

98411

# REPORT ON GROUNDWATER MONITORING

JULY 1995

670 98TH AVENUE  
Oakland, California

For:  
City of Oakland  
Oakland, California

93343-FO

# BASELINE

v2/18/95

Need

- ① letter to cont. QWR
- ② WP to further characterize plume

# BASELINE

## ENVIRONMENTAL CONSULTING

6 July 1995  
93343-F0

Mr. Andrew Clark-Clough  
City of Oakland  
Environmental Affairs  
1333 Broadway, Suite 330  
Oakland, CA 94612

**Subject: Report on Groundwater Monitoring, March 1995, 670 98th Avenue, Oakland, California**

Dear Andrew:

Enclosed please find three copies of the Report on Groundwater Monitoring at 670 98th Avenue, Oakland. The Report presents the results of groundwater sampling performed on 31 March 1995 and recommendations for further investigation of groundwater quality at and in the vicinity of the project site. A copy of the Report has been submitted to Ms. eva chu of the Alameda County Department of Environmental Health. If you have any questions or comments, please contact us at your convenience.

Sincerely,



Yane Nordhav  
Principal  
R.G. No. 4009



Kevin O'Dea  
Senior Geologist

YN/GR/dh  
Enclosure

cc: eva chu, Alameda County Department of Environmental Health

# REPORT ON GROUNDWATER MONITORING

JULY 1995

670 98TH AVENUE  
Oakland, California

For:  
City of Oakland  
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BASELINE Environmental Consulting  
5900 Hollis Street, Suite D • Emeryville, California 94608  
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# REPORT ON GROUNDWATER MONITORING, MARCH 1995

670 98th Avenue  
Oakland, California

## INTRODUCTION

BASELINE Environmental Consulting was retained by the City of Oakland, Office of Public Works to evaluate the current condition of groundwater monitoring wells and the status of groundwater quality at 670 98th Avenue, Oakland (Figure 1). In 1989 and 1990, environmental investigations and interim remedial activities were conducted at the site. Since that time, no further work has been performed. The purpose of the groundwater monitoring was to assess whether there have been any significant changes in groundwater quality since the interim remedial activities were performed.

## BACKGROUND

The site was occupied by a Union 76 service station from about 1947 through 1983. An old station building and an underground tank that occupied the site were removed in 1966. During that same year, a new station building, two 10,000-gallon underground gasoline tanks, and one 230-gallon waste oil tank were installed at the site. The station building was demolished and the underground storage tanks were removed in 1983.<sup>1</sup>

In addition to the on-site source of subsurface petroleum contamination, an additional potential source of contamination at the site was identified at 692 98th Avenue, located northeast of the site. This property was occupied by a Richfield service station from about 1949 to 1963. In 1970, four 1,000-gallon underground fuel storage tanks were removed; the contents and former tank locations are not known.<sup>2</sup>

In 1989, during the widening of 98th Avenue, workers encountered contaminated soil while excavating a water line trench at the site. Soil samples collected from the trench were found to contain up to 350 mg/kg total petroleum hydrocarbons (TPH).

In response to the identification of contaminated soils during road widening, a preliminary soil investigation was conducted by Subsurface Consultants, Inc. Soil samples were collected from 14 soil borings. The highest concentrations of TPH were generally detected in soil samples collected at or immediately below the groundwater table. A summary of analytical results of soil samples collected at the site is included in Table A1 in Appendix A.

In 1990, Subsurface Consultants, Inc. further evaluated subsurface conditions and groundwater quality at the site. Eleven soil borings were drilled, and six of the borings were completed as monitoring

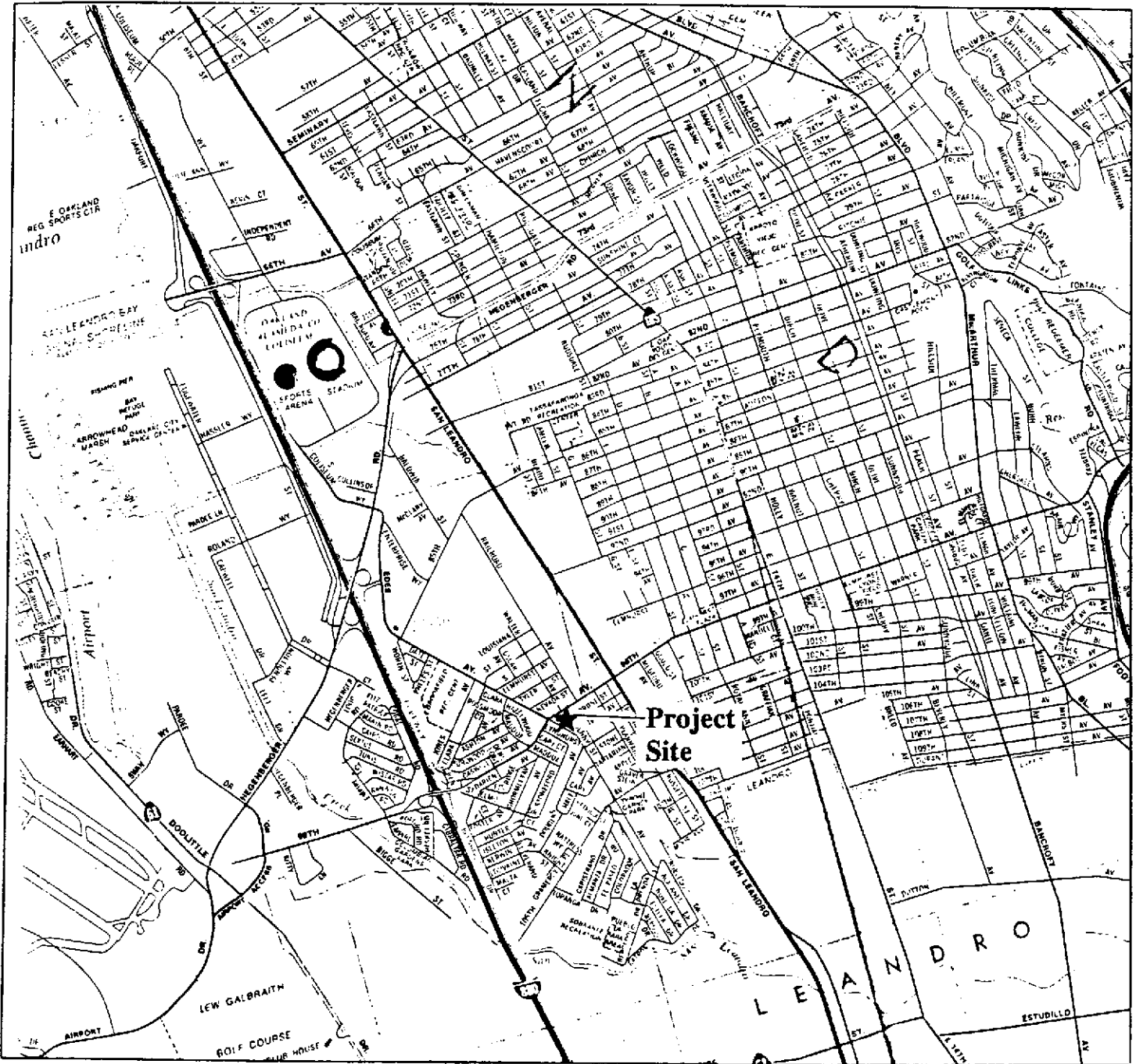
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<sup>1</sup>Subsurface Consultants, Inc., 1989, *Preliminary Contaminated Soil Assessment, 98th and Edes Avenues, Oakland, California*, 17 July.

<sup>2</sup>Subsurface Consultants, Inc., 1990, *Soil and Groundwater Contamination Assessment, Phase 2, 98th and Edes Avenues, Oakland, California*, 10 April.

# REGIONAL LOCATION

# Figure 1



**670 98th Avenue  
Oakland, California**



**BASELINE**

wells (MW-1 through MW-5, and Well 18; Figure 2). Subsurface Consultants, Inc. concluded that the former tank locations were the primary source of contamination at the site. Groundwater samples were found to contain TPH, benzene, toluene, xylenes, and ethylbenzene (BTXE), and chlorinated hydrocarbons. Aromatic petroleum hydrocarbons were detected in monitoring wells located upgradient of the former tank locations, suggesting that those might originate from an off-site source. The analytical results of groundwater samples collected at the site are summarized in Tables 1 and 2.

Subsurface Consultants, Inc. performed quarterly groundwater monitoring during the second and third quarterly periods of 1990. The concentration of contaminants detected in groundwater samples from each well varied from one quarterly period to the next. In general, elevated concentrations of petroleum hydrocarbons were detected in groundwater samples collected from MW-1 and Well 18 (down- and/or crossgradient from the site), but none were detected in samples from MW-4 and MW-5 (up- and/or crossgradient from the site). Free petroleum product was detected in MW-1 at a thickness of 0.52 feet on 4 October 1990. The report for the investigation concluded that a plume of groundwater containing petroleum hydrocarbons was migrating downgradient (westward) of the site. Chlorinated hydrocarbons have been detected in samples from all wells. The source of chlorinated hydrocarbons was not identified.

Contaminated soil was excavated from the area along the roadway under the direction of Subsurface Consultants, Inc. Soil was excavated within five feet of the centerline of the trench lateral and extended to groundwater, approximately ten feet below ground surface. The former tank excavation backfill was removed until native soil was encountered, 10 to 13 feet below ground surface. The lateral extent of the excavation is shown on Figure A1 in Appendix A. The soil was treated by aeration and transported off-site for disposal. About 1,200 cubic yards of materials were removed from the site. Soil samples were collected from the sidewalls and base of the excavation. The analytical results indicated that residual concentrations of TPH ranging from 50 to 2,100 mg/kg remained in the soil on-site.<sup>3</sup>

In 1990, Subsurface Consultants designed a groundwater extraction trench along the northwestern side of 98th Avenue across the street from the project site. The trench and associated piping was installed as part of a proposed groundwater remediation system for collection and treatment of groundwater affected by petroleum and chlorinated hydrocarbons in the area of the site. The system, as designed, was to include a bioreactor system for treatment of groundwater extracted from the trench. The bioreactor system was not installed and extraction of groundwater was never initiated.

Hydrogeologic investigation of the site was resumed in 1993 by Applied Geotechnology, Inc. (AGI). Water level measurements were made monthly in April, May, and June 1993 from MW-1, 2, 3, and 4 and Well 18 (the location of well MW-5 had been paved over at this time, precluding sampling and water level measurements of that well). Prior to the water level measurements, the tops of casings of the wells had been surveyed relative to the City of Oakland Datum. During each water level

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<sup>3</sup>Subsurface Consultants, Inc., 1990, *Progress Report, Contaminated Soil Removal Utility Trench Alignment, 98th and Edes Avenues, Oakland, California*, 13 December.

TABLE I  
 SUMMARY OF ANALYTICAL RESULTS, GROUNDWATER  
 PETROLEUM AND AROMATIC HYDROCARBONS  
 670 98th Avenue, Oakland, California  
 (mg/L)

Sample ID	Date	Gasoline	Diesel	Kerosene	Total Oil & Grease	Benzene	Toluene	Ethyl-benzene	Xylenes	Total Lead
MW-1	2/12/90	0.0551	0.100	--	ND	0.0608	0.0119	ND	0.0199	--
	6/30/90	0.95/<0.05	<0.5	--	--	<0.0005	<0.0005	<0.0005	<0.0005	--
	10/4/90	<b>2,940</b>	<0.2	--	--	7.78	26.7	20	20.3	--
	4/15/93	--	--	--	--	--	--	--	--	--
	3/31/95	5.9	-- <sup>1</sup>	2.3 <sup>2</sup>	--	0.067	0.012	0.092	0.5	0.014
MW-2	2/13/90	0.0351	0.100	--	ND	ND	ND	0.0013	0.004	--
	6/30/90	<0.5/<0.05	<0.5	--	--	<0.0005	<0.0005	<0.0005	<0.0005	--
	10/4/90	0.0528	<0.2	--	--	<0.0005	<0.0005	<0.0005	<0.0005	--
	4/15/93	<1.0	<1.0	--	--	<0.001	<0.001	<0.001	<0.001	--
	3/31/95	<0.05	<0.05	<0.05	--	<0.0005	<0.0005	<0.0005	<0.0005	0.0042
MW-3	2/13/90	ND	0.100	--	ND	ND	ND	ND	0.0029	--
	6/30/90	2.6/0.85	<0.5	--	--	<0.0005	<0.0005	<0.0005	0.044	--
	10/4/90	0.0429	<0.2	--	--	<0.0005	<0.0005	<0.0005	0.0085	--
	4/15/93	<1.0	<1.0	--	--	<0.001	<0.001	<0.001	<0.001	--
	3/31/95	1.6	-- <sup>1</sup>	0.5 <sup>2</sup>	--	<0.0005	<0.0005	<0.0005	0.0041	<0.003
MW-4	2/13/90	ND	ND	--	ND	ND	ND	ND	ND	--
	6/30/90	<0.5/<0.05	<0.5	--	--	<0.0005	<0.0005	<0.0005	<0.0005	--
	10/4/90	<0.020	<0.2	--	--	<0.0005	<0.0005	<0.0005	<0.0005	--
	5/24/93	<1.0	<1.0	--	--	<0.001	<0.001	<0.001	<0.001	--
MW-5	2/13/90	ND	ND	--	ND	ND	ND	ND	ND	--
	6/30/90	<0.5/<0.05	<0.5	--	--	<0.0005	<0.0005	<0.0005	<0.0005	--
	10/4/90	<0.020	<0.2	--	--	<0.0005	<0.0005	<0.0005	<0.0005	--
Well 18	2/14/90	134	17	--	120	3.73	8.92	5.43	22	--
	6/30/90	26/20	2.4	--	--	0.66	0.47	0.18	2.0	--
	10/4/90	4.9	<0.2	--	--	0.082	0.04	0.19	0.635	--
	4/15/93	7	10 <sup>2</sup>	--	--	0.440	0.180	0.340	1.6	--
	3/31/95	11	-- <sup>1</sup>	1.9 <sup>2</sup>	--	0.19	0.01	0.35	1.3	0.016
Travel Blank	3/31/95	<0.05	--	--	--	<0.0005	<0.0005	<0.0005	<0.0005	--

Notes: -- = Constituent not analyzed or data not available.  
 <x.x = Constituent not detected at stated reporting limit.  
 ND = Constituent not detected; reporting limit unknown.  
 xx/xx = Duplicate sample.  
 xx = Bolded numbers indicate compounds identified above the level of detection.

1990 groundwater samples collected by Subsurface Consultants.  
 Monitoring well locations are shown on Figure 2.  
 Laboratory Reports are included in Appendix C.

<sup>1</sup>Diesel range not reported by laboratory due to overlap of hydrocarbon ranges.  
<sup>2</sup>Laboratory reports that sample chromatogram does not resemble hydrocarbon standards.



TABLE 2  
 SUMMARY OF ANALYTICAL RESULTS, GROUNDWATER  
 CHLORINATED HYDROCARBONS  
 670 98th Avenue, Oakland, California  
 (mg/L)

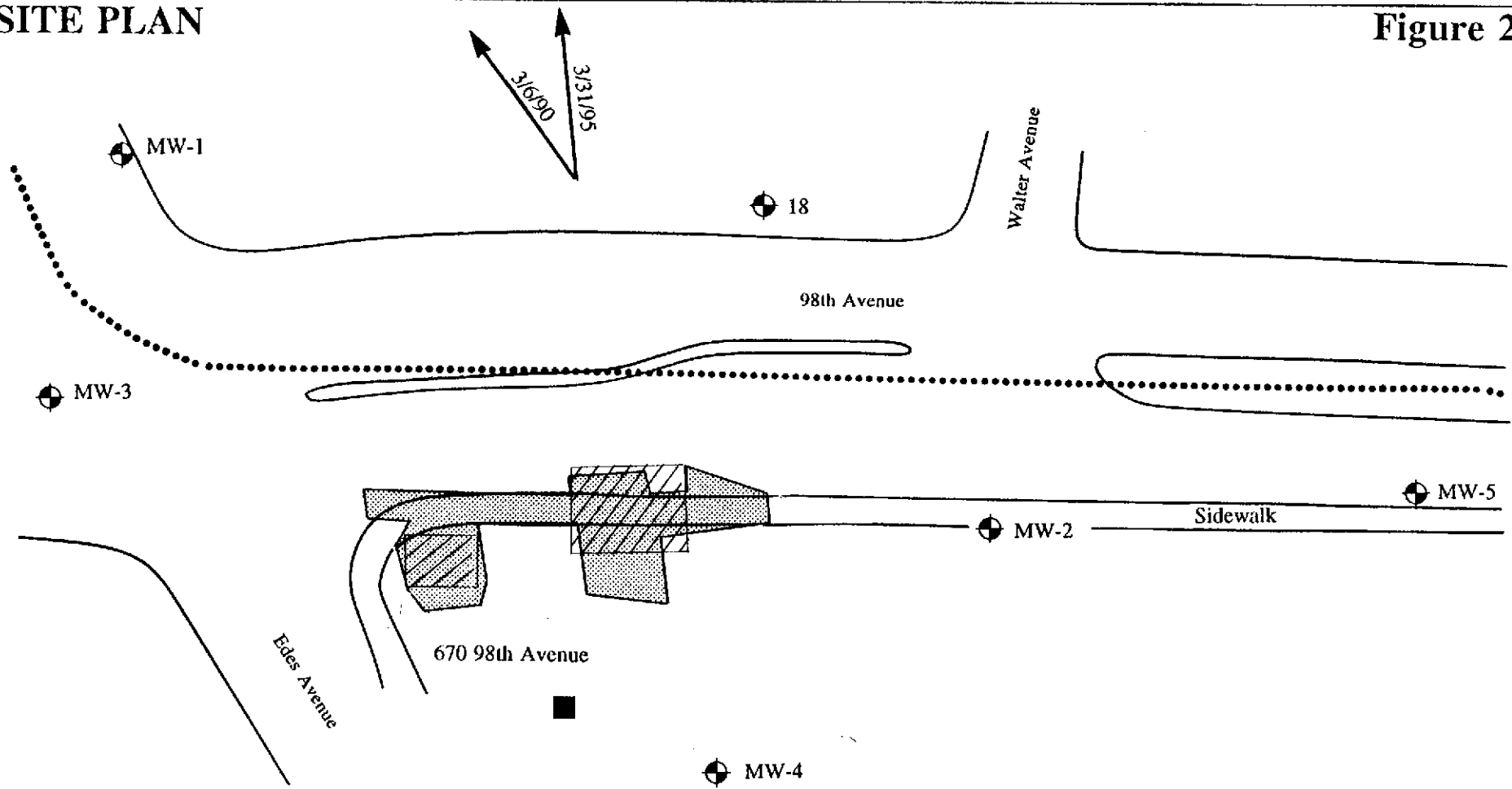
Sample ID	Date	1,1 Dichloro-ethene	1,1 Dichloro-ethane	Total 1,2 dichloro-ethene	1,1,1 Trichloro-ethane	Trichloro-ethene	Dibromo-chloro-methane	Tetrachloro-ethene	Chloroform
MW-1	2/12/90	ND	ND	ND	<b>0.0051</b>	<b>0.0118</b>	<b>0.009</b>	<b>0.0024</b>	ND
	6/30/90	<0.001	<b>0.0041</b>	<0.001	<b>0.008</b>	<b>0.013</b>	<0.001	<b>0.0028</b>	<0.001
	10/4/90	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5
	3/31/95	<0.01	<0.01	<0.01	<0.01	<0.01	<0.02	<0.01	<0.01
MW-2	2/13/90	<b>0.0071</b>	<b>0.0049</b>	ND	<b>0.0116</b>	<b>0.0251</b>	<b>0.0079</b>	<b>0.0085</b>	ND
	6/30/90	<b>0.0031</b>	<b>0.0051</b>	<b>0.0048</b>	<b>0.015</b>	<b>0.035</b>	<0.001	<b>0.016</b>	<0.001
	10/4/90	<0.0005	<b>0.0024</b>	<0.0005	<b>0.0063</b>	<b>0.0187</b>	<0.0005	<b>0.0068</b>	<0.0005
	4/15/93	<0.001	<0.001	<0.001	<0.001	<b>0.014</b>	<0.001	<0.001	<0.001
	3/31/95	<b>0.0017</b>	<b>0.0011</b>	<b>0.0014</b>	<b>0.0051</b>	<b>0.046</b>	<0.001	<b>0.022</b>	<0.001
MW-3	2/13/90	<b>0.0057</b>	ND	ND	<b>0.0171</b>	<b>0.0217</b>	<b>0.0692</b>	<b>0.0016</b>	ND
	6/30/90	<b>0.0013</b>	<b>0.0021</b>	<b>0.0035</b>	<b>0.021</b>	<b>0.026</b>	<0.001	<b>0.0062</b>	<0.001
	10/4/90	<0.0005	<0.0005	<0.0005	<b>0.011</b>	<b>0.0245</b>	<0.0005	<b>0.0051</b>	<0.0005
	4/15/93	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
	3/31/95	<b>0.0022</b>	<0.001	<0.001	<b>0.018</b>	<b>0.018</b>	<0.002	<b>0.0041</b>	<0.001
MW-4	2/13/90	ND	ND	ND	<b>0.0018</b>	<b>0.0024</b>	<b>0.0153</b>	<b>0.0674</b>	ND
	6/30/90	<0.001	<0.001	<0.001	<b>0.0027</b>	<b>0.003</b>	<0.001	<b>0.26</b>	<0.001
	10/4/90	<0.0005	<0.0005	<0.0005	<b>0.0011</b>	<b>0.0028</b>	<0.0005	<b>0.0955</b>	<b>0.0007</b>
	5/24/93	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
MW-5	2/13/90	ND	ND	ND	<b>0.0013</b>	<b>0.001</b>	ND	<b>0.0014</b>	ND
	6/30/90	<0.001	<0.001	<0.001	<b>0.0013</b>	<0.001	<0.001	<b>0.0021</b>	<0.001
	10/4/90	<0.0005	<0.0005	<0.0005	<b>0.0005</b>	<0.0005	<0.0005	<b>0.0007</b>	<0.0005
Well 18	2/14/90	ND	ND	ND	ND	ND	ND	ND	ND
	6/30/90	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	10/4/90	<0.005	<0.005	<0.0005	<b>0.009</b>	<b>0.091</b>	<0.005	<b>0.006</b>	<0.0005
	4/15/93	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
	3/31/95	<0.01	<0.01	<0.01	<0.01	<b>0.029</b>	<0.01	<b>0.01</b>	<0.01
Travel Blank	3/31/95	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001

Notes: -- = Constituent not analyzed or data not available.  
 <x.x = Constituent not detected at stated reporting limit.  
 ND = Constituent not detected; reporting limit unknown.

xx = Bolded numbers indicate compounds identified above the level of detection.  
 1990 groundwater samples collected by Subsurface Consultants.  
 Monitoring well locations are shown on Figure 2.  
 Laboratory reports are included in Appendix C.

# SITE PLAN

Figure 2



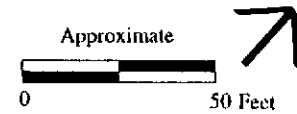
## Legend

- MW-5 Groundwater Monitoring Well
- Former Waste Oil Tank Location
- Groundwater Flow Direction
- Areas of Previous Excavation
- Former Gasoline Tank Locations
- 27-Inch Storm Drain

**670 98th Avenue  
Oakland, California**

Source: Subsurface Consultants, Inc., 1990.

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monitoring event, free product was detected in MW-1, ranging in thickness from 0.005 to 0.02 feet. The water level measurements indicated a consistent gradient directed to the northwest.<sup>4</sup>

On 15 April 1993, AGI collected samples from wells MW-2, MW-3, and well 18. In acknowledgement of contamination reflected by the observed presence of free product in monitoring well MW-1, samples were not collected in this well. In April 1993, MW-4 was buried by fill and was not accessible for sampling. The well was uncovered and subsequently sampled on 24 May 1993. The collected groundwater samples were submitted to CKY, Inc. laboratories for analysis of total petroleum, aromatic, and chlorinated hydrocarbons. The results of the analyses indicated the presence of total petroleum hydrocarbons and aromatic hydrocarbons in the sample from Well 18. One chlorinated hydrocarbon compound, trichloroethene, was detected in MW-2. No chlorinated hydrocarbon compounds were detected in any of the other samples.

In the report on the 1993 groundwater sampling event, AGI included an evaluation of potential on- and off-site sources of chemical compounds detected in the samples collected from the groundwater monitoring network for the project site. The report identified 39 sites within 2,000 feet of the project site as potential sources of the release of industrial solvents. On the basis of proximity to the site and position relative to groundwater flow direction, the report concluded that nine sites had a low to moderate potential for being associated with the chlorinated hydrocarbons detected in groundwater at and adjacent to the project site. The known waste oil tank at the project site and a suspected waste oil tank at 692 98th Avenue (located adjacent to and northeast of the site) were included as two of the nine "low to moderate" potential sites. The nine sites are identified in Table 3.

## HYDROGEOLOGY

The site is located in the East Bay Plain and is underlain by fluvial and alluvial fan deposits. The fluvial deposits consist primarily of fine-grained sands, silts, and clays. The alluvial deposits consist of a heterogeneous mixture of clay, silt, sand, and gravel. According to soil and well borings drilled at the site, the subsurface materials encountered at the site consist primarily of silty and sandy clays to depths of approximately 12 to 15 feet below ground surface. This is underlain by a gravelly sand which extends to a depth of approximately 24 feet. The gravelly sand is underlain by interbedded clay, sandy clay, and clayey sand layers.

The regional groundwater gradient is west-northwestward to the Bay, the direction of the ground surface slope. Measurement of groundwater levels in wells at the site indicates that the localized gradient is directed northwestward.<sup>5</sup> The direction of groundwater flow indicates that wells MW-1, MW-3, and Well 18 are located downgradient to crossgradient of the former tank locations; MW-2, MW-4, and MW-5 are upgradient to crossgradient wells.

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<sup>4</sup>Applied Geotechnology, 1993, *Limited Phase I Environmental Assessment and Groundwater Monitoring*, 670 and 692 98th Avenue, Oakland, California, 11 August.

<sup>5</sup>Subsurface Consultants, Inc., 1990, *Soil and Groundwater Contamination Assessment, Phase 2, 98th and Edes Avenues*, Oakland, California, 10 April.

TABLE 3

**POTENTIAL SOURCES OF GROUNDWATER CONTAMINATION<sup>1</sup>**  
**670 98th Avenue, Oakland, California**

Site No.	Site Address	Site Identification	Site Activity	Potential Contaminants
1	670 98th Avenue	Former fuel station	Fuel storage and dispensing, possible vehicle repair	Fuel products, industrial solvents
2	692 98th Avenue	Former fuel station	Fuel storage and dispensing, possible vehicle repair	Fuel products, industrial solvents
3	10132 Edes Avenue	Action Plating	Abandoned metal plating facility, electroplating activities	Industrial solvents
4	10306 Pearmain Street	K&L Plating and Manufacturing	Metal plating facility	Industrial solvents
5	10122 Pippin Street	Mortensens	Underground storage tank operation	Fuel products; industrial solvents
6	10222 Pearmain Street	Melrose Metal Finishing	Metal manufacturing	Industrial solvents
7	718 Douglas Avenue	Allen ABDOS Co.	Underground storage tank operation; equipment storage	Fuel products; industrial solvents
8	Pearmain Street and 100th Avenue	B&M Foundry	Metal manufacturing	Industrial solvents
9	105 and Edes Avenues	General Metals Corporation Foundry	Metal manufacturing	Industrial solvents

<sup>1</sup> Sites identified by AGI (1993) as having low to moderate potential for generating releases of petroleum or chlorinated hydrocarbons detected in groundwater monitoring network for 670 98th Avenue.

## FIELD ACTIVITIES

### Field Inspection

A BASELINE geologist inspected the condition of the monitoring wells at the site on 31 March 1995. Two of the wells, MW-4 and MW-5 could not be located. The area where MW-5 was located had been paved over. The area where MW-4 was located was covered with gravel within the area currently occupied by the U.S. Rental facility. The approximate location of well MW-4 was identified by measuring scaled distances from monitoring well MW-3. Surface gravel fill was scraped from the immediate area with a shovel, but the well was not found.

The wells that were located (MW-1, MW-2, MW-3, and Well 18) appeared to be in good condition. The traffic-rated Christy boxes protecting the wells were in good condition, but were not water-tight. The well caps and locks were generally found to be in poor condition; locks were missing at some of the wells.

### Groundwater Sampling Activities

Groundwater samples were collected from the four accessible monitoring wells, MW-1, MW-2, MW-3, and Well 18 on 31 March 1995 (Figure 2). The presence of floating product was checked and water levels were measured in each of the wells using a dual-interface probe. Floating product was not identified in any of the wells. The probe was decontaminated by washing with a trisodium phosphate solution and rinsing with deionized water between use at each well. Approximately four to five well volumes of water were slowly purged from each well using a double-diaphragm pump and new disposable polyethylene tubing. The temperature, pH, and electrical conductivity of the groundwater were monitored during purging until they appeared to have stabilized. Water levels were measured again following purging to ensure that the groundwater had sufficiently recharged prior to sampling. All decontamination rinsate and purged groundwater were stored on-site in sealed, labeled drums pending laboratory analysis.

After the water levels had sufficiently recovered, groundwater samples were collected from each well using new disposable PVC bailers, and decanted into appropriate sample containers provided by the analytical laboratory. The groundwater samples were labeled, placed in a cooler containing ice, and transported to Curtis & Tompkins, Ltd., a California-certified analytical laboratory. The groundwater samples were analyzed for gasoline (Method 5030/8015M), diesel (Method 3550/8015M), benzene, toluene, xylenes, ethylbenzene (Method 8020), volatile chlorinated hydrocarbons (Method 8010), and total lead (Method 7421). A blank water sample was prepared by the laboratory for quality control purposes. The blank sample was stored and submitted with the groundwater samples to the laboratory for gasoline, BTXE, and volatile chlorinated hydrocarbons analyses. Groundwater sampling forms that document the March 1995 purging sampling activities are included in Appendix B.

## FINDINGS

### Analytical Results

The analytical results indicate the presence of petroleum hydrocarbons and aromatic hydrocarbons in groundwater at the three down- to crossgradient wells (MW-1, MW-3, and Well 18). Monitoring well MW-2 (up- and crossgradient from the site) did not contain detectable levels of these compounds (Table 1). Gasoline was detected in each of the three wells, ranging in concentration from 11 mg/L

at Well 18 to 1.6 mg/L at MW-3. Diesel was also detected in each of the three wells; although the detected extractable hydrocarbon was quantified by the laboratory as kerosene, the sample chromatograms did not match standards for diesel or kerosene.

Several chlorinated hydrocarbons (Table 2) were detected in the groundwater samples from MW-2 (up- and crossgradient), MW-3 and Well 18 (down- and crossgradient). No chlorinated compounds were identified in the downgradient well MW-1 (at reporting levels of 0.010 mg/L). Trichloroethene (TCE) and tetrachloroethene were detected in each of these three wells. MW-2 and MW-3 also contained 1,1 dichloroethene and 1,1,1 trichloroethane. Total 1,2 dichloroethene and 1,1 dichloroethane were also found in the sample from MW-2. A summary of the volatile chlorinated hydrocarbon results is presented in Table 2 and the laboratory reports are included in Appendix C.

### Groundwater Flow Direction

Groundwater elevations ranged from 91.93 to 92.36 feet above site datum<sup>6</sup> (ASD) in the four accessible wells at the site in March 1995. The direction of groundwater flow was calculated to be to the northwest (N55W), with a gradient of 0.002. The calculated gradient is generally consistent with the gradient shown in previous reports by Subsurface Consultants. Groundwater elevation data and calculated flow directions are summarized in Table 4 and shown on Figure 2.

## CONCLUSIONS

### Field Inspection

- The locking well caps were found to be in poor condition. The Christy boxes are not watertight and do not restrict runoff from entering and accumulating in the Christy box around the well. With poorly sealing well caps, it is possible that accumulated water may enter the wells. Urban runoff may contain contaminants such as oils, fuels, metals, and sediment. Large volumes of sediment were removed from the wells during purging activities. This may be the result of sediment entering the well or due to incomplete well development following well construction.

### Groundwater Sampling

#### *Petroleum and Aromatic Hydrocarbons*

- The four accessible wells were checked for free product; none was identified; however, a slight petroleum odor and a petroleum sheen were observed on the groundwater at Well 18. Free product observed in MW-1 in 1993 was not detected. The thickness of free product reported in 1993 (0.005 to 0.02) decreased significantly from the maximum thickness (0.52 feet) reported in October 1990.
- The detection of total petroleum hydrocarbons (as gasoline and possibly kerosene or diesel) and aromatic hydrocarbons in wells downgradient and crossgradient of the project site (MW-1, MW-3, and Well 18) confirm the release of these compounds to the subsurface. The history of releases

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<sup>6</sup> Elevations at top of casing were referenced by Subsurface Consultants to an arbitrary site datum set at a point across Edes Avenue.

TABLE 4

**GROUNDWATER ELEVATIONS, FLOW DIRECTIONS  
AND GRADIENT MAGNITUDES  
670 98th Avenue  
Oakland, California**

Date	MW-1 <sup>1</sup>		MW-2 <sup>2</sup>		MW-3 <sup>3</sup>		MW-4 <sup>4</sup>		MW-5 <sup>5</sup>		Well 18 <sup>6</sup>		Ground-water Flow Direction	Gradient Magnitude
	Depth to Ground-water (feet from TOC)	Ground-water Elevation (feet)	Depth to Ground-water (feet from TOC)	Ground-water Elevation (feet)	Depth to Ground-water (feet from TOC)	Ground-water Elevation (feet)	Depth to Ground-water (feet from TOC)	Ground-water Elevation (feet)	Depth to Ground-water (feet from TOC)	Ground-water Elevation (feet)	Depth to Ground-water (feet from TOC)	Ground-water Elevation (feet)		
3/1/90 <sup>7</sup>	8.95	7.24	8.85	7.67	9.17	7.39	9.98	7.73	9.61	--	8.53	7.44	-- <sup>8</sup>	-- <sup>8</sup>
3/6/90 <sup>7</sup>	8.55	7.64	8.46	8.06	8.78	7.78	9.60	8.11	9.23	--	8.11	7.86	-- <sup>8</sup>	-- <sup>8</sup>
3/23/90 <sup>7</sup>	9.17	7.02	9.02	7.50	9.35	7.21	10.20	7.51	9.80	--	8.73	7.24	-- <sup>8</sup>	-- <sup>8</sup>
6/30/90 <sup>7</sup>	9.56	6.63	9.40	7.12	9.74	6.82	10.57	7.14	10.17	--	9.11	6.86	-- <sup>8</sup>	-- <sup>8</sup>
10/4/90 <sup>7</sup>	10.23	5.96	9.80	6.72	10.17	6.39	10.98	6.73	10.59	--	9.50	6.47	-- <sup>8</sup>	-- <sup>8</sup>
4/15/93 <sup>9</sup>	8.47	7.73 <sup>10</sup>	8.31	8.21	8.65	7.91	-- <sup>11</sup>	--	-- <sup>11</sup>	--	8.06	7.91	-- <sup>8</sup>	-- <sup>8</sup>
5/24/93 <sup>9</sup>	8.93	7.28 <sup>10</sup>	8.73	7.79	9.10	7.46	9.88	7.83	-- <sup>11</sup>	--	8.49	7.48	-- <sup>8</sup>	-- <sup>8</sup>
6/24/93 <sup>9</sup>	8.86	7.33 <sup>10</sup>	8.63	7.89	9.02	7.54	9.78	7.93	-- <sup>11</sup>	--	8.40	7.57	-- <sup>8</sup>	-- <sup>8</sup>
3/31/95	7.47	8.75	7.35	9.17	7.67	8.89	-- <sup>11</sup>	--	-- <sup>11</sup>	--	7.09 <sup>12</sup>	8.88	N55W	0.002

**Notes:** TOC = Top of well casing.

-- = Data not available.

<sup>1</sup> Elevation of top of casing = 16.19 feet above City of Oakland datum.

<sup>2</sup> Elevation of top of casing = 16.52 feet above City of Oakland datum.

<sup>3</sup> Elevation of top of casing = 16.56 feet above City of Oakland datum.

<sup>4</sup> Elevation of top of casing = 17.71 feet above City of Oakland datum.

<sup>5</sup> Monitoring well not accessible during elevation survey.

<sup>6</sup> Elevation of top of casing = 15.97 feet above City of Oakland datum.

<sup>7</sup> Groundwater data collected by Subsurface Consultants, Inc. (SCI).

<sup>8</sup> Groundwater flow direction and gradient magnitude not reported.

<sup>9</sup> Groundwater data collected by Applied Geotechnology, Inc. (AGI).

<sup>10</sup> Free product detected. Reported groundwater elevation adjusted by AGI for presence of free product.

<sup>11</sup> Monitoring wells were inaccessible.

<sup>12</sup> Slight petroleum odor and sheen.

of petroleum hydrocarbons at the site and its position upgradient of these monitoring points indicate that the site is a potential source of these contaminants.

- Petroleum hydrocarbons and aromatic hydrocarbons were not detected in the MW-2, located upgradient to crossgradient of the identified sources at the project site. Although it is possible that upgradient sources may also be contributing to the constituents detected in the groundwater downgradient of the site, recent and past analytical results for upgradient to crossgradient monitoring points (MW-2, MW-4, and MW-5) do not suggest the presence of an upgradient source of petroleum hydrocarbons and aromatic hydrocarbons.
- The concentrations of petroleum hydrocarbons detected in the March 1995 sample from MW-1 have declined significantly relative to sampling results for October 1990, but are similar or somewhat higher than the February and June 1990 sample results. The concentrations of hydrocarbons in the March 1995 samples from MW-3 are generally similar to previous results; the concentrations at Well 18 are similar to concentrations detected in October 1990 and April 1993 but significantly less than the highest detected levels identified in February 1990. Benzene concentrations detected in samples from MW-1 and Well 18 exceed the California maximum contaminant level (MCL) of 0.001 mg/L<sup>7</sup>. It is possible that the decline in concentrations of hydrocarbons at MW-1 and Well 18 might reflect that attenuation of hydrocarbons levels by dilution or natural biodegradation, or indicate that the hydrocarbon plume has migrated farther downgradient from these well locations.
- It is our understanding that only gasoline and waste oil were stored at the site. The diesel or kerosene identified in groundwater samples could represent a mixture of degraded gasoline and oil, or other hydrocarbons not identified as stored on-site, or possibly hydrocarbons from an off-site location such as the former service station at 692 Fruitvale Avenue.
- Total lead was detected in samples from MW-1, MW-2, and Well 18 at concentrations ranging from 0.0042 to 0.016 mg/L. These concentrations are below the MCL of 0.05 mg/L for lead<sup>8</sup>.

#### *Chlorinated Hydrocarbons*

- The analytical results for chlorinated hydrocarbons for the recent and past sampling events indicate that the extent of these contaminants is not defined. Although chlorinated hydrocarbons were not detected in MW-1, the laboratory reporting limit was elevated (due to interference caused by high petroleum hydrocarbon concentration) and the absence of these compounds cannot not be assumed.
- The underground waste oil storage tank removed from the site could have been used for the disposal of industrial solvents or other compounds containing chlorinated hydrocarbons. Therefore, the former tank is a potential source of the chlorinated hydrocarbons detected in groundwater.

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<sup>7</sup>California Code of Regulations, Title 26, §22-64444.5

<sup>8</sup>California Code of Regulations, Title 26, §22-64435



- The presence of chlorinated hydrocarbons in wells upgradient to crossgradient (MW-2, MW-4, and MW-5) of the former waste oil tank location may indicate that an off-site and upgradient source for these constituents. The closest potential upgradient to crossgradient sources identified in the vicinity of the site are the former service station at 692 98th, Action Plating site (10132 Edes Avenue), and the former B&M Foundry site (Pearmain & 100th Avenue). However, it is possible that upgradient and crossgradient lateral spreading could be caused by preferential flow of chlorinated hydrocarbons away from the former on-site waste oil tank location within more permeable soils in the subsurface or along capillary boundaries.

### Extent of Affected Groundwater

- The extent of groundwater affected by releases of petroleum hydrocarbons is not defined by the existing monitoring network. Additional monitoring points are necessary downgradient and crossgradient of MW-1 to determine the lateral extent of groundwater affected by petroleum hydrocarbons. The upgradient and crossgradient extent of groundwater affected by chlorinated hydrocarbons have not been determined.
- The potential effectiveness of the groundwater extraction system previously installed at the project site cannot be evaluated until the extent of affected groundwater is determined. Groundwater contamination may extend beyond the capture zone for the previously installed extraction system.
- The flow of shallow groundwater underlying the project site could be affected by the presence of utility trenches which extend below the groundwater table. Utility trenches which fully penetrate the upper low-permeability clayey soils could provide a preferential path for groundwater flow. This condition would be particularly significant when groundwater levels rise above the contact of the upper clayey soils and lower, more permeable, sand and gravel deposits. The 27-inch storm drain which runs down 98th Avenue then westward along Edes Avenue may present these conditions.

### RECOMMENDATIONS

- To prevent urban runoff from accumulating and possibly entering the monitoring wells, we recommend replacing the locking well caps with watertight caps and new locks, and if feasible, replacing the existing Christy boxes with boxes that have watertight seals. Yes
- We recommend reviewing regulatory records to determine whether any permits were acquired for destroying wells MW-4 and MW-5, or if there are any other documents at the City that pertain to well destruction at the site. If no evidence of well destruction can be found, we recommend contracting with a geophysical or utility-locating service to search for the missing wells. The Christy boxes used to complete the wells at the surface are constructed of metal and might be located using geophysical or metal detecting instruments. If the wells are not identified by these methods, limited excavation at the assumed well locations should be performed to locate the wells and assess the condition of the wells. Yes
- If monitoring well MW-4 were not located, or were found to be damaged, the well should be replaced with a monitoring well in the general vicinity. The replacement well should be relocated Not necessary to replace MW-4 or MW-5

to a position upgradient of the former location of the waste oil tank. If MW-5 were not located, it should not be replaced; if it were found to be damaged, it should be abandoned.

- The location of underground storage tanks that may be located at the 692 98th site should be researched further. Sanborn maps and building permit files should be reviewed to determine if accurate locations of the tanks have been documented. If the records do not identify the tank locations and records of removal are not available, a geophysical survey should be performed to determine the location of the tanks.
- The extent of petroleum, aromatic, and chlorinated hydrocarbons in the groundwater remains undefined. We recommend conducting a survey of groundwater quality in the vicinity of the site using temporary well points (Hydropunch or similar devices) to collect groundwater samples. Groundwater samples could be collected both upgradient and downgradient of the known affected area and near any sites in the vicinity identified as possible contributory sources. The positions of the monitoring points would be determined based on the expected extent of groundwater contamination and the location of any identified potential off-site sources. In addition, monitoring points along the storm drain along 98th and Edes Avenue should be included. Once the extent of groundwater contamination has been estimated using the temporary well points, additional groundwater monitoring wells should be installed and monitored quarterly with the existing wells for one year to provide data for accessing remedial options. A work plan would need to be developed and permits obtained following the completion of the recommended regulatory review.

## LIMITATIONS

The conclusions presented in this report are professional opinions based on the indicated data described in this report. They are intended only for the purpose, site, and project indicated. Opinions and recommendations presented herein apply to site conditions existing at the time of our study. Changes in the conditions of the subject property can occur with time, because of natural processes or the works of man, on the subject sites or on adjacent properties. Changes in applicable standards can also occur as the result of legislation or from the broadening of knowledge. Accordingly, the findings of this report may be invalidated, wholly or in part, by changes beyond our control.

- ① verify contain in MWS MW-1 and 18 are from site, i.e. HP in between site and MWS.
- ② verify source of HVOGS, if not from site, do not need to do further investigation or monitoring.

**APPENDIX A**  
**BACKGROUND SOIL QUALITY DATA**

TABLE A1

SUMMARY OF ANALYTICAL RESULTS, SOIL  
 PETROLEUM AND AROMATIC HYDROCARBONS  
 670 98th Avenue, Oakland, California

(mg/kg)

Sample ID	Date	Depth (feet)	TPH as Gasoline	TPH as Diesel	Total Oil & Grease	Benzene	Toluene	Ethylbenzene	Xylenes
<u>Soil Borings</u>									
1	5/25/89	7 <sup>1,2</sup>	<10	<10	60	--	--	--	--
		10	1,100	--	--	8.1	2.6	31	120
		13.5	<10	--	--	0.025	0.015	0.052	0.23
2	5/25/89	5	280	--	--	3.1	17	12	72
		9	1,100	--	--	16	31	39	130
		11	13,000	--	--	--	--	--	--
3	5/25/89	4	20	--	--	0.39	0.90	0.33	1.7
		7	<10	--	--	--	--	--	--
		10	260	--	--	1.7	6.2	3.1	26
4	5/25/89	3	14	--	--	0.83	1.1	0.71	3.6
		9	150	--	--	4.7	5.9	6.8	49
5	5/25/89	7	130	--	--	4.7	17	13	58
		10	930	--	--	11	32	20	90
		12	2,600	--	--	--	--	--	--
6	5/25/89	6	<10	--	--	<0.005	<0.005	<0.005	<0.015
		9	45	--	<50	1.1	1.2	2.2	16
7	5/26/89	3 <sup>1</sup>	45	--	--	3.7	6.0	2.6	14
		9 <sup>1</sup>	200	--	--	5.2	8.3	2.9	16
8	5/26/89	7	<10	--	--	<0.010	0.018	<0.010	<0.020
		9	120	--	--	1.5	0.27	4.7	--
9	5/26/89	8	<10	--	--	0.017	<0.010	<0.010	<0.020
		11	--	--	--	--	--	--	--
10	5/26/89	2	<10	--	--	<0.010	0.048	0.012	0.047
		8	<10	--	--	<0.010	0.12	<0.010	<0.020
11	5/26/89	3	16	--	--	0.94	1.9	0.48	2.5
		8	150	--	--	3.3	6.3	3.4	15
12	5/26/89	4	<10	--	--	<0.010	0.046	<0.010	<0.020
		8	440	<10	--	--	--	--	--
		10	310	--	--	1.5	2.2	2.9	13

(Continued)

Table A1: Summary of Analytical Results, Soil - Petroleum and Aromatic Hydrocarbons (Continued)

Sample ID	Date	Depth (feet)	TPH as Gasoline	TPH as Diesel	Total Oil & Grease	Benzene	Toluene	Ethylbenzene	Xylenes
13	5/26/89	8 <sup>1,2</sup>	9,600	67	<50	23	270	190	1,000
		11 <sup>1</sup>	25,000	--	--	--	--	--	--
		13	28	--	--	--	--	--	--
14	5/26/89	12.5 <sup>1</sup>	730	--	--	--	--	--	--
15	2/9/90	6	ND	--	--	ND	0.003	0.004	0.006
		9.5	0.737	16	--	0.75	8.32	9.25	49.0
		10.5	56.6	1,540	--	39.1	260	96.2	519
16	2/9/90	4	ND	--	--	ND	0.079	ND	0.005
		7	0.641	62	--	0.4	2.13	1.43	8.06
		11.5	10.2	5,650	--	13.1	81.9	25.3	146
17	2/9/90	8	ND	--	--	ND	0.007	ND	ND
		10	ND	ND	--	ND	0.037	0.108	0.444
		11.5	ND	--	--	ND	0.007	0.038	0.135
19	2/9/90	10	ND	--	--	ND	0.007	ND	ND
20	2/9/90	9	ND	--	--	ND	0.007	0.003	0.011
21	2/9/90	7.5	ND	--	--	ND	0.005	0.007	0.016
		9.5	ND	16	ND	ND	0.072	0.280	0.970
		11.5	754	20	--	ND	0.860	0.73	2.73
		13	ND	--	--	ND	0.017	0.024	0.07
<u>Monitoring Wells</u>									
MW-1	2/7/90	8	ND	--	--	0.329	0.007	0.070	0.130
		10.5	ND	732	--	1.690	12.8	9.47	48.3
		12	ND	--	--	0.072	0.004	0.006	0.002
MW-2	2/7/90	6	ND	--	--	ND	ND	ND	ND
		9 <sup>2</sup>	ND	293	278	ND	0.355	0.81	3.98
		12	ND	--	--	ND	ND	0.74	3.74
MW-3	2/8/90	6	ND	--	--	ND	ND	ND	ND
		9	14.4	352	840	ND	ND	1.99	10.2
MW-4	2/8/90	4.5	ND	--	--	ND	ND	ND	ND
		10.5	ND	ND	ND	ND	ND	ND	ND
		13.5	ND	--	--	ND	ND	ND	ND
MW-5	2/9/90	9	ND	ND	--	ND	ND	ND	ND
		11	ND	--	--	ND	0.003	ND	ND

(Continued)

Table A1: Summary of Analytical Results, Soil - Petroleum and Aromatic Hydrocarbons (Continued)

Sample ID	Date	Depth (feet)	TPH as Gasoline	TPH as Diesel	Total Oil & Grease	Benzene	Toluene	Ethyl-benzene	Xylenes
18	2/9/90	8	ND	--	--	ND	0.008	0.003	0.012
		9.5	0.766	138	ND	0.333	1.39	2.63	11.5
		11.5	0.703	--	--	0.122	0.236	0.552	1.53
<u>Excavation Sidewall Samples<sup>3</sup></u>									
SW-1	10/90	9	ND	--	--	--	--	--	--
SW-2	10/90	12	81	--	--	--	--	--	--
SW-3	10/90	10	430	--	--	--	--	--	--
SW-4	10/90	9	210	--	--	--	--	--	--
NW-1	10/90	9	ND	--	--	--	--	--	--
NW-2	10/90	10	260	--	--	--	--	--	--
NW-3	10/90	9	420	--	--	--	--	--	--
NW-4	10/90	9	50	--	--	--	--	--	--
NW-5	10/90	9	83	--	--	--	--	--	--
WW-1 <sup>1</sup>	10/90	9	2,000	--	--	--	--	--	--
WW-2	10/90	9	140	--	--	--	--	--	--
<u>Excavation Base Samples<sup>3</sup></u>									
B-1	10/90	10	790	--	--	--	--	--	--
B-2	10/90	13.5	1,700	--	--	--	--	--	--
B-3	10/90	10	1,400	--	--	--	--	--	--
B-4	10/90	10.5	2,100	--	--	--	--	--	--

<sup>1</sup> Soil excavated from sample location.

<sup>2</sup> Sample also analyzed for purgeable halocarbons (Method 8010); no compounds detected.

<sup>3</sup> Collection date of excavation sidewall samples not reported.

Notes: -- = Constituent not analyzed or data not available.

<x.x = Constituent not detected at stated reporting limit.

ND = Constituent not detected, reporting limit unknown.

xx = Bolded numbers indicate compounds identified above the level of detection

1989 and 1990 soil samples collected by Subsurface Consultants, Inc.

Monitoring well and soil boring locations are shown on Figure 2.

**APPENDIX B**  
**GROUNDWATER SAMPLING FORMS**

# GROUNDWATER SAMPLING

Project no.:	93343-F0	Well no.:	MW-1	Date:	3/31/95
Project name:	670 98th Avenue	Depth of well from TOC (feet):	19.30		
Location:	670 98th Avenue	Well diameter (inch):	2		
	Oakland, CA	Screened interval from TOC (feet):	6-19.3		
Recorded by:	WKS	TOC elevation (feet):	99.4 (arbitrary datum)		
Weather:	Sunny	Water level from TOC (feet):	7.47	Time	9:10
Precip in past		Product level from TOC (feet):	None	Time	9:10
5 days (inch):	0	Water level measurement:	Dual-interface probe		

## VOLUME OF WATER TO BE REMOVED BEFORE SAMPLING:

$[(19.30 \text{ ft}) - (7.47 \text{ ft})] \times (0.083 \text{ ft})^2 \times 3.14 \times 7.48 =$	1.9 gallons in one well volume
Well depth    Water level    Well radius	9.6 gallons in 5 well volumes
	9.5 total gallons removed

## CALIBRATION:

	Time	Temp (° C)	pH	EC (µmho/cm)
Calibration Standard:	--		7.00/10.01	1,000
Before Purging:	10:00	18.0	7.00/10.01	900
After Purging:	12:49	18.9	7.17/10.06	1,000

## FIELD MEASUREMENTS:

Time	Temp (° C)	pH	EC (µmho/cm)	Cumulative Gallons Removed	Appearance
					Abundant silt in first few gallons
10:00	17.4	7.07	500	5	Slightly turbid with particles of algae
10:13	17.6	7.08	500	6	Slightly turbid with particles of algae
10:24	17.8	7.08	500	7.5	Very slightly turbid to clear
10:27	17.9	7.06	500	8.5	Very slightly turbid to clear
10:30	18.0	7.09	500	9.5	Very slightly turbid to clear

Water level after purging prior to sampling (feet):	7.48	Time	13:20
Appearance of sample:	Clear	Time	13:30
Duplicate/blank number:	Blank; TPHg, BTXE, 8010	Time	8:00
Purge method:	Double diaphragm pump; disposable polyethylene tubing		
Sampling equipment:	Disposable PVC bailer	VOC attachment:	Used for VOA samples
Sample containers:	2 40-ml VOAs, 2 1-liter amber glass		
Sample analyses:	TPHd, TPHg, BTXE, Lead, 8010	Laboratory:	Curtis & Tompkins
Decontamination method:	TSP and water, DI water rinse	Rinsate disposal:	Drum MW-1, MW-2, MW-3, 18

93343-F0.XLW (5/19/95)



# GROUNDWATER SAMPLING

Project no.:	93343-F0	Well no.:	MW-2	Date:	3/31/95
Project name:	670 98th Avenue	Depth of well from TOC (feet):	27.50		
Location:	670 98th Avenue	Well diameter (inch):	2		
	Oakland, CA	Screened interval from TOC (feet):	9-27.5		
Recorded by:	WKS	TOC elevation (feet):	99.72 (arbitrary datum)		
Weather:	Sunny	Water level from TOC (feet):	7.35	Time	11:40
Precip in past		Product level from TOC (feet):	None	Time	11:40
5 days (inch):	0	Water level measurement:	Dual-interface probe		

## VOLUME OF WATER TO BE REMOVED BEFORE SAMPLING:

$$[(27.50 \text{ ft}) - (7.35 \text{ ft})] \times (0.083 \text{ ft})^2 \times 3.14 \times 7.48 =$$

3.3 gallons in one well volume
16.5 gallons in 5 well volumes
<u>15.0 total gallons removed</u>

## CALIBRATION:

	Time	Temp (° C)	pH	EC (µmho/cm)
Calibration Standard:	--		7.00/10.01	1,000
Before Purging:	10:00	18.0	7.00/10.01	900
After Purging:	12:49	18.9	7.17/10.06	1,000

## FIELD MEASUREMENTS:

Time	Temp (° C)	pH	EC (µmho/cm)	Cumulative Gallons Removed	Appearance
11:51	18.7	7.18	500	3	Turbid with abundant silt and sand in first 2.5 gallons, then trace of silt
11:58	18.7	7.16	500	7	Very slightly turbid
12:04	18.4	7.07	450	10	Clear with trace of sand
12:07	18.4	7.09	500	12	Clear with trace of sand
12:12	18.4	7.08	500	15	Clear with trace of sand

Water level after purging prior to sampling (feet):	7.36	Time	13:58
Appearance of sample:	Clear	Time	14:00
Duplicate/blank number:	Blank; TPHg, BTXE, 8010	Time	8:00
Purge method:	Double diaphragm pump; disposable polyethylene tubing		
Sampling equipment:	Disposable PVC bailer	VOC attachment:	Used for VOA samples
Sample containers:	2 40-ml VOAs, 2 1-liter amber glass		
Sample analyses:	TPHd, TPHg, BTXE, Lead, 8010	Laboratory:	Curtis & Tompkins
Decontamination method:	TSP and water, DI water rinse	Rinsate disposal:	Drum MW-1, MW-2, MW-3, 18

93343-F0.XLW (5/19/95)

# GROUNDWATER SAMPLING

Project no.:	93343-F0	Well no.:	MW-3	Date:	3/31/95
Project name:	670 98th Avenue	Depth of well from TOC (feet):	22.30		
Location:	670 98th Avenue	Well diameter (inch):	2		
	Oakland, CA	Screened interval from TOC (feet):	7-22.3		
Recorded by:	WKS	TOC elevation (feet):	99.74 (arbitrary datum)		
Weather:	Sunny	Water level from TOC (feet):	7.67	Time	10:23
Precip in past		Product level from TOC (feet):	None	Time	10:23
5 days (inch):	0	Water level measurement:	dual-interface probe		

## VOLUME OF WATER TO BE REMOVED BEFORE SAMPLING:

$$[(22.30 \text{ ft}) - (7.67 \text{ ft})] \times (0.083 \text{ ft})^2 \times 3.14 \times 7.48 =$$

Well depth	Water level	Well radius	
------------	-------------	-------------	--

2.4 gallons in one well volume  
 11.9 gallons in 5 well volumes  
 10.0 total gallons removed

## CALIBRATION:

	Time	Temp (°C)	pH	EC (µmho/cm)
Calibration Standard:	--		7.00/10.01	1,000
Before Purging:	10:00	18.0	7.00/10.01	900
After Purging:	12:49	18.9	7.17/10.06	1,000

## FIELD MEASUREMENTS:

Time	Temp (°C)	pH	EC (µmho/cm)	Cumulative Gallons Removed	Appearance
10:53	17.8	6.85	550	2	Slightly turbid with silt and orange particulates
11:00	17.5	6.88	500	5	Very slightly turbid
11:04	17.4	6.90	500	7	Very slightly turbid to clear
11:07	17.4	6.90	500	8	Very slightly turbid to clear
11:10	17.5	6.90	500	10.0	Very slightly turbid to clear

NOTE: Well head not sealed to surface water; no lock; well cap in poor shape.

Water level after purging prior to sampling (feet):	7.67	Time	11:20
Appearance of sample:	Clear	Time	11:25
Duplicate/blank number:	Blank; TPHg, BTXE, 8010	Time	8:00
Purge method:	Double diaphragm pump; disposable polyethylene tubing		
Sampling equipment:	Disposable PVC bailer	VOC attachment:	Used for VOA samples
Sample containers:	2 40-ml VOAs, 2 1-liter amber glass		
Sample analyses:	TPHd, TPHg, BTXE, Lead, 8010	Laboratory:	Curtis & Tompkins
Decontamination method:	TSP and water, DI water rinse	Rinsate disposal:	Drum MW-1, MW-2, MW-3, 18

93343-F0.XLW (5/19/95)

# GROUNDWATER SAMPLING

Project no.:	93343-F0	Well no.:	18	Date:	3/31/95
Project name:	670 98th Avenue	Depth of well from TOC (feet):	16.55		
Location:	670 98th Avenue	Well diameter (inch):	2		
	Oakland, CA	Screened interval from TOC (feet):	6-16.55		
Recorded by:	WKS	TOC elevation (feet):	99.17 (arbitrary datum)		
Weather:	Sunny	Water level from TOC (feet):	7.09	Time	9:00
Precip in past		Product level from TOC (feet):	None	Time	9:00
5 days (inch):	0	Water level measurement:	Dual-interface probe		

## VOLUME OF WATER TO BE REMOVED BEFORE SAMPLING:

$$[(16.55 \text{ ft}) - (7.09 \text{ ft})] \times (0.083 \text{ ft})^2 \times 3.14 \times 7.48 =$$

1.5 gallons in one well volume
7.5 gallons in 5 well volumes
<u>8 total gallons removed</u>

## CALIBRATION:

	Time	Temp (°C)	pH	EC (µmho/cm)
Calibration Standard:	--		7.00/10.01	1,000
Before Purging:	10:00	18.0	7.00/10.01	900
After Purging:	12:49	18.9	7.17/10.06	1,000

## FIELD MEASUREMENTS:

Time	Temp (°C)	pH	EC (µmho/cm)	Cumulative Gallons Removed	Appearance
12:30	18.9	7.34	900	2	Clear to very slightly turbid, sheen, slight diesel odor, sand, turbid first 1.5 gallon
12:34	18.8	7.16	700	5	Clear to very slightly turbid
12:39	18.9	7.05	650	6	Clear to very slightly turbid
12:42	18.8	7.05	650	8	Clear to very slightly turbid

Water level after purging prior to sampling (feet):	7.09	Time	13:40
Appearance of sample:	Clear to very slightly turbid	Time	13:45
Duplicate/blank number:	Blank; TPHg, BTXE, 8010	Time	8:00
Purge method:	Double diaphragm pump; disposable polyethylene tubing		
Sampling equipment:	Disposable PVC bailer	VOC attachment:	Used for VOA samples
Sample containers:	2 40-ml VOAs, 2 1-liter amber glass		
Sample analyses:	TPHd, TPHg, BTXE, Lead, 8010	Laboratory:	Curtis & Tompkins
Decontamination method:	TSP and water, DI water rinse	Rinsate disposal:	Drum MW-1, MW-2, MW-3, 18

93343-F0.XLW (5/19/95)

**APPENDIX C**  
**LABORATORY REPORT**



Curtis & Tompkins, Ltd., Analytical Laboratories, Since 1878  
2323 Fifth Street, Berkeley, CA 94710, Phone (415) 486-0900

RECEIVED

APR 12 1995

BASELINE

ANALYTICAL REPORT

Prepared for:

Baseline Environmental  
5900 Hollis Street  
Suite D  
Emeryville, CA 94608

Date: 10-APR-95  
Lab Job Number: 120491  
Project ID: 93343-FO  
Location: 98th Ave.

Reviewed by: *James K. Morrison*

Reviewed by: *[Signature]*

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LABORATORY NUMBER: 120491  
CLIENT: BASELINE ENVIRONMENTAL  
PROJECT ID: 93343-FO  
LOCATION: 98th Ave

DATE SAMPLED: 03/31/95  
DATE RECEIVED: 03/31/95  
DATE EXTRACTED: 04/05/95  
DATE ANALYZED: 04/06/95  
DATE REPORTED: 04/10/95  
BATCH NO: 19817

Extractable Petroleum Hydrocarbons in Aqueous Solutions  
California DOHS Method  
LUFT Manual October 1989

LAB ID	CLIENT ID	KEROSENE RANGE (ug/L)	DIESEL RANGE (ug/L)	REPORTING LIMIT (ug/L)
120491-001	MW-3	500*	***	50
120491-002	MW-1	2,300*	***	50
120491-003	MW-2	ND	ND	50
120491-004	18	1,900*	***	50
METHOD BLANK	N/A	ND	ND	50

\* Sample chromatogram does not resemble the hydrocarbon standard.

\*\*\* Diesel range not reported due to overlap of hydrocarbon ranges.

ND = Not detected at or above reporting limit. Reporting limit  
applies to all analytes.

QA/QC SUMMARY: BS/BSD

=====  
RPD, % 4  
RECOVERY, % 93  
=====



LABORATORY NUMBER: 120491  
CLIENT: BASELINE ENVIRONMENTAL  
PROJECT ID: 93343-FO  
LOCATION: 98th Ave

DATE SAMPLED: 03/31/95  
DATE RECEIVED: 03/31/95  
DATE ANALYZED: 04/03/95  
DATE REPORTED: 04/10/95  
BATCH NO.: 19772

Total Volatile Hydrocarbons with BTXE in Aqueous Solutions  
TVH by California DOHS Method/LUFT Manual October 1989  
BTXE by EPA 5030/8020

LAB ID	SAMPLE ID	TVH AS GASOLINE (ug/L)	BENZENE (ug/L)	TOLUENE (ug/L)	ETHYL BENZENE (ug/L)	TOTAL XYLENES (ug/L)
120491-001	MW-3	1,600	ND(0.5)	ND(0.5)	ND(0.5)	4.1
120491-002	MW-1	5,900	67	12	92	500*
METHOD BLANK	N/A	ND(50)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)

\* Result obtained from a dilution analyzed on 04/05/95 (Batch No:19822).

ND = Not detected at or above reporting limit; Reporting limit indicated in parentheses.

QA/QC SUMMARY: BS/BSD

RPD, % <1  
RECOVERY, % 97



LABORATORY NUMBER: 120491  
CLIENT: BASELINE ENVIRONMENTAL  
PROJECT ID: 93343-FO  
LOCATION: 98th Ave

DATE SAMPLED: 03/31/95  
DATE RECEIVED: 03/31/95  
DATE ANALYZED: 04/05/95  
DATE REPORTED: 04/10/95  
BATCH NO.: 19822

Total Volatile Hydrocarbons with BTXE in Aqueous Solutions  
TVH by California DOHS Method/LUFT Manual October 1989  
BTXE by EPA 5030/8020

LAB ID	SAMPLE ID	TVH AS GASOLINE (ug/L)	BENZENE (ug/L)	TOLUENE (ug/L)	ETHYL BENZENE (ug/L)	TOTAL XYLENES (ug/L)
120491-003	MW-2	ND(50)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)
120491-004	18	11,000	190	10	350	1,300
120491-005	BLANK	ND(50)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)
METHOD BLANK	N/A	ND(50)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)

ND = Not detected at or above reporting limit; Reporting limit indicated in parentheses.

QA/QC SUMMARY: BS/BSD

RPD, % 6  
RECOVERY, % 104



CLIENT: Baseline Environmental  
PROJECT ID: 93343-FO  
LOCATION: 98th Ave.  
MATRIX: Water

DATE REPORTED: 04/10/95

Metals Analytical Report

Lead

Sample ID	Lab ID	Sample Date	Receive Date	Result (ug/L)	Reporting Limit (ug/L)	QC Batch	Method	Analysis Date
MW-3	120491-001	03/31/95	03/31/95	ND	3.0	19856	EPA 6010A	04/07/95
MW-1	120491-002	03/31/95	03/31/95	14	3.0	19856	EPA 6010A	04/07/95
MW-2	120491-003	03/31/95	03/31/95	4.2	3.0	19856	EPA 6010A	04/07/95
18	120491-004	03/31/95	03/31/95	16	3.0	19856	EPA 6010A	04/07/95

ND = Not detected at or above reporting limit



LABORATORY NUMBER: 120491-001  
 CLIENT: BASELINE ENVIRONMENTAL  
 PROJECT ID: 93343-FO  
 LOCATION: 98th Ave  
 SAMPLE ID: MW-3

DATE SAMPLED: 03/31/95  
 DATE RECEIVED: 03/31/95  
 DATE ANALYZED: 04/04/95  
 DATE REPORTED: 04/10/95  
 BATCH NO: 19785

EPA 8010  
 Purgeable Halocarbons in Water

Compound	Result ug/L	Reporting Limit ug/L
Chloromethane	ND	2.0
Bromomethane	ND	2.0
Vinyl chloride	ND	2.0
Chloroethane	ND	2.0
Methylene chloride	ND	20
Trichlorofluoromethane	ND	1.0
1,1-Dichloroethene	2.2	1.0
1,1-Dichloroethane	ND	1.0
cis-1,2-Dichloroethene	ND	1.0
trans-1,2-Dichloroethene	ND	1.0
Chloroform	ND	1.0
Freon 113	ND	1.0
1,2-Dichloroethane	ND	1.0
1,1,1-Trichloroethane	18	1.0
Carbon tetrachloride	ND	1.0
Bromodichloromethane	ND	1.0
1,2-Dichloropropane	ND	1.0
cis-1,3-Dichloropropene	ND	1.0
Trichloroethene	18	1.0
1,1,2-Trichloroethane	ND	1.0
trans-1,3-Dichloropropene	ND	1.0
Dibromochloromethane	ND	1.0
Bromoform	ND	2.0
Tetrachloroethene	4.1	1.0
1,1,2,2-Tetrachloroethane	ND	1.0
Chlorobenzene	ND	1.0
1,3-Dichlorobenzene	ND	1.0
1,4-Dichlorobenzene	ND	1.0
1,2-Dichlorobenzene	ND	1.0

ND = Not detected at or above reporting limit.

Surrogate Recovery

=====

Bromobenzene	100 %
--------------	-------

=====

LABORATORY NUMBER: 120491-002  
 CLIENT: BASELINE ENVIRONMENTAL  
 PROJECT ID: 93343-FO  
 LOCATION: 98th Ave  
 SAMPLE ID: MW-1

DATE SAMPLED: 03/31/95  
 DATE RECEIVED: 03/31/95  
 DATE ANALYZED: 04/05/95  
 DATE REPORTED: 04/10/95  
 BATCH NO: 19785

EPA 8010  
 Purgeable Halocarbons in Water

Compound	Result ug/L	Reporting Limit* ug/L
Chloromethane	ND	20
Bromomethane	ND	20
Vinyl chloride	ND	20
Chloroethane	ND	20
Methylene chloride	ND	200
Trichlorofluoromethane	ND	10
1,1-Dichloroethene	ND	10
1,1-Dichloroethane	ND	10
cis-1,2-Dichloroethene	ND	10
trans-1,2-Dichloroethene	ND	10
Chloroform	ND	10
Freon 113	ND	10
1,2-Dichloroethane	ND	10
1,1,1-Trichloroethane	ND	10
Carbon tetrachloride	ND	10
Bromodichloromethane	ND	10
1,2-Dichloropropane	ND	10
cis-1,3-Dichloropropene	ND	10
Trichloroethene	ND	10
1,1,2-Trichloroethane	ND	10
trans-1,3-Dichloropropene	ND	10
Dibromochloromethane	ND	10
Bromoform	ND	20
Tetrachloroethene	ND	10
1,1,2,2-Tetrachloroethane	ND	10
Chlorobenzene	ND	10
1,3-Dichlorobenzene	ND	10
1,4-Dichlorobenzene	ND	10
1,2-Dichlorobenzene	ND	10

\* Elevated detection limits due to high levels of non-target analytes.  
 ND = Not detected at or above reporting limit.

Surrogate Recovery

=====

Bromobenzene

100 %

=====

LABORATORY NUMBER: 120491-003  
 CLIENT: BASELINE ENVIRONMENTAL  
 PROJECT ID: 93343-FO  
 LOCATION: 98th Ave  
 SAMPLE ID: MW-2

DATE SAMPLED: 03/31/95  
 DATE RECEIVED: 03/31/95  
 DATE ANALYZED: 04/04/95  
 DATE REPORTED: 04/10/95  
 BATCH NO: 19785

EPA 8010  
 Purgeable Halocarbons in Water

Compound	Result ug/L	Reporting Limit ug/L
Chloromethane	ND	2.0
Bromomethane	ND	2.0
Vinyl chloride	ND	2.0
Chloroethane	ND	2.0
Methylene chloride	ND	20
Trichlorofluoromethane	ND	1.0
1,1-Dichloroethene	1.7	1.0
1,1-Dichloroethane	1.1	1.0
cis-1,2-Dichloroethene	1.4	1.0
trans-1,2-Dichloroethene	ND	1.0
Chloroform	ND	1.0
Freon 113	ND	1.0
1,2-Dichloroethane	ND	1.0
1,1,1-Trichloroethane	5.1	1.0
Carbon tetrachloride	ND	1.0
Bromodichloromethane	ND	1.0
1,2-Dichloropropane	ND	1.0
cis-1,3-Dichloropropene	ND	1.0
Trichloroethene	46	1.0
1,1,2-Trichloroethane	ND	1.0
trans-1,3-Dichloropropene	ND	1.0
Dibromochloromethane	ND	1.0
Bromoform	ND	2.0
Tetrachloroethene	22	1.0
1,1,2,2-Tetrachloroethane	ND	1.0
Chlorobenzene	ND	1.0
1,3-Dichlorobenzene	ND	1.0
1,4-Dichlorobenzene	ND	1.0
1,2-Dichlorobenzene	ND	1.0

ND = Not detected at or above reporting limit.

Surrogate Recovery

=====

Bromobenzene

=====

99 %



LABORATORY NUMBER: 120491-004  
 CLIENT: BASELINE ENVIRONMENTAL  
 PROJECT ID: 93343-FO  
 LOCATION: 98th Ave  
 SAMPLE ID: 18

DATE SAMPLED: 03/31/95  
 DATE RECEIVED: 03/31/95  
 DATE ANALYZED: 04/05/95  
 DATE REPORTED: 04/10/95  
 BATCH NO: 19785

EPA 8010  
 Purgeable Halocarbons in Water

Compound	Result ug/L	Reporting Limit ug/L
Chloromethane	ND	20
Bromomethane	ND	20
Vinyl chloride	ND	20
Chloroethane	ND	20
Methylene chloride	ND	200
Trichlorofluoromethane	ND	10
1,1-Dichloroethene	ND	10
1,1-Dichloroethane	ND	10
cis-1,2-Dichloroethene	ND	10
trans-1,2-Dichloroethene	ND	10
Chloroform	ND	10
Freon 113	ND	10
1,2-Dichloroethane	ND	10
1,1,1-Trichloroethane	ND	10
Carbon tetrachloride	ND	10
Bromodichloromethane	ND	10
1,2-Dichloropropane	ND	10
cis-1,3-Dichloropropene	ND	10
Trichloroethene	29	10
1,1,2-Trichloroethane	ND	10
trans-1,3-Dichloropropene	ND	10
Dibromochloromethane	ND	10
Bromoform	ND	20
Tetrachloroethene	10	10
1,1,2,2-Tetrachloroethane	ND	10
Chlorobenzene	ND	10
1,3-Dichlorobenzene	ND	10
1,4-Dichlorobenzene	ND	10
1,2-Dichlorobenzene	ND	10

ND = Not detected at or above reporting limit.

Surrogate Recovery

=====  
 Bromobenzene 101 %  
 =====

LABORATORY NUMBER: 120491-005  
 CLIENT: BASELINE ENVIRONMENTAL  
 PROJECT ID: 93343-FO  
 LOCATION: 98th Ave  
 SAMPLE ID: BLANK

DATE SAMPLED: 03/31/95  
 DATE RECEIVED: 03/31/95  
 DATE ANALYZED: 04/04/95  
 DATE REPORTED: 04/10/95  
 BATCH NO: 19785

EPA 8010  
 Purgeable Halocarbons in Water

Compound	Result ug/L	Reporting Limit ug/L
Chloromethane	ND	2.0
Bromomethane	ND	2.0
Vinyl chloride	ND	2.0
Chloroethane	ND	2.0
Methylene chloride	ND	20
Trichlorofluoromethane	ND	1.0
1,1-Dichloroethene	ND	1.0
1,1-Dichloroethane	ND	1.0
cis-1,2-Dichloroethene	ND	1.0
trans-1,2-Dichloroethene	ND	1.0
Chloroform	ND	1.0
Freon 113	ND	1.0
1,2-Dichloroethane	ND	1.0
1,1,1-Trichloroethane	ND	1.0
Carbon tetrachloride	ND	1.0
Bromodichloromethane	ND	1.0
1,2-Dichloropropane	ND	1.0
cis-1,3-Dichloropropene	ND	1.0
Trichloroethene	ND	1.0
1,1,2-Trichloroethane	ND	1.0
trans-1,3-Dichloropropene	ND	1.0
Dibromochloromethane	ND	1.0
Bromoform	ND	2.0
Tetrachloroethene	ND	1.0
1,1,2,2-Tetrachloroethane	ND	1.0
Chlorobenzene	ND	1.0
1,3-Dichlorobenzene	ND	1.0
1,4-Dichlorobenzene	ND	1.0
1,2-Dichlorobenzene	ND	1.0

ND = Not detected at or above reporting limit.

Surrogate Recovery

=====

Bromobenzene

=====

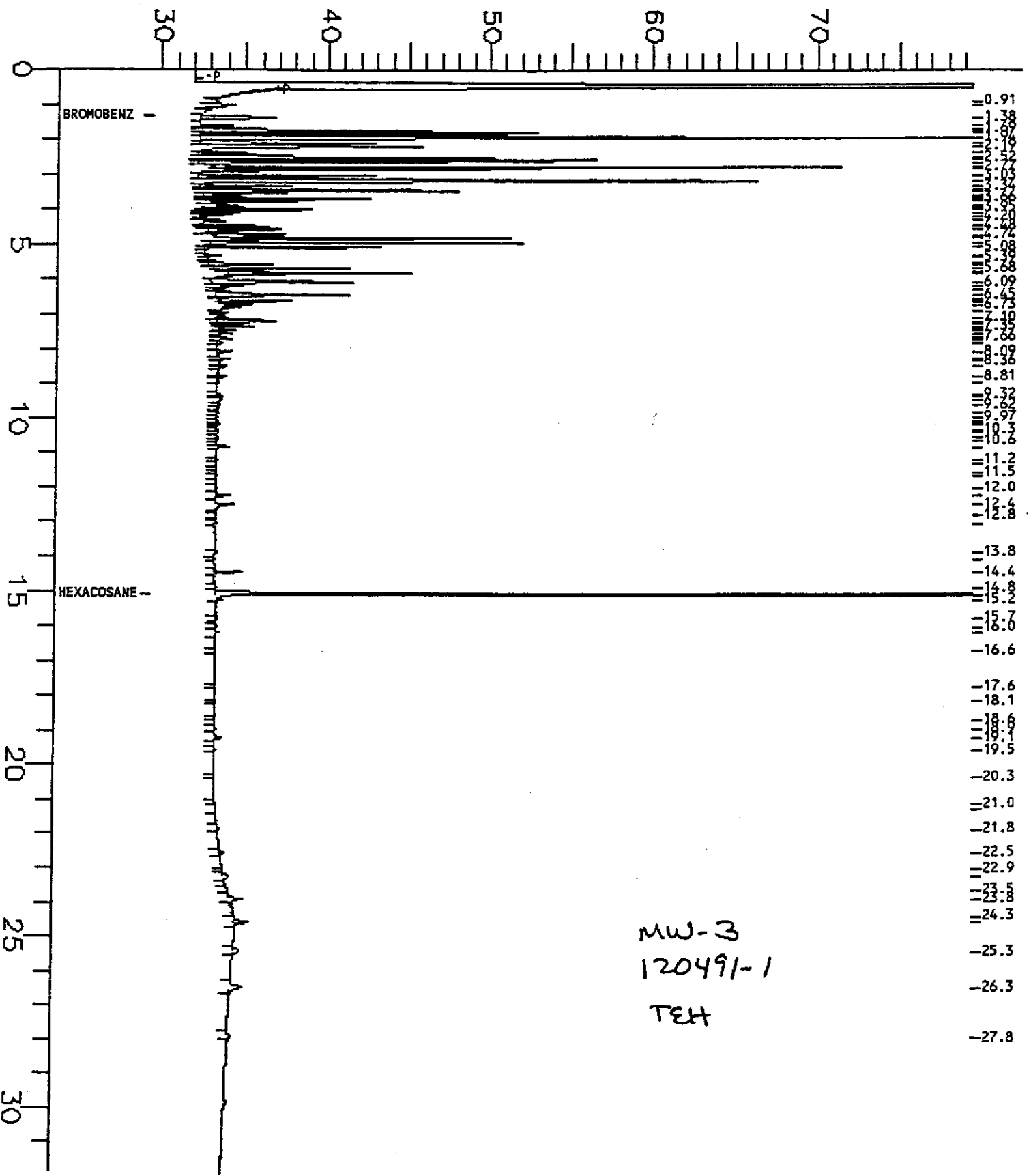
101 %

Sample Name : 120491-001 500:2.5  
FileName : g:\gc15\cha\095A015.raw  
Method : TEH.ins  
Start Time : 0.00 min  
Scale Factor : -1

End Time : 31.92 min  
Plot Offset: 30 mV

Sample #: 19817  
Date : 4/6/95 4:46 AM  
Time of Injection: 4/6/95 4:13 AM  
Low Point : 29.45 mV  
Plot Scale: 50 mV  
High Point : 79.45 mV

# Response [mV]



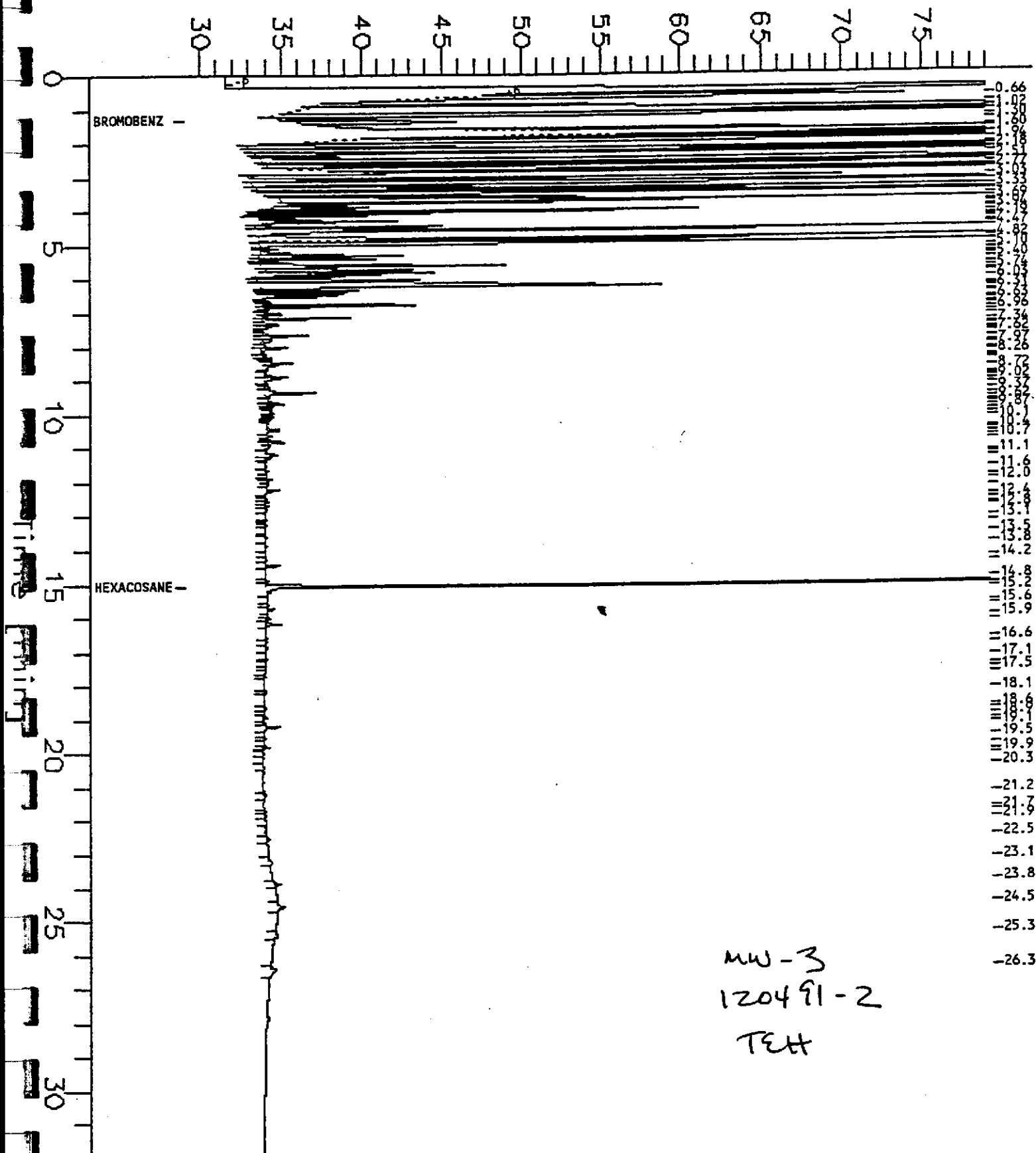
MW-3  
120491-1  
TEH

File Name : 120491-002 500:2.5  
Name : g:\gc15\cha\095A018.raw  
Method : TEN.ins  
Start Time : -0.00 min  
Scale Factor : -1

End Time : 31.92 min  
Plot Offset: 29 mV

Sample #: 19817  
Date : 4/6/95 6:59 AM  
Time of Injection: 4/6/95 6:25 AM  
Low Point : 29.05 mV  
Plot Scale: 50 mV  
High Point : 79.05 mV

# Response [mV]



MW-3  
120491-2  
TET

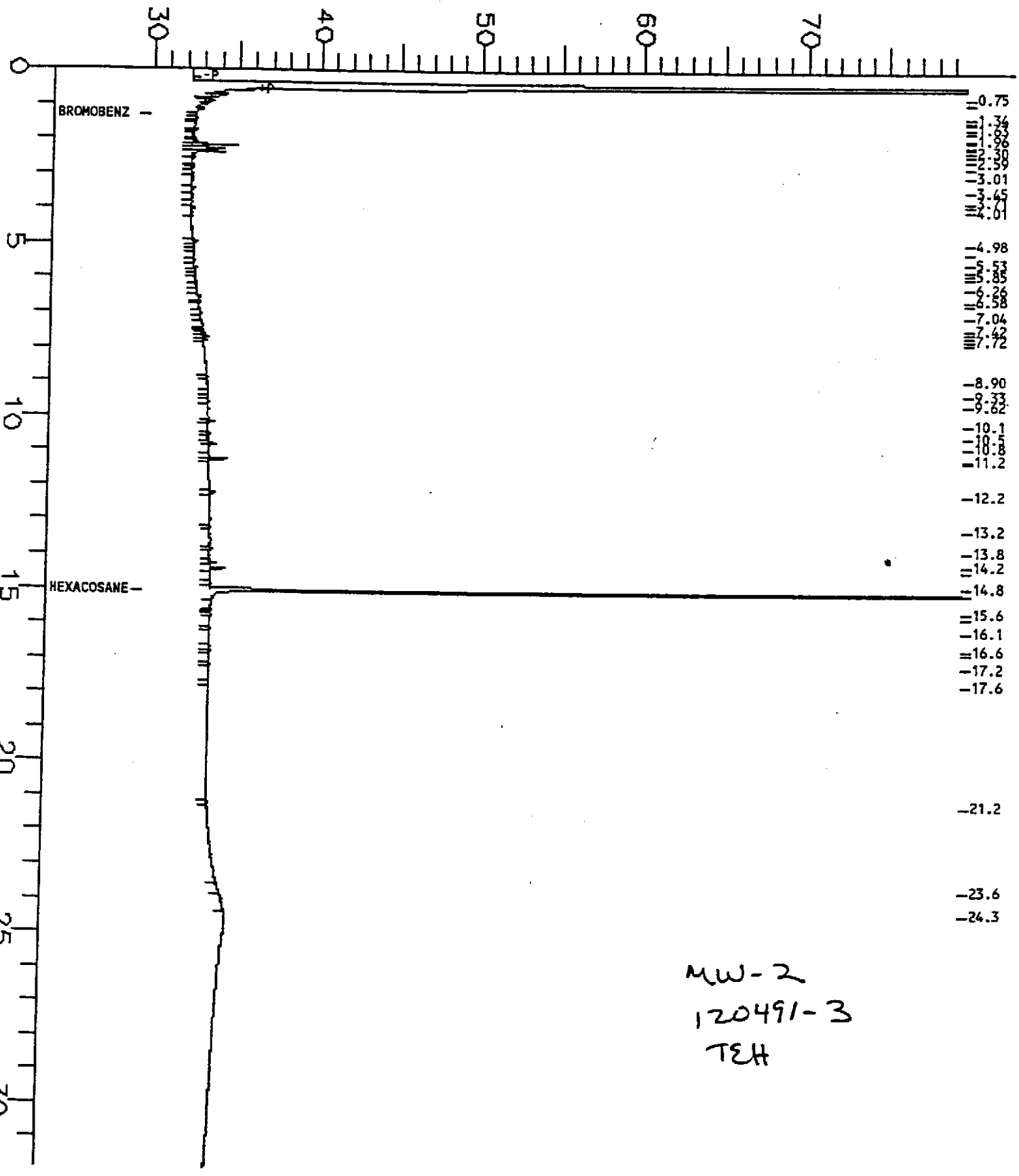


File Name : 120491-003 500:2.5  
FileName : g:\gc15\cha\095A014.raw  
Method : TEH.ins  
Start Time : 0.00 min  
File Factor : -1

End Time : 31.92 min  
Plot Offset: 30 mV

Sample #: 19817  
Date : 4/6/95 4:02 AM  
Time of Injection: 4/6/95 3:29 AM  
Low Point : 29.68 mV  
Plot Scale: 50 mV  
Page 1 of 1  
High Point : 79.68 mV

# Response [mV]



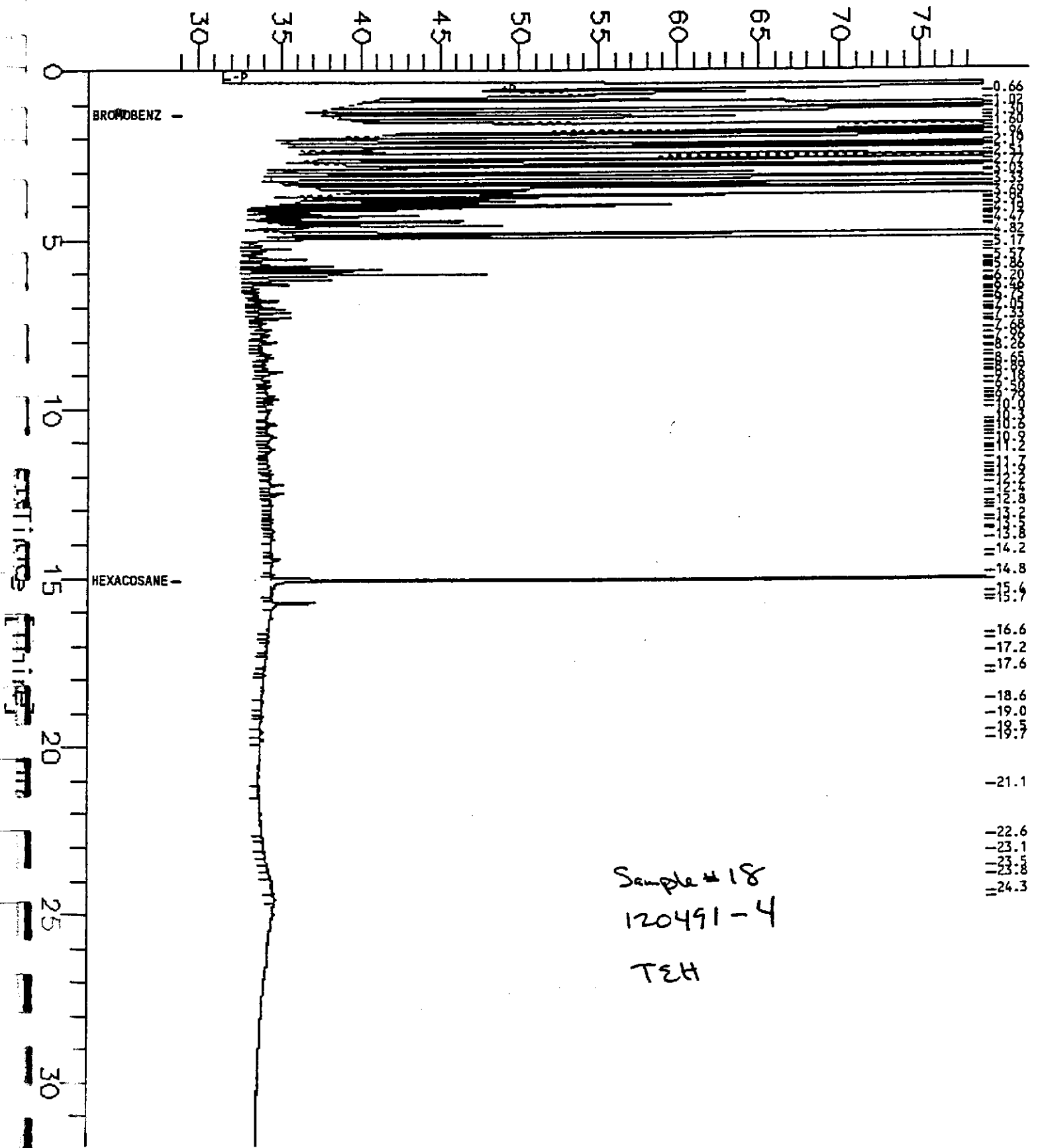
MW-2  
120491-3  
TEH

File Name : 120491-004 500:2.5  
eName : g:\gc15\cha\095A016.raw  
Method : TEH.ins  
Start Time : 0.00 min  
Scale Factor : -1

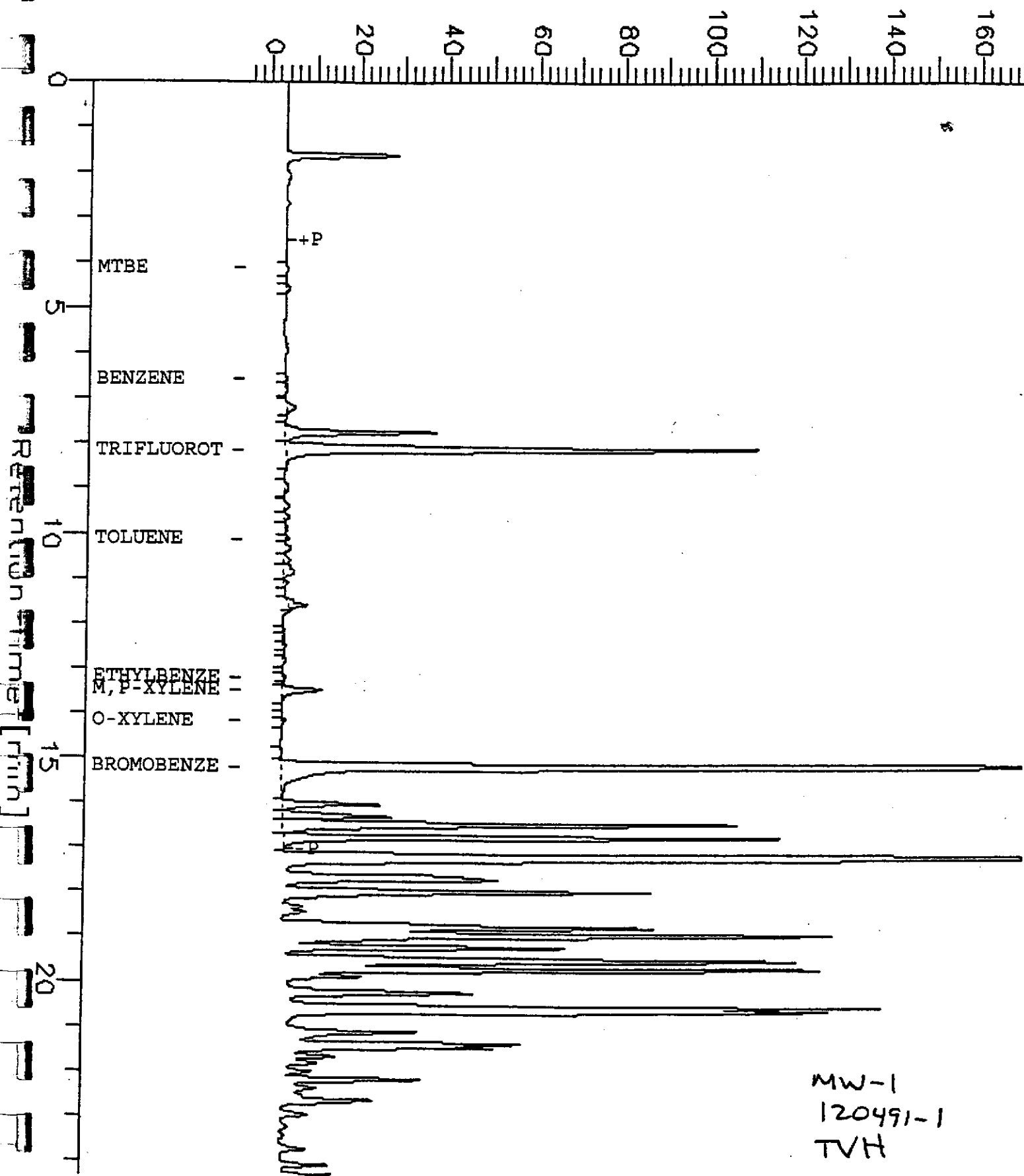
End Time : 31.92 min  
Plot Offset: 29 mV

Sample #: 19817  
Date : 4/6/95 5:31 AM  
Time of Injection: 4/6/95 4:57 AM  
Low Point : 28.97 mV  
Plot Scale: 50 mV  
High Point : 78.97 mV

# Response [mV]



# Response [mV]



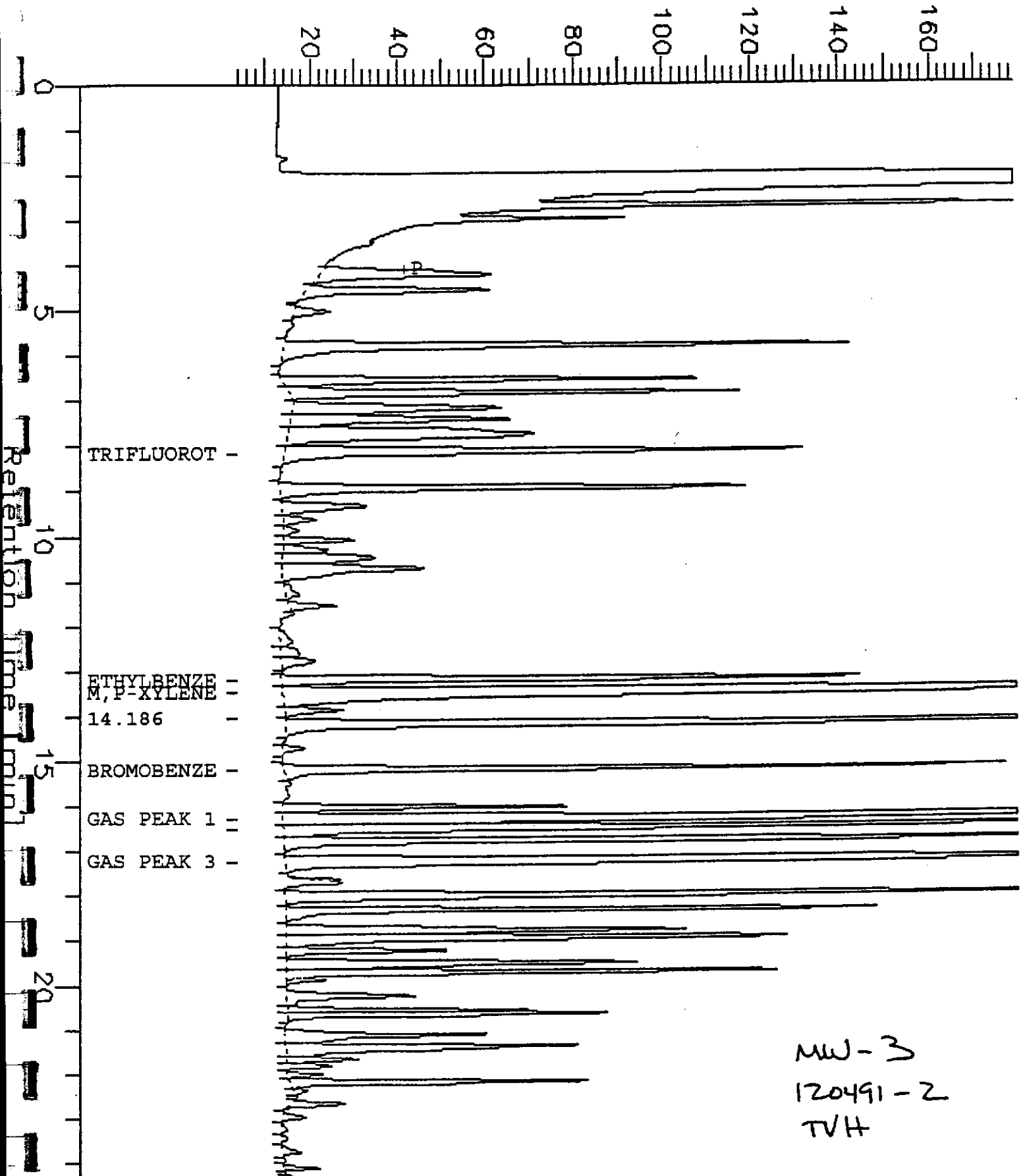
Name : G:\GC07\093F012.raw  
Start Time : 0.00 min  
Scale Factor : -1

End Time : 24.33 min  
Plot Offset: 4 mV

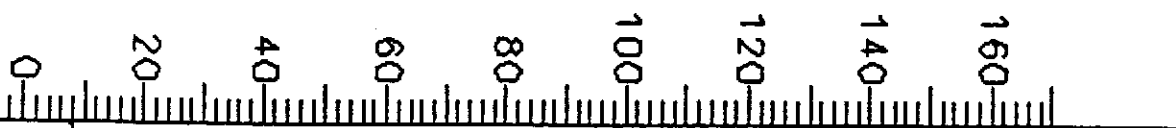
Date : 4/3/95 5:24 PM  
Low Point : 3.92 mV  
Plot Scale: 175 mV

Page 1 of 1  
High Point : 178.92 mV

# Response [mV]



# Response [mV]



5  
10  
15  
20

TRIFLUOROT -

TOLUENE -

ETHYLBENZE -  
M, P-XYLENE -

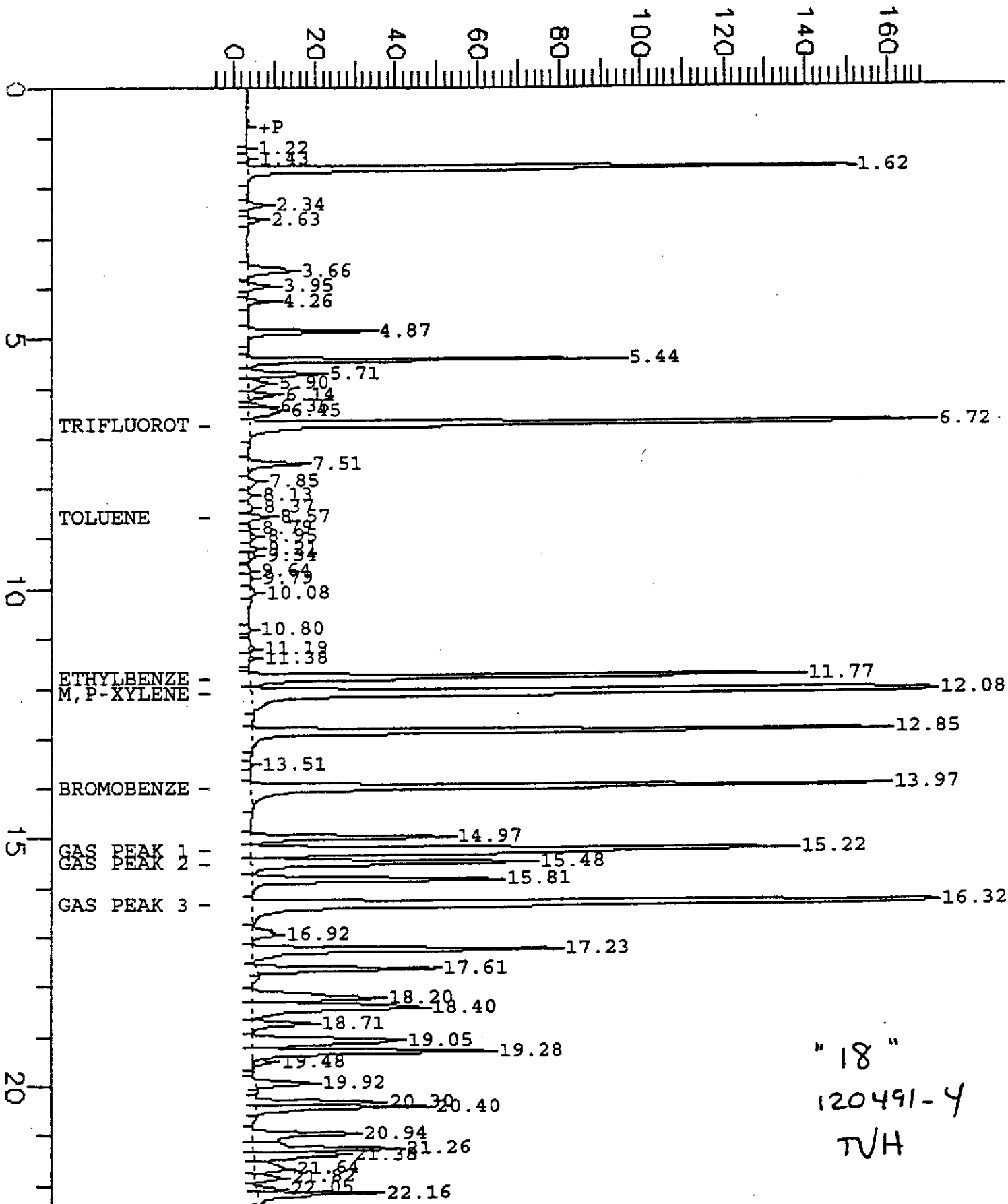
BROMOBENZE -

GAS PEAK 1 -  
GAS PEAK 2 -

GAS PEAK 3 -

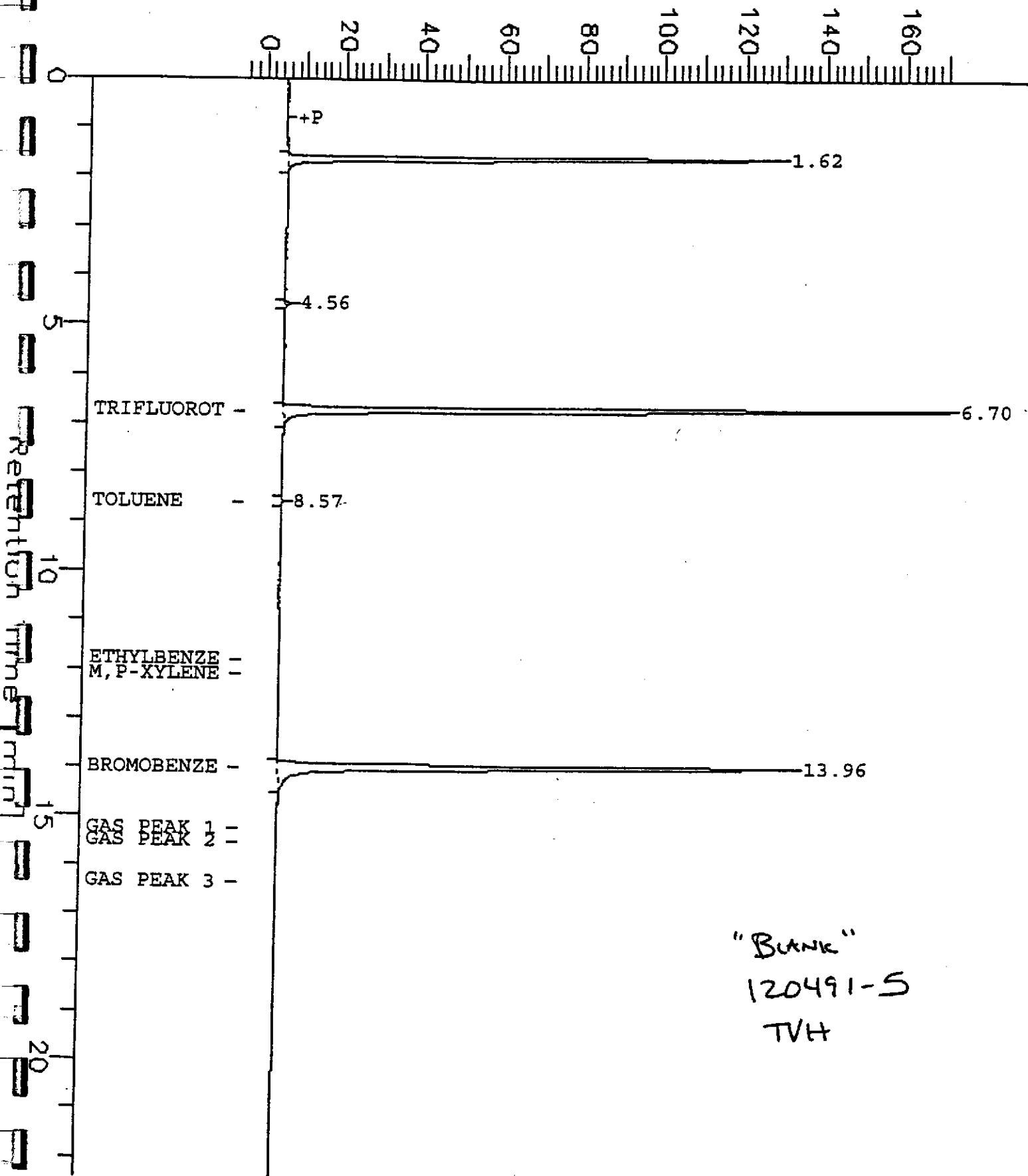
MW-2  
120491-3  
TVH

# Response [mV]



" 18 "  
120491-4  
TVH

# Response [mV]





CLIENT: Baseline Environmental  
JOB NUMBER: 120491

DATE REPORTED: 04/10/95

BATCH QC REPORT  
PREP BLANK

Compound	Result	Reporting Limit	Units	QC Batch	Method	Analysis Date
Lead	ND	3	ug/L	19856	EPA 6010A	04/06/95

ND = Not Detected at or above reporting limit





LABORATORY NUMBER: 120491-METHOD BLANK  
CLIENT: BASELINE ENVIRONMENTAL  
PROJECT ID: 93343-FO  
LOCATION: 98th Ave  
SAMPLE ID: MB

DATE ANALYZED: 04/04/95  
DATE REPORTED: 04/10/95  
BATCH NO: 19785

EPA 8010  
Purgeable Halocarbons in Water

Compound	Result ug/L	Reporting Limit ug/L
Chloromethane	ND	2.0
Bromomethane	ND	2.0
Vinyl chloride	ND	2.0
Chloroethane	ND	2.0
Methylene chloride	ND	20
Trichlorofluoromethane	ND	1.0
1,1-Dichloroethene	ND	1.0
1,1-Dichloroethane	ND	1.0
cis-1,2-Dichloroethene	ND	1.0
trans-1,2-Dichloroethene	ND	1.0
Chloroform	ND	1.0
Freon 113	ND	1.0
1,2-Dichloroethane	ND	1.0
1,1,1-Trichloroethane	ND	1.0
Carbon tetrachloride	ND	1.0
Bromodichloromethane	ND	1.0
1,2-Dichloropropane	ND	1.0
cis-1,3-Dichloropropene	ND	1.0
Trichloroethene	ND	1.0
1,1,2-Trichloroethane	ND	1.0
trans-1,3-Dichloropropene	ND	1.0
Dibromochloromethane	ND	1.0
Bromoform	ND	2.0
Tetrachloroethene	ND	1.0
1,1,2,2-Tetrachloroethane	ND	1.0
Chlorobenzene	ND	1.0
1,3-Dichlorobenzene	ND	1.0
1,4-Dichlorobenzene	ND	1.0
1,2-Dichlorobenzene	ND	1.0

ND = Not detected at or above reporting limit.

Surrogate Recovery

Bromobenzene	99 %
--------------	------



## 8010 BS/BSD Report

Matrix: WATER  
 Batch No: 19785 325094131005 325094114003  
 Date Analyzed: 04-APR-95  
 Spike File: 094W005  
 Spike Dup File: 094W003  
 Analyst: LW

	Instrdgd	SpikeAmt	% Rec	Limits
<u>BS RESULTS</u>				
1,1-Dichloroethene	21.4931	20	108 %	61-145%
Trichloroethene	23.9496	20	120 %	71-120%
Chlorobenzene	21.75	20	109 %	75-130%
Surrogate Recoveries				
Bromobenzene	99.443	100	99 %	75-125%
<u>BSD RESULTS</u>				
1,1-Dichloroethene	21.041	20	105 %	61-145%
Trichloroethene	23.2495	20	116 %	71-120%
Chlorobenzene	21.2208	20	106 %	75-130%
Surrogate Recoveries				
Bromobenzene	101.8192	100	102 %	75-125%
<u>RPD DATA</u>				
1,1-Dichloroethene	2 %			< 14%
Trichloroethene	3 %			< 14%
Chlorobenzene	2 %			< 13%

Column: Rtx 502.2  
 Limits based on 3/90 SOW

Results within Specifications - PASS

LINE  
 Hollis Street, Suite D  
 ryville, CA 94608  
 420-8686

HAZARDOUS WASTE RECORD

Turn-around Time  
 Lab  
 BASELINE Contact Person

Normal  
 Curtis J. Thompson  
 Kevin O'Neil

Project No. 93343-F0  
 Project Name and Location 98<sup>th</sup> Ave

Impilers: (Signature) William K. Scott

Sample ID / Station	Date	Time	Media	Depth	No. of Containers
W-3	3-31-95	11:25	water		4
W-1	↓	13:30			4
W-2		14:00			4
8		13:45			4
bank		8:00			2

Analysis	Oil & Grease	Motor Oil	PNAS	Title 22 Metals	Total Lead	Remarks/Composite	Detection Limits
3550/8015 TEH d. 001 G's (Gross wt.) (TPH with BTX&E) 5030/8015					7421 Purged 6 reductions 8010		
X X				X X			
X X				X X			
X X				X X			
X X				X X			
					X		

Impilled by: (Signature) William K. Scott	Date / Time 3-31-95/15:00	Received by: (Signature) Mary Plesman	Date / Time 3/31/95 15:00	Conditions of Samples Upon Arrival at Laboratory:
Impilled by: (Signature)	Date / Time	Received by: (Signature)	Date / Time	Remarks:
Impilled by: (Signature)	Date / Time	Received by: (Signature)	Date / Time	