PORT OF OAKLAND

November 8, 1999

Mr. Barney Chan
Alameda County Health Care Services Agency
Environmental Protection Division
1131 Harbor Bay Parkway, #250
Alameda, CA 94502-6577

SUBJECT: Subsurface Investigation, Former USTs: MF08/09/10
South Field, Metropolitan Oakland International Airport, Oakland, CA 94621

Dear Mr. Chan:

Enclosed is a copy of the October 7, 1999 *"Subsurface Investigation"* report. Oversight of the site investigation and tank removal activities were performed by Harding Lawson Associates, one of the "as needed" consultants retained by the Port of Oakland (Port).

Should you have any questions or need additional information, please contact me at 272-1118. Thank you for your on-going assistance and support on this project.

Sincerely,

Dale H. Klettke, CHMM
Associate Environmental Scientist
Environmental Health & Safety Compliance

enclosures

c: (w/o encl.): Neil Werner - EH & SC
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ENVIRONMENTAL PROTECTION

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Harding Lawson Associates

October 7, 1999

47858 4

Mr. Dale Klettke
Port of Oakland
Environmental Health & Safety Compliance
530 Water Street
Oakland, California 94607

Subsurface Investigation
Former USTs: MF-08, MF-09, MF-10
South Airport Self-Fueling Facility, Taxiway U
Metropolitan Oakland International Airport
Oakland, California

Dear Mr. Klettke:

This report presents the results of Harding Lawson Associates' (HLA's) soil and groundwater investigation conducted at the Metropolitan Oakland International Airport (MIOA) in Oakland, California (Plate 1). This investigation summarizes the results of our investigation activities as described in *Work Plan for Subsurface Investigation, Former USTs: MF-08, MF-09, MF-10, South Airport Self-Fueling Facility, Taxiway 4, Metropolitan Oakland International Airport, Oakland, California* dated August 10, 1999. We understand that Taxiway 4 is currently designated Taxiway U. The objective of this investigation was to investigate the impact of petroleum hydrocarbons on soil and groundwater in the vicinity of the former underground storage tanks (USTs) and at a former oil-water separator located adjacent to Taxiway 4.

BACKGROUND

On April 26, 1999, the Port of Oakland's contractor removed three underground storage tanks (USTs), MF-08, MF-09, and MF-10 from an area adjacent to Taxiway U, see Plate 2. MF-08 and MF-09 consisted of adjacent 1,000-gallon diesel tanks, and MF-10 was a 5,000-gallon gasoline tank located approximately 45 feet north to northeast. Removal of the three USTs involved two separate excavations, one for the diesel tanks and one for the gasoline tank. Soil and groundwater samples taken from the excavations indicated that there had been a release of petroleum hydrocarbons at both sites. Total petroleum hydrocarbons as diesel (TPH-diesel), total petroleum hydrocarbons as gasoline (TPH-gas), benzene, toluene, ethylbenzene, and total xylenes (BTEX) and methyl tertiary butl-ether (MTBE) were detected in both soil and groundwater samples collected from the excavations. The results are summarized in HLA's Underground Storage Tank Closure Report, dated June 22, 1999.

FIELD INVESTIGATION

Prior to initiating field activities, HLA obtained a drilling permit (No. 99WR516) from Alameda County Department of Public Works. On August 31, 1999, Gregg Drilling and Testing, Inc. (Gregg), under the direction of HLA, advanced eight geoprobe borings at the locations of the former USTs as shown on Plate

2. HLA contracted California Utility Surveys to check that all proposed soil boring locations were clear of utilities before drilling.

The borings extended to a total depth of 8 feet. Soil samples were collected continuously in 1¾-inch by 4-foot PVC liners from near surface to the final depth of 8 feet. An HLA field engineer directed the work, logged the borings in accordance with ASTM D2487-85 Unified Soil Classification, and screened samples with a photo-ionization detector (PID).

One soil sample was selected and preserved at each boring location. The basis for selection included soil discoloration, odor, and organic vapor readings. The soil samples selected for testing were immediately sealed, labeled, placed in a cooler chilled with Blue Ice, and delivered under chain-of-custody to Curtis and Tompkins, Ltd., a California state-certified laboratory under a direct contract with the Port, for chemical analyses. Soil samples were analyzed for the following constituents:

- Benzene, toluene, ethylbenzene and xylenes (BTEX) and methyl tertiary butyl-ether (MTBE) in accordance with EPA Test Method 8260b
- Total petroleum hydrocarbons (TPH)-gas in accordance with EPA Test Method 8015 modified
- TPH-diesel with silica gel cleanup and in accordance with EPA Test Method 8015 modified
- The sample with the highest diesel concentration was analyzed for Polynuclear Aromatic Hydrocarbons (PAHs) by EPA Method 8310

After the borings reached the final depth, HLA placed a ¾-inch temporary PVC well casing with 5 feet of 0.02-inch slotted screen in each of the borings. HLA measured the water level with an electronic water sounder, and collected a groundwater sample through polyurethane tubing using a peristaltic pump. HLA measured conductivity, pH, dissolved oxygen (DO), and oxidation-reduction potential (REDOX) of the groundwater at each soil boring. HLA immediately sealed, labeled, and placed all groundwater samples in a cooler chilled with Blue Ice to be delivered to C&T under chain-of-custody protocol. With the exception of SB-4, groundwater samples were subjected to the analyses listed below. The groundwater sample from SB-4 was not analyzed for TPH-gas.

- BTEX and MTBE in accordance with EPA Test Method 8260b
- TPH-gas in accordance with EPA Test Method 8015 modified
- TPH-diesel with silica gel cleanup and in accordance with EPA Test Method 8015 modified
- Ferrous Iron in accordance with EPA Test Method SM 3500
- Total Iron in accordance with EPA Test Method 6010
- Nitrate and Sulfate in accordance with EPA Test Method 300.0
- Orthophosphates in accordance with EPA Test Method 365.2
- Total Organic Carbon in accordance with EPA Test Method 415.2

- The sample with the highest diesel concentration was analyzed for PAHs in accordance with EPA Test Method 8310.

HLA's subcontractor decontaminated all downhole drilling and sampling equipment before use at each boring location. Unused polyurethane tubing was used at each boring to collect the water sample. Borehole soil cores were contained in a two 5-gallon metal bucket for subsequent disposal by the Port of Oakland's waste disposal contractor. A composite sample was taken from the soil cutting and analyzed for BTEX, MTBE, TPH-gas, and TPH-diesel.

RESULTS

Soil in the eight borings consisted of approximately 1 to 1.5 feet of asphalt, base rock or fill with organic material, underlain by poorly graded sand. At the time of drilling and sampling, the depth to groundwater in the borings appeared to stabilize at approximately 5.5 to 6.5 feet below ground surface (bgs) (Plate 3). Because the water levels were measured at various times throughout the day and because no information was available regarding the ground surface elevation, accurate groundwater contours can not be determined. On the basis of the water level observations during the UST removal at the site, HLA believes that the water levels are strongly influenced by tidal fluctuations, and that the direction of the groundwater gradient is to the south.

SOIL SAMPLE RESULTS

Analytical results for the soil samples are summarized in Tables 1 and 2. The results of the TPH and VOC analyses are displayed on Plate 4. TPH diesel was detected in the soil at SB-1 and SB-4 at concentrations of 8.7 to 680 µg/kg respectively. We analyzed the soil sample with the highest diesel concentration, SB-4, for concentrations of PAHs. Detections included naphthalene at 8,800 µg/kg, benzo(a)pyrene at 620 µg/kg, and 11 other PAHs listed in Table 2.

GROUNDWATER SAMPLE RESULTS

Analytical results for the groundwater samples are summarized in Tables 3 through 5. The results of the TPH and BTEX analyses are displayed on Plate 5. TPH diesel was detected in the groundwater at soil borings SB-2, SB-4 and SB-8 at concentrations ranging from 72 to 380 micrograms per liter (µg/L). TPH gas was detected in the groundwater at SB-1, SB-2 and SB-8 at concentrations ranging from 33 to 300 µg/L. MTBE was found in SB-2, SB-3, SB-4 and SB-8 at concentrations ranging from 3.5 to 4,500 µg/L with the highest concentrations in SB-2 and SB-4 at 2000 and 4500 µg/L respectively. SB-4 also contained both m,p-xylene and o-xylene at 340 and 100 µg/L. Benzene was detected above the MCL for drinking water at SB-2 with a concentration of 63 µg/L.

PAHs were analyzed in SB-4 (the groundwater sample with the highest diesel detection) and no PAHs were detected at or above their reporting limits.

The groundwater samples were subjected to a variety of chemical analyses to evaluate the potential for natural attenuation. HLA also measured certain groundwater parameters in the field to supplement the

chemical data. This data is summarized in Table 5. The recorded groundwater temperature and pH measurements are all within ranges acceptable to support the presence of microorganisms. Organic carbon in the groundwater is also an indication of an environment that will support microorganisms.

The presence of ferrous iron in the groundwater is evidence of natural bio-degradation of the petroleum hydrocarbons in the areas of SB-2, SB-3, SB-4, and SB-8. Ferrous iron is produced when iron $^{+3}$ is used in the bio-degradation process. The absence of phosphorous in the groundwater from SB-2, SB-3, SB-4, and SB-8 indicates microbial growth because phosphorous is utilized by the microbes to break down the petroleum hydrocarbons. Groundwater samples from SB- 2, SB-4, and SB-8 contained significant concentrations of dissolved petroleum hydrocarbons. SB-3, where the groundwater sample did not contain detectable petroleum hydrocarbons, may be on the edge of the plume or have been a location of biological activity in the past. The lack of ferrous iron and the presence of phosphorous in the groundwater at SB-1, which also contained detectable concentrations of petroleum hydrocarbons, may be due to it being located in the upgradient portion of the plume. Bio-degradation of petroleum hydrocarbons using iron is a reducing process as opposed to an oxidation process. The REDOX measurements are consistent with the above indications of reduction of petroleum hydrocarbons; measurements of less than 300 millivolts can be considered evidence of a reducing environment.

The DO measurements are not conclusive, possibly because they were performed on grab samples from temporary well casings that were extracted using a peristaltic pump. DO measurements of the groundwater from monitoring wells may produce more accurate measurements.

QUALITY ASSURANCE AND QUALITY CONTROL

Laboratory QA/QC consisted of method blanks, matrix spikes and duplicate matrix spikes. C&T included a case narrative along with the analytical results, presented in the Appendix.

The TPH diesel analysis for soil sample SB-5 did not detect TPH diesel above the reporting limit, however, the sample did not meet QA/AC limits for surrogate recovery and the sample was re-extracted one day outside the hold time and the analysis re-run. The second analysis also did not detect any TPH diesel above the reporting limit. The laboratory's Corrective Action Report is included in the Appendix with the laboratory report. HLA believes that the re-extraction of the sample outside the holding time was not significant to the final result, because both analyses indicated concentrations below the reporting limit.

The soil sample tested for PAHs from SB-4 was also analyzed outside the holding time. The laboratory was requested to analyze the sample with the highest TPH diesel concentration for PAHs. Because of the delay in performing the analyses the measured concentration of PAHs may be smaller than those actually present in the soil at the site.

CONCLUSION AND RECOMMENDATIONS

Analytical results obtained during this investigation indicate that both the soil and the groundwater have been impacted by a release of petroleum hydrocarbons from the former USTs on site. SB-4 has the highest

concentrations of the petroleum hydrocarbons in both the soil and the groundwater. While SB-4 was not analyzed for TPH-gas, xylene concentrations in the soil indicated that TPH-gas is likely to be present.

The groundwater conditions at the site appear to be favorable to insitu bio-remediation. Under current conditions, the petroleum hydrocarbons are degrading in a reduction reaction, rather than an oxidation reaction that would allow much quicker degradation. By applying an oxygen-releasing compound (ORC), the Port can probably accelerate the natural attenuation of the existing petroleum hydrocarbons through an oxidation reaction. HLA therefore recommends the injection of an ORC slurry into the vadose zone of the soil in the vicinity of SB-1, SB-2, SB-4, and SB-8 where petroleum hydrocarbons have been detected. We further recommend the installation and quarterly monitoring of three groundwater monitoring wells for one year to measure the fluctuations of groundwater concentrations. One well should be located in an upgradient location, north of SB-1, and two in downgradient locations, south of the SB-4 and SB-8.

We appreciate this opportunity to provide these consulting engineering services to the Port. If you have any further questions please call either of the undersigned at (510) 451-1001.

Yours very truly,

HARDING LAWSON ASSOCIATES

James G. McCarty
Project Engineer

Stephen J. Osborne
Geotechnical Engineer

REGISTERED PROFESSIONAL ENGINEER
STEPHEN J. OSBORNE
GE 656
Exp. 3-31-03
GEOTECHNICAL
STATE OF CALIFORNIA

JGM/SJO/mlw/47858/037390L

4 copies submitted

Attachments:
Table 1 – TPH and VOC Analyses - Soil Samples
Table 2 – PAH Analyses - Soil Samples
Table 3 – TPH and VOC Analyses - Groundwater Samples
Table 4 – PAH Analyses - Groundwater Samples
Table 5 – Natural Attenuation Parameters - Groundwater Samples
Plate 1 – Site Location Map
Plate 2 – Site Plan
Plate 3 – Depth to Groundwater
Plate 4 – Groundwater Chemical Results
Plate 5 – Soil Chemical Results
Appendix - Laboratory Reports

TABLE

Table 1. pH and VOICE Analysis - Soil Samples
Collected August 31, 1999
South Airport Self-Fueling Facility
Metropolitan Oakland International Airport
Oakland, California

Analyze	EPA Method	Sample ID / Depth (feet) / Units	SB-1 6.0	SB-2 6.0	SB-3 5.5	SB-4 6.0	SB-5 6.0	SB-6 6.0	SB-7 6.0	SB-8 5.5
PH Diesel	8015 Modified	mg/kg	**8.7 YH**	ND<1.0	ND<1.0	**680 YL**	ND<1.0 *	ND<1.0	ND<1.0	ND<1.0
PH Gas	8015 Modified	mg/kg	ND<1.0	ND<1.0	ND<1.0	**4.8 H**	ND<1.0	ND<1.0	ND<1.0	ND<1.0
MTBE	8260	µg/kg	ND<4.8	ND<4.9	ND<4.9	**43**	ND<4.7	ND<5.0.1	ND<4.7	ND<5.0
Benzene	8260	µg/kg	ND<4.8	ND<4.9	ND<4.9	ND<5.0	ND<4.7	ND<5.0.1	ND<4.7	ND<5.0
Toluene	8260	µg/kg	ND<4.8	ND<4.9	ND<4.9	ND<5.0	ND<4.7	ND<5.0.1	ND<4.7	ND<5.0
Ethylbenzene	8260	µg/kg	ND<4.8	ND<4.9	ND<4.9	ND<5.0	ND<4.7	ND<5.0.1	ND<4.7	ND<5.0
m,p-Xylene	8260	µg/kg	ND<4.8	ND<4.9	ND<4.9	**24**	ND<4.7	ND<5.0.1	ND<4.7	ND<5.0
o-Xylene	8260	µg/kg	ND<4.8	ND<4.9	ND<4.9	**12**	ND<4.7	ND<5.0.1	ND<4.7	ND<5.0

mg/kg - milligrams per kilogram
µg/kg - micrograms per kilogram
VOC - Volatile organic compound
TPH - Total Petroleum Hydrocarbon
NA - Not Analyzed
Y - Sample exhibits fuel pattern which does not resemble standard
L - Lighter hydrocarbons than indicated standard
H - Heavier hydrocarbons than indicated standard
* - Did not meet QA/AC limits for surrogate recovery
(The sample was re-extracted outside the hold time with the same results: ND<1.0)

Table 2. PAH Analyses - Soil Samples
Collected August 31, 1999
EPA Test Method 8310
South Airport Self-Fueling Facility
Metropolitan Oakland International Airport
Oakland, California

Sample Identification		SB-4
Depth (feet)		6.0
Analyte	Units	
Naphthalene	µg/kg	**8,800**
Acenaphthylene	µg/kg	ND<6,800
Acenaphthene	µg/kg	ND<680
Fluorene	µg/kg	**1,600**
Phenanthrene	µg/kg	**1,600**
Anthracene	µg/kg	**510**
Fluoranthene	µg/kg	**2,000**
Pyrene	µg/kg	**1,700**
Benzo (a) anthracene	µg/kg	**800**
Chrysene	µg/kg	**610**
Benzo (b) fluoranthene	µg/kg	**510**
Benzo (k) fluoranthene	µg/kg	**300**
Benzo (a) pyrene	µg/kg	**620**
Dibenz (a,h) anthracene	µg/kg	ND<130
Benzo (g,h, i) perylene	µg/kg	**320**
Indeno (1, 2, 3-cd) pyrene	µg/kg	**430**

PAH - Polyaromatic hydrocarbons
µg/kg - micrograms per kilogram
This analysis was performed outside the holding time

Table 3. TPH and VOC Analyses - Groundwater Samples
Collected August 31, 1999
South Airport Self-Fueling Facility
Metropolitan Oakland International Airport
Oakland, California

Analyte	EPA Method	Units	SB-1 GW-1	SB-2 GW-2	SB-3 GW-3	SB-4 GW-4	SB-5 GW-5	SB-6 GW-6	SB-7 GW-7	SB-8 GW-8
TPH Diesel	8015 Modified	µg/L	ND<50	**80 YL**	ND<50	**380 YL**	ND<50	ND<50	ND<50	**72 YL**
TPH Gas	8015 Modified	µg/L	**59**	**300**	ND<50	NA	ND<50	ND<50	ND<50	**33**
MTBE	8260	µg/L	ND<5.0	**2,000**	**3.5 J**	**4,500**	ND<5.0	ND<5.0	ND<5.0	**8.3**
Benzene	8260	µg/L	ND<5.0	**63**	ND<5.0	ND<130	ND<5.0	ND<5.0	ND<5.0	ND<5.0
Toluene	8260	µg/L	ND<5.0	ND<63	ND<5.0	ND<130	ND<5.0	ND<5.0	ND<5.0	ND<5.0
Ethylbenzene	8260	µg/L	ND<5.0	**43 J**	ND<5.0	ND<130	ND<5.0	ND<5.0	ND<5.0	ND<5.0
m,p-Xylene	8260	µg/L	**3.5 J**	ND<63	ND<5.0	**340**	ND<5.0	ND<5.0	ND<5.0	ND<5.0
o-Xylene	8260	µg/L	ND<5.0	ND<63	ND<5.0	**100 J**	ND<5.0	ND<5.0	ND<5.0	ND<5.0
1,3,5-Trimethylbenzene	8260	µg/L	ND<5.0	ND<63	ND<5.0	**75 J**	ND<5.0	ND<5.0	ND<5.0	ND<5.0
1,2,4-Trimethylbenzene	8260	µg/L	ND<5.0	ND<63	ND<5.0	**150**	ND<5.0	ND<5.0	ND<5.0	ND<5.0

µg/L - micrograms per liter
TPH - Total petroleum hydrocarbon
VOC - Volatile organic compound
NA - Not Analyzed
Y - Sampe exhibits fuel pattern which does not resemble standard
L - Lighter hydrocarbons than indicated standard
J - Estimated value

Table 4. PAH Analyses - Groundwater Samples
Collected August 31, 1999
EPA Test Method 8310
South Airport Self-Fueling Facility
Metropolitan Oakland International Airport
Oakland, California

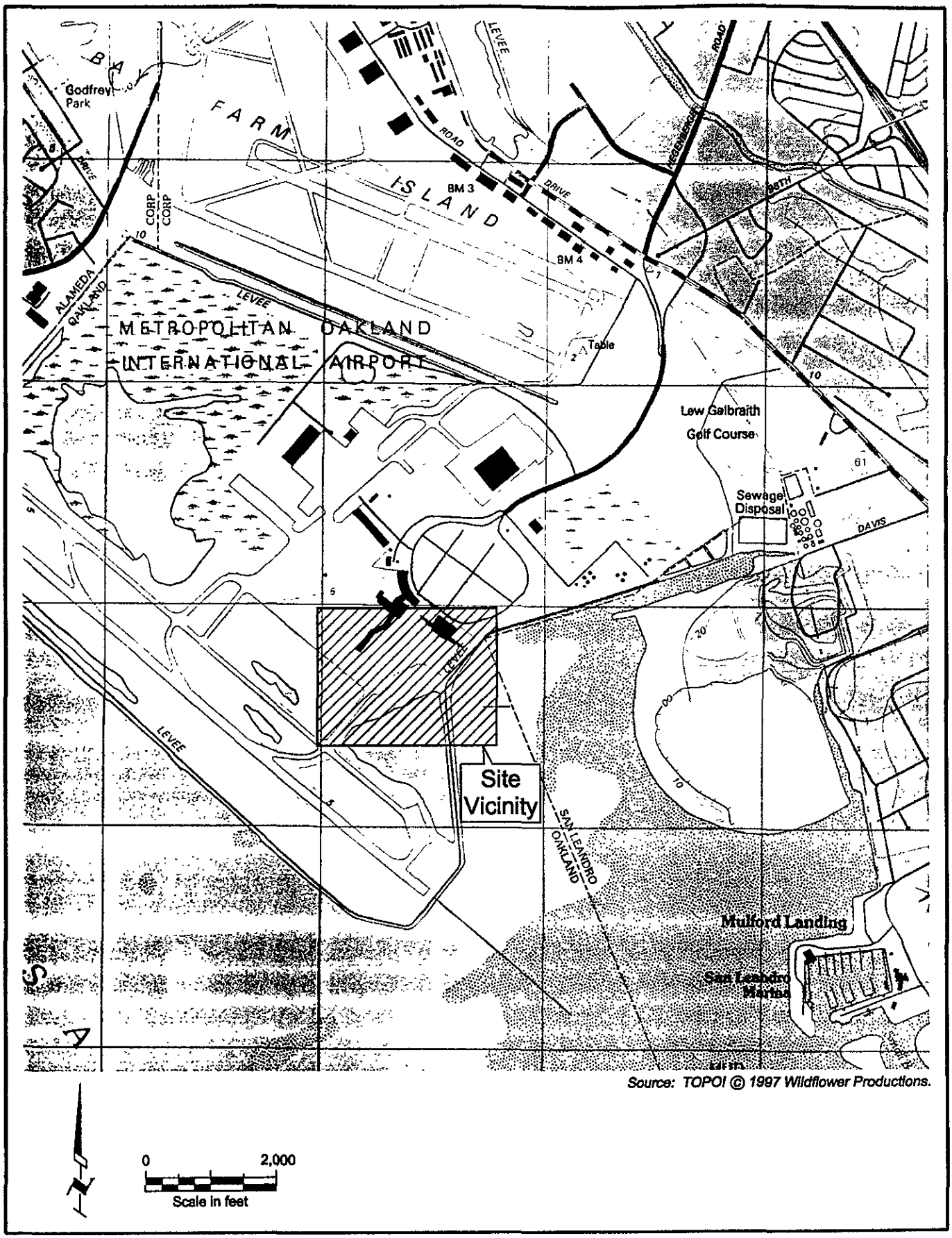
Sample Location / Sample ID / Analyte	Units	SB-4 GW-4
Naphthalene	µg/L	ND<10
Acenaphthylene	µg/L	ND<20
Acenaphthene	µg/L	ND<2.0
Fluorene	µg/L	ND<2.0
Phenanthrene	µg/L	ND<1.0
Anthracene	µg/L	ND<1.0
Fluoranthene	µg/L	ND<0.8
Pyrene	µg/L	ND<0.4
Benzo (a) anthracene	µg/L	ND<0.2
Chrysene	µg/L	ND<0.2
Benzo (b) fluoranthene	µg/L	ND<0.4
Benzo (k) fluoranthene	µg/L	ND<0.2
Benzo (a) pyrene	µg/L	ND<0.2
Dibenz (a,h) anthracene	µg/L	ND<0.4
Benzo (g,h, i) perylene	µg/L	ND<0.4
Indeno (1, 2, 3-cd) pyrene	µg/L	ND<0.28

µg/L - micrograms per liter
PAH - Polyaromatic hydrocarbons

Table 5. Natural Attenuation Parameters - Groundwater Samples
Collected August 31, 1999
South Airport Self-Fueling Facility
Metropolitan International Airport
Oakland, California

Analyses	Sample Location / Sample ID / Units	SB-1 GW-1	SB-2 GW-2	SB-3 GW-3	SB-4 GW-4	SB-5 GW-5	SB-6 GW-6	SB-7 GW-7	SB-8 GW-8
Total Iron	µg/L	37,000	17,000	10,000	29,000	3,200,000	21,000	450,000	23,000
Ferrous Iron	mg/L	ND<0.1	0.27	0.72	1.5	ND<0.1	ND<0.1	ND<0.1	0.78
Nitrogen Nitrate	mg/L	ND<0.05	0.06	ND<0.05	0.05	ND<0.05	ND<0.05	ND<0.05	ND<0.05
Orthophosphate as Phosphorous	mg/L	0.58	ND<0.2	ND<0.2	ND<0.2	0.23	0.65	0.69	ND<0.2
Sulfate	mg/L	12	10	8.1	44	10	7.8	10	23
Total Organic Carbon	mg/L	18	17	21	15	3.1	1.9	6.4	11
pH	--	7.27	7.69	6.98	7.06	8.12	8.9	7.85	7.46
Conductivity	µS/cm	1,700	5,750	2,610	1,003	1,220	2,590	1,870	4,510
Temperature	Deg F	75	79.6	78.3	78.5	73.6	79.9	79.8	73.6
Redox	mV	50	-254	-24	-440	177	-677	-413	157
Dissolved Oxygen	µg/L	3.3	4.1	7.8	2.6	5.0	0.8	2.2	3.4

PLATES



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Scale in feet

Harding Lawson Associates
Engineering and
Environmental Services

Site Location Map

Work Plan, Taxiway 4
Oakland International Airport
Oakland, California

PLATE **1**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
AJW	47858-1	JGM	08/09/99	...

location.dwg

Explanation

SB-1 Geoprobe Borings

Former 6"Ø Product Line

Former 5,000-Gallon UST

Former 4"Ø Drain Line

SB-1

Former 25gpm Pump

SB-8

SB-4

Edge of Apron

Edge of Pavement

Former 1,000-Gallon Sump Tank

Former Hydril Surge Absorber

SB-2

Former Separator Box

Former 1,000-Gallon USTs

SB-5

Diesel

Edge of Pavement

SB-6

Former 4"Ø Drain Line From Separator Box to Culvert

SB-3

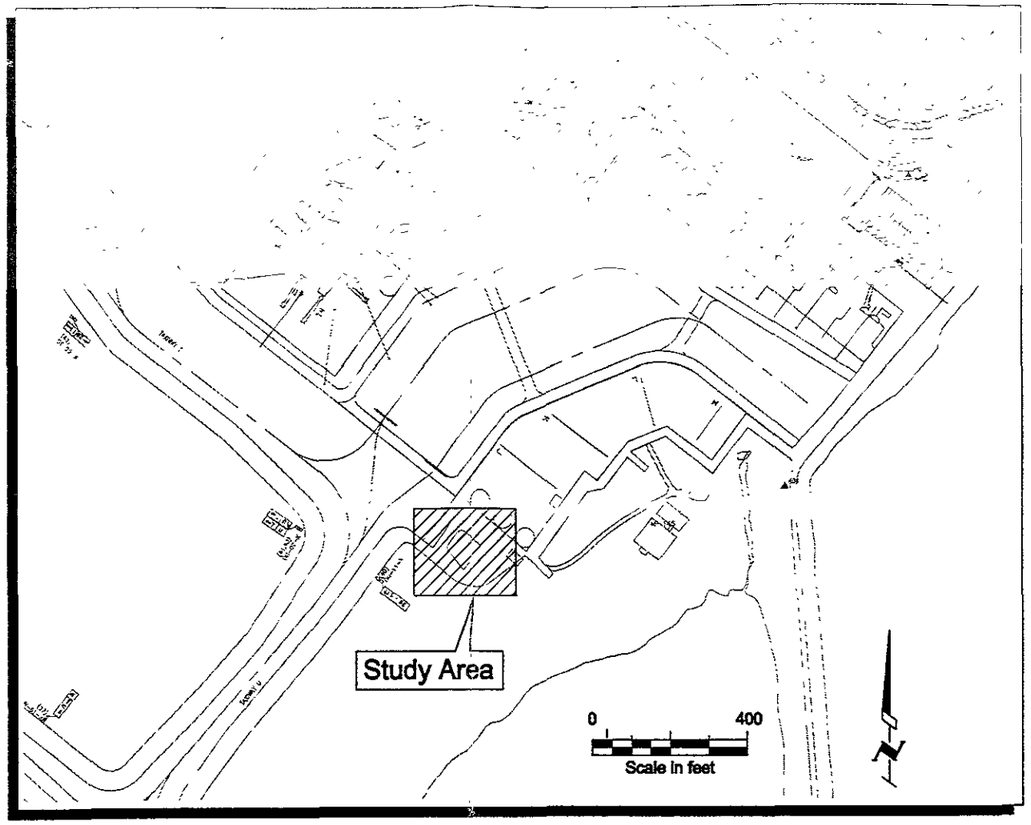
SB-7

N

0 20

Scale in feet

site-del.dwg



Harding Lawson Associates
Engineering and Environmental Services

Site Plan
South Airport Self-Fueling Facility
Metropolitan Oakland International Airport
Oakland, California

PLATE **2**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
AJW	47858-3	JGM	09/30/99	...

Explanation

SB-1 — Geoprobe Borings

(5.6) — Depth to Groundwater in feet below ground surface

Approximate Direction of Groundwater Gradient

Former 6"Ø Product Line

Former 5,000-Gallon UST

(5.6) SB-1

Former 4"Ø Drain Line

Former 25gpm Pump

(6.0) SB-8

Edge of Apron

Edge of Pavement

SB-4 (6.34)

Former 1,000-Gallon Sump Tank

Former Hydril Surge Absorber

(6.31) SB-2

Former Separator Box

Former 1,000-Gallon USTs

SB-5 (6.12)

(6.38) SB-6

Former 4"Ø Drain Line From Separator Box to Culvert

Edge of Pavement

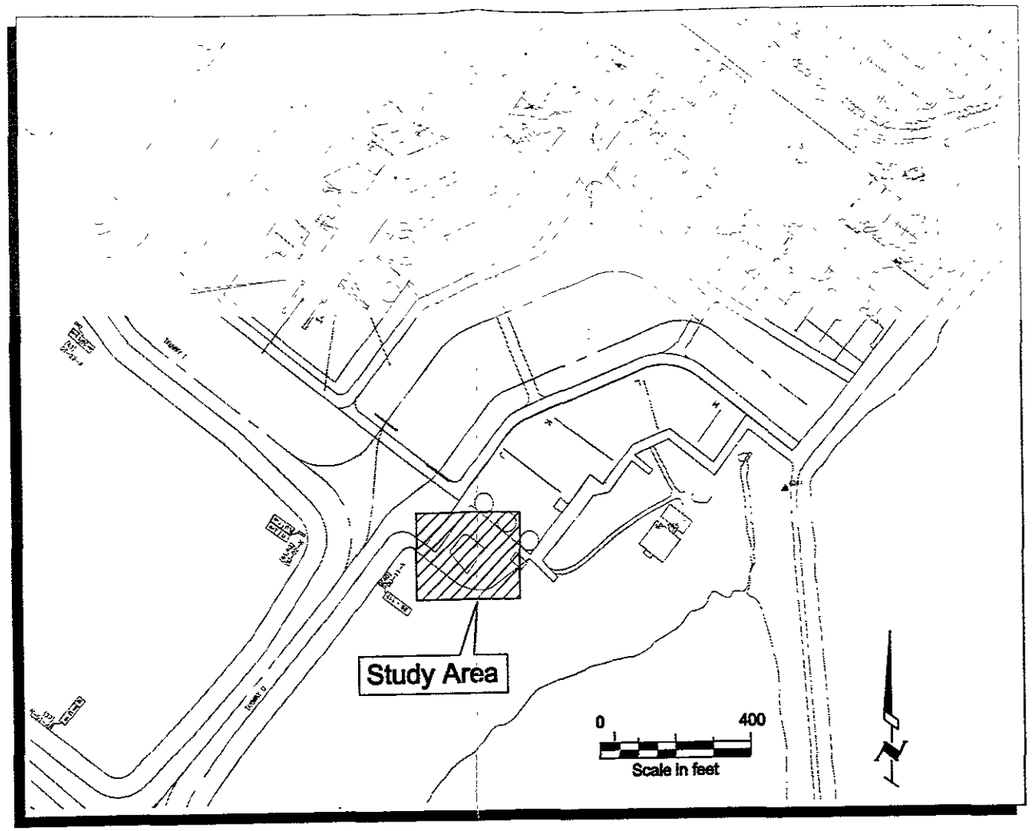
SB-3 (6.37)

(6.37) SB-7

0 20

Scale in feet

site-dtw.dwg



Harding Lawson Associates
Engineering and Environmental Services

Depth to Groundwater (8/31/99)
South Airport Self-Fueling Facility
Metropolitan Oakland International Airport
Oakland, California

PLATE **3**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
AJW	47858-3	JGM	09/30/99	...

Explanation

SB-1 Geoprobe Borings

Depth	6.0'
TPH D	8.7
TPH G	ND<1.0
MTBE	ND<4.8
B	ND<4.8
T	ND<4.8
E	ND<4.8
m,p-X	ND<4.8
o-X	ND<4.8

Depth	6.0'
TPH D	680
TPH G	4.8
MTBE	43
B	ND<5
T	ND<5
E	ND<5
m,p-X	24
o-X	12

Depth	5.5'
TPH D	110
TPH G	ND<1.0
MTBE	ND<5
B	ND<5
T	ND<5
E	ND<5
m,p-X	ND<5
o-X	ND<5

Depth	6.0'
TPH D	ND<1.0
TPH G	ND<1.0
MTBE	ND<4.9
B	ND<4.9
T	ND<4.9
E	ND<4.9
m,p-X	ND<4.9
o-X	ND<4.9

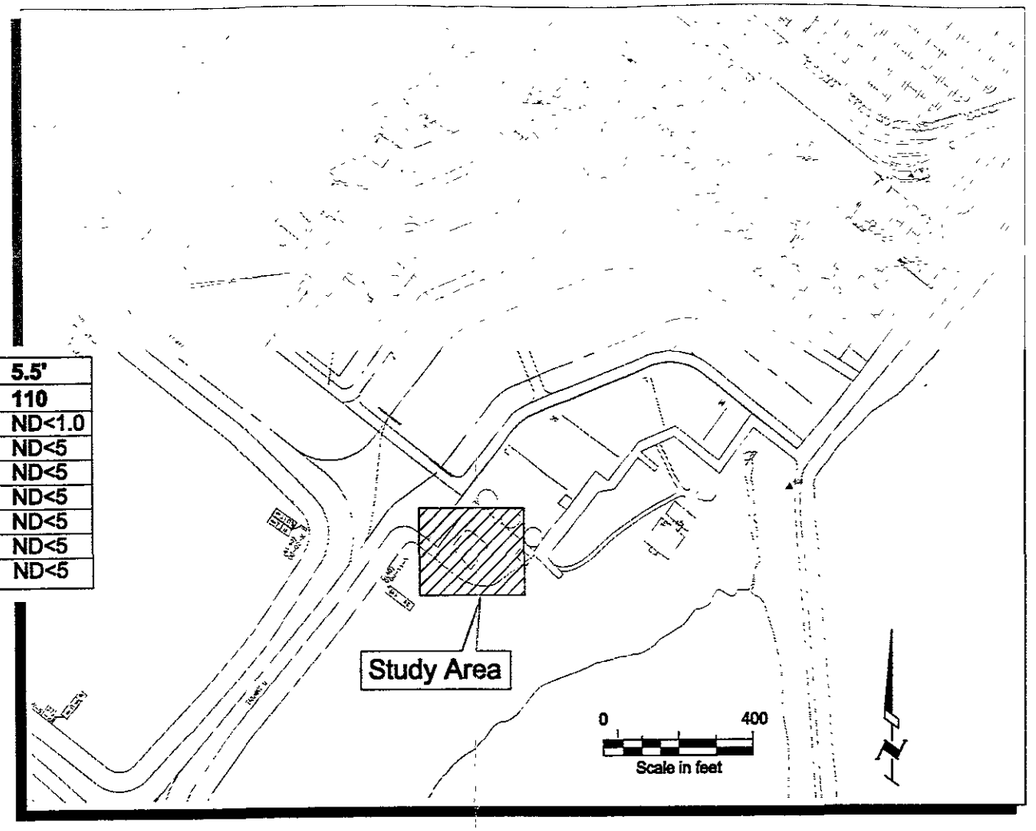
Depth	6.0'
TPH D	ND<1.0
TPH G	ND<1.0
MTBE	ND<4.7
B	ND<4.7
T	ND<4.7
E	ND<4.7
m,p-X	ND<4.7
o-X	ND<4.7

Depth	6.0'
TPH D	ND<1.0
TPH G	ND<1.0
MTBE	ND<5.1
B	ND<5.1
T	ND<5.1
E	ND<5.1
m,p-X	ND<5.1
o-X	ND<5.1

Depth	5.5'
TPH D	ND<1.0
TPH G	ND<1.0
MTBE	ND<4.9
B	ND<4.9
T	ND<4.9
E	ND<4.9
m,p-X	ND<4.9
o-X	ND<4.9

Depth	6.0'
TPH D	ND<1.0
TPH G	ND<1.0
MTBE	ND<4.7
B	ND<4.7
T	ND<4.7
E	ND<4.7
m,p-X	ND<4.7
o-X	ND<4.7

Former 6"Ø Product Line
Former 5,000-Gallon UST
Former 4"Ø Drain Line
Former 25gpm Pump
Former 1,000-Gallon Sump Tank
Former Hydril Surge Absorber
Former Separator Box
Former 1,000-Gallon USTs
Former 4"Ø Drain Line From Separator Box to Culvert
Edge of Apron
Edge of Pavement
gas
diesel
SB-1
SB-2
SB-3
SB-4
SB-5
SB-6
SB-7
SB-8



0 20
Scale in feet

KEY:
Depth ~ as measured in feet below ground surface
TPH D = TPH diesel
TPH G = TPH Gas
B = Benzene
T = Toluene
E = Ethylbenzene
m,p-X = m,p-Xylene
o-X = o-Xylene

TPH D and TPH G results in mg/kg.
All other results in µg/kg .

Samples collected 8/31/99.

Harding Lawson Associates
Engineering and Environmental Services

Soil Chemical Results
South Airport Self-Fueling Facility
Metropolitan Oakland International Airport
Oakland, California

PLATE **4**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
AJW	47858-3	JGM	09/30/99	---

site-det.dwg

Explanation

SB-1 Geoprobe Borings

TPH D	380
TPH G	NA
MTBE	4,500
B	ND<130
T	ND<130
E	ND<130
m,p-X	340
o-X	100
1,3,5-TMB	75
1,2,4-TMB	150

TPH D	ND<50
TPH G	59
MTBE	ND<5
B	ND<5
T	ND<5
E	ND<5
m,p-X	3.5
o-X	ND<5
1,3,5-TMB	ND<5
1,2,4-TMB	ND<5

TPH D	72
TPH G	33
MTBE	8.3
B	ND<5
T	ND<5
E	ND<5
m,p-X	ND<5
o-X	ND<5
1,3,5-TMB	ND<5
1,2,4-TMB	ND<5

TPH D	80
TPH G	300
MTBE	2,000
B	63
T	ND<63
E	43
m,p-X	ND<63
o-X	ND<63
1,3,5-TMB	ND<63
1,2,4-TMB	ND<63

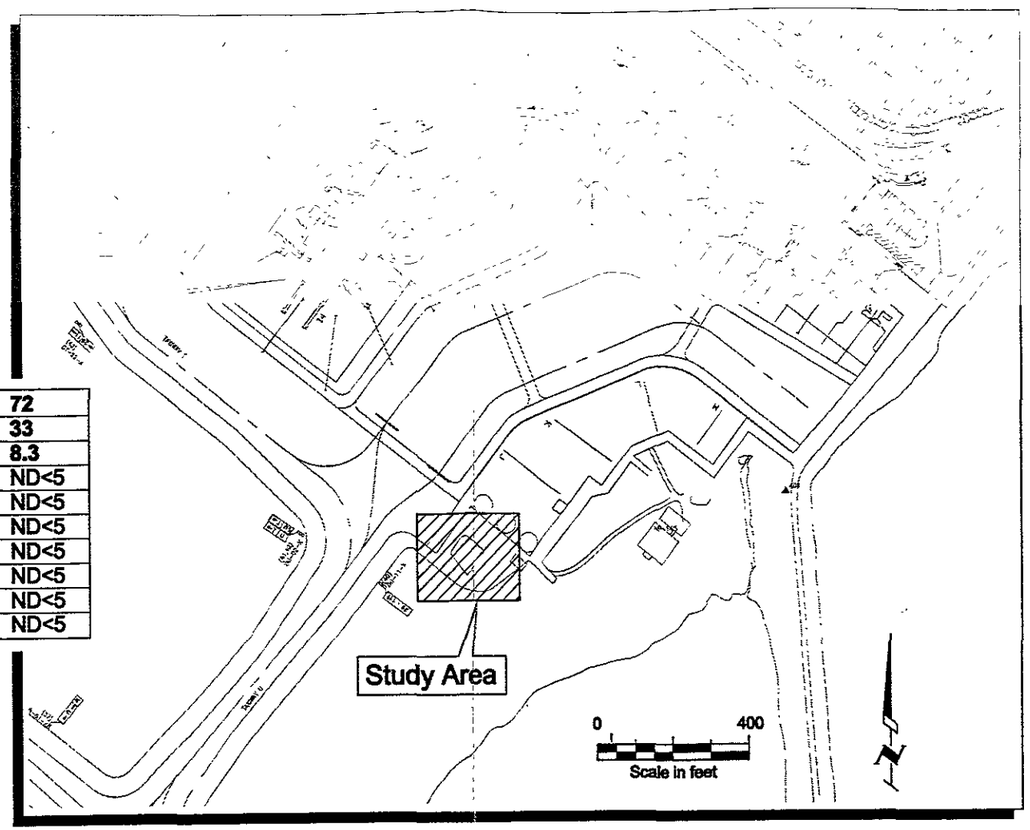
TPH D	ND<50
TPH G	ND<50
MTBE	ND<5
B	ND<5
T	ND<5
E	ND<5
m,p-X	ND<5
o-X	ND<5
1,3,5-TMB	ND<5
1,2,4-TMB	ND<5

TPH D	ND<50
TPH G	ND<50
MTBE	ND<5
B	ND<5
T	ND<5
E	ND<5
m,p-X	ND<5
o-X	ND<5
1,3,5-TMB	ND<5
1,2,4-TMB	ND<5

TPH D	ND<50
TPH G	ND<50
MTBE	3.5
B	ND<5
T	ND<5
E	ND<5
m,p-X	ND<5
o-X	ND<5
1,3,5-TMB	ND<5
1,2,4-TMB	ND<5

TPH D	ND<50
TPH G	ND<50
MTBE	ND<5
B	ND<5
T	ND<5
E	ND<5
m,p-X	ND<5
o-X	ND<5
1,3,5-TMB	ND<5
1,2,4-TMB	ND<5

Former 6"Ø Product Line
Former 5,000-Gallon UST
Former 4"Ø Drain Line
Former 25gpm Pump
Former 1,000-Gallon Sump Tank
Former Hydril Surge Absorber
Former Separator Box
Former 1,000-Gallon USTs
Former 4"Ø Drain Line From Separator Box to Culvert
Edge of Apron
Edge of Pavement
Edge of Pavement
SB-1
SB-2
SB-3
SB-4
SB-5
SB-6
SB-7
SB-8



0 20
Scale in feet

KEY:
TPH D = TPH diesel
TPH G = TPH Gas
B = Benzene
T = Toluene
E = Ethylbenzene
m,p-X = m,p-Xylene
o-X = o-Xylene
1,3,5-TMB = 1,3,5-Trimethylbenzene
1,2,4-TMB = 1,2,4-Trimethylbenzene

All results in µg/L.
NA - Not Analyzed.

Samples collected 8/31/99.

site-det.dwg

Harding Lawson Associates
Engineering and Environmental Services

Groundwater Chemical Results
South Airport Self-Fueling Facility
Metropolitan Oakland International Airport
Oakland, California

PLATE **5**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
AJW	47858-3	JGM	09/30/99	...

APPENDIX
LABORATORY REPORTS

Curtis & Tompkins, Ltd., Analytical Laboratories, Since 1878
2323 Fifth Street, Berkeley, CA 94710, Phone (510) 486-0900, Fax (510) 486-0532

ANALYTICAL REPORT

Prepared for:

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

Date: 11-OCT-99
Lab Job Number: 141259
Project ID: 47858.3
Location: Oakland Airport,Taxiway 4

Reviewed by: _____

Reviewed by: _____

Curtis & Tompkins, Ltd.

Laboratory Number: **141259** Receipt Date: **8/31/99**
Client: **Harding Lawson Associates**
Project#: **47858.3**
Location: **Oakland Airport, Taxiway 4**

CASE NARRATIVE

This hardcopy data package contains sample and QC results for nine soil samples that were received on August 31, 1999. All samples were received cold and intact.

Total Volatile Hydrocarbons: No analytical problems were encountered.

Total Extractable Hydrocarbons: All extracts were treated with silica gel prior to analysis. Sample SB-5 was re-extracted past hold due to low surrogate recovery. See Corrective Action Report #3066. Both extracts are reported for this sample (CT#141259-005 and –010). Sample CB-01 (CT#141259-009) was analyzed at a 10X dilution, causing the surrogate recovery to be diluted out. The %Recovery for the Matrix Spike and Matrix Spike Duplicate (Batch#50521) are considered "Not Meaningful" because the diesel concentrations obtained from the matrix spike sample was greater than ten times the spike amount. No other analytical problems were encountered.

BTXE by EPA Method 8260B: No analytical problems were encountered.

Polyaromatic Hydrocarbons: As requested by the client, the sample with the highest diesel concentration was logged in for this analysis (CT#141259-004) . Because there were problems with the diesel analysis, this sample (141259-004) was not logged in for PAH within hold. The client was notified and requested the analysis be performed past hold. See Corrective Action Report #4462.

The sample was analyzed at a 20X dilution, causing the surrogate recoveries to be diluted out. No other analytical problems were encountered.

Corrective Action Report

Curtis & Tompkins, Ltd.

Analysis: TEH dsl, soil silica gel **Job#:** 141259

Batch#: 50521 **Client:** Harding Lawson Assoc.

Problem/ Nonconformance:

		Initial & Date:
_ Hold Time	141259-005 sg - low surrogate recovery	Analyst LB 9/14/99
_ QC Limits	re-run confirmed	GL 9/15/99
_ Contamination	Hold Time expired 9/14/99	
_ Other	9/14/99	

Impact:

		Initial & Date:
X Data Quality	~~low bias~~ possible low bias in sample result	GL 9/15/99
_ Cost		PM TB 9/15/99
X TAT		QA 9.15.99
X # of redo's		
_ Other		

Immediate Solution:

		Initial & Date:
✓ Reanalyze	~~re~~extract past hold (re-analysis confirmed low recovery)	GL 9/15/99
X Re-extract:		PM TB 9/15/99
new login:	141259-~~015~~ 010 ← surrogate OK upon re-extract.	QA 9.8.99
new batch#:		
_ Narrate		CAD TCM 9/21
_ Educate Client		

Resolution:

		Initial & Date:
_ Train Analyst		Analyst
_ Revise SOP		GL
(attach revision)		PM
_ Single Incident		QA
_ Educate Client		OpM
_ None Required		

CAR#: 3066

Corrective Action Report

Curtis & Tompkins, Ltd.

Analysis: 8310 / Proj Mangegent **Job#:** 141259

Batch#: _____ **Client:** HLA

Problem/ Nonconformance:

__ Hold Time	Chain-of-custody requested 8310 on the highest TEH list (not logged in for Port of Oakland) — missed on login — missed by reviewer? — TEH not turned in on time because there was a TEH re-extract needed.	Initial & Date: Analyst _____ GL _____
__ QC Limits		
__ Contamination		
__ Other		

Impact:

X Data Quality	extracted past hold	Initial & Date: GL _____ PM TB 9/28 QA JKM 9/28
__ Cost		
__ TAT		
__ # of redo's		
__ Other		

Immediate Solution:

__ Reanalyze		Initial & Date: GL _____ PM TB 9/28 QA JKM 9/28
__ Re-extract:		
new login: _____		
new batch#: _____		
__ Narrate		
__ Educate Client		

Resolution:

X Train Analyst PM	① in future, use daytimer to alert to possible hold-times	Initial & Date: Analyst _____ GL _____ PM TB 9/28 QA JKM 9/28 OpM _____
__ Revise SOP (attach revision)	② if a different analysis is holding up other extractions, go ahead & start based on results available & have them start the extraction on the other sample as well.	
__ Single Incident		
__ Educate Client		
__ None Required		

CAR#: _____

4462

No. 230[illegible]

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 & Thompkins

-220

Job Number: 47858.3
Name/Location: Oakland Airport, Taxiway 4
Project Manager: Jim McCarty

Samplers: Valerie Harris
Jim McCarty
Recorder: [signature] (Signature Required)

Source Code	Matrix: Water	Matrix: Sediment	Matrix: Soil	Matrix: Oil	# Containers & Preserv.: Unpres.	H_2SO_4	HNO_3	HCL	Ice	Sample Number or Lab Number (Yr / Wk / Seq)	Date: Yr	Mo	Day	Time	Station Description/ Notes	EPA 8010	EPA 8020	EPA 8260 / BTEX MTBE ONLY	EPA 8270	Metals	EPA 8015M/TPHG	EPA 8020/BTEX	EPA 8015M/TPHd w/ silica gel cleanup *
			X		1				X	SB-1	99	08	31	0930	1			X			X		X
			X		1				X	SB-2	99	08	31	1020	2			X			X		X
			X		1				X	SB-3	99	08	31	1000	3			X			X		X
			X		1				X	SB-4	99	08	31	1046	4			X			X		X
			X		1				X	SB-5	99	08	31	1115	5			X			X		X
			X		1				X	SB-6	99	08	31	1200	6			X			X		X
			X		1				X	SB-7	99	08	31	1230	7			X			X		X
			X		1				X	SB-8	99	08	31	1330	8			X			X		X
			X		1				X	CB-01	99	08	31	1620	9			X			X		X

Lab Number (Yr / Wk / Seq)	Depth in Feet	Col Mtd CD	QA Code	Miscellaneous
				* ANALYZE THE SAMPLE THAT HAS THE HIGHEST DIESEL CONCENTRATION FOR PAH'S

CHAIN OF CUSTODY RECORD

Relinquished By: (Signature)	Received By: (Signature)	Date/Time
[signature]	[signature]	8/31

Dispatched By: (Signature) — Date/Time
Received for Lab By: (Signature) [signature] — Date/Time 8/31/99
Method of Shipment
Sample Condition When Received by the Laboratory

Laboratory Copy White — Project Office Copy Yellow — Field or Office Copy Pink

TVH-Total Volatile Hydrocarbons

Client: Harding Lawson Associates
Project#: 47858.3
Location: Oakland Airport,Taxiway 4

Analysis Method: EPA 8015M
Prep Method: EPA 5030

Sample #	Client ID	Batch #	Sampled	Extracted	Analyzed	Moisture
141259-001	SB-1	50551	08/31/99	09/13/99	09/13/99	
141259-002	SB-2	50551	08/31/99	09/13/99	09/13/99	
141259-003	SB-3	50551	08/31/99	09/14/99	09/14/99	
141259-004	SB-4	50577	08/31/99	09/14/99	09/14/99	

Matrix: Soil

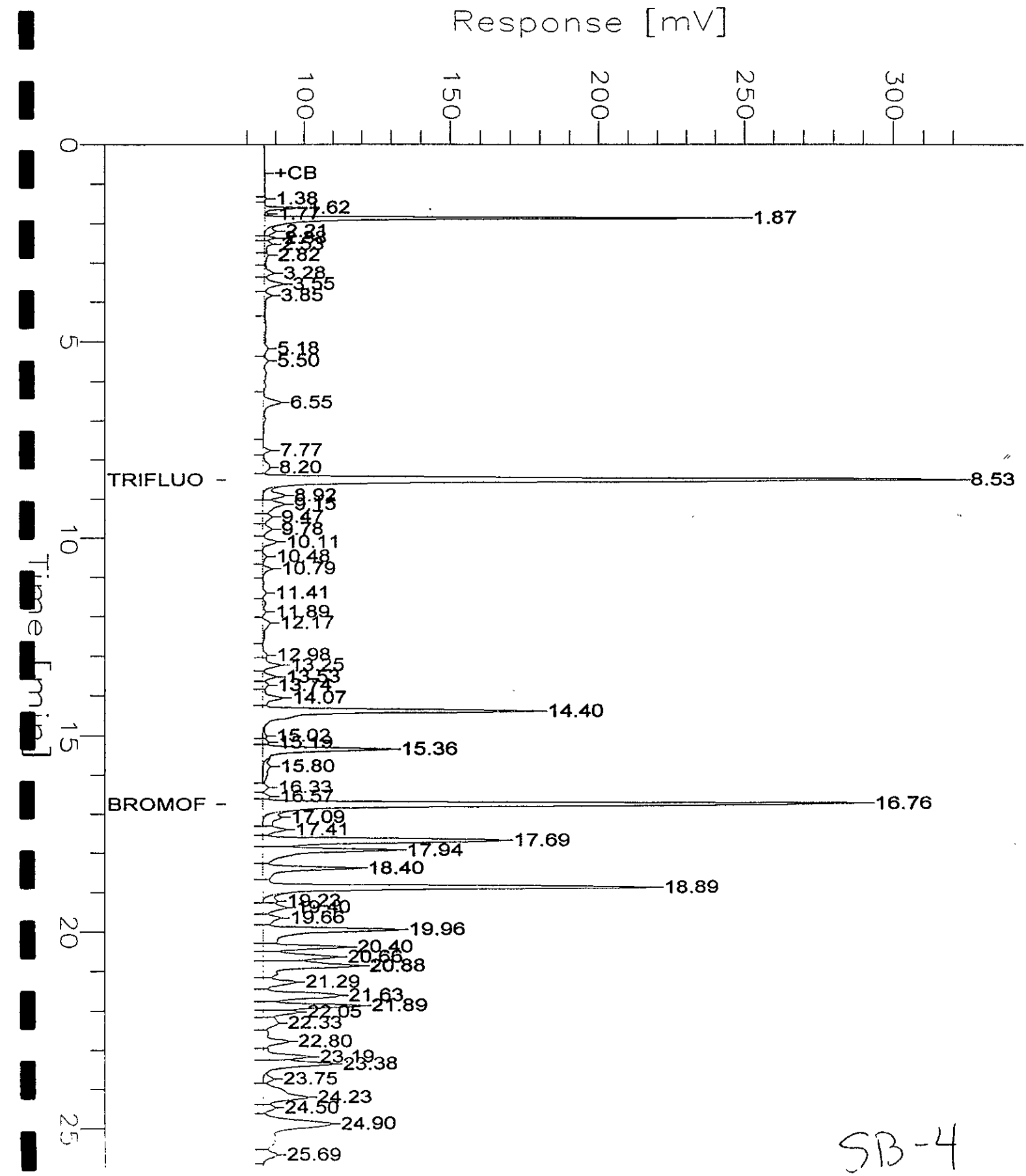
Analyte	Units	141259-001	141259-002	141259-003	141259-004
Diln Fac:		1	1	1	1
Gasoline C7-C12	mg/Kg	<1	<1	<1	4.8H
Surrogate					
Trifluorotoluene	%REC	104	100	102	99
Bromofluorobenzene	%REC	103	103	103	116

H: Heavier hydrocarbons than indicated standard

GC04 TVH 'J' Data File Rtx1FID

Sample Name : r,141259-004,50577,tvh only+avgas
FileName : G:\GC04\DATA\257J012.raw
Method : TVHBTXE
Start Time : 0.00 min End Time : 26.00 min
Scale Factor: -1.0 Plot Offset: 73 mV

Sample #: Page 1 of 1
Date : 9/14/99 09:56 PM
Time of Injection: 9/14/99 09:30 PM
Low Point : 72.51 mV High Point : 322.51 mV
Plot Scale: 250.0 mV

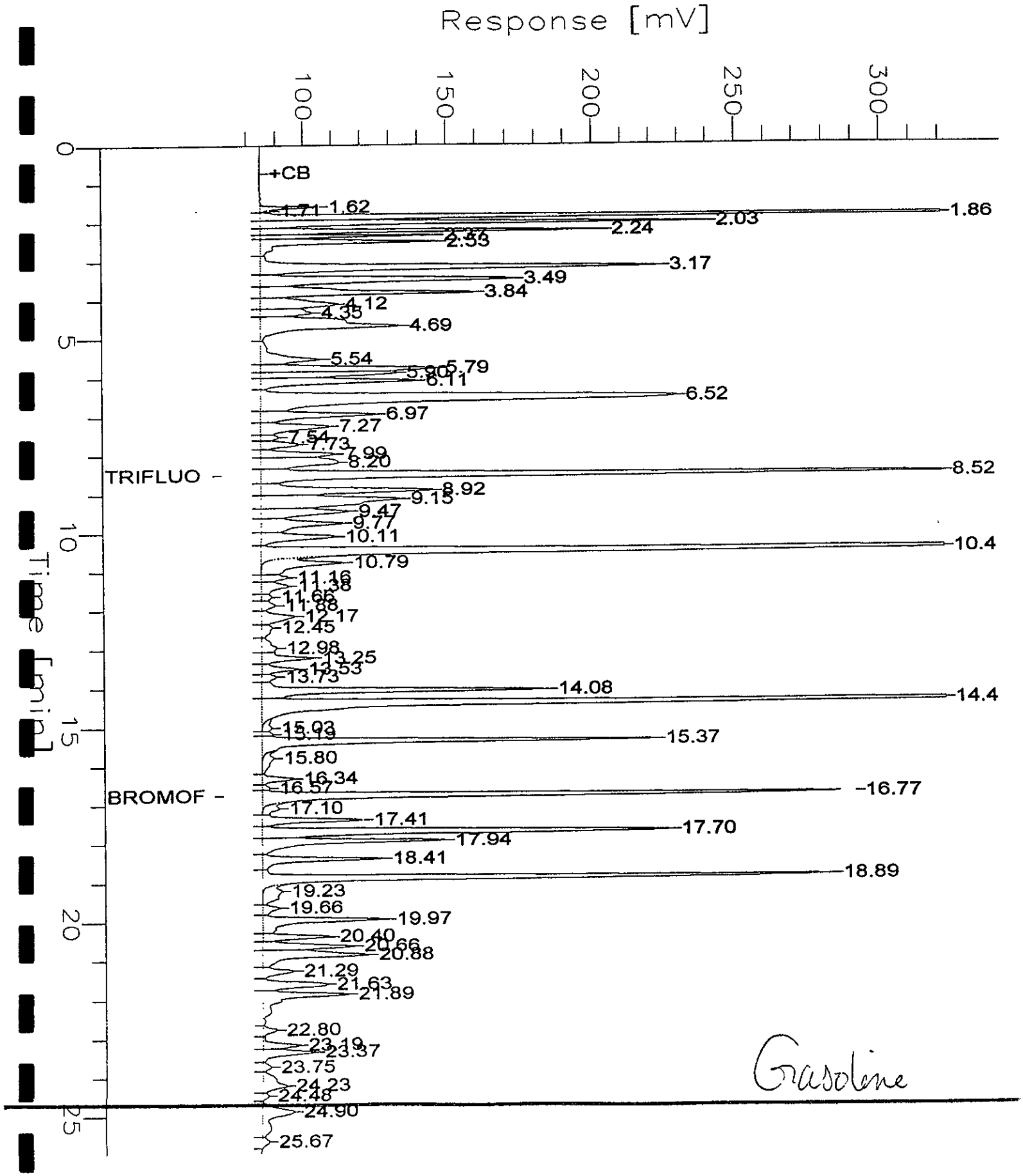


SB-4

GC04 TVH 'J' Data File RtxIID

Sample Name : ccv/lcs,qc07489,99ws8047,50551
FileName : G:\GC04\DATA\256J003.raw
Method : TVHBTXE
Start Time : 0.00 min End Time : 26.00 min
Scale Factor: -1.0 Plot Offset: 71 mV

Sample #: gas Page 1 of 1
Date : 9/13/99 02:17 PM
Time of Injection: 9/13/99 01:51 PM
Low Point : 70.89 mV High Point : 320.89 mV
Plot Scale: 250.0 mV



TVH-Total Volatile Hydrocarbons

Client: Harding Lawson Associates
Project#: 47858.3
Location: Oakland Airport,Taxiway 4

Analysis Method: EPA 8015M
Prep Method: EPA 5030

Sample #	Client ID	Batch #	Sampled	Extracted	Analyzed	Moisture
141259-005	SB-5	50551	08/31/99	09/14/99	09/14/99	
141259-006	SB-6	50551	08/31/99	09/14/99	09/14/99	
141259-007	SB-7	50551	08/31/99	09/14/99	09/14/99	
141259-008	SB-8	50551	08/31/99	09/14/99	09/14/99	

Matrix: Soil

Analyte	Units	141259-005	141259-006	141259-007	141259-008
Diln Fac:		1	1	1	1
Gasoline C7-C12	mg/Kg	<1	<1	<1	<1
Surrogate					
Trifluorotoluene	%REC	103	100	103	99
Bromofluorobenzene	%REC	106	101	102	102

TVH-Total Volatile Hydrocarbons

Client: Harding Lawson Associates
Project#: 47858.3
Location: Oakland Airport,Taxiway 4

Analysis Method: EPA 8015M
Prep Method: EPA 5030

Sample #	Client ID	Batch #	Sampled	Extracted	Analyzed	Moisture
141259-009	CB-01	50551	08/31/99	09/14/99	09/14/99	

Matrix: Soil

Analyte	Units	141259-009
Diln Fac:		1
Gasoline C7-C12	mg/Kg	<1
Surrogate		
Trifluorotoluene	%REC	105
Bromofluorobenzene	%REC	107

TVH-Total Volatile Hydrocarbons

Client:	Harding Lawson Associates	Analysis Method:	EPA 8015M
Project#:	47858.3	Prep Method:	EPA 5030
Location:	Oakland Airport,Taxiway 4		

METHOD BLANK

Matrix:	Soil	Prep Date:	09/13/99
Batch#:	50551	Analysis Date:	09/13/99
Units:	mg/Kg		
Diln Fac:	1		

MB Lab ID: QC07488

Analyte	Result
Gasoline C7-C12	<1.0

Surrogate	%Rec	Recovery Limits
Trifluorotoluene	107	62-143
Bromofluorobenzene	104	59-150

TVH-Total Volatile Hydrocarbons

Client:	Harding Lawson Associates	Analysis Method:	EPA 8015M
Project#:	47858.3	Prep Method:	EPA 5030
Location:	Oakland Airport,Taxiway 4		

METHOD BLANK

Matrix:	Soil	Prep Date:	09/14/99
Batch#:	50577	Analysis Date:	09/14/99
Units:	mg/Kg		
Diln Fac:	1		

MB Lab ID: QC07597

Analyte	Result
Gasoline C7-C12	<1.0

Surrogate	%Rec	Recovery Limits
Trifluorotoluene	103	62-143
Bromofluorobenzene	102	59-150

Lab #: 141259 BATCH QC REPORT

Curtis & Tompkins, Ltd.

TVH-Total Volatile Hydrocarbons

Client:	Harding Lawson Associates	Analysis Method:	EPA 8015M
Project#:	47858.3	Prep Method:	EPA 5030
Location:	Oakland Airport,Taxiway 4		

LABORATORY CONTROL SAMPLE

Matrix:	Soil	Prep Date:	09/13/99
Batch#:	50551	Analysis Date:	09/13/99
Units:	mg/Kg		
Diln Fac:	1		

LCS Lab ID: QC07489

Analyte	Result	Spike Added	%Rec #	Limits
Gasoline C7-C12	11.33	10	113	77-122

Surrogate	%Rec	Limits
Trifluorotoluene	107	62-143
Bromofluorobenzene	115	59-150

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

TVH-Total Volatile Hydrocarbons

Client:	Harding Lawson Associates	Analysis Method:	EPA 8015M
Project#:	47858.3	Prep Method:	EPA 5030
Location:	Oakland Airport,Taxiway 4		

LABORATORY CONTROL SAMPLE

Matrix:	Soil	Prep Date:	09/14/99
Batch#:	50577	Analysis Date:	09/14/99
Units:	mg/Kg		
Diln Fac:	1		

LCS Lab ID: QC07598

Analyte	Result	Spike Added	%Rec #	Limits
Gasoline C7-C12	11.51	10	115	77-122

Surrogate	%Rec	Limits
Trifluorotoluene	108	62-143
Bromofluorobenzene	117	59-150

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

TVH-Total Volatile Hydrocarbons

Client: Harding Lawson Associates
Project#: 47858.3
Location: Oakland Airport,Taxiway 4

Analysis Method: EPA 8015M
Prep Method: EPA 5030

MATRIX SPIKE/MATRIX SPIKE DUPLICATE

Field ID: SB-1
Lab ID: 141259-001
Matrix: Soil
Batch#: 50551
Units: mg/Kg
Diln Fac: 1

Sample Date: 08/31/99
Received Date: 08/31/99
Prep Date: 09/13/99
Analysis Date: 09/13/99

MS Lab ID: QC07558

Analyte	Spike Added	Sample	MS	%Rec #	Limits
Gasoline C7-C12	10	<1	10.28	103	55-134

Surrogate	%Rec	Limits
Trifluorotoluene	105	62-143
Bromofluorobenzene	117	59-150

MSD Lab ID: QC07559

Analyte	Spike Added	MSD	%Rec #	Limits	RPD #	Limit
Gasoline C7-C12	10	10.29	103	55-134	0	30

Surrogate	%Rec	Limits
Trifluorotoluene	105	62-143
Bromofluorobenzene	117	59-150

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

Lab #: 141259 BATCH QC REPORT

Curtis & Tompkins, Ltd.

TVH-Total Volatile Hydrocarbons

Client:	Harding Lawson Associates	Analysis Method:	EPA 8015M
Project#:	47858.3	Prep Method:	EPA 5030
Location:	Oakland Airport,Taxiway 4		

MATRIX SPIKE/MATRIX SPIKE DUPLICATE

Field ID:	ZZZZZZ	Sample Date:	09/08/99
Lab ID:	141386-001	Received Date:	09/08/99
Matrix:	Soil	Prep Date:	09/14/99
Batch#:	50577	Analysis Date:	09/14/99
Units:	mg/Kg		
Diln Fac:	1		

MS Lab ID: QC07670

Analyte	Spike Added	Sample	MS	%Rec #	Limits
Gasoline C7-C12	10	<1	10.54	105	55-134

Surrogate	%Rec	Limits
Trifluorotoluene	105	62-143
Bromofluorobenzene	118	59-150

MSD Lab ID: QC07671

Analyte	Spike Added	MSD	%Rec #	Limits	RPD #	Limit
Gasoline C7-C12	10	10.3	103	55-134	2	30

Surrogate	%Rec	Limits
Trifluorotoluene	106	62-143
Bromofluorobenzene	119	59-150

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#: 47858.3
Location: Oakland Airport,Taxiway 4

Analysis Method: EPA 8015M
Prep Method: CA LUFT

Sample #	Client ID	Batch #	Sampled	Extracted	Analyzed	Moisture
141259-001	SB-1	50521	08/31/99	09/10/99	09/11/99	
141259-002	SB-2	50521	08/31/99	09/10/99	09/11/99	
141259-003	SB-3	50521	08/31/99	09/10/99	09/11/99	
141259-004	SB-4	50521	08/31/99	09/10/99	09/13/99	

Matrix: Soil

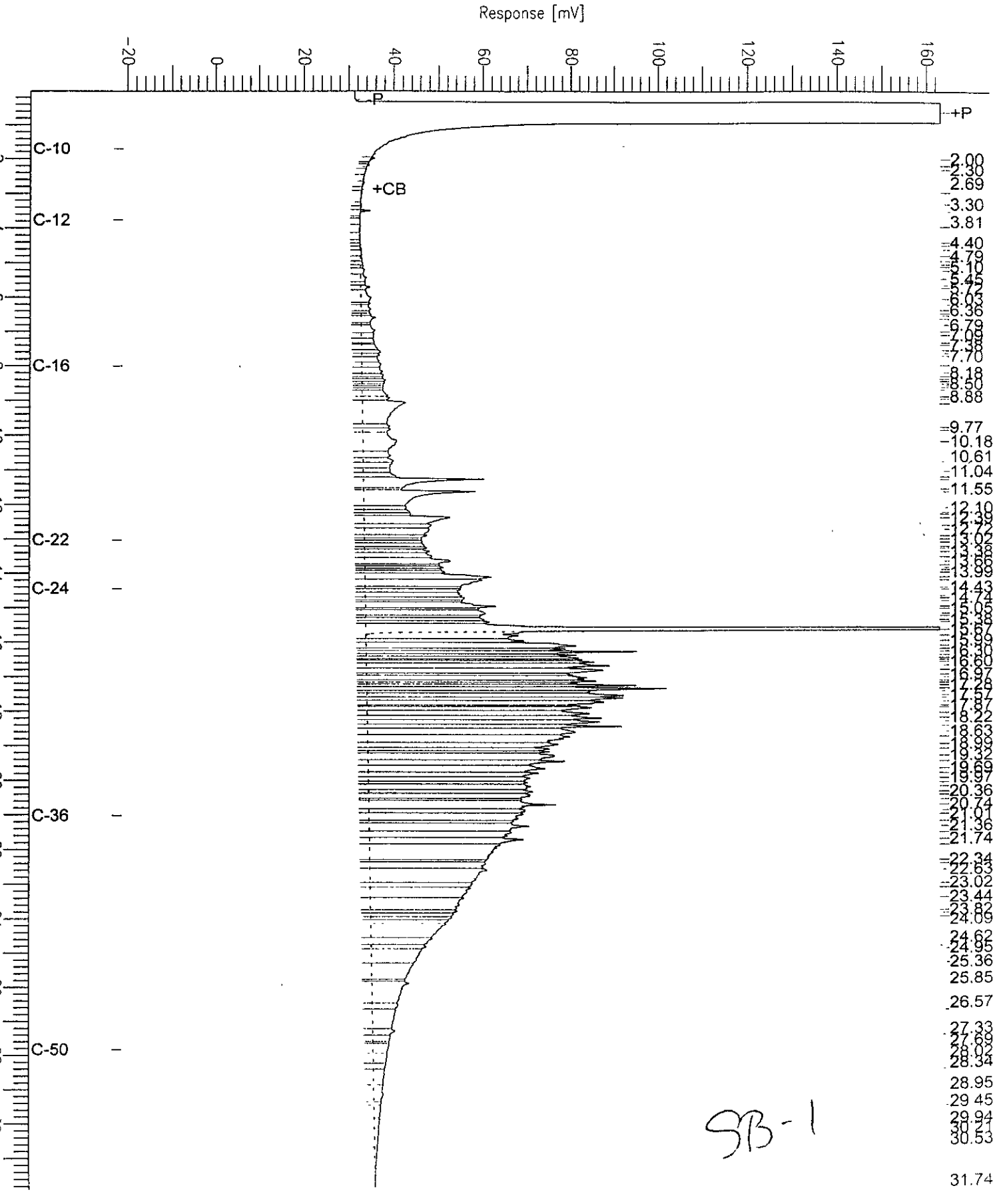
Analyte	Units	141259-001	141259-002	141259-003	141259-004
Diln Fac:		1	1	1	5
Diesel C10-C24	mg/Kg	8.7YH	<1	<1	680 YL
Surrogate					
Hexacosane	%REC	95	88	91	85

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 : 141259-001sg,50521
FileName : G:\GC11\CHA\252A059.RAW
Method : ATEH245.MTH
Start Time : 0.01 min End Time : 31.91 min
Scale Factor: 0.0 Plot Offset: -21 mV

Sample #: 50521 Page 1 of 1
Date : 9/13/99 12:18 PM
Time of Injection: 9/11/99 10:47 AM
Low Point : -21.00 mV High Point : 163.15 mV
Plot Scale: 184.2 mV

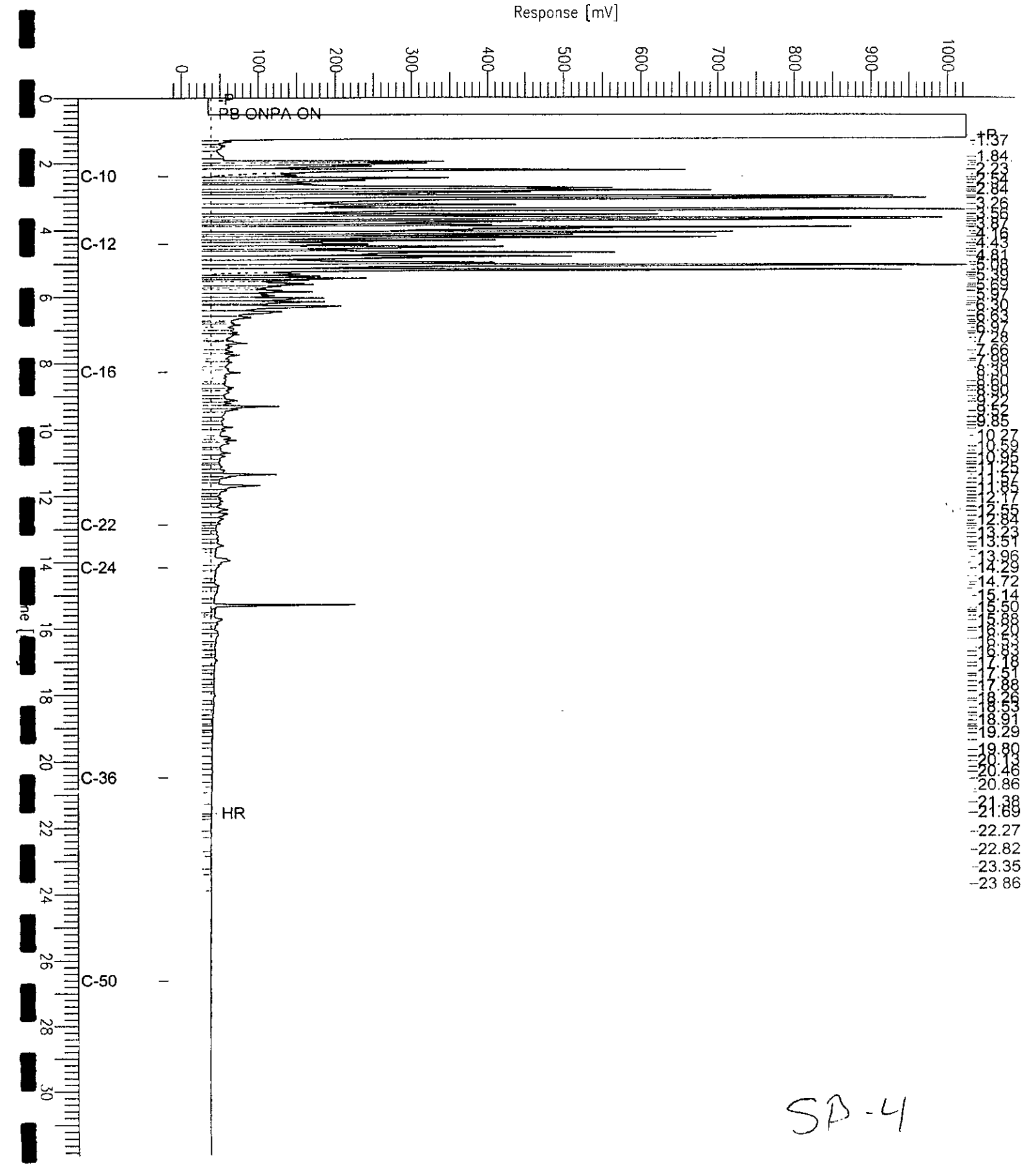


SB-1

Chromatogram

[redacted]mple Name : 141259-004sg,50521
FileName : C:\GC15\CHB\252B094.RAW
Method : BTEH244.MTH
[redacted]art Time : 0.00 min End Time : 31.90 min
[redacted]ale Factor: 0.0 Plot Offset: -17 mV

Sample #: 50521 Page 1 of 1
Date : 9/13/99 03:57 PM
Time of Injection: 9/13/99 02:15 AM
Low Point : -17.42 mV High Point : 1024.00 mV
Plot Scale: 1041.4 mV



SD-4

TEH-Tot Ext Hydrocarbons

Client: Harding Lawson Associates
Project#: 47858.3
Location: Oakland Airport,Taxiway 4

Analysis Method: EPA 8015M
Prep Method: CA LUFT

Sample #	Client ID	Batch #	Sampled	Extracted	Analyzed	Moisture
141259-005	SB-5	50521	08/31/99	09/10/99	09/14/99	
141259-006	SB-6	50521	08/31/99	09/10/99	09/11/99	
141259-007	SB-7	50521	08/31/99	09/10/99	09/11/99	
141259-008	SB-8	50521	08/31/99	09/10/99	09/11/99	

Matrix: Soil

Analyte	Units	141259-005		141259-006	141259-007	141259-008
Diln Fac:		1		1	1	1
Diesel C10-C24	mg/Kg	<1		<1	<1	<1
Surrogate						
Hexacosane	%REC	29	*	103	97	82

TEH-Tot Ext Hydrocarbons

Client: Harding Lawson Associates
Project#: 47858.3
Location: Oakland Airport,Taxiway 4

Analysis Method: EPA 8015M
Prep Method: CA LUFT

Sample #	Client ID	Batch #	Sampled	Extracted	Analyzed	Moisture
141259-009	CB-01	50521	08/31/99	09/10/99	09/11/99	
141259-010	SB-5-RE	50617	08/31/99	09/15/99	09/18/99	

Matrix: Soil

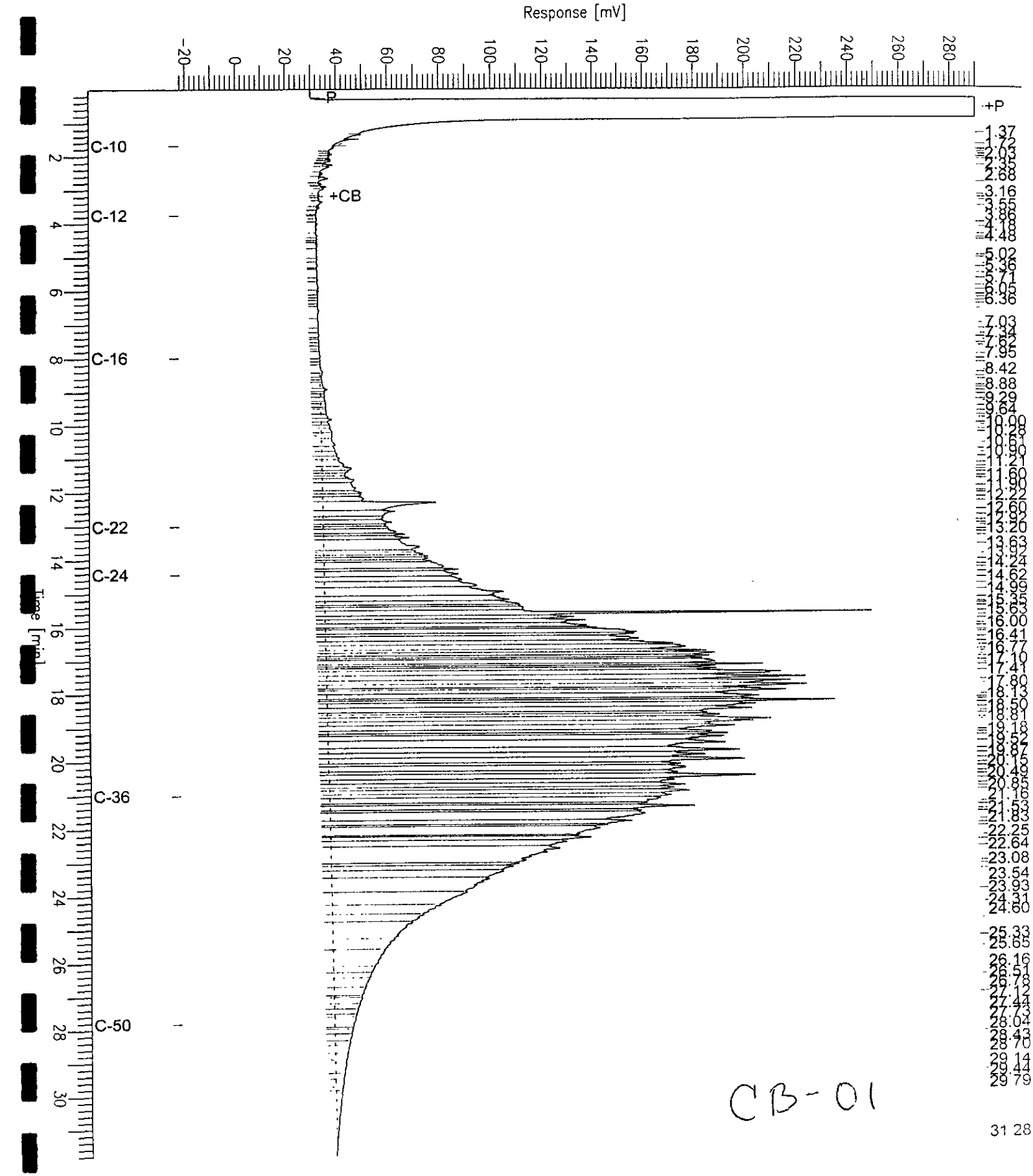
Analyte	Units	141259-009	141259-010
Diln Fac:		10	1
Diesel C10-C24	mg/Kg	110 YH	<1
Surrogate			
Hexacosane	%REC	DO	117

DO: Surrogate diluted out
Y: Sample exhibits fuel pattern which does not resemble standard
H: Heavier hydrocarbons than indicated standard

Chromatogram

Sample Name : 141259-009sg,50521
FileName : G:\GC11\CHA\252A067.RAW
Method : ATEH245.MTH
Start Time : 0.01 min End Time : 31.83 min
Scale Factor: 0.0 Plot Offset: -22 mV

Sample #: 50521 Page 1 of 1
Date : 9/13/99 12:24 PM
Time of Injection: 9/11/99 04:08 PM
Low Point : -22.27 mV High Point : 290.03 mV
Plot Scale: 312.3 mV



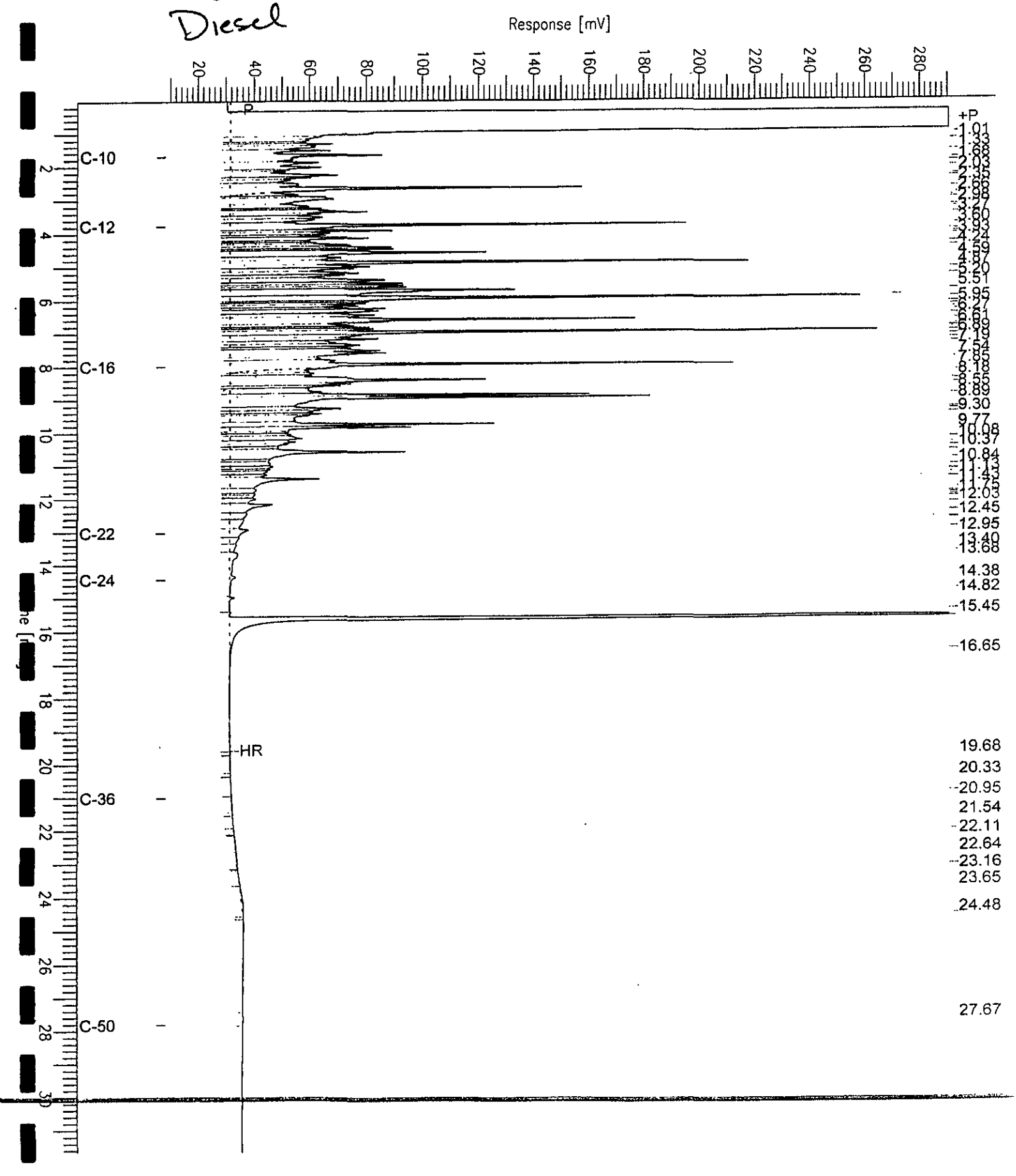
CB-01

Chromatogram

Sample Name : ccv,99ws8083,dsl
FileName : G:\GC11\CHA\255A002.RAW
Method : ATEH245.MTH
Start Time : 0.01 min End Time : 31.87 min
Scale Factor: 0.0 Plot Offset: 8 mV

Sample #: 500mg/l Page 1 of 1
Date : 9/13/99 10:47 AM
Time of Injection: 9/12/99 06:02 PM
Low Point : 8.25 mV High Point : 290.51 mV
Plot Scale: 282.3 mV

Diesel



TEH-Tot Ext Hydrocarbons

Client:	Harding Lawson Associates	Analysis Method:	EPA 8015M
Project#:	47858.3	Prep Method:	CA LUFT
Location:	Oakland Airport,Taxiway 4		

METHOD BLANK

Matrix:	Soil	Prep Date:	09/10/99
Batch#:	50521	Analysis Date:	09/13/99
Units:	mg/Kg		
Diln Fac:	1		

MB Lab ID: QC07374

Analyte	Result	
Diesel C10-C24	<1.0	
Surrogate	**%Rec**	**Recovery Limits**
Hexacosane	66	52-137

TEH-Tot Ext Hydrocarbons

Client:	Harding Lawson Associates	Analysis Method:	EPA 8015M
Project#:	47858.3	Prep Method:	CA LUFT
Location:	Oakland Airport,Taxiway 4		

METHOD BLANK

Matrix:	Soil	Prep Date:	09/15/99
Batch#:	50617	Analysis Date:	09/18/99
Units:	mg/Kg		
Diln Fac:	1		

MB Lab ID: QC07726

Analyte	Result	
Diesel C10-C24	<1.0	
Surrogate	**%Rec**	**Recovery Limits**
Hexacosane	100	52-137

TEH-Tot Ext Hydrocarbons

Client: Harding Lawson Associates
Project#: 47858.3
Location: Oakland Airport,Taxiway 4

Analysis Method: EPA 8015M
Prep Method: CA LUFT

LABORATORY CONTROL SAMPLE

Matrix: Soil
Batch#: 50521
Units: mg/Kg
Diln Fac: 1

Prep Date: 09/10/99
Analysis Date: 09/11/99

LCS Lab ID: QC07375

Analyte	Result	Spike Added	%Rec #	Limits
Diesel C10-C24	41.16	49.5	83	52-117
Surrogate	**%Rec**	**Limits**		
Hexacosane	92	52-137		

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

TEH-Tot Ext Hydrocarbons

Client: Harding Lawson Associates
Project#: 47858.3
Location: Oakland Airport,Taxiway 4

Analysis Method: EPA 8015M
Prep Method: CA LUFT

LABORATORY CONTROL SAMPLE

Matrix: Soil
Batch#: 50617
Units: mg/Kg
Diln Fac: 1

Prep Date: 09/15/99
Analysis Date: 09/18/99

LCS Lab ID: QC07727

Analyte	Result	Spike Added	%Rec #	Limits
Diesel C10-C24	48.2	49.5	97	52-117
Surrogate	**%Rec**	**Limits**		
Hexacosane	107	52-137		

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

TEH-Tot Ext Hydrocarbons

Client:	Harding Lawson Associates	Analysis Method:	EPA 8015M
Project#:	47858.3	Prep Method:	CA LUFT
Location:	Oakland Airport,Taxiway 4		

MATRIX SPIKE/MATRIX SPIKE DUPLICATE

Field ID:	ZZZZZZ	Sample Date:	09/02/99
Lab ID:	141299-023	Received Date:	09/03/99
Matrix:	Soil	Prep Date:	09/10/99
Batch#:	50521	Analysis Date:	09/13/99
Units:	mg/Kg dry weight	Moisture:	13%
Diln Fac:	2		

MS Lab ID: QC07376

Analyte	Spike Added	Sample	MS	%Rec #	Limits
Diesel C10-C24	56.9	907.2	937.1	NM	41-135
Surrogate	**%Rec**	**Limits**			
Hexacosane	101	52-137			

MSD Lab ID: QC07377

Analyte	Spike Added	MSD	%Rec #	Limits	RPD #	Limit
Diesel C10-C24	56.9	789.3	NM	41-135	17	37
Surrogate	**%Rec**	**Limits**				
Hexacosane	96	52-137				

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
NM: Not meaningful

TEH-Tot Ext Hydrocarbons

Client:	Harding Lawson Associates	Analysis Method:	EPA 8015M
Project#:	47858.3	Prep Method:	CA LUFT
Location:	Oakland Airport,Taxiway 4		

MATRIX SPIKE/MATRIX SPIKE DUPLICATE

Field ID:	ZZZZZZ	Sample Date:	09/13/99
Lab ID:	141461-007	Received Date:	09/14/99
Matrix:	Soil	Prep Date:	09/15/99
Batch#:	50617	Analysis Date:	09/17/99
Units:	mg/Kg		
Diln Fac:	1		

MS Lab ID: QC07728

Analyte	Spike Added	Sample	MS	%Rec #	Limits
Diesel C10-C24	49.5	<1	50.35	102	41-135
Surrogate	%Rec	Limits			
Hexacosane	118	52-137			

MSD Lab ID: QC07729

Analyte	Spike Added	MSD	%Rec #	Limits	RPD #	Limit
Diesel C10-C24	49.5	49.36	100	41-135	2	37
Surrogate	%Rec	Limits				
Hexacosane	115	52-137				

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
NM: Not meaningful

Aromatic Volatile Organics
EPA 8020 Analyte List

Client:	Harding Lawson Associates	Analysis Method:	EPA 8260A
Project#:	47858.3	Prep Method:	EPA 5030
Location:	Oakland Airport, Taxiway 4		

Field ID:	SB-1	Sampled:	08/31/99
Lab ID:	141259-001	Received:	08/31/99
Matrix:	Soil	Extracted:	09/11/99
Batch#:	50513	Analyzed:	09/11/99
Units:	ug/Kg		
Diln Fac:	0.9615		

Analyte	Result	Reporting Limit
MTBE	ND	4.8
Benzene	ND	4.8
Toluene	ND	4.8
Ethylbenzene	ND	4.8
m,p-Xylenes	ND	4.8
o-Xylene	ND	4.8

Surrogate	%Recovery	Recovery Limits
1,2-Dichloroethane-d4	89	80-129
Toluene-d8	99	88-111
Bromofluorobenzene	101	76-128

Aromatic Volatile Organics
EPA 8020 Analyte List

Client:	Harding Lawson Associates	Analysis Method:	EPA 8260A
Project#:	47858.3	Prep Method:	EPA 5030
Location:	Oakland Airport,Taxiway 4		

Field ID:	SB-2	Sampled:	08/31/99
Lab ID:	141259-002	Received:	08/31/99
Matrix:	Soil	Extracted:	09/11/99
Batch#:	50513	Analyzed:	09/11/99
Units:	ug/Kg		
Diln Fac:	0.9804		

Analyte	Result	Reporting Limit
MTBE	ND	4.9
Benzene	ND	4.9
Toluene	ND	4.9
Ethylbenzene	ND	4.9
m,p-Xylenes	ND	4.9
o-Xylene	ND	4.9

Surrogate	%Recovery	Recovery Limits
1,2-Dichloroethane-d4	94	80-129
Toluene-d8	99	88-111
Bromofluorobenzene	116	76-128

Aromatic Volatile Organics
EPA 8020 Analyte List

Client:	Harding Lawson Associates	Analysis Method:	EPA 8260A
Project#:	47858.3	Prep Method:	EPA 5030
Location:	Oakland Airport,Taxiway 4		

Field ID:	SB-3	Sampled:	08/31/99
Lab ID:	141259-003	Received:	08/31/99
Matrix:	Soil	Extracted:	09/11/99
Batch#:	50533	Analyzed:	09/11/99
Units:	ug/Kg		
Diln Fac:	0.9804		

Analyte	Result	Reporting Limit
MTBE	ND	4.9
Benzene	ND	4.9
Toluene	ND	4.9
Ethylbenzene	ND	4.9
m,p-Xylenes	ND	4.9
o-Xylene	ND	4.9

Surrogate	%Recovery	Recovery Limits
1,2-Dichloroethane-d4	91	80-129
Toluene-d8	98	88-111
Bromofluorobenzene	95	76-128

Aromatic Volatile Organics
EPA 8020 Analyte List

Client:	Harding Lawson Associates	Analysis Method:	EPA 8260A
Project#:	47858.3	Prep Method:	EPA 5030
Location:	Oakland Airport,Taxiway 4		

Field ID:	SB-4	Sampled:	08/31/99
Lab ID:	141259-004	Received:	08/31/99
Matrix:	Soil	Extracted:	09/11/99
Batch#:	50533	Analyzed:	09/11/99
Units:	ug/Kg		
Diln Fac:	1		

Analyte	Result	Reporting Limit
MTBE	43	5.0
Benzene	ND	5.0
Toluene	ND	5.0
Ethylbenzene	ND	5.0
m,p-Xylenes	24	5.0
o-Xylene	12	5.0

Surrogate	%Recovery	Recovery Limits
1,2-Dichloroethane-d4	89	80-129
Toluene-d8	100	88-111
Bromofluorobenzene	96	76-128

Aromatic Volatile Organics
EPA 8020 Analyte List

Client:	Harding Lawson Associates	Analysis Method:	EPA 8260A
Project#:	47858.3	Prep Method:	EPA 5030
Location:	Oakland Airport,Taxiway 4		

Field ID:	SB-5	Sampled:	08/31/99
Lab ID:	141259-005	Received:	08/31/99
Matrix:	Soil	Extracted:	09/11/99
Batch#:	50533	Analyzed:	09/11/99
Units:	ug/Kg		
Diln Fac:	0.9434		

Analyte	Result	Reporting Limit
MTBE	ND	4.7
Benzene	ND	4.7
Toluene	ND	4.7
Ethylbenzene	ND	4.7
m,p-Xylenes	ND	4.7
o-Xylene	ND	4.7

Surrogate	%Recovery	Recovery Limits
1,2-Dichloroethane-d4	89	80-129
Toluene-d8	100	88-111
Bromofluorobenzene	98	76-128

Aromatic Volatile Organics
EPA 8020 Analyte List

Client:	Harding Lawson Associates	Analysis Method:	EPA 8260A
Project#:	47858.3	Prep Method:	EPA 5030
Location:	Oakland Airport, Taxiway 4		

Field ID:	SB-6	Sampled:	08/31/99
Lab ID:	141259-006	Received:	08/31/99
Matrix:	Soil	Extracted:	09/11/99
Batch#:	50533	Analyzed:	09/11/99
Units:	ug/Kg		
Diln Fac:	1.02		

Analyte	Result	Reporting Limit
MTBE	ND	5.1
Benzene	ND	5.1
Toluene	ND	5.1
Ethylbenzene	ND	5.1
m,p-Xylenes	ND	5.1
o-Xylene	ND	5.1

Surrogate	%Recovery	Recovery Limits
1,2-Dichloroethane-d4	90	80-129
Toluene-d8	100	88-111
Bromofluorobenzene	97	76-128

Aromatic Volatile Organics
EPA 8020 Analyte List

Client:	Harding Lawson Associates	Analysis Method:	EPA 8260A
Project#:	47858.3	Prep Method:	EPA 5030
Location:	Oakland Airport,Taxiway 4		

Field ID:	SB-7	Sampled:	08/31/99
Lab ID:	141259-007	Received:	08/31/99
Matrix:	Soil	Extracted:	09/11/99
Batch#:	50533	Analyzed:	09/11/99
Units:	ug/Kg		
Diln Fac:	0.9434		

Analyte	Result	Reporting Limit
MTBE	ND	4.7
Benzene	ND	4.7
Toluene	ND	4.7
Ethylbenzene	ND	4.7
m,p-Xylenes	ND	4.7
o-Xylene	ND	4.7

Surrogate	%Recovery	Recovery Limits
1,2-Dichloroethane-d4	88	80-129
Toluene-d8	100	88-111
Bromofluorobenzene	95	76-128

Aromatic Volatile Organics
EPA 8020 Analyte List

Client:	Harding Lawson Associates	Analysis Method:	EPA 8260A
Project#:	47858.3	Prep Method:	EPA 5030
Location:	Oakland Airport,Taxiway 4		

Field ID:	SB-8	Sampled:	08/31/99
Lab ID:	141259-008	Received:	08/31/99
Matrix:	Soil	Extracted:	09/11/99
Batch#:	50533	Analyzed:	09/11/99
Units:	ug/Kg		
Diln Fac:	1		

Analyte	Result	Reporting Limit
MTBE	ND	5.0
Benzene	ND	5.0
Toluene	ND	5.0
Ethylbenzene	ND	5.0
m,p-Xylenes	ND	5.0
o-Xylene	ND	5.0

Surrogate	%Recovery	Recovery Limits
1,2-Dichloroethane-d4	90	80-129
Toluene-d8	98	88-111
Bromofluorobenzene	96	76-128

Aromatic Volatile Organics
EPA 8020 Analyte List

Client:	Harding Lawson Associates	Analysis Method:	EPA 8260A
Project#:	47858.3	Prep Method:	EPA 5030
Location:	Oakland Airport,Taxiway 4		

Field ID:	CB-01	Sampled:	08/31/99
Lab ID:	141259-009	Received:	08/31/99
Matrix:	Soil	Extracted:	09/12/99
Batch#:	50533	Analyzed:	09/12/99
Units:	ug/Kg		
Diln Fac:	0.9434		

Analyte	Result	Reporting Limit
MTBE	ND	4.7
Benzene	ND	4.7
Toluene	ND	4.7
Ethylbenzene	ND	4.7
m,p-Xylenes	ND	4.7
o-Xylene	ND	4.7

Surrogate	%Recovery	Recovery Limits
1,2-Dichloroethane-d4	94	80-129
Toluene-d8	101	88-111
Bromofluorobenzene	98	76-128

Purgeable Aromatics by GC/MS
EPA 8020 Analyte List

Client: Harding Lawson Associates
Project#: 47858.3
Location: Oakland Airport,Taxiway 4

Analysis Method: EPA 8260A
Prep Method: EPA 5030

METHOD BLANK

Matrix: Soil
Batch#: 50513
Units: ug/Kg
Diln Fac: 1

Prep Date: 09/10/99
Analysis Date: 09/10/99

MB Lab ID: QC07335

Analyte	Result	Reporting Limit
MTBE	ND	5.0
Benzene	ND	5.0
Toluene	ND	5.0
Ethylbenzene	ND	5.0
m,p-Xylenes	ND	5.0
o-Xylene	ND	5.0

Surrogate	%Rec	Recovery Limits
1,2-Dichloroethane-d4	98	80-129
Toluene-d8	100	88-111
Bromofluorobenzene	99	76-128

Purgeable Aromatics by GC/MS
EPA 8020 Analyte List

Client: Harding Lawson Associates
Project#: 47858.3
Location: Oakland Airport,Taxiway 4

Analysis Method: EPA 8260A
Prep Method: EPA 5030

METHOD BLANK

Matrix: Soil
Batch#: 50513
Units: ug/Kg
Diln Fac: 1

Prep Date: 09/10/99
Analysis Date: 09/10/99

MB Lab ID: QC07336

Analyte	Result	Reporting Limit
MTBE	ND	5.0
Benzene	ND	5.0
Toluene	ND	5.0
Ethylbenzene	ND	5.0
m,p-Xylenes	ND	5.0
o-Xylene	ND	5.0

Surrogate	%Rec	Recovery Limits
1,2-Dichloroethane-d4	94	80-129
Toluene-d8	100	88-111
Bromofluorobenzene	94	76-128

Purgeable Aromatics by GC/MS
EPA 8020 Analyte List

Client:	Harding Lawson Associates	Analysis Method:	EPA 8260A
Project#:	47858.3	Prep Method:	EPA 5030
Location:	Oakland Airport,Taxiway 4		

METHOD BLANK

Matrix:	Soil	Prep Date:	09/11/99
Batch#:	50533	Analysis Date:	09/11/99
Units:	ug/Kg		
Diln Fac:	1		

MB Lab ID: QC07422

Analyte	Result	Reporting Limit
MTBE	ND	5.0
Benzene	ND	5.0
Toluene	ND	5.0
Ethylbenzene	ND	5.0
m,p-Xylenes	ND	5.0
o-Xylene	ND	5.0

Surrogate	%Rec	Recovery Limits
1,2-Dichloroethane-d4	92	80-129
Toluene-d8	97	88-111
Bromofluorobenzene	96	76-128

Purgeable Aromatics by GC/MS
EPA 8020 Analyte List

Client: Harding Lawson Associates
Project#: 47858.3
Location: Oakland Airport,Taxiway 4

Analysis Method: EPA 8260A
Prep Method: EPA 5030

METHOD BLANK

Matrix: Soil
Batch#: 50533
Units: ug/Kg
Diln Fac: 1

Prep Date: 09/11/99
Analysis Date: 09/11/99

MB Lab ID: QC07423

Analyte	Result	Reporting Limit
MTBE	ND	5.0
Benzene	ND	5.0
Toluene	ND	5.0
Ethylbenzene	ND	5.0
m,p-Xylenes	ND	5.0
o-Xylene	ND	5.0

Surrogate	%Rec	Recovery Limits
1,2-Dichloroethane-d4	92	80-129
Toluene-d8	101	88-111
Bromofluorobenzene	98	76-128

BATCH QC REPORT

Curtis & Tompkins, Ltd.

Purgeable Aromatics by GC/MS
EPA 8020 Analyte List

Client: Harding Lawson Associates
Project#: 47858.3
Location: Oakland Airport,Taxiway 4

Analysis Method: EPA 8260A
Prep Method: EPA 5030

LABORATORY CONTROL SAMPLE

Matrix: Soil
Batch#: 50513
Units: ug/Kg
Diln Fac: 1

Prep Date: 09/10/99
Analysis Date: 09/10/99

LCS Lab ID: QC07334

Analyte	Result	Spike Added	%Rec #	Limits
Benzene	49.05	50	98	74-127
Toluene	47.29	50	95	72-131

Surrogate	%Rec	Limits
1,2-Dichloroethane-d4	96	80-129
Toluene-d8	101	88-111
Bromofluorobenzene	96	76-128

Column to be used to flag recovery and RPD values with an asterisk
* Values outside of QC limits
Spike Recovery: 0 out of 2 outside limits

Purgeable Aromatics by GC/MS
EPA 8020 Analyte List

Client: Harding Lawson Associates
Project#: 47858.3
Location: Oakland Airport,Taxiway 4

Analysis Method: EPA 8260A
Prep Method: EPA 5030

LABORATORY CONTROL SAMPLE

Matrix: Soil
Batch#: 50533
Units: ug/Kg
Diln Fac: 1

Prep Date: 09/11/99
Analysis Date: 09/11/99

LCS Lab ID: QC07421

Analyte	Result	Spike Added	%Rec #	Limits
Benzene	52.11	50	104	74-127
Toluene	51.72	50	103	72-131

Surrogate	%Rec	Limits
1,2-Dichloroethane-d4	94	80-129
Toluene-d8	100	88-111
Bromofluorobenzene	95	76-128

Column to be used to flag recovery and RPD values with an asterisk
* Values outside of QC limits
Spike Recovery: 0 out of 2 outside limits

Purgeable Aromatics by GC/MS
EPA 8020 Analyte List

Client:	Harding Lawson Associates	Analysis Method:	EPA 8260A
Project#:	47858.3	Prep Method:	EPA 5030
Location:	Oakland Airport,Taxiway 4		

MATRIX SPIKE/MATRIX SPIKE DUPLICATE

Field ID:	ZZZZZZ	Sample Date:	09/03/99
Lab ID:	141383-001	Received Date:	09/08/99
Matrix:	Soil	Prep Date:	09/10/99
Batch#:	50513	Analysis Date:	09/10/99
Units:	ug/Kg		
Diln Fac:	0.9804		

MS Lab ID: QC07340

Analyte	Spike Added	Sample	MS	%Rec #	Limits
Benzene	49.02	<4.902	48.36	99	53-128
Toluene	49.02	<4.902	45.46	93	45-134

Surrogate	%Rec	Limits
1,2-Dichloroethane-d4	96	80-129
Toluene-d8	101	88-111
Bromofluorobenzene	99	76-128

MSD Lab ID: QC07415

Analyte	Spike Added	MSD	%Rec #	Limits	RPD #	Limit
Benzene	49.02	47.72	97	53-128	1	34
Toluene	49.02	44.46	91	45-134	2	44

Surrogate	%Rec	Limits
1,2-Dichloroethane-d4	96	80-129
Toluene-d8	101	88-111
Bromofluorobenzene	97	76-128

Column to be used to flag recovery and RPD values with an asterisk
* Values outside of QC limits
RPD: 0 out of 2 outside limits
Spike Recovery: 0 out of 4 outside limits

Purgeable Aromatics by GC/MS
EPA 8020 Analyte List

Client:	Harding Lawson Associates	Analysis Method:	EPA 8260A
Project#:	47858.3	Prep Method:	EPA 5030
Location:	Oakland Airport, Taxiway 4		

MATRIX SPIKE/MATRIX SPIKE DUPLICATE

Field ID:	SB-5	Sample Date:	08/31/99
Lab ID:	141259-005	Received Date:	08/31/99
Matrix:	Soil	Prep Date:	09/11/99
Batch#:	50533	Analysis Date:	09/11/99
Units:	ug/Kg		
Diln Fac:	0.9615		

MS Lab ID: QC07424

Analyte	Spike Added	Sample	MS	%Rec #	Limits
Benzene	48.08	<4.808	47.08	98	53-128
Toluene	48.08	<4.808	44.49	93	45-134

Surrogate	%Rec	Limits
1,2-Dichloroethane-d4	89	80-129
Toluene-d8	98	88-111
Bromofluorobenzene	95	76-128

MSD Lab ID: QC07425

Analyte	Spike Added	MSD	%Rec #	Limits	RPD #	Limit
Benzene	48.08	46.45	97	53-128	1	34
Toluene	48.08	45.14	94	45-134	1	44

Surrogate	%Rec	Limits
1,2-Dichloroethane-d4	90	80-129
Toluene-d8	100	88-111
Bromofluorobenzene	93	76-128

Column to be used to flag recovery and RPD values with an asterisk
* Values outside of QC limits
RPD: 0 out of 2 outside limits
Spike Recovery: 0 out of 4 outside limits

Polyaromatic Hydrocarbons by HPLC

Client:	Harding Lawson Associates	Analysis Method:	EPA 8310
Project#:	47858.3	Prep Method:	EPA 3550
Location:	Oakland Airport, Taxiway 4		

Field ID:	SB-4	Sampled:	08/31/99
Lab ID:	141259-004	Received:	08/31/99
Matrix:	Soil	Extracted:	09/24/99
Batch#:	50831	Analyzed:	09/27/99
Units:	ug/Kg		
Diln Fac:	20		

Analyte	Result	ppm	Reporting Limit
Naphthalene	8800	4.8	3300
Acenaphthylene	ND		6800
Acenaphthene	ND		680
Fluorene	1600	8.9	680
Phenanthrene	1600	11	330
Anthracene	510	2.8	330
Fluoranthene	2000	40	270
Pyrene	1700	85	130
Benzo(a)anthracene	800	1.3	66
Chrysene	610	13	66
Benzo(b)fluoranthene	510	1.3	130
Benzo(k)fluoranthene	300	1.3	66
Benzo(a)pyrene	620	.13	66
Dibenz(a,h)anthracene	ND		130
Benzo(g,h,i)perylene	320	27	130
Indeno(1,2,3-cd)pyrene	430	1.3	66

Surrogate	%Recovery	Recovery Limits
1-Methylnaphthalene (UV)	DO*	44-122
1-Methylnaphthalene (F)	DO*	22-149

* Values outside of QC limits
DO: Surrogate diluted out

EPA 8310 PAHs by HPLC

Client: Harding Lawson Associates
Project#: 47858.3
Location: Oakland Airport,Taxiway 4

Analysis Method: EPA 8310
Prep Method: EPA 3550

METHOD BLANK

Matrix: Soil
Batch#: 50831
Units: ug/Kg
Diln Fac: 1

Prep Date: 09/24/99
Analysis Date: 09/27/99

MB Lab ID: QC08537

Analyte	Result	Reporting Limit
Naphthalene	ND	170
Acenaphthylene	ND	340
Acenaphthene	ND	34
Fluorene	ND	34
Phenanthrene	ND	17
Anthracene	ND	17
Fluoranthene	ND	13
Pyrene	ND	6.7
Benzo(a)anthracene	ND	3.3
Chrysene	ND	3.3
Benzo(b)fluoranthene	ND	6.7
Benzo(k)fluoranthene	ND	3.3
Benzo(a)pyrene	ND	3.3
Dibenz(a,h)anthracene	ND	6.7
Benzo(g,h,i)perylene	ND	6.7
Indeno(1,2,3-cd)pyrene	ND	3.3

Surrogate	%Rec	Recovery Limits
1-Methylnaphthalene (UV)	81	44-122
1-Methylnaphthalene (F)	82	22-149

EPA 8310 PAHs by HPLC

Client: Harding Lawson Associates
Project#: 47858.3
Location: Oakland Airport, Taxiway 4

Analysis Method: EPA 8310
Prep Method: EPA 3550

LABORATORY CONTROL SAMPLE

Matrix: Soil
Batch#: 50831
Units: ug/Kg
Diln Fac: 1

Prep Date: 09/24/99
Analysis Date: 09/27/99

LCS Lab ID: QC08538

Analyte	Result	Spike Added	%Rec #	Limits
Naphthalene	293.1	334	87	37-125
Acenaphthylene	527.7	668	79	41-110
Acenaphthene	259	334	77	35-118
Fluorene	62.3	67	93	44-118
Phenanthrene	23.5	34	70	43-131
Anthracene	25.6	34	76	29-110
Benzo(k)fluoranthene	30.2	34	90	54-110
Indeno(1,2,3-cd)pyrene	30.6	34	91	16-140

Surrogate	%Rec	Limits
1-Methylnaphthalene (UV)	87	44-122
1-Methylnaphthalene (F)	82	22-149

Column to be used to flag recovery and RPD values with an asterisk
* Values outside of QC limits
Spike Recovery: 0 out of 8 outside limits

Curtis & Tompkins, Ltd., Analytical Laboratories, Since 1878
2323 Fifth Street, Berkeley, CA 94710, Phone (510) 486-0900, Fax (510) 486-0532

ANALYTICAL REPORT

Prepared for:

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

Date: 07-OCT-99
Lab Job Number: 141232
Project ID: 47858.3
Location: Oakland Airport,Taxiway 4

Reviewed by:

Reviewed by:

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

CHAIN OF CUSTODY FORM

№ 2363

14232

Lab: Curtis & Thompkins

Job Number: 47858.3

Name/Location: Oakland Airport, Taxiway 4

Project Manager: Jim McCarty

Samplers: Valerie Harris
Jim McCarty

Recorder: [signature] (Signature Required)

Source Code	Matrix: Water	Sediment	Soil	Oil	Unpres	H_2SO_4	HNO_3	HCL	Ice	Sample Number or Lab Number (Yr Wk Seq)	Date Yr	Mo	Day	Time	Station Description/Notes
	X				3	2	1	3		GW-1	99	08	31	1030	-1
	X				3	2	1	2		GW-2	99	08	31	1145	-2
	X				3	2	1	2		GW-3	99	08	31	1115	-3
	X			on	3	2	1	2		GW-4	99	08	31	1220	-4 — No HCl VOAs / H_2SO_4 only!
	X				3	2	1	3		GW-5	99	08	31	1550	-5
	X				3	2	1	2		GW-6	99	08	31	1400	-6
	X				3	2	1	2		GW-7	99	08	31	1500	-7
	X				3	2	1	2		GW-8	99	08	31	1530	-8

ANALYSIS REQUESTED

Sample	EPA 8010	EPA 8020	EPA 8260 (BTEX, MTBE only)	EPA 8270	METALS	EPA 8015M/TPHG	EPA 8020/BTEX	EPA 8015M/TPHd *	w/silica gel cleanup		Ferrous Iron	Total Iron	Nitrite (EPA 300.0)	Sulfate	Orthophosphates	Total Organic Carbon
GW-1			X			X		X			X	X	X	X	X	X
GW-2			X			X		X			X	X	X	X	X	X
GW-3			X			X		X			X	X	X	X	X	X
GW-4			X			X		X			X	X	X	X	X	X
GW-5			X			X		X			X	X	X	X	X	X
GW-6			X			X		X			X	X	X	X	X	X
GW-7			X			X		X			X	X	X	X	X	X
GW-8			X			X		X			X	X	X	X	X	X

Lab Number (Yr Wk Seq)	Depth in Feet	Col Mtd CD	QA Code	Miscellaneous
				* Analyze sample w/ highest diesel concentration for PAH's.

CHAIN OF CUSTODY RECORD

RELINQUISHED BY: (Signature) [signature]	RECEIVED BY: (Signature) [signature]	DATE/TIME 8/31/99
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) [signature]	DATE/TIME

METHOD OF SHIPMENT

SAMPLE CONDITION WHEN RECEIVED BY THE LABORATORY: O.K. Jow 9/3/99

Laboratory Copy White — Project Office Copy Yellow — Field or Office Copy Pink

TVH-Total Volatile Hydrocarbons

Client: Harding Lawson Associates
Project#: 47858.3
Location: Oakland Airport,Taxiway 4

Analysis Method: EPA 8015M
Prep Method: EPA 5030

Sample #	Client ID	Batch #	Sampled	Extracted	Analyzed	Moisture
141232-001	GW-1	50418	08/31/99	09/08/99	09/08/99	
141232-002	GW-2	50418	08/31/99	09/08/99	09/08/99	
141232-003	GW-3	50418	08/31/99	09/08/99	09/08/99	
141232-005	GW-5	50418	08/31/99	09/08/99	09/08/99	

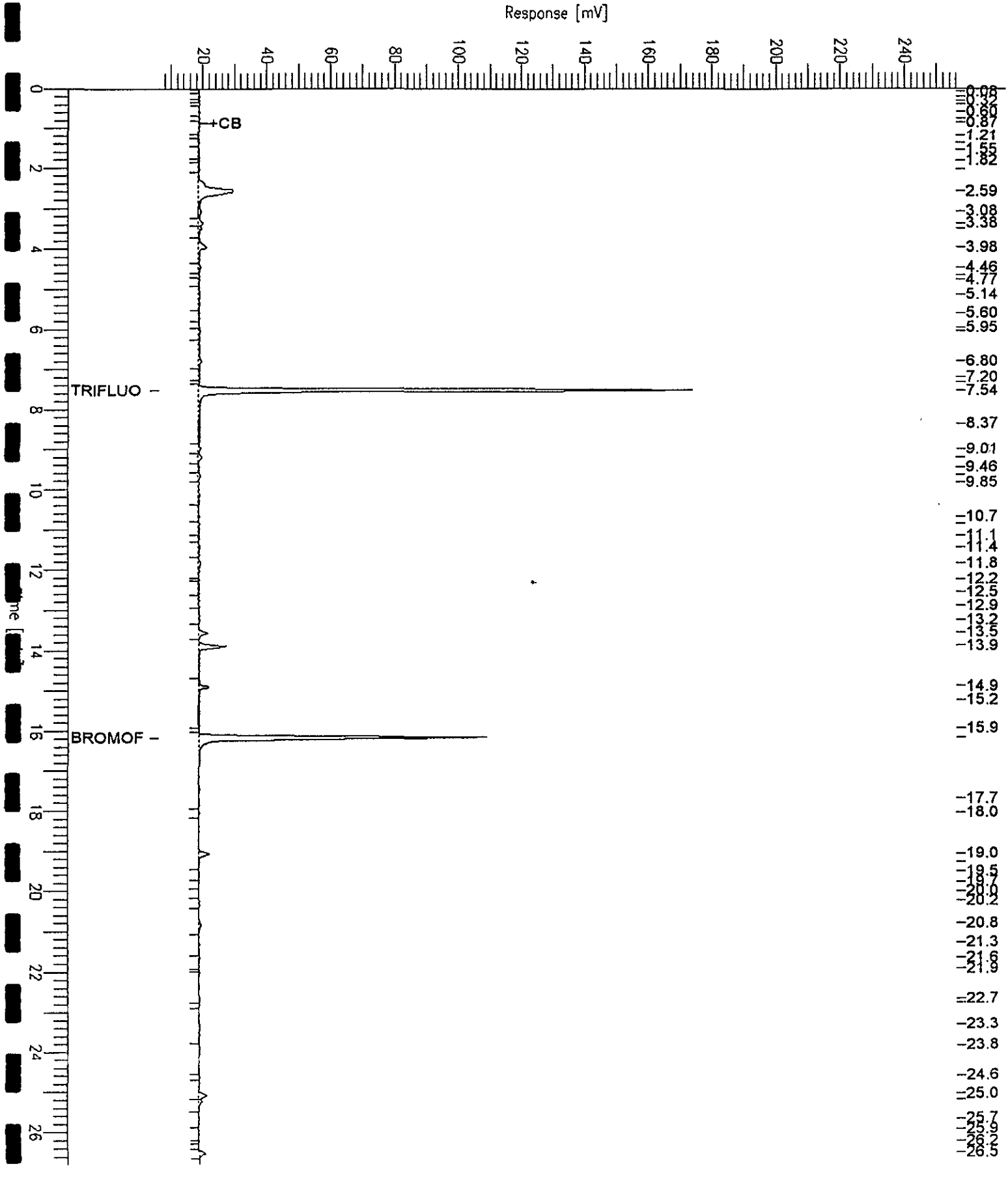
Matrix: Water

Analyte Diln Fac:	Units	141232-001 1	141232-002 1	141232-003 1	141232-005 1
Gasoline C7-C12	ug/L	59	300	<50	<50
Surrogate					
Trifluorotoluene	%REC	118	116	110	112
Bromofluorobenzene	%REC	116	122	108	109

GC19 TVH 'X' Data File (FID)

Sample Name : 141232-001,50418,TVH ONLY
FileName : G:\GC19\DATA\250X020.raw
thod : TVHBTXE
art Time : 0.00 min End Time : 26.80 min
ale Factor: -1.0 Plot Offset: 6 mV

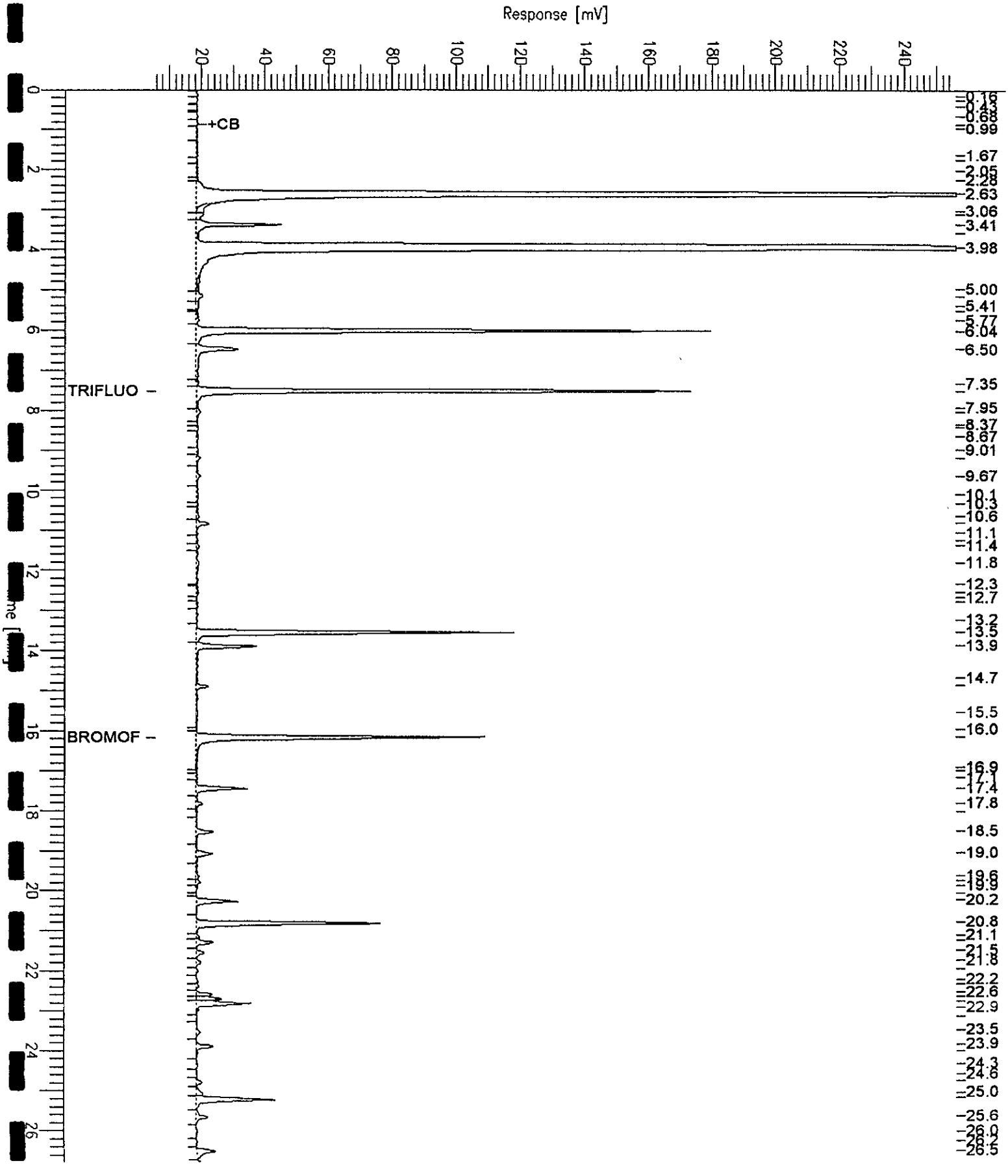
Sample #: Page 1 of 1
Date : 9/8/99 08:43 AM
Time of Injection: 9/8/99 06:03 AM
Low Point : 6.10 mV High Point : 256.10 mV
Plot Scale: 250.0 mV



GC19 TVH 'X' Data File (FID)

Sample Name : 141232-002,50418,TVH ONLY
FileName : G:\GC19\DATA\250X019.raw
Method : TVHBTXE
Start Time : 0.00 min End Time : 26.80 min
Scale Factor: -1.0 Plot Offset: 6 mV

Sample #: Page 1 of 1
Date : 9/8/99 08:43 AM
Time of Injection: 9/8/99 05:24 AM
Low Point : 5.90 mV High Point : 255.90 mV
Plot Scale: 250.0 mV



TVH-Total Volatile Hydrocarbons

Client: Harding Lawson Associates
Project#: 47858.3
Location: Oakland Airport,Taxiway 4

Analysis Method: EPA 8015M
Prep Method: EPA 5030

Sample #	Client ID	Batch #	Sampled	Extracted	Analyzed	Moisture
141232-006	GW-6	50418	08/31/99	09/08/99	09/08/99	
141232-007	GW-7	50481	08/31/99	09/10/99	09/10/99	
141232-008	GW-8	50418	08/31/99	09/08/99	09/08/99	

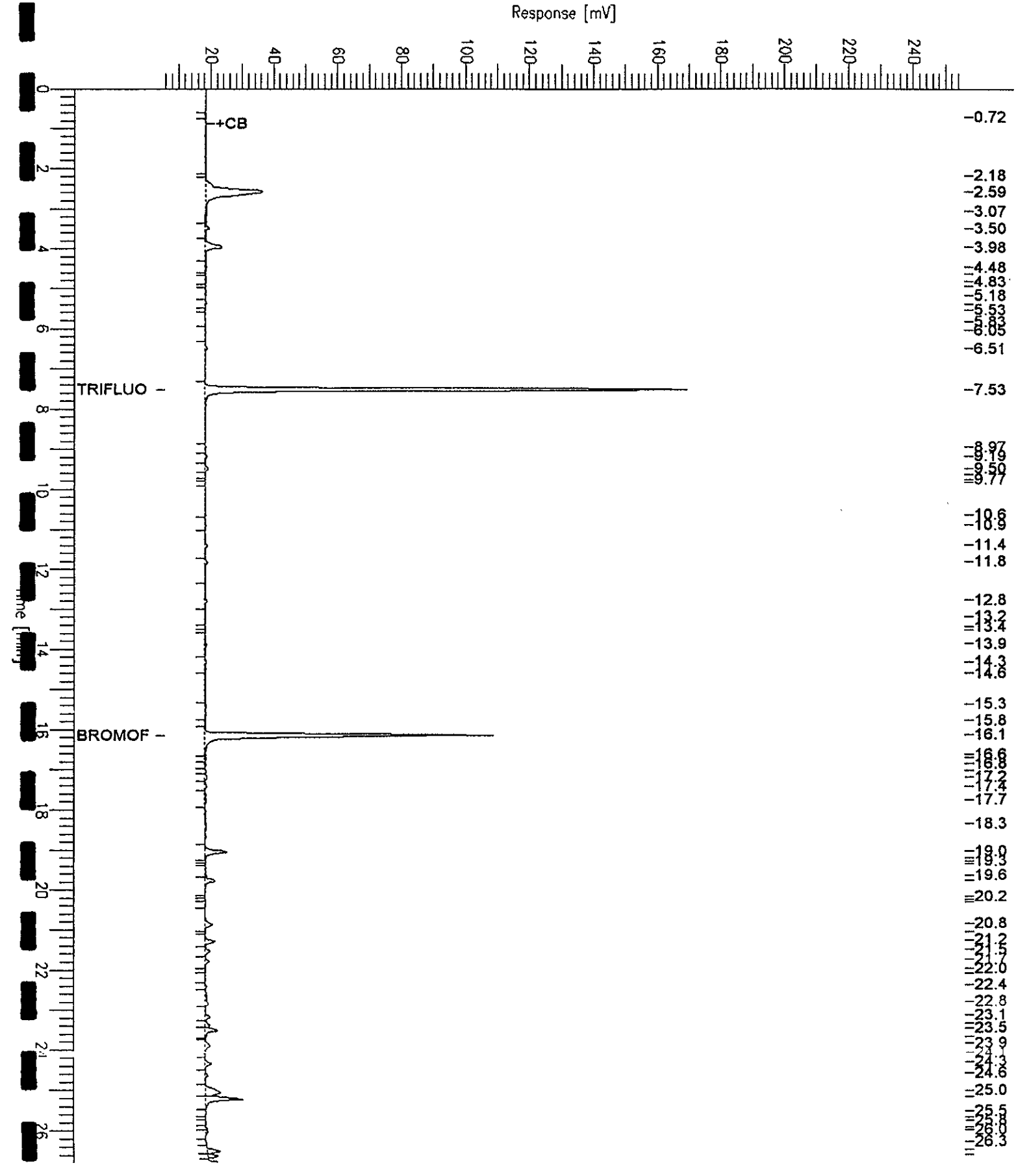
Matrix: Water

Analyte	Units	141232-006	141232-007	141232-008
Diln Fac:		1	1	1
Gasoline C7-C12	ug/L	<50	<50	83
Surrogate				
Trifluorotoluene	%REC	113	88	115
Bromofluorobenzene	%REC	114	92	113

GC19 TVH 'X' Data File (FID)

Sample Name : 141232-008,50418,TVH ONLY
FileName : G:\GC19\DATA\250X016.raw
Method : TVHBTXE
Start Time : 0.00 min End Time : 26.80 min
Scale Factor: -1.0 Plot Offset: 6 mV

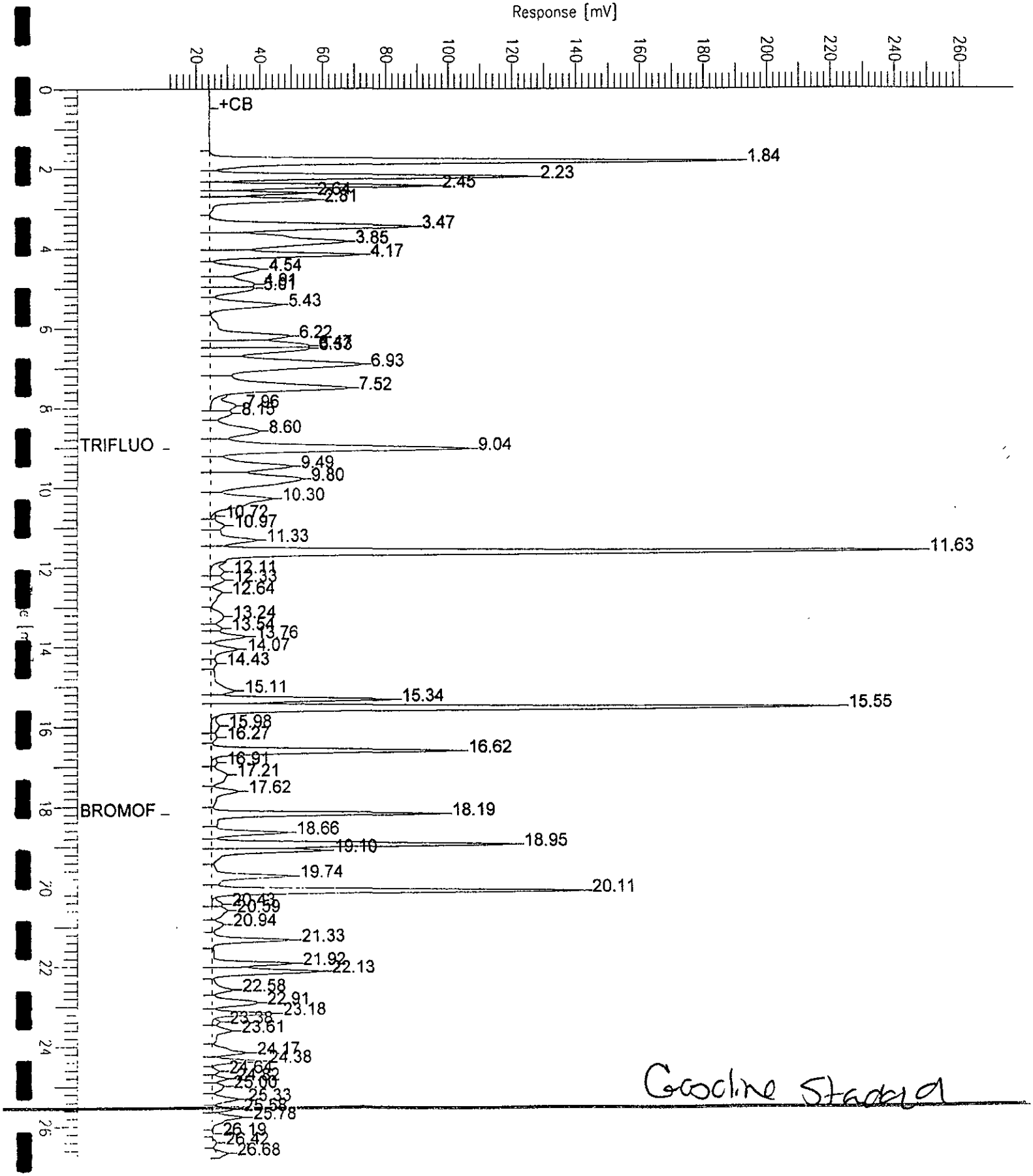
Sample #: Page 1 of 1
Date : 9/8/99 08:42 AM
Time of Injection: 9/8/99 03:28 AM
Low Point : 5.70 mV High Point : 255.70 mV
Plot Scale: 250.0 mV



Chromatogram

mple Name : CCV/LCS,QC07215,99WS8047,50481
FileName : G:\GC05\DATA\252G001.raw
Method : TVHBTXE
art Time : 0.00 min End Time : 26.80 min
ale Factor: -1.0 Plot Offset: 12 mV

Sample #: GAS Page 1 of 1
Date : 9/9/99 01:42 PM
Time of Injection: 9/9/99 01:15 PM
Low Point : 11.66 mV High Point : 261.66 mV
Plot Scale: 250.0 mV



Gasoline Standard

TVH-Total Volatile Hydrocarbons

Client:	Harding Lawson Associates	Analysis Method:	EPA 8015M
Project#:	47858.3	Prep Method:	EPA 5030
Location:	Oakland Airport,Taxiway 4		

METHOD BLANK

Matrix:	Water	Prep Date:	09/07/99
Batch#:	50418	Analysis Date:	09/07/99
Units:	ug/L		
Diln Fac:	1		

MB Lab ID: QC06976

Analyte	Result
Gasoline C7-C12	<50

Surrogate	%Rec	Recovery Limits
Trifluorotoluene	101	53-150
Bromofluorobenzene	97	53-149

TVH-Total Volatile Hydrocarbons

Client:	Harding Lawson Associates	Analysis Method:	EPA 8015M
Project#:	47858.3	Prep Method:	EPA 5030
Location:	Oakland Airport,Taxiway 4		

METHOD BLANK

Matrix:	Water	Prep Date:	09/09/99
Batch#:	50481	Analysis Date:	09/09/99
Units:	ug/L		
Diln Fac:	1		

MB Lab ID: QC07217

Analyte	Result
Gasoline C7-C12	<50

Surrogate	%Rec	Recovery Limits
Trifluorotoluene	76	53-150
Bromofluorobenzene	72	53-149

Lab #: 141232

BATCH QC REPORT

Curtis & Tompkins, Ltd.

TVH-Total Volatile Hydrocarbons

Client: Harding Lawson Associates
Project#: 47858.3
Location: Oakland Airport,Taxiway 4

Analysis Method: EPA 8015M
Prep Method: EPA 5030

LABORATORY CONTROL SAMPLE

Matrix: Water
Batch#: 50418
Units: ug/L
Diln Fac: 1

Prep Date: 09/07/99
Analysis Date: 09/07/99

LCS Lab ID: QC06973

Analyte	Result	Spike Added	%Rec #	Limits
Gasoline C7-C12	1973	2000	99	77-117

Surrogate	%Rec	Limits
Trifluorotoluene	114	53-150
Bromofluorobenzene	123	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

TVH-Total Volatile Hydrocarbons

Client: Harding Lawson Associates
Project#: 47858.3
Location: Oakland Airport,Taxiway 4

Analysis Method: EPA 8015M
Prep Method: EPA 5030

LABORATORY CONTROL SAMPLE

Matrix: Water
Batch#: 50481
Units: ug/L
Diln Fac: 1

Prep Date: 09/09/99
Analysis Date: 09/09/99

LCS Lab ID: QC07215

Analyte	Result	Spike Added	%Rec #	Limits
Gasoline C7-C12	2011	2000	101	77-117

Surrogate	%Rec	Limits
Trifluorotoluene	102	53-150
Bromofluorobenzene	87	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

Lab #: 141232

BATCH QC REPORT

Curtis & Tompkins, Ltd.

TVH-Total Volatile Hydrocarbons

Client: Harding Lawson Associates
Project#: 47858.3
Location: Oakland Airport,Taxiway 4

Analysis Method: EPA 8015M
Prep Method: EPA 5030

MATRIX SPIKE/MATRIX SPIKE DUPLICATE

Field ID: GW-6
Lab ID: 141232-006
Matrix: Water
Batch#: 50418
Units: ug/L
Diln Fac: 1

Sample Date: 08/31/99
Received Date: 08/31/99
Prep Date: 09/08/99
Analysis Date: 09/08/99

MS Lab ID: QC06977

Analyte	Spike Added	Sample	MS	%Rec #	Limits
Gasoline C7-C12	2000	<50	2070	103	69-131

Surrogate	%Rec	Limits
Trifluorotoluene	122	53-150
Bromofluorobenzene	132	53-149

MSD Lab ID: QC06978

Analyte	Spike Added	MSD	%Rec #	Limits	RPD #	Limit
Gasoline C7-C12	2000	2058	103	69-131	1	13

Surrogate	%Rec	Limits
Trifluorotoluene	119	53-150
Bromofluorobenzene	129	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

TVH-Total Volatile Hydrocarbons

Client: Harding Lawson Associates
Project#: 47858.3
Location: Oakland Airport,Taxiway 4

Analysis Method: EPA 8015M
Prep Method: EPA 5030

MATRIX SPIKE/MATRIX SPIKE DUPLICATE

Field ID: ZZZZZZ
Lab ID: 141271-001
Matrix: Water
Batch#: 50481
Units: ug/L
Diln Fac: 1

Sample Date: 09/02/99
Received Date: 09/02/99
Prep Date: 09/10/99
Analysis Date: 09/10/99

MS Lab ID: QC07218

Analyte	Spike Added	Sample	MS	%Rec #	Limits
Gasoline C7-C12	2000	<50	1885	94	69-131

Surrogate	%Rec	Limits
Trifluorotoluene	105	53-150
Bromofluorobenzene	93	53-149

MSD Lab ID: QC07219

Analyte	Spike Added	MSD	%Rec #	Limits	RPD #	Limit
Gasoline C7-C12	2000	1934	97	69-131	3	13

Surrogate	%Rec	Limits
Trifluorotoluene	107	53-150
Bromofluorobenzene	94	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

TEH-Tot Ext Hydrocarbons

Client: Harding Lawson Associates
Project#: 47858.3
Location: Oakland Airport,Taxiway 4

Analysis Method: EPA 8015M
Prep Method: EPA 3520

Sample #	Client ID	Batch #	Sampled	Extracted	Analyzed	Moisture
141232-001	GW-1	50364	08/31/99	09/02/99	09/05/99	
141232-002	GW-2	50364	08/31/99	09/02/99	09/05/99	
141232-003	GW-3	50364	08/31/99	09/02/99	09/05/99	
141232-004	GW-4	50364	08/31/99	09/02/99	09/05/99	

Matrix: Water

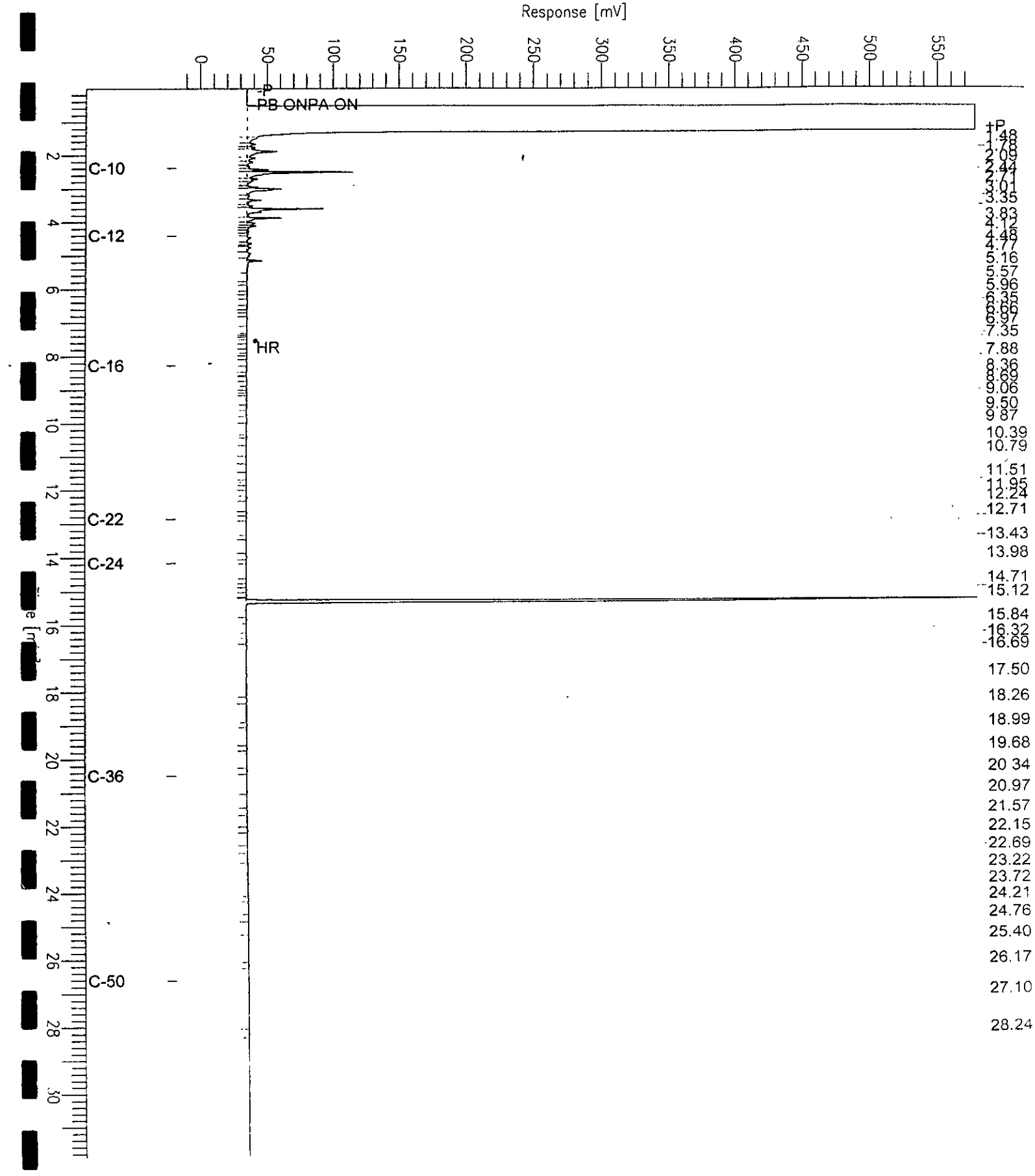
Analyte	Units	141232-001	141232-002	141232-003	141232-004
Diln Fac:		1	1	1	1
Diesel C10-C24	ug/L	<50	80 YL	<50	380 YL
Surrogate					
Hexacosane	%REC	65	83	82	79

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

Chromatogram

[redacted]ample Name : 141232-002sg,50364
FileName : C:\GC15\CHB\247B010.RAW
Method : BTEH244.MTH
[redacted]tart Time : 0.01 min End Time : 31.91 min
[redacted]cale Factor: 0.0 Plot Offset: -17 mV

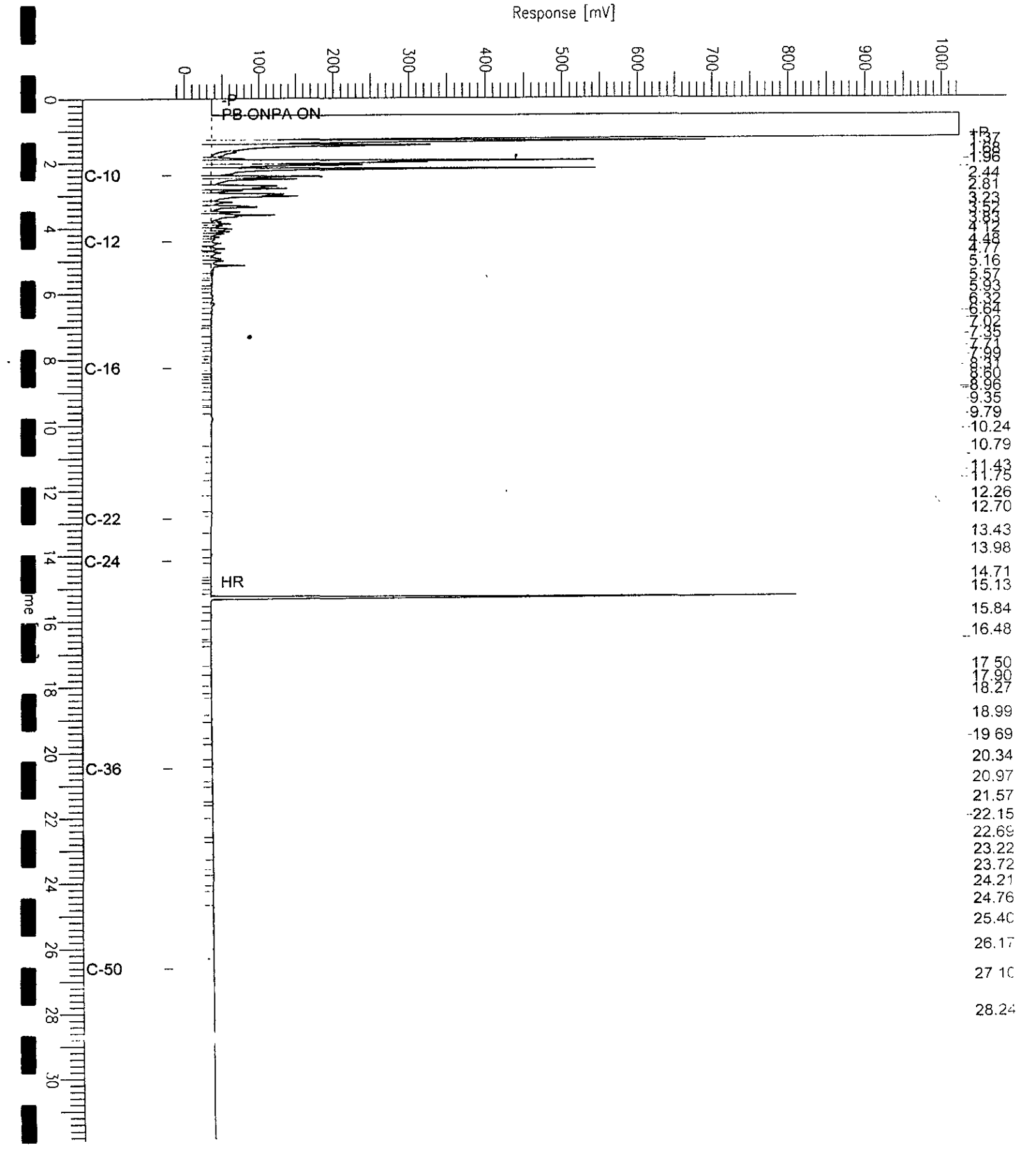
Sample #: 50364 Page 1 of 1
Date : 9/6/99 06:40 PM
Time of Injection: 9/5/99 03:17 AM
Low Point : -17.47 mV High Point : 577.63 mV
Plot Scale: 595.1 mV



Chromatogram

Sample Name : 141232-004sg,50364
FileName : C:\GC15\CHB\247B012.RAW
Method : BTEH244.MTH
Start Time : 0.00 min End Time : 31.90 min
Scale Factor: 0.0 Plot Offset: -16 mV

Sample #: 50364 Page 1 of 1
Date : 9/6/99 06:41 PM
Time of Injection: 9/5/99 04:43 AM
Low Point : -15.87 mV High Point : 1024.00 mV
Plot Scale: 1039.9 mV



TEH-Tot Ext Hydrocarbons

Client: Harding Lawson Associates
Project#: 47858.3
Location: Oakland Airport,Taxiway 4

Analysis Method: EPA 8015M
Prep Method: EPA 3520

Sample #	Client ID	Batch #	Sampled	Extracted	Analyzed	Moisture
141232-005	GW-5	50364	08/31/99	09/02/99	09/05/99	
141232-006	GW-6	50364	08/31/99	09/02/99	09/05/99	
141232-007	GW-7	50364	08/31/99	09/02/99	09/05/99	
141232-008	GW-8	50364	08/31/99	09/02/99	09/05/99	

Matrix: Water

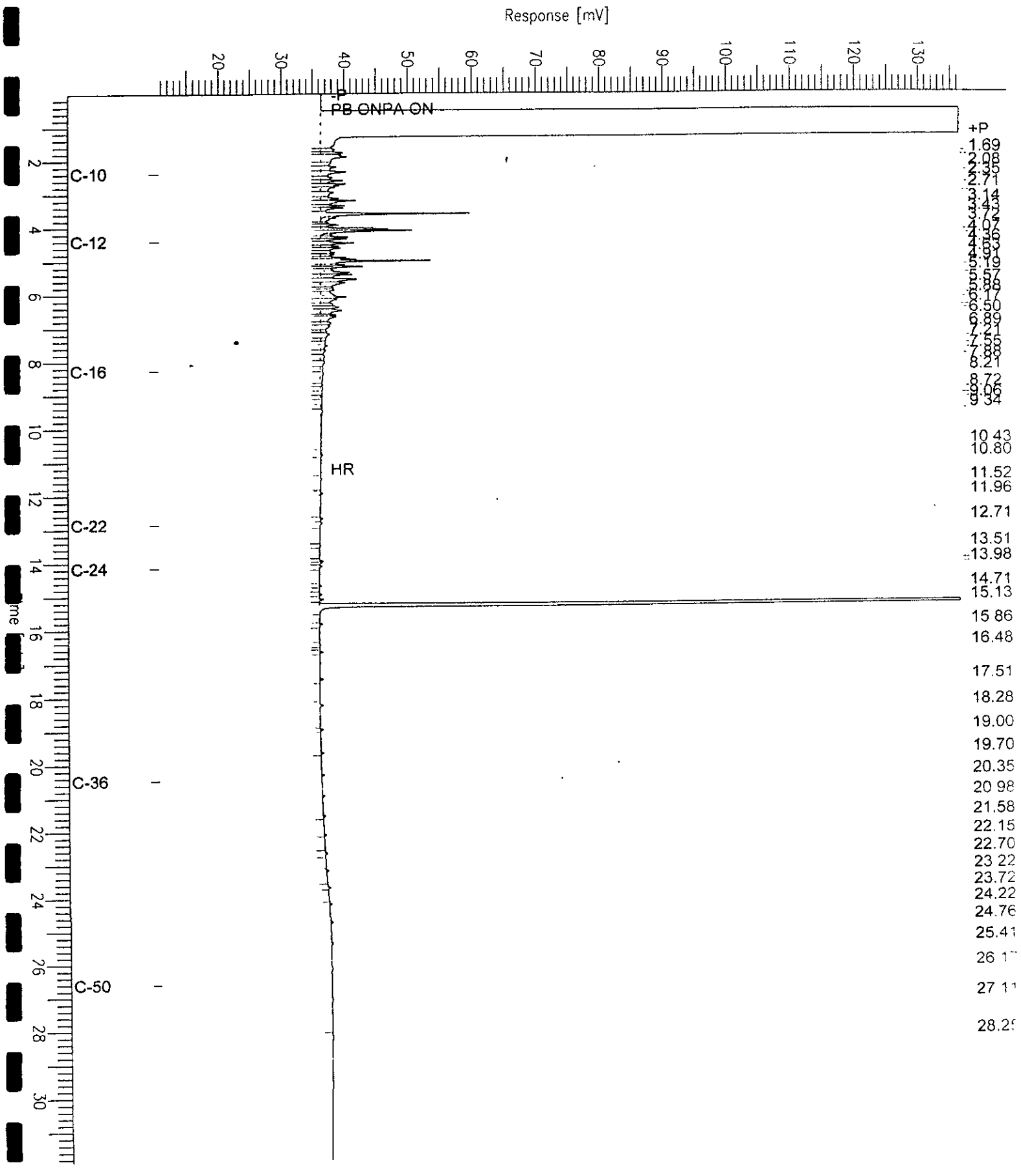
Analyte	Units	141232-005	141232-006	141232-007	141232-008
Diln Fac:		1	1	1	1
Diesel C10-C24	ug/L	<50	<50	<50	72 YL
Surrogate					
Hexacosane	%REC	83	85	79	80

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

Chromatogram

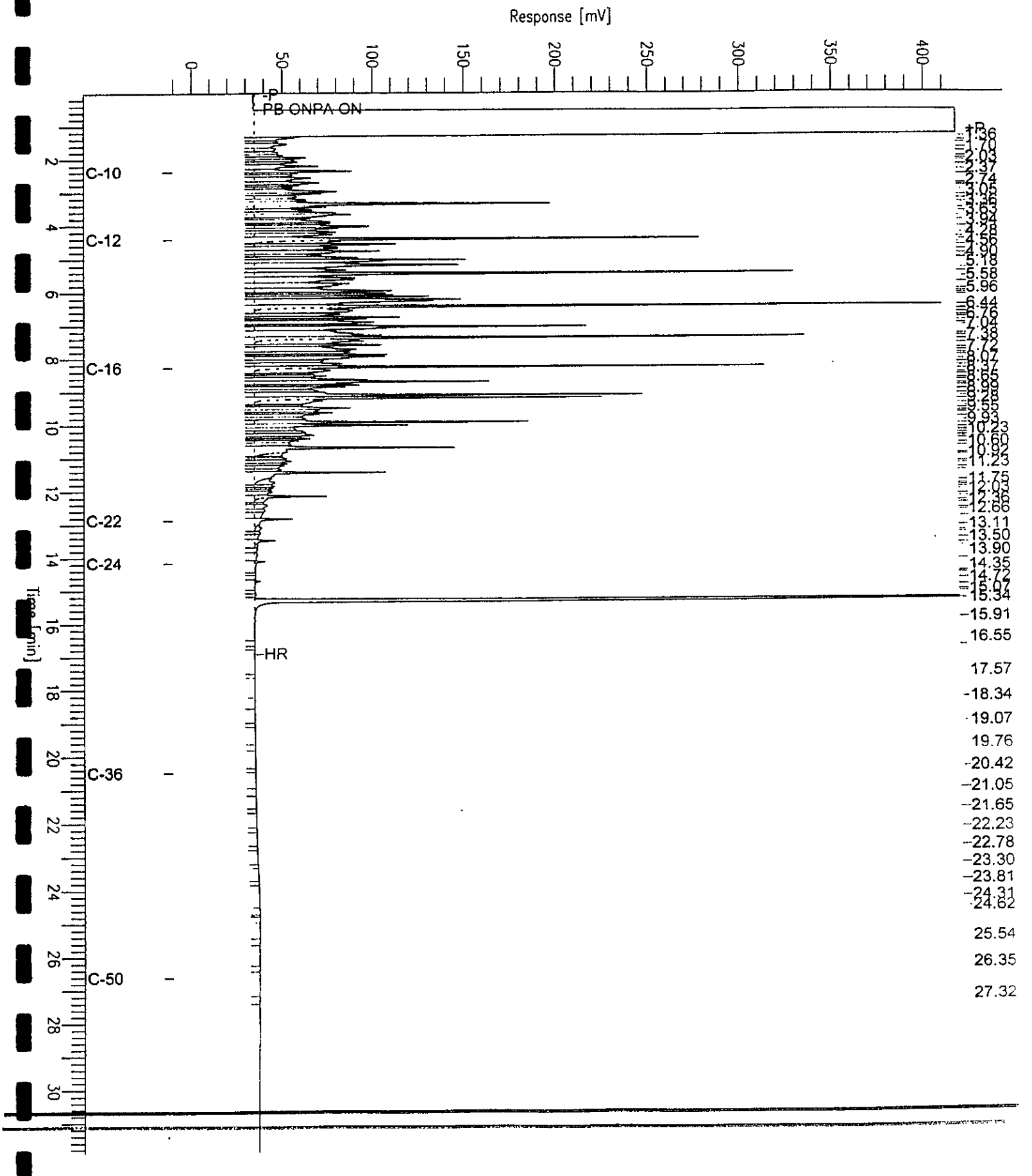
Sample Name : 141232-008sg,50364
FileName : C:\GC15\CHB\247B019.RAW
Method : BTEH244.MTH
Start Time : 0.01 min End Time : 31.91 min
Scale Factor: 0.0 Plot Offset: 11 mV

Sample #: 50364 Page 1 of 1
Date : 9/6/99 06:45 PM
Time of Injection: 9/5/99 09:45 AM
Low Point : 10.66 mV High Point : 136.37 mV
Plot Scale: 125.7 mV



Sample Name : ccv,99ws8004,dsl
FileName : C:\GC15\CHB\247B028.RAW
Method : BTEH244.MTH
Start Time : 0.01 min End Time : 31.91 min
Scale Factor: 0.0 Plot Offset: -10 mV

Sample #: 500mg/l
Date : 9/6/99 06:46 PM
Time of Injection: 9/5/99 04:12 PM
Low Point : -10.19 mV High Point : 417.20 mV
Plot Scale: 427.4 mV



TEH-Tot Ext Hydrocarbons

Client:	Harding Lawson Associates	Analysis Method:	EPA 8015M
Project#:	47858.3	Prep Method:	EPA 3520
Location:	Oakland Airport,Taxiway 4		

METHOD BLANK

Matrix:	Water	Prep Date:	09/02/99
Batch#:	50364	Analysis Date:	09/04/99
Units:	ug/L		
Diln Fac:	1		

MB Lab ID: QC06752

Analyte	Result	
Diesel C10-C24	<50	
Surrogate	**%Rec**	**Recovery Limits**
Hexacosane	87	58-128

TEH-Tot Ext Hydrocarbons

Client: Harding Lawson Associates
Project#: 47858.3
Location: Oakland Airport,Taxiway 4

Analysis Method: EPA 8015M
Prep Method: EPA 3520

BLANK SPIKE/BLANK SPIKE DUPLICATE

Matrix: Water
Batch#: 50364
Units: ug/L
Diln Fac: 1

Prep Date: 09/02/99
Analysis Date: 09/10/99

BS Lab ID: QC06753

Analyte	Spike Added	BS	%Rec	#	Limits
Diesel C10-C24	2475	1807	73		50-114
Surrogate	**%Rec**	**Limits**			
Hexacosane	94	58-128			

BSD Lab ID: QC06754

Analyte	Spike Added	BSD	%Rec	#	Limits	RPD	#	Limit
Diesel C10-C24	2475	1794	72		50-114	1		25
Surrogate	**%Rec**	**Limits**						
Hexacosane	88	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

Volatile Organics by GC/MS

Client:	Harding Lawson Associates	Analysis Method:	EPA 8260
Project#:	47858.3	Prep Method:	EPA 5030
Location:	Oakland Airport,Taxiway 4		

Field ID:	GW-1	Sampled:	08/31/99
Lab ID:	141232-001	Received:	08/31/99
Matrix:	Water	Extracted:	09/02/99
Batch#:	50352	Analyzed:	09/02/99
Units:	ug/L		
Diln Fac:	1		

Analyte	Result	Reporting Limit
MTBE	ND	5.0
Benzene	ND	5.0
Toluene	ND	5.0
Ethylbenzene	ND	5.0
m,p-Xylenes	3.5 J	5.0
o-Xylene	ND	5.0

Surrogate	%Recovery	Recovery Limits
1,2-Dichloroethane-d4	108	76-127
Toluene-d8	97	90-109
Bromofluorobenzene	103	82-118

J: Estimated Value

Volatile Organics by GC/MS

Client:	Harding Lawson Associates	Analysis Method:	EPA 8260
Project#:	47858.3	Prep Method:	EPA 5030
Location:	Oakland Airport,Taxiway 4		

Field ID:	GW-2	Sampled:	08/31/99
Lab ID:	141232-002	Received:	08/31/99
Matrix:	Water	Extracted:	09/03/99
Batch#:	50373	Analyzed:	09/03/99
Units:	ug/L		
Diln Fac:	12.5		

Analyte	Result	Reporting Limit
MTBE	2000	63
Benzene	63	63
Toluene	ND	63
Ethylbenzene	43 J	63
m,p-Xylenes	ND	63
o-Xylene	ND	63

Surrogate	%Recovery	Recovery Limits
1,2-Dichloroethane-d4	102	76-127
Toluene-d8	101	90-109
Bromofluorobenzene	95	82-118

J: Estimated Value

Volatile Organics by GC/MS

Client:	Harding Lawson Associates	Analysis Method:	EPA 8260
Project#:	47858.3	Prep Method:	EPA 5030
Location:	Oakland Airport,Taxiway 4		

Field ID:	GW-3	Sampled:	08/31/99
Lab ID:	141232-003	Received:	08/31/99
Matrix:	Water	Extracted:	09/02/99
Batch#:	50352	Analyzed:	09/02/99
Units:	ug/L		
Diln Fac:	1		

Analyte	Result	Reporting Limit
MTBE	3.5 J	5.0
Benzene	ND	5.0
Toluene	ND	5.0
Ethylbenzene	ND	5.0
m,p-Xylenes	ND	5.0
o-Xylene	ND	5.0

Surrogate	%Recovery	Recovery Limits
1,2-Dichloroethane-d4	105	76-127
Toluene-d8	98	90-109
Bromofluorobenzene	102	82-118

J: Estimated Value

Volatile Organics by GC/MS

Client:	Harding Lawson Associates	Analysis Method:	EPA 8260
Project#:	47858.3	Prep Method:	EPA 5030
Location:	Oakland Airport,Taxiway 4		

Field ID:	GW-4	Sampled:	08/31/99
Lab ID:	141232-004	Received:	08/31/99
Matrix:	Water	Extracted:	09/02/99
Batch#:	50352	Analyzed:	09/02/99
Units:	ug/L		
Diln Fac:	25		

Analyte	Result	Reporting Limit
MTBE	4500	130
Benzene	ND	130
Toluene	ND	130
Ethylbenzene	ND	130
m,p-Xylenes	340	130
o-Xylene	100 J	130

Surrogate	%Recovery	Recovery Limits
1,2-Dichloroethane-d4	111	76-127
Toluene-d8	100	90-109
Bromofluorobenzene	103	82-118

J: Estimated Value

Volatile Organics by GC/MS

Client:	Harding Lawson Associates	Analysis Method:	EPA 8260
Project#:	47858.3	Prep Method:	EPA 5030
Location:	Oakland Airport,Taxiway 4		

Field ID:	GW-5	Sampled:	08/31/99
Lab ID:	141232-005	Received:	08/31/99
Matrix:	Water	Extracted:	09/03/99
Batch#:	50352	Analyzed:	09/03/99
Units:	ug/L		
Diln Fac:	1		

Analyte	Result	Reporting Limit
MTBE	ND	5.0
Benzene	ND	5.0
Toluene	ND	5.0
Ethylbenzene	ND	5.0
m,p-Xylenes	ND	5.0
o-Xylene	ND	5.0

Surrogate	%Recovery	Recovery Limits
1,2-Dichloroethane-d4	120	76-127
Toluene-d8	99	90-109
Bromofluorobenzene	100	82-118

Volatile Organics by GC/MS

Client:	Harding Lawson Associates	Analysis Method:	EPA 8260
Project#:	47858.3	Prep Method:	EPA 5030
Location:	Oakland Airport,Taxiway 4		

Field ID:	GW-6	Sampled:	08/31/99
Lab ID:	141232-006	Received:	08/31/99
Matrix:	Water	Extracted:	09/03/99
Batch#:	50352	Analyzed:	09/03/99
Units:	ug/L		
Diln Fac:	1		

Analyte	Result	Reporting Limit
MTBE	ND	5.0
Benzene	ND	5.0
Toluene	ND	5.0
Ethylbenzene	ND	5.0
m,p-Xylenes	ND	5.0
o-Xylene	ND	5.0

Surrogate	%Recovery	Recovery Limits
1,2-Dichloroethane-d4	116	76-127
Toluene-d8	100	90-109
Bromofluorobenzene	104	82-118

Volatile Organics by GC/MS

Client:	Harding Lawson Associates	Analysis Method:	EPA 8260
Project#:	47858.3	Prep Method:	EPA 5030
Location:	Oakland Airport,Taxiway 4		

Field ID:	GW-7	Sampled:	08/31/99
Lab ID:	141232-007	Received:	08/31/99
Matrix:	Water	Extracted:	09/03/99
Batch#:	50352	Analyzed:	09/03/99
Units:	ug/L		
Diln Fac:	1		

Analyte	Result	Reporting Limit
MTBE	ND	5.0
Benzene	ND	5.0
Toluene	ND	5.0
Ethylbenzene	ND	5.0
m,p-Xylenes	ND	5.0
o-Xylene	ND	5.0

Surrogate	%Recovery	Recovery Limits
1,2-Dichloroethane-d4	122	76-127
Toluene-d8	99	90-109
Bromofluorobenzene	101	82-118

Volatile Organics by GC/MS

Client:	Harding Lawson Associates	Analysis Method:	EPA 8260
Project#:	47858.3	Prep Method:	EPA 5030
Location:	Oakland Airport,Taxiway 4		

Field ID:	GW-8	Sampled:	08/31/99
Lab ID:	141232-008	Received:	08/31/99
Matrix:	Water	Extracted:	09/03/99
Batch#:	50373	Analyzed:	09/03/99
Units:	ug/L		
Diln Fac:	1		

Analyte	Result	Reporting Limit
MTBE	8.3	5.0
Benzene	ND	5.0
Toluene	ND	5.0
Ethylbenzene	ND	5.0
m,p-Xylenes	ND	5.0
o-Xylene	ND	5.0

Surrogate	%Recovery	Recovery Limits
1,2-Dichloroethane-d4	101	76-127
Toluene-d8	101	90-109
Bromofluorobenzene	96	82-118

EPA 8260 Volatile Organics

Client: Harding Lawson Associates
Project#: 47858.3
Location: Oakland Airport,Taxiway 4

Analysis Method: EPA 8260A
Prep Method: EPA 5030

METHOD BLANK

Matrix: Water
Batch#: 50373
Units: ug/L
Diln Fac: 1

Prep Date: 09/03/99
Analysis Date: 09/03/99

MB Lab ID: QC06791

Analyte	Result	Reporting Limit
MTBE	ND	0.5
Benzene	ND	0.5
Toluene	ND	0.5
Ethylbenzene	ND	0.5
m,p-Xylenes	ND	0.5
o-Xylene	ND	0.5

Surrogate	%Rec	Recovery Limits
1,2-Dichloroethane-d4	103	76-127
Toluene-d8	99	90-109
Bromofluorobenzene	97	82-118

EPA 8260 Volatile Organics

Client: Harding Lawson Associates
Project#: 47858.3
Location: Oakland Airport, Taxiway 4

Analysis Method: EPA 8260A
Prep Method: EPA 5030

METHOD BLANK

Matrix: Water
Batch#: 50352
Units: ug/L
Diln Fac: 1

Prep Date: 09/02/99
Analysis Date: 09/02/99

MB Lab ID: QC06697

Analyte	Result	Reporting Limit
MTBE	ND	0.5
Benzene	ND	0.5
Toluene	ND	0.5
Ethylbenzene	ND	0.5
m,p-Xylenes	ND	0.5
o-Xylene	ND	0.5

Surrogate	%Rec	Recovery Limits
1,2-Dichloroethane-d4	104	76-127
Toluene-d8	99	90-109
Bromofluorobenzene	103	82-118

EPA 8260 Volatile Organics

Client: Harding Lawson Associates
Project#: 47858.3
Location: Oakland Airport,Taxiway 4

Analysis Method: EPA 8260
Prep Method: EPA 5030

BLANK SPIKE/BLANK SPIKE DUPLICATE

Matrix: Water
Batch#: 50373
Units: ug/L
Diln Fac: 1

Prep Date: 09/03/99
Analysis Date: 09/03/99

BS Lab ID: QC06788

Analyte	Spike Added	BS	%Rec #	Limits
Benzene	50	48.78	98	71-127
Toluene	50	50.39	101	73-129

Surrogate	%Rec	Limits
1,2-Dichloroethane-d4	100	76-127
Toluene-d8	100	90-109
Bromofluorobenzene	97	82-118

BSD Lab ID: QC06789

Analyte	Spike Added	BSD	%Rec #	Limits	RPD #	Limit
Benzene	50	50.34	101	71-127	3	10
Toluene	50	51.75	103	73-129	3	10

Surrogate	%Rec	Limits
1,2-Dichloroethane-d4	99	76-127
Toluene-d8	102	90-109
Bromofluorobenzene	97	82-118

Column to be used to flag recovery and RPD values with an asterisk
* Values outside of QC limits
RPD: 0 out of 2 outside limits
Spike Recovery: 0 out of 4 outside limits

EPA 8260 Volatile Organics

Client: Harding Lawson Associates
Project#: 47858.3
Location: Oakland Airport,Taxiway 4

Analysis Method: EPA 8260
Prep Method: EPA 5030

BLANK SPIKE/BLANK SPIKE DUPLICATE

Matrix: Water
Batch#: 50352
Units: ug/L
Diln Fac: 1

Prep Date: 09/02/99
Analysis Date: 09/02/99

BS Lab ID: QC06695

Analyte	Spike Added	BS	%Rec #	Limits
Benzene	50	48.84	98	71-127
Toluene	50	47.74	95	73-129

Surrogate	%Rec	Limits
1,2-Dichloroethane-d4	103	76-127
Toluene-d8	98	90-109
Bromofluorobenzene	101	82-118

BSD Lab ID: QC06696

Analyte	Spike Added	BSD	%Rec #	Limits	RPD #	Limit
Benzene	50	49.11	98	71-127	1	10
Toluene	50	47.66	95	73-129	0	10

Surrogate	%Rec	Limits
1,2-Dichloroethane-d4	104	76-127
Toluene-d8	98	90-109
Bromofluorobenzene	101	82-118

Column to be used to flag recovery and RPD values with an asterisk
* Values outside of QC limits
RPD: 0 out of 2 outside limits
Spike Recovery: 0 out of 4 outside limits

Polyaromatic Hydrocarbons by HPLC

Client:	Harding Lawson Associates	Analysis Method:	EPA 8310
Project#:	47858.3	Prep Method:	EPA 3520
Location:	Oakland Airport,Taxiway 4		

Field ID:	GW-4	Sampled:	08/31/99
Lab ID:	141232-004	Received:	08/31/99
Matrix:	Water	Extracted:	09/07/99
Batch#:	50436	Analyzed:	09/13/99
Units:	ug/L		
Diln Fac:	1		

Analyte	Result	Reporting Limit
Naphthalene	ND	10
Acenaphthylene	ND	20
Acenaphthene	ND	2.0
Fluorene	ND	2.0
Phenanthrene	ND	1.0
Anthracene	ND	1.0
Fluoranthene	ND	0.8
Pyrene	ND	0.4
Benzo(a)anthracene	ND	0.2
Chrysene	ND	0.2
Benzo(b)fluoranthene	ND	0.4
Benzo(k)fluoranthene	ND	0.2
Benzo(a)pyrene	ND	0.2
Dibenz(a,h)anthracene	ND	0.4
Benzo(g,h,i)perylene	ND	0.4
Indeno(1,2,3-cd)pyrene	ND	0.28

Surrogate	%Recovery	Recovery Limits
1-Methylnaphthalene (UV)	36	26-123
1-Methylnaphthalene (F)	35	20-127

EPA 8310 PAHs by HPLC

Client:	Harding Lawson Associates	Analysis Method:	EPA 8310
Project#:	47858.3	Prep Method:	EPA 3520
Location:	Oakland Airport,Taxiway 4		

METHOD BLANK

Matrix:	Water	Prep Date:	09/07/99
Batch#:	50436	Analysis Date:	09/13/99
Units:	ug/L		
Diln Fac:	1		

MB Lab ID: QC07038

Analyte	Result	Reporting Limit
Naphthalene	ND	5.0
Acenaphthylene	ND	10
Acenaphthene	ND	1.0
Fluorene	ND	1.0
Phenanthrene	ND	0.5
Anthracene	ND	0.5
Fluoranthene	ND	0.4
Pyrene	ND	0.2
Benzo(a)anthracene	ND	0.1
Chrysene	ND	0.1
Benzo(b)fluoranthene	ND	0.2
Benzo(k)fluoranthene	ND	0.1
Benzo(a)pyrene	ND	0.1
Dibenz(a,h)anthracene	ND	0.2
Benzo(g,h,i)perylene	ND	0.2
Indeno(1,2,3-cd)pyrene	ND	0.14

Surrogate	%Rec	Recovery Limits
1-Methylnaphthalene (UV)	59	26-123
1-Methylnaphthalene (F)	57	20-127

EPA 8310 PAHs by HPLC

Client: Harding Lawson Associates
Project#: 47858.3
Location: Oakland Airport,Taxiway 4

Analysis Method: EPA 8310
Prep Method: EPA 3520

BLANK SPIKE/BLANK SPIKE DUPLICATE

Matrix: Water
Batch#: 50436
Units: ug/L
Diln Fac: 1

Prep Date: 09/07/99
Analysis Date: 09/13/99

BS Lab ID: QC07039

Analyte	Spike Added	BS	%Rec #	Limits
Naphthalene	10	7.55	76	27-118
Acenaphthylene	20	14.96	75	33-112
Acenaphthene	10	7.65	77	28-120
Fluorene	2	1.52	76	36-117
Phenanthrene	1	0.69	69	32-124
Anthracene	1	0.72	72	19-113
Benzo(k)fluoranthene	1	0.79	79	29-121
Indeno(1,2,3-cd)pyrene	1	0.75	75	31-122

Surrogate	%Rec	Limits
1-Methylnaphthalene (UV)	72	26-123
1-Methylnaphthalene (F)	69	20-127

BSD Lab ID: QC07040

Analyte	Spike Added	BSD	%Rec #	Limits	RPD #	Limit
Naphthalene	10	7.02	70	27-118	7	29
Acenaphthylene	20	13.7	69	33-112	9	22
Acenaphthene	10	6.71	67	28-120	13	31
Fluorene	2	1.42	71	36-117	7	25
Phenanthrene	1	0.65	65	32-124	6	28
Anthracene	1	0.66	66	19-113	9	25
Benzo(k)fluoranthene	1	0.74	74	29-121	7	16
Indeno(1,2,3-cd)pyrene	1	0.7	70	31-122	7	35

Surrogate	%Rec	Limits
1-Methylnaphthalene (UV)	64	26-123
1-Methylnaphthalene (F)	61	20-127

Column to be used to flag recovery and RPD values with an asterisk
* Values outside of QC limits

CLIENT: Harding Lawson Associates
PROJECT ID: 47858.3
LOCATION: Oakland Airport,Taxiway 4
MATRIX: Water

DATE REPORTED: 09/14/99

Metals Analytical Report

				Iron					
Sample ID	Lab ID	Sample Date	Receive Date	Result (ug/L)	Reporting Limit (ug/L)	IDF	QC Batch	Method	Analysis Date
GW-1	141232-001	08/31/99	08/31/99	37000	100	1	50423	EPA 6010B	09/08/99
GW-2	141232-002	08/31/99	08/31/99	17000	100	1	50423	EPA 6010B	09/08/99
GW-3	141232-003	08/31/99	08/31/99	10000	100	1	50423	EPA 6010B	09/08/99
GW-4	141232-004	08/31/99	08/31/99	29000	100	1	50423	EPA 6010B	09/08/99
GW-5	141232-005	08/31/99	08/31/99	3200000	20000	200	50423	EPA 6010B	09/08/99
GW-6	141232-006	08/31/99	08/31/99	21000	100	1	50423	EPA 6010B	09/08/99
GW-7	141232-007	08/31/99	08/31/99	450000	1000	10	50423	EPA 6010B	09/08/99
GW-8	141232-008	08/31/99	08/31/99	23000	100	1	50423	EPA 6010B	09/08/99

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CLIENT: Harding Lawson Associates
JOB NUMBER: 141232

DATE REPORTED: 09/14/99

BATCH QC REPORT
PREP BLANK

Compound	Result	Reporting Limit	Units	IDF	QC Batch	Method	Analysis Date
Iron	ND	100	ug/L	1	50423	EPA 6010B	09/08/99

ND = Not Detected at or above reporting limit

Curtis & Tompkins, Ltd.

CLIENT: Harding Lawson Associates
JOB NUMBER: 141232

DATE REPORTED: 09/14/99

BATCH QC REPORT
BLANK SPIKE / BLANK SPIKE DUPLICATE

Compound	Spike Amount	BS Result	BSD Result	Units	BS% Rec.	BSD% Rec.	Rec. Limits	RPD %	RPD Limit	QC Batch	Method	Analysis Date
Iron	1000	1010	972.3	ug/L	101	97	80-120	4	20	50423	EPA 6010B	09/08/99

Curtis & Tompkins, Ltd.

CLIENT: Harding Lawson Associates
JOB NUMBER: 141232

DATE REPORTED: 09/14/99

BATCH QC REPORT
SAMPLE DUPLICATE

Compound	Sample	Sample Result	Duplicate Result	Units	RPD %	RPD Limit	QC Batch	Method	Analysis Date
Iron	141254-001	6752	6519	ug/L	4	20	50423	EPA 6010B	09/08/99

Curtis & Tompkins, Ltd.

Ferrous Iron (Fe+2)

Client: Harding Lawson Associates
Project #: 47858.3
Location : Oakland Airport,Taxiway 4

Analysis Method: FE+2
Prep Method: FE+2

Sample #	Client ID	Batch#	Sampled	Analyzed	Moisture
141232-001	GW-1	50322	31-AUG-99	01-SEP-99	-
141232-002	GW-2	50322	31-AUG-99	01-SEP-99	-
141232-003	GW-3	50322	31-AUG-99	01-SEP-99	-
141232-004	GW-4	50322	31-AUG-99	01-SEP-99	-
141232-005	GW-5	50322	31-AUG-99	01-SEP-99	-
141232-006	GW-6	50322	31-AUG-99	01-SEP-99	-
141232-007	GW-7	50322	31-AUG-99	01-SEP-99	-
141232-008	GW-8	50322	31-AUG-99	01-SEP-99	-
QC06548	Method Blank	50322	-	01-SEP-99	-

Analyte: Ferrous Iron (Fe+2) **Matrix:** Water **Units:** mg/L

Sample #	Client ID		Result	Reporting Limit	Dilution Factor
141232-001	GW-1		ND	0.10	1
141232-002	GW-2		0.27	0.10	1
141232-003	GW-3		0.72	0.10	1
141232-004	GW-4		1.5	0.10	1
141232-005	GW-5		ND	0.10	1
141232-006	GW-6		ND	0.10	1
141232-007	GW-7		ND	0.10	1
141232-008	GW-8		0.78	0.10	1
QC06548	Method Blank	ND		0.10	1

ND = None Detected at or above Reporting Limit

Lab#: 141232
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Curtis & Tompkins, Ltd.

Ferrous Iron (Fe+2)

Client: Harding Lawson Associates
Project #: 47858.3
Location : Oakland Airport,Taxiway 4

Analysis Method: FE+2
Prep Method: FE+2

Sample #	Client ID	Batch#	Sampled	Analyzed	Moisture
QC06551	Lab Control Sample	50322	-	01-SEP-99	-

Analyte: Ferrous Iron (Fe+2) **Matrix:** Water **Units:** mg/L

Sample #	Sample Type	Spike Amt.	Result	%Recovery	Limits
QC06551	Lab Control Sample	0.8000	0.7820	98	80-120

Curtis & Tompkins, Ltd.

Ferrous Iron (Fe+2)

Client: Harding Lawson Associates
Project #: 47858.3
Location : Oakland Airport,Taxiway 4

Analysis Method: FE+2
Prep Method: FE+2

Sample #	Client ID	Batch#	Sampled	Analyzed	Moisture
QC06549	MS of 141232-008	50322	31-AUG-99	01-SEP-99	-
QC06550	MSD of 141232-008	50322	31-AUG-99	01-SEP-99	-

Analyte: Ferrous Iron (Fe+2) **Matrix:** Water **Units:** mg/L

Sample #	Client ID	Spikeamt	Result	%Rec	Limits	%RPD	Limit
QC06549	MS of 141232-008	0.8000	1.572	99	75-125		
QC06550	MSD of 141232-008	0.8000	1.614	104	75-125	3	35
141232-008	GW-8		0.7800				

Curtis & Tompkins, Ltd.

Nitrogen,Nitrate

Client: Harding Lawson Associates
Project #: 47858.3
Location : Oakland Airport,Taxiway 4

Analysis Method: EPA 300.0
Prep Method: EPA 300.0

Sample #	Client ID	Batch#	Sampled	Analyzed	Moisture
141232-001	GW-1	50313	31-AUG-99	01-SEP-99	-
141232-002	GW-2	50313	31-AUG-99	01-SEP-99	-
141232-003	GW-3	50313	31-AUG-99	01-SEP-99	-
141232-004	GW-4	50313	31-AUG-99	01-SEP-99	-
141232-005	GW-5	50313	31-AUG-99	01-SEP-99	-
141232-006	GW-6	50313	31-AUG-99	01-SEP-99	-
141232-007	GW-7	50313	31-AUG-99	01-SEP-99	-
141232-008	GW-8	50313	31-AUG-99	01-SEP-99	-
QC06513	Method Blank	50313	-	01-SEP-99	-

Analyte: Nitrogen, Nitrate **Matrix:** Water **Units:** mg/L

Sample #	Client ID		Result	Reporting Limit	Dilution Factor
141232-001	GW-1		ND	0.05	1
141232-002	GW-2		0.06	0.05	1
141232-003	GW-3		ND	0.05	1
141232-004	GW-4		0.05	0.05	1
141232-005	GW-5		ND	0.05	1
141232-006	GW-6		ND	0.05	1
141232-007	GW-7		ND	0.05	1
141232-008	GW-8		ND	0.05	1
QC06513	Method Blank	ND		0.05	1

ND = None Detected at or above Reporting Limit

Curtis & Tompkins, Ltd.

Nitrogen,Nitrate

Client: Harding Lawson Associates
Project #: 47858.3
Location : Oakland Airport,Taxiway 4

Analysis Method: EPA 300.0
Prep Method: EPA 300.0

Sample #	Client ID	Batch#	Sampled	Analyzed	Moisture
QC06514	Blank Spike	50313	-	01-SEP-99	-
QC06515	Blank Spike Duplicate	50313	-	01-SEP-99	-

Analyte: Nitrogen, Nitrate **Matrix:** Water **Units:** mg/L

Sample #	Sample Type	Spike Amt.	Result	%Rec	Limits	%RPD	Limit
QC06514	Blank Spike	3.000	3.030	101	80-120		
QC06515	Blank Spike Duplicate	3.000	3.060	102	80-120	1	25

Lab#: 141232
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Curtis & Tompkins, Ltd.

Nitrogen,Nitrate

Client: Harding Lawson Associates
Project #: 47858.3
Location : Oakland Airport,Taxiway 4

Analysis Method: EPA 300.0
Prep Method: EPA 300.0

Sample #	Client ID	Batch#	Sampled	Analyzed	Moisture
QC06516	MS of 141155-001	50313	07-JUL-99	01-SEP-99	-
QC06517	MSD of 141155-001	50313	07-JUL-99	01-SEP-99	-

Analyte: Nitrogen, Nitrate **Matrix:** Water **Units:** mg/L

Sample #	Client ID	Spikeamt	Result	%Rec	Limits	%RPD	Limit
QC06516	MS of 141155-001	15.00	15.17	101	75-125		
QC06517	MSD of 141155-001	15.00	15.20	101	75-125	0	35
141155-001	ZZZZZZZZ		<0.05000				

Lab#: 141232
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Curtis & Tompkins, Ltd.

Orthophosphate-Phosphorous

Client: Harding Lawson Associates
Project #: 47858.3
Location : Oakland Airport,Taxiway 4

Analysis Method: EPA 300.0
Prep Method: EPA 300.0

Sample #	Client ID	Batch#	Sampled	Analyzed	Moisture
141232-001	GW-1	50313	31-AUG-99	01-SEP-99	-
141232-002	GW-2	50313	31-AUG-99	01-SEP-99	-
141232-003	GW-3	50313	31-AUG-99	01-SEP-99	-
141232-004	GW-4	50313	31-AUG-99	01-SEP-99	-
141232-005	GW-5	50313	31-AUG-99	01-SEP-99	-
141232-006	GW-6	50313	31-AUG-99	01-SEP-99	-
141232-007	GW-7	50313	31-AUG-99	01-SEP-99	-
141232-008	GW-8	50313	31-AUG-99	01-SEP-99	-
QC06513	Method Blank	50313	-	01-SEP-99	-

Analyte: Orthophosphate (as P) **Matrix:** Water **Units:** mg/L

Sample #	Client ID	Result	Reporting Limit	Dilution Factor
141232-001	GW-1	0.58	0.20	1
141232-002	GW-2	ND	0.20	1
141232-003	GW-3	ND	0.20	1
141232-004	GW-4	ND	0.20	1
141232-005	GW-5	0.23	0.20	1
141232-006	GW-6	0.65	0.20	1
141232-007	GW-7	0.69	0.20	1
141232-008	GW-8	ND	0.20	1
QC06513	Method Blank	ND	0.20	1

ND = None Detected at or above Reporting Limit

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Curtis & Tompkins, Ltd.

Orthophosphate-Phosphorous

Client: Harding Lawson Associates
Project #: 47858.3
Location : Oakland Airport,Taxiway 4

Analysis Method: EPA 300.0
Prep Method: EPA 300.0

Sample #	Client ID	Batch#	Sampled	Analyzed	Moisture
QC06514	Blank Spike	50313	-	01-SEP-99	-
QC06515	Blank Spike Duplicate	50313	-	01-SEP-99	-

Analyte: Orthophosphate (as P) **Matrix:** Water **Units:** mg/L

Sample #	Sample Type	Spike Amt.	Result	%Rec	Limits	%RPD	Limit
QC06514	Blank Spike	5.000	4.930	99	80-120		
QC06515	Blank Spike Duplicate	5.000	4.740	95	80-120	4	25

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Curtis & Tompkins, Ltd.

Sulfate

Client: Harding Lawson Associates
Project #: 47858.3
Location : Oakland Airport,Taxiway 4

Analysis Method: EPA 300.0
Prep Method: EPA 300.0

Sample #	Client ID	Batch#	Sampled	Analyzed	Moisture
141232-001	GW-1	50313	31-AUG-99	01-SEP-99	-
141232-002	GW-2	50313	31-AUG-99	01-SEP-99	-
141232-003	GW-3	50313	31-AUG-99	01-SEP-99	-
141232-004	GW-4	50313	31-AUG-99	01-SEP-99	-
141232-005	GW-5	50313	31-AUG-99	01-SEP-99	-
141232-006	GW-6	50313	31-AUG-99	01-SEP-99	-
141232-007	GW-7	50313	31-AUG-99	01-SEP-99	-
141232-008	GW-8	50313	31-AUG-99	01-SEP-99	-
QC06513	Method Blank	50313	-	01-SEP-99	-

Analyte: Sulfate **Matrix:** Water **Units:** mg/L

Sample #	Client ID		Result	Reporting Limit	Dilution Factor
141232-001	GW-1		12	0.50	1
141232-002	GW-2		10	0.50	1
141232-003	GW-3		8.1	0.50	1
141232-004	GW-4		44	0.50	1
141232-005	GW-5		10	0.50	1
141232-006	GW-6		7.8	0.50	1
141232-007	GW-7		10	0.50	1
141232-008	GW-8		23	0.50	1
QC06513	Method Blank	ND		0.50	1

ND = None Detected at or above Reporting Limit

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Curtis & Tompkins, Ltd.

Sulfate

Client: Harding Lawson Associates
Project #: 47858.3
Location : Oakland Airport,Taxiway 4

Analysis Method: EPA 300.0
Prep Method: EPA 300.0

Sample #	Client ID	Batch#	Sampled	Analyzed	Moisture
QC06514	Blank Spike	50313	-	01-SEP-99	-
QC06515	Blank Spike Duplicate	50313	-	01-SEP-99	-

Analyte: Sulfate **Matrix:** Water **Units:** mg/L

Sample #	Sample Type	Spike Amt.	Result	%Rec	Limits	%RPD	Limit
QC06514	Blank Spike	10.00	10.02	100	80-120		
QC06515	Blank Spike Duplicate	10.00	9.870	99	80-120	2	25

Curtis & Tompkins, Ltd.

Sulfate

Client: Harding Lawson Associates
Project #: 47858.3
Location : Oakland Airport,Taxiway 4

Analysis Method: EPA 300.0
Prep Method: EPA 300.0

Sample #	Client ID	Batch#	Sampled	Analyzed	Moisture
QC06516	MS of 141155-001	50313	07-JUL-99	01-SEP-99	-
QC06517	MSD of 141155-001	50313	07-JUL-99	01-SEP-99	-

Analyte: Sulfate **Matrix:** Water **Units:** mg/L

Sample #	Client ID	Spikeamt	Result	%Rec	Limits	%RPD	Limit
QC06516	MS of 141155-001	50.00	66.75	101	75-125		
QC06517	MSD of 141155-001	50.00	67.24	102	75-125	1	35
141155-001	ZZZZZZZZ		16.26				

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Curtis & Tompkins, Ltd.

Total Organic Carbon (TOC)

Client: Harding Lawson Associates
Project #: 47858.3
Location : Oakland Airport,Taxiway 4

Analysis Method: EPA 415.2
Prep Method: EPA 415.2

Sample #	Client ID	Batch#	Sampled	Analyzed	Moisture
141232-001	GW-1	50489	31-AUG-99	09-SEP-99	-
141232-002	GW-2	50489	31-AUG-99	09-SEP-99	-
141232-003	GW-3	50489	31-AUG-99	09-SEP-99	-
141232-004	GW-4	50489	31-AUG-99	09-SEP-99	-
141232-005	GW-5	50489	31-AUG-99	09-SEP-99	-
141232-006	GW-6	50489	31-AUG-99	09-SEP-99	-
141232-007	GW-7	50489	31-AUG-99	09-SEP-99	-
141232-008	GW-8	50489	31-AUG-99	09-SEP-99	-
QC07244	Method Blank	50489	-	09-SEP-99	-

Analyte: Total Organic Carbon **Matrix:** Water **Units:** mg/L

Sample #	Client ID	Result	Reporting Limit	Dilution Factor
141232-001	GW-1	18	1.0	1
141232-002	GW-2	17	1.0	1
141232-003	GW-3	21	1.0	1
141232-004	GW-4	15	1.0	1
141232-005	GW-5	3.1	1.0	1
141232-006	GW-6	1.9	1.0	1
141232-007	GW-7	6.4	1.0	1
141232-008	GW-8	11	1.0	1
QC07244	Method Blank	ND	1.0	1

ND = None Detected at or above Reporting Limit

Lab#: 141232
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Curtis & Tompkins, Ltd.

Total Organic Carbon (TOC)

Client: Harding Lawson Associates
Project #: 47858.3
Location : Oakland Airport,Taxiway 4

Analysis Method: EPA 415.2
Prep Method: EPA 415.2

Sample #	Client ID	Batch#	Sampled	Analyzed	Moisture
QC07245	Lab Control Sample	50489	-	09-SEP-99	-

Analyte: Total Organic Carbon **Matrix:** Water **Units:** mg/L

Sample #	Sample Type	Spike Amt.	Result	%Recovery	Limits
QC07245	Lab Control Sample	10.00	9.300	93	80-120

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Curtis & Tompkins, Ltd.

Total Organic Carbon (TOC)

Client: Harding Lawson Associates
Project #: 47858.3
Location : Oakland Airport,Taxiway 4

Analysis Method: EPA 415.2
Prep Method: EPA 415.2

Sample #	Client ID	Batch#	Sampled	Analyzed	Moisture
QC07246	MS of 141232-003	50489	31-AUG-99	09-SEP-99	-
QC07247	MSD of 141232-003	50489	31-AUG-99	09-SEP-99	-

Analyte: Total Organic Carbon **Matrix:** Water **Units:** mg/L

Sample #	Client ID	Spikeamt	Result	%Rec	Limits	%RPD	Limit
QC07246	MS of 141232-003	10.00	28.80	78	75-125		
QC07247	MSD of 141232-003	10.00	28.99	80	75-125	1	35
141232-003	GW-3		21.00				