January 30, 2003

Mr. Don Hwang
Alameda County Environmental Health Services
Environmental Protection
1131 Harbor Bay Parkway, Suite 250
Alameda, CA 94502-6577

Subject: Former Exxon Station, 5175 Broadway St., Oakland, CA; Fuel Leak Case No. RO0000139.

Dear Mr. Hwang,

In response to your memorandum of December 17, 2002, I am providing the attached report for your review. In your memo, you requested the following items:

1. November 30, 1990 report by Tank Protect Engineering;
2. Monitoring well diagrams;
3. Historical Hydraulic Gradient;
4. Revised Groundwater Analytical Results for Fuel Oxygenates by EPA Method 8260 Table;
5. Contaminant Concentrations and "Depth To Water" Graphs with Monitoring Well Screen Depths.

The following sections present my response to your requests:

1. November 30, 1990 report by Tank Protect Engineering.
As we discussed in our phone conversation on January 10, 2003, neither I nor the property owners currently has a copy of the requested report. The referenced report would certainly be useful for determining the extent and effectiveness of the remedial actions that were performed during 1990 by Tank Protect Engineering. Dr. Fred Choobineh (a colleague here at UNL, who is brother-in-law of the property owners) unsuccessfully tried to track down the company that performed the work and submitted the report (the company no longer exists) and the registered geologist listed on some of the early reports.

2. Monitoring well diagrams.
The site currently has five monitoring wells: MW-1, MW-2, MW-3, STMW-4, and STMW-5. Well completion diagrams for each of these wells are included with this report as Attachment A. Well completion diagrams for the five wells were obtained from the following reports:

- Well construction details for MW-1, MW-2, and MW-3 are all from Appendix D of "Preliminary Site Assessment, 5175 Broadway, San Jose [sic], California," submitted by: Tank Protect Engineering of Northern California, June 13, 1990.
- Well construction details for STMW-4 and STMW-5 (originally referred to as STMW-1 and STMW-2, respectively) are from Appendices C and D of "Additional Investigation and Groundwater Sampling for the Site Located at 5175 Broadway Street, Oakland, California," June 23, 1991, by Soil Tech Engineering, Inc. of Santa Clara, CA.

All five of the monitoring wells are constructed of 4-inch diameter Schedule 40 PVC; screened sections in each of the wells have 0.020-inch slots. The following table summarizes available information about the five monitoring wells.

Summary of Monitoring Wells

	MW-1	MW-2	MW-3	STMW-4	STMW-5
Total depth (ft)	23	23	27.0	19.5	24
Depth to top of screened interval (ft)	13.0	8.0	7.0	8.0	8.0
Perforated Length (ft)	10.0	15.0	20.0	11.5	16.0
Top of casing elevation (ft)	155.03[a] 161.03[b]	154.97[a] 160.98[b]	155.93[a] 161.43[b]	162.31[b]	161.65[b]
Completion Date	4/17/90	4/24/90	4/17/90	6/21/91	6/21/91

Notes:
[a] – From initial well completion reports, "Preliminary Site Assessment", Tank Protect Engineering, June 13, 1990.
[b] – From Quarterly Monitoring Report, July 2002; all wells were apparently re-surveyed during this sampling event.

Note: Historical groundwater elevation data in the quarterly groundwater monitoring reports are erroneous. The consultants apparently re-surveyed the top-of-casing elevations in July 2002, but failed to update their data tables to account for this. Thus, all of the groundwater elevations prior to July 2002 are 60-70 feet lower than those reported in July and October 2002 (see groundwater elevations in Table 1 of previous monitoring reports completed by Enviro Soil Tech Consultants). From these tables, it appears that the groundwater elevations suddenly rose by this amount between January and July 2002. According to a USGS topographic map of the vicinity, the 160' contour passes through the site. Thus, the most recent survey data (July 2002) is probably the most accurate of the several different sets of survey data for top-of-casing elevations.

3. Historical hydraulic gradient.
Using 27 sets of water level measurements from the past 11 ½ years, the groundwater flow directions and gradients over time were calculated using the methodology of Heath (1995), *Basic Ground-Water Hydrology*, U.S. Geological Survey, Water Supply paper 2200, 7th printing, Denver, CO. This methodology uses three wells with different relative water table elevations (high, intermediate, and low). The wells selected for this analysis were wells MW-1 (high), MW-3 (intermediate), and STMW-5 (consistently lowest groundwater elevation). A total of 27 sets of groundwater elevations (starting with July 1991 data and going through October 2002) were included in these calculations. Groundwater elevations are based on the most recent survey data for top-of-casing elevations (July 2002). Hydraulic gradient and flow direction calculations are included in Attachment B.

The following table summarizes the results of these calculations. Over the period for which data are available, the average hydraulic gradient at the site was 0.0320 ft/ft, and groundwater flow was generally to the southwest. The highest hydraulic gradient occurred in August 2000; the minimum gradient occurred in January 2002. Attachment B also includes a diagram of the groundwater flow directions and relative magnitudes of the hydraulic gradient for each of the 27 data points. This diagram shows the relative magnitude of the hydraulic gradient (distance from the origin) as well as the relative direction of groundwater flow. Because of assumptions and approximations made for locations of the monitoring wells, the groundwater flow directions are

not exact. However, the calculations consistently show that the groundwater beneath the site flows generally to the southwest.

Summary of Calculated Hydraulic Gradients and Flow Directions

	Hydraulic Gradient (ft/ft)	Flow Direction[a]
Average	0.03202	219.5
Standard Deviation	0.00381	7.56
Maximum	0.04176	228.8
Minimum	0.02679	193.4
Data Points	27	27

Notes:
[a] – Flow direction is the angle of the groundwater flow direction counterclockwise from due East (=0°). Thus, the average flow direction of 219.5° corresponds to a flow direction of 39.5° south of due west.

4. Revised Groundwater Analytical Results for Fuel Oxygenates by EPA Method 8260. Attachment C includes summary tables of the analytical results for analysis of fuel oxygenates by EPA Method 8260. These data were taken directly from the most recent quarterly monitoring report (October 2002) that was prepared by Enviro Soil Tech Consultants, with additional data from the July 2002 groundwater monitoring report. These data cover the period from May 1999 – October 2002. Numerical concentrations are only provided for specific contaminants that were detected. In the summary tables, concentrations with an asterisk (*) are estimated values for tentatively identified compounds or if the result is below the Practical Quantitation limit but above the Method Detection Limit.

Note that in July 2002, two sets of groundwater samples were taken (samples taken on July 1 and July 18), and separate sets of analytical results are available for these two sampling events. The main difference between these two sampling events is that the Reporting Limits for each compound were significantly lower for analysis of the latter samples; thus, several additional analytes were detected and reported for the July 18 sampling event. These findings do not alter the overall conclusion of which contaminants are most prevalent in groundwater at the site. As expected, the major contaminants at the site are the BTEX compounds, which have been consistently detected in all five monitoring wells.

It is interesting to note that MTBE has been detected in samples from the site only once using EPA Method 8260 (7.9 µg/L in MW-1, January 2002), although it has been sporadically detected in samples from several wells using Method 8020. I think that any detections of MTBE at the site should be suspect. MTBE detections may be due to invalid Method 8020 analyses, contamination of samples, or possibly an off-site source of MTBE. First, Method 8020 does not identify specific contaminants using mass spectrometry, but only uses gas chromatography retention times to identify peaks. The second reason is that MTBE was detected in MW-1 at 110 µg/L during the January 2002 sampling event, suggesting sample contamination. MTBE has not been detected in STMW-4, upgradient of MW-1. MTBE had not been previously detected in MW-1; MW-1 samples were first analyzed for MTBE in November 1996, and there were no MTBE detections prior to January 2002.

Furthermore, the site has not been operated as a gasoline station since 1978 (and most likely several years prior to 1978). MTBE was not used in gasoline formulations until 1979, when its usage began as an gasoline octane enhancer as leaded gasoline was phased out (Happel, *et al.*, 1998. An Evaluation of MTBE Impacts to California Groundwater Resources. Report

UCRL-AR-130897, Lawrence Livermore National Laboratory, University of California, Livermore, CA). The State of California did not require MTBE in gasoline until 1992 (Happel, *et al.*, 1998). This history of MTBE usage in gasoline strongly suggests that the USTs at 5175 Broadway were an improbable source of the current MTBE contamination at the site.

5. Contaminant Concentrations and "Depth to Water" Graphs.
Graphs of contaminant concentrations with depth to water and monitoring well screen depths are included as Attachment D for each of the five monitoring wells. Only the two most prevalent contaminants (TPHg and benzene) are included in these graphs. In most of the wells, there are no clear concentration trends, but I would like to point out that in well STMW-4, the increase in TPHg and benzene concentrations since 1997 are highly unlikely to be due to contamination at the site. Because STMW-4 is at the upgradient side of the site, and about 50 feet from the former tank pit (the supposed source of contamination), it is unlikely that contamination observed in STMW-4 is originally from the 5175 Broadway. Several other monitoring wells provide additional evidence for a possible off-site source. According to the State of California Geotracker database, there are other possible sources (both known LUFT sites and other sites with USTs of unknown condition) upgradient of 5175 Broadway. There is obviously significant contamination in the area, but I do not believe that 5175 Broadway is the sole source of this contamination.

Closing
I was asked by the property owners to review the reports provided by previous consultants and to respond to your letter dated December 17, 2002. After almost 10 years of making no real progress towards site closure, the property owners are eager to accelerate this process and move the site towards proper closure. Due to my location in Nebraska and time demand of my academic job at University of Nebraska, I have recommended to the property owners to retain a competent local consultant to work with Alameda County and move toward properly closing the site.

If you wish, I can provide you with electronic versions of the spreadsheets that I have prepared. Please let me know if you have additional questions about the site or if I can provide additional comments on the data.

Sincerely,

Matthew C. Morley, Ph.D., P.E.
Assistant Professor, Environmental Engineering
University of Nebraska – Lincoln

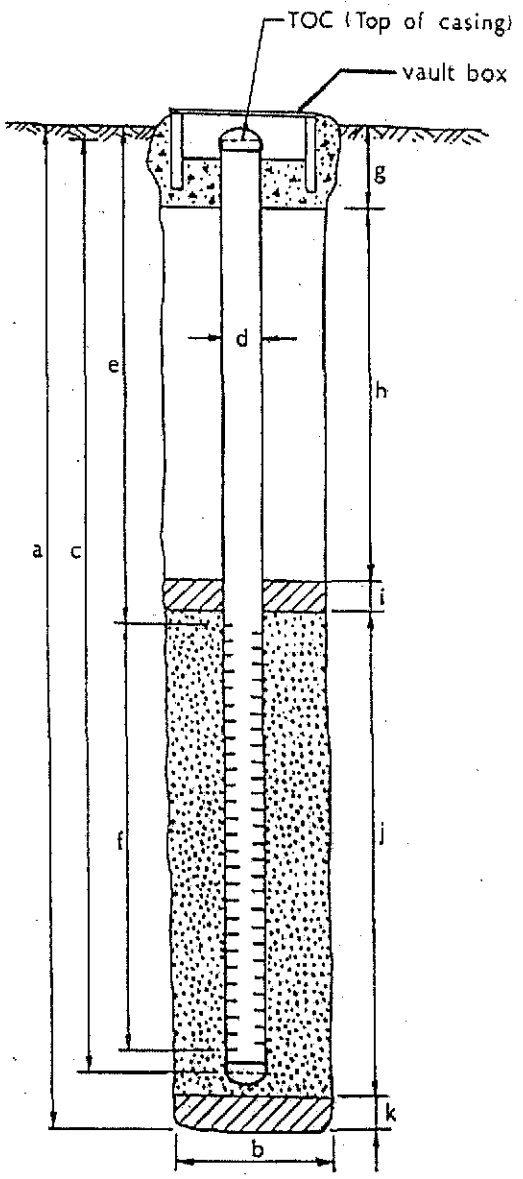
Disclaimer:
The findings that are included in this letter and the attachments are based solely on the data contained in previous reports that are currently available. Several different consulting firms generated those reports, and findings provided in this letter are only as good as the data obtained from those reports.

CC: Property owners

WELL DETAILS

PROJECT NUMBER 104
PROJECT NAME 5175 Broadway
LOCATION Oakland, CA
WELL PERMIT NO. 90222

BORING / WELL NO. MW-1
TOP OF CASING ELEV. 155.03
GROUND SURFACE ELEV. 156 ±
DATUM Mean sea level
INSTALLATION DATE 4/17/90



EXPLORATORY BORING

a. Total depth 23 ft.
b. Diameter 10 in.
Drilling method Hollow-stem auger

WELL CONSTRUCTION

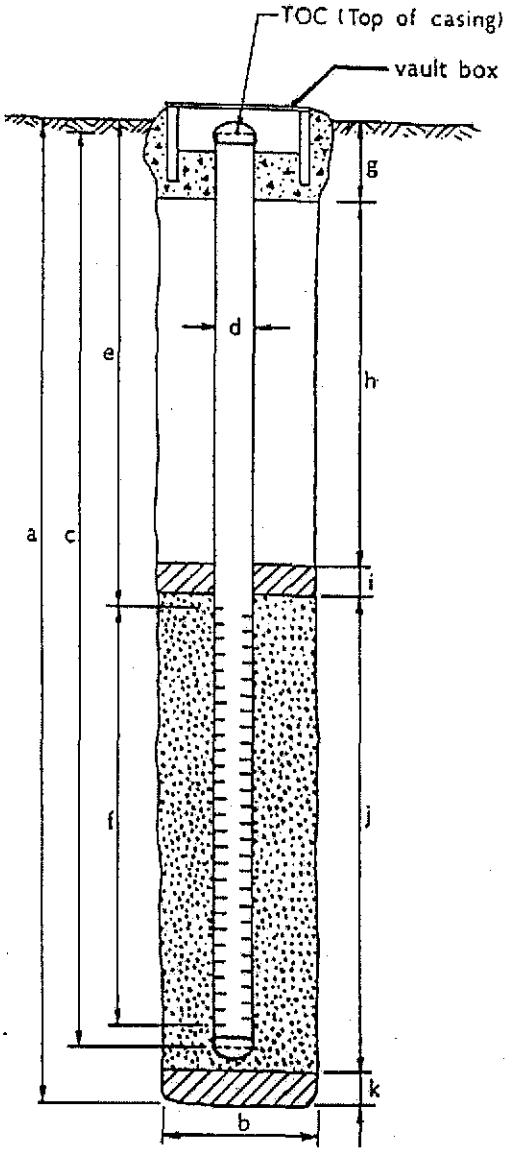
c. Total casing length 23 ft.
Material Schedule 40 PVC
d. Diameter 4 in.
e. Depth to top perforations 13.0 ft.
f. Perforated length 10.0 ft.
Perforated interval from 23.0 to 13.0 ft.
Perforation type Machine slot
Perforation size .020-inch
g. Surface seal 1.0 ft.
Seal material Concrete
h. Backfill 8.5 ft.
Backfill material Cement
i. Seal 1.0 ft.
Seal material Bentonite
j. Gravel pack 12.5 ft.
Pack material 8x20 filter sand
k. Bottom seal 0.0 ft.
Seal material N/A

Completion diagram for MW-1.

WELL DETAILS

PROJECT NUMBER 104
PROJECT NAME 5175 Broadway
LOCATION Oakland, CA
WELL PERMIT NO. 90222

BORING / WELL NO. MW-2
TOP OF CASING ELEV. 154.97
GROUND SURFACE ELEV. 156 ±
DATUM Mean sea level
INSTALLATION DATE 4/24/90



EXPLORATORY BORING

a. Total depth 23.0 ft.
b. Diameter 10 in.
Drilling method Hollow-stem auger

WELL CONSTRUCTION

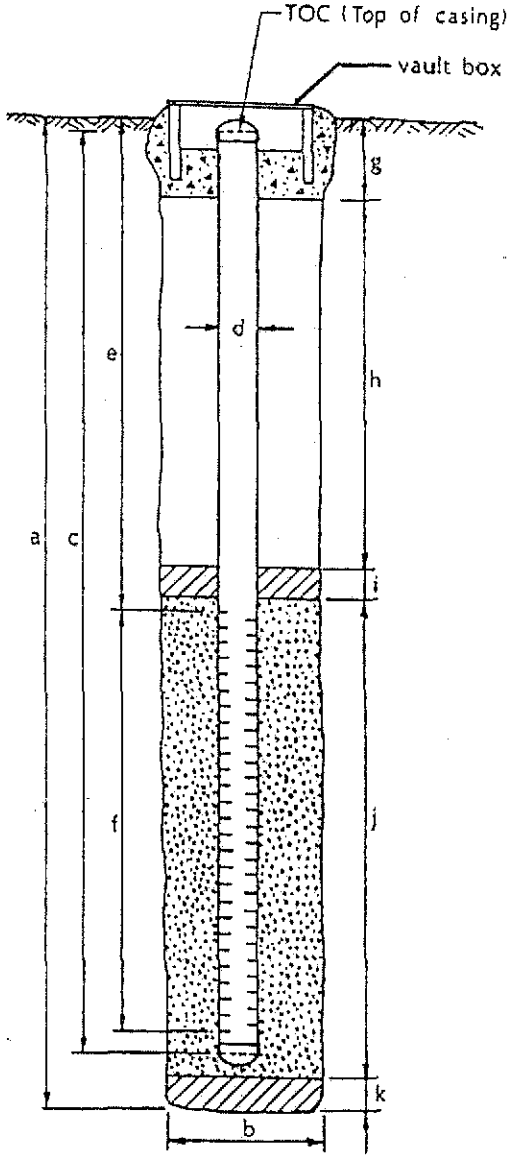
c. Total casing length 23.0 ft.
Material Schedule 40 PVC
d. Diameter 4 in.
e. Depth to top perforations 8.0 ft.
f. Perforated length 15.0 ft.
Perforated interval from 23.0 to 8.0 ft.
Perforation type Machine slot
Perforation size .020-inch
g. Surface seal 1.0 ft.
Seal material Concrete
h. Backfill 4.0 ft.
Backfill material Cement
i. Seal 1.0 ft.
Seal material Bentonite
j. Gravel pack 17.0 ft.
Pack material 8x20 filter sand
k. Bottom seal 0.0 ft.
Seal material N/A

Completion diagram for MW-2.

WELL DETAILS

PROJECT NUMBER 104
PROJECT NAME 5175 Broadway
LOCATION Oakland, CA
WELL PERMIT NO. 90222

BORING / WELL NO. MW-3
TOP OF CASING ELEV. 155.93
GROUND SURFACE ELEV. 156 ±
DATUM Mean sea level
INSTALLATION DATE 4/17/90



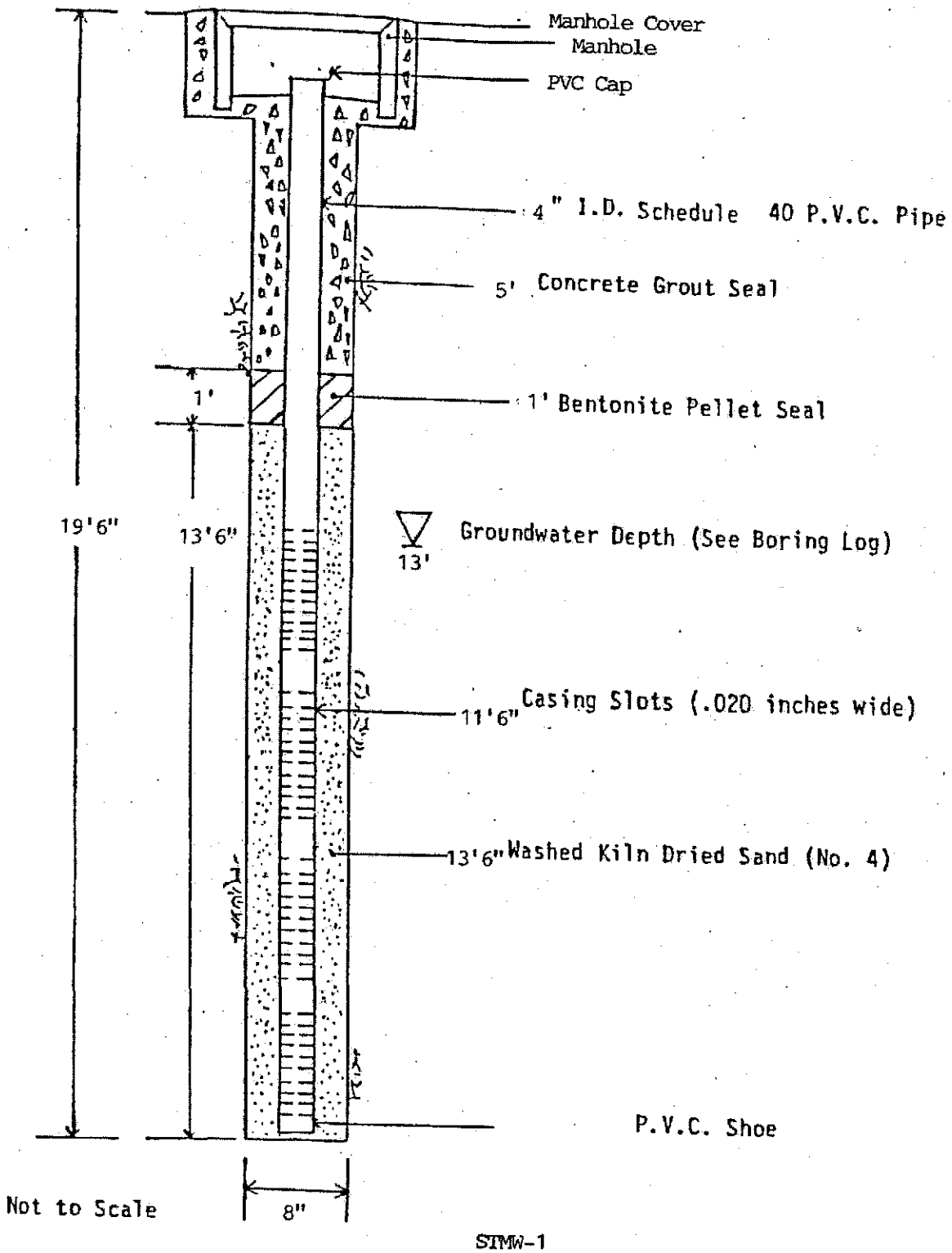
EXPLORATORY BORING

a. Total depth 27.0 ft.
b. Diameter 10 in.
Drilling method Hollow-stem auger

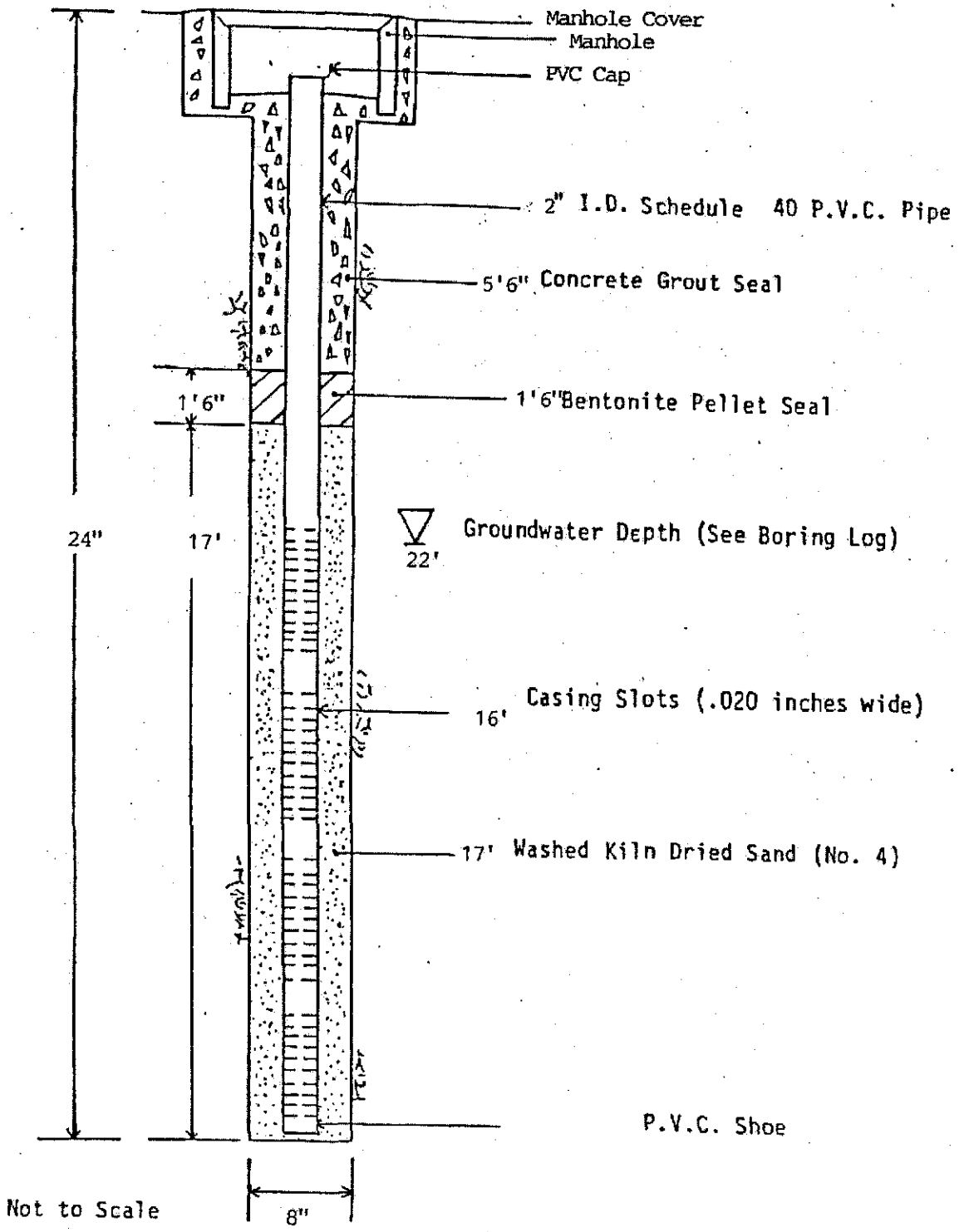
WELL CONSTRUCTION

c. Total casing length 27.0 ft.
Material Schedule 40 PVC
d. Diameter 4 in.
e. Depth to top perforations 7.0 ft.
f. Perforated length 20.0 ft.
Perforated interval from 27.0 to 7.0 ft.
Perforation type Machine slot
Perforation size .020-inch
g. Surface seal 1.0 ft.
Seal material Concrete
h. Backfill 4.0 ft.
Backfill material Cement
i. Seal 1.5 ft.
Seal material Bentonite
j. Gravel pack 21.5 ft.
Pack material 8x20 filter sand
k. Bottom seal 0.0 ft.
Seal material N/A

Completion diagram for MW-3.



Completion diagram for STMW-4 (originally designated STMW-1).



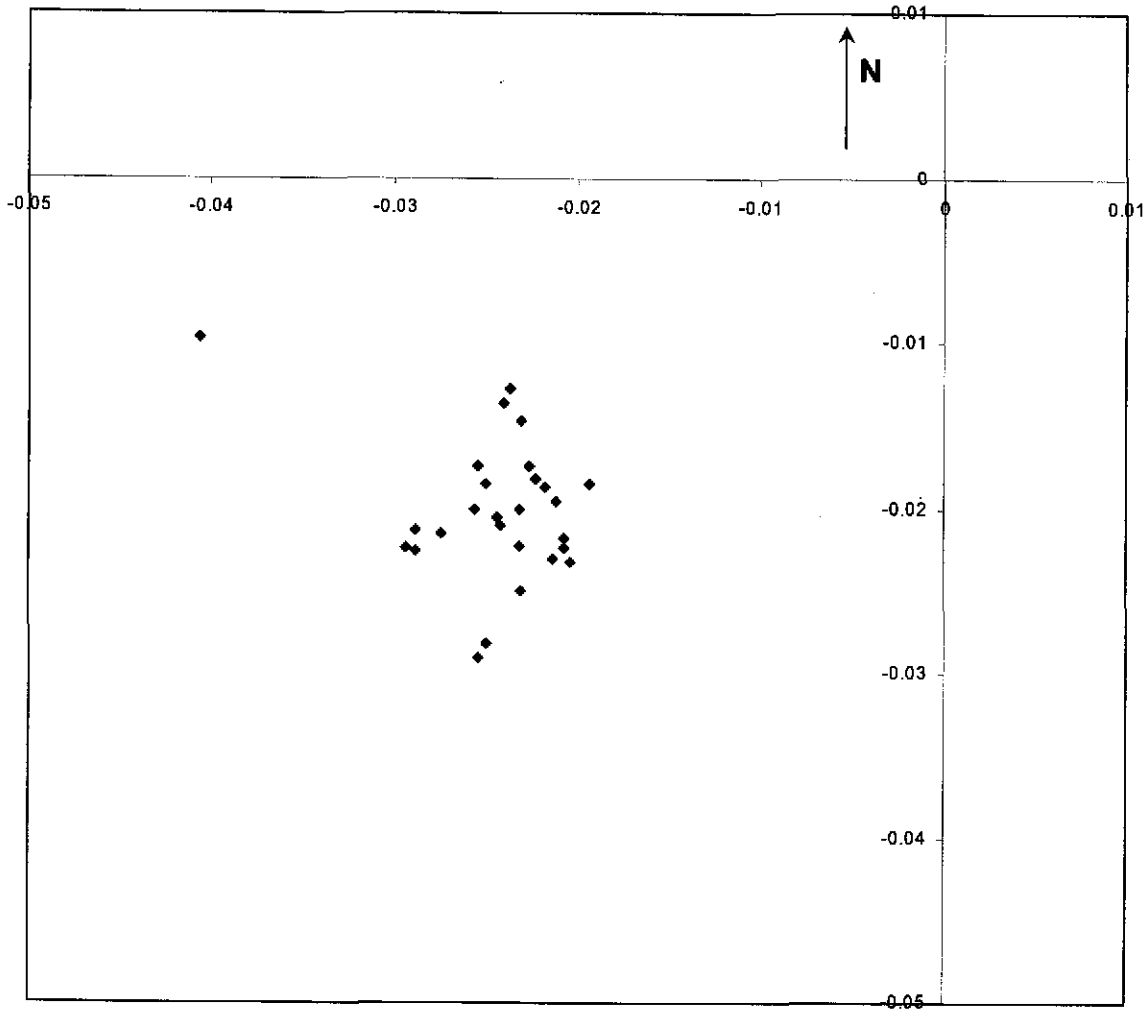
Completion diagram for STMW-5 (originally designated STMW-2)

CALCULATION OF HYDRAULIC GRADIENT AND GROUNDWATER FLOW DIRECTION

	MW-1	**MW-2**	**STMW-5**
X (ft)	85.0	105.7	0
Y (ft)	74.3	10.0	0

Date	MW-1 C GW Elev. (ft)	MW-2 B GW Elev. (ft)	STMW-5 A GW Elev. (ft)	Head differences CA	CB	BA	Distances AB	BC	AC	Gradient (ft/ft)	Direction degrees South of due West
7/3/1991	151.61	150.9	148.36	3.25	0.71	2.54	106.1	67.5	112.8	0.02882	39.3
11/11/1991	151.58	150.77	147.65	3.93	0.81	3.12	106.1	67.5	112.8	0.03488	38.0
3/4/1992	153.1	152.28	149.85	3.25	0.82	2.43	106.1	67.5	112.8	0.02881	42.8
6/2/1992	152.05	151.46	148.59	3.46	0.59	2.87	106.1	67.5	112.8	0.03088	34.3
9/28/1992	151.74	150.89	147.61	4.13	0.85	3.28	106.1	67.5	112.8	0.03666	37.9
1/11/1993	153.47	152.46	150.04	3.43	1.01	2.42	106.1	67.5	112.8	0.03056	47.2
8/15/1994	151.84	151.07	147.8	4.04	0.77	3.27	106.1	67.5	112.8	0.03593	36.4
11/7/1996	152.3	150.96	147.98	4.32	1.34	2.98	106.1	67.5	112.8	0.03863	48.8
2/12/1997	153.11	152.07	149.58	3.53	1.04	2.49	106.1	67.5	112.8	0.03146	47.2
6/16/1997	151.99	151.23	148.32	3.67	0.76	2.91	106.1	67.5	112.8	0.03257	38.1
9/30/1997	153.47	153.09	150.41	3.06	0.38	2.68	106.1	67.5	112.8	0.02768	29.6
1/27/1998	153.07	152.6	150.01	3.06	0.47	2.59	106.1	67.5	112.8	0.02743	32.6
4/24/1998	153.05	152.3	149.81	3.24	0.75	2.49	106.1	67.5	112.8	0.02871	40.6
8/17/1998	152.05	151.24	148.45	3.6	0.81	2.79	106.1	67.5	112.8	0.03191	39.9
11/16/1998	152.13	150.84	147.91	4.22	1.29	2.93	106.1	67.5	112.8	0.03769	48.3
2/16/1999	152.39	152.06	149.43	2.96	0.33	2.63	106.1	67.5	112.8	0.02690	28.3
5/17/1999	152.53	151.72	149.07	3.46	0.81	2.65	106.1	67.5	112.8	0.03066	40.9
8/17/1999	151.79	150.94	148.17	3.62	0.85	2.77	106.1	67.5	112.8	0.03208	41.0
11/17/1999	150.59	149.46	146.77	3.82	1.13	2.69	106.1	67.5	112.8	0.03405	47.3
2/17/2000	152.55	151.48	149.09	3.46	1.07	2.39	106.1	67.5	112.8	0.03093	48.7
5/17/2000	152.79	152.14	149.57	3.22	0.65	2.57	106.1	67.5	112.8	0.02859	37.5
8/17/2000	152.26	152.48	148.09	4.17	-0.22	4.39	106.1	67.5	112.8	0.04176	13.4
11/15/2000	151.99	151.04	148.37	3.62	0.95	2.67	106.1	67.5	112.8	0.03212	43.8
2/16/2001	153.43	152.46	150.05	3.38	0.97	2.41	106.1	67.5	112.8	0.03008	46.4
1/11/2002	152.95	152.16	149.93	3.02	0.79	2.23	106.1	67.5	112.8	0.02679	43.8

Date	MW-1 C GW Elev. (ft)	MW-2 B GW Elev. (ft)	STMW-5 A GW Elev. (ft)	Head Differences CA	CB	BA	Distances AB	BC	AC	Gradient (ft/ft)	degrees South of due West
7/1/2002	152.01	151.34	148.51	3.5	0.67	2.83	106.1	67.5	112.8	0.03112	36.5
10/4/2002	151.29	150.46	147.13	4.16	0.83	3.33	106.1	67.5	112.8	0.03695	37.3
									average	0.03202	39.5
									standard deviation	0.00381	7.6
									data points	27	27
									maximum	0.04176	48.8
									minimum	0.02679	13.4



Relative Flow Directions.
For each data point, the flow direction is the direction of the vector from the origin to data point, and the magnitude of the hydraulic gradient is the length of this vector.

Results of Fuel Oxygenate Analysis by EPA Method 8260 -- MW-1

Date	1,2,4-Trimethylbenzene	1,3,5-Trimethylbenzene	Benzene	Diisopropyl ether	Ethylbenzene	Hexane	Isopropylbenzene	n-Butylbenzene	sec-Butylbenzene	Methyl tert-butyl ether	Naphthalene	Propylbenzene	tert-Butanol	Toluene	o-Xylene	m-Xylene	p-Xylene	Total xylenes
5/17/1999	--	--	--	120	--	--	--	--	--	--	--	--	--	--	5.4	5.3	--	--
8/17/1999	--	--	5.2	--	--	--	--	--	--	--	--	--	--	--	2.5	1.8	2.3	--
11/17/1999	--	--	3.6	--	2.7	--	--	--	--	--	--	--	--	1.9	2.1	1.2	1.6	--
2/17/2000	--	--	1.1	--	3.6	--	--	--	--	--	--	--	--	2.3	--	--	--	--
5/17/2000	9.8	--	130	130	6.1	--	5.3	--	--	--	--	5.6	--	6.8	--	--	--	--
8/17/2000	--	--	160	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/15/2000	--	--	--	22	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/16/2001	--	--	26	110	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/11/2002	7	10	74	110	13	--	3.5*	--	0.6	7.9	--	5.1	--	60	--	--	--	54
7/1/2002	--	--	25	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/18/2002[a]	3.1	2.7	12	--	3.3	--	3.6	3.6	1.4	--	2.5	5.6	--	0.8	0.6	1.9	--	--
10/4/2002	--	9.4	130	60	8.1	--	5.9	--	--	--	6	8.2	--	7.8	--	--	--	14

Notes:

[a] – In addition to the results in this table, the following compounds were detected by Method 8260B analysis: 1,2-dichloroethane 3.3 µg/L; para-Isopropyl toluene 1.7 µg/L

Results of Fuel Oxygenate Analysis by EPA Method 8260 – MW-2

Date	1,2,4-Trimethylbenzene	1,3,5-Trimethylbenzene	Benzene	Diisopropyl ether	Ethylbenzene	Isopropylbenzene	n-Butylbenzene	sec-Butylbenzene	Methyl tert-butyl ether	Naphthalene	Propylbenzene	Toluene	o-Xylene	m-Xylene	p-Xylene	Total xylenes
5/17/1999	--	--	400	--	140	--	--	--	--	--	--	--	--	--	--	--
8/17/1999	--	--	19	--	19	--	--	--	--	--	--	18	14	11	15	--
11/17/1999	--	--	7	--	5.3	--	--	--	--	--	--	3.7	4.9	3.6	4.4	--
2/17/2000	--	--	3.2	--	11	--	--	--	--	--	--	6.8	5.9	3.4	3.9	--
5/17/2000	51	--	450	--	110	--	--	--	--	--	--	65	--	--	--	80
8/17/2000	--	--	440	--	78	--	--	--	--	--	--	--	--	--	--	--
11/15/2000	48	--	320	--	78	--	--	--	--	--	--	41	--	--	--	64
2/16/2001	22	5.7	110	--	38	--	--	--	--	6.6	5.1	20	--	--	--	33
1/11/2002	28	33	220	--	63	6*	5.6	--	--		13*	71	--	--	--	94
7/1/2002	--	--	300	--	45	--	--	--	--	--	13	29	--	27[a]	--	--
7/18/2002[b]	22	18	170	--	21	1.3	--	1.0	--	6.4	1.5	30	34	68[a]	--	--
10/4/2002	52	--	440	--	140	--	--	--	--	35	--	66	--	--	--	120

Notes:

[a] -- Result is for sum of m-xylene and p-xylene

[b] – In addition to the results in this table, the following compounds were detected by Method 8260B analysis: 2-butanone 20 µg/L; 1,2-dichloroethane 0.9 µg/L; tert-butylbenzene 1.1 µg/L; para-isopropyl toluene 4.0 µg/L

Results of Fuel Oxygenate Analysis by EPA Method 8260 – MW-3

Date	1,2,4-Trimethylbenzene	1,3,5-Trimethylbenzene	Benzene	Diisopropyl ether	Ethylbenzene	Isopropylbenzene	sec-Butylbenzene	n-Butylbenzene	Methyl tert-butyl ether	Naphthalene	Propylbenzene	Toluene	o-Xylene	m-Xylene	p-Xylene	Total xylenes
5/17/1999	480	290	190	--	--	--	--	--	--	--	--	--	--	--	--	590
8/17/1999	--	--	49	--	63	--	--	--	--	--	--	39	44	39	40	--
11/17/1999	--	--	39	--	31	--	--	--	--	--	--	22	31	21	30	--
2/17/2000	--	--	16	--	74	--	--	--	--	--	--	39	37	22	31	--
5/17/2000	930	290	300	--	410	--	--	--	--	160	--	260	--	--	--	940
8/17/2000	900	290	230	--	470	51	--	100	--	160	100	140	--	--	--	750
11/15/2000	760	240	250	--	390	34	--	--	--	180	92	210	--	--	--	700
2/16/2001	300	110	40	--	100	--	--	43	--	41	30	72	--	--	--	250
1/11/2002	400	220	150	--	250	20*	--	35*	--	--	60*	170	--	--	--	510
7/1/2002	490	180	230	--	450	35	--	57	--	140	120	220	170	720[a]		--
7/18/2002[b]	750	270	200	--	400	28	12	79	--	160	95	140	110	510[a]		--
10/4/2002	350	120	280	--	450	39	--	44	--	150	130	170	--	--	--	730

Notes:

[a] -- Result is for sum of m-xylene and p-xylene

[b] – In addition to the results in this table, the following compounds were detected by Method 8260B analysis: 1,2-dichloroethane 5.1 µg/L; para-isopropyl toluene 15 µg/L;

Results of Fuel Oxygenate Analysis by EPA Method 8260 – STMW-4

Date	1,2,4-Trimethylbenzene	1,3,5-Trimethylbenzene	Benzene	Diisopropyl ether	Ethylbenzene	Hexane	Isopropylbenzene	sec-Butylbenzene	n-Butylbenzene	Methyl tert-butyl ether	Naphthalene	Propylbenzene	tert-Butanol	Toluene	o-Xylene	m-Xylene	p-Xylene	Total xylenes
5/24/1999	--	--	1600	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/17/1999	--	--	24	--	31	--	--	--	--	--	--	--	--	25	28	21	26	--
11/17/1999	--	--	21	--	17	--	--	--	--	--	--	--	--	12	15	11	14	--
2/17/2000	--	--	8.9	--	38	--	--	--	--	--	--	--	--	21	19	14	17	--
5/17/2000	170	87	840	--	61	--	53	--	85	--	--	84	--	--	--	--	--	--
8/17/2000	69	--	680	--	62	--	--	--	--	--	--	--	--	--	--	--	--	--
11/15/2000	31	--	640	34	26	--	--	--	--	--	--	28	100	--	--	--	--	27
2/16/2001	48	--	560	26	--	140	--	--	--	--	--	26	--	--	--	--	--	--
1/11/2002	25*	30*	460	--	22*	--	13*	--	7.6*	--	--	20*	--	48*	--	--	--	63*
7/1/2002	75	41	470	--	32	--	20	--	16	--	20	31	--	18	--	45[a]		--
7/18/2002[b]	110	55	870	--	54	--	29	7.3	23	--	63	45	--	27	16	67[a]		--
10/4/2002	190	66	590	35	65	--	36	--	--	--	85	61	--	26	--	--	--	110

Notes:

[a] -- Result is for sum of m-xylene and p-xylene

[b] – In addition to the results in this table, the following compounds were detected by Method 8260B analysis: tert-butylbenzene 4.9 µg/L; para-isopropyl toluene 12 µg/L

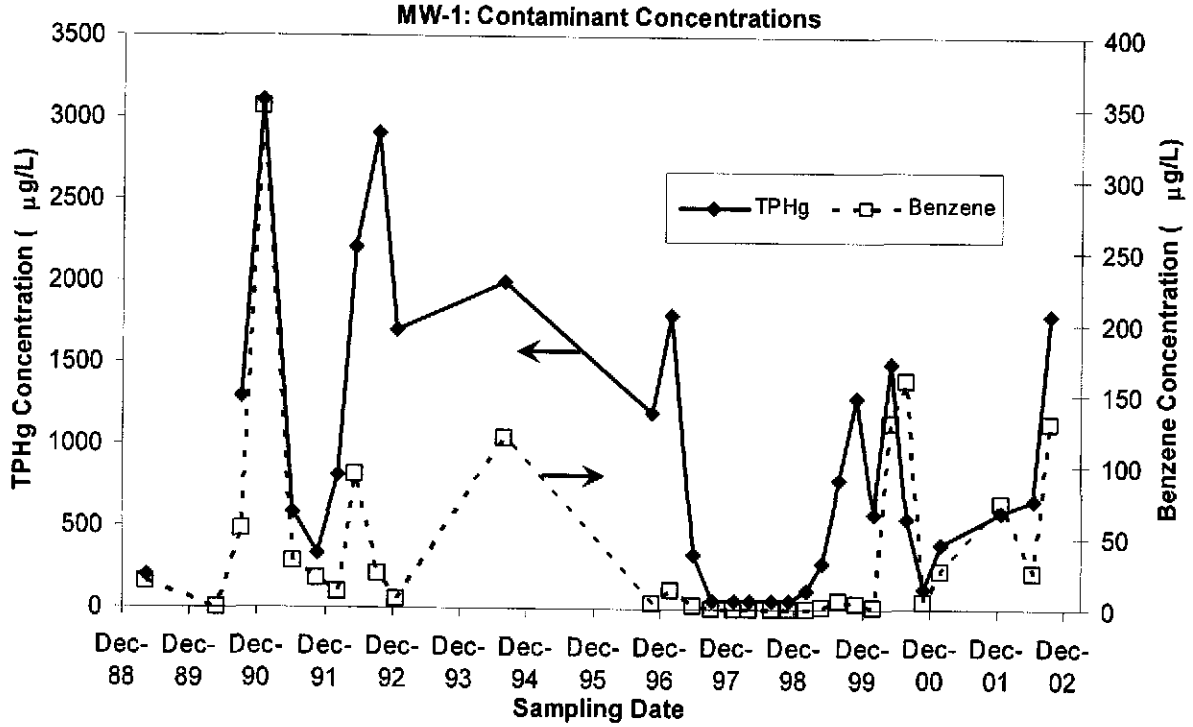
Results of Fuel Oxygenate Analysis by EPA Method 8260 – STMW-5

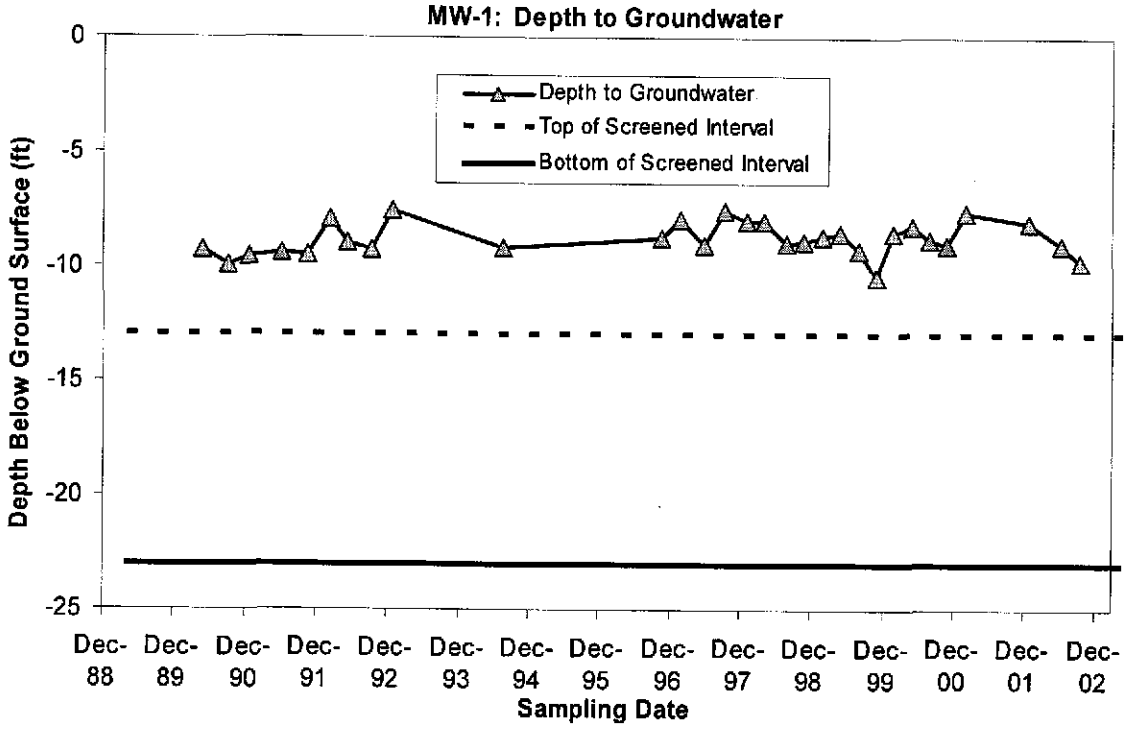
Date	1,2,4-Trimethylbenzene	1,3,5-Trimethylbenzene	Benzene	Diisopropyl ether	Ethylbenzene	Hexane	Isopropylbenzene	sec-Butylbenzene	n-Butylbenzene	Methyl tert-butyl ether	Naphthalene	Propylbenzene	tert-Butanol	Toluene	o-Xylene	m-Xylene	p-Xylene	Total xylenes
5/17/1999	--	--	88	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/17/1999	--	--	19	--	21	--	--	--	--	--	--	--	--	16	14	11	16	--
11/17/1999	--	--	3.9	--	3.2	--	--	--	--	--	--	--	--	2.3	2.9	2.1	2.5	--
2/17/2000	--	--	1.5	--	5.8	--	--	--	--	--	--	--	--	3.2	2.5	2.2	2.3	--
5/17/2000	59	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/17/2000	38	--	170	--	100	--	10	--	11	--	20	24	--	64	--	--	--	250
11/15/2000	26	--	120	--	40	--	6.5	--	9.4	--	15	23	--	24	--	--	--	54
2/16/2001	--	--	58	--	9.4	--	--	--	--	--	--	9.9	--	9.8	--	--	--	18
1/11/2002	6.8	7.9	87	--	18	--	5.1	1.3*	5.6	--	--	16	--	16	--	--	--	32
7/1/2002	15	6.8	71	--	14	--	5.9	--	18	--	5.6	22	--	14	--	36[a]		--
7/18/2002[b]	25	8.2	110	--	34	--	3.4	2.1	16	--	4.8	13	--	29	4.1	53[a]		--
10/4/2002	5.2	--	71	--	26	--	--	--	--	--	9.6	12	--	17	--	--	--	35

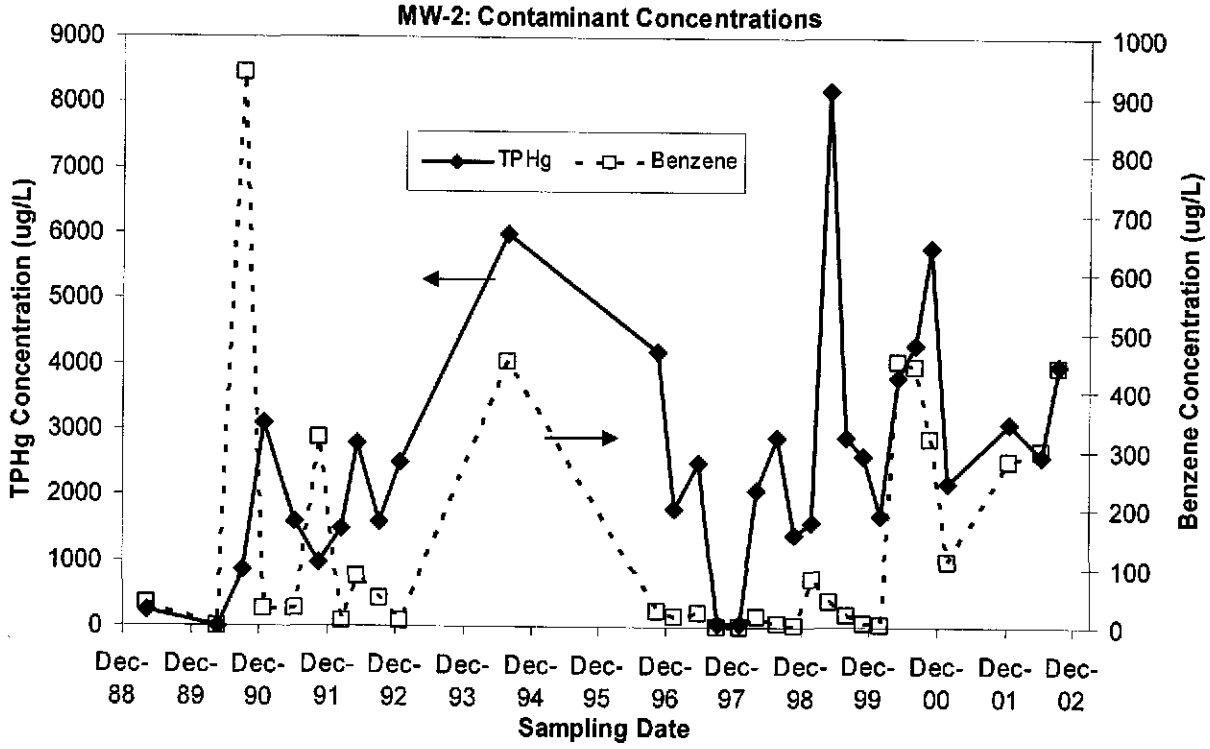
Notes:

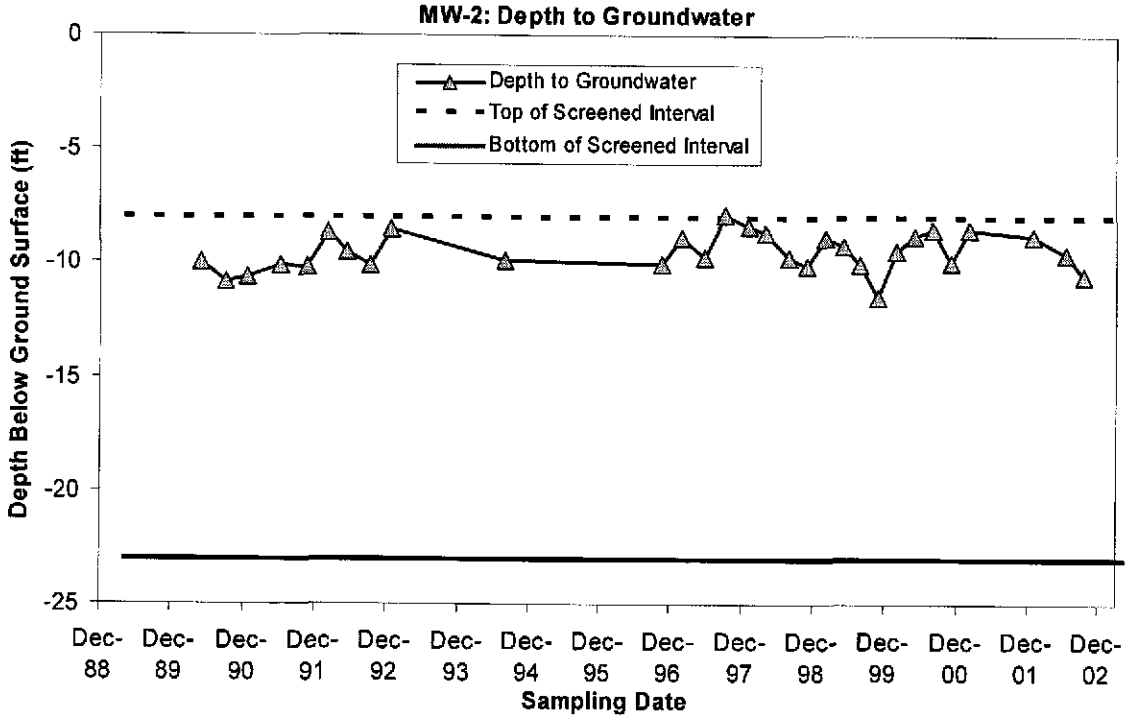
[a] -- Result is for sum of m-xylene and p-xylene

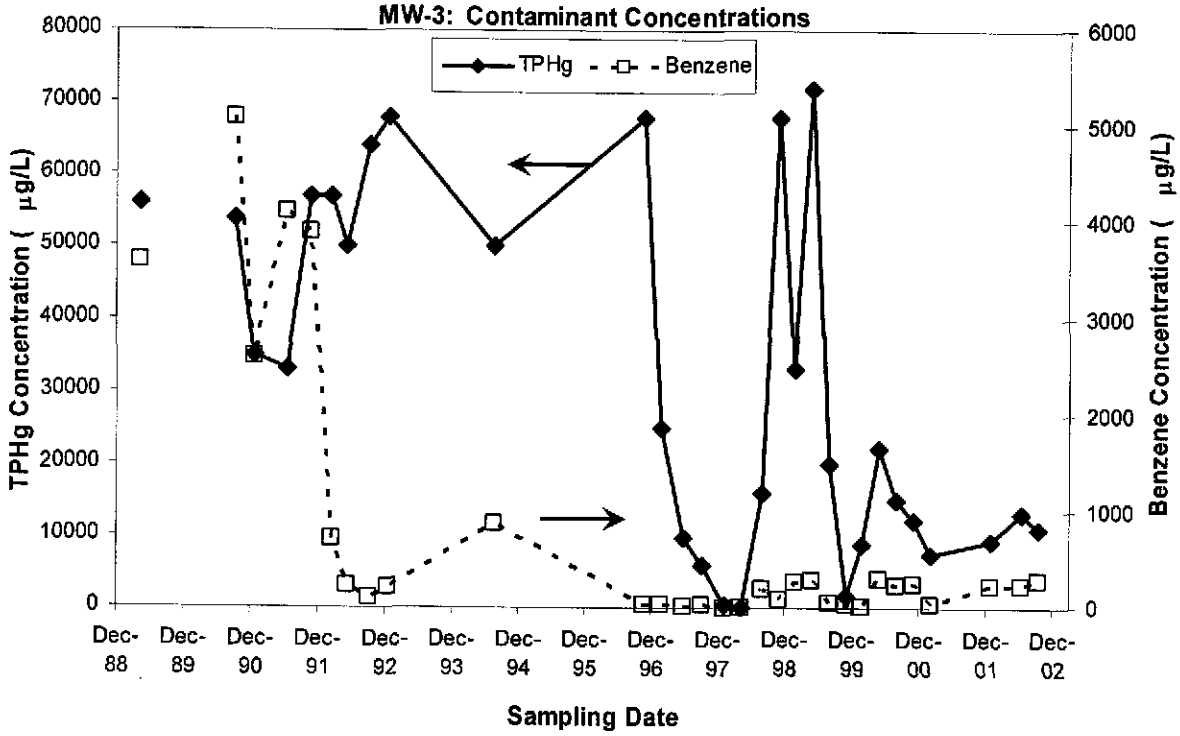
[b] – In addition to the results in this table, the following compounds were detected by Method 8260B analysis: 1,2-dichloroethane 1.1 µg/L; para-isopropyl toluene 2.2 µg/L

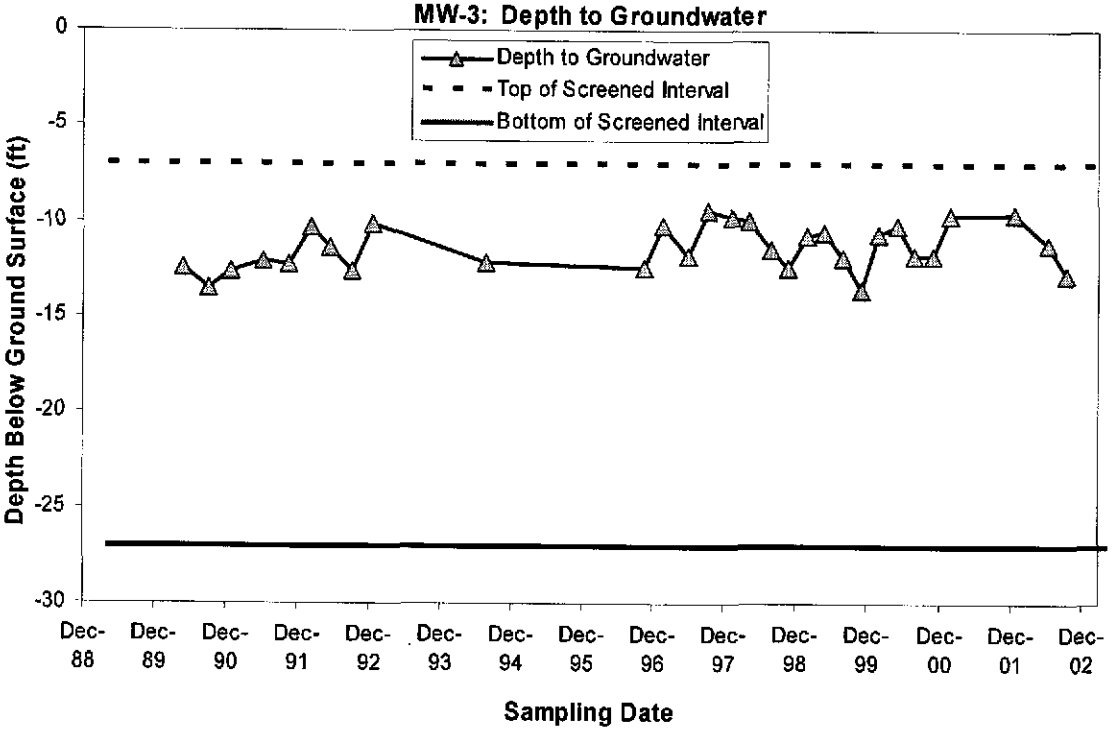

MW-1: Contaminant Concentrations
TPHg Concentration (µg/L)
Benzene Concentration (µg/L)
TPHg
Benzene
3500
3000
2500
2000
1500
1000
500
0
400
350
300
250
200
150
100
50
0
Dec-88
Dec-89
Dec-90
Dec-91
Dec-92
Dec-93
Dec-94
Dec-95
Dec-96
Dec-97
Dec-98
Dec-99
Dec-00
Dec-01
Dec-02
Sampling Date

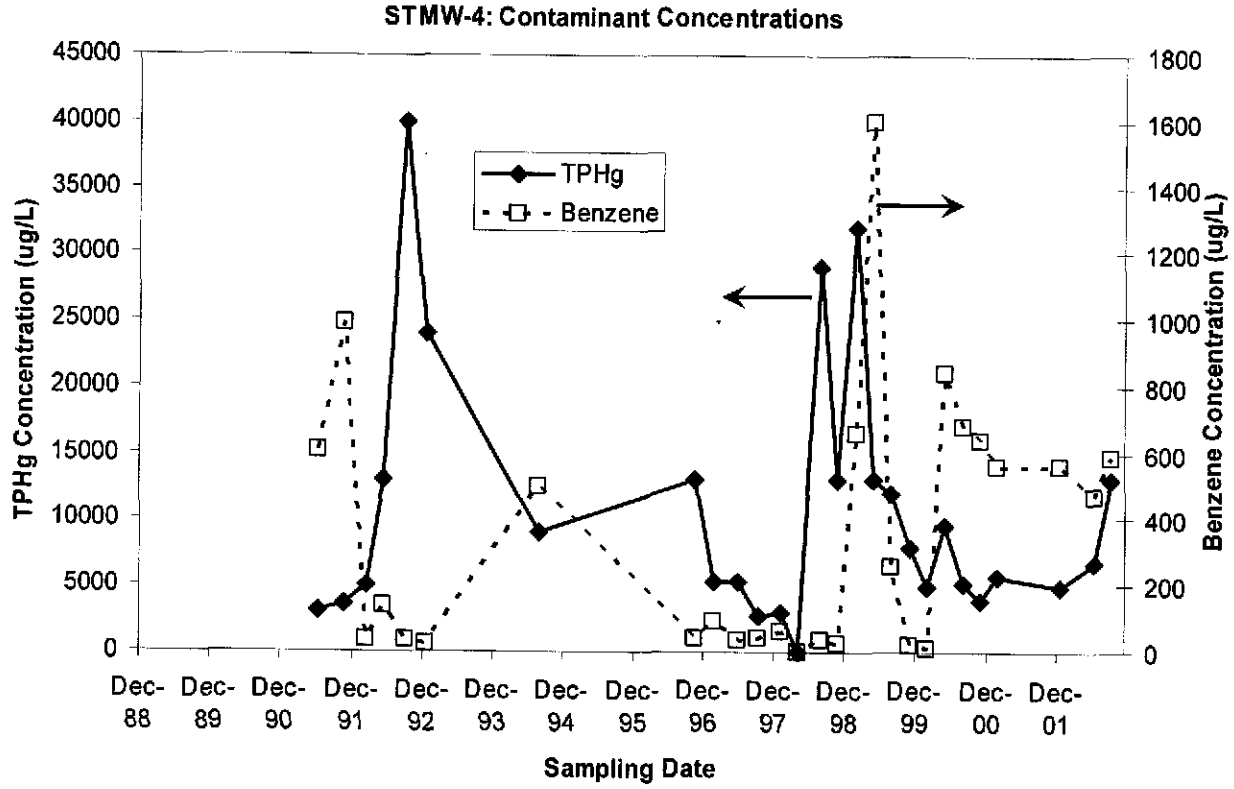

MW-1: Depth to Groundwater
Depth Below Ground Surface (ft)
Depth to Groundwater
Top of Screened Interval
Bottom of Screened Interval
0
-5
-10
-15
-20
-25
Dec-88
Dec-89
Dec-90
Dec-91
Dec-92
Dec-93
Dec-94
Dec-95
Dec-96
Dec-97
Dec-98
Dec-99
Dec-00
Dec-01
Dec-02
Sampling Date

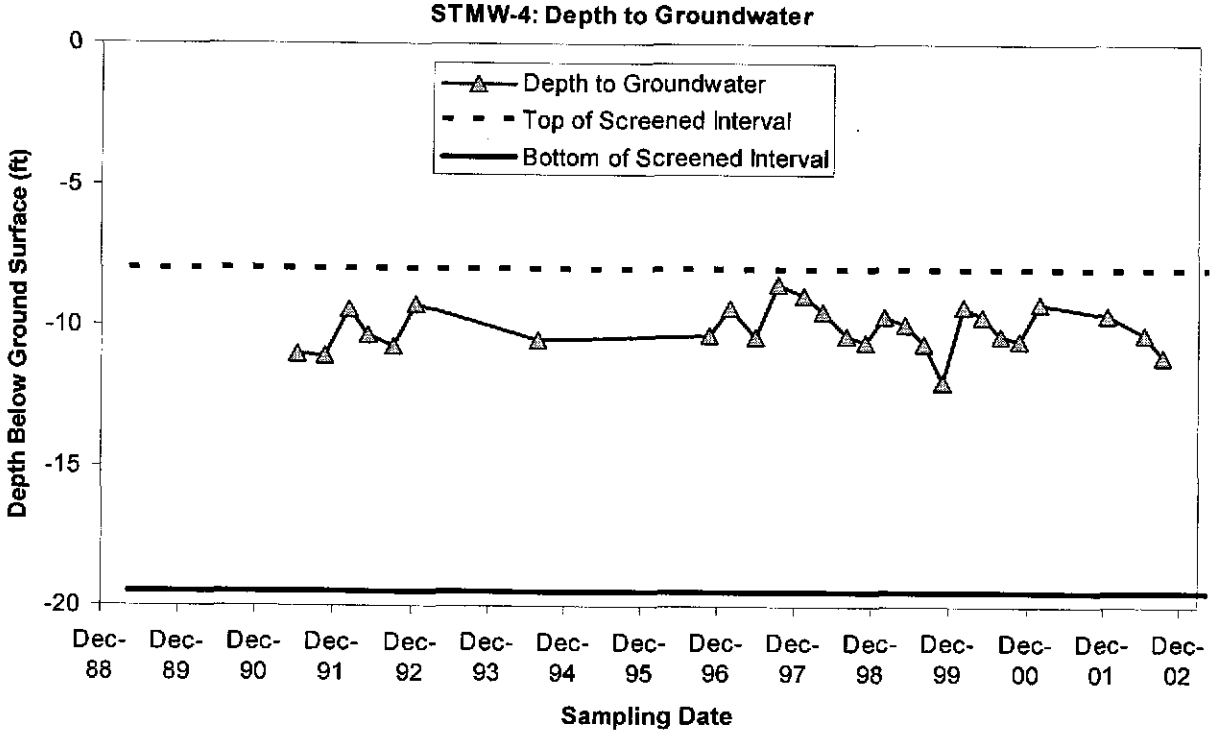

MW-2: Contaminant Concentrations
TPHg Concentration (ug/L)
Benzene Concentration (ug/L)
TPHg
Benzene
9000
8000
7000
6000
5000
4000
3000
2000
1000
0
1000
900
800
700
600
500
400
300
200
100
0
Dec-88
Dec-89
Dec-90
Dec-91
Dec-92
Dec-93
Dec-94
Dec-95
Dec-96
Dec-97
Dec-98
Dec-99
Dec-00
Dec-01
Dec-02
Sampling Date

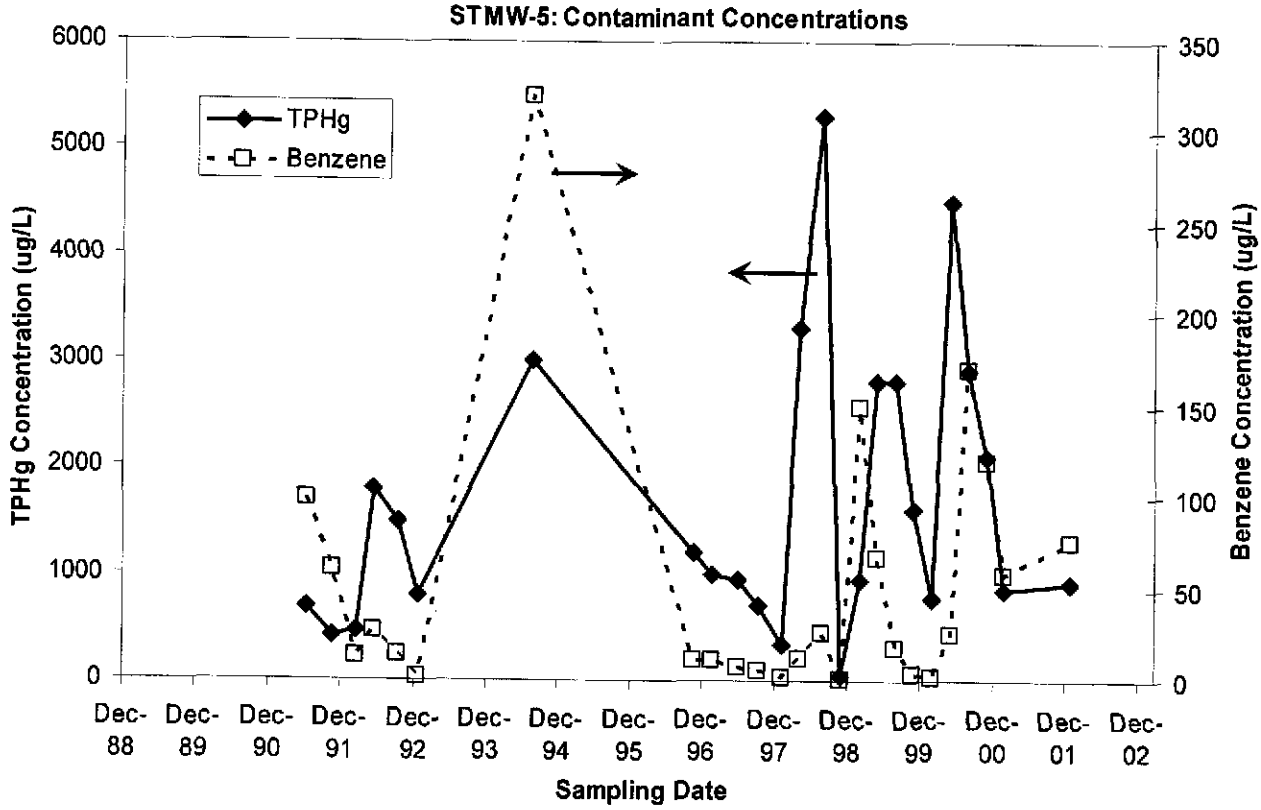

MW-2: Depth to Groundwater
Depth Below Ground Surface (ft)
Depth to Groundwater
Top of Screened Interval
Bottom of Screened Interval
0
-5
-10
-15
-20
-25
Dec-88
Dec-89
Dec-90
Dec-91
Dec-92
Dec-93
Dec-94
Dec-95
Dec-96
Dec-97
Dec-98
Dec-99
Dec-00
Dec-01
Dec-02
Sampling Date

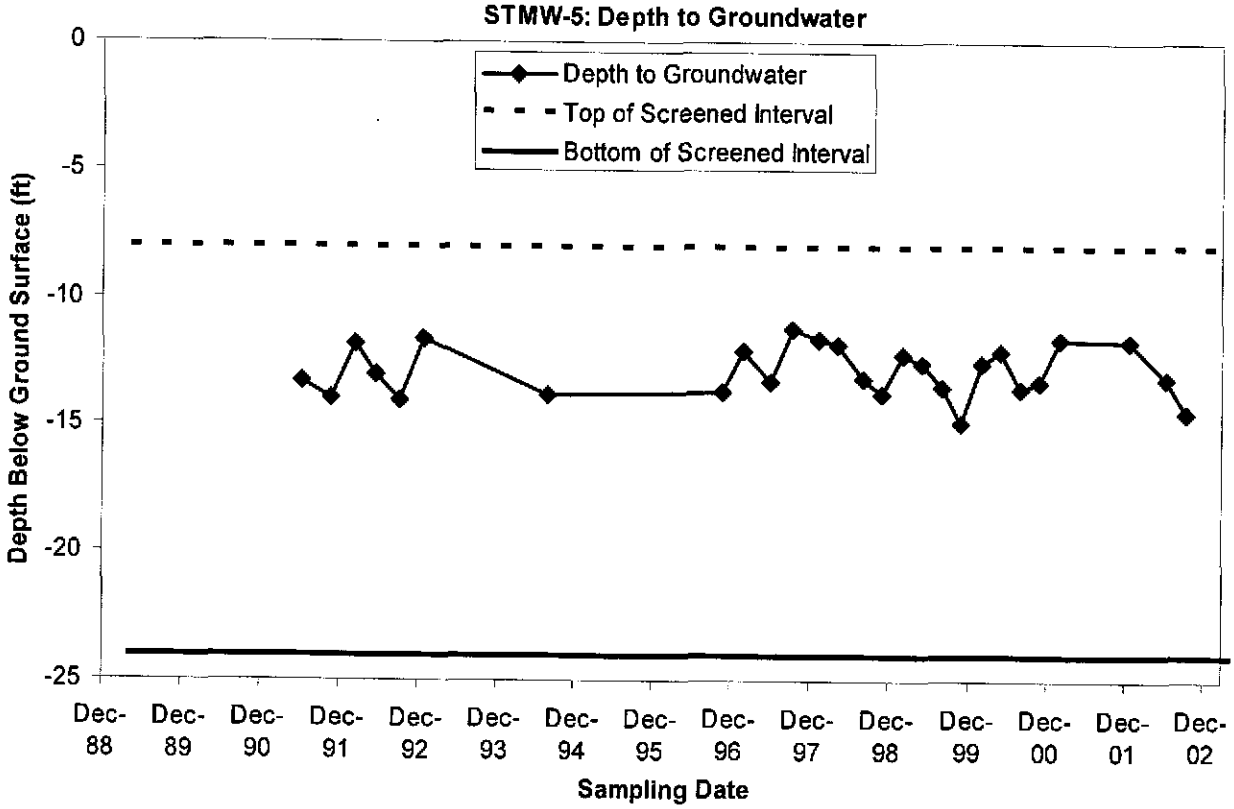

MW-3: Contaminant Concentrations
TPHg
Benzene
TPHg Concentration (µg/L)
Benzene Concentration (µg/L)
80000
70000
60000
50000
40000
30000
20000
10000
0
6000
5000
4000
3000
2000
1000
0
Dec-88
Dec-89
Dec-90
Dec-91
Dec-92
Dec-93
Dec-94
Dec-95
Dec-96
Dec-97
Dec-98
Dec-99
Dec-00
Dec-01
Dec-02
Sampling Date


MW-3: Depth to Groundwater
Depth to Groundwater
Top of Screened Interval
Bottom of Screened Interval
Depth Below Ground Surface (ft)
0
-5
-10
-15
-20
-25
-30
Dec-88
Dec-89
Dec-90
Dec-91
Dec-92
Dec-93
Dec-94
Dec-95
Dec-96
Dec-97
Dec-98
Dec-99
Dec-00
Dec-01
Dec-02
Sampling Date


STMW-4: Contaminant Concentrations
TPHg
Benzene
TPHg Concentration (ug/L)
Benzene Concentration (ug/L)
45000
40000
35000
30000
25000
20000
15000
10000
5000
0
1800
1600
1400
1200
1000
800
600
400
200
0
Dec-88
Dec-89
Dec-90
Dec-91
Dec-92
Dec-93
Dec-94
Dec-95
Dec-96
Dec-97
Dec-98
Dec-99
Dec-00
Dec-01
Sampling Date


STMW-4: Depth to Groundwater
Depth to Groundwater
Top of Screened Interval
Bottom of Screened Interval
Depth Below Ground Surface (ft)
0
-5
-10
-15
-20
Dec-88
Dec-89
Dec-90
Dec-91
Dec-92
Dec-93
Dec-94
Dec-95
Dec-96
Dec-97
Dec-98
Dec-99
Dec-00
Dec-01
Dec-02
Sampling Date


STMW-5: Contaminant Concentrations
TPHg
Benzene
TPHg Concentration (ug/L)
Benzene Concentration (ug/L)
6000
5000
4000
3000
2000
1000
0
350
300
250
200
150
100
50
0
Dec-88
Dec-89
Dec-90
Dec-91
Dec-92
Dec-93
Dec-94
Dec-95
Dec-96
Dec-97
Dec-98
Dec-99
Dec-00
Dec-01
Dec-02
Sampling Date


STMW-5: Depth to Groundwater
Depth to Groundwater
Top of Screened Interval
Bottom of Screened Interval
Depth Below Ground Surface (ft)
0
-5
-10
-15
-20
-25
Dec-88
Dec-89
Dec-90
Dec-91
Dec-92
Dec-93
Dec-94
Dec-95
Dec-96
Dec-97
Dec-98
Dec-99
Dec-00
Dec-01
Dec-02
Sampling Date