QUARTERLY REPORT APRIL - JUNE 1998

TONY'S EXPRESS AUTO SERVICE
3609 EAST 14TH STREET
OAKLAND, CALIFORNIA

FOR

Mr. ABOLGHASSEM RAZI
TONY'S EXPRESS AUTO SERVICE
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BY

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1 INTRODUCTION

The following Report documents the performance of a groundwater monitoring round at Tony's Express Auto Services, 3609 East 14th Street, Oakland, California. The property is primarily used as a service station.

During the groundwater monitoring round the following information and samples were gathered; with the results presented in this report.

1. Depth to water

2. Groundwater samples for TPHg and BTEX, certified analysis.

2 SITE HISTORY

In July 1993, Alpha Geo Services removed three fuel tanks and a waste oil tank from the site. During the tank pull, Soil Tech Engineering Inc. (STE) collected soil samples from the tank excavation area and the old piping associated with the tanks. Soil samples from the tank area were taken at approximately 12 feet below the surface and range in TPHg concentration from 2.1 to 640 mg/kg . The soil samples from the beneath the old piping, 2 to 5 feet below grade, range in concentration from 75 to 4,100 mg/kg TPHg. No gasoline range hydrocarbons were found in the sample from the waste oil tank excavation.

Since the initial tank pull, STE installed 11 groundwater monitor wells including MW09, which was destroyed (see figure 3 for location of wells). MW09 was destroyed to allow for construction.

In addition to the borings completed as monitor wells, a number of other soil borings have been performed in order to determine the extent of contaminated soil at the site.

3 SITE ACTIVITY APRIL-JUNE 1998

3.1 May 13, 1998

On May 13, Western Geo-Engineers installed airsparging compressor and began airsparing to MW 2 and VW4.

3.2 May 18 - May 22, 1998

Western Geo-Engineers preformed vapor extraction pilot test starting on May 18 and ending on May 22, 1998 see Appendix D, Vapor extraction test for results.

Additionally, the first nutrient addition was performed on May 21, 1998. To add the nutrients, 10 pounds of sodium hexametaphosphate and 20 pounds ammonium sulfate were mixed with 110

gallons of water. Eleven gallons of the mixture was then pumped into each of the monitor wells except MW11, and MW 3. MW11 could not be accessed because Western Geo-Engineers lock had been removed from the gate. Twenty-two gallons of the mixture was pumped into MW3, which is located in the center of the hydrocarbon plume.

3.3 June 30, 1998

On June 30, 1998, A Western Geo-Engineers geologist and a technician performed a groundwater monitoring round and a second nutrient addition treatment.

4 GROUNDWATER MONITORING ROUND

A groundwater monitoring round was preformed on June 30 1998, see Appendix A for methods and procedures. All of the wells, except MW01, which contained floating product sheen, were purged and water samples for TPHg/BTEX were collected. Additional, the electron acceptors, dissolved Oxygen, O_2; Nitrate, NO_3^-; Sulfate, SO_4^{--}; and Ferrous iron, Fe^{++}, were analyzed for in the field. The actual electron acceptor is Ferric iron Fe^{+++} but it is insoluble, so the reaction product Fe^{++} was measured, see appendix A for methods.

5 RESULTS

5.1 DEPTH TO WATER, GROUNDWATER GRADIENT.

The groundwater at this site is shallow and unconfined. During the initial construction of monitor wells MW01, MW02 and MW03, groundwater was encountered at 15 feet below the surface. The current depth to groundwater in the wells is between 10.22 and 11.23 feet below the surface and the groundwater gradient is to the south, see Figure 4.

5.2 WATER SAMPLES

5.2.1 TPHg/BTEX

The water samples from all of the wells contained significant levels of TPHg and BTEX, see Table 2.

5.2.2 Electron Acceptors

Dissolved Oxygen, O_2, and Ferrous iron, Fe^{++}, were present in all of the monitor wells, see Table 3. The seven of the ten wells tested contained detectable levels of Nitrate, NO_3^-, and nine of the ten Sulfate, SO_4^{--}, see Table 3.

6 DISCUSSION

6.1 HYDROCARBONS

Significant levels of TPHg and BTEX continue to exist at this site. MW01 contained a thin film of floating product. The benzene and TPHg plumes continue offsite, see Figures 6 and 7. There has been a decrease of the TPHg and BTEX levels in all of the wells since the March 4, 1998 sampling round.

6.2 BIOREMEDIATION

The results of the December 30, 1997, bioremediation sampling indicated that natural attenuation/bioremediation is active at this site. This continues to be the case in the June 30, 1998 sampling.

All of the tested wells have reduced levels of dissolved oxygen. Six of the nine wells had less than 0.1 mg/l of dissolve oxygen in the December 97 sampling. During the June 30, 1998, monitor round all of the wells contained low levels of dissolved Oxygen.

The presence of Ferrous iron in the wells indicates that biodegradation has progressed to the point that the system is oxygen deficient and the bacteria have started to reduce the iron to provide oxygen for the degradation. With the increase of dissolved oxygen in the wells the amount of Ferrous iron has deceased in a majority of the wells, see table 3 and figure 9A.

In December biodegradation in MW02, which is in the heart of the plume, had consumed all of the available electron acceptors. With the start-up of airsparging into P4 and LW1there has been an increase in the amount of dissolved oxygen in the vicinity of MW02.

The levels of electron acceptors present and the presence of the reaction products, carbon dioxide, methane and ferrous iron indicate that the bacteria in the soil and the compounds in the groundwater have the capability to consume a significant amount of hydrocarbons.

Introducing ambient air (O_2) into the system during vapor vacuum extraction and/or sparging will greatly increase this bioactivity.

6.3 REGULATORY RESPONSE

A workplan for the augmenting the natural biodegradation at this site was approved during the second Quarter of 1998 by Mr. Barney Chan, Environmental Health Services. After the receipt of his approval, a pre-approval request was sent to the tank fund to perform the work described in the workplan. Pre-approval was granted on May 5 and received May 14. The majority of the work specified in the workplan has been preformed and is included in or as an appendix to this report.

7 CONCLUSIONS

1. Continue to add sodium hexametaphosphate and ammonium sulfate to the groundwater monitoring wells, in order increase the nutrition level.

2. Continue air sparging to increase Oxygen levels in the groundwater plume.

3. Permit and start vapor extraction in order to remove the hydrocarbon contamination remaining in the soil, and to further increase the amount of oxygen available in the groundwater.

If you have any questions concerning this report or if we can be of further assistance, please don't hesitate to contact us at (530) 668-5300.

8 CONCERNED PARTIES

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Alameda, CA 94502-6577
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9 LIMITATIONS

This report is based upon the following:

- The observations of field personnel.
- The results of laboratory analyses performed by a state certified laboratory.
- Referenced documents.
- Our understanding of the regulations of the State of California and Alameda County, Hazardous Materials Section and/or City of Oakland, California.

Changes in groundwater conditions can occur due to variations in rainfall, temperature, local and regional water usage and local construction practices. In addition, variations in the soil and groundwater conditions could exist beyond the points explored in this investigation.

State certified analytical results are included in this report. This laboratory follows EPA and State of California approved procedures; however, WEGE is not responsible for errors in these laboratory results.

The services performed by Western Geo-Engineers, a corporation, under California Registered Geologist #3037 and/or Contractors License #513857, have been conducted in a manner consistent with the level of care and skill ordinarily exercised by members of our profession currently practicing under similar conditions in the State of California and the Woodland area. Our work and/or supervision of remediation and/or abatement operations, active or preliminary, at this site is in no way meant to imply that we are owners or operators of this site. Please note that known contamination of soil and/or groundwater must be reported to the appropriate agencies in a timely manner. No other warranty, expressed or implied, is made.

If you have any questions concerning this report or if we can be of further assistance, please don't hesitate to contact us at (530) 668-5300.

Respectfully,

REGISTERED GEOLOGIST
JACK E. NAPPER
No. 3037

Roy Butler
Project Geologist

Jack E. Napper
Registered Geologist #3037

Table 1, Tony's Express, Groundwater Elevations						
	DEPTH TO TOP SLOTS	DEPTH TO WATER	DEPTH TO WATER	DEPTH TO WATER		
DATE		12/30/97	03/04/98	06/30/98		
MW01	10	9.3	7.53	10.62		
MW02	10	9.05	7.44	10.58		
MW03	10	9.74	8.21	11.13		
MW04	7	9.43	7.96	10.72		
MW05	6	9.15	7.53	10.85		
MW06	6	9.3	8.30	11.26		
MW07	6	8.65	6.93	10.22		
MW08	7	8.95	7.38	10.33		
MW09	8	DESTROYED				
MW10	8	8.78	7.23	9.52		
MW11	8	10.2	8.81	11.02		
	CASING ELEVATION	GROUND-WATER ELEVATION	GROUND-WATER ELEVATION	GROUND-WATER ELEVATION		
MW01	97.99	88.69	90.46	87.37		
MW02	98.58	89.53	91.14	88		
MW03	97.78	88.04	89.57	86.65		
MW04	97.85	88.42	89.89	87.13		
MW05	99.04	89.89	91.51	88.19		
MW06	98.77	89.47	90.47	87.51		
MW07	97.83	89.18	90.9	87.61		
MW08	97.25	88.3	89.87	86.92		
MW09	95.94					
MW10	94.54	85.76	87.31	85.02		
MW11	95.94	85.74	87.13	84.92		
Avg	97.41	88.30	89.83	86.93		

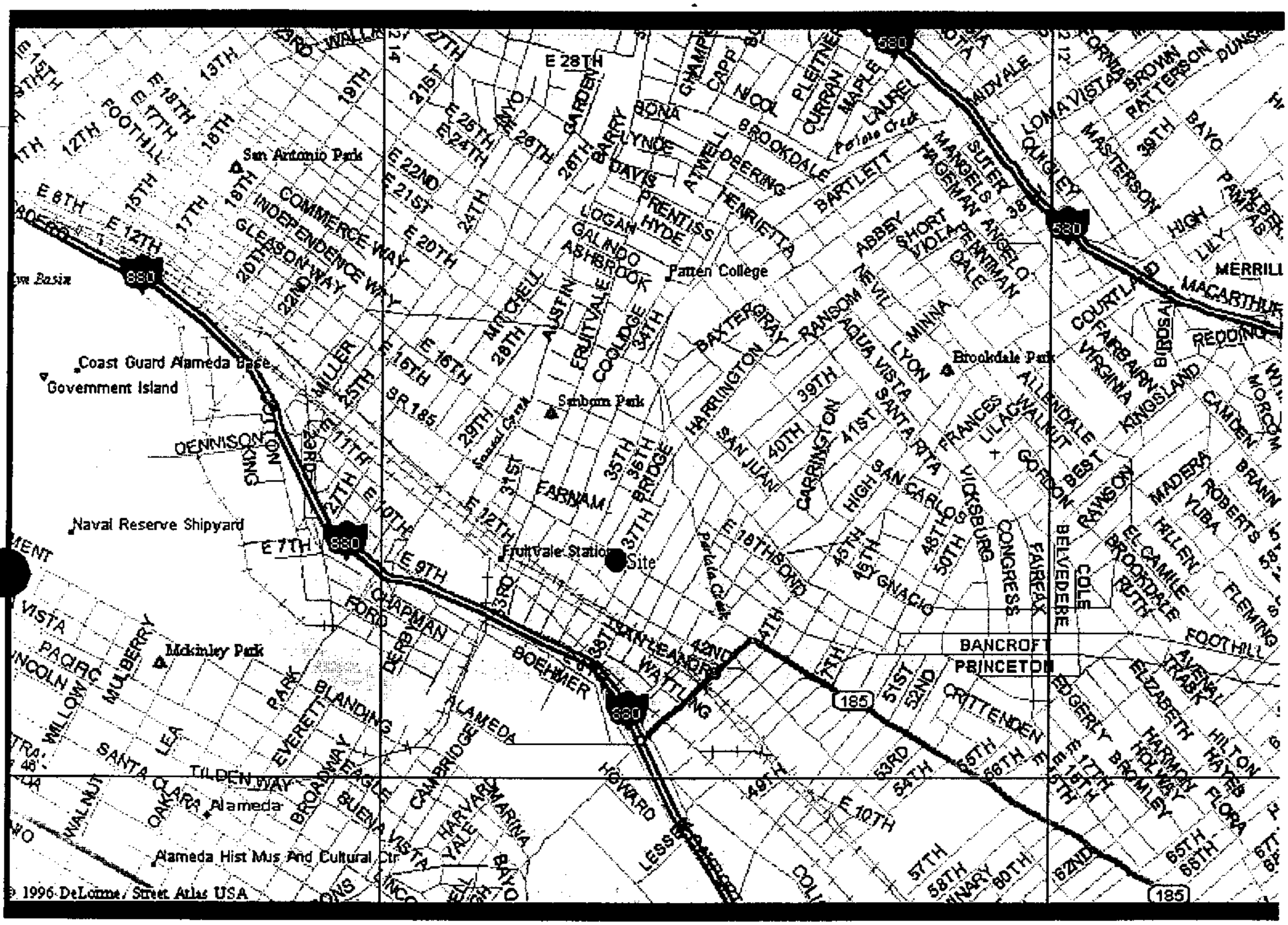
Table 2, ug/l, Gasoline Range Hydrocarbons in Groundwater								
DATE	10/5/94	12/2/94	3/6/95	6/5/95	10/2/95	1/3/96	4/3/96	9/12/96
MW01, TPHg	320000	80000	32000	21000	5900	30000	31000	
MW01, Benzene	24000	3800	190	950	140	71	98	
MW01, Toluene	21000	6600	150	650	130	73	120	
MW01, Ethylbenzene	2600	2300	150	570	140	50	63	
MW01, Xylene	15000	11000	490	1500	390	120	170	
MW02, TPHg	260000	42000	490	8000	46000	3400	27000	19000
MW02, Benzene	17000	1700	3.2	220	160	7.6	100	210
MW02, Toluene	19000	2200	2.6	330	130	13	92	220
MW02, Ethylbenzene	570	1200	1.6	350	93	7.4	44	110
MW02, Xylene	15000	3600	5.9	660	240	26	130	400
MW03, TPHg	3000000	250000	21000	350000	15000	19000	70000	66000
MW03, Benzene	190000	19000	80	20000	510	290	310	430
MW03, Toluene	740000	22000	73	42000	410	270	260	420
MW03, Ethylbenzene	310000	4400	35	5800	210	97	89	210
MW03, Xylene	13000	28000	130	36000	650	890	280	510
MW04, TPHg					9300	1100	1900	2100
MW04, Benzene					23	4	12	46
MW04, Toluene					11	1.3	7.5	24
MW04, Ethylbenzene					9.9	0.9	5.2	31
MW04, Xylene					29	3.3	14	73
MW05, TPHg					1500	830	780	
MW05, Benzene					1.1	<0.5	1.3	
MW05, Toluene					1.3	<0.5	1	
MW05, Ethylbenzene					3.9	1.3	4.8	
MW05, Xylene					5.3	2.2	3.8	
MW06, TPHg					12000	68000	48000	23000
MW06, Benzene					350	60	140	150
MW06, Toluene					310	61	110	160
MW06, Ethylbenzene					200	27	62	110
MW06, Xylene					610	180	170	310
MW07, TPHg					3300	1500	1900	
MW07, Benzene					8.9	1.5	2.1	
MW07, Toluene					12	0.9	2.6	
MW07, Ethylbenzene					17	3	5.1	
MW07, Xylene					45	4.1	6.9	
MW08, TPHg					94000	23000	58000	46000
MW08, Benzene					310	19	250	210
MW08, Toluene					250	12	170	150
MW08, Ethylbenzene					180	8.8	140	160
MW08, Xylene					480	47	330	360
MW10, TPHg								26000
MW10, Benzene								98
MW10, Toluene								37
MW10, Ethylbenzene								63
MW10, Xylene								99
MW11, TPHg								2300
MW11, Benzene								7
MW11, Toluene								7.2
MW11, Ethylbenzene								12
MW11, Xylene								31

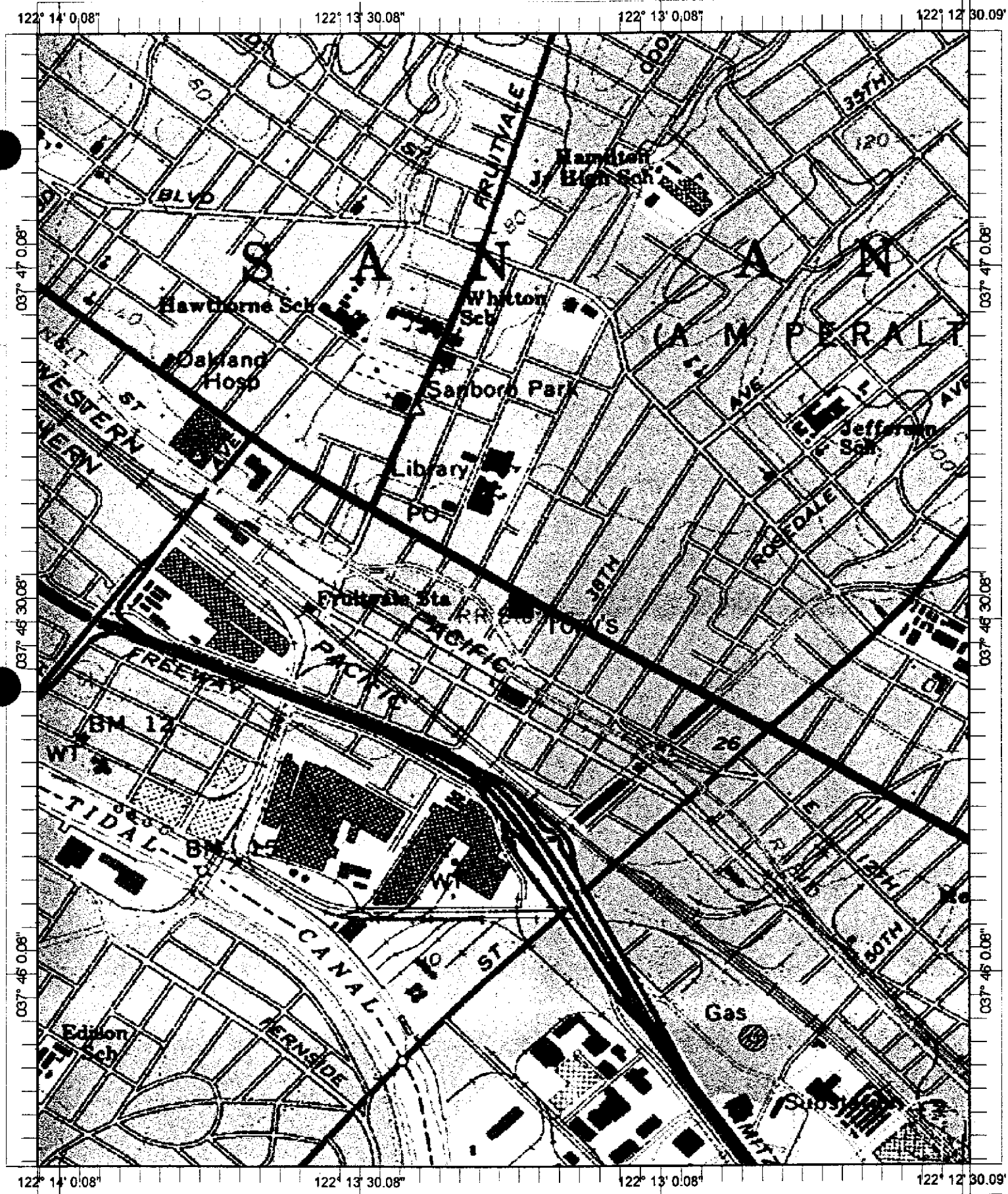
Table 2, ug/l, Gasoline Range Hydrocarbons in Groundwater					
DATE	12/9/96	4/10/97	12/30/97	3/4/98	6/30/98
MW01, TPHg			27000		
MW01, Benzene			2300		
MW01, Toluene			2100		
MW01, Ethylbenzene			1400		
MW01, Xylene			5100		
MW02, TPHg	6200	53000	35000	51000	25000
MW02, Benzene	110	150	4900	4200	2000
MW02, Toluene	6.6	110	4900	6000	2000
MW02, Ethylbenzene	2.1	37	1600	1600	1300
MW02, Xylene	14	1120	7000	8800	4300
MW03, TPHg	54000	54000		150000	33000
MW03, Benzene	320	130		7100	2000
MW03, Toluene	280	120		9500	1900
MW03, Ethylbenzene	90	38		2700	900
MW03, Xylene	250	120		12000	4600
MW04, TPHg	4000	<50	2300	2000	1700
MW04, Benzene	14	<0.5	410	600	780
MW04, Toluene	6.3	<0.5	270	950	160
MW04, Ethylbenzene	4.2	<0.5	100	100	54
MW04, Xylene	12	<0.5	1500	500	200
MW05, TPHg			790	400	400
MW05, Benzene			82	3	<5
MW05, Toluene			66	<0.5	<5
MW05, Ethylbenzene			59	14	15
MW05, Xylene			160	5	<10
MW06, TPHg	57000	29000	36000	65000	28000
MW06, Benzene	480	60	660	6100	3100
MW06, Toluene	450	70	7600	11000	4300
MW06, Ethylbenzene	160	24	1500	1800	1300
MW06, Xylene	460	71	7700	9900	4900
MW07, TPHg			1400	800	620
MW07, Benzene			130	25	4
MW07, Toluene			98	47	<5
MW07, Ethylbenzene			75	22	9
MW07, Xylene			200	76	<10
MW08, TPHg	27000	24000	28000	70000	54000
MW08, Benzene	88	86	6000	8400	4600
MW08, Toluene	43	55	1600	3500	2800
MW08, Ethylbenzene	44	50	2100	3700	3500
MW08, Xylene	80	100	4700	11000	7300
MW10, TPHg	3000	1000	10000	9000	8900
MW10, Benzene	8.1	21	5300	2600	3700
MW10, Toluene	2.2	9.3	76	1200	60
MW10, Ethylbenzene	1.5	3.3	1100	1300	980
MW10, Xylene	5.1	33	780	3400	420
MW11, TPHg	650	<50	710	1800	1100
MW11, Benzene	1.8	<0.5	66	160	45
MW11, Toluene	0.5	<0.5	97	31	24
MW11, Ethylbenzene	0.8	<0.5	59	120	71
MW11, Xylene	0.42	<0.5	190	250	100

Table 3. Bioremediation Sampling, Results December 30, 1997 Sampling

WELL	Date	TPHg	Dissolved Oxygen	Nitrate as Nitrogen	Ferrous Iron	Sulfate	Methane	Carbon Dioxide	Ammonia Nitrogen	Ortho-Phosphate	Hydro-carbon degraders	ORP	K
UNITS		mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	cfu/ml		feet/day
MW01	12/30/97	27	0.5	<0.1	3.04	<1	3.2	99.1	1.3	0.1	60	-110	0.4
MW01	6/30/98	FLOATING PRODUCT NOT SAMPLED											
MW02	12/30/97	35	<0.1	<0.1	>3.30	<1	1.24	117	1.3	0.4	220	-81	0.47
MW02	6/30/98	25	3.2	<0.1	0.50	14							
MW03	12/30/97	FLOATING PRODUCT NOT SAMPLED											
MW03	6/30/68	33	2	0.1	0.37	77							
MW04	12/30/97	2.3	<0.1	4.5	0.39	42						72	2.01
MW04	6/30/98	1.7	1.3	0.9	0.93	7							
MW05	12/30/97	0.79	<0.1	0.3	0.94	18	0.0113	62.7	0.8	0.4	160	46	2.01
MW05	6/30/98	0.4	0.6	1.6	0.50	6							
MW06	12/30/97	36	<0.1	<0.1	0.30	5						14	10.42
MW06	6/30/98	28	2.5	0.7	0.40	4							
MW07	12/30/97	1.4	1.2	0.2	0.23	32	0.449	64.2	0.2	0.2	60	-82	3.86
MW07	6/30/98	0.62	1	0.5	0.78	4							
MW08	12/30/97	28	2.5	0.1	>3.30	0	3.54	153	0.8	0.3	300	1	1.16
MW08	6/30/98	54	1.3	<0.1	2.82	3							
MW09	12/30/97	WELL DESTROYED											
MW10	12/30/97	10	<0.1	0.3	2.21	<1						4	9.66
MW10	6/30/98	8.9	0.9	<0.1	0.38	<1							
MW11	12/30/97	0.71	<0.1	3.5	0.32	35						66	2.54
MW11	6/30/98	1.1	2.2	1.2	0.15	6							

Figure 1, Location Map



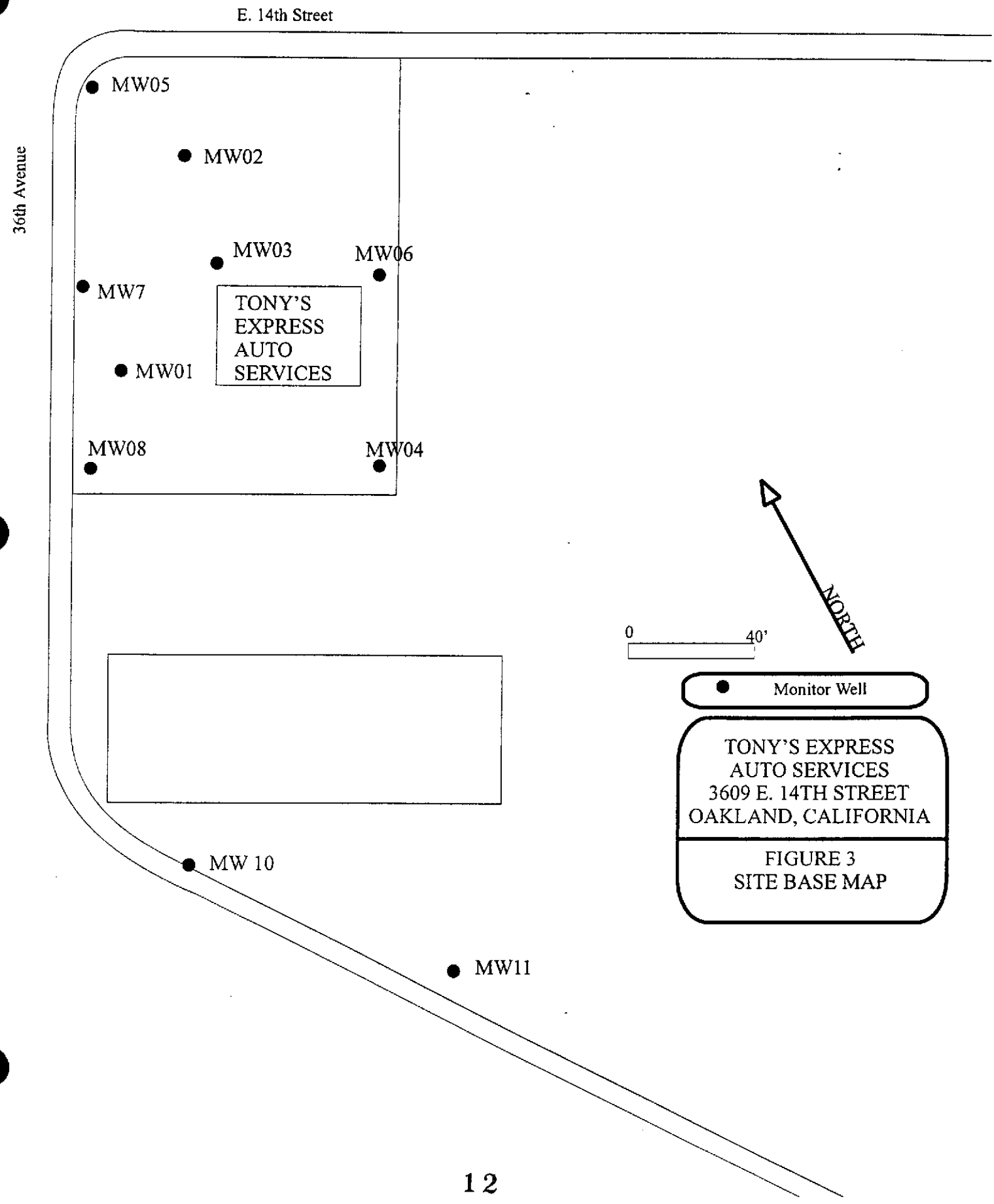


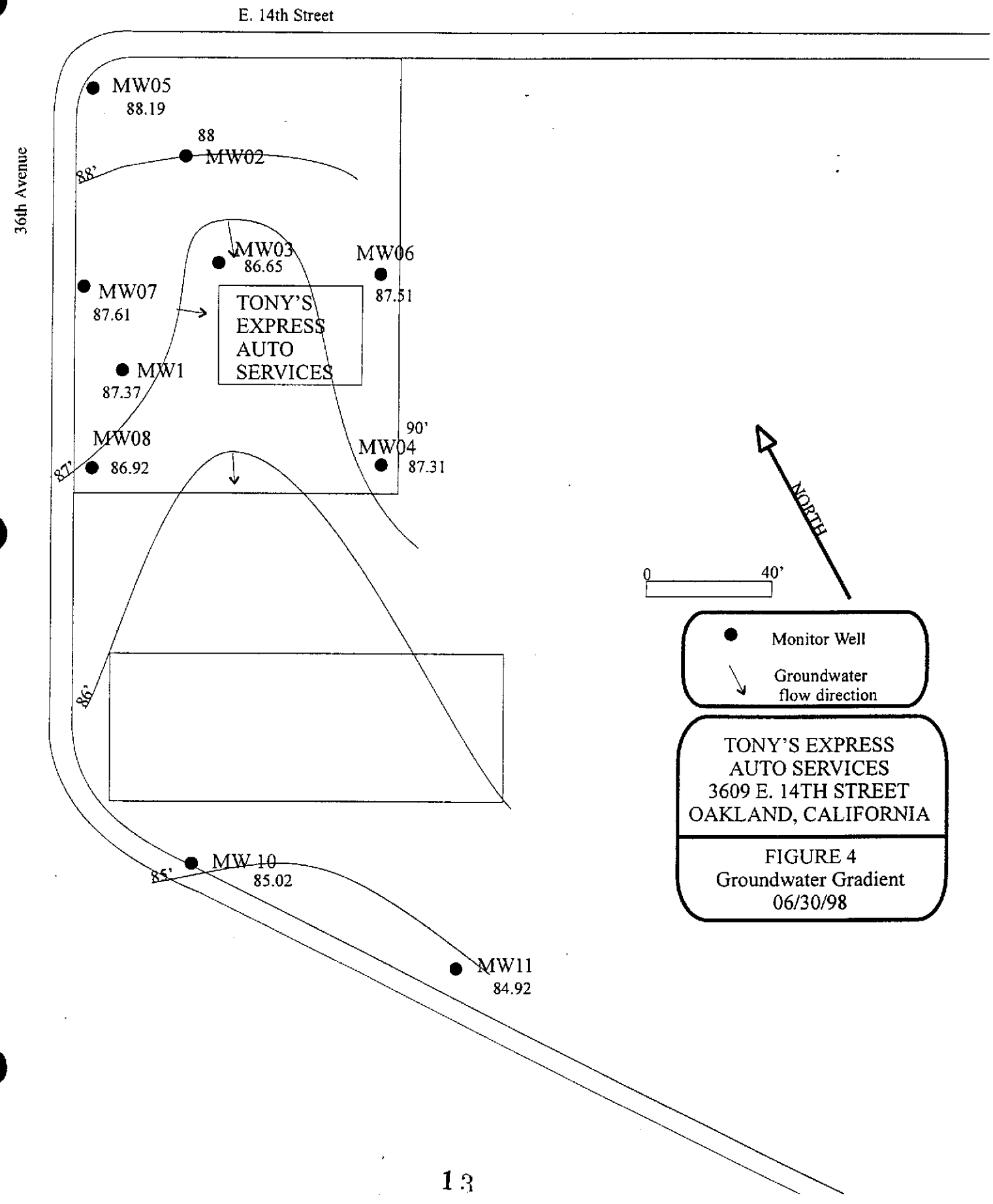
<Default> - 1 Markers, Length = 0 feet

Tony's - 037° 46' 31.3" N, 122° 13' 13.8" W

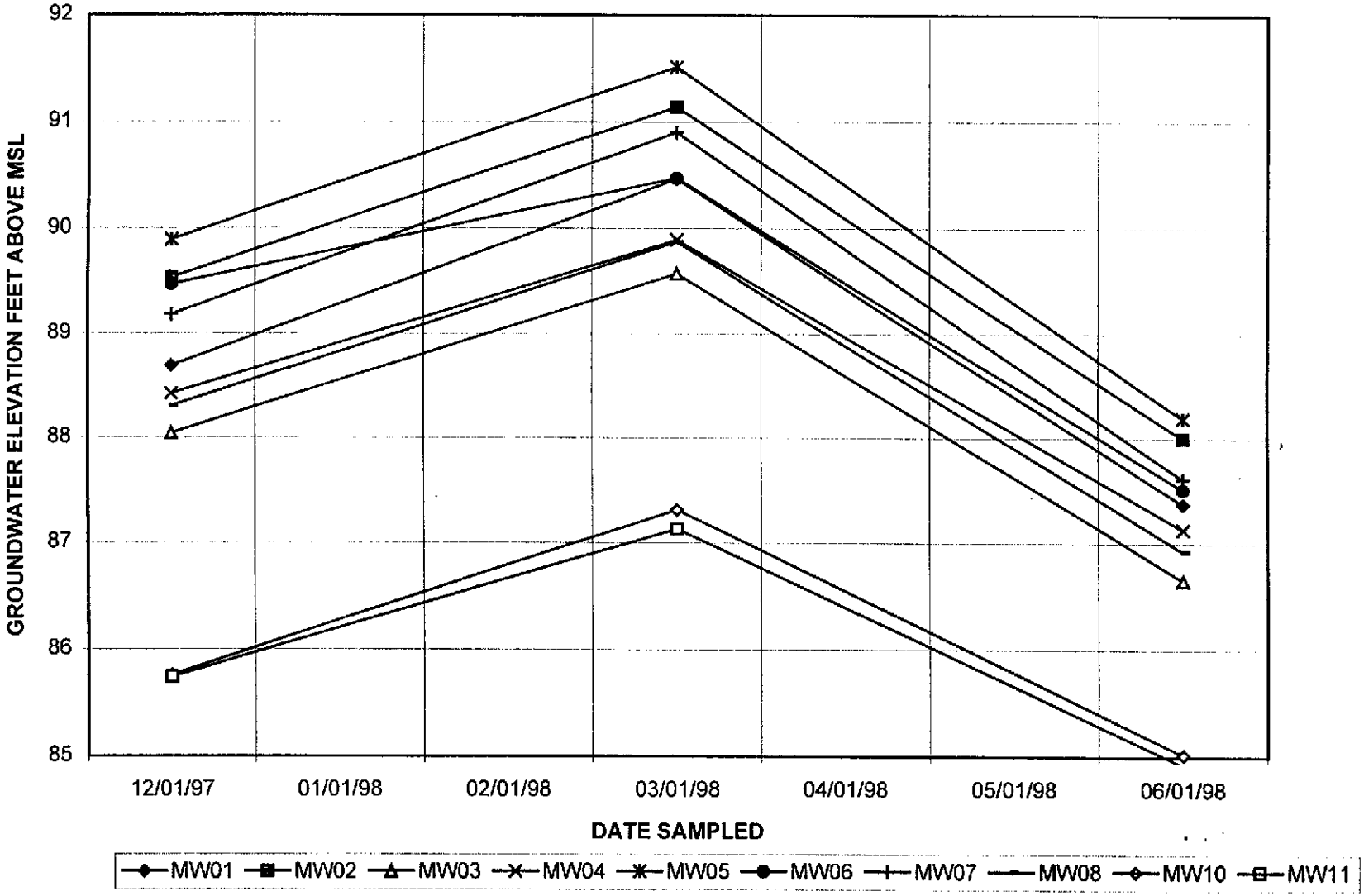
Name: OAKLAND EAST
Date: 5/11/98
Scale: 1 inch equals 1000 feet

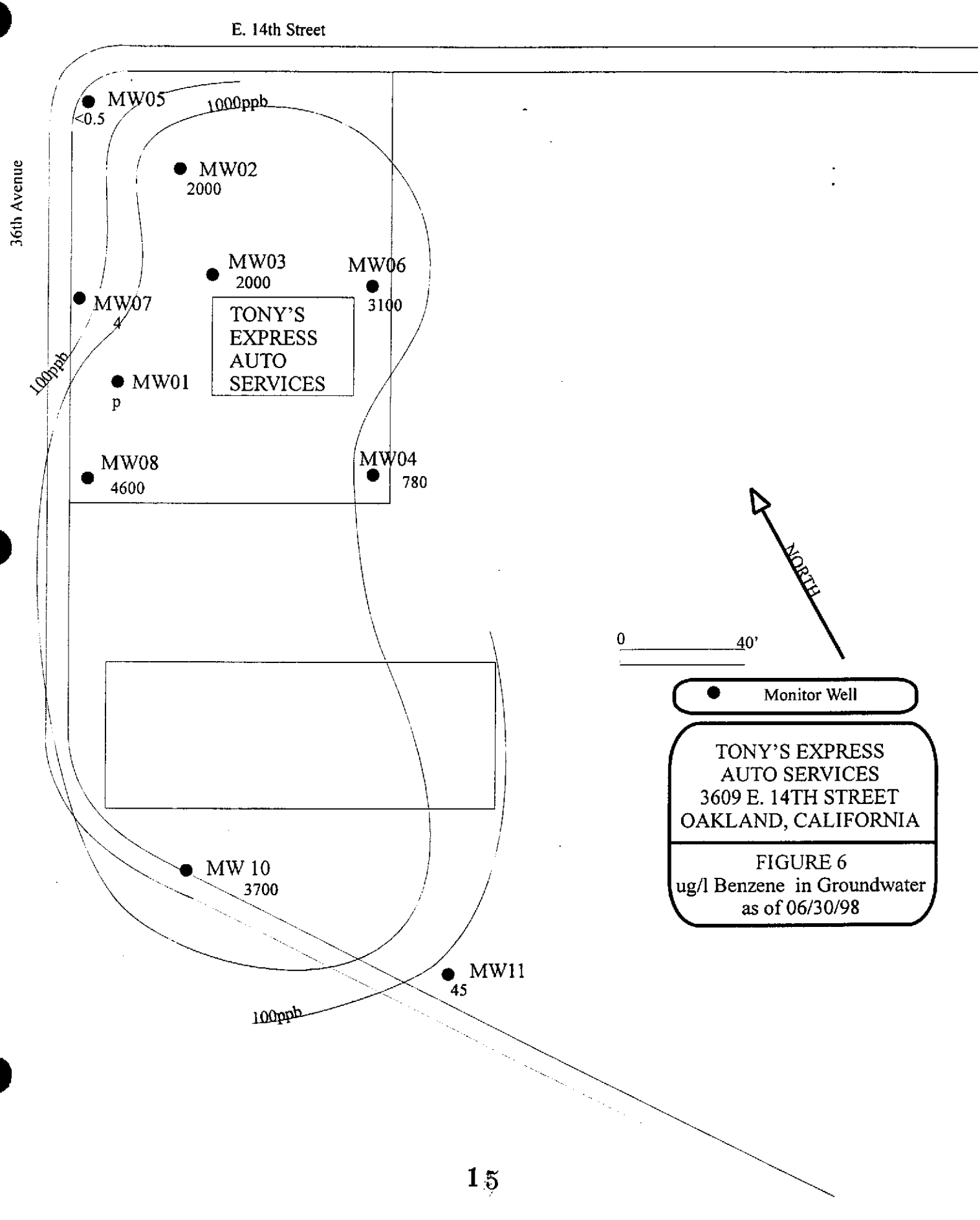
Location: 037° 46' 31.7" N 122° 13' 15.9" W
Caption: Figure 2, USGS Topographic Map


E. 14th Street
36th Avenue
MW05
MW02
MW03
MW06
MW7
TONY'S EXPRESS AUTO SERVICES
MW01
MW08
MW04
NORTH
0
40'
Monitor Well
TONY'S EXPRESS AUTO SERVICES
3609 E. 14TH STREET
OAKLAND, CALIFORNIA
FIGURE 3
SITE BASE MAP
MW 10
MW11


E. 14th Street
36th Avenue
MW05
88.19
88
MW02
88'
MW03
86.65
MW06
87.51
MW07
87.61
TONY'S
EXPRESS
AUTO
SERVICES
MW1
87.37
MW08
86.92
87'
90'
MW04
87.31
86'
MW 10
85.02
85'
MW11
84.92
NORTH
0
40'
Monitor Well
Groundwater
flow direction
TONY'S EXPRESS
AUTO SERVICES
3609 E. 14TH STREET
OAKLAND, CALIFORNIA
FIGURE 4
Groundwater Gradient
06/30/98

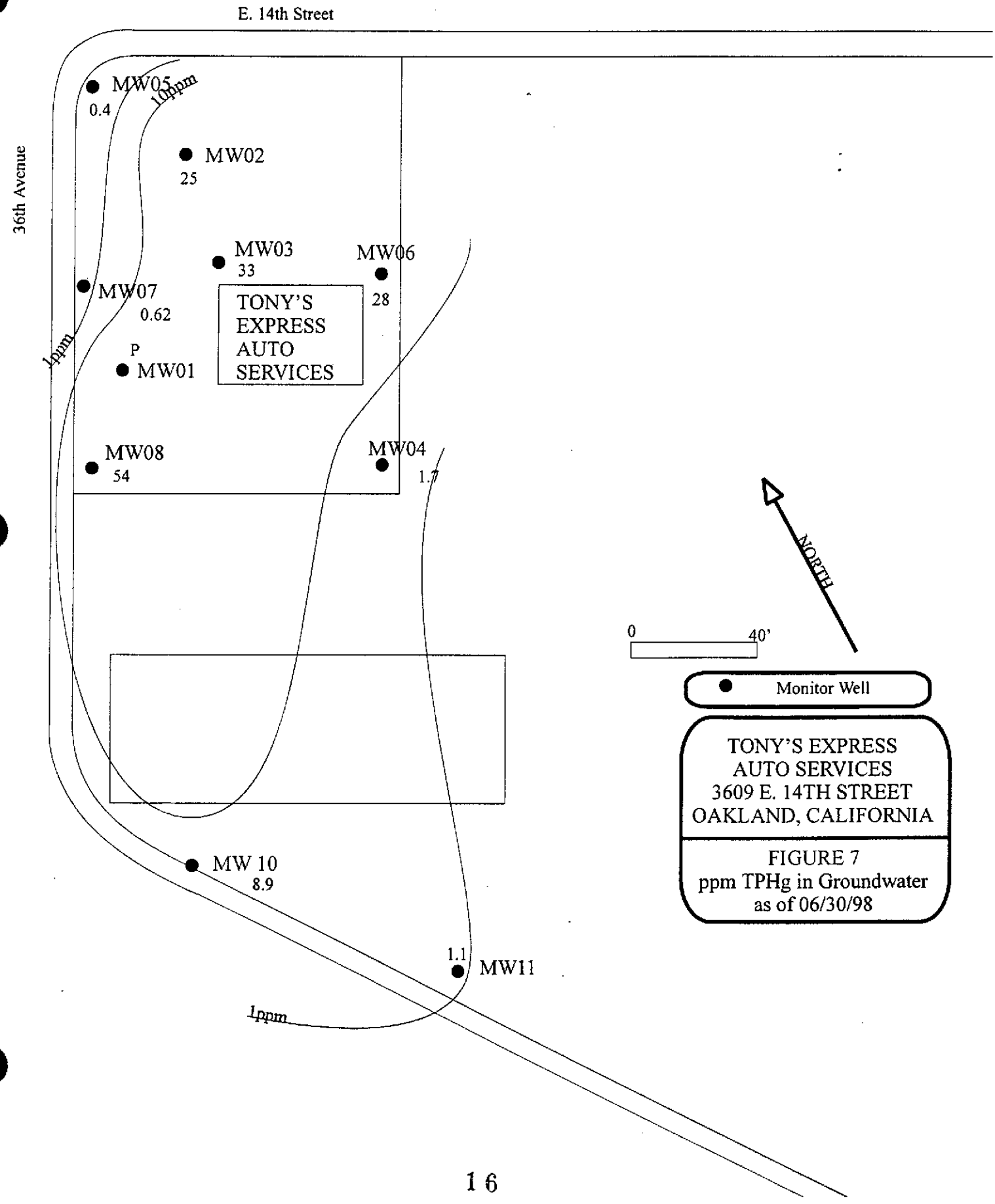
GROUNDWATER ELEVATION
Figure 5



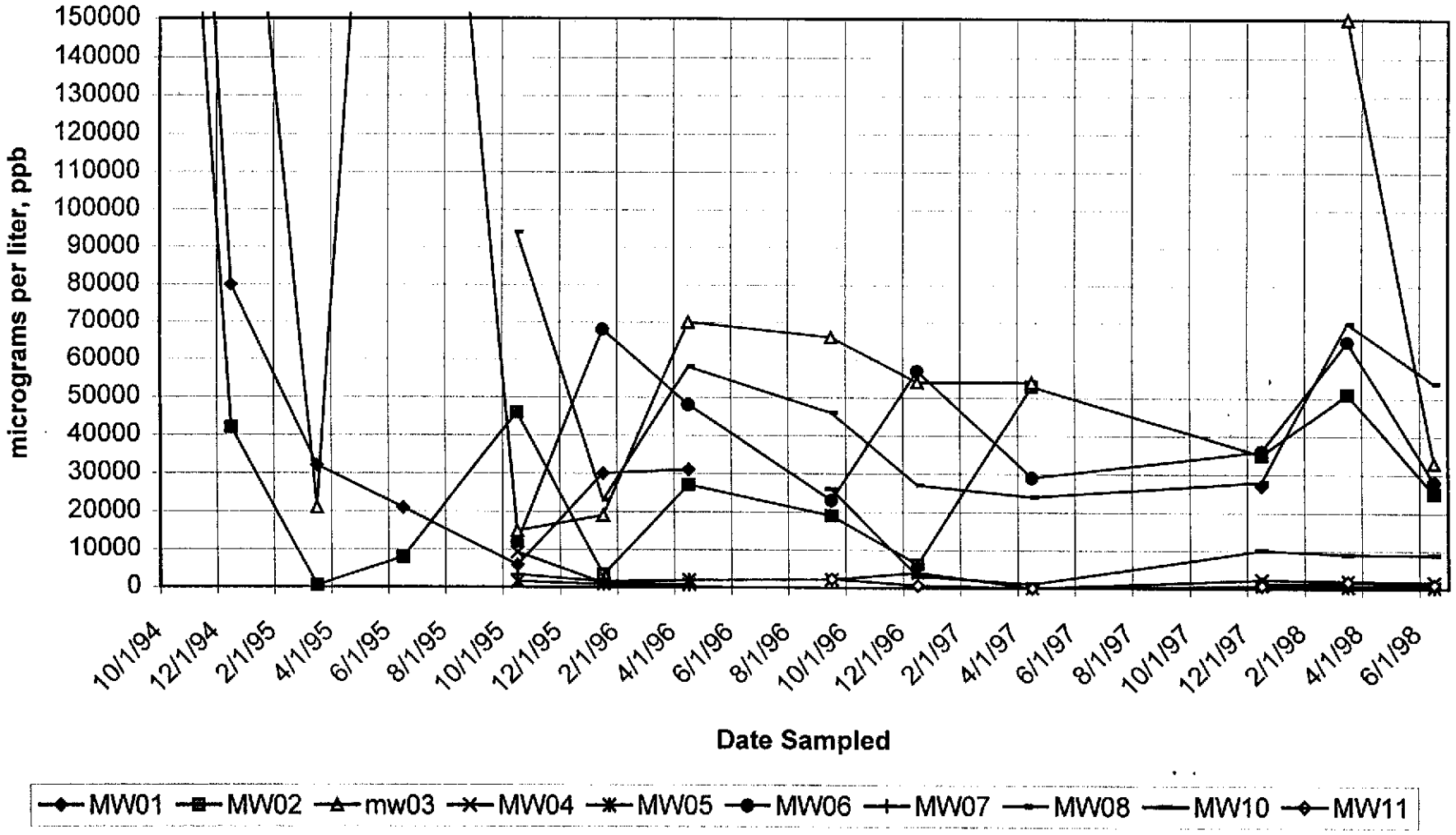


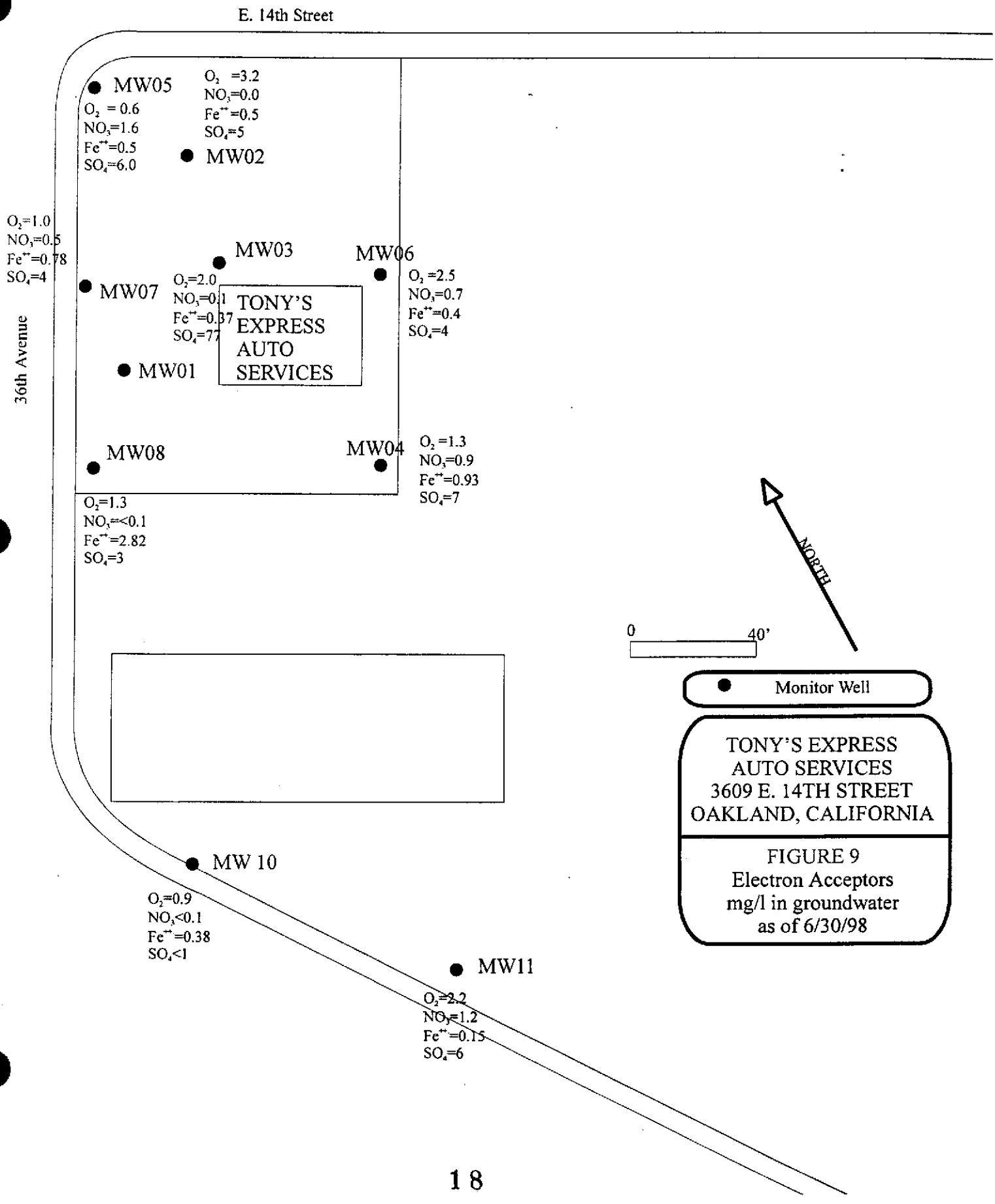
TONY'S EXPRESS
AUTO SERVICES
3609 E. 14TH STREET
OAKLAND, CALIFORNIA

FIGURE 6
ug/l Benzene in Groundwater
as of 06/30/98

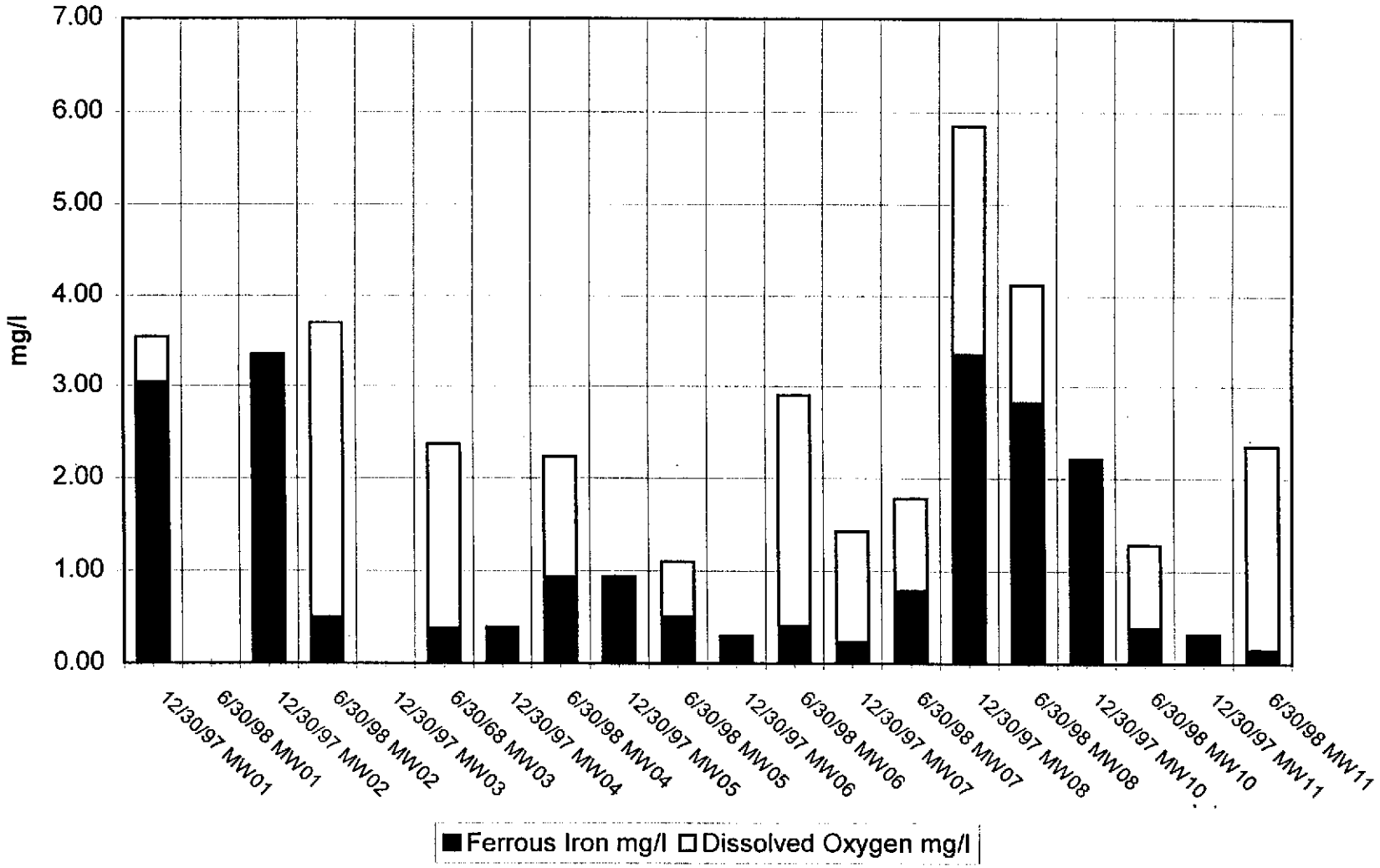

E. 14th Street
36th Avenue
MW05
0.4
10ppm
MW02
25
MW03
33
MW06
28
MW07
0.62
1ppm
P
MW01
TONY'S
EXPRESS
AUTO
SERVICES
MW08
54
MW04
1.7
MW 10
8.9
1.1
MW11
1ppm
NORTH
0
40'
Monitor Well
TONY'S EXPRESS
AUTO SERVICES
3609 E. 14TH STREET
OAKLAND, CALIFORNIA
FIGURE 7
ppm TPHg in Groundwater
as of 06/30/98

Tony's Express Auto Services, Micrograms per liter TPHg
Figure 8

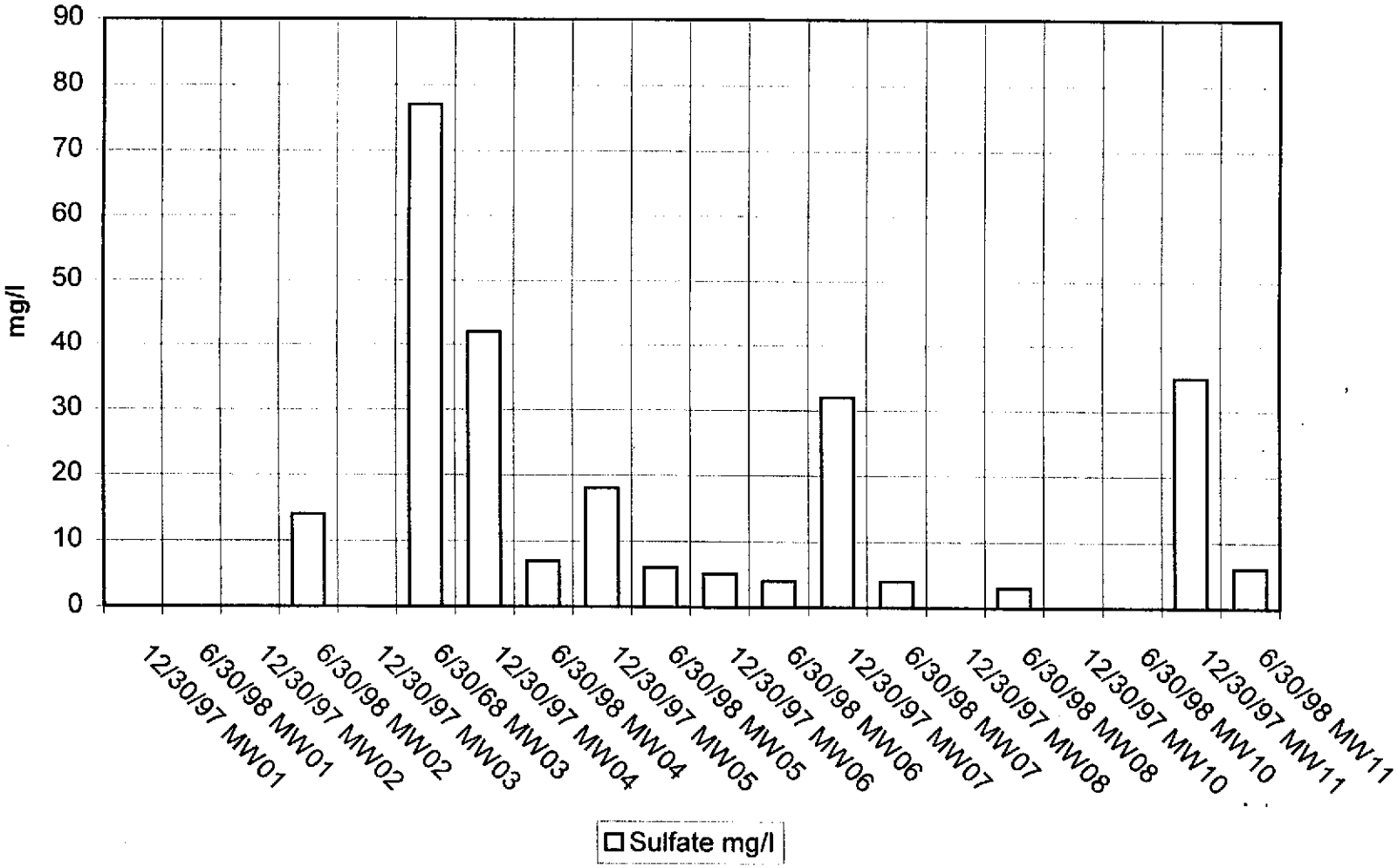



E. 14th Street
MW05
O_2 = 0.6
NO_3=1.6
Fe^{++}=0.5
SO_4=6.0
O_2 =3.2
NO_3=0.0
Fe^{++}=0.5
SO_4=5
MW02
O_2=1.0
NO_3=0.5
Fe^{++}=0.78
SO_4=4
MW03
MW06
O_2 =2.5
NO_3=0.7
Fe^{++}=0.4
SO_4=4
MW07
O_2=2.0
NO_3=0.1
Fe^{++}=0.37
SO_4=77
TONY'S EXPRESS AUTO SERVICES
36th Avenue
MW01
MW08
MW04
O_2 =1.3
NO_3=0.9
Fe^{++}=0.93
SO_4=7
O_2=1.3
NO_3=<0.1
Fe^{++}=2.82
SO_4=3
NORTH
0
40'
Monitor Well
TONY'S EXPRESS AUTO SERVICES
3609 E. 14TH STREET
OAKLAND, CALIFORNIA
FIGURE 9
Electron Acceptors
mg/l in groundwater
as of 6/30/98
MW 10
O_2=0.9
NO_3<0.1
Fe^{++}=0.38
SO_4<1
MW11
O_2=2.2
NO_3=1.2
Fe^{++}=0.15
SO_4=6

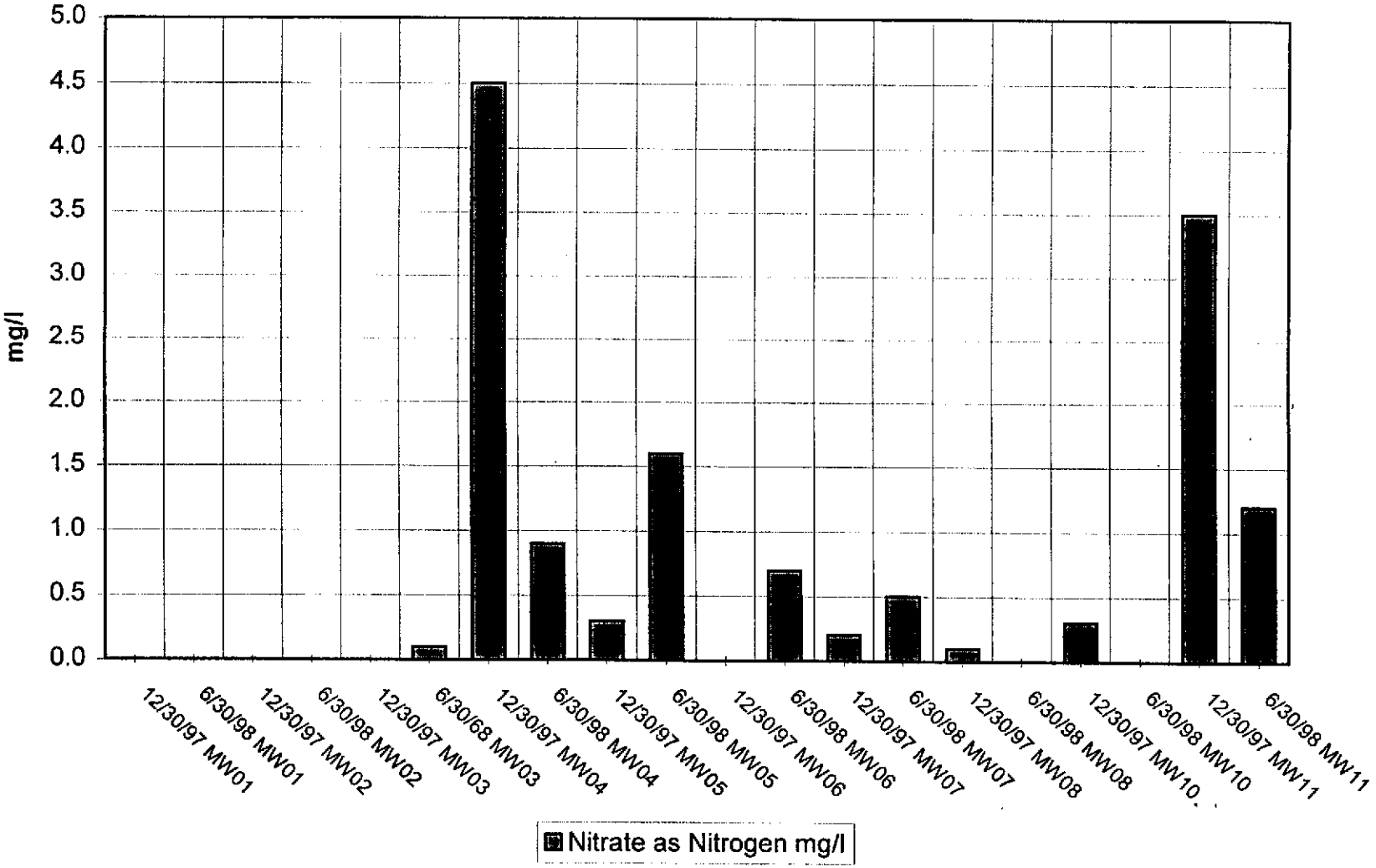
Electron Acceptors
FIGURE 10A

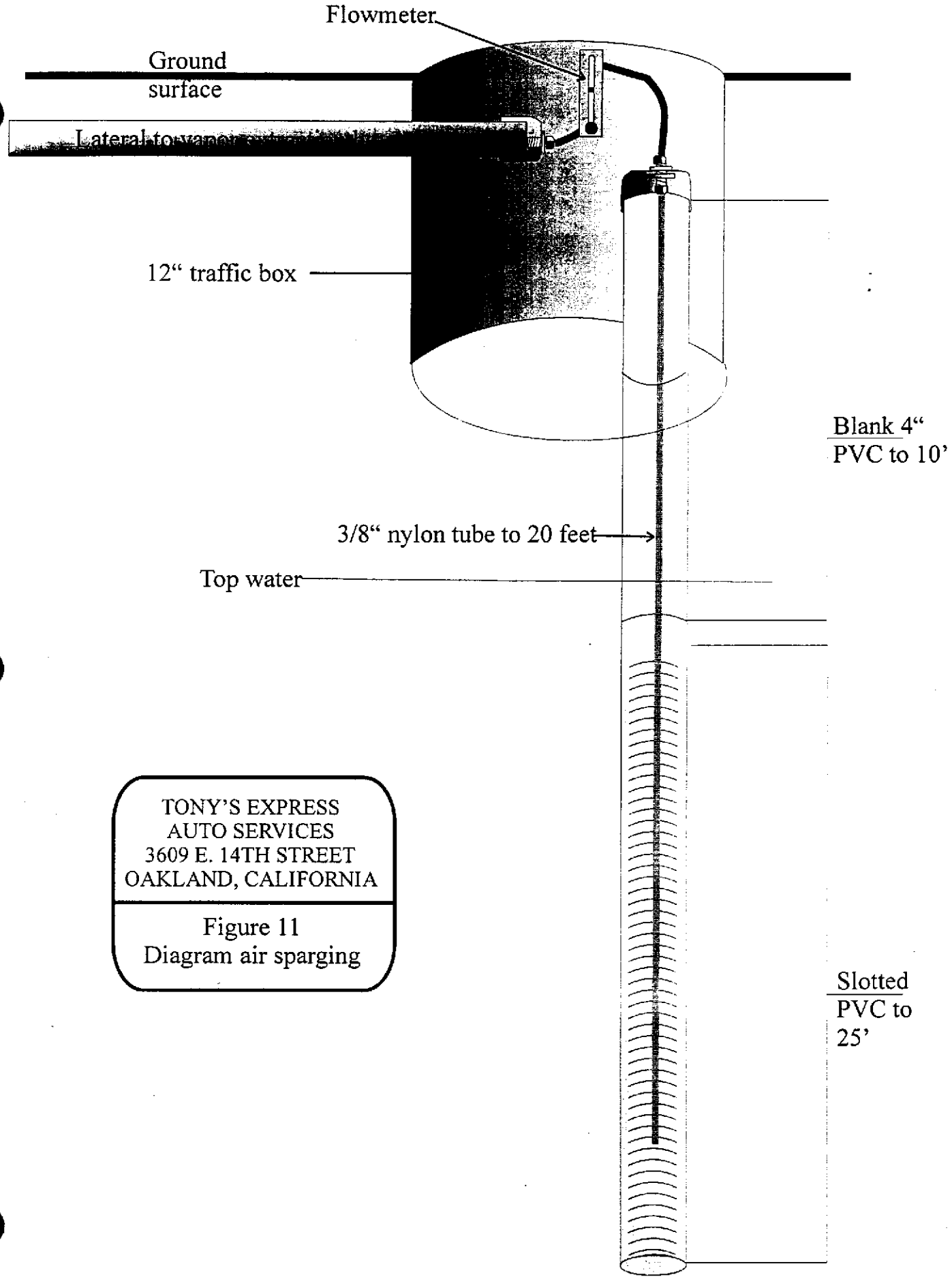


Electron Acceptors
FIGURE 10B
Sulfate mg/l



Electron Acceptors
FIGURE 10C





TONY'S EXPRESS
AUTO SERVICES
3609 E. 14TH STREET
OAKLAND, CALIFORNIA

Figure 11
Diagram air sparging

APPENDIX A

METHODS AND PROCEDURES
QA/QC

APPENDIX A:
METHODS AND PROCEDURES
QA/QC

This Appendix documents the specific methods, procedures, and materials used to collect and analyze groundwater samples.

GAUGING AND MEASURING MONITOR WELLS

Prior to sampling a well, WEGE personnel obtain three measurements:

1. the depth to groundwater (DTW);
2. the product thickness using a battery powered depth to water-product interface probe and/or by using a specially designed bailer;
3. the total depth of casing, to calculate the total water volume in the well.

The DTW-product interface probe is lowered into the well casing until the instrument signals when the top of free phase floating product (if present) and/or the top of water is reached. The distance from the top of free phase floating product and/or water to the top of casing is read from the tape that is attached to the probe. The probe is then lowered to the bottom of the well and the tape is read again. The tape is calibrated in 0.01-foot intervals for accuracy to 0.01 foot. The measured distance is subtracted from the established elevation at the top of casing to determine the elevation of groundwater with respect to mean sea level and the difference between the top of groundwater and the base of the well is noted to establish water volume in the well. The probe and tape is washed with TSP (Tri Sodium Phosphate) and rinsed in distilled water before each measurement. WEGE has designed and built bailers that will collect a sample of the contents of a well to show the exact thickness of any floating product.

Some of the abbreviations used in water sampling and or measuring or monitoring are: BGS, Below Ground Surface; DTW, Depth to Water (from surface reference i.e. usually TOC); TOC, Top of Casing; MSL, Mean Sea Level; AMSL and BMSL, Above and Below MSL; BS, Below Surface; TOW, Top of Water; TSP, Tri Sodium Phosphate.

PURGING STANDING WATER FROM MONITOR WELLS

If no product is present, WEGE personnel purge the well by removing groundwater until the water quality parameters (temperature, pH, and conductivity) stabilize, or until the well is emptied of water. Periodic measurements of groundwater temperature, pH, and conductivity are taken with a Hydac Monitor or other meter and recorded along with the volume of groundwater removed from the well. Purging is done by one or more methods singularly or in combination. Bailers, pneumatic or electric sample pumps, or vacuum pump tanks or trucks may be used. The usual amount of water removed is three borehole volumes, unless otherwise stated.

$$BV = (7.48/4) \times (CD2+P\ (BD2-CD)\ 2) \times (WD-GW)$$

BV borehole volume (gallons)
CD casing diameter (feet)
GW depth to groundwater (feet)
BD borehole diameter (feet)
WD well depth (feet)
P porosity of the gravel pack, 25%

Table of Common Boring and Casing Diameters

Boring diameter inches	Casing diameter inches	Volume gallons/ foot	3 VolumesX (WD-GW) gallons /foot
4	1	0.042	0.126
6	1	0.082	0.246
6	2	0.173	0.519
8	2	0.277	0.831
8	4	0.671	2.013
10	2	0.572	1.716
10	4	0.844	2.532

EXAMPLE: An 8 inch boring with 2 inch casing requires removal of 0.831 gallons of water per foot of water column.

The water collected during purging is either safely stored on- site in 55 gallon DOT 17H drums for later disposition, transported to an approved on-site/off-site treatment facility or to a sewer discharge system.

COLLECTION OF WATER SAMPLE FOR ANALYSIS

The groundwater in the well is allowed to recover to at least 80% of its volume prior to purging, if practical, before the groundwater sample is collected.

$$\text{Percent Recovery} = (1 - \frac{\text{Residual drawdown}}{\text{Maximum drawdown}}) \times 100.$$

A fresh bailer is used to collect enough water for the requirements of the laboratory for the analyses needed or required. The water samples are decanted from the bailer into the appropriate number and size containers. These containers are furnished pre-cleaned to exact EPA protocols, with and without preservatives added, by the analytical laboratory or a chemical supply company. The bottles are filled, with no headspace, and then capped with plastic caps with teflon liners.

The vials or bottles containing the groundwater samples are labeled with site name, station, date, time, sampler, and analyses to be performed, and documented on a chain of custody form. They are placed in ziplock bags and stored in a chest cooled to 4 °C with

ice. The preserved samples are COC (chain of custody) delivered to the chosen laboratory.

ANALYTICAL RESULTS

TPH is the abbreviations used for Total Petroleum Hydrocarbons used by the laboratories for water and soil analyses. The letter following TPH indicates a particular distinction or grouping for the results. The letters "g", "d", "k", or "o" indicate gasoline, diesel, kerosene, or oil, respectively, i.e. TPH-d for diesel ranges TPH.

BTEX or MTBE are acronyms or abbreviations used for Benzene, Toluene, Ethylbenzene and all of the Xylenes (BTEX) and Methyl tertiary-Butyl Ether (MTBE), respectively. MBTEX is the designation for the combination of the above five compounds.

Laboratory lower detection limits unless otherwise noted, due to matrix interference or elevated concentrations of target compounds, are as follows:

TPHg	50 ug/L	MTBE	0.5 ug/L
Benzene	0.5 ug/L	Toluene	0.5 ug/L
Ethyl Benzene	0.5 ug/L	Total Xylenes	1.0 ug/L

The less than symbol, <, used with a "parts per value" indicates the lower detection limit for a given analytical result and the level, if present, of that particular analyte is below or less than that lower detection limit.

Other abbreviations commonly used are ppm, ppb, mg/Kg, ug/Kg, ml/l and ul/l are parts per million, parts per billion, milligrams per kilogram, micrograms per kilogram, milliliters per liter, microliters per liter, respectively.

CHAIN OF CUSTODY DOCUMENTATION

All water samples that are collected by WEGE and transported to a certified analytical laboratory are accompanied by chain-of- custody (COC) documentation. This documentation is used to record the movement and custody of a sample from collection in the field to final analysis and storage. Samples to be analyzed at the certified laboratory were logged on the COC sheet provided by the laboratory. The same information provided on the sample labels (site name, sample location, date, time, and analysis to be performed) is also noted on the COC form. Each person relinquishing custody of the sample set signs the COC form indicating the date and time of the transfer to the recipient. A copy of the COC follows the samples or their extracts throughout the laboratory to aid the analyst in identifying the samples and to assure analysis within holding times. Copies of the COC documentation are included with the laboratory results in Appendix B of the sampling report.

APPENDIX B

CERTIFIED ANALYTICAL
LABORATORY REPORT

COC DOCUMENTATION

North State Environmental
Chemical Waste Disposal · Trucking · Consulting

C E R T I F I C A T E O F A N A L Y S I S

Lab Number: 98-766
Client: Western Geo-Engineers
Project: Tony's / 3609 E. 14th Street, Oakland

Date Reported: 07/14/98

Gasoline and BTEX by Methods 8015M and 8020

Analyte	Method	Result	Unit	Date Sampled	Date Analyzed
Sample: 98-766-01	Client ID: MW 02			06/30/98	WATER
Gasoline	8015M	25000	ug/L		07/07/98
Benzene	8020	2000	ug/L		
Ethylbenzene	8020	1300	ug/L		
Toluene	8020	2000	ug/L		
Xylenes	8020	4300	ug/L		
Sample: 98-766-02	Client ID: MW 03			06/30/98	WATER
Gasoline	8015M	33000	ug/L		07/07/98
Benzene	8020	2000	ug/L		
Ethylbenzene	8020	900	ug/L		
Toluene	8020	1900	ug/L		
Xylenes	8020	4600	ug/L		
Sample: 98-766-03	Client ID: MW 04			06/30/98	WATER
Gasoline	8015M	1700	ug/L		07/07/98
Benzene	8020	780	ug/L		
Ethylbenzene	8020	54	ug/L		
Toluene	8020	160	ug/L		
Xylenes	8020	200	ug/L		

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C E R T I F I C A T E O F A N A L Y S I S

Lab Number: 98-766
Client: Western Geo-Engineers
Project: Tony's / 3609 E. 14th Street, Oakland

Date Reported: 07/14/98

Gasoline and BTEX by Methods 8015M and 8020

Analyte	Method	Result	Unit	Date Sampled	Date Analyzed
Sample: 98-766-04	Client ID: MW 05			06/30/98	WATER
Gasoline	8015M	400	ug/L		07/07/98
Benzene	8020	ND			
Ethylbenzene	8020	15	ug/L		
Toluene	8020	ND			
Xylenes	8020	ND			
Sample: 98-766-05	Client ID: MW 06			06/30/98	WATER
Gasoline	8015M	28000	ug/L		07/07/98
Benzene	8020	3100	ug/L		
Ethylbenzene	8020	1300	ug/L		
Toluene	8020	4300	ug/L		
Xylenes	8020	4900	ug/L		
Sample: 98-766-06	Client ID: MW 07			06/30/98	WATER
Gasoline	8015M	620	ug/L		07/07/98
Benzene	8020	4	ug/L		
Ethylbenzene	8020	9	ug/L		
Toluene	8020	ND			
Xylenes	8020	ND			

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C E R T I F I C A T E O F A N A L Y S I S

Lab Number: 98-766
Client: Western Geo-Engineers
Project: Tony's / 3609 E. 14th Street, Oakland

Date Reported: 07/14/98

Gasoline and BTEX by Methods 8015M and 8020

Analyte	Method	Result	Unit	Date Sampled	Date Analyzed
Sample: 98-766-07	Client ID: MW 08			06/30/98	WATER
Gasoline	8015M	54000	ug/L		07/07/98
Benzene	8020	4600	ug/L		
Ethylbenzene	8020	3500	ug/L		
Toluene	8020	2800	ug/L		
Xylenes	8020	7300	ug/L		
Sample: 98-766-08	Client ID: MW 10			06/30/98	WATER
Gasoline	8015M	8900	ug/L		07/07/98
Benzene	8020	3700	ug/L		
Ethylbenzene	8020	980	ug/L		
Toluene	8020	60	ug/L		
Xylenes	8020	420	ug/L		
Sample: 98-766-09	Client ID: MW 11			06/30/98	WATER
Gasoline	8015M	1100	ug/L		07/07/98
Benzene	8020	45	ug/L		
Ethylbenzene	8020	71	ug/L		
Toluene	8020	24	ug/L		
Xylenes	8020	100	ug/L		

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North State Environmental
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CERTIFICATE OF ANALYSIS

Quality Control/Quality Assurance

Lab Number: 98-766
Client: Western Geo-Engineers
Project: Tony's / 3609 E. 14th Street, Oakland

Date Reported: 07/14/98

Gasoline and BTEX by Methods 8015M and 8020

Analyte	Method	Reporting Limit	Unit	Blank	MS/MSD Recovery	RPD
Gasoline	8015M	50	ug/L	ND	96	11
Benzene	8020	0.5	ug/L	ND	108	13
Ethylbenzene	8020	0.5	ug/L	ND	105	15
Toluene	8020	0.5	ug/L	ND	106	14
Xylenes	8020	1.0	ug/L	ND	108	11

ELAP Certificate NO:1753
Reviewed and Approved

John A.Murphy, Laboratory Director

P. O. Box 5624 • South San Francisco, California 94083 • 650-588-2838 FAX 588-1950

98-766

North State Environmental Analytical Laboratory

Phone: (415) 588-9652 Fax: (415) 588-1950

Chain of Custody / Request for Analysis

Lab Job No.: _____ Page 1 of 1

Client: Western Geo Engineers	Report to: same	Phone:	Turnaround Time
Mailing Address: 1386 E. Beamer st. Woodland C.A. 95776	Billing to: same as ←	Fax:	
		PO# / Billing Reference:	Date: 7-2-98
			Sampler:

Project / Site Address: 3609 E. 14th street Oakland C.A. Tony's

Analysis Requested

	Sample ID	Sample Type	Container No. / Type	Pres.	Sampling Date / Time	TPHG/BTEX							Comments/Hazards
1	MW 02	H_2O	2/VOAs	HCL	6-30-98/ 5:25	✓							
2	MW 03				6:06	✓							
3	MW 04				2:50	✓							
4	MW 05				11:00	✓							
5	MW 06				4:04	✓							
6	MW 7				11:51	✓							
7	MW 08				4:35	✓							
8	MW 10				2:05	✓							
9	MW 11				12:46	✓							

Relinquished by: Matt Penick	Date: 7-2-98	Time: 12:05	Received by: NSE Labs		Lab Comments
Relinquished by:	Date:	Time:	Received by:		
Relinquished by:	Date:	Time:	Received by:		

APPENDIX C

MONITOR WELL
SAMPLING DATA SHEETS

WESTERN GEO-ENGINEERS
1386 EAST BEAMER
WOODLAND, CALIFORNIA 95695
(916) 668-5300, FAX (916) 662-0273

WELL SAMPLING DATA SHEET

SITE Tony's	DATE 6-30-98	TIME 6:38
WELL MW01	SAMPLED BY. MP	
WELL ELEVATION		
PRODUCT THICKNESS	10.62	
DEPTH TO WATER	DTW: [illegible]	DTB: 29.89
FLUID ELEVATION		
BAILER TYPE	Disposable Bailer	
PUMP		

WELL PURGING RECORD

TIME	VOLUME REMOVED	TEMP.	pH	COND.
	1st bailer			x1000
	gal			

FINAL VOLUME PURGED	gal
TIME SAMPLED	
SAMPLE ID.	MW01
SAMPLE CONTAINERS	2 VOAs
ANALYSIS TO BE RUN	TPHg/BTEX
LABORATORY	NSE
NOTES:	1st bailer w/o Product

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1386 EAST BEAMER
WOODLAND, CALIFORNIA 95695
(916) 668-5300, FAX (916) 662-0273

WELL SAMPLING DATA SHEET

SITE Tony's	DATE 6-30-98	TIME 4:55
WELL MW02	SAMPLED BY. MP	
WELL ELEVATION		
PRODUCT THICKNESS		
DEPTH TO WATER DTW: 10.58		DTB: 30.00
FLUID ELEVATION		
BAILER TYPE Disposable Bailer		
PUMP		

WELL PURGING RECORD

TIME	VOLUME REMOVED	TEMP.	pH	COND. x1000
	1st bailer			
5:03	1 gal	73.8	7.35	.24
5:08	10	71.2	7.37	.22
5:14	10	70.7	7.28	.22
5:20	6	69.8	7.47	.21
5:22		68.6	7.40	.19
5:23		68.5	7.42	.20

FINAL VOLUME PURGED	28 1/2 gal
TIME SAMPLED	5:25
SAMPLE ID.	MW02
SAMPLE CONTAINERS	2 VOAs
ANALYSIS TO BE RUN	TPHg/BTEX
LABORATORY	NSE
NOTES:	1st bailer Clear with a gas odor
O_2 = 3.2	
SO_4 = 14.	
NO_3 = 0.0	
FE = .5	

38

11.13

WESTERN GEO-ENGINEERS
1386 EAST BEAMER
WOODLAND, CALIFORNIA 95695
(916) 668-5300, FAX (916) 662-0273

WELL SAMPLING DATA SHEET

SITE Tony's	DATE 6-30-98	TIME 5:40
WELL MW03	SAMPLED BY. MP	
WELL ELEVATION		
PRODUCT THICKNESS		
DEPTH TO WATER DTW: 11.13	DTB: 29.96	
FLUID ELEVATION		
BAILER TYPE Disposable Bailer		
PUMP		

WELL PURGING RECORD

TIME	VOLUME REMOVED	TEMP.	pH	COND. x1000
	1st bailer			
5:41	1 gal	69.3	7.65	.20
5:49	10	69.0	8.03	.18
5:53	10	69.1	7.58	.18
5:59	10	69.2	7.71	.18
6:02	5	69.0	7.53	.18
6:04	2	68.1	7.28	.18
6:05		68.6	7.33	18
			~~sampled~~	

FINAL VOLUME PURGED	40 gal
TIME SAMPLED	6:06
SAMPLE ID.	MW03
SAMPLE CONTAINERS	2 VOAs
ANALYSIS TO BE RUN	TPHg/BTEX
LABORATORY	NSE
NOTES:	1st bailer clear NO odor
O_2 =	2
SO_4 =	77
NO_2 =	1
FE =	0.37

37

2b1

WESTERN GEO-ENGINEERS
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WOODLAND, CALIFORNIA 95695
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WELL SAMPLING DATA SHEET

SITE Tony's	DATE 6-30-98	TIME 2:30
WELL mw04	SAMPLED BY. mp	
WELL ELEVATION		
PRODUCT THICKNESS		
DEPTH TO WATER DTW: 10.72 DTB: 25.12		
FLUID ELEVATION		
BAILER TYPE Disposable Bailer		
PUMP		

WELL PURGING RECORD

TIME	VOLUME REMOVED	TEMP.	pH	COND.
2:33	1st bailer	83.2	7.96	.32 x1000
2:36	2 gal	79.6	8.25	.26
2:39	2	78.7	8.13	.23
2:43	2	76.8	8.09	.20
2:46	2	74.8	8.15	.20
2:47		74.3	8.19	.20
2:48		74.6	8.21	.20
			sample	

FINAL VOLUME PURGED	9 3/4 gal
TIME SAMPLED	2:50
SAMPLE ID.	mw04
SAMPLE CONTAINERS	2 VOAs
ANALYSIS TO BE RUN	TPHg/BTEX
LABORATORY	NSE
NOTES:	1st bailer clear No odor
O_2 =	1.3
SO_4 =	7
NO_2 =	.9
FE =	0.93

WESTERN GEO-ENGINEERS
1386 EAST BEAMER
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WELL SAMPLING DATA SHEET

SITE Tony's	DATE 6-30-98	TIME 10:38
WELL MW05	SAMPLED BY. MP	
WELL ELEVATION		
PRODUCT THICKNESS		
DEPTH TO WATER DTW: 10.85	DTB: 27.60	
FLUID ELEVATION		
BAILER TYPE Disposable Bailer		
PUMP		

WELL PURGING RECORD

TIME	VOLUME REMOVED	TEMP.	pH	COND.
10:47	1st bailer	69.0	8.23	.23 x1000
10:49	2 1/2 gal	68.8	8.61	.19
10:53	4 1/2	69.0	8.85	.17
10:57	1	65.9	8.31	.16
10:58		66.4	8.32	.16
10:59		66.6	8.31	.16
O_2 0.6				
SO_4 6.0				
NO_2 1.6				
Fe 0.5				

FINAL VOLUME PURGED	9 1/2 gal
TIME SAMPLED	11:00
SAMPLE ID.	MW05
SAMPLE CONTAINERS	2 VOAs
ANALYSIS TO BE RUN	TPHg/BTEX
LABORATORY	NSE
NOTES:	1st bailer clear No odor

2 to 1

WESTERN GEO-ENGINEERS
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WELL SAMPLING DATA SHEET

SITE Tony's	DATE 6-30-98	TIME 3:29
WELL mw06	SAMPLED BY. mp	
WELL ELEVATION		
PRODUCT THICKNESS		
DEPTH TO WATER DTW: 11.26	DTB: 26.33	
FLUID ELEVATION		
BAILER TYPE Disposable Bailer		
PUMP		

WELL PURGING RECORD

TIME	VOLUME REMOVED	TEMP.	pH	COND.
3:52	1st bailer	79.7	6.85	.31 x1000
3:55	5 gal	76.0	7.11	.26
3:58	2	72.9	7.39	.20
4:00		71.7	7.36	.19
4:01		70.4	7.33	.18
4:02		71.2	7.35	.18
			~~sampled~~	

FINAL VOLUME PURGED	8 1/2 gal
TIME SAMPLED	4:04
SAMPLE ID.	mw06
SAMPLE CONTAINERS	2 VOAs
ANALYSIS TO BE RUN	TPHg/BTEX
LABORATORY	NSE
NOTES:	1st bailer clear light gas odor
O_2	2.5
SO_4	4
NO_3	.7
FE^{-}	.4

10.33

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WELL SAMPLING DATA SHEET

SITE Tony's	DATE 6-30-98	TIME 11:26
WELL MW-7	SAMPLED BY. MP	
WELL ELEVATION		
PRODUCT THICKNESS		
DEPTH TO WATER DTW: 10.22	DTB: 26.12	
FLUID ELEVATION		
BAILER TYPE Disposable Bailer		
PUMP		

WELL PURGING RECORD

TIME	VOLUME REMOVED	TEMP.	pH	COND. x1000
	1st bailer			
11:31	2 gal	69.0	7.67	.26
11:33	1	70.0	7.96	.26
11:36	2	69.8	8.10	.21
11:37	1	69.6	8.03	.17
11:39	1	70.0	8.00	.16
11:41	1	69.5	7.93	.15
11:48		66.5	7.92	.14
11:50		66.9	7.98	.15
		Sampled		

FINAL VOLUME PURGED	10 gal
TIME SAMPLED	11:51
SAMPLE ID.	MW-7
SAMPLE CONTAINERS	2 VOAs
ANALYSIS TO BE RUN	TPHg/BTEX
LABORATORY	NSE
NOTES:	1st bailer clear No odor
FE =	0.78
O_2 =	1
SO_4 =	4
NO_3 =	0.5

8

2b1

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WOODLAND, CALIFORNIA 95695
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WELL SAMPLING DATA SHEET

SITE Tony's	DATE 6-30-98	TIME 4:20
WELL MW 08	SAMPLED BY. MP	
WELL ELEVATION		
PRODUCT THICKNESS		
DEPTH TO WATER DTW: 10.33	DTB: 26.08	
FLUID ELEVATION		
BAILER TYPE Disposable Bailer		
PUMP		

WELL PURGING RECORD

TIME	VOLUME REMOVED	TEMP.	pH	COND.
	1st bailer			x1000
4:26	1 gal	72.7	6.42	.30
4:28	4	71.4	7.08	.24
4:30	2	70.3	7.30	.27
4:31	1	69.9	7.28	.20
4:32		69.3	7.28	.20
4:34		69.6	7.28	.20
			SAMPLED	

FINAL VOLUME PURGED	9 1/2 gal
TIME SAMPLED	4:35
SAMPLE ID.	MW 08
SAMPLE CONTAINERS	2 VOAs
ANALYSIS TO BE RUN	TPHg/BTEX
LABORATORY	NSE
NOTES:	1st bailer clear gas odor
O_2 = 1.3	
SO_4 = 3	
NO_3 = 0	
FE^{2} = 2.82	

3Ab1

WESTERN GEO-ENGINEERS
1386 EAST BEAMER
WOODLAND, CALIFORNIA 95695
(916) 668-5300, FAX (916) 662-0273

WELL SAMPLING DATA SHEET

SITE Tony's	DATE 6-30-98	TIME 1:41
WELL MW 10	SAMPLED BY. MP	
WELL ELEVATION		
PRODUCT THICKNESS		
DEPTH TO WATER DTW: 9.52	DTB: 24.33	
FLUID ELEVATION		
BAILER TYPE Disposable Bailer		
PUMP		

WELL PURGING RECORD

TIME	VOLUME REMOVED	TEMP.	pH	COND.
	1st bailer			x1000
1:51	2 gal	76.8	7.56	21
1:55	2	75.6	7.61	.19
1:58	3	74.2	7.69	.18
2:01		72.0	7.71	.17
2:02		71.8	7.55	.17
2:03		72.0	7.56	.17
			Sampled	

FINAL VOLUME PURGED	8 1/2 gal
TIME SAMPLED	2:05
SAMPLE ID.	MW 10
SAMPLE CONTAINERS	2 VOAs
ANALYSIS TO BE RUN	TPHg/BTEX
LABORATORY	NSE
NOTES:	1st bailer. Clear No odor
O_2 =	0.9
SO_4 =	0
NO_2 =	0.0
FE =	0.38

WESTERN GEO-ENGINEERS
1386 EAST BEAMER
WOODLAND, CALIFORNIA 95695
(916) 668-5300, FAX (916) 662-0273

WELL SAMPLING DATA SHEET

SITE Tony's	DATE 6-30-98	TIME 12:24
WELL mw 11	SAMPLED BY. mp	
WELL ELEVATION		
PRODUCT THICKNESS		
DEPTH TO WATER DTW: 11.02	DTB: 26.50	
FLUID ELEVATION		
BAILER TYPE Disposable Bailer		
PUMP		

WELL PURGING RECORD

TIME	VOLUME REMOVED	TEMP.	pH	COND. x1000
	1st bailer			
12:26	1 1/2 gal	72.5	8.26	.17
12:31	2 1/2	71.1	8.05	.16
12:33	1	71.4	7.90	.16
12:37	2	72.6	8.12	.17
12:39	1	71.9	7.75	.16
12:43		69.9	8.18	.16
12:45		69.3	8.18	.16
			Sampled	

FINAL VOLUME PURGED	9 3/4 gal
TIME SAMPLED	12:46
SAMPLE ID.	mw 11
SAMPLE CONTAINERS	2 VOAs
ANALYSIS TO BE RUN	TPHg/BTEX
LABORATORY	NSE
NOTES:	1st bailer clear No odor
O_2 =	2.2
SO_4 =	6
NO_2 =	1.2
FE =	0.15

APPENDIX D
VAPOR EXTRACTION PILOT TEST

WESTERN
GEO-ENGINEERS
CALIF. CONTRACTOR #513857
REGISTERED GEOLOGISTS

1386 EAST BEAMER STREET
WOODLAND CA 95776-6003
(530) 668-5300,
FAX (530) 662-0273
wege@mother.com

July 13, 1998

RESULTS FIVE DAY VAPOR EXTRACTION PILOT TEST AT TONY'S EXPRESS AUTO SERVICES, 3609 EAST 14TH STREET OAKLAND, CALIFORNIA.

In order to determine the effectiveness of vapor extraction remediation for this site, we performed a five day vapor extraction pilot test.

1 AIR ABATEMENT SYSTEM

Four WestStates Vent Scrub 200 carbon canisters in series, were used to treat the extracted soil vapor.

2 VACUUM EXTRACTION PILOT TEST

The Pilot Test was performed by using a Roton 404 to extract and carbon to treat the vapors from five of the six vapor extraction laterals. Vapor was extracted from LW1, LW2, P1, P2, and P3, see figure 4 for location of extraction points. The sixth lateral P4 was not used; depth to groundwater measurements indicated that the top of groundwater would be above the top of the slots in the vapor well. The test was performed from 15:10 hr on May 18, 1998 to 08:30 hr on May 22, 1998

During the initial start-up, the flow rate was varied. A series of vacuum readings, at increasing flow rates were established and recorded.

The pilot test lasted for a period of 5 days. During the test, the following samples of the vapor extraction system were collected, see table 1 for results:

- Start up, samples of the influent and effluent of the system.
- First day, sample of influent taken after the system has operated for 1 hour.
- Day two, influent after the system had operated 0.71 days.
- Day three, influent after the system had operated 2.04days.
- Day four, influent after the system had operated 3.0 days
- Day five, samples of the influent and the effluent taken after system after the system had operated 3.72 days. After these samples were collected, the system was shut down.

In addition to the system samples above, samples of the vapor extraction laterals were taken at the start of the test.

2.1 SAMPLING DETAIL

Prior to sampling, the system was adjusted and allowed to run with steady parameters for one hour. Then the values for the following parameters were recorded:

1. Well influent vapor temperature.

2. Well vacuum.

3. Differential pressure, across flow meter, total influent.

4. Stack Temperature, exit.

5. Stack Pressure, 1 foot below exit.

6. Hydrocarbon concentration of the influent as determined by a PID Hydrocarbon Vapor meter.

7. Hydrocarbon concentration between each carbon and the effluent as determined by a PID Hydrocarbon Vapor meter.

8. Lower Explosion Limit (LEL) and Oxygen level with LEL/O_2 meter.

After the parameter values were recorded, the system samples were collected.

2.2 INFLUENT AND EFFLUENT SAMPLE S

The influent samples were obtained from a sample port located in the piping connecting the blower to the carbon canisters. The flow pressure from the exhaust is great enough to fill a 1-liter septum "valve" and tubing bib tedlar bag. Sterile poly tubing is fitted to the sample port and the tedlar bag. Then the sample valve of the tedlar bag is opened and the bag is filled with the sample. Once the tedlar bag is full, the valve is closed and locked, the sample port closed, and the appropriate label is placed on the bag.

A sample port for the effluent is located in the exhaust stack, where the positive pressure allows the filling of the tedlar bag as described above.

The labels for both the influent and effluent tedlar bag samples show the date, time, sample ID# and analyses to be run.

The samples were Chain-Of-Custody delivered to a certified laboratory, were the samples will be analyzed for TPHg and MBTEX.

2.3 BREAKTHROUGH

Effluent vapors between each of the in-series carbon canisters were monitored with a PID meter. Breakthrough, as measured with the PID did not occur.

2.4 CALCULATIONS

To calculate the pounds (lb) per day the concentration is multiplied by the volume of air produced in one day.

The lab reports the Concentrations (C) of the air sampling in g/liter. The first step is to convert this value to lbs/cf (pounds per cubic foot). 1 ug/l x 0.000001g/ug x 0.002205l/g x 28.32l/cf = 0.0000000621lb/cf
The volume of air produced in one day, equals the flow rate (Q) x the time of flow. V = Q x T = cf/day = cf/min x 1440min/day
The volume must be corrected to standard temperature and pressure(STP).
P = Pressure = 29.92 in Hg @ STP
V = Volume cf
T = Temperature in degrees above absolute Zero = 491.58°R @ STP.
Using the Ideal Gas Law P1V1/T1 = P2V2/T2
Solving for V2 =P1V1T2/P2T1
V1 = Q cfm x 1440 min/day
T2 = 491.58°R T1 = 459.58 + T°F Air
P2 = 29.92 P1 = Air Pressure - System Vacuum
V2 = Q cfm x 1440 min/day x 491.58°R/(459.58° + T°F) x P1/P2
X lb/day = C ug/l x 0.0000000621 lb l/ug cf x Q cf/min x 1440 min/day x 491.58°R/(459.58° + T°F)

Q for the Influent sample = The well flow rate. This will be calculated from the readings from the orifice plate flowmeters.

Q for the Effluent = The well flow

2.4.1 FLOW RATES

The flow rates, for the laterals were measured by the use of an orifice plate. An orifice plate restricts the flow of air across it. This restriction causes a pressure drop across the orifice. By measuring the resulting pressure change across the orifice it is possible to calculate the air flow rate. The pressure drop (millimeters (mm) water) is used to calculate the flow rate across a square edge orifice plate.

Ve = CK sqr(P) Q = AVe
Where:
Ve= velocity in feet per minute (fpm)
C = Orifice Coefficient = 0.65 (for orifice used)
K = Constant = 794.6 mm water
P = Pressure differential across the orifice
Q = Flow rate in cubic feet per minute (CFM)
A = Area orifice in square feet. 1" = 0.00545 ft^2
Q = A X 0.65 X 794.6 X Square Root (P)

3 RESULTS PILOT TEST

3.1 FLOW RATES

3.1.1 SYSTEM FLOW RATES

Experience with Roton blowers on sites with lighology similar to this site indicated an expected minimum flow rate to be in the 40 to 50 cfm range.

During the test the flow rate varied between 55 and 64 cubic feet a minute with an average flow rate of 58 cfm, see Table 1 and Figure 5.

3.1.2 FLOW RATES INDIVIDUAL LATERALS

At the start of the test, the vacuum was varied on each of the individual laterals and the resulting flow rates were determined. At the time of the test, it was found that only LW2 and P3 had significant flow rates, see table 3 and figure 6, flows from the remaining laterals were restricted by the current high groundwater.

Lw2 which is installed as a horizontal well adjacent to the other pump island, see figure 4, had a higher flow rate per inch of vacuum when compared to P3 which was installed as a vertical well.

3.2 VAPOR RECOVERY

3.2.1 TPHg

The initial concentration of the vapor extracted from the soil was 7100 ug/l , which calculates to be 40.81 pounds per day. This quickly dropped to 1300 ug/l or 6.38 pounds per day after the system had been in operation 1.7 hours. Figure 7 shows the vapor concentrations during the test. During the test, the daily recovery rate went from 7100 ug/l or 40.81 pounds per day at start up to 500 ug/l or 2.6 pounds per day, see Table 1. A total of 13.32 pounds of gasoline was recovered during the test, see Figure 11B.

3.2.2 BTEX

Initially Benzene with its higher vapor pressure had the highest vapor concentration of the BTEX compounds. Its relative concentration quickly dropped off as the original at equilibrium soil vapors were removed and the vaporization rate dependent directly from soil concentration became the dominant factor determining the vapor concentrations. At the end of the test, xylenes were found to have the highest concentrations, see Table 1 and Figure 8.

3.2.3 Carbon Dioxide

The initial concentration of Carbon Dioxide was 2%. It quickly fell to 0.3% where it remained until the end of the test, see figure 9. The carbon dioxide (CO_2) levels in the soil vapor indicate that a portion of the hydrocarbons have been degraded. CO_2 and water are the final byproducts of the biodegradation of hydrocarbons. The carbon in CO_2 results from the oxidation of the hydrocarbon radical CH_2 and as such 1 mg of CO2 = . 0.41 mg of CH_2 (CH_2 (12+1+1 = 14) / (CO_2 (12+16+16=34). During the test, a total of 27 pounds of CH_2 was recovered in the form of Carbon Dioxide, see table one, Figure 12B.

3.2.4 Oxygen

The initial Oxygen concentration in the soil vapor was 17.5 % by the second day the concentration had risen to 21 to 20 %, near atmospheric levels. This indicates that once pumping began, there was entry of a significant amount of new air from outside the soil plume or from the surface air into the soil, see Figure 10.

3.2.5 Methane

The initial Methane (CH_4) concentration was 118 ug/l, or 0.67 pounds per day, this fell to between 18 and 60 ug/l. Methane is the product of the degradation of the contaminate hydrocarbons in an anaerobic (oxygen starved) environment. As in oxygen above its, drop off is indicative of the entry of new air into the system, and the equilibrium flow from the methane from the groundwater into the extracted vapor.

3.3 CONCENTRATIONS INDIVIDUAL EXTRACTION LATERALS

Samples were taken of the individual laterals at the start of the test, see table 3 for the results. The highest concentrations were detected in P2, which is located between the tank location and the pump islands. The lowest levels were detected in LW1, which is Located adjacent to the inside pump island, see Figure 4.

During the test, readings of the TPHg as determined by a PID meter and Oxygen content were recorded, see Table one and Figure 10.

4 DISCUSSION

During the test a total of 40.36 pounds of hydrocarbons 13.32 as TPHg and 27.04 pounds as the bio-degradation end product CO_2 were removed from the subsurface. The best-fit curves (Excel) predict that the poundage production for TPHg and CH_2 respectively, with a similar Vapor extraction system, would be 585 pounds of TPHg and 480 pounds of CH_2 as Carbon Dioxide. This would produce a total of approximately 1065 pounds of hydrocarbons. It was estimated for the workplan that the soil at this site contains approximately 1126 pounds of gasoline.

The quick increase in the oxygen levels and the quick decline in the carbon dioxide and methane levels seen during the early part of the test indicates that there is a large amount of fresh air being pulled into the subsurface during vapor extraction. This is to be expected because of the shallow depth to water, eight to nine feet below the surface, and the short dry soil column. This air exchange is beneficial at the site because the groundwater is oxygen deficient and contact with fresh air will aid in reoxygenating the groundwater and the soil. Methane production will not be expected once fresh air is introduced into the system.

At the time of the test the high groundwater slowed flow from LW1, P1, P2, and P4. Sampling of the vapors in these lines indicates that they contain levels comparable to LW2 and P3. If during the dry season as the groundwater level lowers and these wells become available for extraction they should not cause a large change in the daily recovery rate, but will probably increase the final total gasoline recovery.

The shallow depth to groundwater makes the use of a extremely high or high vacuum vapor extraction system at this site unfeasible because the upward coning of the groundwater in response to the higher vacuums will soon block off the wells.

5 RECOMMENDATIONS

- Permit and begin vapor extraction at this site.
- The system should be similar to the one used to perform the vapor extraction test.

1. The 404 Roton Blower has a maximum vacuum of 50" of water and a maximum flowrate of 100 cfm.

2. Use four WestStates Vent Scrub 200 carbon canisters in series, to treat the extracted soil vapor. Each carbon will absorb approximately 40 pounds of hydrocarbon, ie. 200 pounds carbon 20 % efficiency. Approximately 580 pounds of TPHg should be removed the first year, using about 15 carbon canisters

6 LIMITATIONS

This report is based upon the following:

- The observations of field personnel.
- The results of laboratory analyses performed by a state certified laboratory.
- Referenced documents.
- Our understanding of the regulations of the State of California and Alameda County, Hazardous Materials Section and/or City of Oakland, California.

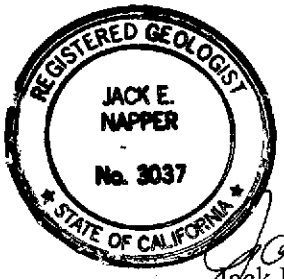
Changes in groundwater conditions can occur due to variations in rainfall, temperature, local and regional water usage and local construction practices. In addition, variations in the soil and groundwater conditions could exist beyond the points explored in this investigation.

State certified analytical results are included in this report. This laboratory follows EPA and State of California approved procedures; however, WEGE is not responsible for errors in these laboratory results.

The services performed by Western Geo-Engineers, a corporation, under California Registered Geologist #3037 and/or Contractors License #513857, have been conducted in a manner consistent with the level of care and skill ordinarily exercised by members of our profession currently practicing under similar conditions in the State of California and the Oakland area. Our work and/or supervision of remediation and/or abatement operations, active or preliminary, at this site is in no way meant to imply that we are owners or operators of this site. Please note that known contamination of soil and/or groundwater must be reported to the appropriate agencies in a timely manner. No other warranty, expressed or implied, is made.

If you have any questions concerning this report or if we can be of further assistance, please don't hesitate to contact us at (530) 668-5300.

Respectfully,



Roy Butler
Project Geologist

Jack E. Napper
Registered Geologist #3037

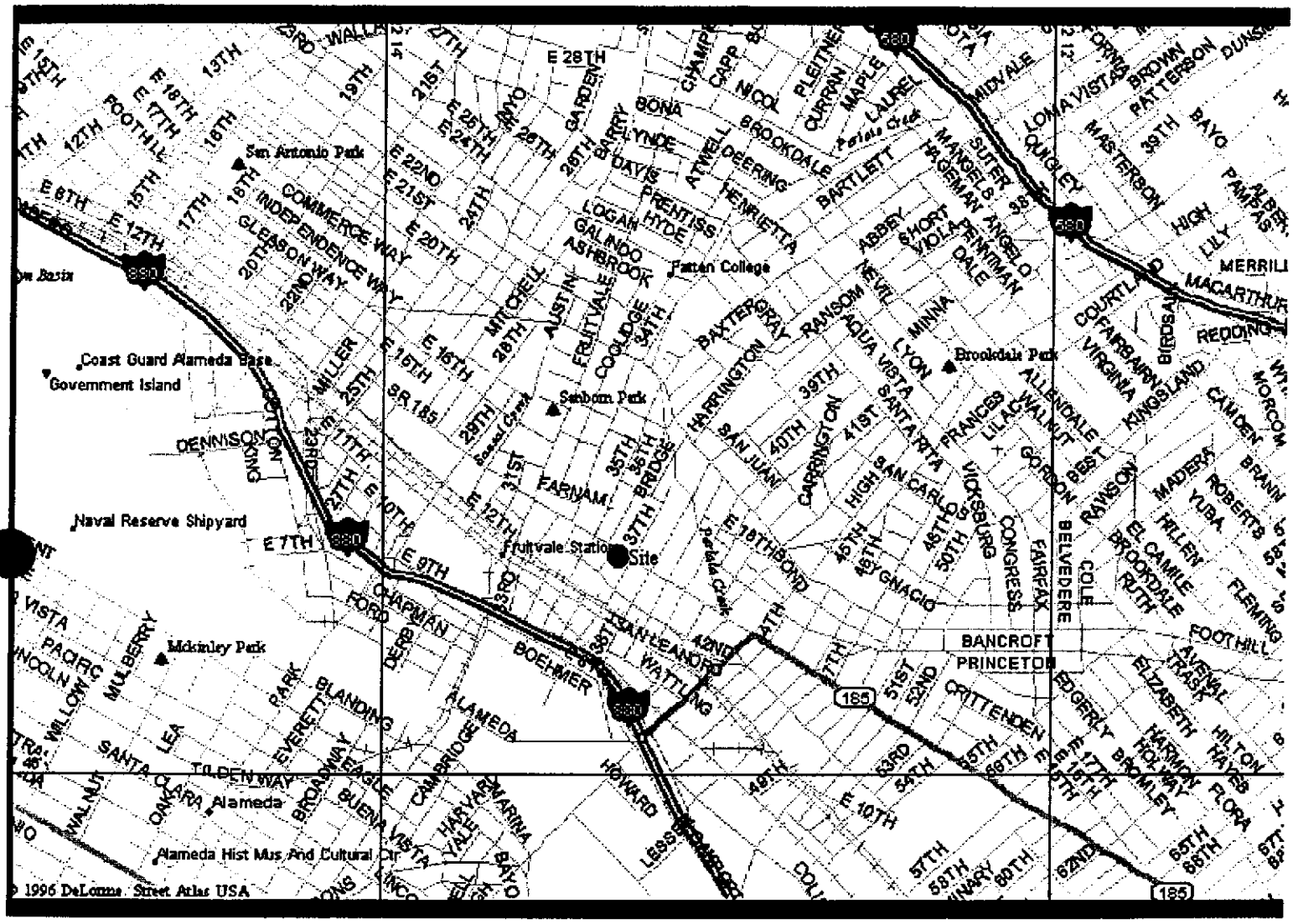
TABLE 1: INFLUENT/EFFLUENT						
Tony's Express Auto						
DATE SAMPLED	05/18/98	05/18/98	05/19/98	05/20/98	05/21/98	05/22/98
TIME	15:10	16:45	8:15	16:00	15:15	8:30
DAYS RUN SINCE LAST CHECK	0.00	0.07	0.65	1.32	0.97	0.72
LW1 VACUUM DIFFERENCE "H2O	0.1	0	0	0	0	0
LW1 AVERAGE VACUUM "H2O	15	13	13.2	14	12.7	11.8
FLOW RATE scfm 60F	4	0	0	0	0	0
LW2 VACUUM DIFFERENCE "H2O	6.00	5.00	5.00	4.50	4.20	3.80
LW2 AVERAGE VACUUM "H2O	10	10.5	9.5	9.5	9.3	8.8
FLOW RATE scmf 60F	34	31	31	29	28	27
P1 VACUUM DIFFERENCE "H2O	0.05	0.00	0.00	0.00	0.00	0.00
P1 AVERAGE VACUUM "H2O	14	12.3	12.5	12.5	12	11.1
FLOW RATE scmf 60F	3	0	0	0	0	0
P2 VACUUM DIFFERENCE "H2O	0.10	0.00	0.00	0.00	0.00	0.00
P2 AVERAGE VACUUM "H2O	14	12.2	12.5	12.5	12	11.1
FLOW RATE scmf 60F	4	0	0	0	0	0
P3 VACUUM DIFFERENCE "H2O	2.50	3.00	3.50	3.70	4.20	5.00
P3 AVERAGE VACUUM "H2O	13	10	10.5	9.8	9.2	7.6
FLOW RATE scmf 60F	22	24	26	27	28	31
WELL TEMPERATURE F	78	78	78	78	78	78
WELL FLOW RATE scfm	64	55	57	56	57	58
TPH INFLUENT ug/l	7100	1300	740	630	890	500
%CO2	2	0.8	0.3	0.3	0.3	0.3
%O2	17.5	18.9	21	20.5	20	20
BENZENE INFLUENT ug/l	71	28	17	16	18	12
TOLUENE INFLUENT ug/l	49	46	26	29	33	24
ETHYL-BEN INFLUENT ug/l	9.2	16	9.1	9.9	11	7.9
XYLENE INFLUENT ug/l	49	110	53	58	68	53
METHANE ug/l	118	22	18	60	58	1
TPH EFFLUENT ug/l		<50				50
BENZENE EFFLUENT ug/l		<0.5				0.9
TOLUENE EFFLUENT ug/l		<0.5				1
ETHYL-BEN EFFLUENT ug/l		<0.5				0.8
XYLENE EFFLUENT ug/l		<2				3
TPH INFLUENT lb/day	40.81	6.38	3.76	3.16	4.52	2.60
BENZENE INFLUENT lb/day	0.4081	0.1374	0.0864	0.0802	0.0915	0.0625
TOLUENE INFLUENT lb/day	0.2817	0.2258	0.1322	0.1453	0.1677	0.1249
ETHYL-BEN INFLUENT lb/day	0.0529	0.0785	0.0463	0.0496	0.0559	0.0411
XYLENE INFLUENT lb/day	0.2817	0.5399	0.2694	0.2906	0.3456	0.2758
METHANE lb/day	0.6765	0.1082	0.0940	0.3006	0.2965	0.0041
TPH EFFLUENT lb/day		<0.24				<0.25
CH2 AS CO2 lb/day	45.35	15.49	6.02	5.93	6.02	6.16
BENZENE EFFLUENT lb/day		<0.0025				0.0047
TOLUENE EFFLUENT lb/day		<0.0025				0.0052
ETHYL-BEN EFFLUENT lb/day		<0.0025				0.0042
XYLENE EFFLUENT lb/day		<0.0098				0.0156
% HYDROCARBON DESTRUCTION		>96.28				>90.33
BENZENE % DESTRUCTION		>98.21				92.50

TABLE 1: INFLUENT/EFFLUENT						
Tony's Express Auto						
DATE SAMPLED	05/18/98	05/18/98	05/19/98	05/20/98	05/21/98	05/22/98
TIME	15:10	16:45	8:15	16:00	15:15	8:30
DAYS RUN SINCE LAST CHECK	0.00	0.07	0.65	1.32	0.97	0.72
TOLUENE % DESTRUCTION		>98.91				95.83
ETHYL-BEN % DESTRUCTION		>96.88				89.87
XYLENE % DESTRUCTION		>98.18				94.34
TOTAL DAYS OPERATED	0.00	0.07	0.71	2.04	3.00	3.72
TOTAL POUNDS TPHg	0.04	0.46	2.89	7.07	11.45	13.32
TOTAL POUNDS CH2	0.02	2.03	8.97	16.88	22.66	27.04
LW1, ppm TPHg		30	200	190	60	80
LW2, ppm TPHg		140	240	210	70	120
P1, ppm TPHg		200	720	140	134	150
P2, ppm TPHg		260	750	220	140	220
P3, ppm TPHg		60	75	100	30	40
LW1, %Oxygen		19.2	21	20.5	21	20
LW2, %Oxygen		19.2	21	20	20.5	20.5
P1, %Oxygen		18.5	16.5	16.25	17	17.3
P2, %Oxygen		15.3	15	16	16.8	16.2
P3, %Oxygen		19.8	21	20	20.5	20.5

Table 2						
Hydrocarbon Concentrations at start of test, Vapor Laterals						
Well	THPg ug/l	Benzene ug/l	Toluene ug/l	Ethly Benzene ug/l	Xylenes ug/l	MTBE ug/l
L1	60	<0.5	0.8	<0.5	<0.5	<5
L2	1600	36	39	13	85	93
P1	1400	7.1	0.8	1.2	<2	64
P2	7400	130	190	78	200	370
P3	550	5	34	6.2	76	31

Table 3						
Flowrate verses vacuum L2						
Vacuum	2	5	10	12	13	15.7
Delta v	0.2	2.3	5.8	7.5	8.3	11.2
Flow	6.345961	21.5202	34.17405	38.86092	40.88099	47.48882
Flowrate verses vacuum P3						
Vacuum	5	12	15	20		
Delta v	1	2.9	3.5	4		
Flow	14.19	24.1647	26.54706	28.38		

Figure 1, Location Map



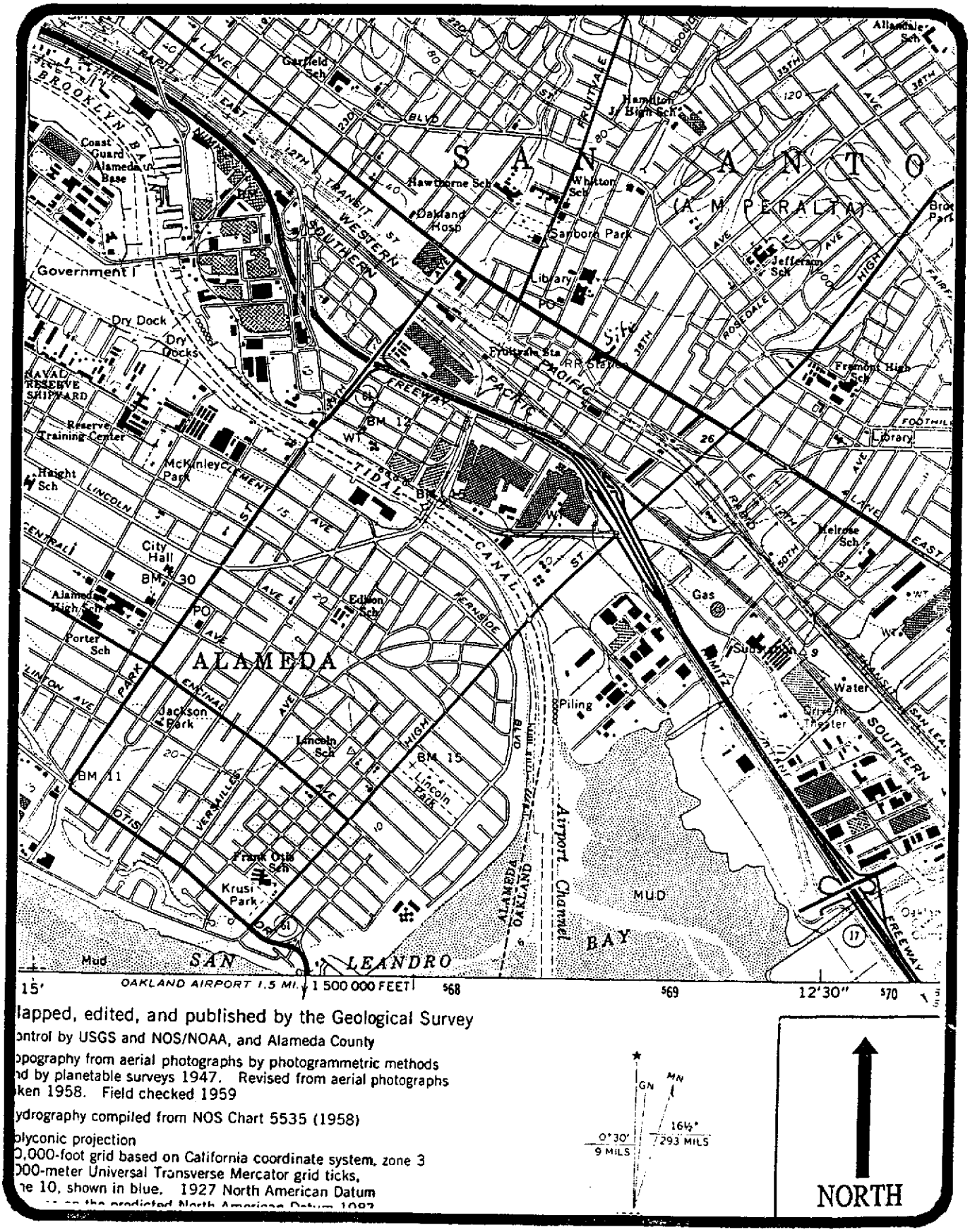
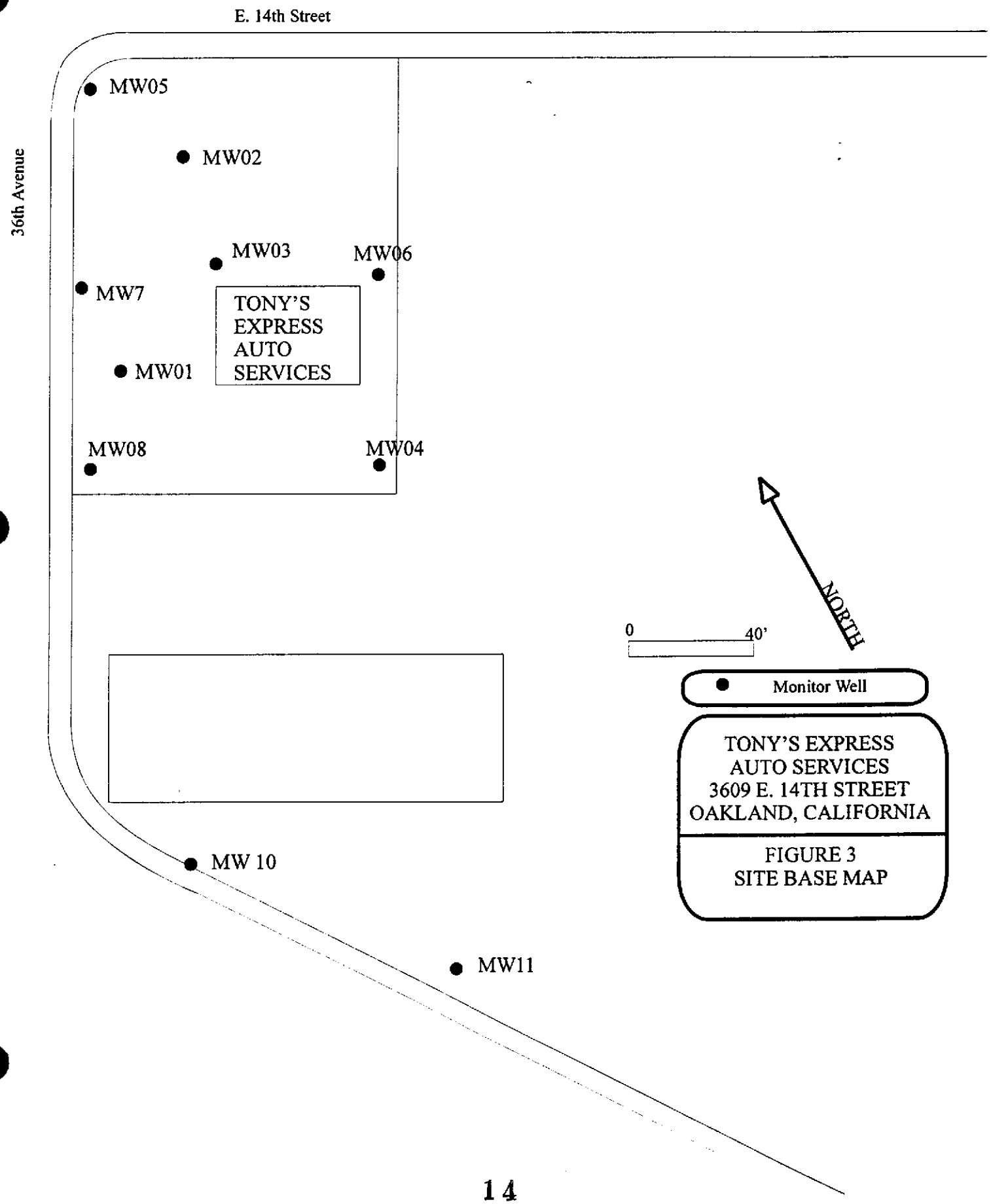
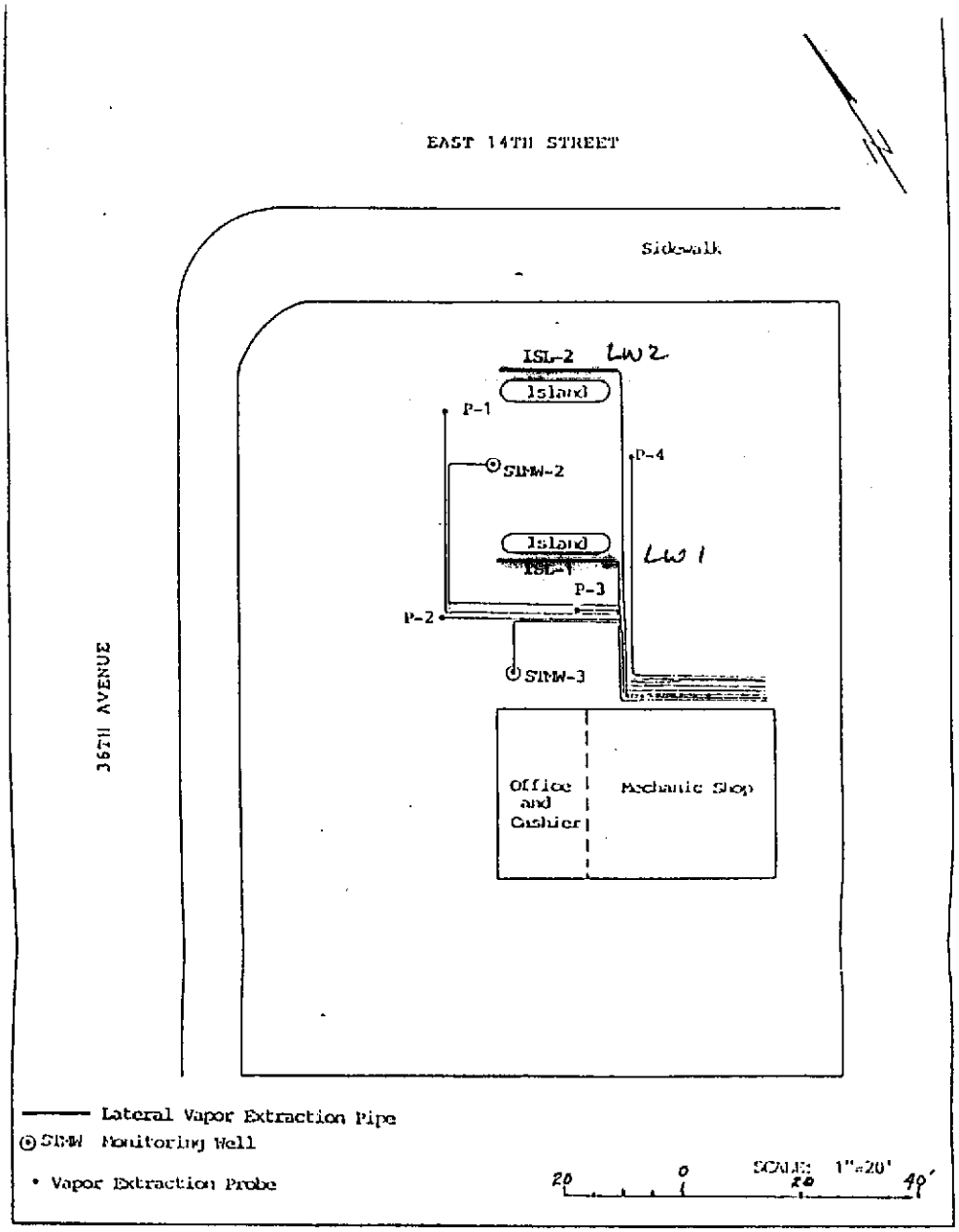
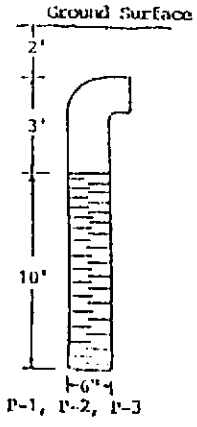
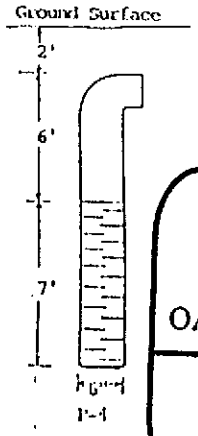


FIGURE 2, USGS TOPOGRAPHIC MAP


E. 14th Street
36th Avenue
MW05
MW02
MW03
MW06
MW7
TONY'S
EXPRESS
AUTO
SERVICES
MW01
MW08
MW04
NORTH
0
40'
Monitor Well
TONY'S EXPRESS
AUTO SERVICES
3609 E. 14TH STREET
OAKLAND, CALIFORNIA
FIGURE 3
SITE BASE MAP
MW 10
MW11



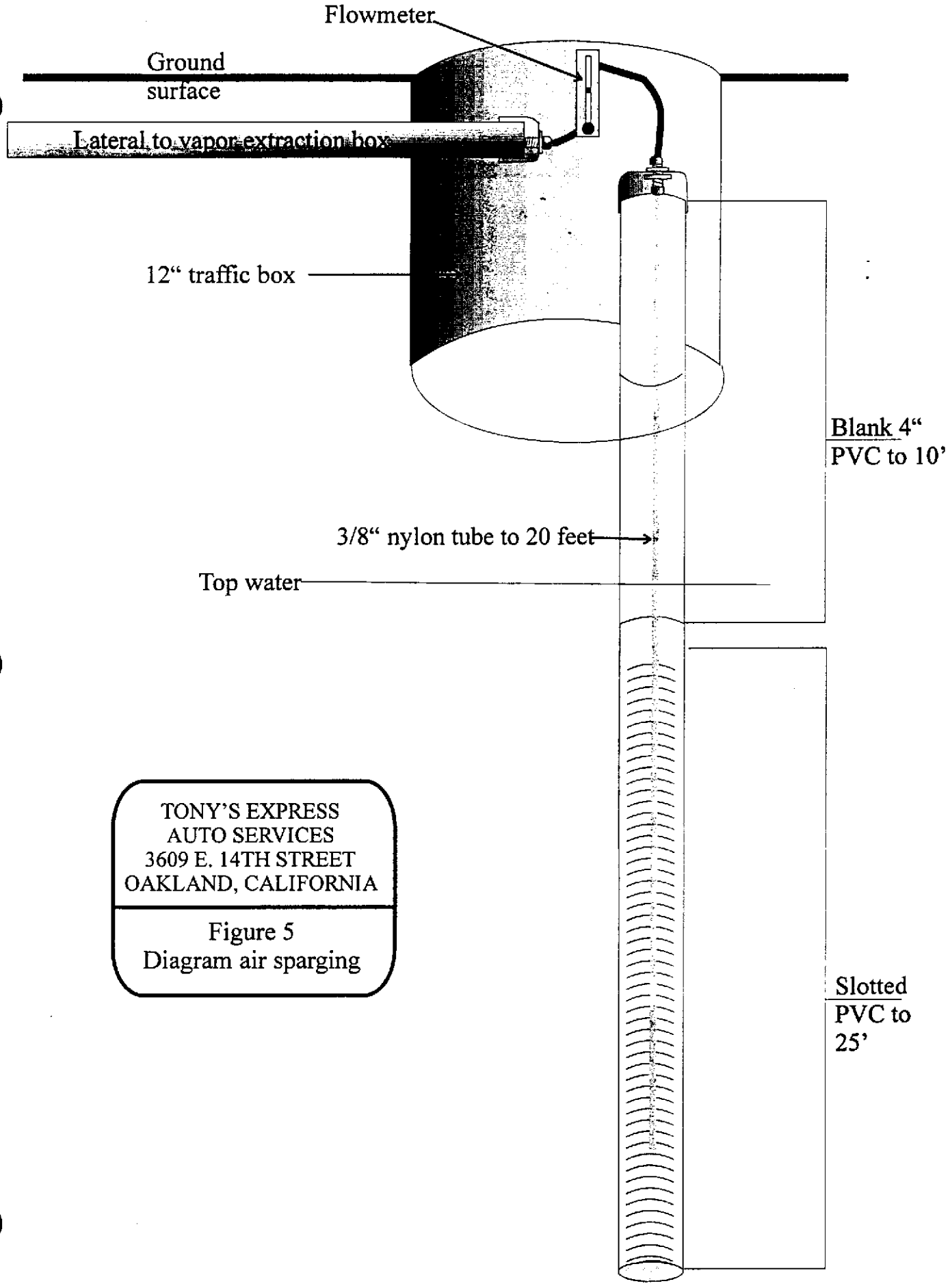




Profile of Vapor Extraction Probes

TONY'S EXPRESS
AUTO SERVICES
3609 E. 14TH STREET
OAKLAND, CALIFORNIA

Figure 4
Vapor Extraction and
air sparging laterals



TONY'S EXPRESS
AUTO SERVICES
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OAKLAND, CALIFORNIA

Figure 5
Diagram air sparging

Figure 5
System Flowrate

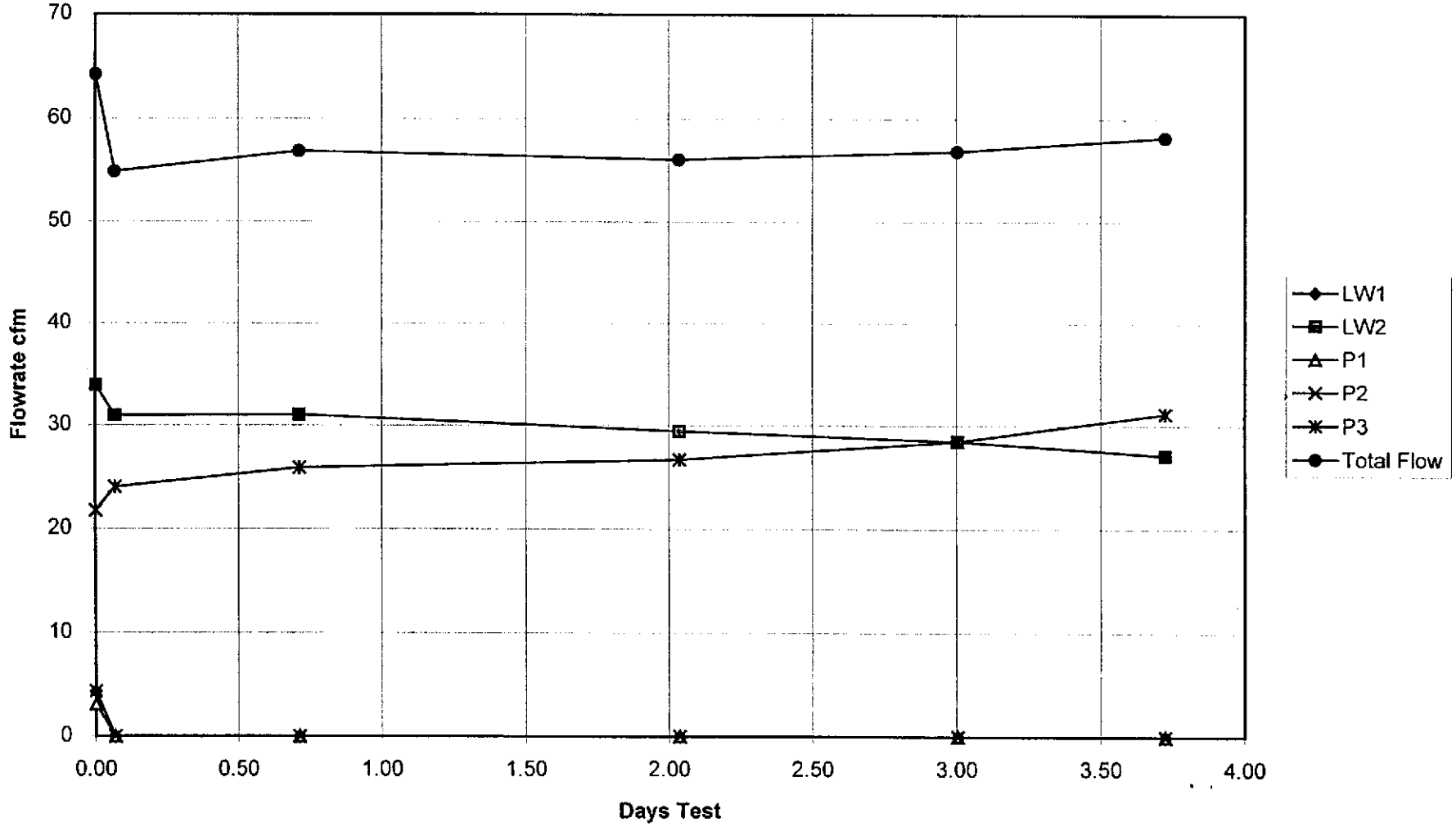


Figure 6
Flowrate compared to Vacuum
Individual Vapor wells

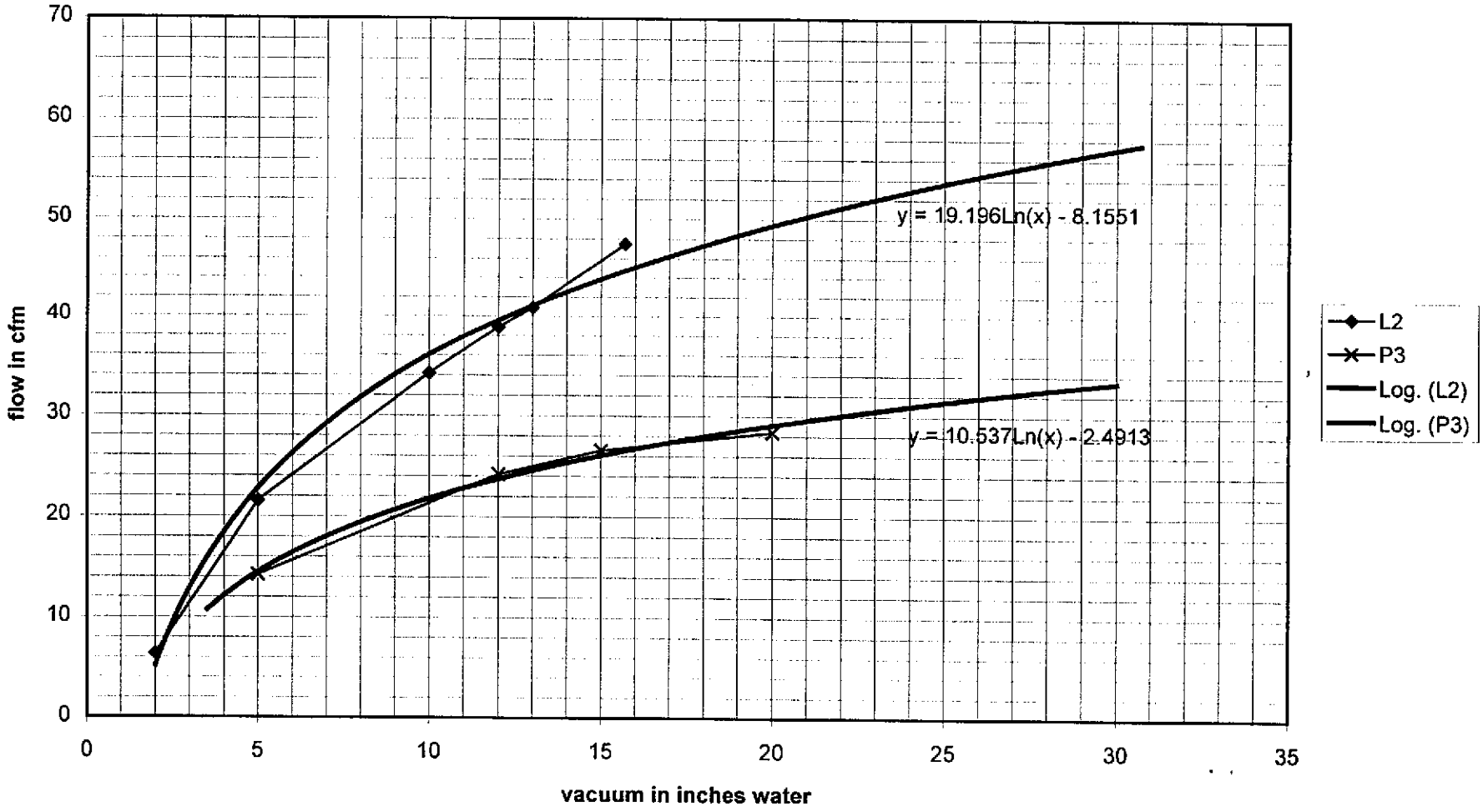


Figure 7,
ug/l TPHg

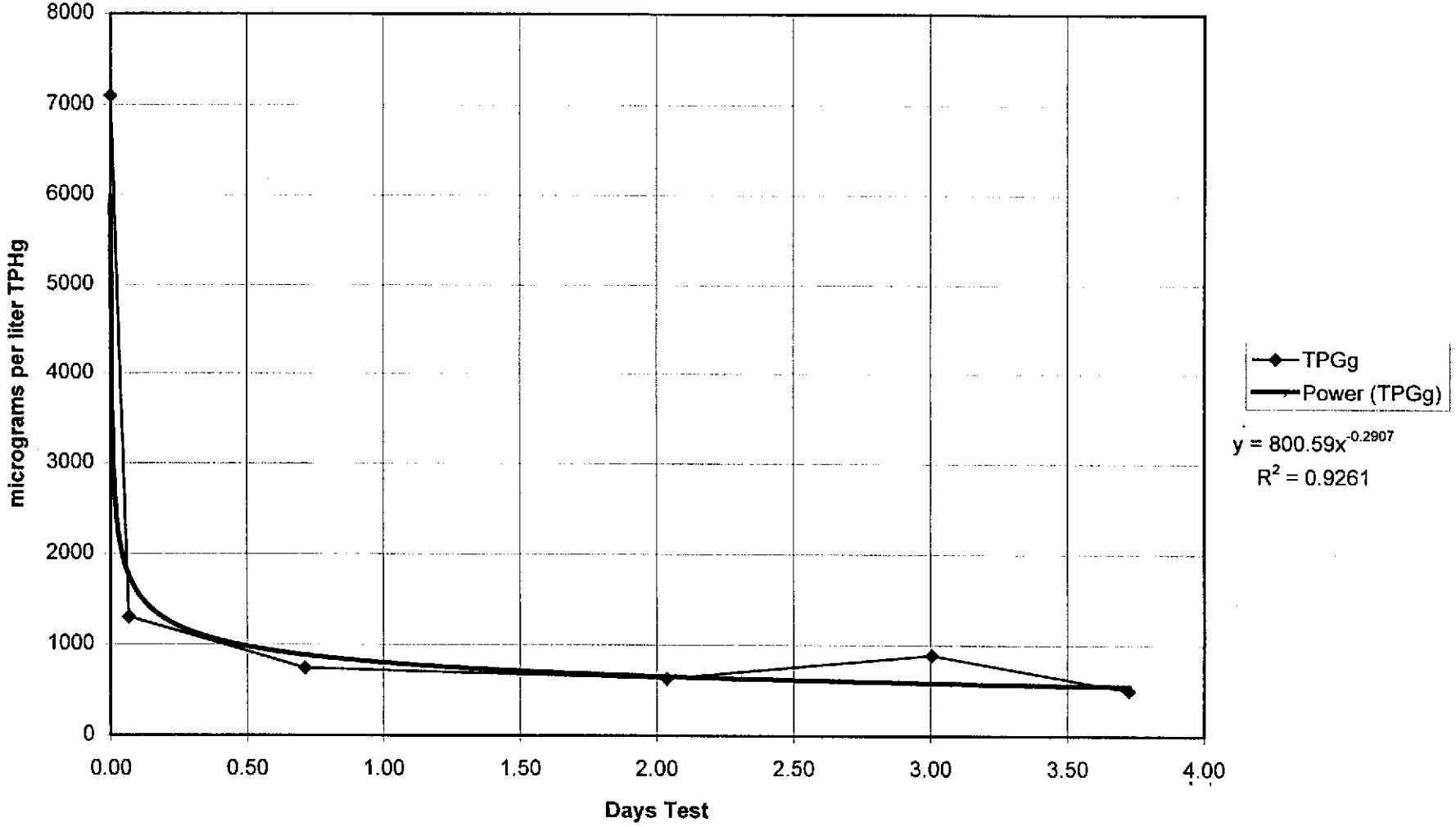


Figure 8,
ug/l BETX

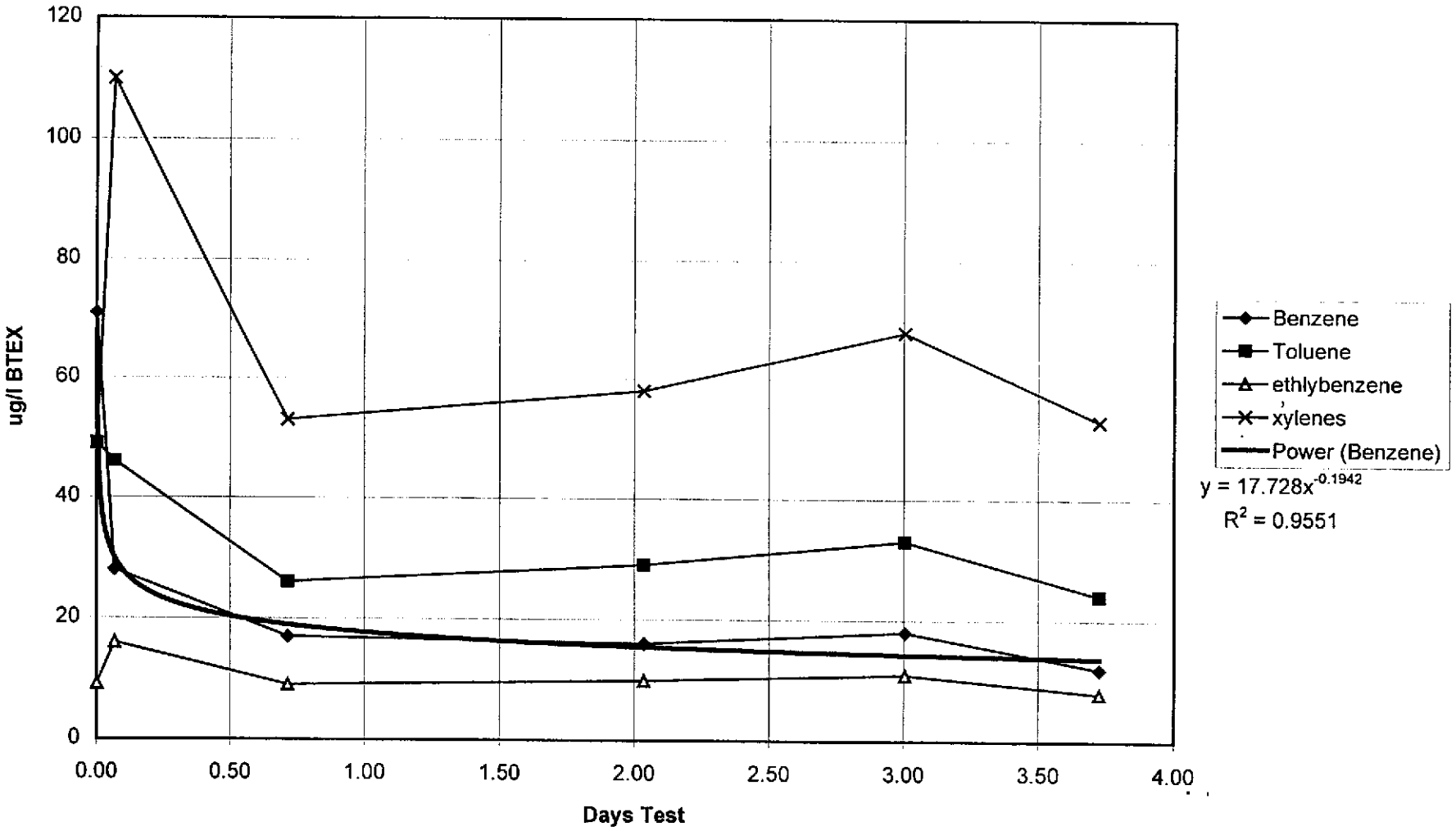


Figure 9
%Carbon Dioxide

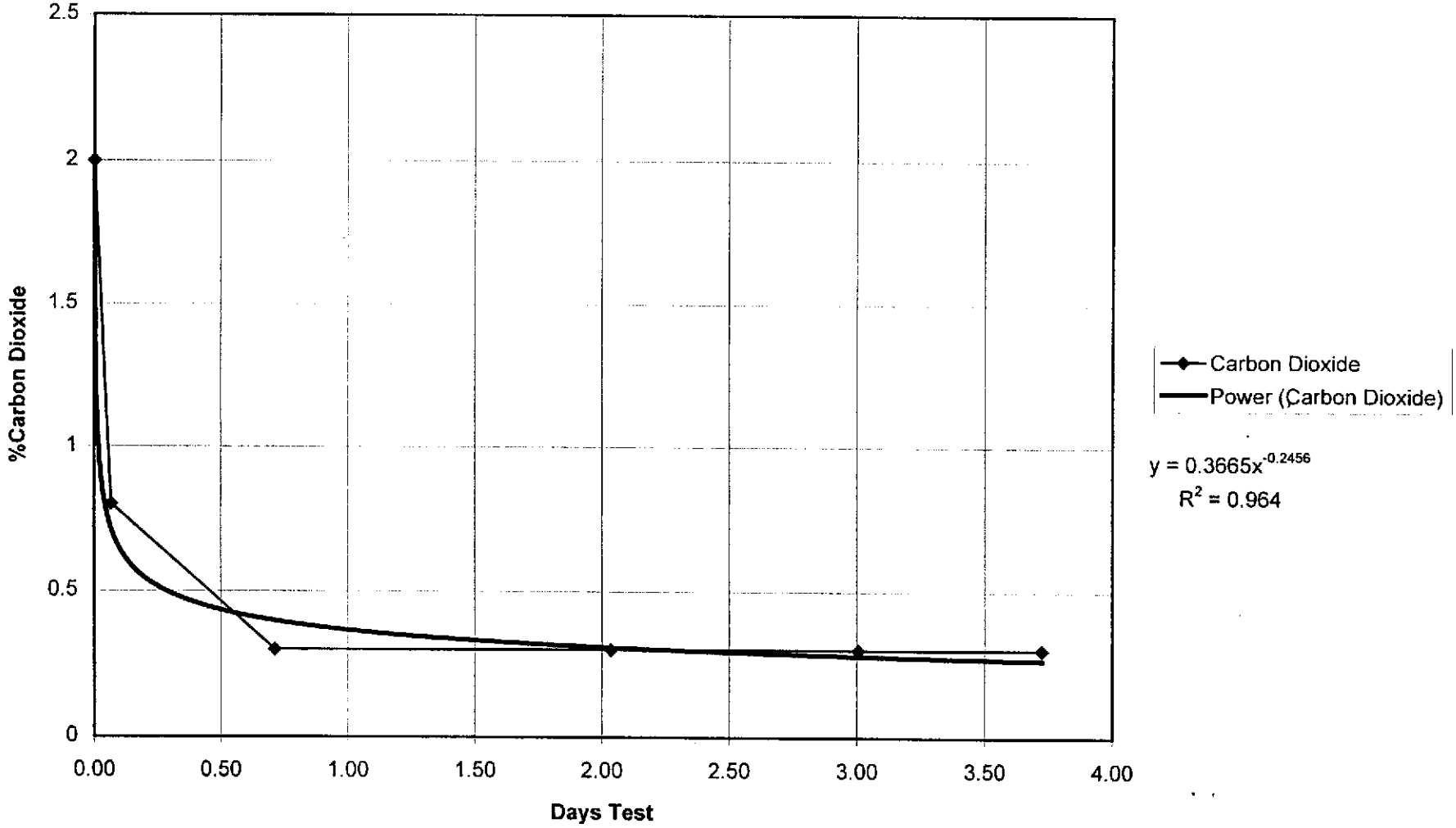


Figure 10
%oxygen in vapor wells

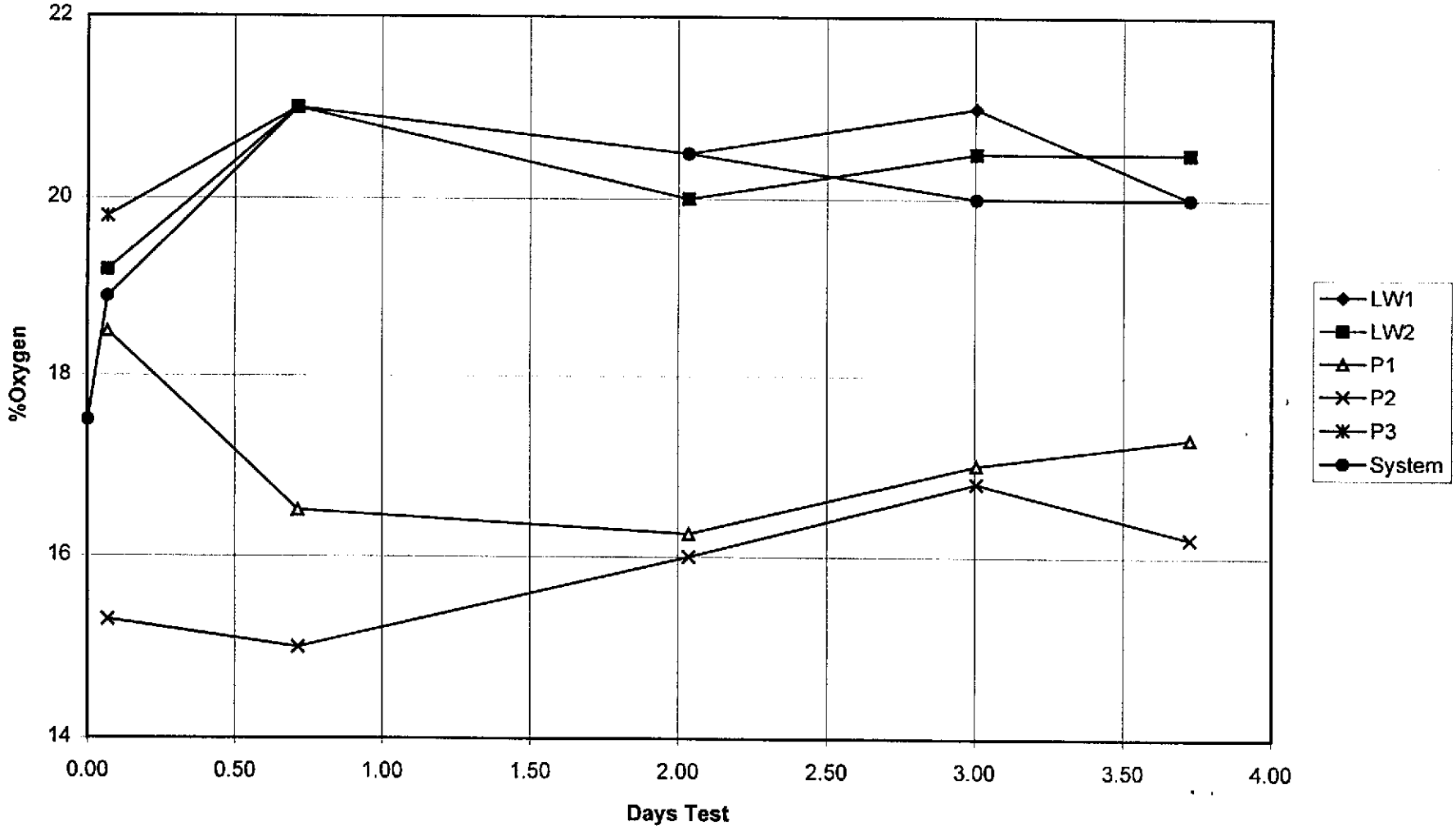


Figure 11A
Rate in Pounds per Day TPHg

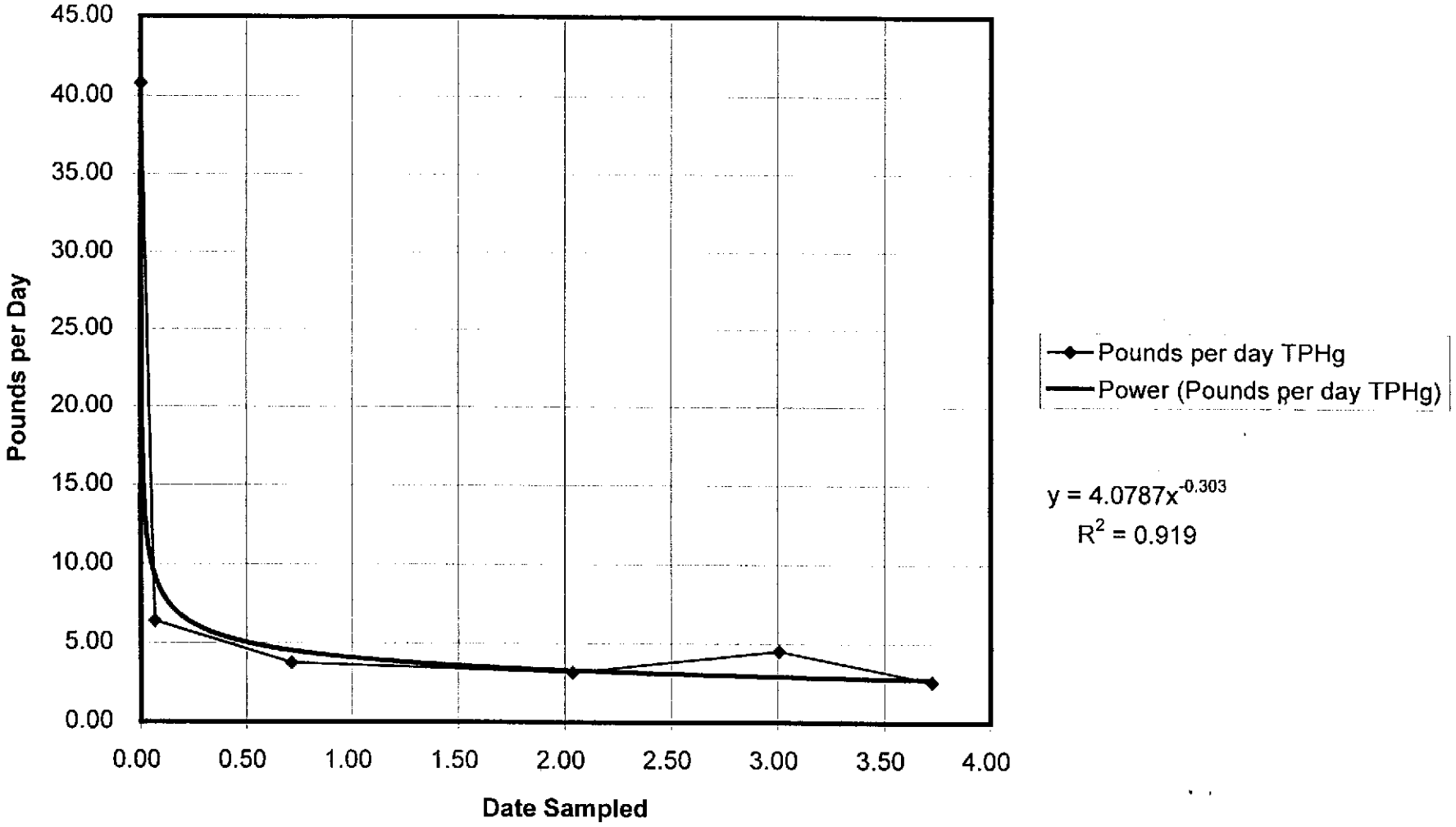


Figure 11B
Pounds TPH

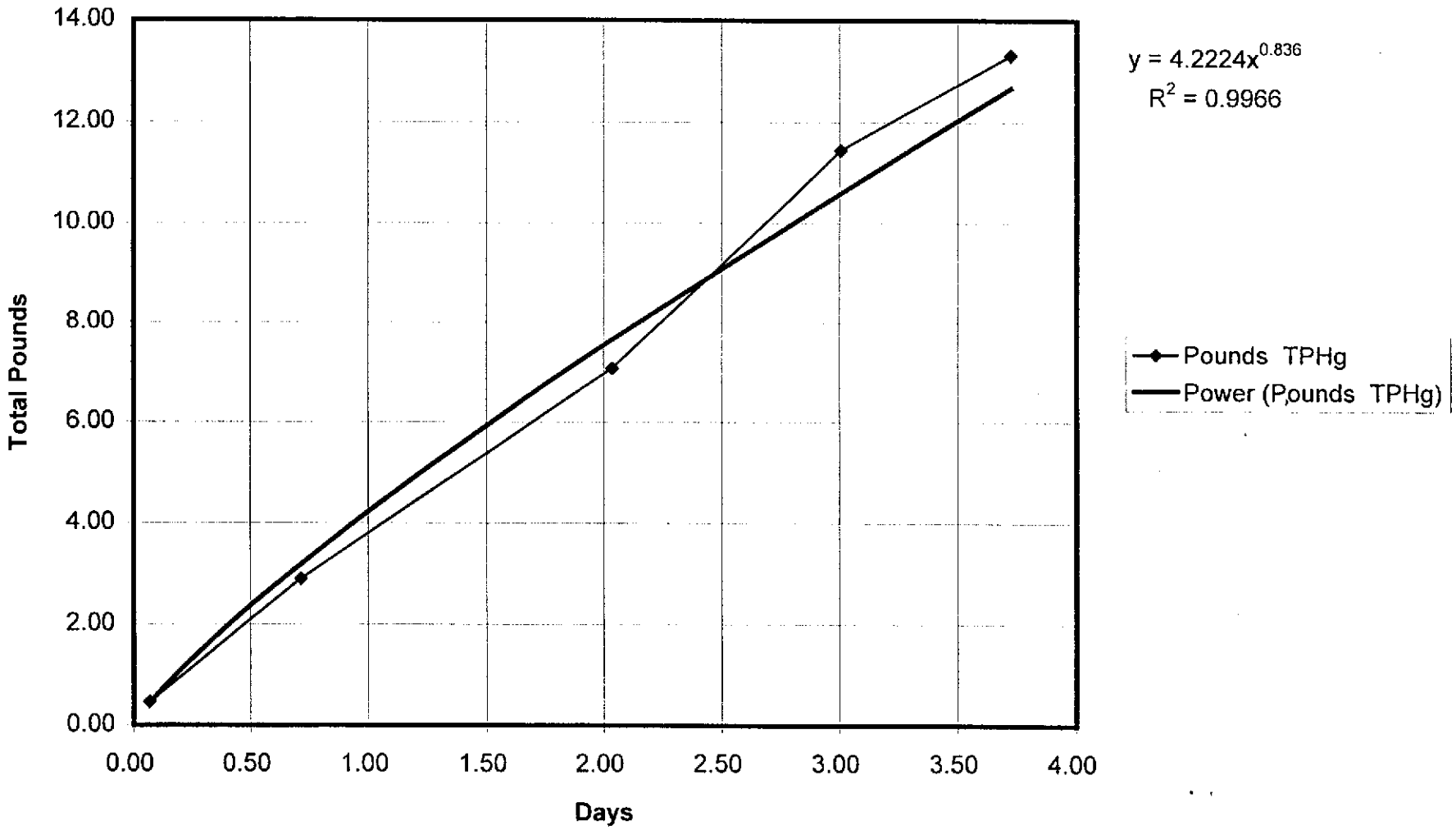


Figure 12A
Pounds CH2 Per Day

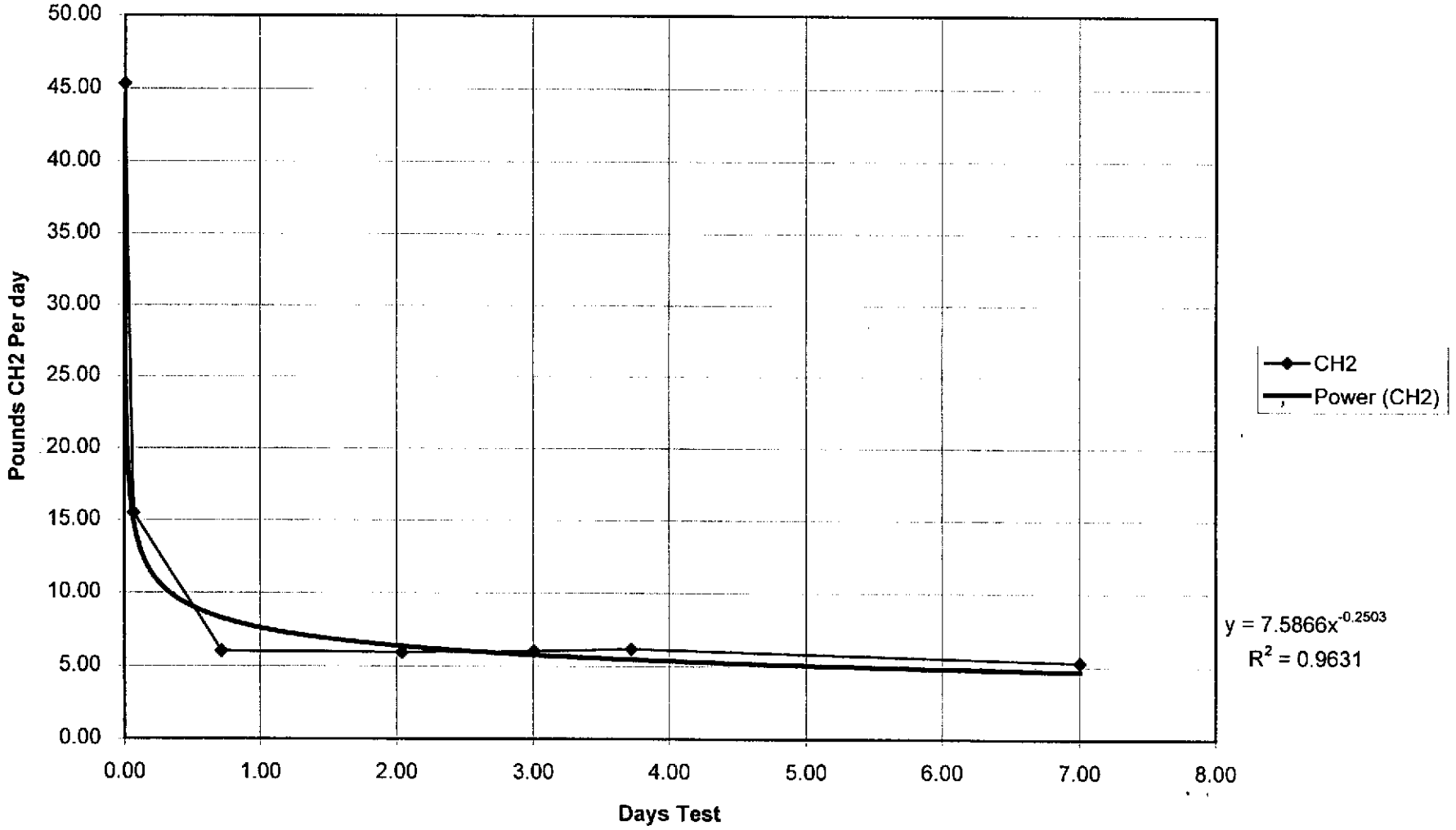
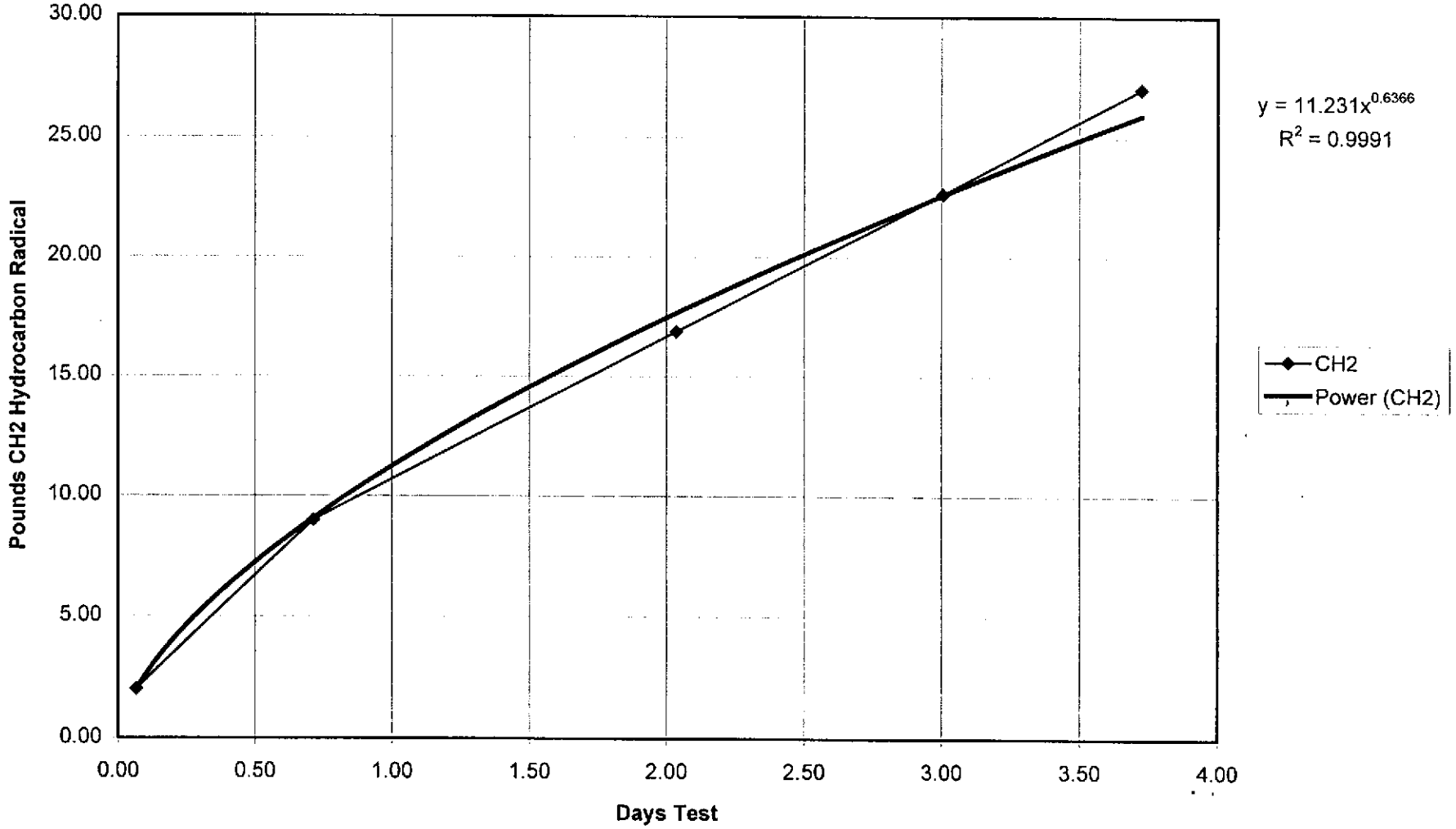


Figure 12B
Total Pounds CH2



American Environmental Network

Certificate of Analysis

DOHS Certification: 1172 AIHA Accreditation: 11134

WESTERN GEO-ENGINEERING
1386 E. BEAMER STREET
WOODLAND, CA 95776-6003

ATTN: ROY BUTLER
CLIENT PROJ. ID: TONY'S

REPORT DATE: 05/26/98
DATE(S) SAMPLED: 05/18/98-05/19/98
DATE RECEIVED: 05/19/98
AEN WORK ORDER: 9805187

PROJECT SUMMARY:

On May 19, 1998, this laboratory received 9 Tedlar bag sample(s).

Client requested sample(s) be analyzed for chemical parameters. Results of analysis are summarized on the following page(s). Please see quality control report for a summary of QC data pertaining to this project.

Samples will be stored for 30 days after completion of analysis, then disposed of in accordance with State and Federal regulations. Samples may be archived by prior arrangement.

If you have any questions, please contact Client Services at (510) 930-9090.

Reviewed by:

William Luboda

WESTERN GEO-ENGINEERING

SAMPLE ID: INFLUENT 1
AEN LAB NO: 9805187-01
AEN WORK ORDER: 9805187
CLIENT PROJ. ID: TONY'S

DATE SAMPLED: 05/18/98
DATE RECEIVED: 05/19/98
REPORT DATE: 05/26/98

ANALYTE	METHOD/ CAS#	RESULT	REPORTING LIMIT	UNITS	DATE ANALYZED
BTEX & HCs as Gasoline	EPA 8020				
Benzene	71-43-2	71 *	3	ug/L	05/21/98
Toluene	108-88-3	49 *	3	ug/L	05/21/98
Ethylbenzene	100-41-4	9.2 *	3	ug/L	05/21/98
Xylenes, Total	1330-20-7	69 *	10	ug/L	05/21/98
Purgeable HCs as Gasoline	5030/GCFID	7,100 *	300	ug/L	05/21/98
Methyl-t-butyl ether	1634-04-4	550 *	30	ug/L	05/21/98

Reporting limits elevated due to high levels of target compounds. Sample run at dilution.

ND = Not detected at or above the reporting limit
* = Value at or above reporting limit

WESTERN GEO-ENGINEERING

SAMPLE ID: LW1
AEN LAB NO: 9805187-02
AEN WORK ORDER: 9805187
CLIENT PROJ. ID: TONY'S

DATE SAMPLED: 05/18/98
DATE RECEIVED: 05/19/98
REPORT DATE: 05/26/98

ANALYTE	METHOD/ CAS#	RESULT	REPORTING LIMIT	UNITS	DATE ANALYZED
BTEX & HCs as Gasoline	**EPA 8020**				
Benzene	71-43-2	ND	0.5	ug/L	05/21/98
Toluene	108-88-3	0.8 *	0.5	ug/L	05/21/98
Ethylbenzene	100-41-4	ND	0.5	ug/L	05/21/98
Xylenes, Total	1330-20-7	ND	2	ug/L	05/21/98
Purgeable HCs as Gasoline	5030/GCFID	60 *	50	ug/L	05/21/98
Methyl-t-butyl ether	1634-04-4	ND	5	ug/L	05/21/98

ND = Not detected at or above the reporting limit
* = Value at or above reporting limit

WESTERN GEO-ENGINEERING

SAMPLE ID: LW2
AEN LAB NO: 9805187-03
AEN WORK ORDER: 9805187
CLIENT PROJ. ID: TONY'S

DATE SAMPLED: 05/18/98
DATE RECEIVED: 05/19/98
REPORT DATE: 05/26/98

ANALYTE	METHOD/ CAS#	RESULT	REPORTING LIMIT	UNITS	DATE ANALYZED
BTEX & HCs as Gasoline	**EPA 8020**				
Benzene	71-43-2	36 *	0.5	ug/L	05/20/98
Toluene	108-88-3	39 *	0.5	ug/L	05/20/98
Ethylbenzene	100-41-4	13 *	0.5	ug/L	05/20/98
Xylenes, Total	1330-20-7	85 *	2	ug/L	05/20/98
Purgeable HCs as Gasoline	5030/GCFID	1,600 *	50	ug/L	05/20/98
Methyl-t-butyl ether	1634-04-4	93 *	5	ug/L	05/20/98

ND = Not detected at or above the reporting limit
* = Value at or above reporting limit

WESTERN GEO-ENGINEERING

SAMPLE ID: P1
AEN LAB NO: 9805187-04
AEN WORK ORDER: 9805187
CLIENT PROJ. ID: TONY'S

DATE SAMPLED: 05/18/98
DATE RECEIVED: 05/19/98
REPORT DATE: 05/26/98

ANALYTE	METHOD/ CAS#	RESULT	REPORTING LIMIT	UNITS	DATE ANALYZED
BTEX & HCs as Gasoline	**EPA 8020**				
Benzene	71-43-2	7.1 *	0.5	ug/L	05/20/98
Toluene	108-88-3	0.8 *	0.5	ug/L	05/20/98
Ethylbenzene	100-41-4	1.2 *	0.5	ug/L	05/20/98
Xylenes, Total	1330-20-7	ND	2	ug/L	05/20/98
Purgeable HCs as Gasoline	5030/GCFID	1,400 *	50	ug/L	05/20/98
Methyl-t-butyl ether	1634-04-4	64 *	5	ug/L	05/20/98

ND = Not detected at or above the reporting limit
* = Value at or above reporting limit

WESTERN GEO-ENGINEERING

SAMPLE ID: P2
AEN LAB NO: 9805187-05
AEN WORK ORDER: 9805187
CLIENT PROJ. ID: TONY'S

DATE SAMPLED: 05/18/98
DATE RECEIVED: 05/19/98
REPORT DATE: 05/26/98

ANALYTE	METHOD/ CAS#	RESULT	REPORTING LIMIT	UNITS	DATE ANALYZED
BTEX & HCs as Gasoline	EPA 8020				
Benzene	71-43-2	130 *	3	ug/L	05/21/98
Toluene	108-88-3	190 *	3	ug/L	05/21/98
Ethylbenzene	100-41-4	78 *	3	ug/L	05/21/98
Xylenes, Total	1330-20-7	200 *	20	ug/L	05/21/98
Purgeable HCs as Gasoline	5030/GCFID	7,400 *	300	ug/L	05/21/98
Methyl-t-butyl ether	1634-04-4	370 *	30	ug/L	05/21/98

Reporting limits elevated due to high levels of target compounds. Sample run at dilution.

ND = Not detected at or above the reporting limit
* = Value at or above reporting limit

WESTERN GEO-ENGINEERING

SAMPLE ID: P3
AEN LAB NO: 9805187-06
AEN WORK ORDER: 9805187
CLIENT PROJ. ID: TONY'S

DATE SAMPLED: 05/18/98
DATE RECEIVED: 05/19/98
REPORT DATE: 05/26/98

ANALYTE	METHOD/ CAS#	RESULT	REPORTING LIMIT	UNITS	DATE ANALYZED
BTEX & HCs as Gasoline	EPA 8020				
Benzene	71-43-2	5.0 *	0.5	ug/L	05/20/98
Toluene	108-88-3	34 *	0.5	ug/L	05/20/98
Ethylbenzene	100-41-4	6.2 *	0.5	ug/L	05/20/98
Xylenes, Total	1330-20-7	76 *	2	ug/L	05/20/98
Purgeable HCs as Gasoline	5030/GCFID	550 *	50	ug/L	05/20/98
Methyl-t-butyl ether	1634-04-4	31 *	5	ug/L	05/20/98

ND = Not detected at or above the reporting limit
* = Value at or above reporting limit

WESTERN GEO-ENGINEERING

SAMPLE ID: INFLUENT 2
AEN LAB NO: 9805187-07
AEN WORK ORDER: 9805187
CLIENT PROJ. ID: TONY'S

DATE SAMPLED: 05/18/98
DATE RECEIVED: 05/19/98
REPORT DATE: 05/26/98

ANALYTE	METHOD/ CAS#	RESULT	REPORTING LIMIT	UNITS	DATE ANALYZED
BTEX & HCs as Gasoline	EPA 8020				
Benzene	71-43-2	28 *	0.5	ug/L	05/20/98
Toluene	108-88-3	46 *	0.5	ug/L	05/20/98
Ethylbenzene	100-41-4	16 *	0.5	ug/L	05/20/98
Xylenes, Total	1330-20-7	110 *	2	ug/L	05/20/98
Purgeable HCs as Gasoline	5030/GCFID	1,300 *	50	ug/L	05/20/98
Methyl-t-butyl ether	1634-04-4	70 *	5	ug/L	05/20/98

ND = Not detected at or above the reporting limit
* = Value at or above reporting limit

WESTERN GEO-ENGINEERING

SAMPLE ID: EFFLUENT 2
AEN LAB NO: 9805187-08
AEN WORK ORDER: 9805187
CLIENT PROJ. ID: TONY'S

DATE SAMPLED: 05/18/98
DATE RECEIVED: 05/19/98
REPORT DATE: 05/26/98

ANALYTE	METHOD/ CAS#	RESULT	REPORTING LIMIT	UNITS	DATE ANALYZED
BTEX & HCs as Gasoline	EPA 8020				
Benzene	71-43-2	ND	0.5	ug/L	05/20/98
Toluene	108-88-3	ND	0.5	ug/L	05/20/98
Ethylbenzene	100-41-4	ND	0.5	ug/L	05/20/98
Xylenes, Total	1330-20-7	ND	2	ug/L	05/20/98
Purgeable HCs as Gasoline	5030/GCFID	ND	50	ug/L	05/20/98
Methyl-t-butyl ether	1634-04-4	ND	5	ug/L	05/20/98

ND = Not detected at or above the reporting limit
* = Value at or above reporting limit

WESTERN GEO-ENGINEERING

SAMPLE ID: INFLUENT 3
AEN LAB NO: 9805187-09
AEN WORK ORDER: 9805187
CLIENT PROJ. ID: TONY'S

DATE SAMPLED: 05/19/98
DATE RECEIVED: 05/19/98
REPORT DATE: 05/26/98

ANALYTE	METHOD/ CAS#	RESULT	REPORTING LIMIT	UNITS	DATE ANALYZED
BTEX & HCs as Gasoline	EPA 8020				
Benzene	71-43-2	17 *	0.5	ug/L	05/20/98
Toluene	108-88-3	26 *	0.5	ug/L	05/20/98
Ethylbenzene	100-41-4	9.1 *	0.5	ug/L	05/20/98
Xylenes, Total	1330-20-7	53 *	2	ug/L	05/20/98
Purgeable HCs as Gasoline	5030/GCFID	740 *	50	ug/L	05/20/98
Methyl-t-butyl ether	1634-04-4	53 *	5	ug/L	05/20/98

ND = Not detected at or above the reporting limit
* = Value at or above reporting limit

AEN (CALIFORNIA)
QUALITY CONTROL REPORT

AEN JOB NUMBER: 9805187

CLIENT PROJECT ID: TONY'S

Quality Control and Project Summary

All laboratory quality control parameters were found to be within established limits.

Definitions

Laboratory Control Sample (LCS)/Method Spike(s): Control samples of known composition. LCS and Method Spike data are used to validate batch analytical results.

Matrix Spike(s): Aliquot of a sample (aqueous or solid) with added quantities of specific compounds and subjected to the entire analytical procedure. Matrix spike and matrix spike duplicate QC data are advisory.

Method Blank: An analytical control consisting of all reagents, internal standards, and surrogate standards carried through the entire analytical process. Used to monitor laboratory background and reagent contamination.

Not Detected (ND): Not detected at or above the reporting limit.

Relative Percent Difference (RPD): An indication of method precision based on duplicate analysis.

Reporting Limit (RL): The lowest concentration routinely determined during laboratory operations. The RL is generally 1 to 10 times the Method Detection Limit (MDL). Reporting limits are matrix, method, and analyte dependent and take into account any dilutions performed as part of the analysis.

Surrogates: Organic compounds which are similar to analytes of interest in chemical behavior, but are not found in environmental samples. Surrogates are added to all blanks, calibration and check standards, samples, and spiked samples. Surrogate recovery is monitored as an indication of acceptable sample preparation and instrumental performance.

D: Surrogates diluted out.

#: Indicates result outside of established laboratory QC limits.

QUALITY CONTROL DATA

METHOD: EPA 8020, 5030 GCFID

AEN JOB NO: 9805187
INSTRUMENT: F
MATRIX: AIR

Surrogate Standard Recovery Summary

Date Analyzed	Client Id.	Lab Id.	Percent Recovery Fluorobenzene
05/21/98	INFLUENT 1	01	96
05/21/98	LW1	02	95
05/20/98	LW2	03	96
05/20/98	P1	04	95
05/21/98	P2	05	92
05/20/98	P3	06	91
05/20/98	INFLUENT 2	07	94
05/20/98	EFFLUENT 2	08	95
05/20/98	INFLUENT 3	09	95
QC Limits:			70-130

DATE ANALYZED: 05/20/98
SAMPLE SPIKED: LCS
INSTRUMENT: F

Laboratory Control Sample Recovery

Analyte	Spike Added (ug/L)	Percent Recovery	RPD	QC Limits Percent Recovery	QC Limits RPD
Benzene	200	99	3	70-130	20
Toluene	200	103	4	70-130	20
Ethylbenzene	200	106	3	70-130	20
Total Xylenes	600	105	4	70-130	20

Daily method blanks for all associated analytical runs showed no contamination at or above the reporting limit.

*** END OF REPORT ***

Reporting Information:

1. Client: Western Geo Engineers
Address: 1386 East Beamer
Woodland
Contact: Roy Butler
Alt. Contact: George Conver

American Environmental Network
3440 Vincent Road, Pleasant Hill, CA 94523
Phone (510) 930-9090
FAX (510) 930-0256

AEN

Page ____ of ____

REQUEST FOR ANALYSIS / CHAIN OF CUSTODY

Lab Job Number: 9805187
Lab Destination:
Date Samples Shipped:
Lab Contact:
Date Results Required: STANDARD
Date Report Required:
Client Phone No.:
Client FAX No.:

Address Report To:

2. as 1 above

Send Invoice To:

3. as 1 above

Send Report To: (1) or 2 (Circle one)

Client P.O. No.: _____ Client Project I.D. No.: Tony 15

Sample Team Member (s) Roy Butler

Lab Number	Client Sample Identification	Air Volume	Date/ Time Collected	Sample Type*	Pres.	No. of Cont.	Type of Cont.	ANALYSIS: TPH/BTEX, MTBE	Comments / Hazards
01A	Influent 1	1 Liter	5/18/98 15:10	10		1	Tedlar		
02A	LW1		17:00						
03A	LW2								
04A	P1								
05A	P2								
06A	P3								
07A	Influent 2		18:00						
08A	Effluent 2		18:00						
09A	Influent 3		5/19/98 8:30						

		DATE	TIME
Relinquished by: (Signature)	Roy Butler	5/19/98	11:00
Relinquished by: (Signature)		DATE	TIME
Relinquished by: (Signature)		DATE	TIME
Method of Shipment			

		DATE	TIME
Received by: (Signature)	Ronald C. Jensen	5/19/98	11:00
Received by: (Signature)		DATE	TIME
Received by: (Signature)		DATE	TIME
Lab Comments			

*Sample type (Specify): 1) 37mm 0.8 µm MCEF 2) 25mm 0.8 µm MCEF 3) 25mm 0.4 µm polycarb. filter
4) PVC filter, diam. ____ pore size ____ 5) Charcoal tube 6) Silica gel tube 7) Water 8) Soil 9) Bulk Sample
10) Other Soil Vapor 11) Other _____

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American Environmental Network

Certificate of Analysis

DOHS Certification: 1172 AIHA Accreditation: 11134

WESTERN GEO-ENGINEERING
1386 E. BEAMER STREET
WOODLAND, CA 95776-6003

ATTN: ROY BUTLER
CLIENT PROJ. ID: TONY'S

REPORT DATE: 06/03/98

DATE(S) SAMPLED: 05/20/98

DATE RECEIVED: 05/21/98

AEN WORK ORDER: 9805218

PROJECT SUMMARY:

On May 21, 1998, this laboratory received 1 Tedlar bag sample(s).

Client requested sample(s) be analyzed for chemical parameters. Results of analysis are summarized on the following page(s). Please see quality control report for a summary of QC data pertaining to this project.

Samples will be stored for 30 days after completion of analysis, then disposed of in accordance with State and Federal regulations. Samples may be archived by prior arrangement.

If you have any questions, please contact Client Services at (510) 930-9090.

Reviewed by:

WESTERN GEO-ENGINEERING

SAMPLE ID: INFLUENT 4
AEN LAB NO: 9805218-01
AEN WORK ORDER: 9805218
CLIENT PROJ. ID: TONY'S

DATE SAMPLED: 05/20/98
DATE RECEIVED: 05/21/98
REPORT DATE: 06/03/98

ANALYTE	METHOD/ CAS#	RESULT	REPORTING LIMIT	UNITS	DATE ANALYZED
BTEX & HCs as Gasoline	EPA 8020				
Benzene	71-43-2	16 *	0.5	ug/L	05/22/98
Toluene	108-88-3	29 *	0.5	ug/L	05/22/98
Ethylbenzene	100-41-4	9.9 *	0.5	ug/L	05/22/98
Xylenes, Total	1330-20-7	58 *	2	ug/L	05/22/98
Purgeable HCs as Gasoline	5030/GCFID	630 *	50	ug/L	05/22/98
Methyl-t-butyl ether	1634-04-4	42 *	5	ug/L	05/22/98

MTBE included in gasoline result.

ND = Not detected at or above the reporting limit
* = Value at or above reporting limit

AEN (CALIFORNIA)
QUALITY CONTROL REPORT

AEN JOB NUMBER: 9805218

CLIENT PROJECT ID: TONY'S

Quality Control and Project Summary

All laboratory quality control parameters were found to be within established limits.

Definitions

Laboratory Control Sample (LCS)/Method Spike(s): Control samples of known composition. LCS and Method Spike data are used to validate batch analytical results.

Matrix Spike(s): Aliquot of a sample (aqueous or solid) with added quantities of specific compounds and subjected to the entire analytical procedure. Matrix spike and matrix spike duplicate QC data are advisory.

Method Blank: An analytical control consisting of all reagents, internal standards, and surrogate standards carried through the entire analytical process. Used to monitor laboratory background and reagent contamination.

Not Detected (ND): Not detected at or above the reporting limit.

Relative Percent Difference (RPD): An indication of method precision based on duplicate analysis.

Reporting Limit (RL): The lowest concentration routinely determined during laboratory operations. The RL is generally 1 to 10 times the Method Detection Limit (MDL). Reporting limits are matrix, method, and analyte dependent and take into account any dilutions performed as part of the analysis.

Surrogates: Organic compounds which are similar to analytes of interest in chemical behavior, but are not found in environmental samples. Surrogates are added to all blanks, calibration and check standards, samples, and spiked samples. Surrogate recovery is monitored as an indication of acceptable sample preparation and instrumental performance.

D: Surrogates diluted out.

#: Indicates result outside of established laboratory QC limits.

QUALITY CONTROL DATA

METHOD: EPA 8020, 5030 GCFID

AEN JOB NO: 9805218
INSTRUMENT: F
MATRIX: AIR

Surrogate Standard Recovery Summary

Date Analyzed	Client Id.	Lab Id.	Percent Recovery Fluorobenzene
05/22/98	INFLUENT 4	01	95
QC Limits:			70-130

DATE ANALYZED: 05/22/98
SAMPLE SPIKED: LCS
INSTRUMENT: E

Laboratory Control Sample Recovery

Analyte	Spike Added (ug/L)	Percent Recovery	RPD	QC Limits Percent Recovery	QC Limits RPD
Benzene	200	108	<1	70-130	20
Toluene	200	109	2	70-130	20
Ethylbenzene	200	110	4	70-130	20
Total Xylenes	600	110	3	70-130	20

Daily method blanks for all associated analytical runs showed no contamination at or above the reporting limit.

*** END OF REPORT ***

Reporting Information:

1. Client: Weston Geo-Engineers
Address: 4586 First Avenue
Livermore
Contact: Ray Patton
Alt. Contact:

American Environmental Network
3440 Vincent Road, Pleasant Hill, CA 94523
Phone (510) 930-9090
FAX (510) 930-0256

Hood

AEN

Page ____ of ____

REQUEST FOR ANALYSIS / CHAIN OF CUSTODY

Lab Job Number: 9805218
Lab Destination:
Date Samples Shipped:
Lab Contact:
Date Results Required:
Date Report Required:
Client Phone No.:
Client FAX No.:

Address Report To:

2. Laboratory

Send Invoice To:

3. Laboratory

Send Report To: 1 or 2 (Circle one)

Client P.O. No.: _____ Client Project I.D. No.: Tully's

Sample Team Member (s) Ray Patton

Lab Number	Client Sample Identification	Air Volume	Date/ Time Collected	Sample Type*	Pres.	No. of Cont.	Type of Cont.	ANALYSIS: TPH(gas) BTEX MTBE	Comments / Hazards
1A	Influent 4	1 L	5/20/98	10	none	1	Tedlar		

Relinquished by: (Signature) Ray Patton	DATE 5-21	TIME 14:10	Received by: (Signature) Greg Glaser	DATE 5-21	TIME 14:10
Relinquished by: (Signature)	DATE	TIME	Received by: (Signature)	DATE	TIME
Relinquished by: (Signature)	DATE	TIME	Received by: (Signature)	DATE	TIME
Method of Shipment			Lab Comments		

*Sample type (Specify): 1) 37mm 0.8 µm MCEF 2) 25mm 0.8 µm MCEF 3) 25mm 0.4 µm polycarb. filter
4) PVC filter, diam. ____ pore size ____ 5) Charcoal tube 6) Silica gel tube 7) Water 8) Soil 9) Bulk Sample
10) Other ____ 11) Other ____

COPIES: WHITE - JOB FILE YEL[illegible]ROJECT FILE PINK - CLIENT

American Environmental Network

Certificate of Analysis

DOHS Certification: 1172 AIHA Accreditation: 11134

WESTERN GEO-ENGINEERING
1386 E. BEAMER STREET
WOODLAND, CA 95776-6003

ATTN: ROY BUTLER
CLIENT PROJ. ID: TONY'S

REPORT DATE: 06/03/98

DATE(S) SAMPLED: 05/21/98-05/22/98

DATE RECEIVED: 05/22/98

AEN WORK ORDER: 9805226

PROJECT SUMMARY:

On May 22, 1998, this laboratory received 3 Tedlar bag sample(s).

Client requested sample(s) be analyzed for chemical parameters. Results of analysis are summarized on the following page(s). Please see quality control report for a summary of QC data pertaining to this project.

Samples will be stored for 30 days after completion of analysis, then disposed of in accordance with State and Federal regulations. Samples may be archived by prior arrangement.

If you have any questions, please contact Client Services at (510) 930-9090.

Reviewed by:

William Luboda

WESTERN GEO-ENGINEERING

SAMPLE ID: INFLUENT 5
AEN LAB NO: 9805226-01
AEN WORK ORDER: 9805226
CLIENT PROJ. ID: TONY'S

DATE SAMPLED: 05/21/98
DATE RECEIVED: 05/22/98
REPORT DATE: 06/03/98

ANALYTE	METHOD/ CAS#	RESULT	REPORTING LIMIT	UNITS	DATE ANALYZED
BTEX & HCs as Gasoline	**EPA 8020**				
Benzene	71-43-2	18 *	0.5	ug/L	05/22/98
Toluene	108-88-3	33 *	0.5	ug/L	05/22/98
Ethylbenzene	100-41-4	11 *	0.5	ug/L	05/22/98
Xylenes, Total	1330-20-7	68 *	2	ug/L	05/22/98
Purgeable HCs as Gasoline	5030/GCFID	890 *	50	ug/L	05/22/98
Methyl-t-butyl ether	1634-04-4	43 *	5	ug/L	05/22/98

MTBE included in gasoline result.

ND = Not detected at or above the reporting limit
* = Value at or above reporting limit

WESTERN GEO-ENGINEERING

SAMPLE ID: INFLUENT 6
AEN LAB NO: 9805226-02
AEN WORK ORDER: 9805226
CLIENT PROJ. ID: TONY'S

DATE SAMPLED: 05/22/98
DATE RECEIVED: 05/22/98
REPORT DATE: 06/03/98

ANALYTE	METHOD/ CAS#	RESULT	REPORTING LIMIT	UNITS	DATE ANALYZED
BTEX & HCs as Gasoline	**EPA 8020**				
Benzene	71-43-2	12 *	0.5	ug/L	05/22/98
Toluene	108-88-3	24 *	0.5	ug/L	05/22/98
Ethylbenzene	100-41-4	7.9 *	0.5	ug/L	05/22/98
Xylenes, Total	1330-20-7	53 *	2	ug/L	05/22/98
Purgeable HCs as Gasoline	5030/GCFID	500 *	50	ug/L	05/22/98
Methyl-t-butyl ether	1634-04-4	28 *	5	ug/L	05/22/98

MTBE included in gasoline result.

ND = Not detected at or above the reporting limit
* = Value at or above reporting limit

WESTERN GEO-ENGINEERING

SAMPLE ID: EFFLUENT 6
AEN LAB NO: 9805226-03
AEN WORK ORDER: 9805226
CLIENT PROJ. ID: TONY'S

DATE SAMPLED: 05/22/98
DATE RECEIVED: 05/22/98
REPORT DATE: 06/03/98

ANALYTE	METHOD/ CAS#	RESULT	REPORTING LIMIT	UNITS	DATE ANALYZED
BTEX & HCs as Gasoline	**EPA 8020**				
Benzene	71-43-2	0.9 *	0.5	ug/L	05/22/98
Toluene	108-88-3	1.0 *	0.5	ug/L	05/22/98
Ethylbenzene	100-41-4	0.8 *	0.5	ug/L	05/22/98
Xylenes, Total	1330-20-7	3 *	2	ug/L	05/22/98
Purgeable HCs as Gasoline	5030/GCFID	ND	50	ug/L	05/22/98
Methyl-t-butyl ether	1634-04-4	ND	5	ug/L	05/22/98

ND = Not detected at or above the reporting limit
* = Value at or above reporting limit

AEN (CALIFORNIA)
QUALITY CONTROL REPORT

AEN JOB NUMBER: 9805226

CLIENT PROJECT ID: TONY'S

Quality Control and Project Summary

All laboratory quality control parameters were found to be within established limits.

Definitions

Laboratory Control Sample (LCS)/Method Spike(s): Control samples of known composition. LCS and Method Spike data are used to validate batch analytical results.

Matrix Spike(s): Aliquot of a sample (aqueous or solid) with added quantities of specific compounds and subjected to the entire analytical procedure. Matrix spike and matrix spike duplicate QC data are advisory.

Method Blank: An analytical control consisting of all reagents, internal standards, and surrogate standards carried through the entire analytical process. Used to monitor laboratory background and reagent contamination.

Not Detected (ND): Not detected at or above the reporting limit.

Relative Percent Difference (RPD): An indication of method precision based on duplicate analysis.

Reporting Limit (RL): The lowest concentration routinely determined during laboratory operations. The RL is generally 1 to 10 times the Method Detection Limit (MDL). Reporting limits are matrix, method, and analyte dependent and take into account any dilutions performed as part of the analysis.

Surrogates: Organic compounds which are similar to analytes of interest in chemical behavior, but are not found in environmental samples. Surrogates are added to all blanks, calibration and check standards, samples, and spiked samples. Surrogate recovery is monitored as an indication of acceptable sample preparation and instrumental performance.

D: Surrogates diluted out.

#: Indicates result outside of established laboratory QC limits.

QUALITY CONTROL DATA

METHOD: EPA 8020, 5030 GCFID

AEN JOB NO: 9805226
INSTRUMENT: F
MATRIX: AIR

Surrogate Standard Recovery Summary

Date Analyzed	Client Id.	Lab Id.	Percent Recovery Fluorobenzene
05/22/98	INFLUENT 5	01	96
05/22/98	INFLUENT 6	02	95
05/22/98	EFFLUENT 6	03	95
QC Limits:			70-130

DATE ANALYZED: 05/22/98
SAMPLE SPIKED: LCS
INSTRUMENT: F

Laboratory Control Sample Recovery

Analyte	Spike Added (ug/L)	Percent Recovery	RPD	QC Limits Percent Recovery	QC Limits RPD
Benzene	200	108	<1	70-130	20
Toluene	200	109	2	70-130	20
Ethylbenzene	200	110	4	70-130	20
Total Xylenes	600	110	3	70-130	20

Daily method blanks for all associated analytical runs showed no contamination at or above the reporting limit.

*** END OF REPORT ***

Reporting Information:

1. Client: Western Geo-Engineers
Address: 1386 East Bernard St
Woodland CA 95776
Contact: Ray Butler
Att. Contact: George Connors PE

American Environmental Network
3440 Vincent Road, Pleasant Hill, CA 94523
Phone (510) 930-9090
FAX (510) 930-0256

AEN

Page ____ of ____

REQUEST FOR ANALYSIS / CHAIN OF CUSTODY

Lab Job Number: 9805226
Lab Destination:
Date Samples Shipped:
Lab Contact:
Date Results Required:
Date Report Required:
Client Phone No.:
Client FAX No.:

HOOD

Address Report To:
2. Labone

Send Invoice To:
3. Labone

Send Report To: (1) or 2 (Circle one)

Client P.O. No.: _____ Client Project I.D. No.: Tony's

Sample Team Member (s) Ray Butler

Lab Number	Client Sample Identification	Air Volume	Date/ Time Collected	Sample Type*	Pres.	No. of Cont.	Type of Cont.	ANALYSIS: TPH BTEX	ANALYSIS: MTBE	Comments / Hazards
1A	Influent 5	1 l/min	5/21/98 15:30	10	none	1	Tedlar	X	X	
2A	Influent 6	1 l/min	5/22/98 9:00	10		1		X	X	
3A	Effluent 6	1 l/min	9:00	10		1		X	X	

Relinquished by: (Signature) Ray Butler	DATE 5/22/98	TIME 11:50	Received by: (Signature) Paul C Rich
Relinquished by: (Signature)	DATE	TIME	Received by: (Signature)
Relinquished by: (Signature)	DATE	TIME	Received by: (Signature)
Method of Shipment			Lab Comments

DATE 5/22/98 TIME 1150

*Sample type (Specify): 1) 37mm 0.8 µm MCEF 2) 25mm 0.8 µm MCEF 3) 25mm 0.4 µm polycarb. filter
4) PVC filter, diam. ____ pore size ____ 5) Charcoal tube 6) Silica gel tube 7) Water 8) Soil 9) Bulk Sample
10) Other Vapor 11) Other ____

COPIES: WHITE - JOB FILE YELLOW - PROJECT FILE PINK - CLIENT