



April 19, 2000

42633.1

Mr. John Prall
Associate Environmental Scientist
Port of Oakland
530 Water Street
Oakland, California 94607

PORT OF OAKLAND
ENVIRONMENTAL DIVISION

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**Quarterly Groundwater Monitoring
and Product Recovery Report
4th Quarter of 1999
2277 Seventh Street
Oakland, California**

Dear Mr. Prall:

Harding Lawson Associates (HLA) has prepared this Quarterly Groundwater Monitoring and Product Recovery Report on behalf of the Port of Oakland for the groundwater monitoring and sampling program and the operation of the product recovery system at 2277 Seventh Street in Oakland, California (Plate 1) between October 1, 1999 and December 31, 1999.

This report summarizes the monitoring of five groundwater monitoring wells, MW-2, MW-4, MW-5, MW-6, and MW-7 and the maintenance activities of the product recovery system during the fourth quarter of 1999. MW-3 and MW-1 contain in-well product skimmers that recover separate-phase petroleum hydrocarbons. MW-8 is not monitored because it contains a thick viscous tar-like petroleum product. Well locations are presented on Plate 2.

The monitoring wells were installed at the site to assess groundwater quality following the removal of underground storage tanks (USTs) from the site in September 1993. The former USTs, located on the south side of Building 401, consisted of two 10,000-gallon gasoline tanks (CF-17 and CF-18), one 500-gallon oil tank (CF-19), and one 300-gallon waste oil tank (CF-20).

MONITORING AND SAMPLING OF MONITORING WELLS

HLA conducted the groundwater sampling at 2277 7th Street on November 12, 1999. Prior to purging and sampling the monitoring wells, HLA measured the depth to groundwater below the top of the well's casing with an electric water level indicator. HLA also measured the depth to product and depth to groundwater in wells MW-1 and MW-3. Groundwater level measurements are summarized in Table 1, groundwater elevations and the gradient direction are presented on Plate 3, and product thickness measurements are

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summarized on Table 2. HLA did not use the groundwater level measurements from MW-1, MW-3, and MW-8 to calculate groundwater elevations presented on Plate 3 because MW-1, and MW-3, contained product recovery equipment and because the thick viscous petroleum product in MW-8 prevents accurate groundwater level measurements.

After measuring the depth to water, HLA purged MW-2, MW-4, MW-5, MW-6, and MW-7 using a PVC bailer. Conductivity, pH, and temperature were monitored periodically during purging. Sampling was not performed until at least three well casing volumes of water were removed and conductivity, pH, and temperature measurements had stabilized. The depths to groundwater and field parameter measurements were recorded on Groundwater Sampling Forms included in Appendix A. The purge water was stored onsite in the treatment system's product recovery tank to be disposed of by the Port waste disposal contractor, Performance Excavators, Inc.

HLA collected groundwater samples from the five monitoring wells using a Teflon disposable bailer and then transferred the groundwater into laboratory-provided containers. A duplicate sample was collected from MW-6. Sample containers were labeled with the sample number, date and time of collection, and sampler's initials, then placed in an insulated cooler with blue ice. The samples were accompanied by a laboratory provided trip blank and delivered under chain-of-custody protocol to Curtis and Thompkins, Ltd., a California-state certified laboratory.

LABORATORY ANALYSIS GROUNDWATER SAMPLES

Curtis and Thompkins, Ltd. performed the chemical analyses of the groundwater samples using the following analytical methods:

- Total petroleum hydrocarbons as gasoline (TPHg) in accordance with EPA Method 8015 modified.
- Benzene, toluene, ethylbenzene, and xylenes (BTEX) and methyl t-butyl ether (MTBE) in accordance with Method 8020B.
- TPH as diesel (TPHd) in accordance with EPA Method 8015 modified following a silica-gel cleanup procedure.
- TPH as motor oil (TPHmo) in accordance with EPA Method 8015 modified following a silica-gel cleanup procedure.

The trip blank was analyzed for BTEX and MTBE. The laboratory results for the groundwater samples are summarized in Table 3 and are shown on Plate 4. Copies of the laboratory results and chain-of-custody forms are provided in Appendix B.

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FINDINGS

Results of the November 12, 1999 groundwater sampling are summarized below:

- Separate-phase hydrocarbons were observed in monitoring wells MW-1, MW-3 and MW-8.
- TPHg was reported at a concentration of 330 micrograms per liter ($\mu\text{g/l}$) in MW-4 and 150 $\mu\text{g/l}$ in MW-6. TPHg was not detected in MW-2, MW-5 or MW-7. TPHg was detected in the sample from MW-4 at 750 $\mu\text{g/l}$ and in MW-6 at 130 $\mu\text{g/l}$ last quarter.
- Benzene was reported at a concentration of 740 $\mu\text{g/l}$ in MW-4, at 27 $\mu\text{g/l}$ in MW-6 and was not detected in MW-2, MW-5, or MW-7. Benzene was detected in the sample from MW-4 at 280 $\mu\text{g/l}$ and in MW-6 at 20 $\mu\text{g/l}$ last quarter
- Toluene was not detected above the reporting limit in any of the wells sampled.
- Ethylbenzene was reported at a concentration of 2.2 $\mu\text{g/l}$ in MW-6, the same result as last quarter, and was not detected in MW-2, MW-4, MW-5, or MW-7.
- Total xylenes were not detected above the reporting limit in any of the wells sampled.
- MTBE was reported at a concentration of 6.3 $\mu\text{g/l}$ in MW-2, 42 $\mu\text{g/l}$ in MW-4, 5.5 $\mu\text{g/l}$ in MW-5, 13 $\mu\text{g/l}$ in MW-6, and 15 $\mu\text{g/l}$ in MW-7. Last quarter MTBE was detected a concentration of 14 $\mu\text{g/l}$ at MW-7 and was not detected in MW-2, MW-4, or MW-5.
- TPHd was reported at a concentration of 120 $\mu\text{g/l}$ in MW-2, 840 $\mu\text{g/l}$ in MW-4, 110 $\mu\text{g/l}$ in MW-5, 11,000 $\mu\text{g/l}$ in MW-6, and 600 $\mu\text{g/l}$ in MW-7. TPHd was detected a concentration of 63 $\mu\text{g/l}$ at MW-4 and 820 $\mu\text{g/l}$ at MW-6 and was not detected in MW-2, MW-5, or MW-7 last quarter.
- TPHmo was reported at a concentration of 3,000 $\mu\text{g/l}$ in MW-6 and 420 $\mu\text{g/l}$ in MW-7 and was not detected in MW-2, MW-4, or MW-5. TPHmo was not detected above the reporting limit in any of the wells sampled last quarter.

QUALITY ASSURANCE AND QUALITY CONTROL

- MTBE was detected at a concentration of 4.2 $\mu\text{g/l}$ in the trip blank, which could indicate a compromise in the MTBE results. MTBE was analyzed by EPA Test Method 8020, which may result in false results. HLA will suggest to the Port that future MTBE analyses include confirmation by EPA Test Method 8260.
- BTEX was not detected in the trip blank.
- The relative percent difference between the analytical results from MW-6 and the duplicate sample was considered within acceptable limits, ranging from zero to 9 percent

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PRODUCT RECOVERY SYSTEM

The product recovery system consists of an air-actuated (active) product skimmer in MW-3 and a passive product skimmer in MW-1. HLA completed product recovery at MW-6 and removed the passive skimmer on April 19, 1999. The product in MW-3 discharges to a product recovery tank and HLA removes the product collected in skimmer in MW-1 on a monthly basis. The total volume of product recovered from MW-1 during the fourth quarter of 1999 was 0.6 gallons. The Port's waste disposal contractor, Performance Excavators, Inc., removed product from the product recovery tank on October 29, 1999. According to records provided to the Port, Performance Excavators, Inc removed 470 gallons of product and water. Performance Excavators, Inc estimated that of this 470 gallons removed, 125 gallons was free phase product. Table 2 presents a summary of the product removal data. A summary of the activities during the past quarter associated with the operation and maintenance of the product recovery system is presented in Table 4.

If you have any questions, please contact James McCarty at (510) 628-3220.

Yours very truly,

HARDING LAWSON ASSOCIATES

James G. McCarty
James G. McCarty
Project Engineer

Stephen J. Osborne
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Geotechnical Engineer

JGM/SJO/mlw/42633/037666L

4 copies submitted



TABLES

**Table 1. Groundwater Elevations Data
Port of Oakland
2277 7th Street, Oakland California**

Well ID	Elevation Top of Casing (feet)	Date Of Monitoring	Depth to Water (feet)	Groundwater Elevation (feet)
MW-2	14.36	12/31/97	8.73	5.63
		04/13/98	7.72	6.64
		11/06/98	9.43	4.93
		03/19/99	8.21	6.15
		06/24/99	8.91	5.45
		09/28/99	9.42	4.94
		11/12/199	9.63	4.73
MW-4	13.15	12/31/97	7.09	6.06
		04/13/98	7.71	5.44
		11/06/98	8.69	4.46
		03/19/99	8.00	5.15
		06/24/99	8.45	4.70
		09/28/99	8.73	4.42
		11/12/99	8.83	4.32
MW-5	13.49	12/31/97	6.38	7.11
		04/13/98	5.56	7.93
		11/06/98	9.56	3.93
		03/19/99	6.20	7.29
		06/24/99	6.73	6.76
		09/28/99	6.91	6.58
		11/12/99	7.06	6.43
MW-6	14.00	06/24/99	8.61	5.39
		09/28/99	9.26	4.74
		11/12/99	8.01	5.99
MW-7	14.35	12/31/97	8.88	5.47
		04/13/98	7.86	6.49
		11/06/98	9.55	4.80
		03/19/99	8.41	5.94
		06/24/99	9.08	5.27
		09/28/99	9.60	4.75
		11/12/99	9.77	4.58

¹ Elevation data relative to Port of Oakland datum; well surveys performed on September 12, 1996, and February 4, 1998, by PLS Surveys.

- Data prior to November 6, 1998 taken from *Groundwater Monitoring, Sampling and Product Removal System O&M Report* dated July 21, 1998, by Innovative Technical Solutions, Inc.

**Table 2. Product Removal and Product Thickness Data
Port of Oakland
2277 7th Street, Oakland California**

Well ID	Elevation of Top of Casing ¹ (feet)	Date Of Monitoring	Depth to Free Product (feet)	Depth to Water (feet)	Product Thickness (feet)	Estimated Product Removed (gallons)	Product Removal Method ²
MW-1	14.14	12/31/97	-	-	-	0.2	passive skimmer
		01/29/98	-	-	-	0.2	passive skimmer
		03/02/98	-	-	-	0.018	passive skimmer
		05/11/98	-	-	-	0.02	passive skimmer
		06/15/98	-	-	-	0.2	passive skimmer
		11/06/98	9.34	10.3	0.96	1.2	passive skimmer
		01/07/99	-	-	-	0.2	passive skimmer
		02/11/99	-	-	-	0.2	passive skimmer
		03/12/99	-	-	-	0.2	passive skimmer
		03/19/99	NM	8.45	>0.01	0.07	passive skimmer
		04/14/99	-	-	-	0.2	passive skimmer
		05/11/99	-	-	-	0.2	passive skimmer
		06/24/99	8.88	9.63	0.8	0.2	passive skimmer
		07/15/99	-	-	-	0.2	passive skimmer
		07/16/99	-	-	-	0.2	passive skimmer
		08/27/99	-	-	-	0.2	passive skimmer
09/28/99	-	-	0.65	0.2	passive skimmer		
10/05/99	-	-	-	0.2	passive skimmer		
11/12/99	9.38	10.27	0.89	0.2	passive skimmer		
12/21/99	-	-	-	0.2	passive skimmer		
MW-3	14.22	12/31/97	-	-	-	30	active skimmer
		01/29/98	-	-	-	10	active skimmer
		04/13/98	-	-	-	240	active skimmer
		05/11/98	-	-	-	1,545	active skimmer
		06/15/98	-	-	-	1,950	active skimmer
		11/06/98	8.84	9.94	1.1	500	active skimmer
		01/05/99	-	-	-	275 ²	active skimmer
		01/14/99	-	-	-	400 ²	active skimmer
		02/03/99	-	-	-	400 ²	active skimmer
		02/26/99	-	-	-	570 ²	active skimmer
		03/19/99	7.52	8.05	0.5	211	active skimmer
		06/16/99	-	-	-	310	active skimmer
		06/24/99	8.38	8.56	0.2	-	active skimmer
		07/14/99	-	-	-	50 ²	active skimmer
09/28/99	-	-	0.2	-	active skimmer		
10/29/99	-	-	-	125 ²	active skimmer		
11/12/99	9.14	9.23	0.09	-	active skimmer		
MW-6	14.00	13/31/97	-	-	-	0.0014	passive skimmer
		01/29/98	-	-	-	0.0014	passive skimmer
		03/02/98	-	-	-	0.0014	passive skimmer
		11/06/98	NM	9.62	>0.01	0.0	passive skimmer
		03/19/99	NM	7.37	>0.01	0.0	passive skimmer
MW-8 ¹	12.94	12/31/97	8.49	8.82	0.33	4.38	-
		11/06/98	9.25	10.3	1.1	3.48	-

- Data prior to November 6, 1998 taken from *Groundwater Monitoring, Sampling and Product Removal System O&M Report* dated July 21, 1998, by Innovative Technical Solutions, Inc.

- Data prior to November 6, 1998 taken from *Groundwater Monitoring, Sampling and Product*

- Product removal volumes from 11/6/98 on represent total product removed during that reporting period.

¹ Free product in well is too viscous to allow product thickness or groundwater level measurements.

² Product removal totals for MW-3 are estimated from documentation of product removal from the treatment system performed by Performance Excavators, Inc.

NM - Well checked for free product but was not able to detect a measurable amount in the well.

..... Greyed areas indicates data from this reporting period.

**Table 3. Groundwater Sample Result
Port of Oakland
2277 7th Street, Oakland California**

Monitoring Well ID	Date	TPHg (µg/l)	TPHd (µg/l)	TPHmo (µg/l)	Benzene (µg/l)	Toluene (µg/l)	Ethylbenzene (µg/l)	Total Xylenes (µg/l)	MTBE (µg/l)
MW-2	05/27/94	87	470	NA	<0.5	<0.5	<0.5	<0.5	NA
	03/29/95	<50	110	1,400	<0.4	<0.3	<0.3	<0.4	NA
	09/06/95	<50	NA	NA	<0.4	<0.3	<0.3	<0.4	NA
	01/08/96	<50	<50	1200	<0.4	<0.3	<0.3	<0.4	NA
	04/04/96	<50	160	320	<0.5	<0.5	<0.5	<1.0	NA
	07/10/96	<50	120	1400	<0.4	<0.3	<0.3	<0.4	NA
	12/03/96	<50	230 ^{1,2}	<250	<0.5	<0.5	<0.5	<1.0	NA
	03/28/97	<50	714	<250	<0.5	<0.5	<0.5	<1.0	NA
	06/13/97	51	<50	<250	<0.5	<0.5	<0.5	<1.0	NA
	09/18/97	82	<50	<250	0.56	<0.5	<0.5	<1.0	NA
	12/31/97	<50	<47	<280	1.4	<0.5	<0.5	<1.0	NA
	04/13/98	<50	<50	<300	<0.5	<0.5	<0.5	<1.0	NA
	11/06/98	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	<2
	03/19/99	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	<2
	06/24/99	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	<2
	09/28/99	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	<2
11/12/99	<50	120 ^{2,6}	<300	<0.5	<0.5	<0.5	<0.5	6.3 ^{8,9}	
MW-4	09/11/95	150	<200	500	23	<0.3	<0.3	<0.4	NA
	01/08/96	790	90	400	170	1.2	0.6	0.6	NA
	04/04/96	1,100	180	300	320	1.6	1.1	1.2	NA
	07/10/96	1,200	120	300	470	1.5	0.8	0.8	NA
	12/03/96	990	220 ^{1,2}	<250	350	3.3	1.3	1.3	NA
	03/28/97	440 ²	<50	<250	190	1.2	0.64	<1.0	NA
	06/13/97	1,300	92 ⁵	<250	500	5.5	3.4	2.8	NA
	09/18/97	1,300	150	<250	550	4.9	2.1	2.00	NA
	12/31/97	73 ^{1,2,3}	<47	<280	110 ¹	1.0 ¹	<0.5	<1.0	NA
	04/13/98	150 ^{2,3}	<50	<300	520	2.9	<2.5	<5.0	NA
	11/06/98	<50	<50	<300	250	1.7	<1	<1	<4
	03/19/99	81	<50	<300	250	<1	1.2	<1	<4
	06/24/99	190	<50	<300	360	1.4	2.2	1	24
09/28/99	750 ^{3,5}	63 ^{3,5}	<300	280	1.5	<1	<1	<4	
11/12/99	330 ³	840 ²	<300	740	<2.5	<2.5	<2.5	42 ⁹	
MW-5	09/11/95	90	<300	2,500	3.3	<0.3	<0.3	<0.4	NA
	04/04/96	<50	180	520	<0.5	<0.5	<0.5	<1.0	NA
	07/10/96	<50	120	1,500	<0.4	<0.3	<0.3	<0.4	NA
	12/03/96	<50	200 ^{1,2}	<250	<0.5	<0.5	<0.5	<1.0	NA
	03/28/97	<50	<50	<250	<0.5	<0.5	<0.5	<1.0	NA
	06/13/97	<50	<50	<250	<0.5	<0.5	<0.5	<1.0	NA
	09/18/97	<50	<50	<250	<0.5	<0.5	<0.5	<1.0	NA
	12/31/97	<50	<47	<280	<0.5	<0.5	<0.5	<1.0	NA

**Table 3. Groundwater Sample Result
Port of Oakland
2277 7th Street, Oakland California**

Monitoring Well ID	Date	TPHg (µg/l)	TPHd (µg/l)	TPHmo (µg/l)	Benzene (µg/l)	Toluene (µg/l)	Ethylbenzene (µg/l)	Total Xylenes (µg/l)	MTBE (µg/l)
MW-5 (cont.)	04/13/98	<50	<47	<280	<0.5	<0.5	<0.5	<1.0	NA
	11/06/98	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	<2
	03/19/99	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	<2
	06/24/99	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	3.1
	09/28/99	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	<2
	11/12/99	<50	110 ^{2,6}	<300	<0.5	<0.5	<0.5	<0.5	5.5 ⁹
MW-6	11/06/98	120	12,000	1,200	19	0.65	1.8	<0.5	<2
	03/19/99	170	3,800	580	21	0.86	1.5	2.9	<2
	06/24/99	120	1,700 ⁷	<300 ⁷	18	<0.5	1.0	<0.5	54
	09/28/99	130 ^{3,5}	820	<300	20	0.51	2.2	<0.5	<2
	11/12/99	150	11,000 ^{2,6}	3,000 ^{3,6}	27	<0.5	2.2	<0.5	13 ⁹
	MW-7	09/06/95	<50	<300	800	<0.4	<0.3	<0.3	<0.4
01/08/96		<50	410	110	<0.4	<0.3	<0.3	<0.4	NA
04/04/96		<50	530	340	<0.5	<0.5	<0.5	<1.0	NA
07/10/96		80	840	1,700	<0.4	<0.3	<0.3	<0.4	NA
12/03/96		<50	280 ^{1,2}	<250	<0.5	<0.5	<0.5	<1.0	NA
03/28/97		65 ⁶	94 ²	<250	<0.5	<0.5	<0.5	<1.0	NA
06/13/97		<50	100	<250	<0.5	<0.5	<0.5	<1.0	NA
09/18/97		<50	240	<250	<0.5	<0.5	<0.5	<1.0	NA
12/31/97		<50	53 ^{2,3}	<280	<0.5	<0.5	<0.5	<1.0	NA
04/13/98		<50	<48	<290	<0.5	<0.5	<0.5	<1.0	NA
11/06/98		<50	<50	<300	<0.5	<0.5	<0.5	<0.5	<2
03/19/99		<50	<50	<300	<0.5	<0.5	<0.5	<0.5	5.3
06/24/99		73	<50	<300	<0.5	<0.5	<0.5	<0.5	12
09/28/99		<50	<50	<300	<0.5	<0.5	<0.5	<0.5	14
11/12/99		<50	600 ^{2,6}	420 ³	<0.5	<0.5	<0.5	<0.5	15 ⁹

¹ Analyte found in the associated blank as well as in the sample.

² Hydrocarbons present do not match profile of laboratory standard.

³ Low-boiling-point/lighter hydrocarbons are present in the sample.

⁴ Chromatographic pattern matches known laboratory contaminant.

⁵ Hydrocarbons are present in the requested fuel quantification range, but do not resemble pattern of available fuel standard.

⁶ High-boiling-point/heavier hydrocarbons are present in sample.

⁷ Sample did not pass laboratory QA/QC and may be biased low

⁸ Presence of this compound confirmed by second column, however, the confirmation concentration differed from the reported result by more than a factor of two.

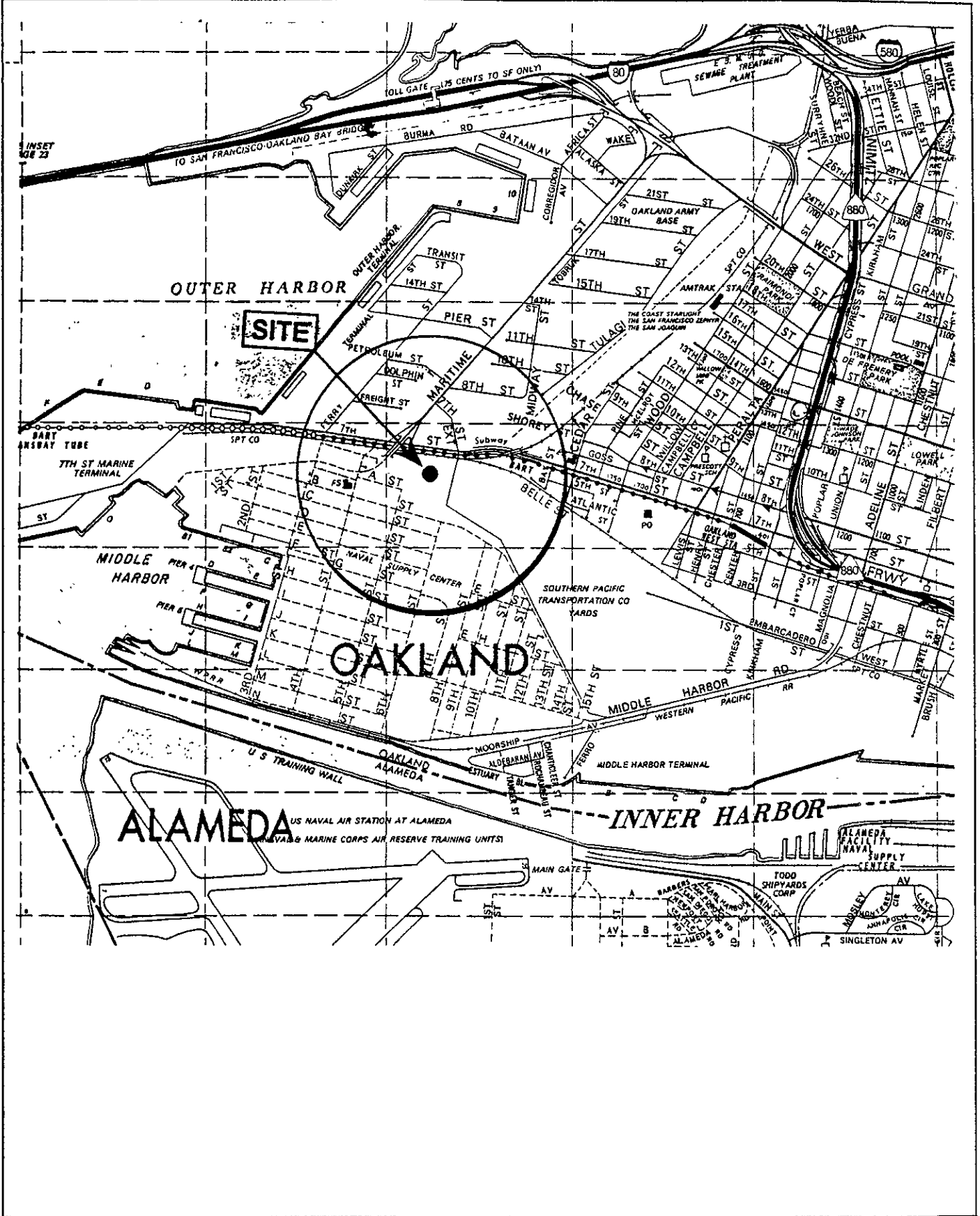
⁹ Trip blank contained MTBE at a concentration of 4.2 µg/l
 - Data from December 1997 through April 1998 taken from *Groundwater Monitoring, Sampling and Product Removal System O&M Report* dated July 21, 1998, by Innovative Technical Solutions, Inc.
 -Data prior to December 1997 taken from *Groundwater Analytical Results, Quarterly Groundwater Monitoring Report: Third Quarter 1997, Building C-401, 2277 7th Street, Oakland, CA*, dated October 24, 1997, by Uribe and Associate

NA Not Analyzed.

**Table 4. Summary of Operation and Maintenance Activities
 Port of Oakland
 2277 7th Street, Oakland California**

Date	System Status	Comments
10/05/99	System Running	Remove product from MW-1, lower passive skimmer 6 inches, active skimmer appears to be removing product at a slow rate, lower skimmer 2 inches, seems to improve
11/12/99	System Running	Remove product from MW-1, check active skimmer, performing well
12/21/99	System Running	Remove product from MW-1, active skimmer pumping some water, raise skimmer 3 inches, seems to improve

PLATES



Harding Lawson Associates
 Engineering and
 Environmental Services

Vicinity Map
 Quarterly Groundwater Monitoring Report
 2277 Seventh Street
 Oakland, California 94607

PLATE

1

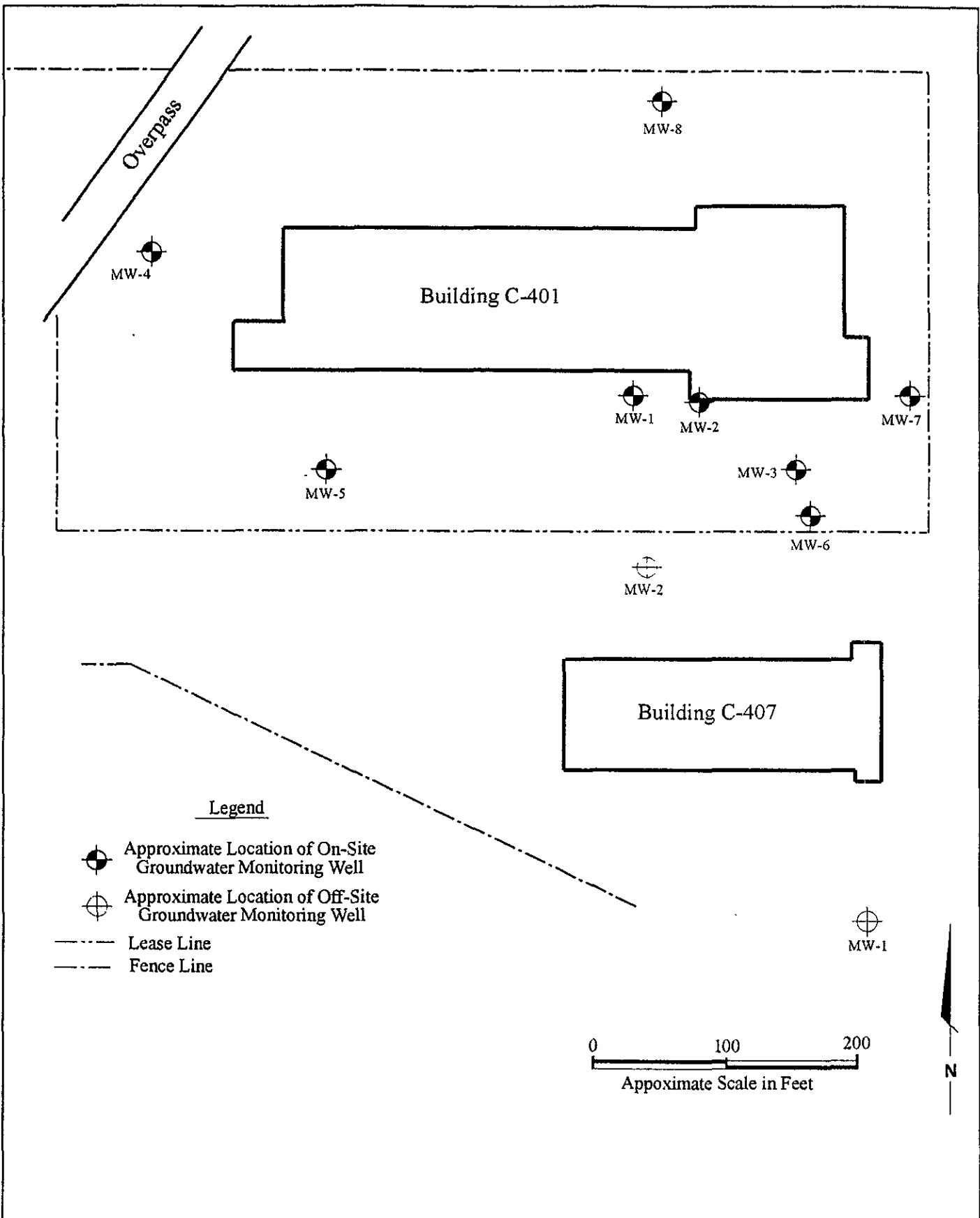
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PROJECT NUMBER
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APPROVED

DATE
 12/17/99

REVISED DATE



Harding Lawson Associates
 Engineering and
 Environmental Services

Site Plan
Quarterly Groundwater Monitoring Report
 2277 Seventh Street
 Oakland, California 94607

PLATE

2

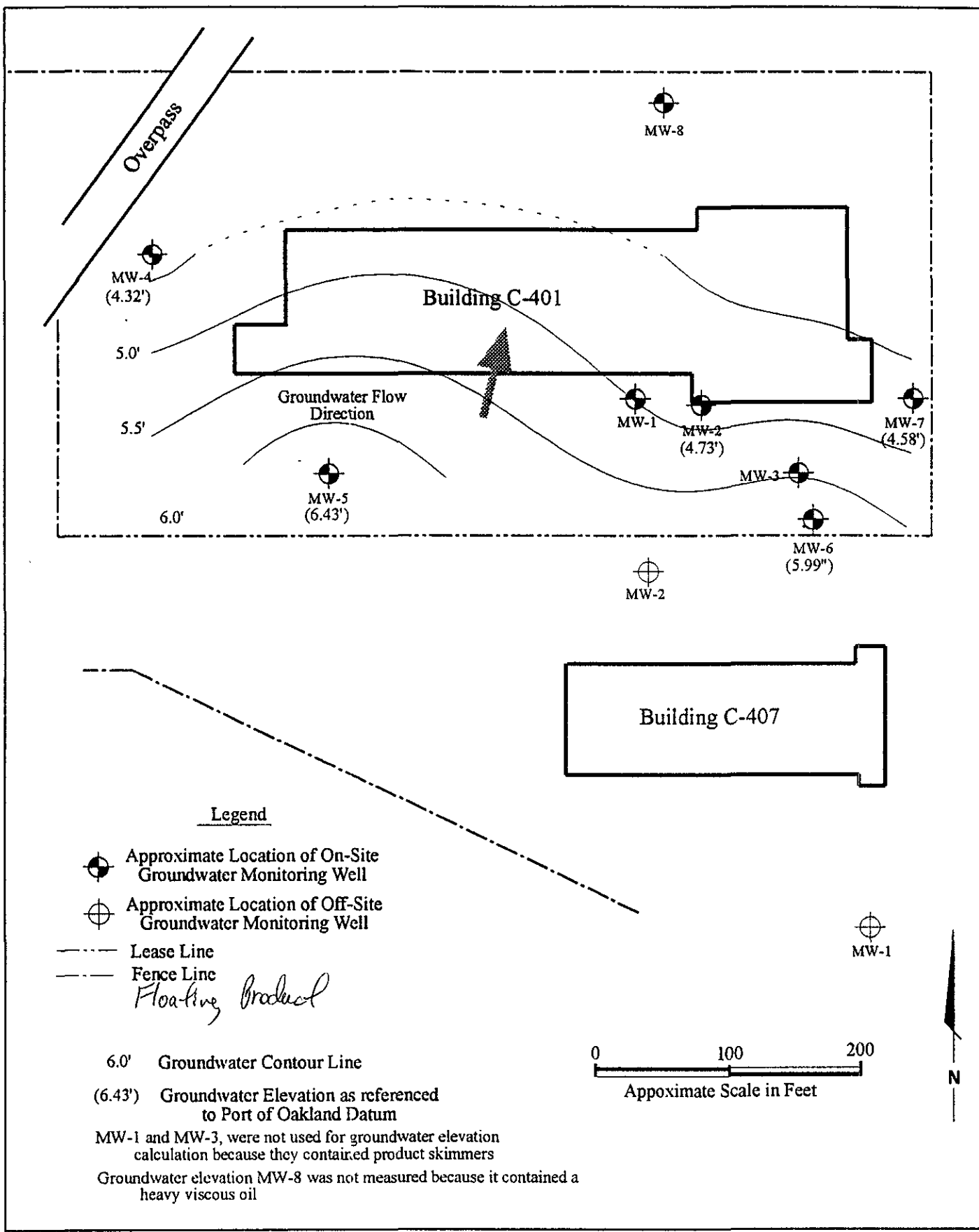
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DATE
 12/17/99

REVISED DATE



Harding Lawson Associates
 Engineering and
 Environmental Services

Groundwater Elevation, November 12, 1999
Quarterly Groundwater Monitoring Report
 2277 Seventh Street
 Oakland, California 94607

PLATE

3

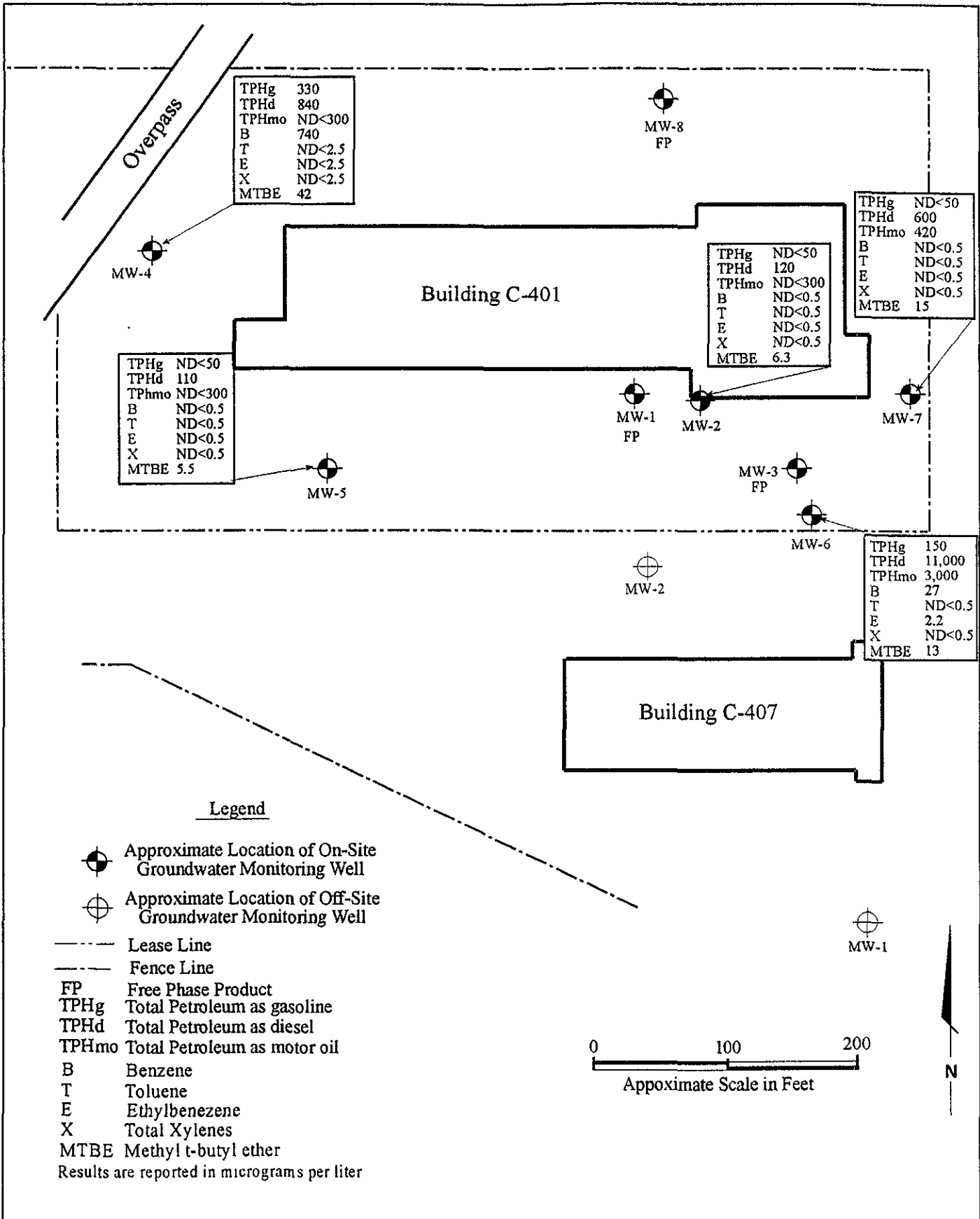
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APPROVED

DATE
 12/17/99

REVISED DATE



Harding Lawson Associates
Engineering and Environmental Services

Groundwater Sample Results, November 12, 1999 PLATE
Quarterly Groundwater Monitoring Report
2277 Seventh Street
Oakland, California 94607

4

DRAWN jgm	PROJECT NUMBER 42633.1	APPROVED	DATE 12/17/99	REVISED DATE
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APPENDIX A
GROUNDWATER SAMPLE FORMS



Job Name 2277 7th Street
Job Number 42033-1
Recorded by Heath Lee

Well No. MW-1
Well Type. Monitor Extraction Other
Well Material: PVC St. Steel Other
Date 11/12/99 Time 1130
Sampled by HDL

WELL PURGING

PURGE VOLUME

Casing Diameter (D in inches):
 2-inch 4-inch 6-inch Other
Total Depth of Casing (TD in feet BTOC):
Water Level Depth (WL in feet BTOC): 10.27'
Number of Well Volumes to be purged (# Vols) product @ 9.38'
 3 4 5 10 Other

PURGE VOLUME CALCULATION:

$$\left(\frac{\text{TD (feet)} - \text{WL (feet)}}{D \text{ (inches)}} \right) \times \text{product thickness is } 0.99' \times \text{# Vols} \times 0.0408 = \text{Calculated Purge Volume} \text{ gallons}$$

PURGE METHOD

Bailer - Type: _____
 Submersible Centrifugal Bladder; Pump No.: _____
 Other - Type: _____

PUMP INTAKE SETTING

Near Bottom Near Top Other
Depth in feet (BTOC): _____ Screen Interval in Feet (BTOC) from _____ to _____

PURGE TIME

Start _____ Stop _____ Elapsed _____

PURGE RATE

Initial _____ gpm Final _____ gpm

ACTUAL PURGE VOLUME

_____ gallons

FIELD PARAMETER MEASUREMENT

Minutes Since Pumping Began	pH	Cond. (µmhos/cm)	T <input type="checkbox"/> °C <input type="checkbox"/> °F	Other

Minutes Since Pumping Began	pH	Cond (µmhos/cm)	T <input type="checkbox"/> °C <input type="checkbox"/> °F	Other

Meter Nos. _____

Observations During Purging (Well Condition, Turbidity, Color, Odor): empty 0.2 gals of product from passive skimmer
Discharge Water Disposal: Sanitary Sewer Storm Sewer Other

WELL SAMPLING

SAMPLING METHOD

Bailer - Type: _____ Same As Above
 Grab - Type: _____
 Submersible Centrifugal Bladder; Pump No.: _____ Other - Type: _____

SAMPLING DISTRIBUTION

Sample Series: _____

Sample No.	Volume Cont.	Analysis Requested	Preservatives	Lab	Comments

QUALITY CONTROL SAMPLES

Duplicate Samples

Original Sample No.	Duplicate Sample No.

Blank Samples

Type	Sample No.

Other Samples

Type	Sample No.



Job Name 2277 7th St.
Job Number 42633-1
Recorded by North Steel
(Signature)

Well No. MW-2
Well Type: Monitor Extraction Other
Well Material: PVC St. Steel Other
Date 11/12/99 Time 1003
Sampled by Tom HDL
(Initials)

WELL PURGING

PURGE VOLUME

Casing Diameter (D in inches):
 2-inch 4-inch 6-inch Other
Total Depth of Casing (TD in feet BTOC): 15.27
Water Level Depth (WL in feet BTOC): 9.63
Number of Well Volumes to be purged (# Vols)
 3 4 5 10 Other

PURGE METHOD

Bailer - Type: PVC
 Submersible Centrifugal Bladder; Pump No.:
 Other - Type:

PUMP INTAKE SETTING

Near Bottom Near Top Other
Depth in feet (BTOC): Screen Interval in Feet (BTOC)
from to

PURGE VOLUME CALCULATION

$$\left(\frac{15.27 - 9.63}{\text{TD (feet)}} \right) \times \frac{2^2}{\text{D (inches)}} \times \frac{3}{\text{\# Vols}} \times 0.0408 = \frac{2.76}{\text{Calculated Purge Volume}} \text{ gallons}$$

PURGE TIME

0948 Start 0957 Stop 9 Elapsed

PURGE RATE

Initial _____ gpm Final _____ gpm

ACTUAL PURGE VOLUME

3 gallons

FIELD PARAMETER MEASUREMENT

Minutes Since Pumping Began	pH	Cond. (µmhos/cm)	T $\begin{matrix} \square \text{ } ^\circ\text{C} \\ \square \text{ } ^\circ\text{F} \end{matrix}$	Other
initial	7.06	2490	67.4	
1	7.14	2300	67.8	
2	7.16	2320	68.0	
3	7.20	2290	67.6	

Minutes Since Pumping Began	pH	Cond. (µmhos/cm)	T $\begin{matrix} \square \text{ } ^\circ\text{C} \\ \square \text{ } ^\circ\text{F} \end{matrix}$	Other
Meter Nos.	<u>9510</u>			

Observations During Purging (Well Condition, Turbidity, Color, Odor): light brown, no odor

Discharge Water Disposal: Sanitary Sewer Storm Sewer Other Drum on Site

WELL SAMPLING

SAMPLING METHOD

Bailer - Type: Reflow Disposable Same As Above
 Submersible Centrifugal Bladder; Pump No.: Grab - Type:
 Other - Type:

SAMPLING DISTRIBUTION

Sample Series: _____

Sample No.	Volume/Cont.	Analysis Requested	Preservatives	Lab	Comments
<u>NW-2</u>	<u>3 Vols</u>	<u>TPHd, TPHmo</u> <u>TPHg, BTEX</u> <u>MTBE</u>	<u>HCL</u>	<u>Curtis + Tompkins</u> <u>"</u>	<u>w/ filtration</u> <u>+ silica gel cleanup</u>

QUALITY CONTROL SAMPLES

Duplicate Samples		Blank Samples		Other Samples	
Original Sample No.	Duplicate Sample No.	Type	Sample No.	Type	Sample No.
				<u>Flow</u>	<u>Flow</u>



Job Name 2277 7th St.
Job Number 42633-1
Recorded by Heath D Lee
(Signature)

Well No. MW-4
Well Type: Monitor Extraction Other
Well Material: PVC St. Steel Other
Date 11/2/99 Time 1031
Sampled by HDL
(Initials)

WELL PURGING

PURGE VOLUME

Casing Diameter (D in inches):
 2-inch 4-inch 6-inch Other
Total Depth of Casing (TD in feet BTOC): 18.84
Water Level Depth (WL in feet BTOC): 8.83
Number of Well Volumes to be purged (# Vols)
 3 4 5 10 Other

PURGE METHOD

Bailer - Type: PVC
 Submersible Centrifugal Bladder; Pump No.:
 Other - Type:

PUMP INTAKE SETTING

Near Bottom Near Top Other
Depth in feet (BTOC): Screen Interval in Feet (BTOC)
from to

PURGE VOLUME CALCULATION

$$\left(\frac{18.84 \text{ (TD) - 8.83 (WL)}}{D \text{ (inches)}} \right) \times \text{\# Vols} \times 0.0408 = \text{Calculated Purge Volume (gallons)}$$

$\left(\frac{18.84 - 8.83}{2} \right) \times 3 \times 0.0408 = 4.9$ gallons

PURGE TIME

1018 Start 1026 Stop 8 Elapsed

PURGE RATE

Initial _____ gpm Final _____ gpm

ACTUAL PURGE VOLUME

5 gallons

FIELD PARAMETER MEASUREMENT

Minutes Since Pumping Began	pH	Cond. (µmhos/cm)	T °C / °F	Other
initial	6.99	1200	67.6	
1.5	7.17	1650	69.8	
3	7.21	1660	71.1	
5	7.22	1760	71.4	

Minutes Since Pumping Began	pH	Cond. (µmhos/cm)	T °C / °F	Other
Meter Nos.	<u>9570</u>			

Observations During Purging (Well Condition, Turbidity, Color, Odor):

Discharge Water Disposal: Sanitary Sewer Storm Sewer Other Drum on Site

WELL SAMPLING

SAMPLING METHOD

Bailer - Type: Reflux Disposable Same As Above
 Submersible Centrifugal Bladder; Pump No.: Grab - Type:
 Other - Type:

SAMPLING DISTRIBUTION

Sample Series:

Sample No.	Volume/Cont.	Analysis Requested	Preservatives	Lab	Comments
MW-4	1 Ambers	TPH d, TPH mo	-	Curtis + Tompkins	w/ filtration & silica gel cleanup
	3 VOLS	TPH g, BTEX MTBE	HCL	"	

QUALITY CONTROL SAMPLES

Duplicate Samples

Original Sample No.	Duplicate Sample No.

Blank Samples

Type	Sample No.

Other Samples

Type	Sample No.



Job Name 2277 7th St.
Job Number 42633-1
Recorded by [Signature]
(Signature)

Well No. MW-6
Well Type: Monitor Extraction Other
Well Material: PVC St. Steel Other
Date 11/2/99 Time 10:53 1110
Sampled by [Signature]
(Initials)

WELL PURGING

PURGE VOLUME

Casing Diameter (D in inches):
 2-inch 4-inch 6-inch Other
Total Depth of Casing (TD in feet BTOC): 18.05
Water Level Depth (WL in feet BTOC): 9.01
Number of Well Volumes to be purged (# Vols)
 3 4 5 10 Other

PURGE METHOD

Bailer - Type: PVC
 Submersible Centrifugal Bladder; Pump No.:
 Other - Type:

PUMP INTAKE SETTING

Near Bottom Near Top Other
Depth in feet (BTOC): _____ Screen Interval in Feet (BTOC)
from _____ to _____

PURGE VOLUME CALCULATION

$$\left(\frac{18.05 - 9.01}{\text{TD (feet)}} \right) \times \frac{2^2}{\text{D (inches)}} \times \frac{3}{\text{\# Vols}} \times 0.0408 = \frac{4.97}{\text{Calculated Purge Volume}} \text{ gallons}$$

PURGE TIME

PURGE RATE

ACTUAL PURGE VOLUME

1044 Start 1104 Stop 20 Elapsed Initial _____ gpm Final _____ gpm 5 gallons

FIELD PARAMETER MEASUREMENT

Minutes Since Pumping Began	pH	Cond. (µmhos/cm)	T °C / °F	Other
initial	6.89	4320	73.0	
1.5	7.16	4380	72.7	
3	7.15	4570	73.4	
5	7.28	4540	73.2	

Minutes Since Pumping Began	pH	Cond. (µmhos/cm)	T °C / °F	Other
Meter Nos.	<u>9510</u>			

Observations During Purging (Well Condition, Turbidity, Color, Odor): light grey, clear, slight odor
Discharge Water Disposal: Sanitary Sewer Storm Sewer Other Drum on Site

WELL SAMPLING

SAMPLING METHOD

Bailer - Type: Reflex Disposable Same As Above
 Submersible Centrifugal Bladder; Pump No.: Grab - Type:
 Other - Type:

SAMPLING DISTRIBUTION

Sample Series: _____

Sample No.	Volume/Cont.	Analysis Requested	Preservatives	Lab	Comments
MW-6	2 Ambers	TPHd, TPHmo	-	Curtis & Tompkins	w/ filtration & silica gel cleanup
1/	3 Vials	TPHg, BTEX, MTBE	HCL	"	

QUALITY CONTROL SAMPLES

Duplicate Samples

Original Sample No.	Duplicate Sample No.
MW-6	DUP1199
(1110)	(1120)

Blank Samples

Type	Sample No.

Other Samples

Type	Sample No.
Trip	



Well No. MW-7
Well Type: Monitor Extraction Other
Well Material: PVC St. Steel Other
Date 11/12/99 Time 0935
Sampled by WHL

Job Name 2277 7th St.
Job Number 42633-1
Recorded by Heather DeLee
(Signature)

WELL PURGING

PURGE VOLUME

Casing Diameter (D in inches):
 2-inch 4-inch 6-inch Other
Total Depth of Casing (TD in feet BTOC): 18.16
Water Level Depth (WL in feet BTOC): 9.77
Number of Well Volumes to be purged (# Vols)
 3 4 5 10 Other

PURGE METHOD

Bailer - Type: PVC
 Submersible Centrifugal Bladder; Pump No.:
 Other - Type:

PUMP INTAKE SETTING

Near Bottom Near Top Other
Depth in feet (BTOC): Screen Interval in Feet (BTOC)
from to

PURGE VOLUME CALCULATION

$$\left(\frac{18.16}{\text{TD (feet)}} - \frac{9.77}{\text{WL (feet)}} \right) \times \frac{2^2}{\text{D (inches)}} \times \frac{3}{\text{\# Vols}} \times 0.0408 = \frac{4.1}{\text{Calculated Purge Volume}} \text{ gallons}$$

PURGE TIME

0918 Start 0928 Stop 10 Elapsed

PURGE RATE

Initial _____ gpm Final _____ gpm

ACTUAL PURGE VOLUME

4.5 gallons

FIELD PARAMETER MEASUREMENT

Minutes Since Pumping Began	pH	Cond. (µmhos/cm)	T <input checked="" type="checkbox"/> °C <input checked="" type="checkbox"/> °F	Other
initial	7.03	2100	66.0	
1.5	7.13	1960	66.8	
3	7.13	2100	67.3	
4.5	7.14	2150	67.7	

Minutes Since Pumping Began	pH	Cond. (µmhos/cm)	T <input type="checkbox"/> °C <input type="checkbox"/> °F	Other
Meter Nos.	<u>9570</u>			

Observations During Purging (Well Condition, Turbidity, Color, Odor): silty brown, no odor
Discharge Water Disposal: Sanitary Sewer Storm Sewer Other Drum on Site

WELL SAMPLING

SAMPLING METHOD

Bailer - Type: Reflux Disposable Same As Above
 Submersible Centrifugal Bladder; Pump No.: Grab - Type:
 Other - Type:

SAMPLING DISTRIBUTION

Sample Series: _____

Sample No.	Volume/Cont.	Analysis Requested	Preservatives	Lab	Comments
MW-7	2 Ambers	TPH d, TPHmo	-	Curtis + Tompkins	w/ filtration & silica gel cleanup
	3 Vols	TPHg, BTEX, MTBE	HCL	"	

QUALITY CONTROL SAMPLES

Duplicate Samples		Blank Samples		Other Samples	
Original Sample No.	Duplicate Sample No.	Type	Sample No.	Type	Sample No.
				Trip	

APPENDIX B
LABORATORY REPORTS

NOV 24 1999



Curtis & Tompkins, Ltd., Analytical Laboratories, Since 1878

2323 Fifth Street, Berkeley, CA 94710, Phone (510) 486-0900, Fax (510) 486-0532

A N A L Y T I C A L R E P O R T

Prepared for:

Harding Lawson Associates
383 Fourth Street
Third Floor
Oakland, CA 94607

Date: 24-NOV-99
Lab Job Number: 142545
Project ID: 42633.1
Location: Port of Oakland-2277

Reviewed by:

Reviewed by:

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Harding Lawson Associates
 383 Fourth Street, Third Floor
 Oakland, California 94607
 (510) 451-1001 - Phone
 (510) 451-3165 - Fax

CHAIN OF CUSTODY FORM

Lab: Curtis + Tompkins

142545

Samplers: Heather Lee

Job Number: 42033-1

Name/Location: Port of Oakland - 2277 7th Street

Project Manager: Jim McCarty

Recorder: Heather Lee
(Signature Required)

SOURCE CODE	MATRIX					# CONTAINERS & PRESERV.				SAMPLE NUMBER OR LAB NUMBER			DATE				STATION DESCRIPTION/ NOTES	
	Water	Sediment	Soil	Oil	Unpres.	FCS	HNO ₃	HCL	Ice	Yr	Wk	Seq	Yr	Mo	Day	Time		
																		3X
	X											TRIP	11	12	08	30	1	
	X											MW-5	99	11	12	09	02	2
	X											MW-7	99	11	12	09	35	3
	X											MW-2	99	11	12	10	03	4
	X											MW-4	99	11	12	10	31	5
	X											MW-6	99	11	12	11	10	6
	X											DUP	11	12	11	20	7	

ANALYSIS REQUESTED						
EPA 8010	EPA 8020	EPA 8260	EPA 8270	METALS	EPA 8015M/TPHG	EPA 8020/BTEX vs /MTBE
					X	X
					X	X
					X	X
					X	X
					X	X
					X	X
					X	X

LAB NUMBER			DEPTH IN FEET	COL MTD CD	QA CODE	MISCELLANEOUS
Yr	Wk	Seq				
						Silica gel cleanup on TPHd + TPHme
						Standard TAT

CHAIN OF CUSTODY RECORD		
RELINQUISHED BY: (Signature)	RECEIVED BY: (Signature)	DATE/TIME
<u>Heather Lee</u>	<u>Anna Poyant</u>	11/12/09 12:00
RELINQUISHED BY: (Signature)	RECEIVED BY: (Signature)	DATE/TIME
RELINQUISHED BY: (Signature)	RECEIVED BY: (Signature)	DATE/TIME
RELINQUISHED BY: (Signature)	RECEIVED BY: (Signature)	DATE/TIME
DISPATCHED BY: (Signature)	DATE/TIME	RECEIVED FOR LAB BY: (Signature)
METHOD OF SHIPMENT		
SAMPLE CONDITION WHEN RECEIVED BY THE LABORATORY		

TVH-Total Volatile Hydrocarbons

Client: Harding Lawson Associates	Analysis Method: EPA 8015M
Project#: 42633.1	Prep Method: EPA 5030
Location: Port of Oakland-2277	

Sample #	Client ID	Batch #	Sampled	Extracted	Analyzed	Moisture
142545-002	MW-5	52014	11/12/99	11/15/99	11/15/99	
142545-003	MW-7	52014	11/12/99	11/15/99	11/15/99	
142545-004	MW-2	52014	11/12/99	11/15/99	11/15/99	
142545-005	MW-4	52014	11/12/99	11/15/99	11/15/99	

Matrix: Water

Analyte	Units	142545-002	142545-003	142545-004	142545-005
Diln Fac:		1	1	1	1
Gasoline C7-C12	ug/L	<50	<50	<50	330 L
Surrogate					
Trifluorotoluene	%REC	101	102	103	108
Bromofluorobenzene	%REC	108	110	108	107

L: Lighter hydrocarbons than indicated standard

TVH-Total Volatile Hydrocarbons

Client: Harding Lawson Associates
 Project#: 42633.1
 Location: Port of Oakland-2277

Analysis Method: EPA 8015M
 Prep Method: EPA 5030

Sample #	Client ID	Batch #	Sampled	Extracted	Analyzed	Moisture
142545-006	MW-6	52014	11/12/99	11/15/99	11/15/99	
142545-007	DUP1199	52014	11/12/99	11/15/99	11/15/99	

Matrix: Water

Analyte	Units	142545-006	142545-007
Diln Fac:		1	1
Gasoline C7-C12	ug/L	150	150
Surrogate			
Trifluorotoluene	%REC	103	103
Bromofluorobenzene	%REC	108	107

BTXE	
Client: Harding Lawson Associates	Analysis Method: EPA 8021B
Project#: 42633.1	Prep Method: EPA 5030
Location: Port of Oakland-2277	

Sample #	Client ID	Batch #	Sampled	Extracted	Analyzed	Moisture
142545-001	TRIP 1199	52053	11/12/99	11/18/99	11/18/99	
142545-002	MW-5	52053	11/12/99	11/17/99	11/17/99	
142545-003	MW-7	52053	11/12/99	11/18/99	11/18/99	
142545-004	MW-2	52053	11/12/99	11/18/99	11/18/99	

Matrix: Water

Analyte	Units	142545-001	142545-002	142545-003	142545-004
Diln Fac:		1	1	1	1
MTBE	ug/L	4.2	5.5	15	6.3C
Benzene	ug/L	<0.5	<0.5	<0.5	<0.5
Toluene	ug/L	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	ug/L	<0.5	<0.5	<0.5	<0.5
m,p-Xylenes	ug/L	<0.5	<0.5	<0.5	<0.5
o-Xylene	ug/L	<0.5	<0.5	<0.5	<0.5
Surrogate					
Trifluorotoluene	%REC	121	120	127	121
Bromofluorobenzene	%REC	127	131	134	128

C: Presence of this compound confirmed by second column, however, the confirmation concentration differed from the reported result by more than a factor of two

BTXE

Client: Harding Lawson Associates
 Project#: 42633.1
 Location: Port of Oakland-2277

Analysis Method: EPA 8021B
 Prep Method: EPA 5030

Sample #	Client ID	Batch #	Sampled	Extracted	Analyzed	Moisture
142545-005	MW-4	52053	11/12/99	11/18/99	11/18/99	
142545-006	MW-6	52053	11/12/99	11/18/99	11/18/99	
142545-007	DUP1199	52053	11/12/99	11/18/99	11/18/99	

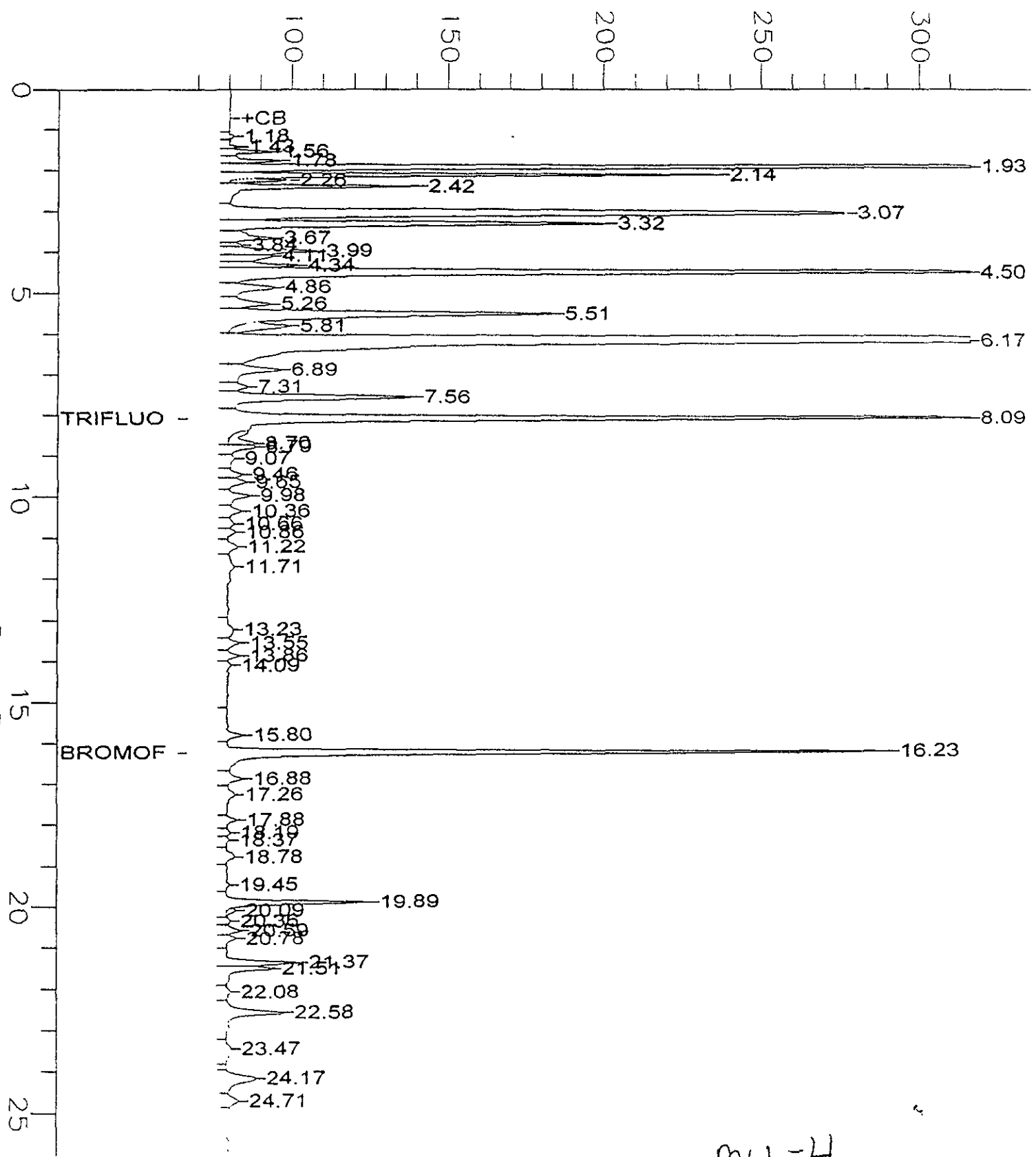
Matrix: Water

Analyte	Units	142545-005	142545-006	142545-007
Diln Fac:		5	1	1
MTBE	ug/L	42	13	14
Benzene	ug/L	740	27	28
Toluene	ug/L	<2.5	<0.5	0.52
Ethylbenzene	ug/L	<2.5	2.2	2.3
m,p-Xylenes	ug/L	<2.5	<0.5	<0.5
o-Xylene	ug/L	<2.5	<0.5	<0.5
Surrogate				
Trifluorotoluene	%REC	126	123	119
Bromofluorobenzene	%REC	132	134	130

Sample Name : 142545-005b,52014
FileName : G:\GC04\DATA\319J012.raw
Method : TVHBTXE
Start Time : 0.00 min
Scale Factor: -1.0

Sample #: ph<2
Date : 11/16/99 11:07 AM
Time of Injection: 11/15/99 09:36 PM
Low Point : 66.61 mV
Plot Scale: 250.0 mV

Response [mV]



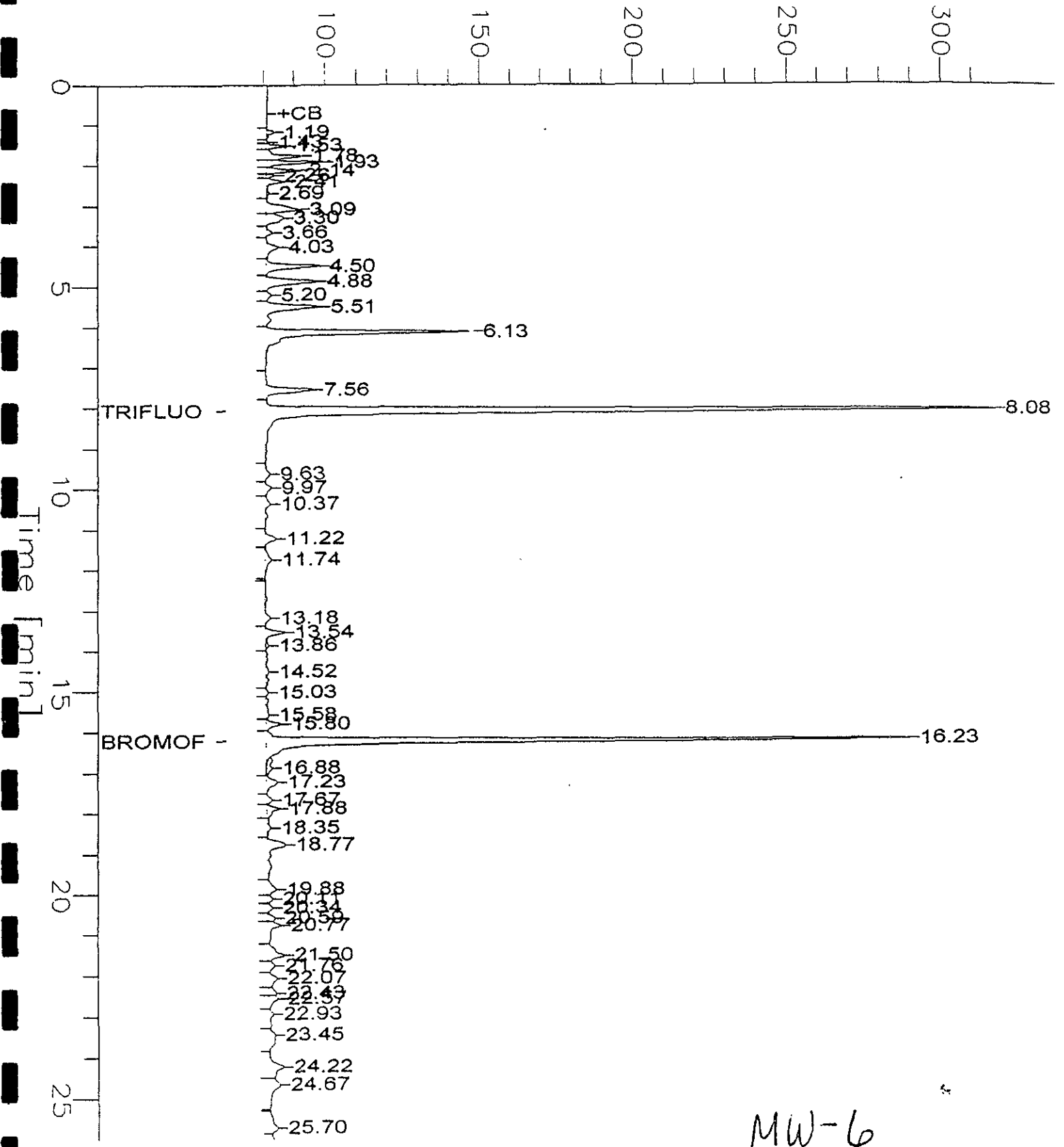
mw-4

Sample Name : 142545-006b, 52014
FileName : G:\GC04\DATA\319J014.raw
Method : TVHBTXE
Start Time : 0.00 min
Scale Factor : -1.0

End Time : 26.00 min
Plot Offset : 68 mV

Sample #: ph<2
Date : 11/16/99 11:07 AM
Time of Injection: 11/15/99 10:45 PM
Low Point : 67.70 mV
Plot Scale: 250.0 mV
High Point : 317.70 mV

Response [mV]



MW-6

Sample Name : 142545-007b,52014

Sample #: ph=7

Page 1 of 1

File Name : G:\GC04\DATA\319J013.raw

Date : 11/16/99 11:07 AM

Method : TVHBTXE

Time of Injection: 11/15/99 10:10 PM

Start Time : 0.00 min

End Time : 26.00 min

Low Point : 67.11 mV

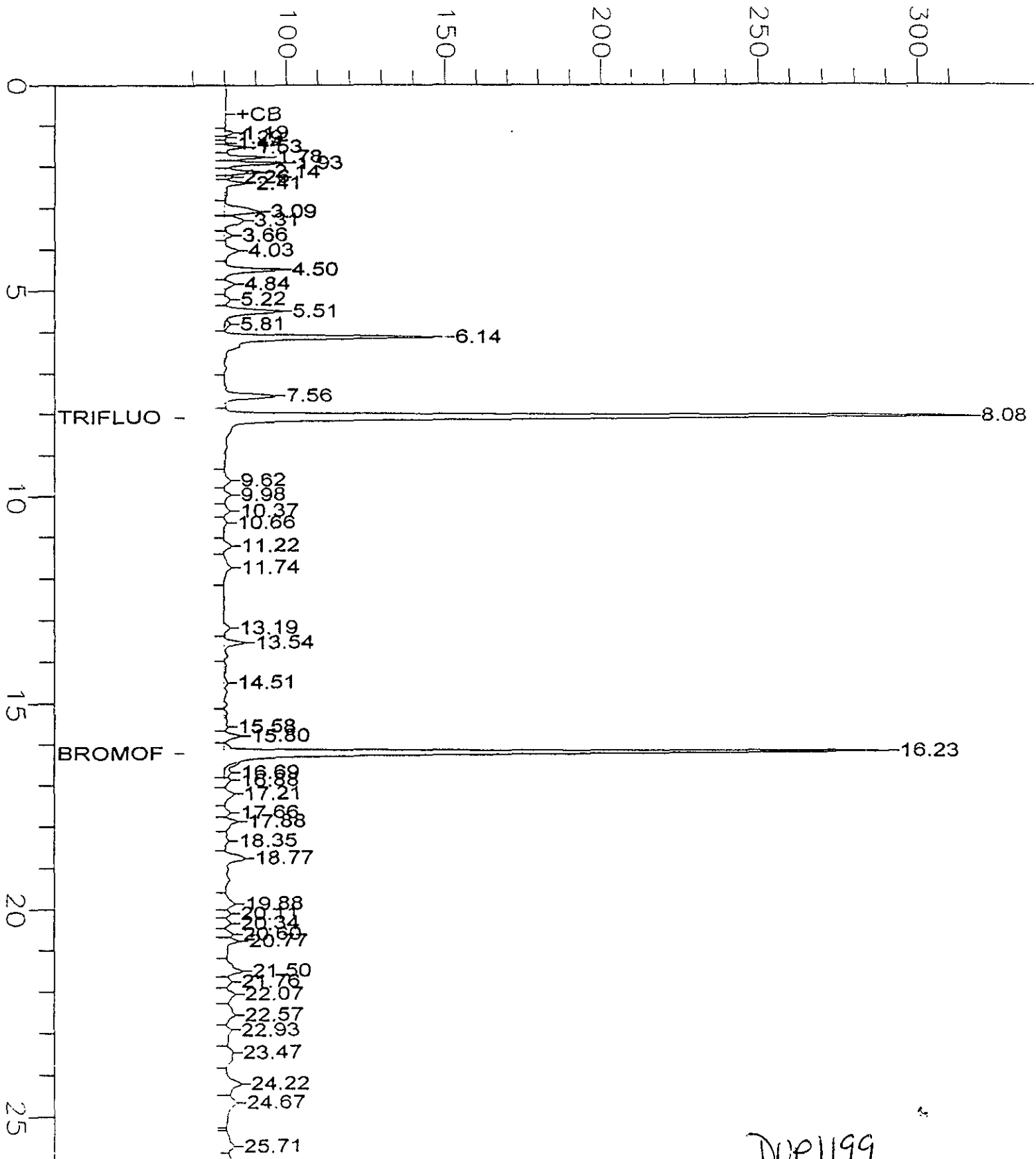
High Point : 317.11 mV

Scale Factor: -1.0

Plot Offset: 67 mV

Plot Scale: 250.0 mV

Response [mV]



DUP1199

GC04 TVH 'J' Data File Rtx1FID

Sample Name : ccv/lcs,qc101245,99ws8141,52014

Sample #: gas

Page 1 of 1

FileName : G:\GC04\DATA\319JCC*.raw

Date : 11/15/99 04:11 PM

Method : TVHBTXE

Time of Injection: 11/15/99 03:41 PM

Start Time : 0.00 min

End Time : 26.00 min

Low Point : 63.45 mV

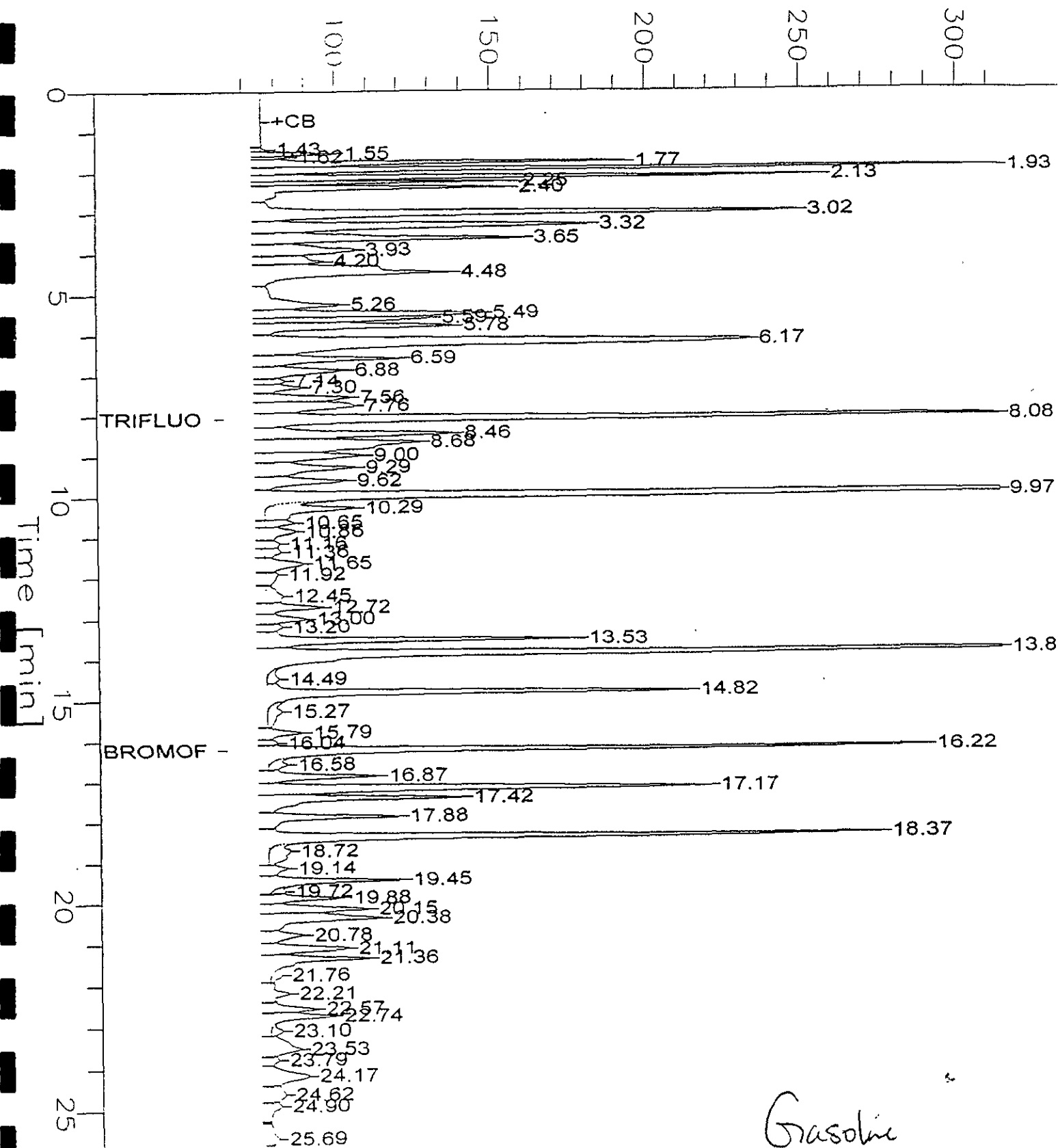
High Point : 313.45 mV

Scale Factor: -1.0

Plot Offset: 63 mV

Plot Scale: 250.0 mV

Response [mV]





TVH-Total Volatile Hydrocarbons

Client: Harding Lawson Associates
 Project#: 42633.1
 Location: Port of Oakland-2277

Analysis Method: EPA 8015M
 Prep Method: EPA 5030

METHOD BLANK

Matrix: Water
 Batch#: 52014
 Units: ug/L
 Diln Fac: 1

Prep Date: 11/15/99
 Analysis Date: 11/15/99

MB Lab ID: QC101244

Analyte	Result		
Gasoline C7-C12	<50		
Surrogate	%Rec		Recovery Limits
Trifluorotoluene	99		53-150
Bromofluorobenzene	100		53-149



BTXE

Client: Harding Lawson Associates
Project#: 42633.1
Location: Port of Oakland-2277

Analysis Method: EPA 8021B
Prep Method: EPA 5030

METHOD BLANK

Matrix: Water
Batch#: 52053
Units: ug/L
Diln Fac: 1

Prep Date: 11/17/99
Analysis Date: 11/17/99

MB Lab ID: QC101386

Analyte	Result		
MTBE	<2.0		
Benzene	<0.5		
Toluene	<0.5		
Ethylbenzene	<0.5		
m,p-Xylenes	<0.5		
o-Xylene	<0.5		
Surrogate	%Rec		Recovery Limits
Trifluorotoluene	114		51-143
Bromofluorobenzene	120		37-146

TVH-Total Volatile Hydrocarbons

Client: Harding Lawson Associates	Analysis Method: EPA 8015M
Project#: 42633.1	Prep Method: EPA 5030
Location: Port of Oakland-2277	

LABORATORY CONTROL SAMPLE

Matrix: Water	Prep Date: 11/15/99
Batch#: 52014	Analysis Date: 11/15/99
Units: ug/L	
Diln Fac: 1	

LCS Lab ID: QC101245

Analyte	Result	Spike Added	%Rec #	Limits
Gasoline C7-C12	2216	2000	111	77-117
Surrogate	%Rec	Limits		
Trifluorotoluene	104	53-150		
Bromofluorobenzene	113	53-149		

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

Spike Recovery: 0 out of 1 outside limits

BTXE

Client: Harding Lawson Associates	Analysis Method: EPA 8021B
Project#: 42633.1	Prep Method: EPA 5030
Location: Port of Oakland-2277	

LABORATORY CONTROL SAMPLE

Matrix: Water	Prep Date: 11/17/99
Batch#: 52053	Analysis Date: 11/17/99
Units: ug/L	
Diln Fac: 1	

LCS Lab ID: QC101447

Analyte	Result	Spike Added	%Rec #	Limits
MTBE	21.01	20	105	66-126
Benzene	22.04	20	110	65-111
Toluene	22.64	20	113	76-117
Ethylbenzene	23.66	20	118	71-121
m,p-Xylenes	47.39	40	118	80-123
o-Xylene	23.29	20	116	75-127
Surrogate	%Rec	Limits		
Trifluorotoluene	116	51-143		
Bromofluorobenzene	123	37-146		

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

Spike Recovery: 0 out of 6 outside limits



TVH-Total Volatile Hydrocarbons

Client: Harding Lawson Associates	Analysis Method: EPA 8015M
Project#: 42633.1	Prep Method: EPA 5030
Location: Port of Oakland-2277	

MATRIX SPIKE/MATRIX SPIKE DUPLICATE

Field ID: MW-5	Sample Date: 11/12/99
Lab ID: 142545-002	Received Date: 11/12/99
Matrix: Water	Prep Date: 11/15/99
Batch#: 52014	Analysis Date: 11/15/99
Units: ug/L	
Diln Fac: 1	

MS Lab ID: QC101283

Analyte	Spike Added	Sample	MS	%Rec #	Limits
Gasoline C7-C12	2000	<50	2403	120	69-131
Surrogate	%Rec	Limits			
Trifluorotoluene	105	53-150			
Bromofluorobenzene	117	53-149			

MSD Lab ID: QC101284

Analyte	Spike Added	MSD	%Rec #	Limits	RPD #	Limit
Gasoline C7-C12	2000	2337	117	69-131	3	13
Surrogate	%Rec	Limits				
Trifluorotoluene	105	53-150				
Bromofluorobenzene	116	53-149				

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

RPD: 0 out of 1 outside limits

Spike Recovery: 0 out of 2 outside limits



BTXE

Client: Harding Lawson Associates
 Project#: 42633.1
 Location: Port of Oakland-2277

Analysis Method: EPA 8021B
 Prep Method: EPA 5030

MATRIX SPIKE/MATRIX SPIKE DUPLICATE

Field ID: MW-5
 Lab ID: 142545-002
 Matrix: Water
 Batch#: 52053
 Units: ug/L
 Diln Fac: 1

Sample Date: 11/12/99
 Received Date: 11/12/99
 Prep Date: 11/18/99
 Analysis Date: 11/18/99

MS Lab ID: QC101448

Analyte	Spike Added	Sample	MS	%Rec #	Limits
MTBE	20	5.46	27.74	111	49-136
Benzene	20	<0.5	22.88	114	55-122
Toluene	20	<0.5	23.97	120	63-139
Ethylbenzene	20	<0.5	24.92	125	61-137
m,p-Xylenes	40	<0.5	49.8	125	57-148
o-Xylene	20	<0.5	25.17	126	70-141
Surrogate	%Rec	Limits			
Trifluorotoluene	126	51-143			
Bromofluorobenzene	138	37-146			

MSD Lab ID: QC101449

Analyte	Spike Added	MSD	%Rec #	Limits	RPD #	Limit
MTBE	20	25.18	99	49-136	10	11
Benzene	20	22.79	114	55-122	0	10
Toluene	20	23.8	119	63-139	1	10
Ethylbenzene	20	24.51	123	61-137	2	10
m,p-Xylenes	40	48.99	122	57-148	2	10
o-Xylene	20	24.73	124	70-141	2	10
Surrogate	%Rec	Limits				
Trifluorotoluene	125	51-143				
Bromofluorobenzene	135	37-146				

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

RPD: 0 out of 6 outside limits

Spike Recovery: 0 out of 12 outside limits

TEH-Tot Ext Hydrocarbons

Client: Harding Lawson Associates
 Project#: 42633.1
 Location: Port of Oakland-2277

Analysis Method: EPA 8015M
 Prep Method: EPA 3520

Sample #	Client ID	Batch #	Sampled	Extracted	Analyzed	Moisture
142545-002	MW-5	52096	11/12/99	11/17/99	11/19/99	
142545-003	MW-7	52096	11/12/99	11/17/99	11/19/99	
142545-004	MW-2	52096	11/12/99	11/17/99	11/19/99	
142545-005	MW-4	52096	11/12/99	11/17/99	11/19/99	

Matrix: Water

Analyte	Units	142545-002	142545-003	142545-004	142545-005
Diln Fac:		1	1	1	1
Diesel C10-C24	ug/L	110 YH	600 YH	120 YH	840 Y
Motor Oil C24-C36	ug/L	<300	420 L	<300	<300
Surrogate					
Hexacosane	%REC	94	94	93	93

- Y: Sample exhibits fuel pattern which does not resemble standard
- H: Heavier hydrocarbons than indicated standard
- L: Lighter hydrocarbons than indicated standard



TEH-Tot Ext Hydrocarbons

Client: Harding Lawson Associates
 Project#: 42633.1
 Location: Port of Oakland-2277

Analysis Method: EPA 8015M
 Prep Method: EPA 3520

Sample #	Client ID	Batch #	Sampled	Extracted	Analyzed	Moisture
142545-006	MW-6	52096	11/12/99	11/17/99	11/20/99	
142545-007	DUP1199	52096	11/12/99	11/17/99	11/19/99	

Matrix: Water

Analyte	Units	142545-006	142545-007
Diln Fac:		1	1
Diesel C10-C24	ug/L	11000 YH	12000 YH
Motor Oil C24-C36	ug/L	3000 LH	2300 LH
Surrogate			
Hexacosane	%REC	98	85

Y: Sample exhibits fuel pattern which does not resemble standard

H: Heavier hydrocarbons than indicated standard

L: Lighter hydrocarbons than indicated standard

Chromatogram

Sample Name : 142545-002, 52096

Sample #: 52096

Page 1 of 1

FileName : C:\GC15\CHB\321B061.RAW

Date : 11/24/1999 10:02 AM

Method : BTEH292.MTH

Time of Injection: 11/19/1999 05:33 AM

Start Time : 0.01 min

End Time : 31.91 min

Low Point : 17.27 mV

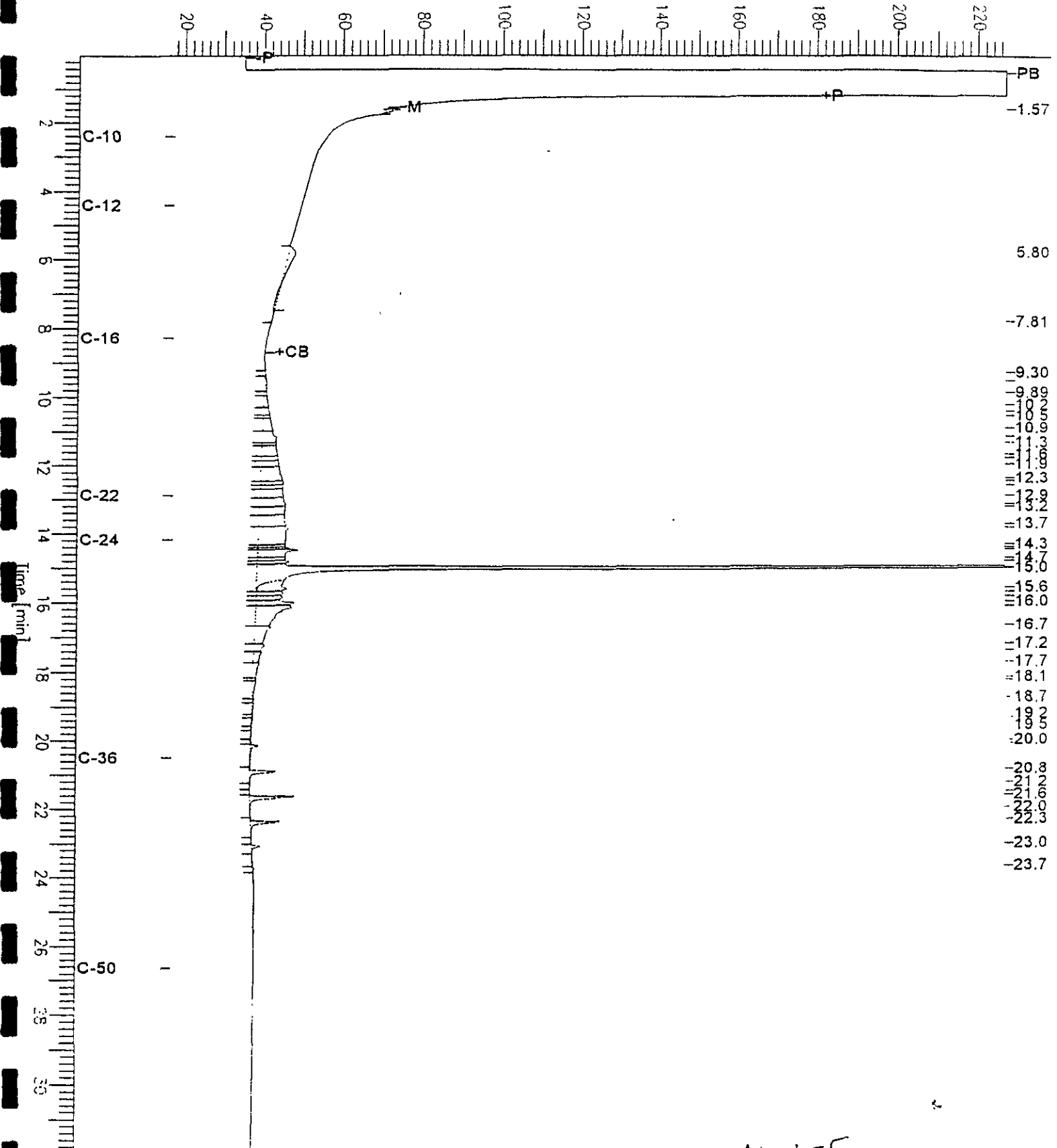
High Point : 227.04 mV

Scale Factor: 0.0

Plot Offset: 17 mV

Plot Scale: 209.8 mV

Response [mV]



MW-5

Chromatogram

Sample Name : 142545-003, 52096

Sample #: 52096

Page 1 of 1

FileName : C:\GC15\CHB\321B062.RAW

Date : 11/19/1999 10:59 AM

Method : BTEH292.MTH

Time of Injection: 11/19/1999 06:16 AM

Start Time : 0.00 min

End Time : 31.90 min

Low Point : -17.34 mV

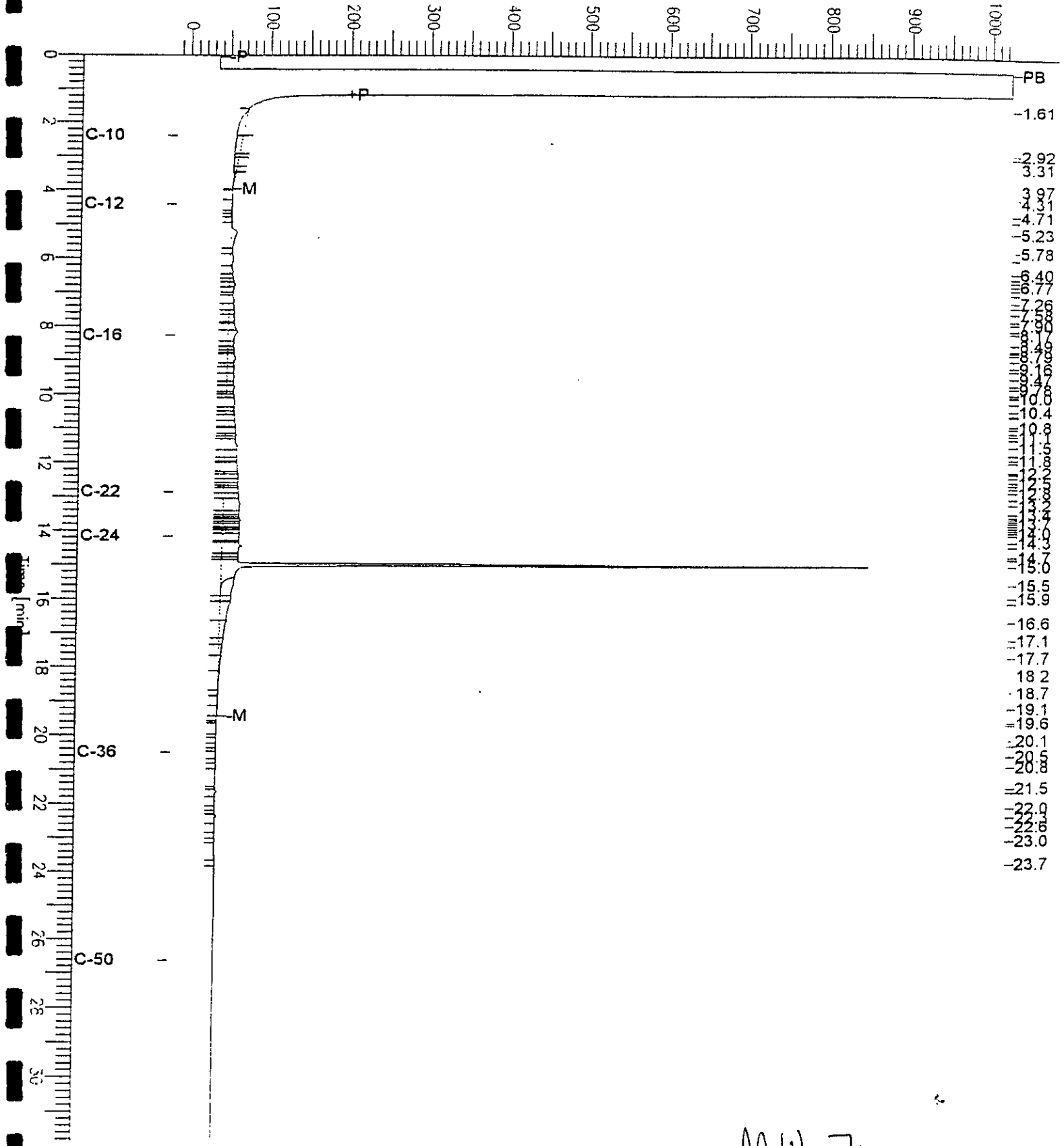
High Point : 1024.00 mV

Scale Factor: 0.0

Plot Offset: -17 mV

Plot Scale: 1041.3 mV

Response [mV]

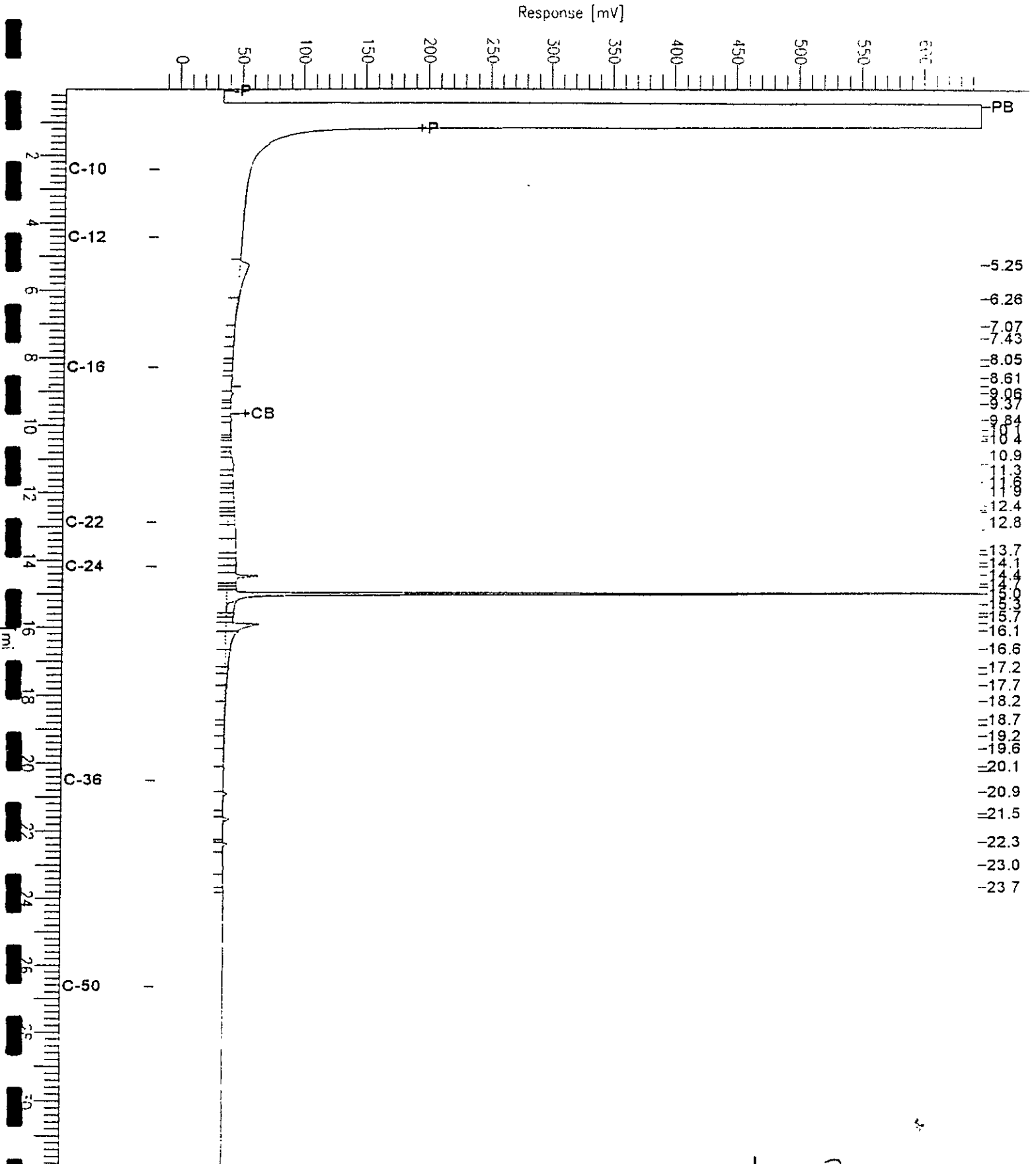


MW-7

Chromatogram

Sample Name : 142545-004, 52096
FileName : C:\GC15\CHB\321B063.RAW
Method : BTEH292.MTH
Start Time : 0.01 min
Scale Factor: 0.0

Sample #: 52096
Date : 11/19/1999 11:00 AM
Time of Injection: 11/19/1999 06:59 AM
Low Point : -17.47 mV
High Point : 246.37 mV
End Time : 31.91 min
Plot Offset: -17 mV
Plot Scale: 663.8 mV

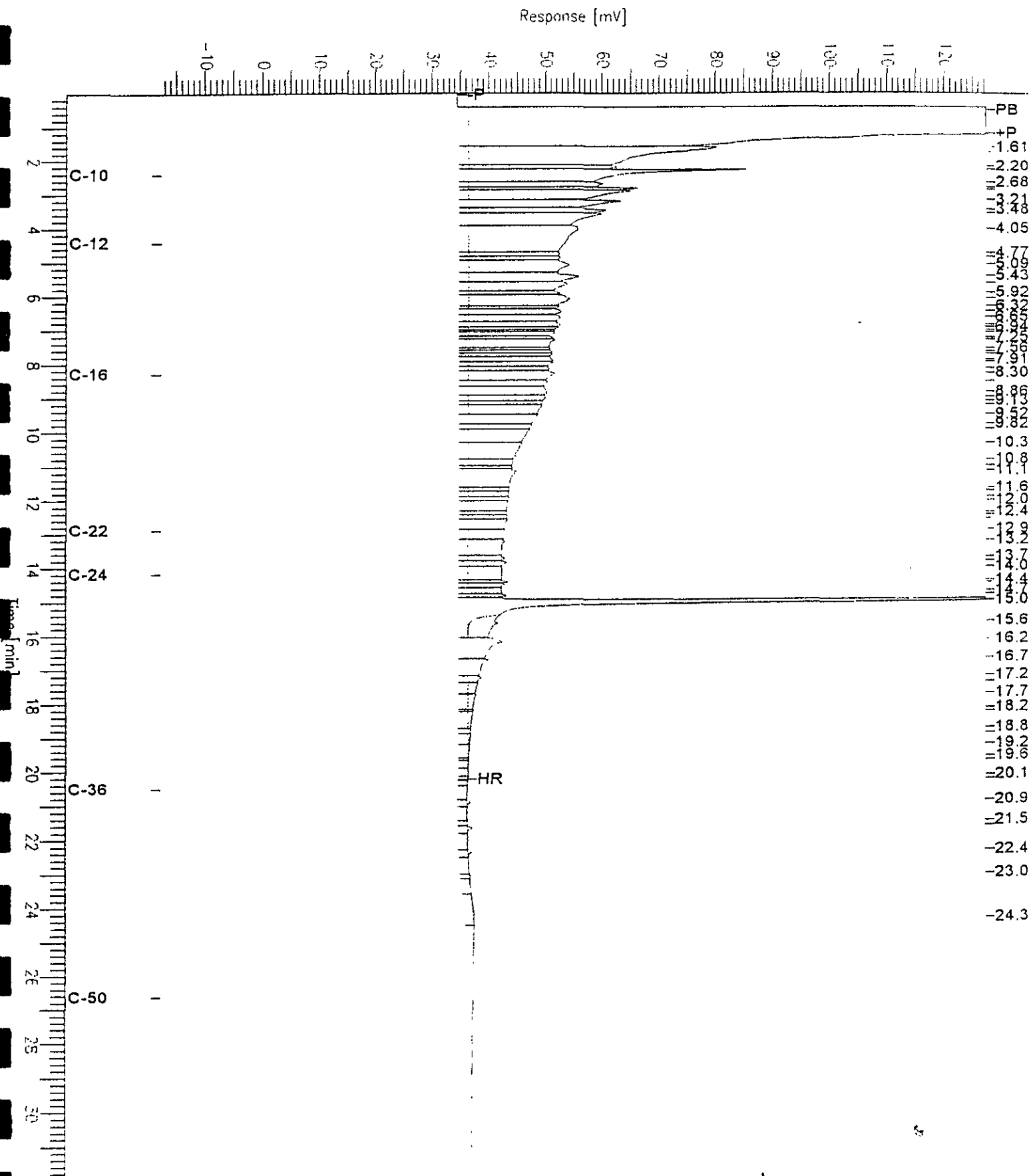


MW-2

Chromatogram

Sample Name : 142545-005,52096
FileName : C:\GC15\CHB\321B064.RAW
Method : BTEH292.MTH
Start Time : 0.01 min
Scale Factor : 0.0

Sample #: 52096
Date : 11/24/1999 10:17 AM
Time of Injection: 11/19/1999 07:42 AM
Low Point : -17.66 mV
High Point : 127.30 mV
Plot Scale: 145.0 mV



MW-4

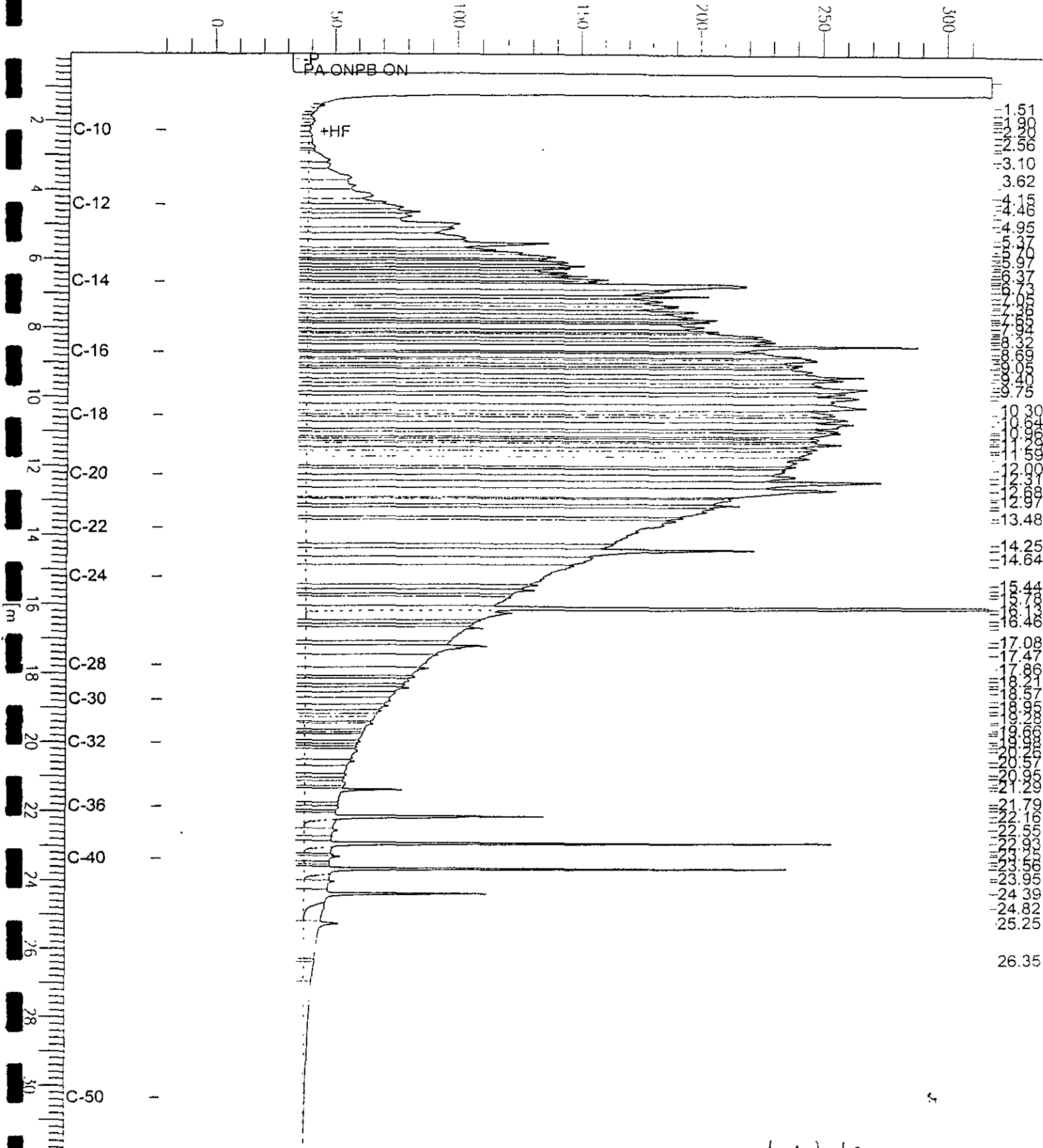
Sample Name : 142545-006,52096
File Name : G:\GC13\CH3\322B057.RAW
Method : BTEH305.MTH
Start Time : 0.01 min
Scale Factor : 0.0

End Time : 31.91 min
Plot Offset : -20 mV

Sample #: 52096
Date : 11/21/1999 10:00 PM
Time of Injection: 11/20/1999 05:33 AM
Low Point : -20.12 mV
Plot Scale: 338.1 mV

High Point : 317.96 mV

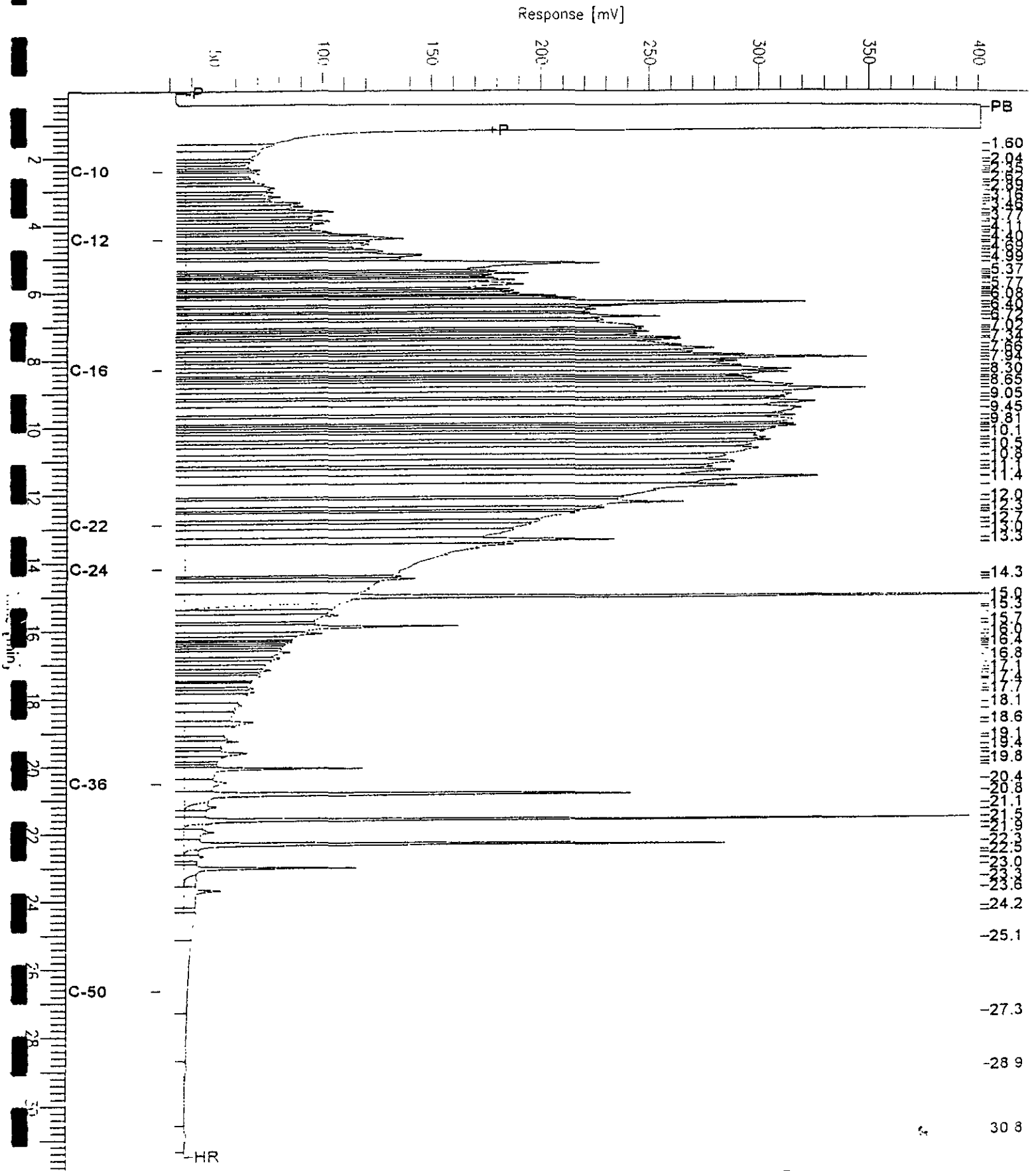
Response [mV]



MW-6

Sample Name : 142545-007, 52096
 File Name : C:\GC15\CHBA\2019066.PAW
 Method : BTEH292.MTH
 Start Time : 0.01 min
 Scale Factor : 0.0

Sample #: 52096
 Date : 11/19/1999 11:04 AM
 Time of Injection: 11/19/1999 09:24 AM
 Low Point : 26.88 mV
 High Point : 401.21 mV
 Plot Offset: 27 mV
 Plot Scale: 374.3 mV



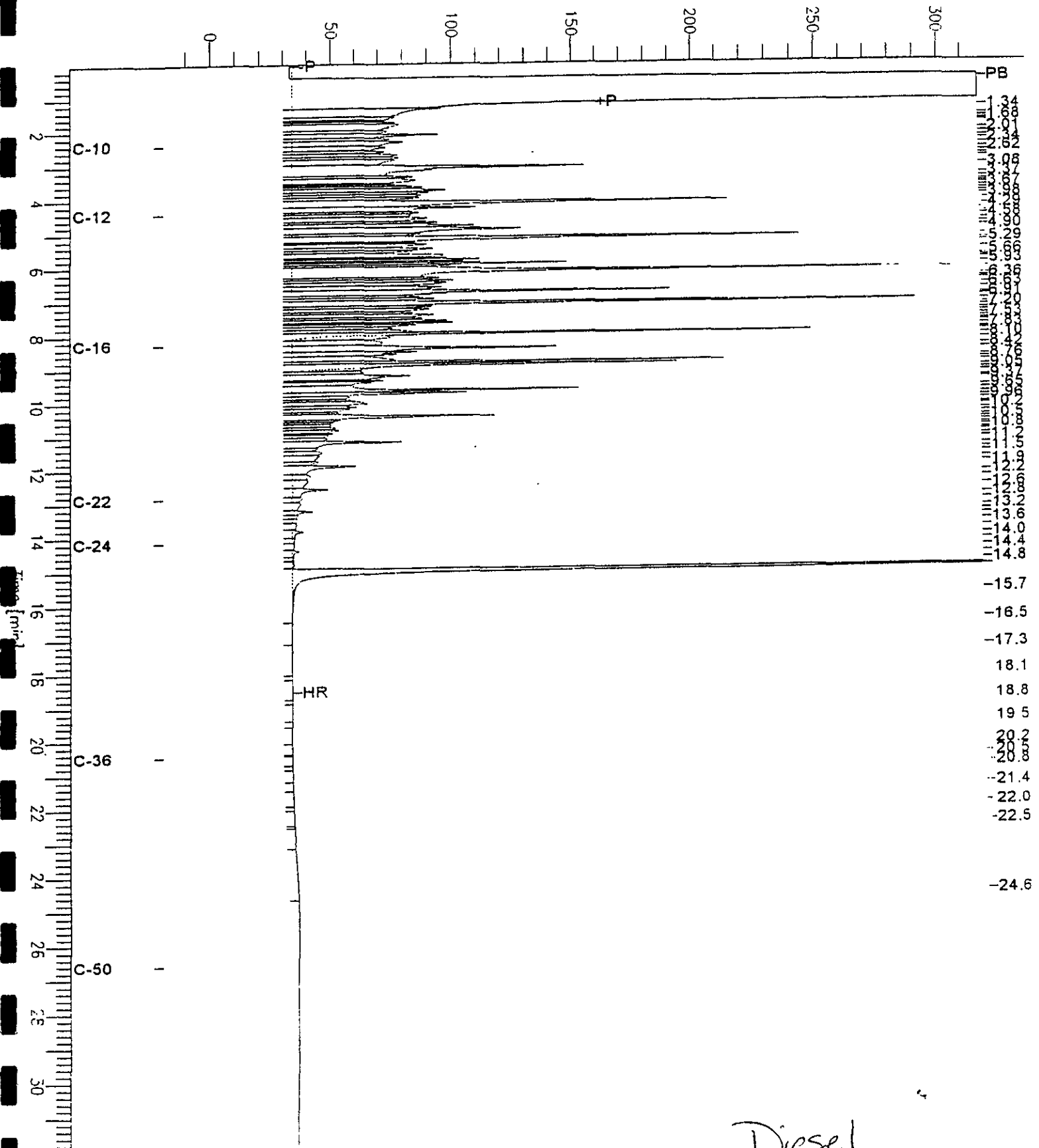
DUP1199

Sample Name : x,ccv,99ws8230,ds1
 FileName : C:\GC15\CHB\3218042.RAW
 Method : BTEH292.MTH
 Start Time : 0.01 min
 Scale Factor: 0.0

End Time : 31.91 min
 Plot Offset: -19 mV

Sample #: 500mg/l
 Date : 11/18/1999 04:23 PM
 Time of Injection: 11/18/1999 03:46 PM
 Low Point : -19.14 mV
 High Point : 317.15 mV
 Plot Scale: 336.3 mV

Response [mV]



Diesel

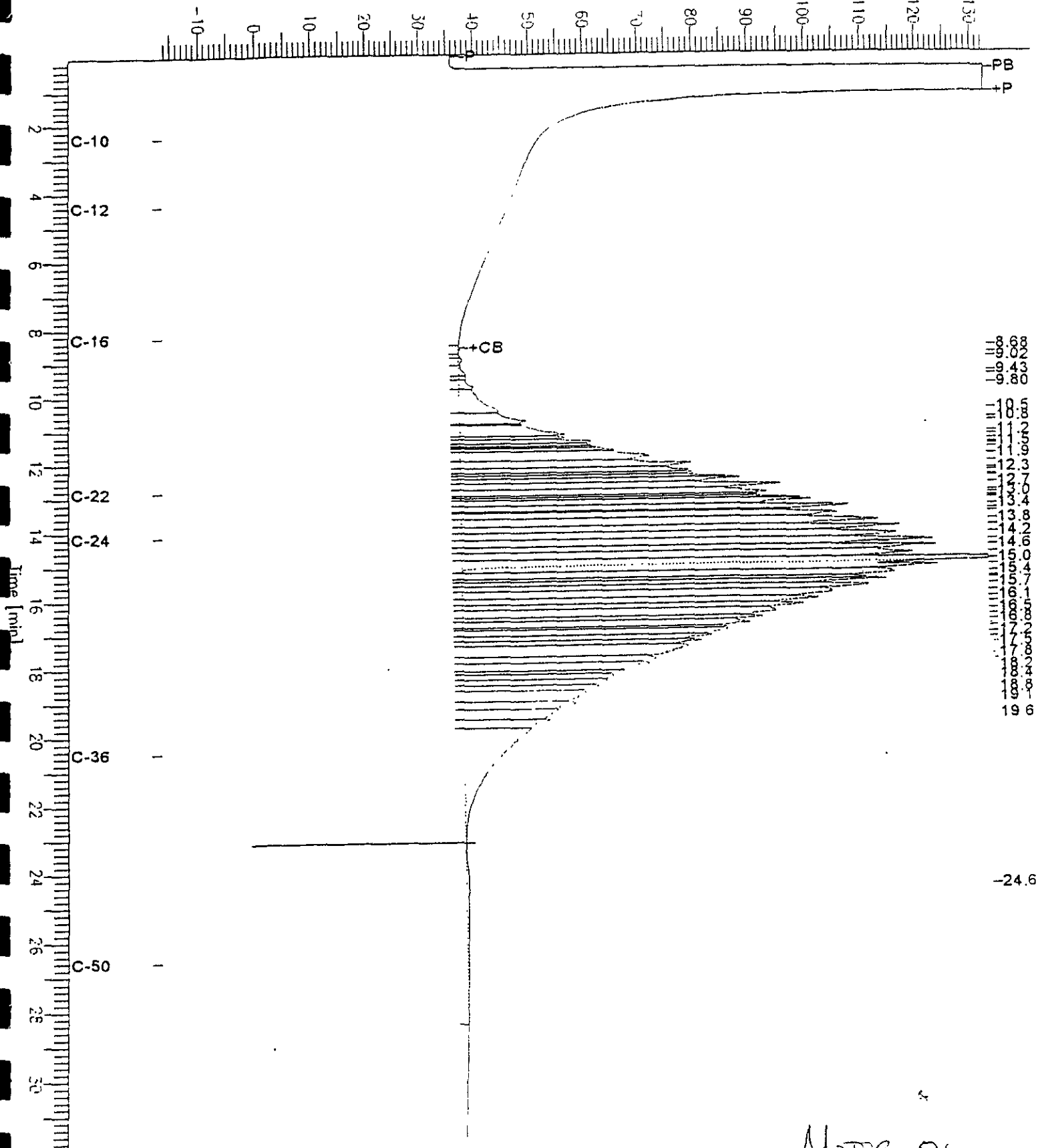
Chromatogram

Sample Name : ccv,99ws8284.mo
FileName : C:\GC15\CHB\321B017.RAW
Method : BTEH292.MTH
Start Time : 0.01 min
Scale Factor: 0.0

End Time : 31.91 min
Plot Offset: -16 mV

Sample #: 500mg/l
Date : 11/18/1999 01:21 PM
Time of Injection: 11/17/1999 09:54 PM
Low Point : -16.18 mV
Plot Scale: 148.6 mV
High Point : 132.37 mV

Response [mV]



Motor Oil

TEH-Tot Ext Hydrocarbons

Client: Harding Lawson Associates Analysis Method: EPA 8015M
 Project#: 42633.1 Prep Method: EPA 3520
 Location: Port of Oakland-2277

BLANK SPIKE/BLANK SPIKE DUPLICATE

Matrix: Water Prep Date: 11/17/99
 Batch#: 52096 Analysis Date: 11/19/99
 Units: ug/L
 Diln Fac: 1

BS Lab ID: QC101580

Analyte	Spike Added	BS	%Rec #	Limits
Diesel C10-C24	2475	2123	86	50-114
Surrogate	%Rec	Limits		
Hexacosane	97	58-128		

BSD Lab ID: QC101581

Analyte	Spike Added	BSD	%Rec #	Limits	RPD #	Limit
Diesel C10-C24	2475	2248	91	50-114	6	25
Surrogate	%Rec	Limits				
Hexacosane	102	58-128				

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

RPD: 0 out of 1 outside limits

Spike Recovery: 0 out of 2 outside limits

TEH-Tot Ext Hydrocarbons

Client: Harding Lawson Associates
 Project#: 42633.1
 Location: Port of Oakland-2277

Analysis Method: EPA 8015M
 Prep Method: EPA 3520

METHOD BLANK

Matrix: Water
 Batch#: 52096
 Units: ug/L
 Diln Fac: 1

Prep Date: 11/17/99
 Analysis Date: 11/18/99

MB Lab ID: QC101579

Analyte	Result	
Diesel C10-C24	<50	
Motor Oil C24-C36	<300	
Surrogate	%Rec	Recovery Limits
Hexacosane	75	58-128