/18/96	3581.46	3583.86	22.25	3561.61	0.00
	04/24/96	3581.46	3583.86	22.25	3561.61	0.00
	01/22/97	3581.46	3583.86	23.02	3560.84	0.00
	08/11/97	3581.46	3583.86	23.18	3560.68	0.00
	01/23/98	3581.46	3583.86	23.37	3560.49	0.00
	08/03/98	3581.46	3583.86	23.49	3560.37	0.00
	02/10/99	3581.46	3583.86	23.57	3560.29	0.00
	08/17/99	3581.46	3583.86	23.13	3560.73	0.00
	02/17/00	3581.46	3583.86	23.33	3560.53	0.00
	08/23/00	3581.46	3583.86	23.03	3560.83	0.00
MW-4	05/16/95	3586.10	3588.77	26.45	3562.32	0.00
	11/21/95	3586.10	3588.77	25.79	3562.98	0.00
	01/18/96	3586.10	3588.77	25.90	3562.87	0.00
	04/24/96	3586.10	3588.77	25.98	3562.79	0.00
	01/22/97	3586.10	3588.77	26.50	3562.27	0.00
	08/11/97	3586.10	3588.77	26.77	3562.00	0.00
	01/23/98	3586.10	3588.77	26.54	3562.23	0.00
	08/03/98	3586.10	3588.77	26.77	3562.00	0.00
	02/10/99	3586.10	3588.77	26.68	3562.09	0.00
	08/17/99	3586.10	3588.77	26.14	3562.63	0.00
	02/17/00	3586.10	3588.77	26.50	3562.27	0.00
	08/23/00	3586.10	3588.77	26.19	3562.58	0.00
MW-5	05/16/95	3589.62	3592.16	28.10	3564.06	0.00
	11/21/95	3589.62	3592.16	28.24	3564.54	0.76
	01/18/96	3589.62	3592.16	28.45	3564.33	0.75
	04/24/96	3589.62	3592.16	28.41	3564.40	0.79
	01/22/97	3589.62	3592.16	28.45	3564.18	0.57
	08/11/97	3589.62	3592.16	28.13	3564.10	0.09
	01/23/98	3589.62	3592.16	27.89	3564.30	0.04
	08/03/98	3589.62	3592.16	28.79	3563.80	0.53
	02/10/99	3589.62	3592.16	28.48	3564.30	0.76
	08/17/99	3589.62	3592.16	27.93	3564.55	0.39
	02/17/00	3589.62	3592.16	28.03	3564.21	0.10
	08/23/00	3589.62	3592.16	28.07	3564.21	0.15

* Elevations initially surveyed by John W. West Engineering Company of Hobbs, NM.

The monitoring well casings were marked on the north side to provide consistent reference points for future gauging operations.

** Groundwater Elev. Corrected for phase-separated hydrocarbons (PSH) = Top of Casing Elev. - [Groundwater Depth - (SG x PSH Thickness)].

Groundwater direction is to the southeast with a hydraulic gradient of approximately 0.007 feet/foot.

**Table 2 (Continued)
Summary of Groundwater Elevations
Monument Booster Station**

Monitoring Well Number	Gauging Date	Ground Surface Elevations (Feet)	Top of Casing Elevations (Feet)	Groundwater Depth Below Top of Casing (Feet)	Groundwater Elevation (Feet)	PSH Thickness (Feet)
MW-6	11/16/95	3586.15	3587.93	24.71	3563.22	0.00
	01/18/96	3586.15	3587.93	24.11	3563.82	0.00
	04/24/96	3586.15	3587.93	24.94	3562.99	0.00
	01/22/97	3586.15	3587.93	25.44	3562.49	0.00
	08/11/97	3586.15	3587.93	25.64	3562.29	0.00
	01/23/98	3586.15	3587.93	25.25	3562.68	0.00
	08/03/98	3586.15	3587.93	25.73	3562.20	0.00
	02/10/99	3586.15	3587.93	25.36	3562.57	0.00
	08/17/99	3586.15	3587.93	24.65	3563.28	0.00
	02/17/00	3586.15	3587.93	25.24	3562.69	0.00
	08/23/00	3586.15	3587.93	24.78	3563.15	0.00
MW-7	11/21/95	3588.06	3589.40	25.16	3564.24	0.00
	01/18/96	3588.06	3589.40	25.48	3563.92	0.00
	04/24/96	3588.06	3589.40	25.33	3564.07	0.00
	01/22/97	3588.06	3589.40	25.56	3563.84	0.00
	08/11/97	3588.06	3589.40	25.73	3563.67	0.00
	01/23/98	3588.06	3589.40	25.38	3564.02	0.00
	08/03/98	3588.06	3589.40	26.01	3563.39	0.00
	02/10/99	3588.06	3589.40	25.32	3564.08	0.00
	08/17/99	3588.06	3589.40	25.19	3564.21	0.00
	02/17/00	3588.06	3589.40	25.43	3563.97	0.00
	08/23/00	3588.06	3589.40	25.42	3563.98	0.00

* Elevations initially surveyed by John W. West Engineering Company of Hobbs, NM.

The monitoring well casings were marked on the north side to provide consistent reference points for future gauging operations.

** Groundwater Elev. Corrected for phase-separated hydrocarbons (PSH) = Top of Casing Elev. - [Groundwater Depth - (SG x PSH Thickness)].

Groundwater direction is to the southeast with a hydraulic gradient of approximately 0.007 feet/foot.

5.0 Groundwater Quality Conditions

5.1 Distribution of Hydrocarbons in Groundwater

A historical listing of BTEX concentrations obtained from the sampled monitoring wells is summarized in Table 3. Hydrocarbon concentration maps depicting the BTEX concentrations for the two 2000 sampling events are presented in Figure 3A (February 18, 2000) and Figure 3B (August 23, 2000). Figure 4 is a graph that depicts the historic benzene concentrations in the groundwater versus time over the life of the monitoring project. Figure 5 is a graph that depicts the historic BTEX concentrations in the groundwater versus time at MW-7. Based on the most recent analytical data for samples collected by TRW on August 23, 2000, the distribution of hydrocarbons at the Monument Booster Station is described below.

- BTEX concentrations in monitoring wells MW-1D, MW-2, MW-3, MW-4, and MW-6 are presently below the New Mexico WQCC standards. With the exception of the August 1999 sample recovered from MW-2 and the August 1999 and February 2000 samples recovered from MW-3, the BTEX concentrations in each of these wells have remained below the WQCC standard levels since 1995.
- BTEX concentrations in downgradient well MW-3 were measured at levels near or below the laboratory detection limit from the initial sampling event in May 1995 until February 1999. The August 1999 and February 2000 sampling events, however, identified benzene concentrations in MW-3 that exceeded the WQCC standard of 0.01 mg/L. It is suspected that this increase in dissolved hydrocarbons represents the downgradient movement of a limited slug of contaminants that was observed in upgradient well MW-7 during the January 17, 1996 sampling event. Preliminary estimates, based on the maximum benzene levels observed in each well indicate that the benzene slug is migrating at approximately 0.31 feet per day and attenuating at a rate of approximately one half-life per 100 feet. At this rate the benzene slug should not represent an environmental threat to potential future receptors within 500 feet of MW-3.
- Only the benzene concentrations from the current and historic groundwater samples recovered from in MW-7 exceed the WQCC standard. These levels, however appear to have stabilized between of 0.5 and 0.7 mg/L over the last four semi-annual monitoring events. There is no indication that a consistent dissolved benzene plume extends off the site to the southeast (downgradient) from the source area. Concern for potential future off site migration is justified based on elevated benzene concentrations observed in MW-3 from groundwater samples recovered during two of the last three monitoring events.

5.2 Distribution of Dissolved WQCC Metals and Ions in Groundwater

Historical groundwater sample analytical results for metals and ions are presented in Tables 4. It should be noted that the concentrations of boron were omitted from the analytical results due to a mistake at the laboratory. These values will be measured during the 2001 annual sampling event. The WQCC standards are listed in the tables for comparison and constituents with concentrations above the WQCC standards are highlighted in boldface type. The laboratory reports and COC documentation are included in Appendix A.

A graph that depicts the historic concentrations of total dissolved solids (TDS) versus time is provided in Figures 6.

The WQCC metal results for the 2000 annual sampling event indicate no constituents exceeded the WQCC standards with the exception of manganese in MW-1D, MW-6, and MW-7, and iron in MW-7. These elevated levels may be due to the reduced chemical environment caused by the presence of dissolved hydrocarbons. Under this condition, certain metal ions (particularly manganese and iron) have a greater affinity to go into the dissolved state as result of being produced as a byproduct from natural biodegradation processes, thus resulting in higher concentrations. In contrast, monitoring wells MW-2, MW-3, and MW-4 contain very low concentrations of iron or manganese. Based on the results of the metal analyses during the 2000 annual sampling event, the groundwater in the site area is not adversely affected or impacted with dissolved metals.

The major ion analyses for the 2000 annual sampling event indicate that no constituents exceeded the WQCC standards with the exception of chloride in MW-2, fluoride in MW-1D, MW-2, MW-3, MW-4, and MW-7, and TDS in MW-2. Fluoride concentrations during the 2000 annual sampling event remain near (or slightly above) the WQCC standard of 1.6 mg/L. Since fluoride is not a constituent for the gas processing activities on site, its presence is likely due to natural conditions as it is a common naturally occurring compound in groundwater (USGS Water-Supply Paper 2254, 1989, pgs.120-123). The increasing TDS concentrations observed in MW-2 may indicate a potential upgradient release of produced water northwest of the Monument Booster Station.

Table 3
Summary of Dissolved BTEX Concentrations
Monument Booster Station

Monitoring Well	Sampling Date	Benzene (mg/L)	Toluene (mg/L)	Ethylbenzene (mg/L)	Xylenes (mg/L)
MW-1D	05/16/95	0.018	0.006	0.015	0.016
	11/15/95	0.003	<0.001	0.002	0.001
	01/18/96	0.004	<0.001	0.003	0.009
	04/24/96	<0.001	<0.001	<0.001	<0.001
	01/22/97	0.001	<0.001	0.001	<0.001
	08/11/97	<0.001	<0.001	<0.001	<0.001
	01/23/98	<0.001	<0.001	<0.001	<0.001
	08/03/98	<0.001	<0.001	<0.001	<0.001
	02/10/99	<0.001	<0.001	<0.001	<0.001
	08/17/99	<0.001	<0.001	<0.001	<0.001
	02/18/00	0.002	<0.001	0.003	0.001
	08/23/00	<0.005	<0.005	<0.005	<0.005
MW-2	05/16/95	<0.001	<0.001	<0.001	<0.001
	11/15/95	0.044*	0.002*	0.006*	0.009*
	01/18/96	<0.001	<0.001	<0.001	<0.001
	04/24/96	<0.001	<0.001	<0.001	<0.001
	01/22/97	<0.001	<0.001	<0.001	<0.001
	08/11/97	<0.001	<0.001	<0.001	<0.001
	01/23/98	<0.001	<0.001	<0.001	<0.001
	08/03/98	<0.001	<0.001	<0.001	<0.001
	02/10/99	<0.001	<0.001	<0.001	<0.001
	08/17/99	0.017	0.013	0.002	0.003
	02/18/00	<0.001	<0.001	<0.001	<0.001
	08/23/00	<0.001	<0.001	<0.001	<0.001
MW-3	05/16/95	<0.001	<0.001	<0.001	<0.001
	11/15/95	<0.001	<0.001	<0.001	<0.001
	01/18/96	<0.001	<0.001	<0.001	<0.001
	04/24/96	<0.001	<0.001	<0.001	<0.001
	01/22/97	<0.001	<0.001	<0.001	<0.001
	08/11/97	<0.001	<0.001	<0.001	<0.001
	01/23/98	<0.001	<0.001	<0.001	<0.001
	08/03/98	0.007	<0.001	<0.001	<0.001
	02/10/99	<0.005	<0.005	<0.005	<0.005
	08/17/99	0.043	<0.005	<0.005	<0.005
	02/17/00	0.021	<0.005	<0.005	<0.005
	08/23/00	0.006	<0.005	<0.005	<0.005
WQCC Standards		0.010	0.75	0.75	0.62

Analyses performed by Trace Analysis, Inc., Lubbock, Texas.

All samples analyzed for BTEX using EPA Method 8020 except for samples obtained on May 16, 1995 (EPA Method 8240).

Values listed in boldface type indicate concentrations exceed New Mexico Water Quality Control Commission (WQCC) standards.

Monitoring wells MW-1 and MW-5 (after May 16, 1995) were not sampled (due to presence of phase-separated hydrocarbons).

* BTEX cross-contamination occurred on samples obtained from monitoring wells MW-2 & MW-4 during the 11/15/95 sampling event.

Table 3 (Continued)
Summary of Dissolved BTEX Concentrations
Monument Booster Station

Monitoring Well	Sampling Date	Benzene (mg/L)	Toluene (mg/L)	Ethylbenzene (mg/L)	Xylenes (mg/L)
MW-4	05/16/95	<0.001	<0.001	<0.001	<0.001
	11/15/95	0.045*	0.002*	0.006*	0.010*
	01/18/96	0.003	<0.001	<0.001	<0.001
	04/24/96	<0.002	<0.002	<0.002	<0.002
	01/22/97	0.002	<0.001	<0.001	<0.001
	08/11/97	0.001	<0.001	<0.001	<0.001
	01/23/98	<0.001	<0.001	<0.001	<0.001
	08/03/98	<0.001	<0.001	<0.001	<0.001
	02/10/99	<0.001	<0.001	<0.001	<0.001
	08/17/99	<0.001	<0.001	<0.001	0.001
	02/18/00	<0.005	<0.005	<0.005	<0.005
	08/23/00	<0.005	<0.005	<0.005	<0.005
MW-5	05/16/95	0.265	0.009	0.261	0.050
MW-6	11/16/95	0.003	<0.001	0.001	0.003
	01/17/96	0.002	<0.001	<0.001	<0.001
	04/24/96	<0.001	<0.001	<0.001	<0.001
	01/22/97	0.001	<0.001	<0.001	<0.001
	08/11/97	<0.001	<0.001	<0.001	0.001
	01/23/98	<0.001	<0.001	<0.001	<0.001
	08/03/98	<0.001	<0.001	<0.001	<0.001
	02/10/99	<0.001	<0.001	<0.001	0.014
	08/17/99	0.002	<0.001	<0.001	0.012
	02/18/00	<0.001	<0.001	0.004	0.006
	08/23/00	<0.001	<0.001	0.004	0.011
MW-7	11/15/95	0.465	<0.001	0.205	0.163
	01/17/96	1.130	0.003	0.476	0.365
	04/24/96	0.585	<0.002	0.251	0.013
	01/22/97	0.896	<0.005	0.240	0.330
	08/11/97	0.317	0.020	0.155	0.049
	01/23/98	0.876	<0.005	0.486	0.181
	08/03/98	0.094	<0.005	0.064	0.007
	02/10/99	0.597	<0.005	0.440	0.120
	08/17/99	0.705	<0.005	0.060	0.556
	02/18/00	0.573	<0.005	0.490	0.226
	08/23/00	0.546	0.006	0.484	0.177
WQCC Standards		0.010	0.75	0.75	0.62

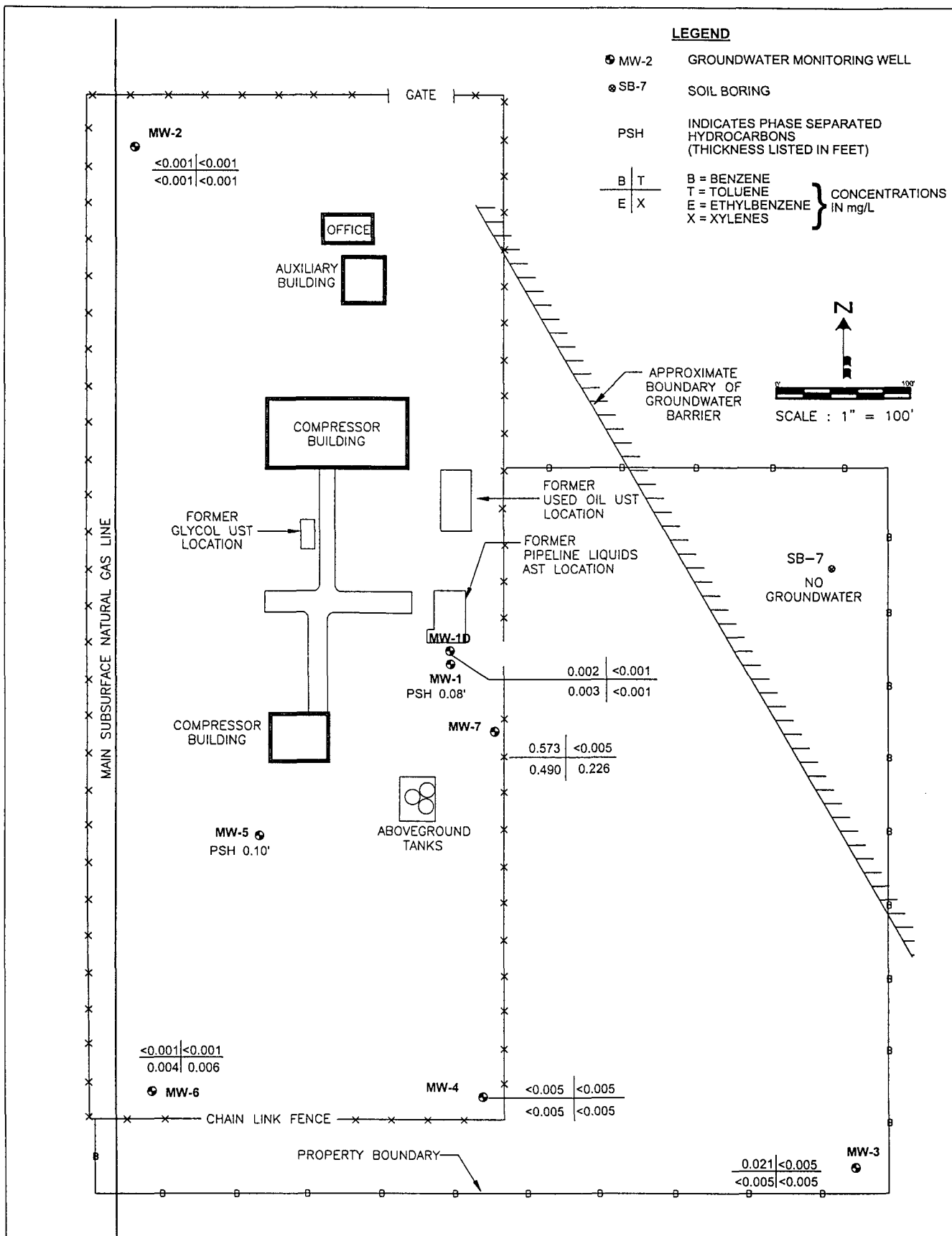
Analyses performed by Trace Analysis, Inc., Lubbock, Texas.

All samples analyzed for BTEX using EPA Method 8020 except for samples obtained on May 16, 1995 (EPA Method 8240).

Values listed in boldface type indicate concentrations exceed New Mexico Water Quality Control Commission (WQCC) standards.

Monitoring wells MW-1 and MW-5 (after May 16, 1995) were not sampled (due to presence of phase-separated hydrocarbons).

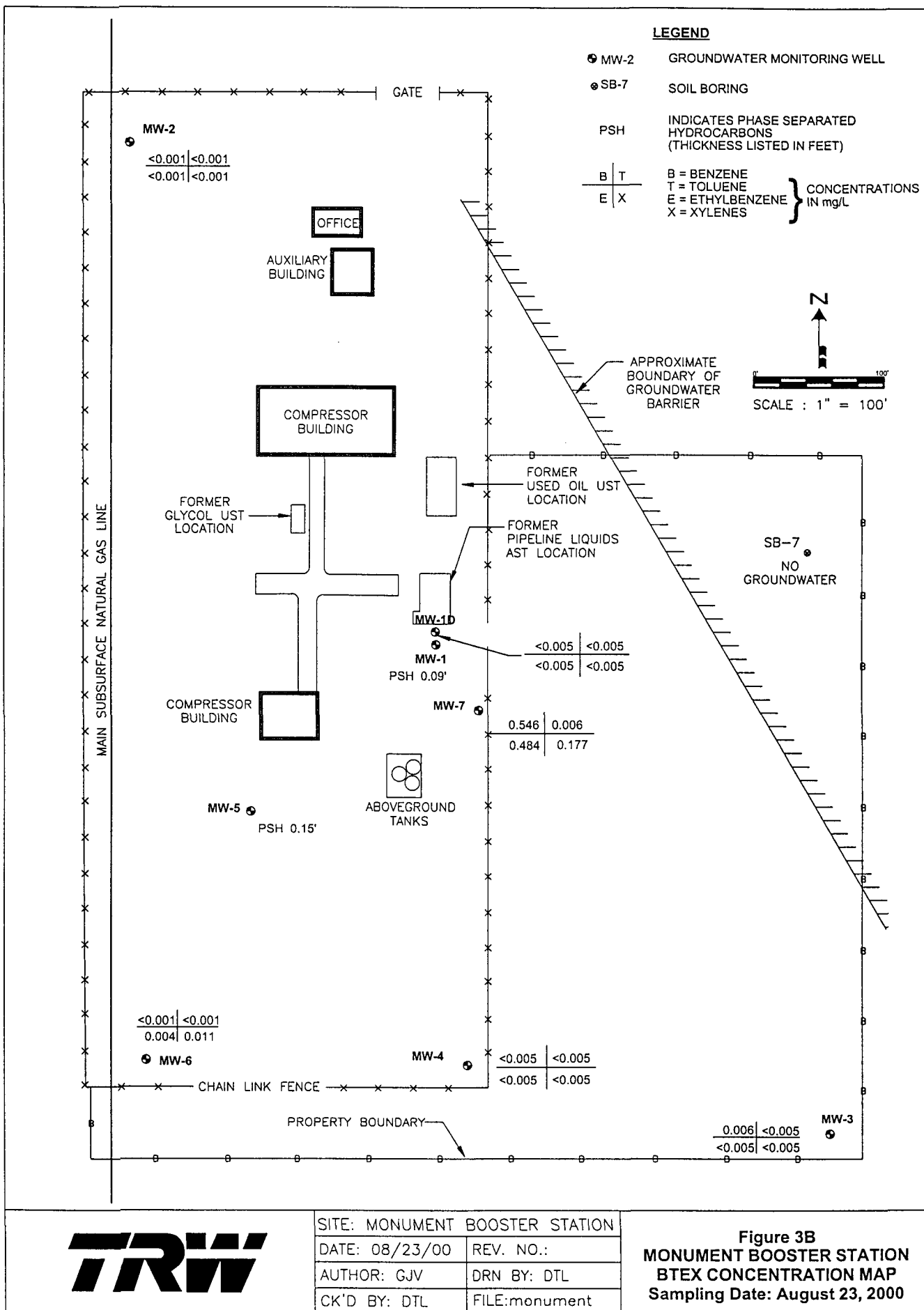
* BTEX cross-contamination occurred on samples obtained from monitoring wells MW-2 & MW-4 during the 11/15/95 sampling event.



TRW

SITE: MONUMENT BOOSTER STATION	
DATE: 2/18/00	REV. NO.:
AUTHOR: GJV	DRN BY: DTL
CK'D BY: DTL	FILE:monument

Figure 3A
MONUMENT BOOSTER STATION
BTEX CONCENTRATION MAP
Sampling Date: February 18, 2000



TRW

SITE: MONUMENT BOOSTER STATION	
DATE: 08/23/00	REV. NO.:
AUTHOR: GJV	DRN BY: DTL
CK'D BY: DTL	FILE:monument

Figure 3B
MONUMENT BOOSTER STATION
BTEX CONCENTRATION MAP
 Sampling Date: August 23, 2000

FIGURE 4
Benzene Versus Time

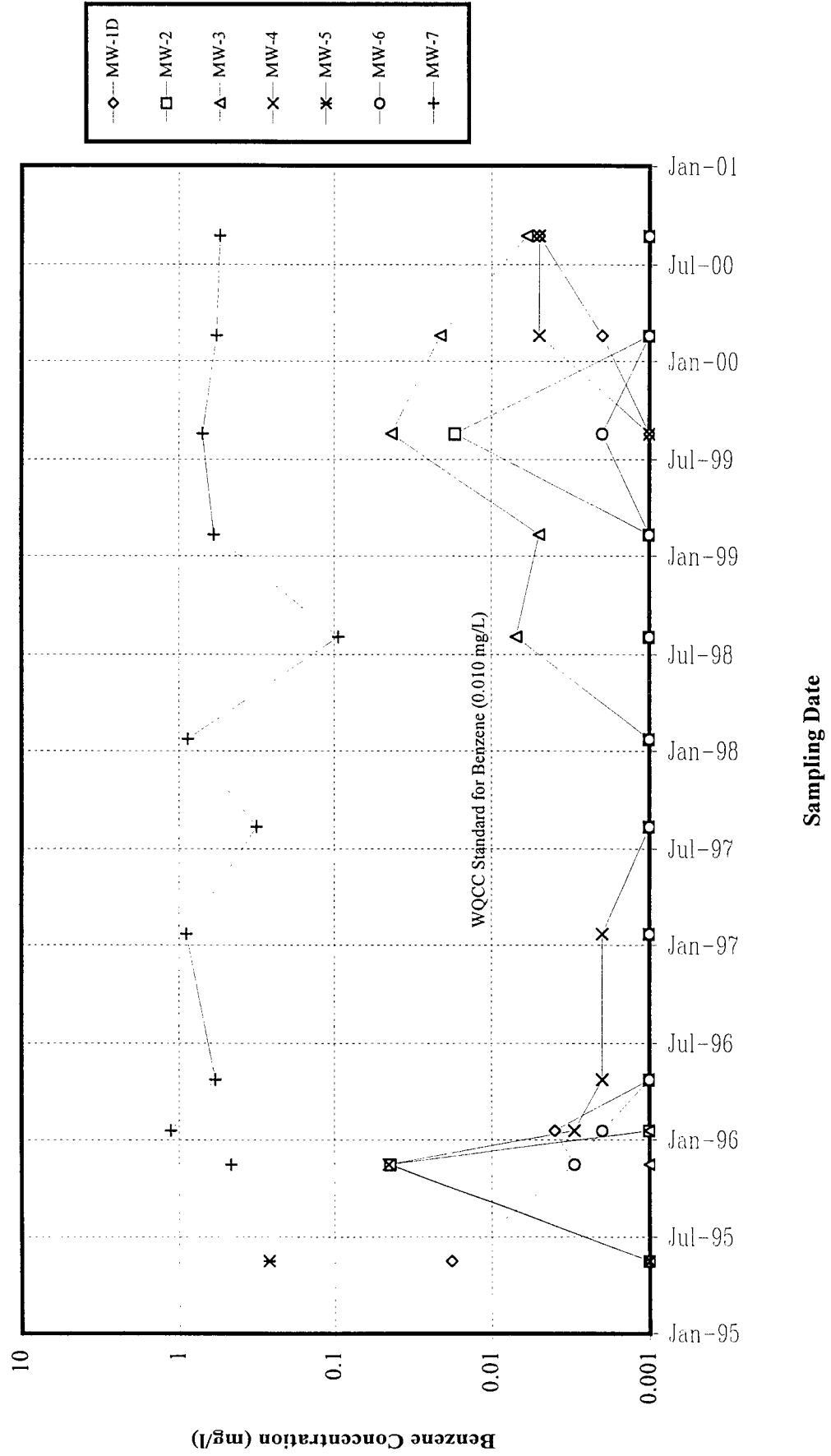


FIGURE 5
BTEX Concentrations and Groundwater Elevation vs Time (MW-7)

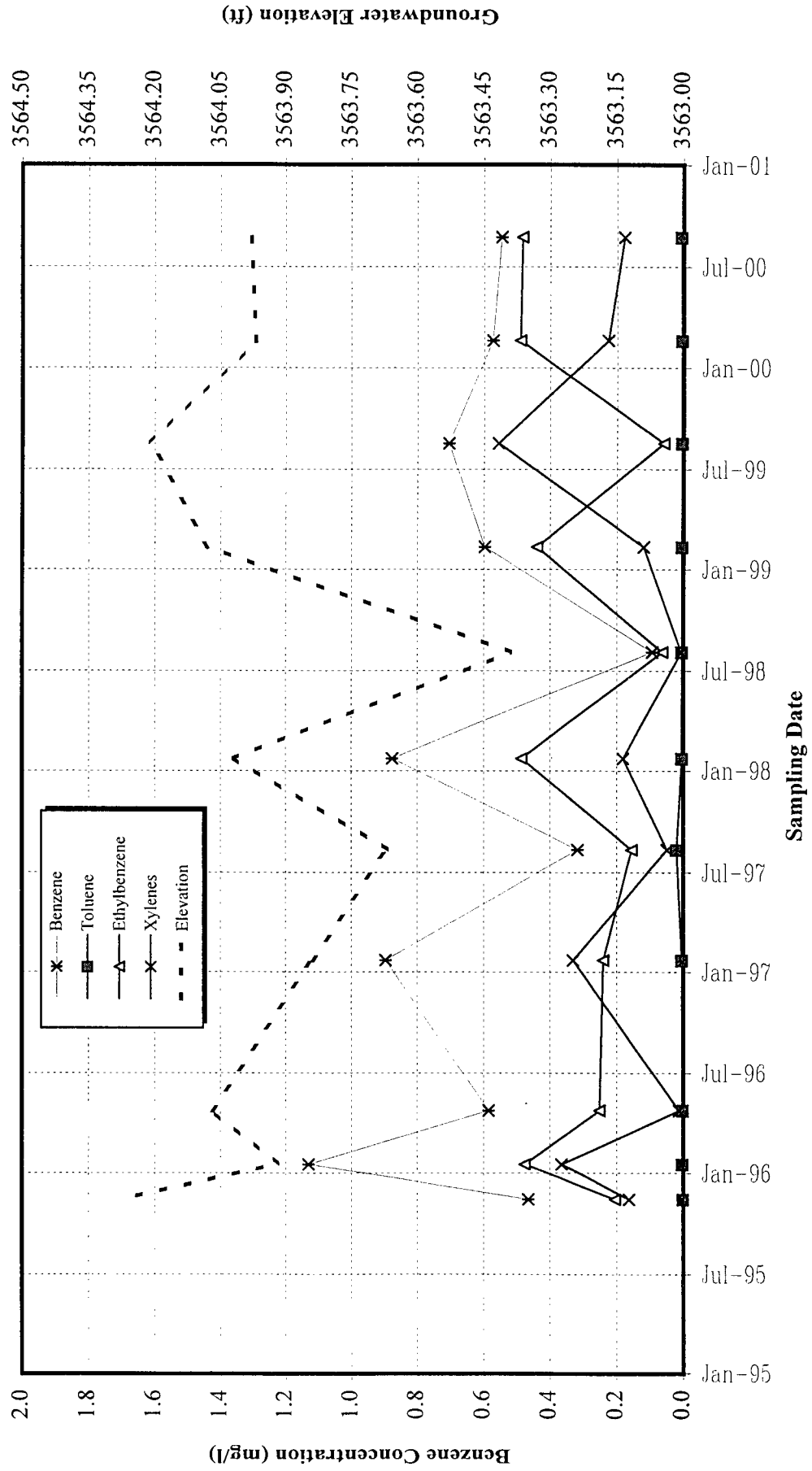




Table 4
Summary of Metal and Major Ion Analytical Results

Constituent	Date	MW-1 (mg/L)	MW-1D (mg/L)	MW-2 (mg/L)	MW-3 (mg/L)	MW-4 (mg/L)	MW-5 (mg/L)	MW-6 (mg/L)	MW-7 (mg/L)	WQCC Standards (mg/L)
Aluminum (Al)	05-16-96	0.55	1.34	13.10	0.88	8.04	0.24	---	---	5
	04-24-96	NS	0.2	<0.2	<0.2	<0.2	NS	0.2	0.3	
	08-11-97	NS	<0.2	0.32	<0.2	<0.2	NS	0.23	<0.2	
	08-03-98	NS	<0.1	0.17	1.7	0.10	NS	<0.1	0.14	
	08-17-99	NS	<0.1	<0.1	<0.1	<0.1	NS	<0.1	<0.1	
Arsenic (As)	08-23-00	NS	<0.2	<0.2	<0.2	<0.2	NS	<0.2	<0.2	0.1
	05-16-96	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	---	---	
	04-24-96	NS	0.012	0.011	0.019	0.008	NS	0.238	0.004	
	08-11-97	NS	<0.1	<0.1	<0.1	<0.1	NS	<0.1	<0.1	
	08-03-98	NS	<0.1	<0.1	<0.1	<0.1	NS	<0.1	<0.1	
Boron (B)	08-17-99	NS	<0.1	<0.1	<0.1	<0.1	NS	<0.1	<0.1	0.75
	08-23-00	NS	<0.05	<0.05	<0.05	<0.05	NS	<0.05	0.06	
	05-16-96	0.85	0.22	0.37	0.09	0.14	0.39	---	---	
	04-24-96	NS	0.11	0.38	<0.03	0.06	NS	0.22	0.6	
	08-11-97	NS	<0.2	<0.2	<0.2	<0.2	NS	0.79	<0.2	
	08-03-98	NS	<0.75	<0.75	<0.75	<0.75	NS	<0.75	<0.75	0.85
	08-17-99	NS	0.15	0.23	0.19	0.21	NS	0.38	0.85	

Analyses performed by Trace Analysis, Inc. using EPA Methods 200.7, 239.2, 270.2, 272.2, 6010B, 160.1 and 300.

Standards **Bold** values indicate concentrations exceed WQCC groundwater standards as listed as specified in Regulation 3-103.

NS Indicates monitoring well was not sampled (due to presence of free product).

--- Indicates monitoring well was installed after this sampling date.

Samples were not filtered on 05-17-95, therefore results indicate total (dissolved and undissolved) metal concentrations.

Samples were filtered with a 45 mm element between 04-24-96 and 08-23-00, therefore results indicate dissolved metal concentrations.



Table 4 (continued)
Summary of Metal and Major Ion Analytical Results

Constituent	Date	MW-1 (mg/L)	MW-ID (mg/L)	MW-2 (mg/L)	MW-3 (mg/L)	MW-4 (mg/L)	MW-5 (mg/L)	MW-6 (mg/L)	MW-7 (mg/L)	WQCC Standards (mg/L)
Chromium (Cr)	05-16-96	0.01	<0.01	0.02	0.01	0.02	0.02	---	---	
	04-24-96	NS	<0.05	0.06	<0.05	<0.05	NS	0.06	<0.05	
	08-11-97	NS	<0.05	<0.05	<0.05	<0.05	NS	<0.05	<0.05	
	08-03-98	NS	<0.05	<0.05	<0.05	<0.05	NS	<0.05	<0.05	0.05
	08-17-99	NS	<0.05	<0.05	<0.05	<0.05	NS	<0.05	<0.05	
	08-23-00	NS	<0.01	0.02	<0.01	<0.01	NS	<0.01	<0.01	
Iron (Fe)	05-16-96	25.58	4.6	5.82	0.53	4.68	1.75	---	---	
	04-24-96	NS	0.06	0.07	0.17	0.08	NS	0.15	<0.03	
	08-11-97	NS	0.28	0.24	0.14	0.08	NS	0.21	0.43	1
	08-03-98	NS	<0.1	<0.1	0.55	<0.1	NS	0.26	6.1	
	08-17-99	NS	0.19	<0.1	<0.1	<0.1	NS	0.42	8.1	
	08-23-00	NS	0.2	<0.05	<0.05	<0.05	NS	<0.05	7.4	
Manganese (Mn)	05-16-96	0.67	0.31	0.12	0.08	0.11	0.58	---	---	
	04-24-96	NS	0.37	<0.01	<0.01	<0.01	NS	0.28	0.38	
	08-11-97	NS	0.35	<0.01	<0.01	<0.01	NS	0.30	0.37	0.2
	08-03-98	NS	0.22	<0.1	<0.1	<0.1	NS	0.36	0.41	
	08-17-99	NS	0.18	<0.1	<0.1	<0.1	NS	0.27	0.19	
	08-23-00	NS	0.2	<0.01	<0.01	0.03	NS	0.34	0.22	
Analyses performed by Trace Analysis, Inc. using EPA Methods 200.7, 239.2, 270.2, 272.2, 6010B, 160.1 and 300. Standards Bold values indicate concentrations exceed WQCC groundwater standards as listed as specified in Regulation 3-103. NS Indicates monitoring well was not sampled (due to presence of free product). --- Indicates monitoring well was installed after this sampling date. Samples were not filtered on 05-17-95, therefore results indicate total (dissolved and undissolved) metal concentrations. Samples were filtered with a 45 mm element between 04-24-96 and 08-23-00, therefore results indicate dissolved metal concentrations.										



Table 4 (continued)

Summary of Metal and Major Ion Analytical Results

Constituent	Date	MW-1 (mg/L)	MW-ID (mg/L)	MW-2 (mg/L)	MW-3 (mg/L)	MW-4 (mg/L)	MW-5 (mg/L)	MW-6 (mg/L)	MW-7 (mg/L)	WQCC Standards (mg/L)
Chloride (Cl)	05-16-95	NS	77	812	188	152	80	---	---	250
	04-24-96	NS	124	314	134	167	NS	186	143	
	08-11-97	NS	180	200	140	140	NS	160	180	
	08-03-98	NS	120	240	160	160	NS	150	160	
	08-17-99	NS	91	1,000	190	170	NS	160	120	
	08-23-00	NS	65	1,800	190	150	NS	140	74	
Fluoride (F)	05-16-95	NS	1.8	1.1	1.8	1.2	1.4	---	---	1.6
	04-24-96	NS	1.6	1.1	1.5	1.1	NS	0.9	1.8	
	08-11-97	NS	1.9	1.3	1.5	1.1	NS	0.85	1.8	
	08-03-98	NS	2.4	1.8	1.6	1.3	NS	1.3	1.8	
	08-17-99	NS	2.7	1.7	2.0	1.5	NS	1.5	2.7	
	08-23-00	NS	2.9	1.8	2.0	1.8		1.8	2.7	
Nitrate (NO ₃ -N)	05-16-95	NS	1.37	7.42	5.62	3.69	0.56	---	---	10.0
	04-24-96	NS	<0.1	0.3	0.3	0.1	NS	<0.1	<0.1	
	08-11-97	NS	<1.0	9	9.4	<1.0	NS	<1.0	<1.0	
	01-23-98	NS	2.8	30	15	1	NS	0.28	0.39	
	08-03-98	NS	4.0	4.0	4.0	2.9	NS	<1.0	<1.0	
	08-17-99	NS	3.8	4.0	3.5	2.5	NS	<1.0	<1.0	
	08-23-00	NS	3.4	2.0	3.3	2.6	NS	<0.1	<1.0	

Analyses performed by Trace Analysis, Inc. using EPA Methods 200.7, 239.2, 270.2, 272.2, 6010B, 160.1 and 300.

Standards **Bold** values indicate concentrations exceed WQCC groundwater standards as listed as specified in Regulation 3-103.

NS Indicates monitoring well was not sampled (due to presence of free product).

--- Indicates monitoring well was installed after this sampling date.

Samples were not filtered on 05-17-95, therefore results indicate total (dissolved and undissolved) metal concentrations.

Samples were filtered with a 45 mm element between 04-24-96 and 08-23-00, therefore results indicate dissolved metal concentrations.



Table 4 (continued)
Summary of Metal and Major Ion Analytical Results

Constituent	Date	MW-1 (mg/L)	MW-1D (mg/L)	MW-2 (mg/L)	MW-3 (mg/L)	MW-4 (mg/L)	MW-5 (mg/L)	MW-6 (mg/L)	MW-7 (mg/L)	WQCC Standards (mg/L)
Sulfate (SO ₄)	05-16-95	NS	174	509	115	136	67	---	---	
	04-24-96	NS	169	443	95	115	NS	70	149	
	08-11-97	NS	110	290	75	96	NS	37	76	
	01-23-98	NS	190	230	240	180	NS	230	180	600
	08-03-98	NS	100	220	80	100	NS	45	90	
	08-17-99	NS	120	150	84	120	NS	82	14	
Total Dissolved Solids (TDS)	08-23-00	NS	98	110	72	100	NS	57	19	
	05-16-95	NS	634	1,478	516	716	692	---	---	
	04-24-96	NS	702	1,318	598	759	NS	929	828	
	08-11-97	NS	770	1,100	670	800	NS	810	860	1,000
	08-03-98	NS	640	930	640	750	NS	870	800	
	08-17-99	NS	790	2,700	830	790	NS	920	850	
	08-23-00	NS	560	3,300	770	780	NS	900	790	

Analyses performed by Trace Analysis, Inc. using EPA Methods 200.7, 239.2, 270.2, 272.2, 6010B, 160.1 and 300.

Standards **Bold** values indicate concentrations exceed WQCC groundwater standards as listed as specified in Regulation 3-103.

NS Indicates monitoring well was not sampled (due to presence of free product).

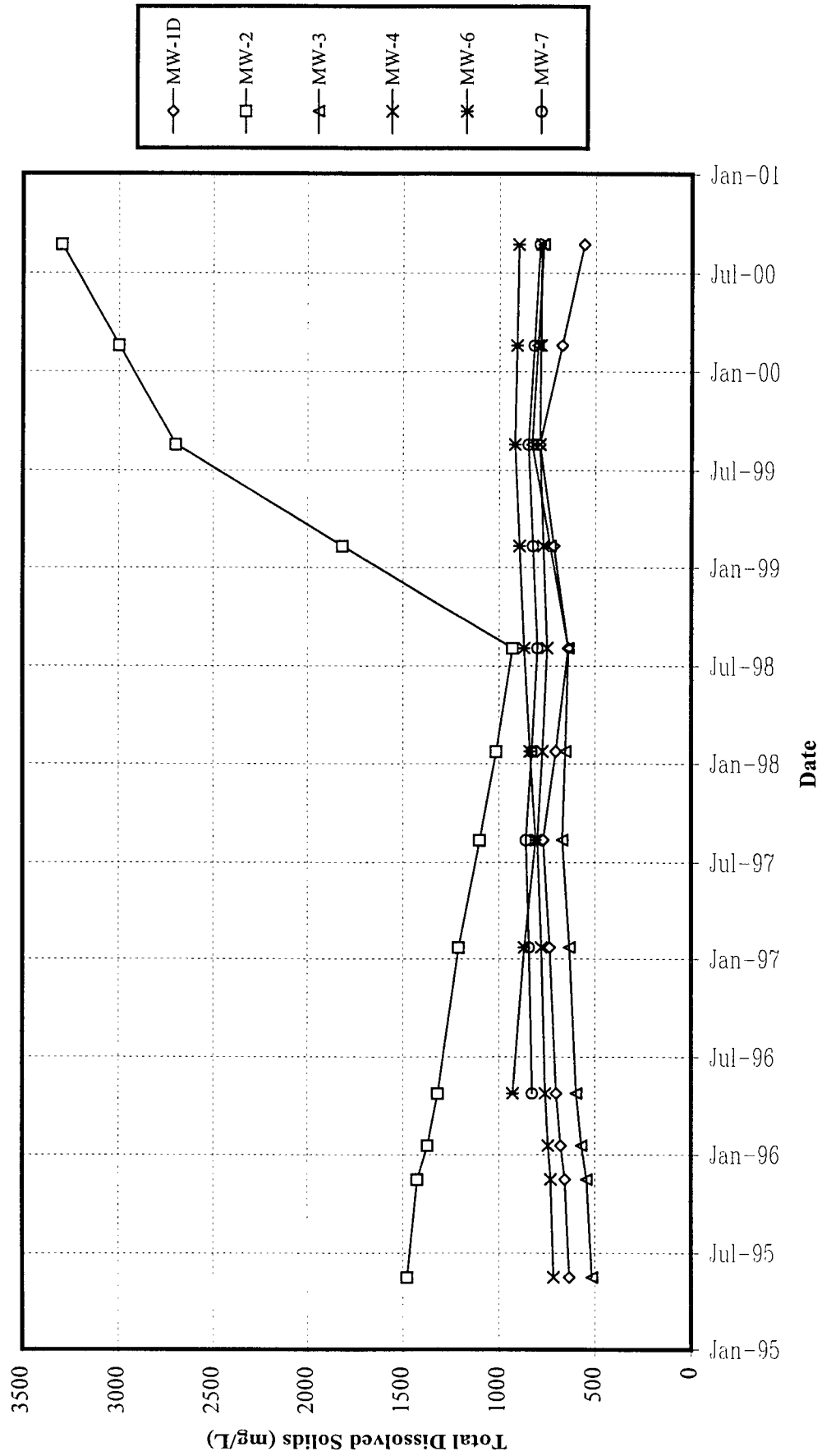
--- Indicates monitoring well was installed after this sampling date.

Samples were not filtered on 05-17-95, therefore results indicate total (dissolved and undissolved) metal concentrations.

Samples were filtered with a 45 mm element between 04-24-96 and 08-23-00, therefore results indicate dissolved metal concentrations.



Figure 6
 Total Dissolved Solid Concentrations Versus Time



6.0 Intrinsic Bioremediation Assessment

During biodegradation, dissolved BTEX is ultimately transformed into carbon dioxide, methane, and water. Biodegradation of BTEX dissolved in groundwater results in a reduction of contaminant concentration (and mass) and slowing (retardation) of the contaminant relative to the average advective groundwater flow velocity. Indigenous hydrocarbon-degrading microorganisms transform available nutrients into forms useful for energy and cell reproduction by facilitating the transfer of electrons from donors to acceptors. This results in oxidation of the electron donor and reduction of the electron acceptor. Electron donors include natural organic material and petroleum hydrocarbons. Electron acceptors are elements or compounds that occur in relatively oxidized states. The more important electron acceptors in groundwater, in order of utilization, include dissolved oxygen, (DO), nitrate (NO_3), ferric iron (Fe^{3+}), sulfate (SO_4), and carbon dioxide (CO_2).

Biodegradation causes measurable changes in groundwater geochemistry. During aerobic respiration, oxygen is reduced to water, and dissolved oxygen concentrations decrease. In anaerobic systems where nitrate is the electron acceptor, the nitrate is reduced (denitrification) to NO_2^- , N_2O , NO , NH_4^+ , or N_2 , and nitrate concentrations decrease. In anaerobic systems where ferric iron (Fe^{3+}) is the electron acceptor, it is reduced (iron reduction) to ferrous iron (Fe^{2+}), and Fe^{2+} concentrations increase. In anaerobic systems where sulfate is the electron acceptor, it is reduced to hydrogen sulfide (H_2S), and sulfate concentrations decrease (sulfate reduction). In anaerobic systems where CO_2 is used as an electron acceptor, methanogenic bacteria reduce it (methanogenesis) to methane (CH_4).

Using the stoichiometric derivations, the mass of benzene degraded per unit mass of electron acceptor utilized and metabolic byproduct produced was calculated to determine the biodegradation capacity of these constituents relative to the highest observed benzene concentration on site. A conservative approach was taken in this analysis in that microbial cell mass production was not taken into account for nitrate or sulfate and only average concentrations of electron acceptors and metabolic byproducts were used. The table below summarizes this comparison.

Electron Acceptor/ Byproduct	Terminal Electron Accepting Process (in order of preferred utilization)	Trend in Analyte Concentration During Biodegradation	Mass of benzene Degraded per unit mass of Electron Acceptor Utilized	Mass of benzene Degraded per unit mass of Metabolic Byproduct Produced	Average Concentrations of Electron Acceptors/ Byproducts (mg/L)	Biodegradation Capacity of Electron Acceptors/ Byproducts (mg/L)
DO	Aerobic Respiration	Decreases	0.97	---	4.54	4.40
NO_3^*	Denitrification	Decreases	0.21	---	2.60	0.55
Fe^{2+}	Ferric Iron Reduction	Increases	---	0.046	1.18	0.05
SO_4^*	Sulfate Reduction	Decreases	0.22	---	129	28.36
Total Biodegradation Capacity						33.36
Highest Observed Benzene Concentration						1.13

* Conservative assumption (does not take into account microbial cell mass production)

Our suite of biological parameters included dissolved oxygen, nitrate, sulfate, dissolved iron, and manganese. These electron acceptor results are summarized in Table 5. Changes in dissolved oxygen, nitrate, sulfate, iron, and manganese concentrations with time are depicted in Figures 7, 8, 9, 10, and 11, respectively.

Hydrocarbon-impacted wells (MW-1D and MW-7) are compared against upgradient and downgradient wells (MW-2, MW-3, MW-4, and MW-6) to observe whether or not significant differences are observed in electron acceptor concentrations that may be related to subsurface biodegradation. The relationships in the electron acceptor data are observed:

- Generally, dissolved oxygen levels have been lower within the hydrocarbon-impacted plume area compared to the downgradient and upgradient wells indicating active aerobic biodegradation conditions.
- Nitrate concentrations fluctuate over time therefore no trend relationship is noted. However, the presence of nitrate as an electron acceptor indicates its availability for by microorganisms in the course of hydrocarbon degradation.
- Generally, sulfate concentrations have decreased with time indicating its utilization as an electron acceptor under anaerobic conditions.
- Increased concentrations of the metabolic byproducts iron and manganese in monitoring well MW-7 indicates iron and manganese reduction conditions that are the result of anaerobic biodegradation processes.
- The biodegradation capacity of electron acceptors and metabolic byproducts (33.36 mg/L) far exceeds the highest benzene concentration (1.13 mg/L) observed on site by a ratio of 30 to 1. This indicates that the biodegradation process will continue.

Table 5 Summary of Biological Parameter Results Monument Booster Station						
Monitoring Well	Sampling Date	DO (mg/L)	Nitrate (mg/L)	Sulfate (mg/L)	Iron (Fe ²⁺ / Fe ³⁺) (mg/L)	Manganese (mg/L)
MW-1D	05/16/95	1.05	1.37	174	4.6	0.3
	11/15/95	1.26	<0.01	119	---	---
	01/18/96	4.8	0.6	168	---	---
	04/24/96	2.6	<0.1	169	0.06	0.37
	01/22/97	7.0	<0.1	83	---	---
	08/11/97	3.6	<0.1	110	0.28	0.35
	01/23/98	4.6	2.8	190	---	---
	08/03/98	2.16	4.0	100	<0.1	0.22
	02/10/99	2.7	4.6	110	---	---
	08/17/99	1.03	3.8	120	0.19	0.18
	02/18/00	0.41	3.6	92	---	---
	08/23/00	1.01	3.4	98	0.20	0.20
MW-2	05/16/95	6.48	7.42	509	5.82	0.12
	11/15/95	6.13	---	---	---	---
	01/18/96	6.2	---	---	---	---
	04/24/96	1.5	0.3	443	0.07	<0.01
	01/22/97	9.0	2.1	310	---	---
	08/11/97	7.6	9.0	290	0.24	<0.01
	01/23/98	8.2	30.0	230	---	---
	08/03/98	7.00	4.0	220	<0.1	<0.1
	02/10/99	8.3	4.8	140	---	---
	08/17/99	5.98	4.0	150	<0.1	<0.1
	02/18/00	5.65	4.1	120	---	---
	08/23/00	6.39	2.0	110	<0.05	<0.01
MW-3	05/16/95	6.85	5.62	115	0.53	0.08
	11/15/95	1.29	---	---	---	---
	01/18/96	4.9	---	---	---	---
	04/24/96	1.0	0.3	95	0.17	<0.01
	01/22/97	8.75	2.7	76	---	---
	08/11/97	9.2	9.4	75	0.14	<0.01
	01/23/98	7.7	15.0	240	---	---
	08/03/98	3.43	4.0	80	0.55	<0.1
	02/10/99	5.80	4.9	74	---	---
	08/17/99	4.04	3.5	84	<0.1	<0.1
	02/17/00	6.24	3.7	69	---	---
	08/23/00	6.25	3.3	72	<0.05	<0.01
Analyses performed by Trace Analysis, Inc., Lubbock, Texas. Dissolved oxygen (DO) readings obtained with Hanna Model 9143 DO meter or comparable model. Monitoring wells MW-6 and MW-7 installed on November 15, 1995. Monitoring wells MW-1 and MW-5 were not analyzed due to presence of phase-separated hydrocarbons (PSH).						

Table 5 (continued)						
Summary of Biological Parameter Results						
Monument Booster Station						
Monitoring Well	Sampling Date	DO (mg/L)	Nitrate (mg/L)	Sulfate (mg/L)	Iron (Fe ²⁺ / Fe ³⁺) (mg/L)	Manganese (mg/L)
MW-4	05/16/95	4.85	3.69	136	4.68	0.11
	11/15/95	1.30	---	---	---	---
	01/18/96	4.0	---	---	---	---
	04/24/96	1.9	0.1	115	0.08	<0.01
	01/22/97	9.0	<0.1	100	---	---
	08/11/97	3.5	<0.1	96	0.08	<0.01
	01/23/98	7.0	1.0	180	---	---
	08/03/98	3.66	2.9	100	<0.1	<0.1
	02/10/99	5.0	3.7	110	---	---
	08/17/99	2.64	2.5	120	<0.1	<0.1
	02/18/00	6.51	2.8	98	---	---
	08/23/00	6.06	2.6	100	<0.05	0.03
MW-6	05/16/95	---	---	---	---	---
	11/16/95	5.40	0.06	233	---	---
	01/18/96	4.1	<0.05	93	---	---
	04/24/96	1.7	<0.1	70	0.15	0.28
	01/22/97	11.0	<0.1	37	---	---
	08/11/97	3.7	<0.1	37	0.21	0.30
	01/23/98	4.7	0.3	230	---	---
	08/03/98	1.96	<1.0	45	0.26	0.36
	02/10/99	2.6	<1.0	42	---	---
	08/17/99	0.8	<1.0	82	0.42	0.27
	02/18/00	0.53	<1.0	59	---	---
	08/23/00	0.61	<0.1	57	<0.05	0.34
MW-7	05/16/95	---	---	---	---	---
	11/15/95	1.6	5.00	418	---	---
	01/18/96	4.8	6.54	180	---	---
	04/24/96	2.1	0.2	149	<0.03	0.38
	01/22/97	13.2	<0.1	25	---	---
	08/11/97	3.0	<0.1	76	0.43	0.37
	01/23/98	4.1	0.4	180	---	---
	08/03/98	1.9	<1.0	90	6.1	0.41
	02/10/99	2.6	<1.0	44	---	---
	08/17/99	0.9	<1.0	14	8.1	0.19
	02/18/00	0.28	<1.0	27	---	---
	08/23/00	0.59	<1.0	19	7.4	0.22
Analyses performed by Trace Analysis, Inc., Lubbock, Texas.						
Dissolved oxygen (DO) readings obtained with Hanna Model 9143 DO meter or comparable model.						
Monitoring wells MW-6 and MW-7 installed on November 15, 1995.						
Monitoring wells MW-1 and MW-5 were not analyzed due to presence of phase-separated hydrocarbons (PSH).						

Figure 7
Dissolved Oxygen Concentrations Versus Time

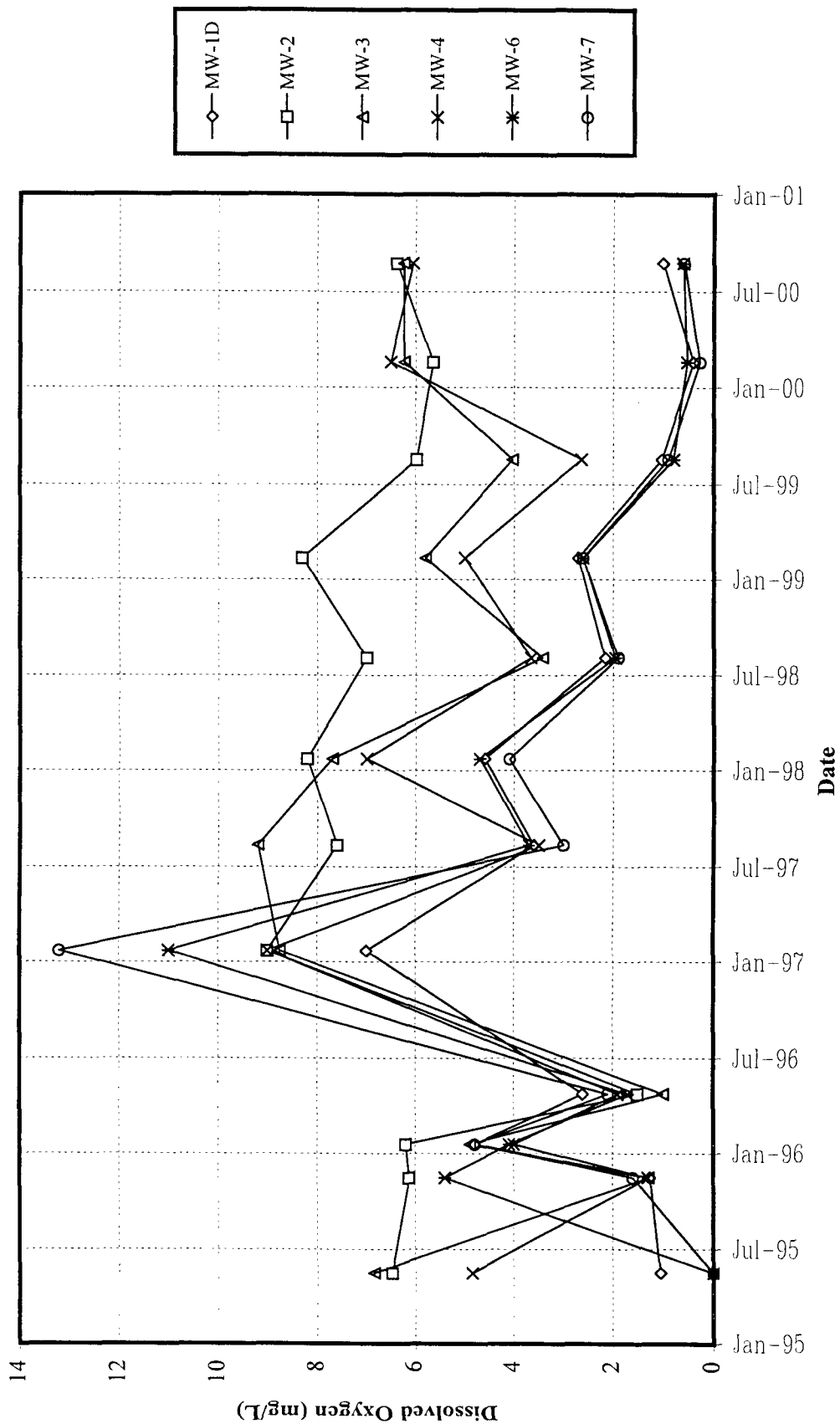


Figure 8
Nitrate Concentrations Versus Time

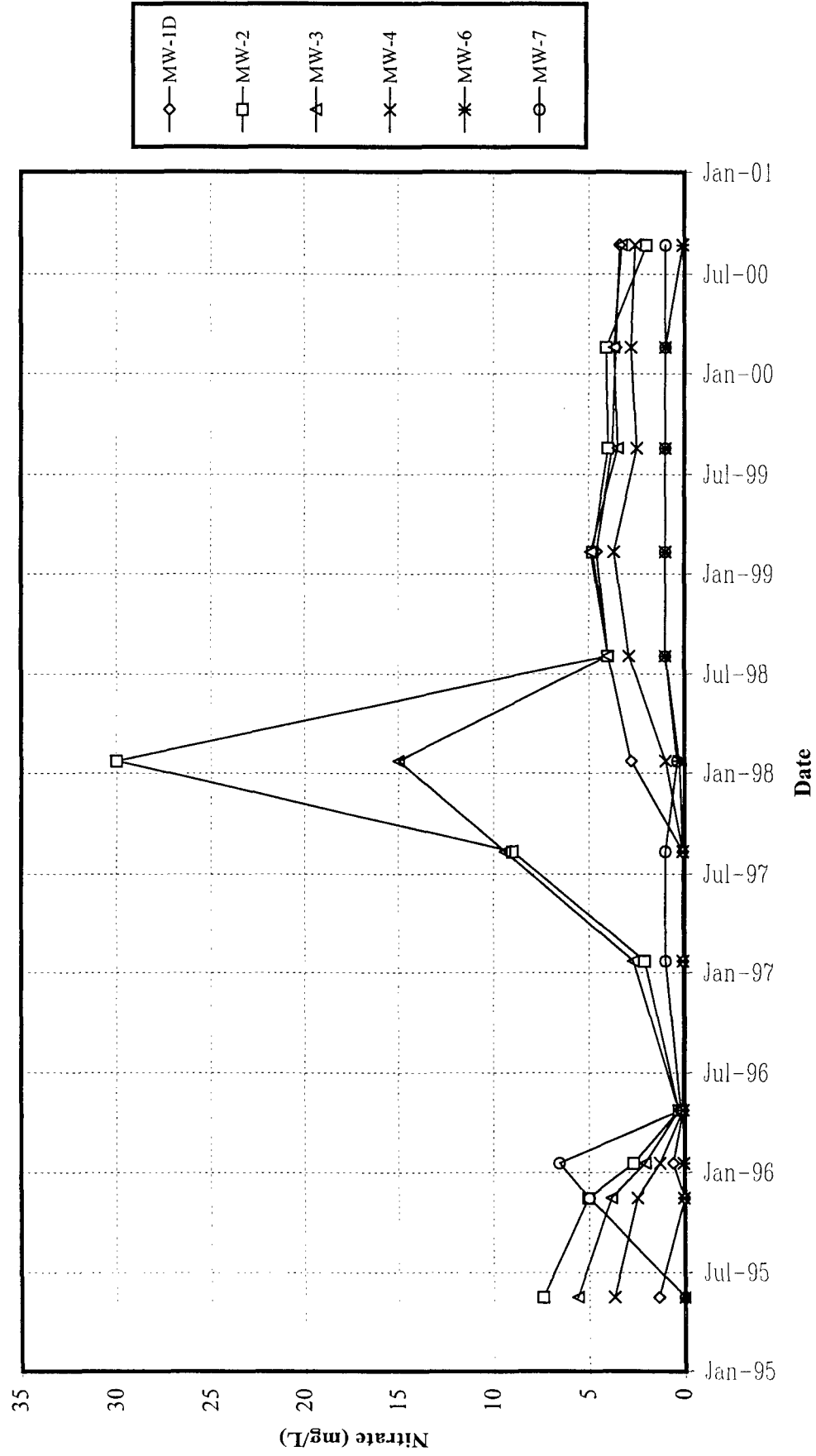


Figure 9
Sulfate Concentrations Versus Time

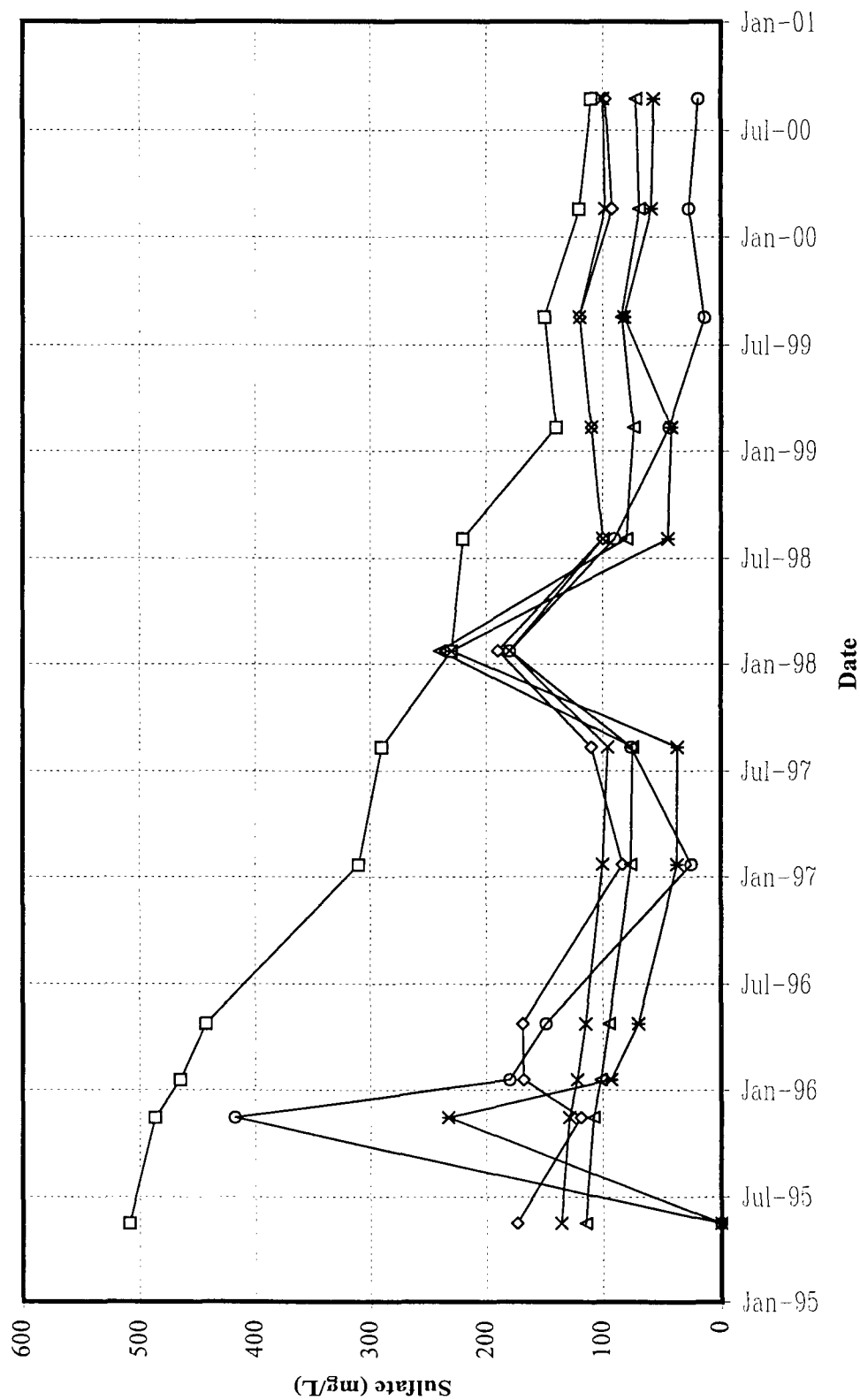


Figure 10
Total Dissolved Iron Concentrations Versus Time

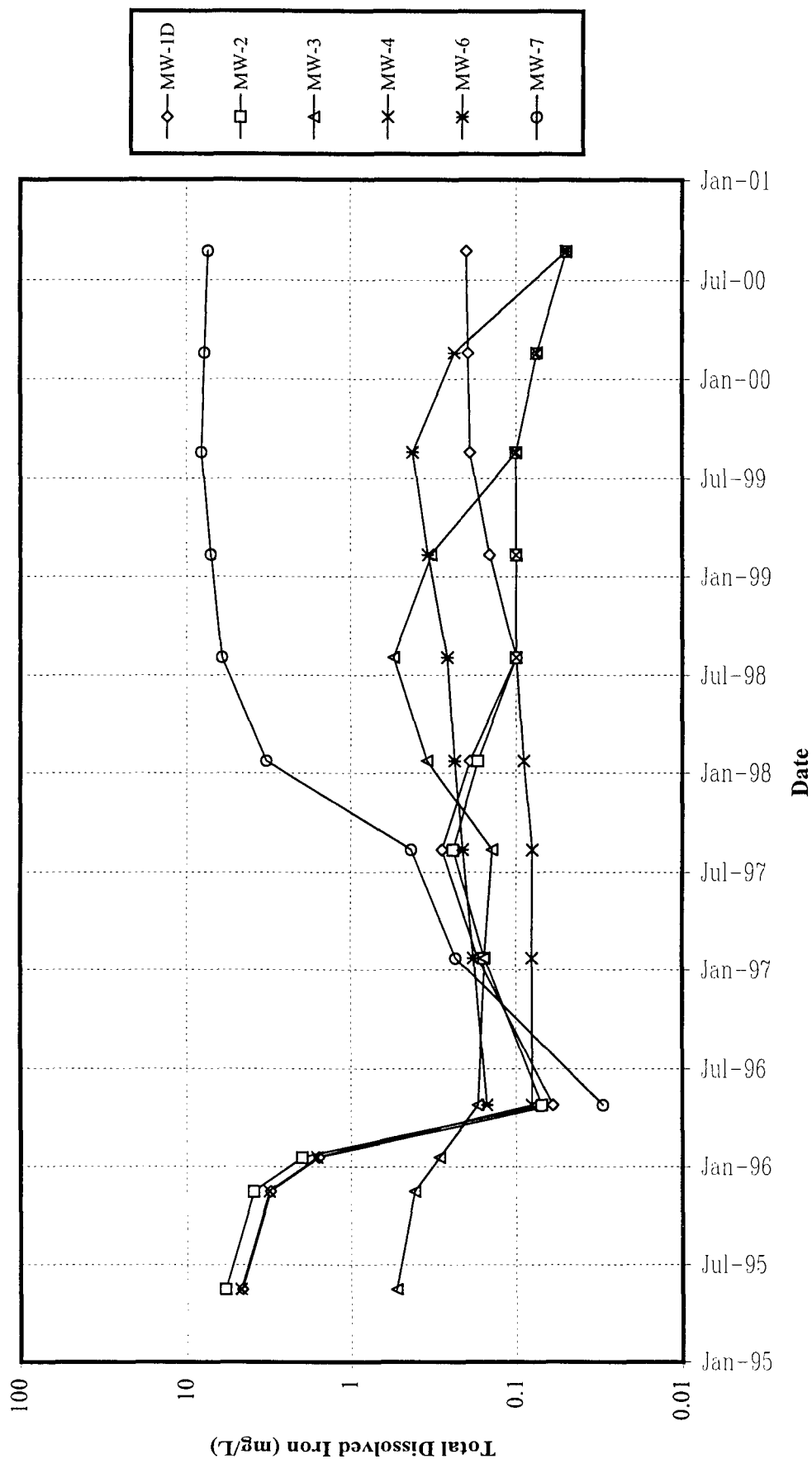
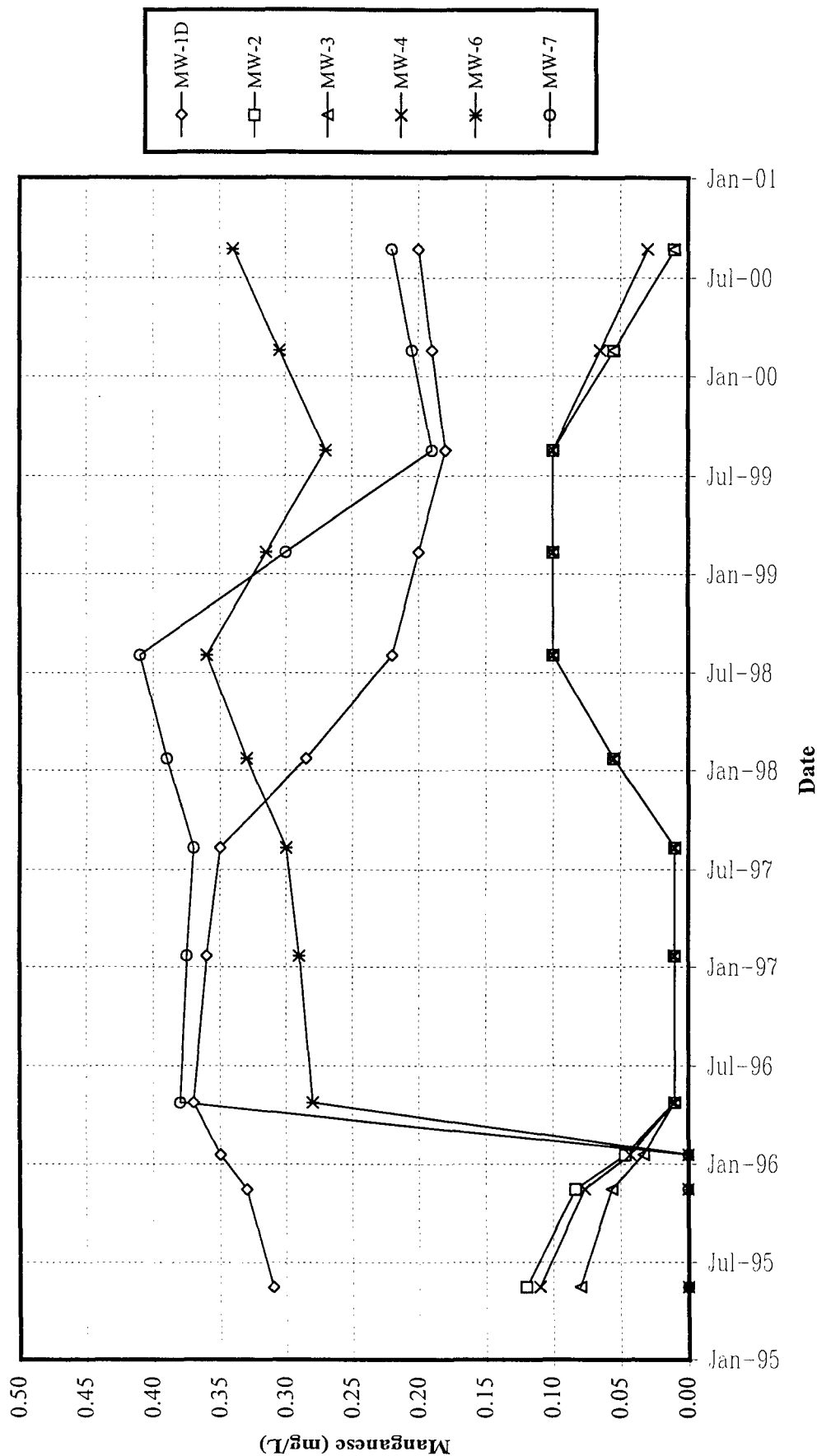


Figure 11
Manganese Concentrations Versus Time



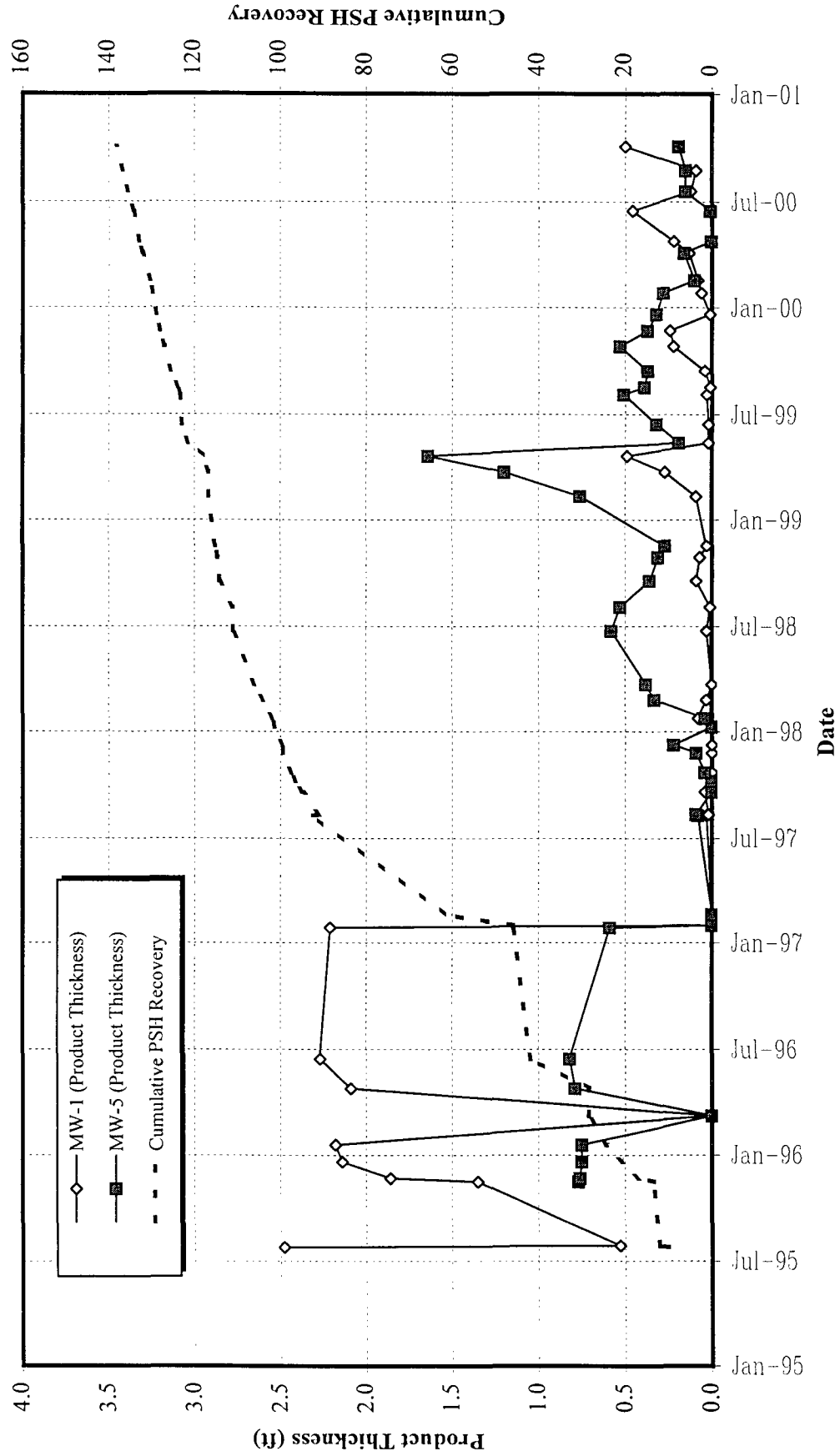
7.0 Remediation System Performance

Free product remediation at the Monument Booster Station is presently being conducted utilizing hydrophobic absorbent socks in both MW-1 and MW-5. Xitech product recovery pumps were initially installed in monitoring wells MW-1 and MW-5 on January 31, 1997 to replace the hand bailing and gravity siphoning techniques used previously. On March 13, 1998 the Xitech pump in MW-5 was removed, to be used at another facility (Lee Plant), and replaced with a passive bailer. On April 20, 1999, the passive bailer in MW-5 was replaced with a hydrophobic adsorbent sock. On December 20, 1999 the Xitech pump in MW-1 was removed and replaced with an adsorbent sock. As of October 3, 2000, a total of approximately 138 gallons of free product (condensate) have been removed from monitoring wells MW-1 and MW-5. Product recovery volumes are listed below in Table 6. A graph of product thickness measurements from each of the impacted wells and the cumulative product recovery versus time is provided in Figure 12.

Table 6 Product Recovery Volumes Duke Energy Field Services - Monument Booster Station						
Date	Product Thickness (feet)		Product Recovered (gallons)			Cumulative Product Recovered (gallons)
	MW-1	MW-5	MW-1		MW-5	
07/24/95	2.48	---	10	HB	---	10
07/27/95	0.53	---	2	SWAP	---	12
11/15/95	1.35	0.77	1.4	SWAP	---	13.4
03/08/96	---	---	15	Pump	---	28.4
06/14/96	2.27	0.82	12	Pump	1.5 HB	41.9
01/27/97	2.21	0.59	4	Pump	0 Pump	45.9
02/07/97	---	---	4	Pump	2 Pump	51.9
02/19/97	---	---	10	Pump	0 Pump	61.9
08/11/97	0.02	0.09	23	Pump	6 Pump	90.9
08/09/97	0.03	0.08	1.5	Pump	0 Pump	92.4
09/18/97	0.04	---	2.5	Pump	0 Pump	94.9
10/07/97	---	---	1.5	Pump	0 Pump	96.4
10/22/97	---	0.04	1	Pump	0 Pump	97.4
11/25/97	---	0.09	1.5	Pump	0.5 Pump	99.4
01/09/98	---	---	2	Pump	0.0 Pump	101.4
01/23/98	0.08	0.04	0.0	Pump	0.5 Pump	101.9
02/24/98	0.03	0.33	2	Pump	0.00 PB	103.9
03/23/98	0.00	0.38	2	Pump	0.07 PB	106.0
06/23/98	0.03	0.58	5	Pump	0.04 PB	111.0
08/03/98	0.01	0.53	0.0	Pump	0.05 PB	111.1
09/18/98	0.09	0.36	3	Pump	0.16 PB	114.2
10/28/98	0.07	0.31	0.5	Pump	0.00 PB	114.7
11/17/98	0.03	0.27	0.5	Pump	0.01 PB	115.2
02/10/99	0.09	0.76	1.5	Pump	0.01 PB	116.7
04/20/99	0.49	1.64	0.5	Pump	0.9 PB	118.1
05/13/99	0.02	0.19	3	Pump	0.4 PB	121.5
06/14/99	0.02	0.32	1	Pump	0.5 Sock	123.0
08/04/99	0.03	0.51	0.0	Pump	0.4 Sock	123.4
08/17/99	0.01	0.39	0.0	Pump	0.5 Sock	123.9
09/14/99	0.04	0.37	1	Pump	0.6 Sock	125.5
10/26/99	0.22	0.53	1	Pump	0.5 Sock	127.0
11/22/99	0.24	0.37	0.5	Pump	0.5 Sock	128.0
12/20/99	0.01	0.32	0.5	Pump	0.4 Sock	128.9
01/26/00	0.06	0.28	0.4	Sock	0.4 Sock	129.7
02/17/00	0.08	0.10	0.4	Sock	0.2 Sock	130.3
04/04/00	0.13	0.16	0.6	Sock	1.2 Sock	132.1
04/24/00	0.22	0.01	0.5	Sock	0.35 Sock	132.9
06/15/00	0.46	0.01	1.1	Sock	0.28 Sock	134.3
07/19/00	0.12	0.15	0.6	Sock	0.55 Sock	135.5
08/23/00	0.09	0.15	0.5	Sock	0.72 Sock	136.7
10/03/00	0.50	0.19	1.1	Sock	0.39 Sock	138.3
Total Volume of Product Recovered:			118.6	(MW-1)	19.6 (MW-5)	138.3
Product recovery methods used: HB: Hand bailing using PVC bailer SWAP: Gravity siphon demonstration Pump: Xitech ADJ 1000 Smart Skimmer (Product Recovery System) PB: Passive bailer with hydrophobic filter Sock: Hydrophobic (oil adsorbent) sock						



Figure 12
Phase Separated Product Recovery Versus Time



8.0 Conclusions

Conclusions relevant to groundwater conditions and the remediation performance at the Monument Booster Station are presented below.

- BTEX concentrations in monitoring wells MW-1D, MW-2, MW-3, MW-4, and MW-6 are presently below New Mexico WQCC standards. With the exception of the August 1999 sample recovered from MW-2 and the August 1999 and February 2000 samples recovered from MW-3, the BTEX concentrations in each of these wells have remained below the WQCC standard levels since 1995.
- Only the benzene concentrations from the current and historic groundwater samples recovered from MW-7 exceed the WQCC standard. These levels, however appear to have stabilized between of 0.5 and 0.7 mg/L over the last four semi-annual monitoring events. There is no indication that a consistent dissolved benzene plume extends off the site to the southeast (downgradient) from the source area. Concern for potential future off site migration is justified based on elevated benzene concentrations observed in MW-3 from groundwater samples recovered during two of the last three monitoring events. Although the benzene slug is estimated to be migrating at approximately 0.31 feet per day and attenuating at a rate of approximately one-half-life per 100 feet. At this rate the benzene slug should not represent an environmental threat to potential future receptors within 500 feet southeast of MW-3.
- As of October 3, 2000, a total of approximately 138 gallons of free product (condensate) has been removed from monitoring wells MW-1 and MW-5 using a combination of gravity siphoning, hand bailing, passive skimmer, adsorbent sock, and pneumatic pump recovery methods.
- The presence and trends of biological parameters (dissolved oxygen, nitrate, sulfate, and iron) indicate that biodegradation has been taking place on site. The biodegradation capacity of electron acceptors and metabolic byproducts (33.36 mg/L) far exceeds the highest benzene concentration (1.13 mg/L) observed on site by a ratio of 30 to 1. This indicates that the biodegradation process has been active. Continued semi-annual monitoring is necessary to demonstrate the effectiveness of intrinsic bioremediation in limiting the migration of the dissolved hydrocarbon plume.

9.0 Recommendations

The following recommendations are proposed for the remediation system and monitoring operations at the Monument Booster Station.

- Continue free product recovery operations utilizing absorbent socks in MW-1 and MW-5. This system appears to have been effective in recovering free product over the last annual monitoring period. However, if the thickness of the product increases beyond the removal capacity of the absorbent socks the Xitech product recovery system can be reinstalled. Additional monitoring wells have also been proposed to better define the source area and extent of the free product observed in MW-5.
- Discontinue analyses for aluminum, arsenic, and chromium since those constituents have been below the WQCC standards for over four years.
- Continue the groundwater-monitoring program on a semi-annual basis. The next sampling event is scheduled during the first quarter of 2001. If future monitoring indicates an increased potential for off-site migration of the dissolved benzene plume, then additional corrective actions will be proposed in a separate work plan.

APPENDIX A

LABORATORY ANALYTICAL REPORTS AND
CHAIN-OF-CUSTODY DOCUMENTATION

TRACE ANALYSIS, INC.

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E-Mail: lab@traceanalysis.com

Analytical and Quality Control Report

Gil Van Deventer
TRW
415 West Wall Suite 1818
Midland, TX 79701

Report Date: September 8, 2000

Order ID Number: A00082516

Project Number: P/6494/4AC
Project Name: Duke Energy Field Services
Project Location: Monument Booster

Enclosed are the Analytical Results and Quality Control Data Reports for the following samples submitted to Trace Analysis, Inc.

Sample	Description	Matrix	Date Taken	Time Taken	Date Received
152205	MW-6	Water	8/23/00	10:40	8/25/00
152206	MW-2	Water	8/23/00	11:45	8/25/00
152207	MW-4	Water	8/23/00	13:45	8/25/00
152208	MW-1D	Water	8/23/00	14:20	8/25/00
152209	MW-3	Water	8/23/00	15:10	8/25/00
152210	MW-7	Water	8/23/00	16:00	8/25/00
152211	Rinsate	Water	8/23/00	16:10	8/25/00
152212	Duplicate	Water	8/23/00	:	8/25/00
152213	Trip Blank	Water	8/23/00	:	8/25/00

These results represent only the samples received in the laboratory. The Quality Control Report is generated on a batch basis. All information contained in this report is for the analytical batch(es) in which your sample(s) were analyzed.

This report consists of a total of 18 pages and shall not be reproduced except in its entirety, without written approval of Trace Analysis, Inc.


Dr. Blair Leftwich, Director

Analytical and Quality Control Report

Sample: 152205 - MW-6

Analysis: BTEX Analytical Method: S 8021B QC Batch: QC04583 Date Analyzed: 8/30/00
Analyst: RC Preparation Method: 5035 Prep Batch: PB03988 Date Prepared: 8/30/00

Param	Flag	Result	Units	Dilution	RDL
Benzene		<0.001	mg/L	1	0.001
Toluene		<0.001	mg/L	1	0.001
Ethylbenzene		0.004	mg/L	1	0.001
M,P,O-Xylene		0.011	mg/L	1	0.001
Total BTEX		0.015	mg/L	1	0.001

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
TFT		0.074	mg/L	1	0.10	74	72 - 128
4-BFB		0.089	mg/L	1	0.10	89	72 - 128

Sample: 152205 - MW-6

Analysis: Dissolved Metals Analytical Method: S 6010B QC Batch: QC04560 Date Analyzed: 8/30/00
Analyst: RR Preparation Method: E 3005A Prep Batch: PB03932 Date Prepared: 8/29/00

Param	Flag	Result	Units	Dilution	RDL
Dissolved Aluminum		<0.20	mg/L	1	0.20
Dissolved Arsenic		<0.05	mg/L	1	0.05
Dissolved Barium		0.12	mg/L	1	0.05
Dissolved Chromium		<0.01	mg/L	1	0.01
Dissolved Iron		<0.05	mg/L	1	0.05
Dissolved Manganese		0.34	mg/L	1	0.01

Sample: 152205 - MW-6

Analysis: Ion Chromatography (IC) Analytical Method: E 300.0 QC Batch: QC04503 Date Analyzed: 8/25/00
Analyst: JS Preparation Method: N/A Prep Batch: PB03922 Date Prepared: 8/25/00

Param	Flag	Result	Units	Dilution	RDL
CL	1	140	mg/L	1	0.50
Fluoride	2	1.8	mg/L	1	0.20
Sulfate	3	57	mg/L	1	0.50

¹Chloride re-ran on IC090100-1.sch (PB04071; QC04677). ICV %IA = 97; CCV %IA = 94; matrix spikes RPD = 0; matrix spikes %EA = 93.

²Fluoride re-ran on IC090100-1.sch (PB04071; QC04677). ICV %IA = 94; CCV %IA = 97; matrix spikes RPD = 1; matrix spikes %EA = 96.

³Sulfate re-ran on IC090100-1.sch (PB04071; QC04677). ICV %IA = 98; CCV %IA = 95; matrix spikes RPD = 1; matrix spikes %EA = 95.

Sample: 152205 - MW-6

Analysis: NO3 Analytical Method: SM 4500-NO3 E QC Batch: QC04646 Date Analyzed: 8/29/00
Analyst: JS Preparation Method: N/A Prep Batch: PB04050 Date Prepared: 8/29/00

Param	Flag	Result	Units	Dilution	RDL
NO3-N		<0.10	mg/L	1	0.10

Sample: 152205 - MW-6

Analysis: TDS Analytical Method: E 160.1 QC Batch: QC04558 Date Analyzed: 8/29/00
Analyst: LD Preparation Method: N/A Prep Batch: PB03963 Date Prepared: 8/28/00

Param	Flag	Result	Units	Dilution	RDL
Total Dissolved Solids		900	mg/L	1	10

Sample: 152206 - MW-2

Analysis: BTEX Analytical Method: S 8021B QC Batch: QC04583 Date Analyzed: 8/30/00
Analyst: RC Preparation Method: 5035 Prep Batch: PB03988 Date Prepared: 8/30/00

Param	Flag	Result	Units	Dilution	RDL
Benzene		<0.001	mg/L	1	0.001
Toluene		<0.001	mg/L	1	0.001
Ethylbenzene		<0.001	mg/L	1	0.001
M,P,O-Xylene		<0.001	mg/L	1	0.001
Total BTEX		<0.001	mg/L	1	0.001

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
TFT		0.08	mg/L	1	0.10	80	72 - 128
4-BFB		0.095	mg/L	1	0.10	95	72 - 128

Sample: 152206 - MW-2

Analysis: Dissolved Metals Analytical Method: S 6010B QC Batch: QC04560 Date Analyzed: 8/30/00
Analyst: RR Preparation Method: E 3005A Prep Batch: PB03932 Date Prepared: 8/29/00

Param	Flag	Result	Units	Dilution	RDL
Dissolved Aluminum		<0.20	mg/L	1	0.20
Dissolved Arsenic		<0.05	mg/L	1	0.05
Dissolved Barium		0.22	mg/L	1	0.05
Dissolved Chromium		0.02	mg/L	1	0.01
Dissolved Iron		<0.05	mg/L	1	0.05
Dissolved Manganese		<0.01	mg/L	1	0.01

Sample: 152206 - MW-2

Analysis: Ion Chromatography (IC) Analytical Method: E 300.0 QC Batch: QC04503 Date Analyzed: 8/25/00
Analyst: JS Preparation Method: N/A Prep Batch: PB03922 Date Prepared: 8/25/00

Param	Flag	Result	Units	Dilution	RDL
CL	4	1800	mg/L	1	0.50
Fluoride	5	1.8	mg/L	1	0.20
Sulfate	6	110	mg/L	1	0.50

Sample: 152206 - MW-2

Analysis: NO3 Analytical Method: SM 4500-NO3 E QC Batch: QC04646 Date Analyzed: 8/29/00
Analyst: JS Preparation Method: N/A Prep Batch: PB04050 Date Prepared: 8/29/00

Param	Flag	Result	Units	Dilution	RDL
NO3-N		2.0	mg/L	1	0.10

Sample: 152206 - MW-2

Analysis: TDS Analytical Method: E 160.1 QC Batch: QC04558 Date Analyzed: 8/29/00
Analyst: LD Preparation Method: N/A Prep Batch: PB03963 Date Prepared: 8/28/00

Param	Flag	Result	Units	Dilution	RDL
Total Dissolved Solids	7	3300	mg/L	1	10

Sample: 152207 - MW-4

Analysis: BTEX Analytical Method: S 8021B QC Batch: QC04583 Date Analyzed: 8/30/00
Analyst: RC Preparation Method: 5035 Prep Batch: PB03988 Date Prepared: 8/30/00

Param	Flag	Result	Units	Dilution	RDL
Benzene		<0.005	mg/L	5	0.001
Toluene		<0.005	mg/L	5	0.001
Ethylbenzene		<0.005	mg/L	5	0.001
M,P,O-Xylene		<0.005	mg/L	5	0.001
Total BTEX		<0.005	mg/L	5	0.001

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
TFT		0.445	mg/L	1	0.10	89	72 - 128
4-BFB		0.532	mg/L	1	0.10	106	72 - 128

Sample: 152207 - MW-4

Analysis: Dissolved Metals Analytical Method: S 6010B QC Batch: QC04560 Date Analyzed: 8/30/00
Analyst: RR Preparation Method: E 3005A Prep Batch: PB03932 Date Prepared: 8/29/00

⁴Chloride re-ran on IC090100-1.sch (PB04071; QC04677). ICV %IA = 97; CCV %IA = 94; matrix spikes RPD = 0; matrix spikes %EA = 93.

⁵Fluoride re-ran on IC090100-1.sch (PB04071; QC04677). ICV %IA = 94; CCV %IA = 97; matrix spikes RPD = 1; matrix spikes %EA = 96.

⁶Sulfate re-ran on IC090100-1.sch (PB04071; QC04677). ICV %IA = 98; CCV %IA = 95; matrix spikes RPD = 1; matrix spikes %EA = 95.

⁷sample ran at a x5 dilution

Param	Flag	Result	Units	Dilution	RDL
Dissolved Aluminum		<0.20	mg/L	1	0.20
Dissolved Arsenic		<0.05	mg/L	1	0.05
Dissolved Barium		<0.05	mg/L	1	0.05
Dissolved Chromium		<0.01	mg/L	1	0.01
Dissolved Iron		<0.05	mg/L	1	0.05
Dissolved Manganese		0.03	mg/L	1	0.01

Sample: 152207 - MW-4

Analysis: Ion Chromatography (IC) Analytical Method: E 300.0 QC Batch: QC04503 Date Analyzed: 8/25/00
Analyst: JS Preparation Method: N/A Prep Batch: PB03922 Date Prepared: 8/25/00

Param	Flag	Result	Units	Dilution	RDL
CL		150	mg/L	1	0.50
Fluoride		1.8	mg/L	1	0.20
Nitrate-N		2.6	mg/L	1	0.20
Sulfate		100	mg/L	1	0.50

Sample: 152207 - MW-4

Analysis: TDS Analytical Method: E 160.1 QC Batch: QC04558 Date Analyzed: 8/29/00
Analyst: LD Preparation Method: N/A Prep Batch: PB03963 Date Prepared: 8/28/00

Param	Flag	Result	Units	Dilution	RDL
Total Dissolved Solids		780	mg/L	1	10

Sample: 152208 - MW-1D

Analysis: BTEX Analytical Method: S 8021B QC Batch: QC04583 Date Analyzed: 8/30/00
Analyst: RC Preparation Method: 5035 Prep Batch: PB03988 Date Prepared: 8/30/00

Param	Flag	Result	Units	Dilution	RDL
Benzene		<0.005	mg/L	5	0.001
Toluene		<0.005	mg/L	5	0.001
Ethylbenzene		<0.005	mg/L	5	0.001
M,P,O-Xylene		<0.005	mg/L	5	0.001
Total BTEX		<0.005	mg/L	5	0.001

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
TFT		0.468	mg/L	1	0.10	93	72 - 128
4-BFB		0.549	mg/L	1	0.10	109	72 - 128

Sample: 152208 - MW-1D

Analysis: Dissolved Metals Analytical Method: S 6010B QC Batch: QC04560 Date Analyzed: 8/30/00
Analyst: RR Preparation Method: E 3005A Prep Batch: PB03932 Date Prepared: 8/29/00

Param	Flag	Result	Units	Dilution	RDL
Dissolved Aluminum		<0.20	mg/L	1	0.20
Dissolved Arsenic		<0.05	mg/L	1	0.05
Dissolved Barium		<0.05	mg/L	1	0.05
Dissolved Chromium		<0.01	mg/L	1	0.01
Dissolved Iron		0.20	mg/L	1	0.05
Dissolved Manganese		0.20	mg/L	1	0.01

Sample: 152208 - MW-1D

Analysis: Ion Chromatography (IC) Analytical Method: E 300.0 QC Batch: QC04503 Date Analyzed: 8/25/00
Analyst: JS Preparation Method: N/A Prep Batch: PB03922 Date Prepared: 8/25/00

Param	Flag	Result	Units	Dilution	RDL
CL		65	mg/L	1	0.50
Fluoride		2.9	mg/L	1	0.20
Nitrate-N		3.4	mg/L	1	0.20
Sulfate		98	mg/L	1	0.50

Sample: 152208 - MW-1D

Analysis: TDS Analytical Method: E 160.1 QC Batch: QC04558 Date Analyzed: 8/29/00
Analyst: LD Preparation Method: N/A Prep Batch: PB03963 Date Prepared: 8/28/00

Param	Flag	Result	Units	Dilution	RDL
Total Dissolved Solids		560	mg/L	1	10

Sample: 152209 - MW-3

Analysis: BTEX Analytical Method: S 8021B QC Batch: QC04583 Date Analyzed: 8/30/00
Analyst: RC Preparation Method: 5035 Prep Batch: PB03988 Date Prepared: 8/30/00

Param	Flag	Result	Units	Dilution	RDL
Benzene		0.006	mg/L	5	0.001
Toluene		<0.005	mg/L	5	0.001
Ethylbenzene		<0.005	mg/L	5	0.001
M,P,O-Xylene		<0.005	mg/L	5	0.001
Total BTEX		0.006	mg/L	5	0.001

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
TFT		0.468	mg/L	1	0.10	93	72 - 128
4-BFB		0.555	mg/L	1	0.10	111	72 - 128

Sample: 152209 - MW-3

Analysis: Dissolved Metals Analytical Method: S 6010B QC Batch: QC04560 Date Analyzed: 8/30/00
Analyst: RR Preparation Method: E 3005A Prep Batch: PB03932 Date Prepared: 8/29/00

Param	Flag	Result	Units	Dilution	RDL
Dissolved Aluminum		<0.20	mg/L	1	0.20
Dissolved Arsenic		<0.05	mg/L	1	0.05
Dissolved Barium		<0.05	mg/L	1	0.05
Dissolved Chromium		<0.01	mg/L	1	0.01
Dissolved Iron		<0.05	mg/L	1	0.05
Dissolved Manganese		<0.01	mg/L	1	0.01

Sample: 152209 - MW-3

Analysis: Ion Chromatography (IC) Analytical Method: E 300.0 QC Batch: QC04503 Date Analyzed: 8/25/00
Analyst: JS Preparation Method: N/A Prep Batch: PB03922 Date Prepared: 8/25/00

Param	Flag	Result	Units	Dilution	RDL
CL		190	mg/L	1	0.50
Fluoride		2.0	mg/L	1	0.20
Nitrate-N		3.3	mg/L	1	0.20
Sulfate		72	mg/L	1	0.50

Sample: 152209 - MW-3

Analysis: TDS Analytical Method: E 160.1 QC Batch: QC04558 Date Analyzed: 8/29/00
Analyst: LD Preparation Method: N/A Prep Batch: PB03963 Date Prepared: 8/28/00

Param	Flag	Result	Units	Dilution	RDL
Total Dissolved Solids		770	mg/L	1	10

Sample: 152210 - MW-7

Analysis: BTEX Analytical Method: S 8021B QC Batch: QC04583 Date Analyzed: 8/30/00
Analyst: RC Preparation Method: 5035 Prep Batch: PB03988 Date Prepared: 8/30/00

Param	Flag	Result	Units	Dilution	RDL
Benzene		0.546	mg/L	5	0.001
Toluene		0.006	mg/L	5	0.001
Ethylbenzene		0.484	mg/L	5	0.001
M,P,O-Xylene		0.177	mg/L	5	0.001
Total BTEX		1.21	mg/L	5	0.001

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
TFT		0.481	mg/L	1	0.10	96	72 - 128
4-BFB		0.545	mg/L	1	0.10	109	72 - 128

Sample: 152210 - MW-7

Analysis: Dissolved Metals Analytical Method: S 6010B QC Batch: QC04560 Date Analyzed: 8/30/00
Analyst: RR Preparation Method: E 3005A Prep Batch: PB03932 Date Prepared: 8/29/00

Param	Flag	Result	Units	Dilution	RDL
Dissolved Aluminum		<0.20	mg/L	1	0.20
Dissolved Arsenic		0.06	mg/L	1	0.05
Dissolved Barium		0.52	mg/L	1	0.05
Dissolved Chromium		<0.01	mg/L	1	0.01
Dissolved Iron		7.4	mg/L	1	0.05
Dissolved Manganese		0.22	mg/L	1	0.01

Sample: 152210 - MW-7

Analysis: Ion Chromatography (IC) Analytical Method: E 300.0 QC Batch: QC04503 Date Analyzed: 8/25/00
Analyst: JS Preparation Method: N/A Prep Batch: PB03922 Date Prepared: 8/25/00

Param	Flag	Result	Units	Dilution	RDL
CL		74	mg/L	1	0.50
Fluoride		2.7	mg/L	1	0.20
Nitrate-N		<1.0	mg/L	1	0.20
Sulfate		19	mg/L	1	0.50

Sample: 152210 - MW-7

Analysis: TDS Analytical Method: E 160.1 QC Batch: QC04558 Date Analyzed: 8/29/00
Analyst: LD Preparation Method: N/A Prep Batch: PB03963 Date Prepared: 8/28/00

Param	Flag	Result	Units	Dilution	RDL
Total Dissolved Solids		790	mg/L	1	10

Sample: 152211 - Rinsate

Analysis: BTEX Analytical Method: S 8021B QC Batch: QC04769 Date Analyzed: 9/7/00
Analyst: RC Preparation Method: 5035 Prep Batch: PB04150 Date Prepared: 9/7/00

Param	Flag	Result	Units	Dilution	RDL
Benzene		<0.001	mg/L	1	0.001
Toluene		<0.001	mg/L	1	0.001
Ethylbenzene		<0.001	mg/L	1	0.001
M,P,O-Xylene		<0.001	mg/L	1	0.001
Total BTEX		<0.001	mg/L	1	0.001

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
TFT		0.124	mg/L	1	0.10	124	72 - 128
4-BFB		0.107	mg/L	1	0.10	107	72 - 128

Sample: 152212 - Duplicate

Analysis: BTEX Analytical Method: S 8021B QC Batch: QC04583 Date Analyzed: 8/30/00
Analyst: RC Preparation Method: 5035 Prep Batch: PB03988 Date Prepared: 8/30/00

Param	Flag	Result	Units	Dilution	RDL
Benzene		0.57	mg/L	5	0.001
Toluene		0.006	mg/L	5	0.001
Ethylbenzene		0.512	mg/L	5	0.001
M,P,O-Xylene		0.192	mg/L	5	0.001
Total BTEX		1.28	mg/L	5	0.001

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
TFT		0.486	mg/L	1	0.10	97	72 - 128
4-BFB		0.537	mg/L	1	0.10	107	72 - 128

Sample: 152213 - Trip Blank

Analysis: BTEX Analytical Method: S 8021B QC Batch: QC04583 Date Analyzed: 8/30/00
Analyst: RC Preparation Method: 5035 Prep Batch: PB03988 Date Prepared: 8/30/00

Param	Flag	Result	Units	Dilution	RDL
Benzene		<0.001	mg/L	1	0.001
Toluene		<0.001	mg/L	1	0.001
Ethylbenzene		<0.001	mg/L	1	0.001
M,P,O-Xylene		<0.001	mg/L	1	0.001
Total BTEX		<0.001	mg/L	1	0.001

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
TFT		0.089	mg/L	1	0.10	89	72 - 128
4-BFB		0.105	mg/L	1	0.10	105	72 - 128

Quality Control Report Method Blank

Sample: Method Blank QC Batch: QC04503

Param	Flag	Results	Units	Reporting Limit
CL		<0.5	mg/L	0.50
Fluoride		<0.2	mg/L	0.20
Nitrate-N		<0.2	mg/L	0.20
Sulfate		<0.5	mg/L	0.50

Sample: Method Blank QC Batch: QC04558

Param	Flag	Results	Units	Reporting Limit
Total Dissolved Solids		<10	mg/L	10

Sample: Method Blank QCBatch: QC04560

Param	Flag	Results	Units	Reporting Limit
Dissolved Aluminum		<0.20	mg/L	0.20
Dissolved Arsenic		<0.05	mg/L	0.05
Dissolved Barium		<0.05	mg/L	0.05
Dissolved Chromium		<0.01	mg/L	0.01
Dissolved Iron		<0.05	mg/L	0.05
Dissolved Manganese		<0.01	mg/L	0.01

Sample: Method Blank QCBatch: QC04583

Param	Flag	Results	Units	Reporting Limit
Benzene		<0.001	mg/L	0.001
Toluene		<0.001	mg/L	0.001
Ethylbenzene		<0.001	mg/L	0.001
M,P,O-Xylene		<0.001	mg/L	0.001
Total BTEX		<0.001	mg/L	0.001

Surrogate	Flag	Result	Units	Spike Amount	Percent Recovery	Recovery Limit
TFT		0.089	mg/L	0.10	89	72 - 128
4-BFB		0.106	mg/L	0.10	106	72 - 128

Sample: Method Blank QCBatch: QC04646

Param	Flag	Results	Units	Reporting Limit
NO3-N		<0.10	mg/L	0.10

Sample: Method Blank QCBatch: QC04769

Param	Flag	Results	Units	Reporting Limit
Benzene		<0.001	mg/L	0.001
Toluene		<0.001	mg/L	0.001
Ethylbenzene		<0.001	mg/L	0.001
M,P,O-Xylene		<0.001	mg/L	0.001

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Param	Flag	Results	Units	Reporting Limit
Total BTEX		<0.001	mg/L	0.001

Surrogate	Flag	Result	Units	Spike Amount	Percent Recovery	Recovery Limit
TFT		0.11	mg/L	0.10	120	72 - 128
4-BFB		0.105	mg/L	0.10	105	72 - 128

Quality Control Report Lab Control Spikes and Duplicate Spikes

Sample: LCS QC Batch: QC04503

Param	Flag	Sample Result	Units	Dil.	Spike Amount Added	Matrix Result	% Rec.	RPD	% Rec. Limit	RPD Limit
CL	⁸	11.53	mg/L	1	12.50	<0.5	92		80 - 120	20
Fluoride	⁹	2.43	mg/L	1	2.50	<0.2	97		80 - 120	20
Nitrate-N	¹⁰	4.53	mg/L	1	5	<0.2	90		80 - 120	20
Sulfate	¹¹	11.85	mg/L	1	12.50	<0.5	94		80 - 120	20

Sample: LCSD QC Batch: QC04503

Param	Flag	Sample Result	Units	Dil.	Spike Amount Added	Matrix Result	% Rec.	RPD	% Rec. Limit	RPD Limit
CL	¹²	11.56	mg/L	1	12.50	<0.5	92	0	80 - 120	20
Fluoride	¹³	2.44	mg/L	1	2.50	<0.2	97	0	80 - 120	20
Nitrate-N	¹⁴	4.56	mg/L	1	5	<0.2	91	1	80 - 120	20
Sulfate	¹⁵	11.80	mg/L	1	12.50	<0.5	94	0	80 - 120	20

Sample: LCS QC Batch: QC04560

⁸ Blank spikes used because I'm re-running the sample that I spiked at lower dilutions.

⁹ Blank spikes used because I'm re-running the sample that I spiked at lower dilutions.

¹⁰ Blank spikes used because I'm re-running the sample that I spiked at lower dilutions.

¹¹ Blank spikes used because I'm re-running the sample that I spiked at lower dilutions.

¹² Blank spikes used because I'm re-running the sample that I spiked at lower dilutions.

¹³ Blank spikes used because I'm re-running the sample that I spiked at lower dilutions.

¹⁴ Blank spikes used because I'm re-running the sample that I spiked at lower dilutions.

¹⁵ Blank spikes used because I'm re-running the sample that I spiked at lower dilutions.

Param	Flag	Sample Result	Units	Dil.	Spike Amount Added	Matrix Result	% Rec.	RPD	% Rec. Limit	RPD Limit
Dissolved Aluminum		1.90	mg/L	1	2	<0.20	95		75 - 125	20
Dissolved Arsenic		0.95	mg/L	1	1	<0.05	95		75 - 125	20
Dissolved Barium		2.04	mg/L	1	2	<0.05	102		75 - 125	20
Dissolved Chromium		0.41	mg/L	1	0.40	<0.01	102		75 - 125	20
Dissolved Iron		2.01	mg/L	1	2	<0.05	100		75 - 125	20
Dissolved Manganese		0.20	mg/L	1	0.20	<0.01	100		75 - 125	20

Sample: LCSD

QC Batch: QC04560

Param	Flag	Sample Result	Units	Dil.	Spike Amount Added	Matrix Result	% Rec.	RPD	% Rec. Limit	RPD Limit
Dissolved Aluminum		1.89	mg/L	1	200	<0.20	94	0	75 - 125	20
Dissolved Arsenic		0.96	mg/L	1	100	<0.05	96	1	75 - 125	20
Dissolved Barium		2.03	mg/L	1	200	<0.05	101	0	75 - 125	20
Dissolved Chromium		0.41	mg/L	1	40	<0.01	102	0	75 - 125	20
Dissolved Iron		2.01	mg/L	1	200	<0.05	100	0	75 - 125	20
Dissolved Manganese		0.20	mg/L	1	20	<0.01	100	0	75 - 125	20

Sample: LCS

QC Batch: QC04583

Param	Flag	Sample Result	Units	Dil.	Spike Amount Added	Matrix Result	% Rec.	RPD	% Rec. Limit	RPD Limit
MTBE		0.104	mg/L	1	0.10	<0.001	104	3	80 - 120	20
Benzene		0.098	mg/L	1	0.10	<0.001	98	2	80 - 120	20
Toluene		0.096	mg/L	1	0.10	<0.001	96	3	80 - 120	20
Ethylbenzene		0.095	mg/L	1	0.10	<0.001	95	6	80 - 120	20
M,P,O-Xylene		0.282	mg/L	1	0.30	<0.001	94	5	80 - 120	20

Surrogate	Flag	Result	Units	Dil.	Spike Amount	% Rec.	% Rec. Limit
TFT		0.089	mg/L	1	0.10	89	72 - 128
4-BFB		0.103	mg/L	1	0.10	103	72 - 128

Sample: LCSD

QC Batch: QC04583

Param	Flag	Sample Result	Units	Dil.	Spike Amount Added	Matrix Result	% Rec.	RPD	% Rec. Limit	RPD Limit
MTBE		0.106	mg/L	1	0.10	<0.001	106	2	80 - 120	20
Benzene		0.1	mg/L	1	0.10	<0.001	100	2	80 - 120	20
Toluene		0.098	mg/L	1	0.10	<0.001	98	2	80 - 120	20

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Param	Flag	Sample Result	Units	Dil.	Spike Amount Added	Matrix Result	% Rec.	RPD	% Rec. Limit	RPD Limit
Ethylbenzene		0.096	mg/L	1	0.10	<0.001	96	1	80 - 120	20
M,P,O-Xylene		0.283	mg/L	1	0.30	<0.001	94	0	80 - 120	20

Surrogate	Flag	Result	Units	Dil.	Spike Amount	% Rec.	% Rec. Limit
TFT		0.091	mg/L	1	0.10	91	72 - 128
4-BFB		0.104	mg/L	1	0.10	104	72 - 128

Sample: LCS QC Batch: QC04769

Param	Flag	Sample Result	Units	Dil.	Spike Amount Added	Matrix Result	% Rec.	RPD	% Rec. Limit	RPD Limit
MTBE		0.104	mg/L	1	0.10	<0.001	104		80 - 120	20
Benzene		0.116	mg/L	1	0.10	<0.001	116		80 - 120	20
Toluene		0.116	mg/L	1	0.10	<0.001	116		80 - 120	20
Ethylbenzene		0.116	mg/L	1	0.10	<0.001	116		80 - 120	20
M,P,O-Xylene		0.359	mg/L	1	0.30	<0.001	119		80 - 120	20

Surrogate	Flag	Result	Units	Dil.	Spike Amount	% Rec.	% Rec. Limit
TFT		0.126	mg/L	1	0.10	126	72 - 128
4-BFB		0.115	mg/L	1	0.10	115	72 - 128

Sample: LCSD QC Batch: QC04769

Param	Flag	Sample Result	Units	Dil.	Spike Amount Added	Matrix Result	% Rec.	RPD	% Rec. Limit	RPD Limit
MTBE		0.105	mg/L	1	0.10	<0.001	105	1	80 - 120	20
Benzene		0.117	mg/L	1	0.10	<0.001	117	1	80 - 120	20
Toluene		0.118	mg/L	1	0.10	<0.001	118	2	80 - 120	20
Ethylbenzene		0.118	mg/L	1	0.10	<0.001	118	2	80 - 120	20
M,P,O-Xylene		0.357	mg/L	1	0.30	<0.001	119	0	80 - 120	20

Surrogate	Flag	Result	Units	Dil.	Spike Amount	% Rec.	% Rec. Limit
TFT		0.127	mg/L	1	0.10	127	72 - 128
4-BFB		0.115	mg/L	1	0.10	115	72 - 128

Quality Control Report Matrix Spikes and Duplicate Spikes

Sample: MS

QC Batch: QC04560

Param	Flag	Sample Result	Units	Dil.	Spike Amount Added	Matrix Result	% Rec.	RPD	% Rec. Limit	RPD Limit
Dissolved Aluminum		1.99	mg/L	1	2	<0.20	99		75 - 125	20
Dissolved Arsenic		0.97	mg/L	1	1	<0.05	97		75 - 125	20
Dissolved Barium		2.09	mg/L	1	2	0.12	98		75 - 125	20
Dissolved Chromium		0.39	mg/L	1	0.40	<0.01	97		75 - 125	20
Dissolved Iron		2.03	mg/L	1	2	<0.05	101		75 - 125	20
Dissolved Manganese		0.54	mg/L	1	0.20	0.34	100		75 - 125	20

Sample: MSD

QC Batch: QC04560

Param	Flag	Sample Result	Units	Dil.	Spike Amount Added	Matrix Result	% Rec.	RPD	% Rec. Limit	RPD Limit
Dissolved Aluminum		1.99	mg/L	1	200	<0.20	99	0	75 - 125	20
Dissolved Arsenic		0.97	mg/L	1	100	<0.05	97	0	75 - 125	20
Dissolved Barium		2.09	mg/L	1	200	0.12	98	0	75 - 125	20
Dissolved Chromium		0.39	mg/L	1	40	<0.01	97	0	75 - 125	20
Dissolved Iron		2.03	mg/L	1	200	<0.05	101	0	75 - 125	20
Dissolved Manganese		0.54	mg/L	1	20	0.34	100	0	75 - 125	20

Sample: MS

QC Batch: QC04646

Param	Flag	Sample Result	Units	Dil.	Spike Amount Added	Matrix Result	% Rec.	RPD	% Rec. Limit	RPD Limit
NO3-N		0.226	mg/L	1	0.16	<0.10	141		57 - 132	20

Sample: MSD

QC Batch: QC04646

Param	Flag	Sample Result	Units	Dil.	Spike Amount Added	Matrix Result	% Rec.	RPD	% Rec. Limit	RPD Limit
NO3-N		0.233	mg/L	1	0.16	<0.10	145	3	57 - 132	20

Quality Control Report Duplicate Samples

Sample: Duplicate QC Batch: QC04558

Param	Flag	Duplicate Result	Sample Result	Units	Dilution	RPD	RPD Limit
Total Dissolved Solids		782	790	mg/L	1	1	20

Quality Control Report Continuing Calibration Verification Standards

Sample: CCV (1) QC Batch: QC04503

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
CL		mg/L	12.50	11.55	92	80 - 120	8/25/00
Fluoride		mg/L	2.50	2.53	101	80 - 120	8/25/00
Nitrate-N		mg/L	5	4.57	91	80 - 120	8/25/00
Sulfate		mg/L	12.50	11.88	95	80 - 120	8/25/00

Sample: ICV (1) QC Batch: QC04503

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
CL		mg/L	12.50	11.57	92	80 - 120	8/25/00
Fluoride		mg/L	2.50	2.52	100	80 - 120	8/25/00
Nitrate-N		mg/L	5	4.55	91	80 - 120	8/25/00
Sulfate		mg/L	12.50	11.87	94	80 - 120	8/25/00

Sample: CCV (1) QC Batch: QC04558

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Total Dissolved Solids		mg/L	1000	975	97	80 - 120	8/29/00

Sample: ICV (1) QC Batch: QC04558

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Total Dissolved Solids		mg/L	1000	993	99	80 - 120	8/29/00

Sample: CCV (1) QC Batch: QC04560

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Dissolved Aluminum		mg/L	5	5.04	100	75 - 125	8/30/00
Dissolved Arsenic		mg/L	2.50	2.60	104	75 - 125	8/30/00
Dissolved Barium		mg/L	5	5.23	104	75 - 125	8/30/00
Dissolved Chromium		mg/L	1	1.03	103	75 - 125	8/30/00
Dissolved Iron		mg/L	5	5.21	104	75 - 125	8/30/00
Dissolved Manganese		mg/L	0.50	0.52	104	75 - 125	8/30/00

Sample: ICV (1) QC Batch: QC04560

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Dissolved Aluminum		mg/L	5	4.92	98	75 - 125	8/30/00
Dissolved Arsenic		mg/L	2.50	2.52	100	75 - 125	8/30/00
Dissolved Barium		mg/L	5	5.09	101	75 - 125	8/30/00
Dissolved Chromium		mg/L	1	1.00	100	75 - 125	8/30/00
Dissolved Iron		mg/L	5	5.07	101	75 - 125	8/30/00
Dissolved Manganese		mg/L	0.50	0.50	100	75 - 125	8/30/00

Sample: CCV (1) QC Batch: QC04583

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Benzene		mg/L	0.10	0.101	101	80 - 120	8/30/00
Toluene		mg/L	0.10	0.1	100	80 - 120	8/30/00
Ethylbenzene		mg/L	0.10	0.1	100	80 - 120	8/30/00
M,P,O-Xylene		mg/L	0.30	0.295	98	80 - 120	8/30/00

Sample: CCV (2) QC Batch: QC04583

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Benzene		mg/L	0.10	0.098	98	80 - 120	8/30/00
Toluene		mg/L	0.10	0.096	96	80 - 120	8/30/00
Ethylbenzene		mg/L	0.10	0.095	95	80 - 120	8/30/00
M,P,O-Xylene		mg/L	0.30	0.28	93	80 - 120	8/30/00

Sample: ICV (1) QC Batch: QC04583

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Benzene		mg/L	0.10	0.096	96	80 - 120	8/30/00
Toluene		mg/L	0.10	0.095	95	80 - 120	8/30/00
Ethylbenzene		mg/L	0.10	0.096	96	80 - 120	8/30/00
M,P,O-Xylene		mg/L	0.30	0.284	94	80 - 120	8/30/00

Sample: CCV (1) QC Batch: QC04646

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
NO3-N		mg/L	0.16	0.175	109	80 - 120	8/29/00

Sample: ICV (1) QC Batch: QC04646

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
NO3-N		mg/L	0.16	0.168	105	80 - 120	8/29/00

Sample: CCV (1) QC Batch: QC04769

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Benzene		mg/L	0.10	0.115	115	80 - 120	9/7/00
Toluene		mg/L	0.10	0.115	115	80 - 120	9/7/00
Ethylbenzene		mg/L	0.10	0.116	116	80 - 120	9/7/00
M,P,O-Xylene		mg/L	0.30	0.36	120	80 - 120	9/7/00

Sample: CCV (2) QC Batch: QC04769

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Benzene		mg/L	0.10	0.107	107	80 - 120	9/7/00
Toluene		mg/L	0.10	0.107	107	80 - 120	9/7/00
Ethylbenzene		mg/L	0.10	0.107	107	80 - 120	9/7/00
M,P,O-Xylene		mg/L	0.30	0.322	107	80 - 120	9/7/00

Sample: ICV (1) QC Batch: QC04769

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Benzene		mg/L	0.10	0.116	116	80 - 120	9/7/00
Toluene		mg/L	0.10	0.116	116	80 - 120	9/7/00
Ethylbenzene		mg/L	0.10	0.117	117	80 - 120	9/7/00
M,P,O-Xylene		mg/L	0.30	0.358	119	80 - 120	9/7/00



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No 13521

Chain of Custody

Date 8-23-00 Page 1 of 1

Lab Name: <u>Trace Analysis Inc.</u>			Analysis Request														
Address: <u>6701 Aberdeen Ave. Ste 9</u>																	
Telephone: <u>806/294-1296</u>																	
Samplers (SIGNATURES)																	
Sample Identification	Matrix	Date	Time	MTBE (EPA 8021B)	SVOC (EPA 8270)	PAH (EPA 8270)	VOC (EPA 8260)	TPH (EPA 418.1)	TPH (TX-1005)	TPH (TX-1006)	GRO (EPA 8015G)	DRO (EPA 8015D)	TDS (EPA 160.1)	Anions/Cations CL, F, NO ₃ , SO ₄ , TO ₅	Total Metals AL, AS, B, Cd, Cr, Fe, Mn, Ni, Pb, Se, Tl, V, Zn	Number of Containers	
MW-1	Water	8-23-00	1040	✓			152205								✓	✓	5
MW-2	Water	8-23-00	1145	✓			206								✓	✓	5
MW-4	Water	8-23-00	1345	✓			207								✓	✓	5
MW-1d	Water	8-23-00	1420	✓			208								✓	✓	5
MW-2	Water	8-23-00	1510	✓			209								✓	✓	5
MW-7	Water	8-23-00	1600	✓			210								✓	✓	5
Pinpoint	Water	8-23-00	1610	✓			211								✓	✓	5
Duplicate	Water	8-23-00	2000	✓			212								✓	✓	2
Top Blank	Water	8-23-00	2183	✓			213								✓	✓	2
Project Information				Relinquished By: <u>John Decker</u> 1315				Relinquished By: <u>HELEN SHELTON</u> 6:30PM				Relinquished By: (3)					
Project Name: <u>Duke Energy Field Services</u>				(Signature)				(Signature)				(Signature)					
Project Location: <u>Monument Booster</u>				(Printed Name)				(Printed Name)				(Printed Name)					
Project Manager: <u>Gil Van Deventer</u>				(Company)				(Company)				(Company)					
Cost Center No.: <u>P/6494/4AC</u>				Received By: (1)				Received By: (2)				Received By: (3)					
Shipping ID No.:				TRW Inc.				HELEN SHELTON 11:15PM				Vicki Gunter					
P.O. No.:				HELEN SHELTON 8/24/00				HELEN SHELTON 8/24/00				Vicki Gunter 10:20PM					
Special Instructions/Comments: <u>Invoice directly to DEFS (Vicki Gunter)</u>				(Signature)				(Signature)				(Signature)					
				(Printed Name)				(Printed Name)				(Printed Name)					
				(Company)				(Company)				(Company)					

John Decker 159-384-839-9 Analyzed 8/23/00 Distribution: White, Canary Laboratory / Pink: TRW