

Harding Lawson Associates

#1059

ROA



April 28, 1999

1049

43145.4

Mr. Dale H. Klettke, CHMM
Port of Oakland
Environmental Health & Safety Compliance
530 Water Street, 2nd Floor
Oakland, California 94607

• moderate decrease in TPH
in wells w/1 & next to AST
Do appear to be consumed
• CHC @ low levels found in MW 4,
higher conc in MW 8 - ? 2 releases?
both LOP / SRC problem.
TDS > 3000, not potable
∴ may be able to eventually clean.

Quarterly Groundwater Monitoring Report
January 1 through March 31, 1999
United Airlines Hangar Area - Economy Parking Lot Site
Metropolitan Oakland International Airport
Oakland, California

Dear Mr. Klettke:

Harding Lawson Associates (HLA) presents this groundwater monitoring report summarizing groundwater conditions observed during the first quarter of 1999 in eight monitoring wells at the United Airlines Hangar Area - Economy Parking Lot Site, Metropolitan Oakland International Airport (MOIA), Oakland, California (Plate 1). This report is the second of eight quarterly groundwater monitoring events that HLA will perform for the Port of Oakland in accordance with the *Work Plan for Installation of Oxygen Releasing Compound (ORC)*, dated December 18, 1999.

BACKGROUND

In March 1992, two underground storage tanks (USTs) MF-25 and MF-26 were removed. Approximately 700 cubic yards of impacted soil was removed and confirmation soil samples were collected following soil removal. The former UST excavation (approximately 80-feet by 80-feet) was reportedly backfilled with permeable material. The area is now paved and used for parking (Plate 2). Monitoring well MW-1 was installed in 1992 where total petroleum hydrocarbons as diesel (TPHd) and petroleum hydrocarbons as motor oil (TPHmo) were reported with elevated concentrations. Two additional monitoring wells, MW-2 and MW-3, were installed in 1995. Free product was observed in MW-2 and MW-3 in 1996 and 1997. Monitoring wells MW-4 through MW-8 were installed in 1998 and a sheen was observed on groundwater from MW-2 and MW-4.

A batch treatment of ORC was installed on December 23, 1998 after checking that no free product was present in the monitoring wells. A total of 780 pounds of time-release ORC was installed along the upgradient edge of the former UST excavation at 11 locations. A direct-push rig injected a total of 780 pounds of time-release ORC mixed into 60 gallons of water down 2-inch diameter rods to a depth of 4 to 8 feet below ground surface.



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GROUNDWATER SAMPLING AND ANALYSIS

HLA measured dissolved oxygen (DO) concentrations in the eight monitoring wells on a weekly basis during January 1999, and monthly in February and March. On February 26, HLA measured groundwater elevations and collected groundwater samples for chemical analyses. Prior to purging or sampling the monitoring wells, HLA measured DO concentrations, reduction oxidation potential (Redox), water levels, and checked for free product with an interface probe. HLA monitored the pH, conductivity, and temperature of the groundwater during purging; however, pH was not measured in all wells due to a malfunctioning field meter. The monitoring wells were sampled after purging at least three well volumes of groundwater and after parameters had stabilized to within 10 percent; the groundwater sampling forms with the field data are included in Appendix A. Water samples were collected using a disposable Teflon bailer and sampling equipment was decontaminated with a non-phosphate cleaning solution and rinsed with distilled water. Purged water was contained in a 55-gallon drum for subsequent disposal by the Port of Oakland.

The water samples were placed in ice-chilled coolers and submitted to Sequoia Analytical of Walnut Creek, California under chain-of-custody protocol. The samples were analyzed for the following analytes:

- Total petroleum hydrocarbons as gasoline (TPHg) by EPA Test Method 8015 (modified)
- Benzene, toluene, ethylbenzene (BTEX) and methyl t-butyl ether (MTBE) by EPA Test Method 8020
- TPHd, TPHj(A), TPHmo by EPA Method 8015 with a silica gel cleanup procedure
- Purgeable halocarbons by EPA Method 8010
- Nitrate, sulfate, orthophosphate
- Total organic carbon (TOC) by EPA Method 415.2

MONITORING RESULTS

No free produce was observed in any of the eight monitoring wells and recent data indicate that ORC is reducing dissolved hydrocarbon concentrations. Groundwater elevations are presented in Table 1 and shown on Plate 3 with an apparent gradient towards the southwest. Chemical concentration results are shown in Tables 2, 3, and 4. DO concentrations are summarized in Table 5. The laboratory report and chain-of-custody form are presented in Appendix B.

The ORC treatment appears to be degrading dissolved petroleum hydrocarbons in the vicinity of the former USTs. ~~Since the ORC treatment, TPHj decreased at MW-4 (located within the former UST excavation) by 87 percent from 41,000 to 5,500 micrograms per liter ($\mu\text{g/L}$) and TPHg decreased by 33 percent to 1,200 $\mu\text{g/L}$.~~ Decreased hydrocarbon concentrations are also observed adjacent to the former excavation at MW-1 where TPHg and benzene concentrations have decreased.

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Successful ORC treatment is also supported by a comparison other monitoring parameters from before and after the ORC application. DO data indicates that an active microbial population has developed at MW-4; although ORC appears to be continuing to release oxygen (as observed by elevated DO concentrations in MW-1), microbial activity began consuming oxygen at MW-4 faster than it was being released within 3 weeks after the ORC treatment. Active biodegradation is also indicated by inorganic parameters that show the development of an oxygenated rather than reductive environment; this is particularly evident at MW-4 with increasing concentrations of nitrate and sulfate and decreasing concentrations of ferrous ion. The same assessment holds true to a lesser degree in downgradient wells MW-6 and MW-7, which are exhibiting increased nitrate concentrations.

cannot
assume
this

Chlorinated volatile organic compounds (VOCs) have been observed in all wells except downgradient wells MW-5 and MW-6. The highest chlorinated VOC concentrations have been observed at upgradient well MW-8 and adjacent to the former UST excavation at MW-2. Several VOCs have been detected at concentrations above the Maximum Contaminant Levels (MCLs).

CLOSURE

If you have any questions or need additional information, please contact the undersigned at (510) 451-1001.

Sincerely,

HARDING LAWSON ASSOCIATES



Heather Lee
Staff Engineer



Michael A. Sides
Civil Engineer

- Attachments:
- Table 1 - Groundwater Elevations
 - Table 2 - Groundwater Analytical Results - Petroleum Hydrocarbons
 - Table 3 - Groundwater Analytical Results - VOCs
 - Table 4 - Groundwater Analytical Results - Inorganics
 - Table 5 - Dissolved Oxygen Concentrations
 - Plate 1 - Vicinity Map
 - Plate 2 - Site Map
 - Plate 3 - Groundwater Elevation Map
 - Appendix A - Groundwater Sampling Forms
 - Appendix B - Laboratory Reports

Table 1. Groundwater Elevations
 United Airlines Hanger - Economy Parking Lot
 Metropolitan Oakland International Airport

Well Name	Top of Casing Elevation (feet)	Date	Depth to Water (feet)	Groundwater Elevation (feet)	Product Thickness (feet)	Note
MW-1	6.91	15-May-92	3.10	3.81	--	1
		7-Aug-92	3.20	3.71	--	1
		24-Nov-92	4.04	2.87	--	1
		12-Feb-93	--	--	--	1
		11-Mar-93	2.09	4.82	--	1
		17-May-93	3.14	3.77	--	1
		3-Aug-93	3.15	3.76	--	1
		25-Nov-93	3.59	3.32	--	1
		24-Mar-94	3.21	3.70	--	1
		9-May-94	2.99	3.92	--	1
		29-Aug-94	3.34	3.57	--	1
		27-Sep-94	3.51	3.40	--	1
		25-Apr-95	2.38	4.53	--	1
		11-Aug-95	3.08	3.83	--	1
		3-Nov-95	3.52	3.39	--	1
		19-Jun-96	2.93	3.98	--	1
		24-Oct-96	3.52	3.39	--	1
		22-Jan-97	2.61	4.30	--	1
		25-Apr-97	2.77	4.14	--	1
		6-Aug-97	3.27	3.64	--	1
23-Dec-97	3.14	3.77	--	1		
26-Mar-98	2.09	4.82	--	1		
13-May-98	--	--	--	2		
16-Dec-98	2.95	3.96	--			
26-Feb-99	5.83	1.08	--			
MW-2	6.63	25-Apr-95	2.20	4.43	--	1
		11-Aug-95	3.11	3.52	--	1
		3-Nov-95	3.28	3.35	--	1
		19-Jun-96	2.53	4.14	0.05	1,3
		24-Oct-96	3.44	3.31	0.16	1,3
		22-Jan-97	2.45	4.20	0.02	1,3
		25-Apr-97	2.60	4.05	0.03	1,3
		30-Jul-97	--	--	0.14	1,4
		6-Aug-97	2.96	3.67	--	1
		23-Dec-97	2.85	3.97	0.25	1,3
		26-Mar-98	1.72	4.92	0.005	1,3
		13-May-98	1.80	4.78	--	2,5
16-Dec-98	2.60	3.98	--			
26-Feb-99	2.06	4.52	--			

Table 1. Groundwater Elevations
 United Airlines Hanger - Economy Parking Lot
 Metropolitan Oakland International Airport

Well Name	Top of Casing Elevation (feet)	Date	Depth to Water (feet)	Groundwater Elevation (feet)	Product Thickness (feet)	Note
MW-3	7.36	25-Apr-95	2.20	5.16	--	1
		11-Aug-95	3.11	4.25	--	1
		3-Nov-95	3.28	4.08	--	1
		19-Jun-96	2.53	4.14	0.05	1,3
		24-Oct-96	3.44	3.31	0.16	1,3
		22-Jan-97	2.45	4.20	0.02	1,3
		25-Apr-97	3.13	4.24	0.01	1,3
		30-Jul-97	NM	NM	0.03	1,4
		6-Aug-97	3.76	3.60	--	1
		23-Dec-97	3.48	3.88	--	1
		26-Mar-98	2.36	5.00	0.005	1,3
		13-May-98	--	--	--	2
		16-Dec-98	3.40	3.96	--	
26-Feb-99	2.49	4.87	--			
MW-4	6.92	13-May-98	2.01	4.91	--	2
		16-Dec-98	2.84	4.08	--	
		26-Feb-99	1.94	4.98	--	
MW-5	5.79	13-May-98	1.05	4.74	--	2
		16-Dec-98	1.95	3.84	--	
		26-Feb-99	1.50	4.29	--	
MW-6	6.39	13-May-98	1.91	4.48	--	2
		16-Dec-98	2.64	3.75	--	
		26-Feb-99	1.89	4.50	--	
MW-7	5.86	13-May-98	1.51	4.35	--	2
		16-Dec-98	2.13	3.73	--	
		26-Feb-99	1.58	4.28	--	
MW-8	7.56	13-May-98	2.46	5.10	--	2
		16-Dec-98	3.51	4.05	--	
		26-Feb-99	2.59	4.97	--	

Notes

- 1 - Data from Table 1, Results of Groundwater Sampling and Analysis, Port of Oakland, Oakland International Airport, United Airlines Hanger Area-Economy Parking Lot Site, by ITSI
- 2 - Data from Table 1, Results of Additional Site Investigation, Port of Oakland, Oakland International Airport, United Airlines Hanger Area-Economy Parking Lot Site, dated October 21, 1998 by ITSI
- 3 - GroundWater elevation calculated assuming a specific gravity of 0.75 for product.
- 4 - Free product removed from well during redevelopment (July 30, 1997).
- 5 - Well MW-2 was reconstructed in May 1998.

Table 2. Groundwater Analytical Results - Petroleum Hydrocarbons
 United Airlines Hanger Economy Parking
 Metropolitan Oakland International Airport

Monitoring Well ID	Date	Benzene (ug/L)	Toluene (ug/L)	Ethyl-benzene (ug/L)	Total Xylenes (ug/L)	MTBE (ug/L)	TPHg (ug/L)	TPH Diesel (C1-C22) (ug/L)	TPH Jet Fuel A (C9-C16) (ug/L)	TPH Motor Oil (>C16) (ug/L)	Unidentified Extractable Hydrocarbons (ug/L)	Note
MW-1	5/15/92	<0.4	<0.3	<0.3	<0.4	--	<50	--	--	--	--	1
	8/7/92	<0.4	<0.3	<0.3	<0.4	--	<50	--	800	--	--	1
	11/24/92	<0.4	<0.3	<0.3	<0.4	--	<50	--	<50	--	--	1
	2/12/93	<0.4	<0.3	<0.3	<0.4	--	<50	--	--	--	--	1
	5/17/93	<0.4	<0.3	<0.3	<0.4	--	<50	--	--	--	--	1
	8/3/93	<0.5	<0.5	<0.5	<0.5	--	<50	5200	--	--	--	1
	11/25/93	<0.5	<0.5	<0.5	0.6	--	70	--	--	--	--	1
	5/9/94	<0.5	<0.5	<0.5	<0.5	--	<50	--	--	--	--	1
	8/29/94	<0.5	<0.5	2.7	<0.5	--	<50	--	--	--	--	1
	4/25/95	<5	<5	<5	<5	--	<50	1,400	<50	610	--	1
	8/11/95	<0.4	<0.3	<0.3	<0.4	--	<50	1,900	<50	1,200	--	1
	11/3/95	0.4	0.4	<0.3	<0.4	--	<50	4,200	<50	1,800	--	1
	6/19/96	0.99	<0.5	1.1	<1.0	--	<50	11,000	<500	820	--	1
	10/24/96	1.9	<0.5	<0.5	1.3	--	57	<250	<500	<250	--	1
	1/22/97	<0.5	<0.5	<0.5	<1.0	--	<50	220	<500	<250	--	1
	4/25/97	1.2	<0.5	1.0	1.2	--	110	<50	<500	<250	--	1
	8/6/97	2.1	<0.5	<0.5	<1.0	--	100	340	<500	<250	--	1
12/23/97	0.7	<0.5	<0.5	<1.0	--	<50	<50	<50	<300	--	1	
3/26/98	<0.5	<0.5	<0.5	<1.0	--	<50	<48	<48	<290	--	2	
12/16/98	1.9	<0.5	<0.5	<0.5	<2.5	120	640	<50	<250	340	--	
2/26/99	0.96	<0.5	<0.5	<0.5	--	69	670	<50	350	<50	4	
MW-2	04/25/95	340	570	110	580	--	5,200	<10,000	13,000	19,000	--	1
	08/11/95	320	680	110	510	--	5,500	<8,000	7,900	20,000	--	1
	11/03/95	280	400	27	360	--	3,800	<11,000	11,000	4,200	--	1
	06/19/96	--	--	--	--	--	--	--	--	--	--	1
	10/24/96	--	--	--	--	--	--	--	--	--	--	1
	01/22/97	--	--	--	--	--	--	--	--	--	--	1
	04/25/97	--	--	--	--	--	--	--	--	--	--	1
	08/06/97	170	170	92	410	--	9,900	12,000	<1,000	2,300	--	1
	12/23/97	--	--	--	--	--	--	--	--	--	--	1
	03/26/98	--	--	--	--	--	--	--	--	--	--	1
	05/13/98	150	270	94	440	--	4,000	2,600 ¹²	3,400	<290	--	2
	12/16/98	130	180	71	330	<50	4,600	<1,000	31,000	8,200	<1,000	--
02/26/99	86	210	64	350	<100	4,700	<1,000	18,000	7,800	<1,000	--	
MW-3	04/25/95	150	600	100	580	--	7,200	<40,000	38,000	31,000	--	1
	08/11/95	--	--	--	--	--	--	--	--	--	--	1
	11/03/95	--	--	--	--	--	--	--	--	--	--	1
	06/19/96	--	--	--	--	--	--	--	--	--	--	1
	10/24/96	--	--	--	--	--	--	--	--	--	--	1
	01/22/97	--	--	--	--	--	--	--	--	--	--	1
	04/25/97	--	--	--	--	--	--	--	--	--	--	1
	08/06/97	4	16	14	90	--	4,200	1,400	<500	<250	--	1

Table 2. Groundwater Analytical Results - Petroleum Hydrocarbons
 United Airlines Hanger Economy Parking
 Metropolitan Oakland International Airport

Monitoring Well ID	Date	Benzene (ug/L)	Toluene (ug/L)	Ethyl - benzene (ug/L)	Total Xylenes (ug/L)	MTBE (ug/L)	TPHg (ug/L)	TPH Diesel (C1-C-22) (ug/L)	TPH Jet Fuel A (C9-C16) (ug/L)	TPH Motor Oil (>C16) (ug/L)	Unidentified Extractable Hydrocarbons (ug/L)	Note
MW-3	12/23/97	13	16	9	116	--	2,200	79,000	110,000	8,200	--	1
	03/26/98	3	3	3	3	3	3	3	3	3	3	2
	12/16/98	<10	12	<10	43	<50	2,300	--	--	--	--	--
	2/26/99	16	16	10	40	<100	5,700	--	--	--	--	--
MW-4	05/16/98	9.8	23	13	79	--	1,400	2000 ^{1,2}	2,300	<310	--	2
	12/16/98	<10	<10	<10	58	<50	1,900	<1,000	40,000	8,800	<1,000	--
	(Dup) 12/16/98	<10	<10	<10	51	<50	1,700	<1,000	41,000	9,400	<1,000	--
	2/26/99	13	<10	<10	22	<50	1,200	<500	5,500	<2,500	<500	--
	(Dup) 02/26/99	16	<2.5	6.2	20	<10	1,200	<500	5,200	<2,500	<500	--
MW-5	05/13/98	<0.5	<0.5	<0.5	<1.0	--	<50	<50	<50	<300	--	2
	12/16/98	<0.5	<0.5	<0.5	<0.5	<2.5	<50	<50	<50	<250	260	--
	02/26/99	<0.5	<0.5	<0.5	<0.5	<2.5	<50	69	<50	<250	<50	--
MW-6	05/13/98	<0.5	<0.5	<0.5	<1.0	--	<50	<48	<48	<290	--	2
	12/16/98	<0.5	<0.5	<0.5	<0.5	<2.5	<50	<50	<50	<250	<50	--
	02/26/99	<0.5	<0.5	<0.5	<0.5	<2.5	<50	83	<50	<250	<50	--
MW-7	05/05/98	<0.5	0.6	<0.5	<1.0	--	<50	<51	<51	<310	--	2
	12/16/98	<0.5	<0.5	<0.5	<0.5	<2.5	<50	<50	<50	<250	<50	--
	02/26/99	<0.5	<0.5	<0.5	<0.5	<2.5	<50	<50	<50	<250	<50	--
MW-8	05/05/98	2	<0.5	<0.5	<1.0	--	<50	<47	<47	<280	--	2
	12/16/98	4.1	<0.5	<0.5	<0.5	2.9	53	<50	200	<250	<50	4
	2/26/99	4	<0.5	<0.5	<0.5	2.7	<50	<50	<50	<250	<50	4
MCLs		1	150	700	1,750	--	--	--	--	--	--	--

Note:

1. Data from Table 2 - Summary of Laboratory Results Tanks MF25 and MF26 (United Airlines Hanger Area - Economy Parking Lot Site) Metropolitan Oakland International Airport (MOIA), 1100 Airport Drive, Oakland California by ITSI.
2. Data from Table 3 - Results of Additional Site Investigation (United Airlines Hanger Area - Economy Parking Lot Site) Metropolitan Oakland International Airport (MOIA), 1100 Airport Drive, Oakland California, dated October 21, 1998 by ITSI.
3. Not analyzed due to the presence of free product
4. MTBE detected by GC methods at slightly over reporting limit has not been confirmed by MS.

MCLs - Maximum Contaminant Levels

Shaded areas indicate detected concentration exceeds MCL.

Table 3. Groundwater Analytical Results - VOCs
 United Airlines Hanger Economy Parking
 Metropolitan Oakland International Airport

Monitoring Well ID	Date	Acetone (µg/L)	2-Butanone (µg/L)	Chloroform (µg/L)	1,1-DCA (µg/L)	(cis/trans) 1,2-DCE (µg/L)	4-Methyl-2-Pentanone (µg/L)	1,1,1-TCA (µg/L)	TCE (µg/L)	PCE (µg/L)	Chloroethane (µg/L)	1,2-DCA (µg/L)	1,1-DCE (µg/L)	Vinyl Chloride (µg/L)	Notes
MW-1	11/24/92	ND	ND	ND	ND	ND	ND	ND	ND	ND	--	--	--	--	1
	2/12/93	ND	ND	ND	ND	ND	ND	ND	ND	ND	--	--	--	--	1
	5/17/93	ND	ND	ND	ND	ND	ND	ND	ND	ND	--	--	--	--	1
	8/3/93	ND	ND	ND	ND	ND	ND	ND	ND	ND	--	--	--	--	1
	11/25/93	ND	ND	ND	ND	6.0	ND	ND	ND	ND	--	--	--	--	1
	5/9/94	ND	ND	ND	ND	ND	ND	ND	ND	5.5	--	--	--	--	1
	9/27/94	ND	ND	ND	ND	ND	ND	ND	ND	ND	--	--	--	--	1
	1/25/95	<20	<20	<5	<5	<5	<20	--	--	<5	--	--	--	--	1
	8/11/95	--	--	<0.5	4.3	13	--	2.0	1.8	0.6	--	--	--	--	1
	11/3/95	--	--	<0.5	1.3	3.7	--	0.6	0.5	<0.5	--	--	--	--	1
	6/19/96	--	--	<0.5	5.4	<0.5	--	<0.5	1.2	<0.5	--	--	--	--	1
	10/24/96	--	--	<0.5	12	<1.0	--	<0.5	1.4	<0.5	--	--	--	--	1
	1/22/97	--	--	<0.5	3.9	8.4	--	<0.5	1.7	<0.5	--	--	--	--	1
	4/25/97	--	--	<0.5	6.2	10	--	<0.5	1.2	0.62	--	--	--	--	1
	8/6/97	--	--	<0.5	14	19	--	<0.5	2.5	0.54	--	--	--	--	1
	12/23/97	--	--	<1.0	8.6	9.3	--	<1.0	<1.0	<1.0	--	--	--	--	1
3/26/98	--	--	<1.0	5.3	8.1	--	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<2.0	3	
12/16/98	--	--	<0.5	20	18	--	<0.5	<0.5	<0.5	<1.0	<0.5	1.5	<1.0		
2/26/99	--	--	<0.5	15	9.8	--	2.9	<0.5	<0.5	<1.0	<0.5	0.79	<1.0		
MW-2	4/25/95	<200	200	<50	50	<50	<200	--	--	<50	--	--	--	--	1
	8/11/95	--	--	5.0	79	26	--	20	4.0	9.0	--	--	--	--	1
	11/3/95	--	--	<0.5	73	24	--	4.8	6.7	6.8	--	--	--	--	1
	6/19/96	-- ²	-- ²	-- ²	-- ²	-- ²	-- ²	-- ²	-- ²	-- ²	-- ²	-- ²	-- ²	-- ²	1
	10/24/96	-- ²	-- ²	-- ²	-- ²	-- ²	-- ²	-- ²	-- ²	-- ²	-- ²	-- ²	-- ²	-- ²	1
	1/22/97	-- ²	-- ²	-- ²	-- ²	-- ²	-- ²	-- ²	-- ²	-- ²	-- ²	-- ²	-- ²	-- ²	1
	4/25/97	-- ²	-- ²	-- ²	-- ²	-- ²	-- ²	-- ²	-- ²	-- ²	-- ²	-- ²	-- ²	-- ²	1
	8/6/97	--	--	<5	69	169	--	<5	<12	<5	--	--	--	--	1
	12/23/97	-- ²	-- ²	-- ²	-- ²	-- ²	-- ²	-- ²	-- ²	-- ²	-- ²	-- ²	-- ²	-- ²	1
	3/26/98	-- ²	-- ²	-- ²	-- ²	-- ²	-- ²	-- ²	-- ²	-- ²	-- ²	-- ²	-- ²	-- ²	1
	5/13/98	--	--	--	51	140	--	--	ND	<1.0	3.4	<1.0	<1.0	<2.0	3
	12/16/98	--	--	<5.0	58	220	--	<2.5	<2.5	<2.5	<1.0	<2.5	<2.5	<5.0	
	2/26/99	--	--	<1.3	19	57	--	2.9	<1.3	<1.3	<2.5	<1.3	<1.3	<2.5	
MW-3	4/25/95	300	300	--	30	<30	200	--	--	<30	--	--	--	--	1
	8/11/95	-- ²	-- ²	-- ²	-- ²	-- ²	-- ²	-- ²	-- ²	-- ²	-- ²	-- ²	-- ²	-- ²	1
	11/3/95	-- ²	-- ²	-- ²	-- ²	-- ²	-- ²	-- ²	-- ²	-- ²	-- ²	-- ²	-- ²	-- ²	1
	6/19/96	-- ²	-- ²	-- ²	-- ²	-- ²	-- ²	-- ²	-- ²	-- ²	-- ²	-- ²	-- ²	-- ²	1
	10/24/96	-- ²	-- ²	-- ²	-- ²	-- ²	-- ²	-- ²	-- ²	-- ²	-- ²	-- ²	-- ²	-- ²	1

Table 3. Groundwater Analytical Results - VOCs
 United Airlines Hanger Economy Parking
 Metropolitan Oakland International Airport

Monitoring Well ID	Date	Acetone (µg/L)	2-Butanone (µg/L)	Chloroform (µg/L)	1,1-DCA (µg/L)	(cis/trans) 1,2-DCE (µg/L)	4-Methyl-2-Pentanone (µg/L)	1,1,1-TCA (µg/L)	TCE (µg/L)	PCE (µg/L)	Chloroethane (µg/L)	1,2-DCA (µg/L)	1,1-DCE (µg/L)	Vinyl Chloride (µg/L)	Notes
MW-3	1/22/97	..2	..2	..2	..2	..2	..2	..2	..2	..2	..2	..2	..2	..2	1
	4/25/97	..2	..2	..2	..2	..2	..2	..2	..2	..2	..2	..2	..2	..2	1
	8/6/97	--	--	2.1	3.8	<0.5	--	<0.5	<1.2	0.62	--	--	--	--	1
	12/23/97	--	--	<1.0	4.2	<1.0	--	<1.0	<1.0	<1.0	--	--	--	--	1
	3/26/98	..2	..2	..2	..2	..2	..2	..2	..2	..2	..2	..2	..2	..2	3
	12/16/98	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
	2/26/99	--	--	<0.5	4.4	<0.5	--	1.6	<0.5	<0.5	<1.0	<0.5	<0.5	<1.0	
MW-4	5/13/98	--	--	<0.5	31	9.9	--	--	ND	2.8	2.8	<1.0	<1.0	<2.0	3
	12/16/98	--	--	<0.5	53	17	--	<5.0	<0.5	0.94	6.8	<0.5	1.6	<1.0	
	(dup) 12/16/98	--	--	<0.5	52	14	--	<5.0	<0.5	0.88	4.4	<0.5	1.2	<1.0	
	2/26/99	--	--	<0.5	39	28	--	1.4	<0.5	0.97	6.5	<0.5	<0.5	<1.0	
	(dup) 2/26/99	--	--	<0.5	43	36	--	1.7	<0.5	1.3	8.3	<0.5	2.8	<1.0	
MW-5	5/13/98	--	--	<1.0	<1.0	<1.0	--	ND	<1.0	<2.0	<1.0	<1.0	<2.0	3	
	12/16/98	--	--	<0.5	<0.5	<0.5	--	<0.5	<0.5	<0.5	<1.0	<0.5	<0.5	<1.0	
	2/26/99	--	--	<0.5	<0.5	<0.5	--	<0.5	<0.5	<0.5	<1.0	<0.5	<0.5	<1.0	
MW-6	5/13/98	--	--	<1.0	<1.0	<1.0	--	ND	<1.0	<2.0	<1.0	<1.0	<2.0	3	
	12/16/98	--	--	<0.5	<0.5	<0.5	--	<0.5	<0.5	<0.5	<1.0	<0.5	<0.5	<1.0	
	2/26/99	--	--	<0.5	<0.5	<0.5	--	<0.5	<0.5	<0.5	<1.0	<0.5	<0.5	<1.0	
MW-7	5/13/98	--	--	<0.5	8	<1.0	--	ND	<1.0	<2.0	<1.0	3.4	<2.0	3	
	12/16/98	--	--	<0.5	12	<0.5	--	<0.5	<0.5	<0.5	<1.0	<0.5	5.0	<1.0	
	2/26/99	--	--	<0.5	15	<0.5	--	<0.5	<0.5	<0.5	<1.0	<0.5	6.8	<1.0	
MW-8	5/13/98	--	--	<0.5	19	1.9	--	ND	<1.0	<2.0	2.7	1.9	6.0	3	
	12/16/98	--	--	<0.5	40	1.2	--	<0.5	<0.5	<0.5	<1.0	4.0	5.0	6.6	
	2/26/99	--	--	<2.5	39	<2.5	--	<2.5	<2.5	<2.5	<5.0	6.9	4.9	18	
MCLs (California/Fed)		--	--	--	5/-	6/70	--	--	5/5	5/5	--	0.5/5	6/7	0.5/2	

Notes:

- 1 - Data from Table 3 - Summary of Laboratory Results for Volatile Organic Compounds Tanks MF25 and MF26 (United Airlines Hanger Area - Economy Parking Lot Site) Metropolitan Oakland International Airport (MOIA), 1100 Airport Drive, Oakland California by ITSI.
- 2 - Not sampled due to the presence of free product in monitoring well.
- 3 - Data from Table 4 - Results of Additional Site Investigation (United Airlines Hanger Area - Economy Parking Lot Site) Metropolitan Oakland International Airport (MOIA), 1100 Airport Drive, Oakland California, dated October 21, 1998 by ITSI.

MCLs - Maximum Contaminant Levels

- Shaded areas indicate detected concentration exceeds MCL.

Storage?

Table 4. Groundwater Analytical Results - Inorganics
 United Airlines Hanger Economy Parking
 Metropolitan Oakland International Airport

Monitoring Well ID	Date	Ferrous Iron Fe+2 (mg/L)	Ferric Iron Fe+3 (mg/L)	Total Iron (mg/L)	Nitrate NO3 (mg/L)	Sulfate (mg/L)	Ortho-phosphate PO4 (mg/L)	TDS (mg/L)	TOC (mg/L)	Redox (millivolts)	Notes
MW-1	5/15/92	--	--	--	--	--	--	5,900	<5	--	1
	8/7/92	--	--	--	--	--	--	--	<5	--	1
	11/24/92	--	--	--	--	--	--	--	<5	--	1
	2/12/93	--	--	--	--	--	--	--	<5	--	1
	5/17/93	--	--	--	--	--	--	4,100	<5	--	1
	8/3/93	--	--	--	--	--	--	7,700	<5	--	1
	11/25/93	--	--	--	--	--	--	3,790	<5	--	1
	5/9/94	--	--	--	--	--	--	9,600	<0.93	--	1
	8/29/94	--	--	--	--	--	--	3,900	<1.0	--	1
	4/25/95	--	--	--	--	--	--	4,000	--	--	1
	8/11/95	--	--	--	--	--	--	8,500	--	--	1
	11/3/95	--	--	--	--	--	--	6,600	--	--	1
	6/19/96	--	--	--	--	--	--	3,040	--	--	1
	10/24/96	--	--	--	--	--	--	3,090	--	--	1
	1/22/97	--	--	--	--	--	--	4,240	--	--	1
	4/25/97	--	--	--	--	--	--	2,770	--	--	1
	8/6/97	--	--	--	--	--	--	2,430	--	--	1
12/23/97	<0.2	3.9	--	<0.2	120	--	--	3,570	--	--	1
3/26/98	0.41	2.1	2.5	<0.2	110	--	--	3,240	--	--	3
12/16/98	--	--	3.3	<0.1	70	<0.5	--	--	32	40	
2/26/99	0.21	--	0.57	<0.1	110	1.1	--	30	147		
MW-2	4/25/95	--	--	--	--	--	--	1,700	--	--	1
	8/11/95	--	--	--	--	--	--	2,500	--	--	1
	11/3/95	--	--	--	--	--	--	2,000	--	--	1
	6/19/96	--	--	--	--	--	--	--	--	--	1
	10/24/96	--	--	--	--	--	--	--	--	--	1
	1/22/97	--	--	--	--	--	--	--	--	--	1
	4/25/97	--	--	--	--	--	--	--	--	--	1
	8/6/97	--	--	--	--	--	--	--	--	--	1
	4/25/97	--	--	--	--	--	--	--	--	--	1
	12/23/97	-- ²	-- ²	-- ²	-- ²	-- ²	-- ²	-- ²	-- ²	-- ²	1

Table 4. Groundwater Analytical Results - Inorganics
 United Airlines Hanger Economy Parking
 Metropolitan Oakland International Airport

Monitoring Well ID	Date	Ferrous Iron Fe+2 (mg/L)	Ferric Iron Fe+3 (mg/L)	Total Iron (mg/L)	Nitrate NO3 (mg/L)	Sulfate (mg/L)	Ortho-phosphate PO4 (mg/L)	TDS (mg/L)	TOC (mg/L)	Redox (millivolts)	Notes
MW-2	5/13/98	0.53	8.0	--	<0.05	12	0.72	3,240	--	123	3
	12/16/98	--	--	28	<0.1	21	<0.5	--	210	146	
	2/26/99	17	--	36	<0.1	27	0.59	--	100	-235	
MW-3	4/25/95	--	--	--	--	--	--	5,600	--	--	1
	8/11/95	--	--	--	--	--	--	--	--	--	1
	11/3/95	--	--	--	--	--	--	--	--	--	1
	6/19/96	--	--	--	--	--	--	--	--	--	1
	10/24/96	--	--	--	--	--	--	--	--	--	1
	1/22/97	--	--	--	--	--	--	--	--	--	1
	4/25/97	--	--	--	--	--	--	--	--	--	1
	8/6/97	--	--	--	--	--	--	15,100	--	--	1
	4/25/97	--	--	--	--	--	--	13,900	--	--	1
	12/23/97	--	--	--	--	--	--	--	--	--	1
	3/26/98	-- ²	-- ²	-- ²	-- ²	-- ²	-- ²	-- ²	-- ²	-- ²	3
	12/16/98	--	--	--	--	--	--	--	240	157	
2/26/99	--	--	--	--	--	--	--	100	-142		
MW-4	5/13/98	0.53	2.9	--	<0.05	20	2.1	1,420	66	168	3
	12/16/98	--	--	13	<0.1	2.8	4.1	--	140	118	
	12/16/98	--	--	11	<0.1	2.6	4.6	--	110	118	
	2/26/99	<0.01	--	2.7	1.6	56	2.8	--	60	81	
	2/26/99	<0.01	--	2.9	1.3	54	2.9	--	95	81	
MW-5	5/13/98	<0.02	0.7	--	0.36	250	0.47	2,300	--	150	3
	12/16/98	--	--	10	<0.1	340	0.57	--	32	46	
	2/26/99	0.64	--	23	<0.1	260	1.2	--	22	230	
MW-6	5/13/98	<0.02	0.69	--	2.1	400	0.15	4,240	--	126	3
	12/16/98	--	--	26	0.45	400	0.65	--	22	47	
	2/26/99	0.44	--	16	4.3	380	0.89	--	42	262	
MW-7	5/13/98	<0.02	0.62	--	0.9	100	<0.03	1,380	--	0.32	3
	12/16/98	--	--	19	6.9	100	0.53	--	7.7	159	
	2/26/99	0.15	--	14	8.3	82	0.78	--	20	272	

Table 4. Groundwater Analytical Results - Inorganics
 United Airlines Hanger Economy Parking
 Metropolitan Oakland International Airport

Monitoring Well ID	Date	Ferrous Iron Fe+2 (mg/L)	Ferric Iron Fe+3 (mg/L)	Total Iron (mg/L)	Nitrate NO3 (mg/L)	Sulfate (mg/L)	Ortho-phosphate PO4 (mg/L)	TDS (mg/L)	TOC (mg/L)	Redox (millivolts)	Notes
MW-8	5/13/98	<0.02	2.2	--	<0.5	500	0.08	8,300	--	60.4	3
	12/16/98	--	--	37	<0.1	360	<0.5	--	2.4	83	
	2/26/99	0.076	--	26	<0.1	290	0.69	--	63	280	

Notes

- 1 - Data from Table 4 - Summary of Laboratory Results for Inorganic Analytes Tanks MF25 and MF26 (United Airlines Hanger Area - Economy Parking Lot Site) Metropolitan Oakland International Airport (MOIA), 1100 Airport Drive, Oakland California by ITSI.
- 2 - Not sampled due to presence of free product in monitoring well.
- 3 - Data from Table 5 - Results of Additional Site Investigation (United Airlines Hanger Area - Economy Parking Lot Site) Metropolitan Oakland International Airport (MOIA), 1100 Airport Drive, Oakland California, dated October 21, 1998 by ITSI.

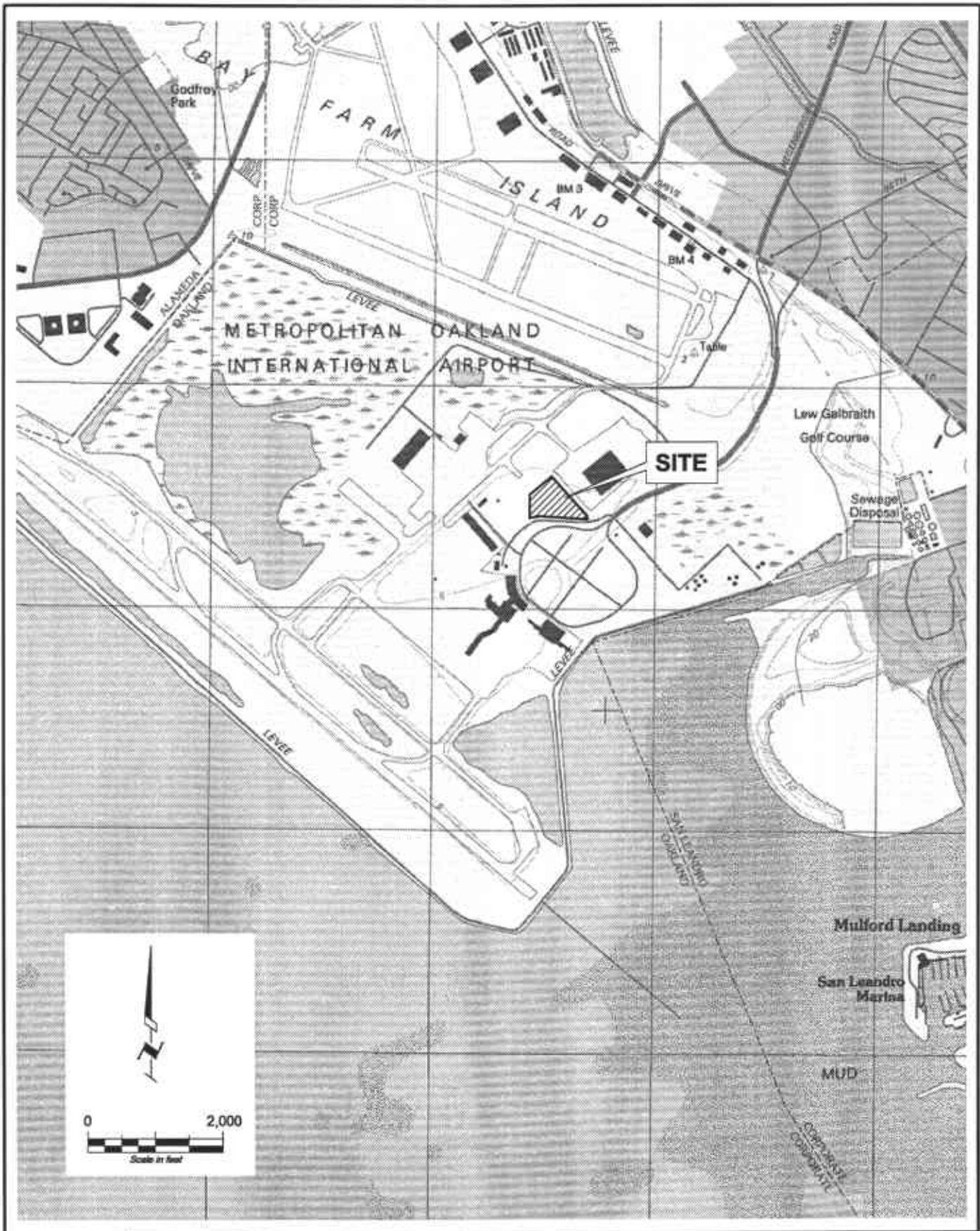
Table 5 - Dissolved Oxygen Concentrations
 United Airlines Hanger Economy Parking
 Metropolitan Oakland International Airport

	MW-1	MW-2	MW-3	MW-4	MW-5	MW-6	MW-7	MW-8
16-Dec-98	2.0	1.2	0.5	1.2	2.0	1.1	2.4	0.8
23-Dec-98	ORC injected in former UST cavity.							
6-Jan-99	>15 ¹	1.1 ²	0.9	>15 ^{1,2}	1.3	2.8	3.0	0.6
12-Jan-99	>15 ¹	0.8	1.0	8.0	0.7	2.4	3.2	0.7
22-Jan-99	>15 ¹	0.6	0.8	1.4	1.1	3.1	4.7	1.4
30-Jan-99	>15 ¹	0.6	1.6	1.0	1.6	4.8	2.6	2.8
26-Feb-99	>15	0.5	0.5	1.4	1.1	4.4	4.0	5.2
30-Mar-99	>15	0.5 ²	0.8	1.0	1.2	1.1	4.2	1.6

All concentrations are presented in milligrams per liter (mg/L)

Notes:

- 1 Milky water; ORC is visibly present in well.
- 2 Diesel odor



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Harding Lawson Associates
 Engineering and
 Environmental Services

Site Location Map
 Economy Parking Lot - United Airlines Hanger Site
 Oakland International Airport
 1100 Airport Drive, Oakland, California

PLATE
1

DRAWN
 AJW

JOB NUMBER
 43145.2

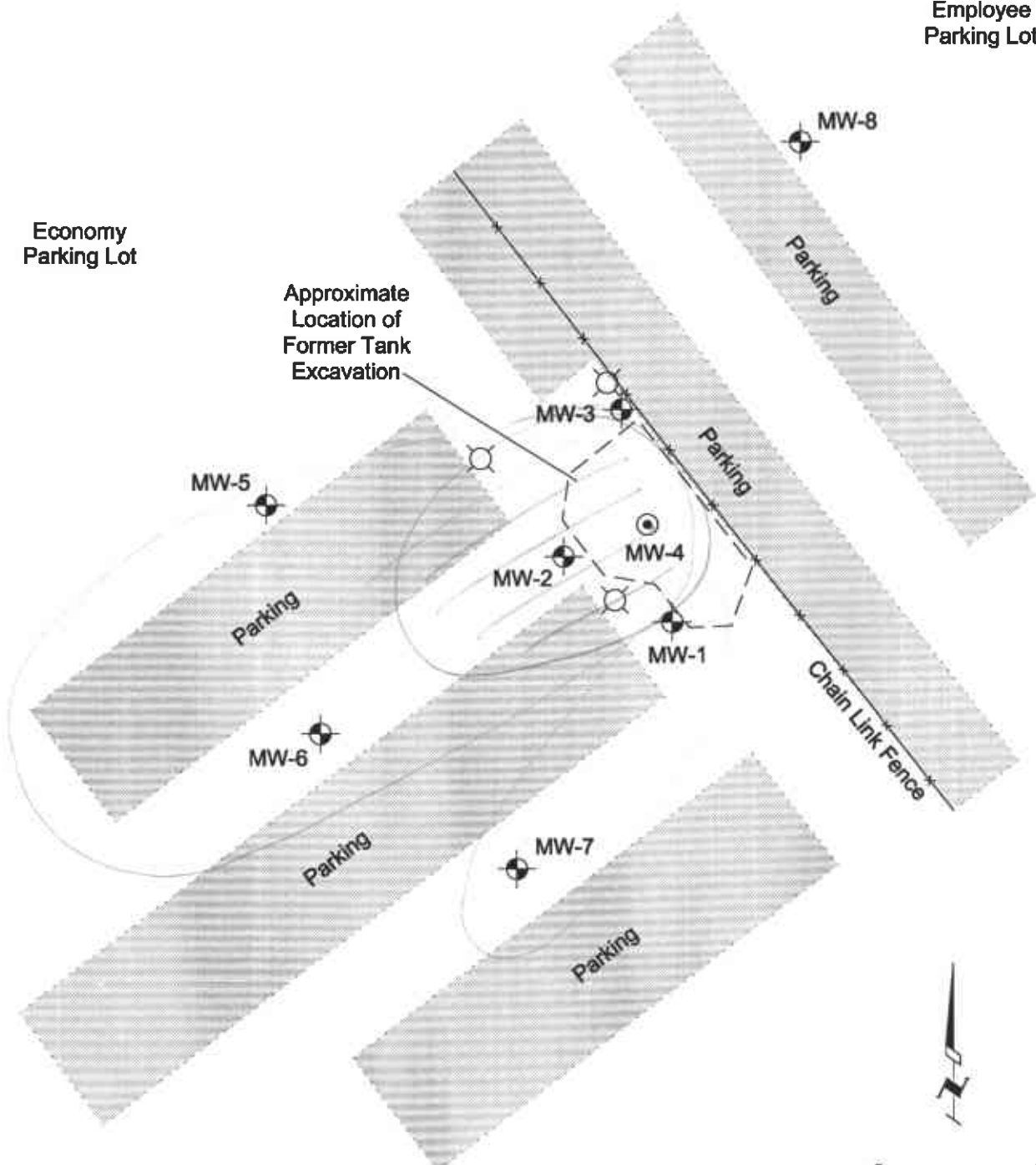
APPROVED
 MS

DATE
 4/29/99

REVISED DATE
 ...

Airport
Employee
Parking Lot

Economy
Parking Lot



LEGEND:

- ⊗ Monitoring Well (2-in. diameter)
- Remediation Well (1-in. diameter)
- ⊗ Light Pole

Reference:
Map based on a figure prepared by
Innovative Technologies Solutions, Inc.

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Harding Lawson Associates
Engineering and
Environmental Services

Site Plan

Economy Parking Lot - United Airlines Hanger Site
Oakland International Airport
1100 Airport Drive, Oakland, California

PLATE

2

DRAWN
AJW

JOB NUMBER
43145.2

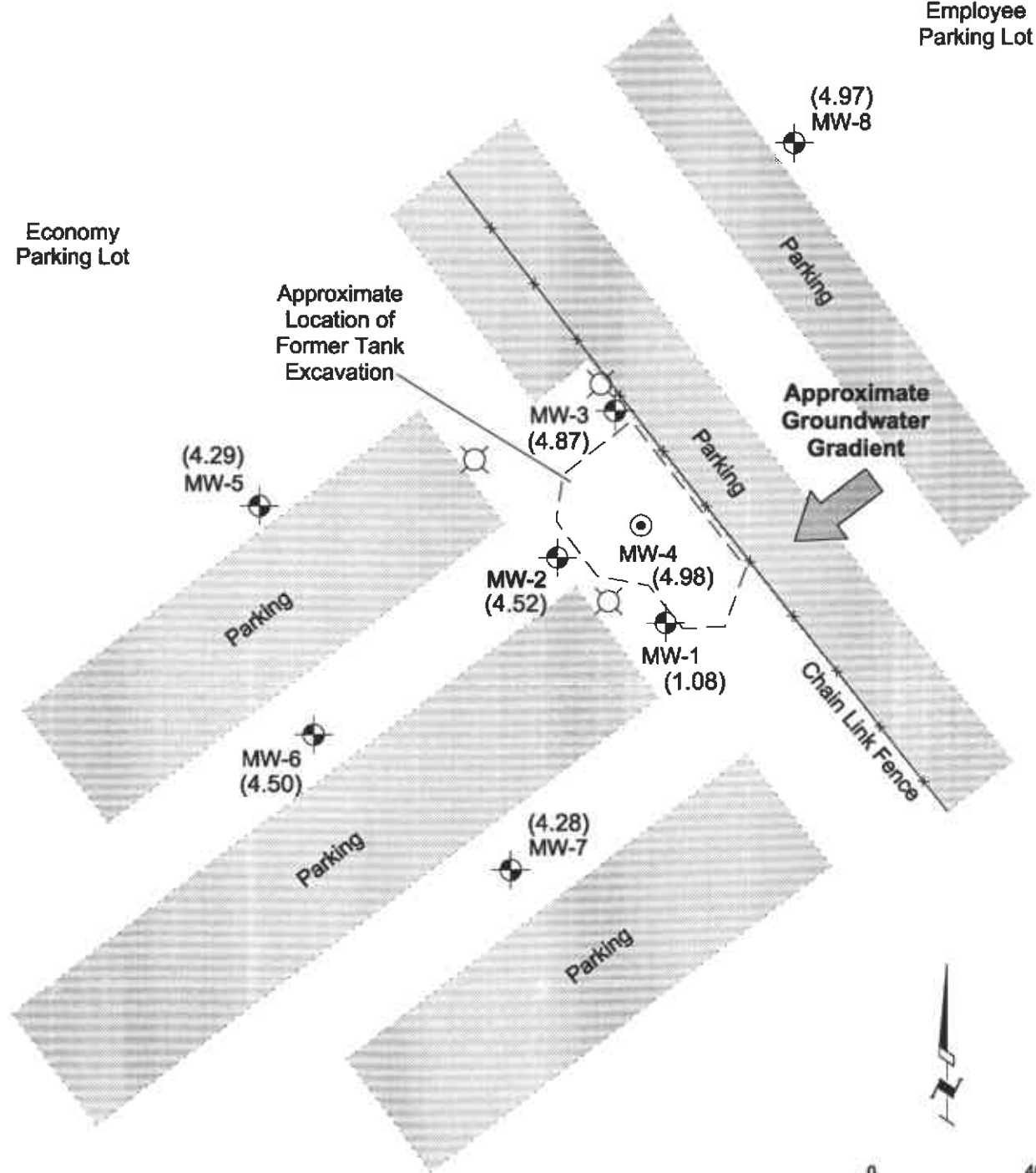
APPROVED
MS

DATE
4/29/99

REVISED DATE
...

Airport Employee Parking Lot

Economy Parking Lot



LEGEND:

- (4.29) Groundwater Elevation (ft msl)
- ⊕ Monitoring Well (2-in. diameter)
- ⊙ Remediation Well (1-in. diameter)
- ⊗ Light Pole

Reference:
Map based on a figure prepared by Innovative Technologies Solutions, Inc.



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Harding Lawson Associates
Engineering and Environmental Services

DRAWN: AJW
JOB NUMBER: 43145.2

Groundwater Elevation Map
Economy Parking Lot - United Airlines Hanger Site
Oakland International Airport
1100 Airport Drive, Oakland, California

APPROVED	DATE	REVISED DATE
MS	4/29/99	...

PLATE
3

APPENDIX A
GROUNDWATER SAMPLING REPORTS



Harding Lawson Associates

Engineering and Environmental Services

GROUND-WATER SAMPLING FORM

Well No. MW-5

Well Type: [X] Monitor [] Extraction [] Other

Well Material: [X] PVC [] St. Steel [] Other

Date 2/26/99 Time 1009

Sampled by HDL

Job Name Part of Oakland - DEC Inj

Job Number 43145.4

Recorded by Heather Fee

WELL PURGING

PURGE VOLUME

Casing Diameter (D in inches):

[X] 2-inch [] 4-inch [] 6-inch [] Other

Total Depth of Casing (TD in feet BTOC): 7.92

Water Level Depth (WL in feet BTOC): 1.50

Number of Well Volumes to be purged (# Vols)

[X] 3 [] 4 [] 5 [] 10 [] Other

PURGE METHOD

[X] Bailer - Type: teflon

[] Submersible [] Centrifugal [] Bladder; Pump No.:

[] Other - Type:

PUMP INTAKE SETTING

[] Near Bottom [] Near Top [] Other

Depth in feet (BTOC): from to Screen Interval in Feet (BTOC) from to

PURGE VOLUME CALCULATION:

(7.92 - 1.50) x 2^2 x 3 x 0.0408 = 3.1 gallons

PURGE TIME

1000 Start 1005 Stop 5 Elapsed

PURGE RATE

Initial Final 3.1 gallons

ACTUAL PURGE VOLUME

FIELD PARAMETER MEASUREMENT

Table with 5 columns: Minutes Since Pumping Began, pH, Cond. (µmhos/cm), T (°C/°F), Other. Rows include Initial, 1, 2, 3.1, and Final measurements.

Table with 5 columns: Minutes Since Pumping Began, pH, Cond. (µmhos/cm), T (°C/°F), Other. Includes a row for Meter Nos.

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

Discharge Water Disposal: [] Sanitary Sewer [] Storm Sewer [] Other 55-drum

WELL SAMPLING

SAMPLING METHOD

[X] Bailer - Type: disposable teflon

[] Same As Above

[] Grab - Type:

[] Submersible [] Centrifugal [] Bladder; Pump No.:

[] Other - Type:

SAMPLING DISTRIBUTION

Sample Series: 9908

Table with 6 columns: Sample No., Volume/Cont., Analysis Requested, Preservatives, Lab, Comments. Includes sample EPO4 with detailed analysis and lab information.

QUALITY CONTROL SAMPLES

Duplicate Samples

Table with 2 columns: Original Sample No., Duplicate Sample No.

Blank Samples

Table with 2 columns: Type, Sample No.

Other Samples

Table with 2 columns: Type, Sample No.

APPENDIX B
LABORATORY REPORTS



Sequoia Analytical

680 Chesapeake Drive
404 N. Wiget Lane
819 Striker Avenue, Suite 8
1455 McDowell Blvd, North, Ste. D

Redwood City, CA 94063
Walnut Creek, CA 94598
Sacramento, CA 95834
Petaluma, CA 94954

(650) 364-9600
(925) 988-9600
(916) 921-9600
(707) 792-1865

FAX (650) 364-9233
FAX (925) 988-9673
FAX (916) 921-0100
FAX (707) 792-0342

Harding Lawson Associates
383 Fourth Street, 3rd Floor
Oakland, CA 94607
Attention: Mike Sides

Client Project ID: Port of Oakland #43145.4
Sample Matrix: Water
Analysis Method: EPA 5030/8015 Mod./8020
First Sample #: 902-2499

Sampled: Feb 26, 1999
Received: Feb 26, 1999
Reported: Mar 12, 1999

QC Batch Number: GC031099 GC031099 GC030999
802002A 802002A 802005A

TOTAL PURGEABLE PETROLEUM HYDROCARBONS with BTEX / MTBE

Analyte	Reporting Limit µg/L	Sample I.D. 902-2499 9908EP07	Sample I.D. 902-2500 9908EP08	Sample I.D. 902-2501 9908EP09
Purgeable Hydrocarbons	50	5,700	4,700	69
Benzene	0.50	16	86	0.96
Toluene	0.50	16	210	N.D.
Ethyl Benzene	0.50	10	64	N.D.
Total Xylenes	0.50	40	350	N.D.
MTBE	2.5	N.D.	N.D.	2.6
Chromatogram Pattern:		Gasoline	Gasoline	Gasoline

Quality Control Data

Report Limit Multiplication Factor:	20	40	1.0
Date Analyzed:	3/10/99	3/10/99	3/9/99
Instrument Identification:	HP-2	HP-2	HP-5
Surrogate Recovery, %: (QC Limits = 70-130%)	115	112	98

Purgeable Hydrocarbons are quantitated against a fresh gasoline standard.
Analytes reported as N.D. were not detected above the stated reporting limit.

SEQUOIA ANALYTICAL, #1271

Melissa A. Brewer

Melissa A. Brewer
Project Manager





Sequoia Analytical

680 Chesapeake Drive
404 N. Wiger Lane
819 Striker Avenue, Suite 8
1455 McDowell Blvd. North, Ste. D

Redwood City, CA 94063
Walnut Creek, CA 94598
Sacramento, CA 95834
Petaluma, CA 94954

(650) 364-9600
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(707) 792-1865

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FAX (925) 988-9673
FAX (916) 921-0100
FAX (707) 792-0342

Harding Lawson Associates
383 Fourth Street, 3rd Floor
Oakland, CA 94607
Attention: Mike Sides

Client Project ID: Port of Oakland #43145.4
Sample Matrix: Water
Analysis Method: EPA 5030/8015 Mod./8020
First Sample #: 902-2493

Sampled: Feb 26, 1999
Received: Feb 26, 1999
Reported: Mar 12, 1999

QC Batch Number: GC030999 GC030699 GC030699 GC030899 GC030899 GC031099
802002A 802005A 802005A 802005A 802005A 802002A

TOTAL PURGEABLE PETROLEUM HYDROCARBONS with BTEX / MTBE

Analyte	Reporting Limit µg/L	Sample I.D. 902-2493 9908EP01	Sample I.D. 902-2494 9908EP02	Sample I.D. 902-2495 9908EP03	Sample I.D. 902-2496 9908EP04	Sample I.D. 902-2497 9908EP05	Sample I.D. 902-2498 9908EP06
Purgeable Hydrocarbons	50	N.D.	N.D.	N.D.	N.D.	1,200	1,200
Benzene	0.50	3.5	N.D.	N.D.	N.D.	13	16
Toluene	0.50	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
Ethyl Benzene	0.50	N.D.	N.D.	N.D.	N.D.	N.D.	6.2
Total Xylenes	0.50	N.D.	N.D.	N.D.	N.D.	22	20
MTBE	2.5	2.7	N.D.	N.D.	N.D.	N.D.	N.D.
Chromatogram Pattern:		--	--	--	--	Gasoline	Gasoline

Quality Control Data

Report Limit Multiplication Factor:	1.0	1.0	1.0	1.0	20	5.0
Date Analyzed:	3/9/99	3/7/99	3/7/99	3/8/99	3/8/99	3/10/99
Instrument Identification:	HP-2	HP-5	HP-5	HP-5	HP-5	HP-2
Surrogate Recovery, %: (QC Limits = 70-130%)	104	87	92	96	105	120

Purgeable Hydrocarbons are quantitated against a fresh gasoline standard.
Analytes reported as N.D. were not detected above the stated reporting limit.

SEQUOIA ANALYTICAL, #1271

Melissa A. Brewer

Melissa A. Brewer
Project Manager





Sequoia Analytical

680 Chesapeake Drive
404 N. Wiger Lane
819 Striker Avenue, Suite 8
1455 McDowell Blvd. North, Ste. D

Redwood City, CA 94063
Walnut Creek, CA 94598
Sacramento, CA 95834
Petaluma, CA 94954

(650) 364-9600
(925) 988-9600
(916) 921-9600
(707) 792-1865

FAX (650) 364-9233
FAX (925) 988-9673
FAX (916) 921-0100
FAX (707) 792-0342

Harding Lawson Associates
383 Fourth Street, 3rd Floor
Oakland, CA 94607
Attention: Mike Sides

Client Project ID: Port of Oakland #43145.4
Sample Matrix: Water
Analysis Method: EPA 3510/8015 Modified
First Sample #: 902-2500

Sampled: Feb 26, 1999
Received: Feb 26, 1999
Reported: Mar 12, 1999

QC Batch Number: SP030499 SP030499
8015EXA 8015EXA

FUEL FINGERPRINT

Analyte	Reporting Limit µg/L	Sample I.D. 902-2500 9908EP08	Sample I.D. 902-2501 9908EP09
Diesel (C9-C24)	50	N.I.	670
Jet Fuel A (C9-C17)	50	18,000	N.I.
Motor Oil (> C16)	250	7,800	350
Unidentified Extractable Hydrocarbons	50	N.I.	N.I.

Quality Control Data

Report Limit Multiplication Factor:	20	1.0
Date Extracted:	3/4/99	3/4/99
Date Analyzed:	3/9/99	3/5/99
Instrument Identification:	HP-3B	HP-3A

Unidentified Extractable Hydrocarbons are quantitated against a fresh diesel standard.
Analytes reported as N.I. (None Identified) were not detected above the stated reporting limit.

SEQUOIA ANALYTICAL, #1271

Melissa A. Brewer

Melissa A. Brewer
Project Manager

9022493.HLA <4>





Sequoia Analytical

680 Chesapeake Drive
404 N. Wiget Lane
819 Striker Avenue, Suite 8
1455 McDowell Blvd. North, Ste. D

Redwood City, CA 94063
Walnut Creek, CA 94598
Sacramento, CA 95834
Petaluma, CA 94954

(650) 364-9600
(925) 988-9600
(916) 921-9600
(707) 792-1865

FAX (650) 364-9233
FAX (925) 988-9673
FAX (916) 921-0100
FAX (707) 792-0342

Harding Lawson Associates
383 Fourth Street, 3rd Floor
Oakland, CA 94607
Attention: Mike Sides

Client Project ID: Port of Oakland #43145.4
Sample Matrix: Water
Analysis Method: EPA 3510/8015 Modified
First Sample #: 902-2493

Sampled: Feb 26, 1999
Received: Feb 26, 1999
Reported: Mar 12, 1999

QC Batch Number: SP030499 SP030499 SP030499 SP030499 SP030499 SP030499
8015EXA 8015EXA 8015EXA 8015EXA 8015EXA 8015EXA

FUEL FINGERPRINT

Analyte	Reporting Limit µg/L	Sample I.D. 902-2493 9908EP01 *	Sample I.D. 902-2494 9908EP02 *	Sample I.D. 902-2495 9908EP03 *	Sample I.D. 902-2496 9908EP04 *	Sample I.D. 902-2497 9908EP05	Sample I.D. 902-2498 9908EP06
Diesel (C9-C24)	50	150	N.I.	83	69	N.I.	N.I.
Jet Fuel A (C9-C17)	50	N.I.	N.I.	N.I.	N.I.	5,500	5,200
Motor Oil (>C16)	250	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.
Unidentified Extractable Hydrocarbons	50	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.

Quality Control Data

Report Limit Multiplication Factor:	1.0	1.0	1.0	1.0	10	10
Date Extracted:	3/4/99	3/4/99	3/4/99	3/4/99	3/4/99	3/4/99
Date Analyzed:	3/4/99	3/9/99	3/5/99	3/5/99	3/9/99	3/9/99
Instrument Identification:	HP-3A	HP-3B	HP-3A	HP-3A	HP-3B	HP-3B

Unidentified Extractable Hydrocarbons are quantitated against a fresh diesel standard.
Analytes reported as N.I. (None Identified) were not detected above the stated reporting limit.

SEQUOIA ANALYTICAL, #1271

Please Note:

* The Surrogate Recoveries were below control limit for samples 902-2493 thru -2496.
There was not additional sample available for re-extraction. Results should be considered as estimates.

Melissa A. Brewer

Melissa A. Brewer
Project Manager





Sequoia Analytical

680 Chesapeake Drive
404 N. Wiget Lane
819 Striker Avenue, Suite 8
1455 McDowell Blvd. North, Ste. D

Redwood City, CA 94063
Walnut Creek, CA 94598
Sacramento, CA 95834
Petaluma, CA 94954

(650) 364-9600
(925) 988-9600
(916) 921-9600
(707) 792-1865

FAX (650) 364-9233
FAX (925) 988-9673
FAX (916) 921-0100
FAX (707) 792-0342

Harding Lawson Associates
383 Fourth Street, 3rd Floor
Oakland, CA 94607
Attention: Mike Sides

Client Project ID: Port of Oakland #43145.4
Sample Descript: Water, 9908EP01
Analysis Method: EPA 8010
Lab Number: 902-2493

Sampled: Feb 26, 1999
Received: Feb 26, 1999
Analyzed: Mar 10, 1999
Reported: Mar 12, 1999

QC Batch Number: GC031099801006A

Instrument ID: HP-6

HALOGENATED VOLATILE ORGANICS (EPA 8010)

Analyte	Detection Limit µg/L	Sample Results µg/L
Bromodichloromethane.....	2.5	N.D.
Bromoform.....	2.5	N.D.
Bromomethane.....	5.0	N.D.
Carbon tetrachloride.....	2.5	N.D.
Chlorobenzene.....	2.5	N.D.
Chloroethane.....	5.0	N.D.
Chloroform.....	2.5	N.D.
Chloromethane.....	5.0	N.D.
Dibromochloromethane.....	2.5	N.D.
1,3-Dichlorobenzene.....	2.5	N.D.
1,4-Dichlorobenzene.....	2.5	N.D.
1,2-Dichlorobenzene.....	2.5	N.D.
1,1-Dichloroethane.....	2.5	390
1,2-Dichloroethane.....	2.5	6.9
1,1-Dichloroethene.....	2.5	490
cis-1,2-Dichloroethene.....	2.5	N.D.
trans-1,2-Dichloroethene.....	2.5	N.D.
1,2-Dichloropropane.....	2.5	N.D.
cis-1,3-Dichloropropene.....	2.5	N.D.
trans-1,3-Dichloropropene.....	2.5	N.D.
Methylene chloride.....	25	N.D.
1,1,2,2-Tetrachloroethane.....	2.5	N.D.
Tetrachloroethene.....	2.5	N.D.
1,1,1-Trichloroethane.....	2.5	N.D.
1,1,2-Trichloroethane.....	2.5	N.D.
Trichloroethene.....	2.5	N.D.
Trichlorofluoromethane.....	2.5	N.D.
Vinyl chloride.....	5.0	10

Surrogates	Control Limit %		% Recovery
Dibromodifluoromethane.....	50	150.....	82
4-Bromofluorobenzene.....	50	150.....	64

Analytes reported as N.D. were not present above the stated limit of detection. Because matrix effects and/or other factors required additional sample dilution, detection limits for this sample have been raised.

SEQUOIA ANALYTICAL, #1271

Melissa A. Brewer

Melissa A. Brewer
Project Manager





Sequoia Analytical

680 Chesapeake Drive
404 N. Wiget Lane
819 Striker Avenue, Suite 8
1455 McDowell Blvd. North, Ste. D

Redwood City, CA 94063
Walnut Creek, CA 94598
Sacramento, CA 95834
Petaluma, CA 94954

(650) 364-9600
(925) 988-9600
(916) 921-9600
(707) 792-1865

FAX (650) 364-9233
FAX (925) 988-9673
FAX (916) 921-0100
FAX (707) 792-0342

Harding Lawson Associates
383 Fourth Street, 3rd Floor
Oakland, CA 94607
Attention: Mike Sides

Client Project ID: Port of Oakland #43145.4
Sample Descript: Water, 9908EP02
Analysis Method: EPA 8010
Lab Number: 902-2494

Sampled: Feb 26, 1999
Received: Feb 26, 1999
Analyzed: Mar 10, 1999
Reported: Mar 12, 1999

QC Batch Number: GC031099801006A

Instrument ID: HP-6

HALOGENATED VOLATILE ORGANICS (EPA 8010)

Analyte	Detection Limit µg/L	Sample Results µg/L
Bromodichloromethane.....	0.50	N.D.
Bromoform.....	0.50	N.D.
Bromomethane.....	1.0	N.D.
Carbon tetrachloride.....	0.50	N.D.
Chlorobenzene.....	0.50	N.D.
Chloroethane.....	1.0	N.D.
Chloroform.....	0.50	N.D.
Chloromethane.....	1.0	N.D.
Dibromochloromethane.....	0.50	N.D.
1,3-Dichlorobenzene.....	0.50	N.D.
1,4-Dichlorobenzene.....	0.50	N.D.
1,2-Dichlorobenzene.....	0.50	N.D.
1,1-Dichloroethane.....	0.50	15
1,2-Dichloroethane.....	0.50	N.D.
1,1-Dichloroethene.....	0.50	6.8
cis-1,2-Dichloroethene.....	0.50	N.D.
trans-1,2-Dichloroethene.....	0.50	N.D.
1,2-Dichloropropane.....	0.50	N.D.
cis-1,3-Dichloropropene.....	0.50	N.D.
trans-1,3-Dichloropropene.....	0.50	N.D.
Methylene chloride.....	5.0	N.D.
1,1,1,2-Tetrachloroethane.....	0.50	N.D.
Tetrachloroethene.....	0.50	N.D.
1,1,1-Trichloroethane.....	0.50	N.D.
1,1,2-Trichloroethane.....	0.50	N.D.
Trichloroethene.....	0.50	N.D.
Trichlorofluoromethane.....	0.50	N.D.
Vinyl chloride.....	1.0	N.D.
Surrogates	Control Limit %	% Recovery
Dibromodifluoromethane.....	50	150
4-Bromofluorobenzene.....	50	150

Analytes reported as N.D. were not present above the stated limit of detection.

SEQUOIA ANALYTICAL, #1271

Melissa A. Brewer

Melissa A. Brewer
Project Manager





Sequoia Analytical

680 Chesapeake Drive
404 N. Wiget Lane
819 Striker Avenue, Suite 8
1455 McDowell Blvd. North, Ste. D

Redwood City, CA 94063
Walnut Creek, CA 94598
Sacramento, CA 95834
Petaluma, CA 94954

(650) 364-9600
(925) 988-9600
(916) 921-9600
(707) 792-1865

FAX (650) 364-9233
FAX (925) 988-9673
FAX (916) 921-0100
FAX (707) 792-0342

Harding Lawson Associates
383 Fourth Street, 3rd Floor
Oakland, CA 94607
Attention: Mike Sides

Client Project ID: Port of Oakland #43145.4
Sample Descript: Water, 9908EP03
Analysis Method: EPA 8010
Lab Number: 902-2495

Sampled: Feb 26, 1999
Received: Feb 26, 1999
Analyzed: Mar 10, 1999
Reported: Mar 12, 1999

QC Batch Number: GC031099801006A

Instrument ID: HP-6

HALOGENATED VOLATILE ORGANICS (EPA 8010)

Analyte	Detection Limit µg/L	Sample Results µg/L
Bromodichloromethane.....	0.50	N.D.
Bromoform.....	0.50	N.D.
Bromomethane.....	1.0	N.D.
Carbon tetrachloride.....	0.50	N.D.
Chlorobenzene.....	0.50	N.D.
Chloroethane.....	1.0	N.D.
Chloroform.....	0.50	N.D.
Chloromethane.....	1.0	N.D.
Dibromochloromethane.....	0.50	N.D.
1,3-Dichlorobenzene.....	0.50	N.D.
1,4-Dichlorobenzene.....	0.50	N.D.
1,2-Dichlorobenzene.....	0.50	N.D.
1,1-Dichloroethane.....	0.50	N.D.
1,2-Dichloroethane.....	0.50	N.D.
1,1-Dichloroethene.....	0.50	N.D.
cis-1,2-Dichloroethene.....	0.50	N.D.
trans-1,2-Dichloroethene.....	0.50	N.D.
1,2-Dichloropropane.....	0.50	N.D.
cis-1,3-Dichloropropene.....	0.50	N.D.
trans-1,3-Dichloropropene.....	0.50	N.D.
Methylene chloride.....	5.0	N.D.
1,1,2,2-Tetrachloroethane.....	0.50	N.D.
Tetrachloroethene.....	0.50	N.D.
1,1,1-Trichloroethane.....	0.50	N.D.
1,1,2-Trichloroethane.....	0.50	N.D.
Trichloroethene.....	0.50	N.D.
Trichlorofluoromethane.....	0.50	N.D.
Vinyl chloride.....	1.0	N.D.
Surrogates	Control Limit %	% Recovery
Dibromodifluoromethane.....	50 150	78
4-Bromofluorobenzene.....	50 150	71

Analytes reported as N.D. were not present above the stated limit of detection.

SEQUOIA ANALYTICAL, #1271

Melissa A. Brewer

Melissa A. Brewer
Project Manager

9022493.HLA <7>





Sequoia Analytical

680 Chesapeake Drive
404 N. Wiget Lane
819 Striker Avenue, Suite 8
1455 McDowell Blvd. North, Ste. D

Redwood City, CA 94063
Walnut Creek, CA 94598
Sacramento, CA 95834
Petaluma, CA 94954

(650) 364-9600
(925) 988-9600
(916) 921-9600
(707) 792-1865

FAX (650) 364-9233
FAX (925) 988-9673
FAX (916) 921-0100
FAX (707) 792-0342

Harding Lawson Associates
383 Fourth Street, 3rd Floor
Oakland, CA 94607
Attention: Mike Sides

Client Project ID: Port of Oakland #43145.4
Sample Descript: Water, 9908EP04
Analysis Method: EPA 8010
Lab Number: 902-2496

Sampled: Feb 26, 1999
Received: Feb 26, 1999
Analyzed: Mar 10, 1999
Reported: Mar 12, 1999

QC Batch Number: GC031099801006A

Instrument ID: HP-6

HALOGENATED VOLATILE ORGANICS (EPA 8010)

Analyte	Detection Limit µg/L	Sample Results µg/L
Bromodichloromethane.....	0.50	N.D.
Bromoform.....	0.50	N.D.
Bromomethane.....	1.0	N.D.
Carbon tetrachloride.....	0.50	N.D.
Chlorobenzene.....	0.50	N.D.
Chloroethane.....	1.0	N.D.
Chloroform.....	0.50	N.D.
Chloromethane.....	1.0	N.D.
Dibromochloromethane.....	0.50	N.D.
1,3-Dichlorobenzene.....	0.50	N.D.
1,4-Dichlorobenzene.....	0.50	N.D.
1,2-Dichlorobenzene.....	0.50	N.D.
1,1-Dichloroethane.....	0.50	N.D.
1,2-Dichloroethane.....	0.50	N.D.
1,1-Dichloroethene.....	0.50	N.D.
cis-1,2-Dichloroethene.....	0.50	N.D.
trans-1,2-Dichloroethene.....	0.50	N.D.
1,2-Dichloropropane.....	0.50	N.D.
cis-1,3-Dichloropropene.....	0.50	N.D.
trans-1,3-Dichloropropene.....	0.50	N.D.
Methylene chloride.....	5.0	N.D.
1,1,2,2-Tetrachloroethane.....	0.50	N.D.
Tetrachloroethene.....	0.50	N.D.
1,1,1-Trichloroethane.....	0.50	N.D.
1,1,2-Trichloroethane.....	0.50	N.D.
Trichloroethene.....	0.50	N.D.
Trichlorofluoromethane.....	0.50	N.D.
Vinyl chloride.....	1.0	N.D.
Surrogates	Control Limit %	% Recovery
Dibromodifluoromethane.....	50	150..... 76
4-Bromofluorobenzene.....	50	150..... 61

Analytes reported as N.D. were not present above the stated limit of detection.

SEQUOIA ANALYTICAL, #1271

Melissa A. Brewer

Melissa A. Brewer
Project Manager





Sequoia Analytical

680 Chesapeake Drive
404 N. Wiger Lane
819 Striker Avenue, Suite 8
1455 McDowell Blvd. North, Ste. D

Redwood City, CA 94063
Walnut Creek, CA 94598
Sacramento, CA 95834
Petaluma, CA 94954

(650) 364-9600
(925) 988-9600
(916) 921-9600
(707) 792-1865

FAX (650) 364-9233
FAX (925) 988-9673
FAX (916) 921-0100
FAX (707) 792-0342

Harding Lawson Associates
383 Fourth Street, 3rd Floor
Oakland, CA 94607
Attention: Mike Sides

Client Project ID: Port of Oakland #43145.4
Sample Descript: Water, 9908EP05
Analysis Method: EPA 8010
Lab Number: 902-2497

Sampled: Feb 26, 1999
Received: Feb 26, 1999
Analyzed: Mar 10, 1999
Reported: Mar 12, 1999

QC Batch Number: GC031099801006A

Instrument ID: HP-6

HALOGENATED VOLATILE ORGANICS (EPA 8010)

Analyte	Detection Limit µg/L	Sample Results µg/L
Bromodichloromethane.....	0.50	N.D.
Bromoform.....	0.50	N.D.
Bromomethane.....	1.0	N.D.
Carbon tetrachloride.....	0.50	N.D.
Chlorobenzene.....	0.50	N.D.
Chloroethane.....	1.0	6.5
Chloroform.....	0.50	N.D.
Chloromethane.....	1.0	N.D.
Dibromochloromethane.....	0.50	N.D.
1,3-Dichlorobenzene.....	0.50	N.D.
1,4-Dichlorobenzene.....	0.50	N.D.
1,2-Dichlorobenzene.....	0.50	N.D.
1,1-Dichloroethane.....	0.50	39
1,2-Dichloroethane.....	0.50	N.D.
1,1-Dichloroethene.....	0.50	N.D.
cis-1,2-Dichloroethene.....	0.50	28
trans-1,2-Dichloroethene.....	0.50	N.D.
1,2-Dichloropropane.....	0.50	N.D.
cis-1,3-Dichloropropene.....	0.50	N.D.
trans-1,3-Dichloropropene.....	0.50	N.D.
Methylene chloride.....	5.0	N.D.
1,1,2,2-Tetrachloroethane.....	0.50	N.D.
Tetrachloroethene.....	0.50	0.97
1,1,1-Trichloroethane.....	0.50	1.4
1,1,2-Trichloroethane.....	0.50	N.D.
Trichloroethene.....	0.50	N.D.
Trichlorofluoromethane.....	0.50	N.D.
Vinyl chloride.....	1.0	N.D.

Surrogates	Control Limit %	% Recovery
Dibromodifluoromethane.....	50 150.....	88
4-Bromofluorobenzene.....	50 150.....	73

Analytes reported as N.D. were not present above the stated limit of detection.

SEQUOIA ANALYTICAL, #1271

Melissa A. Brewer

Melissa A. Brewer
Project Manager





Sequoia Analytical

680 Chesapeake Drive
404 N. Wiget Lane
819 Striker Avenue, Suite 8
1455 McDowell Blvd. North, Ste. D

Redwood City, CA 94063
Walnut Creek, CA 94598
Sacramento, CA 95834
Petaluma, CA 94954

(650) 364-9600
(925) 988-9600
(916) 921-9600
(707) 792-1865

FAX (650) 364-9233
FAX (925) 988-9673
FAX (916) 921-0100
FAX (707) 792-0342

Harding Lawson Associates
383 Fourth Street, 3rd Floor
Oakland, CA 94607
Attention: Mike Sides

Client Project ID: Port of Oakland #43145.4
Sample Descript: Water, 9908EP06
Analysis Method: EPA 8010
Lab Number: 902-2498

Sampled: Feb 26, 1999
Received: Feb 26, 1999
Analyzed: Mar 10, 1999
Reported: Mar 12, 1999

QC Batch Number: GC031099801006A

Instrument ID: HP-6

HALOGENATED VOLATILE ORGANICS (EPA 8010)

Analyte	Detection Limit µg/L	Sample Results µg/L
Bromodichloromethane.....	0.50	N.D.
Bromoform.....	0.50	N.D.
Bromomethane.....	1.0	N.D.
Carbon tetrachloride.....	0.50	N.D.
Chlorobenzene.....	0.50	N.D.
Chloroethane.....	1.0	8.3
Chloroform.....	0.50	N.D.
Chloromethane.....	1.0	N.D.
Dibromochloromethane.....	0.50	N.D.
1,3-Dichlorobenzene.....	0.50	N.D.
1,4-Dichlorobenzene.....	0.50	N.D.
1,2-Dichlorobenzene.....	0.50	N.D.
1,1-Dichloroethane.....	0.50	43
1,2-Dichloroethane.....	0.50	N.D.
1,1-Dichloroethene.....	0.50	2.8
cis-1,2-Dichloroethene.....	0.50	36
trans-1,2-Dichloroethene.....	0.50	N.D.
1,2-Dichloropropane.....	0.50	N.D.
cis-1,3-Dichloropropene.....	0.50	N.D.
trans-1,3-Dichloropropene.....	0.50	N.D.
Methylene chloride.....	5.0	N.D.
1,1,2,2-Tetrachloroethane.....	0.50	N.D.
Tetrachloroethene.....	0.50	1.3
1,1,1-Trichloroethane.....	0.50	1.7
1,1,2-Trichloroethane.....	0.50	N.D.
Trichloroethene.....	0.50	N.D.
Trichlorofluoromethane.....	0.50	N.D.
Vinyl chloride.....	1.0	N.D.

Surrogates	Control Limit %	% Recovery	
Dibromodifluoromethane.....	50	150	87
4-Bromofluorobenzene.....	50	150	67

Analytes reported as N.D. were not present above the stated limit of detection.

SEQUOIA ANALYTICAL, #1271

Melissa A. Brewer

Melissa A. Brewer
Project Manager





Sequoia Analytical

680 Chesapeake Drive
404 N. Wiget Lane
819 Striker Avenue, Suite 8
1455 McDowell Blvd. North, Ste. D

Redwood City, CA 94063
Walnut Creek, CA 94598
Sacramento, CA 95834
Petaluma, CA 94954

(650) 364-9600
(925) 988-9600
(916) 921-9600
(707) 792-1865

FAX (650) 364-9233
FAX (925) 988-9673
FAX (916) 921-0100
FAX (707) 792-0342

Harding Lawson Associates
383 Fourth Street, 3rd Floor
Oakland, CA 94607
Attention: Mike Sides

Client Project ID: Port of Oakland #43145.4
Sample Descript: Water, 9908EP07
Analysis Method: EPA 8010
Lab Number: 902-2499

Sampled: Feb 26, 1999
Received: Feb 26, 1999
Analyzed: Mar 11, 1999
Reported: Mar 12, 1999

QC Batch Number: GC031199801006A

Instrument ID: HP-6

HALOGENATED VOLATILE ORGANICS (EPA 8010)

Analyte	Detection Limit µg/L	Sample Results µg/L
Bromodichloromethane.....	0.50	N.D.
Bromoform.....	0.50	N.D.
Bromomethane.....	1.0	N.D.
Carbon tetrachloride.....	0.50	N.D.
Chlorobenzene.....	0.50	N.D.
Chloroethane.....	1.0	N.D.
Chloroform.....	0.50	N.D.
Chloromethane.....	1.0	N.D.
Dibromochloromethane.....	0.50	N.D.
1,3-Dichlorobenzene.....	0.50	N.D.
1,4-Dichlorobenzene.....	0.50	N.D.
1,2-Dichlorobenzene.....	0.50	N.D.
1,1-Dichloroethane.....	0.50	4.4
1,2-Dichloroethane.....	0.50	N.D.
1,1-Dichloroethene.....	0.50	N.D.
cis-1,2-Dichloroethene.....	0.50	N.D.
trans-1,2-Dichloroethene.....	0.50	N.D.
1,2-Dichloropropane.....	0.50	N.D.
cis-1,3-Dichloropropene.....	0.50	N.D.
trans-1,3-Dichloropropene.....	0.50	N.D.
Methylene chloride.....	5.0	N.D.
1,1,2,2-Tetrachloroethane.....	0.50	N.D.
Tetrachloroethene.....	0.50	N.D.
1,1,1-Trichloroethane.....	0.50	1.6
1,1,2-Trichloroethane.....	0.50	N.D.
Trichloroethene.....	0.50	N.D.
Trichlorofluoromethane.....	0.50	N.D.
Vinyl chloride.....	1.0	N.D.
Surrogates	Control Limit %	% Recovery
Dibromodifluoromethane.....	50 150.....	70
4-Bromofluorobenzene.....	50 150.....	44 *

Analytes reported as N.D. were not present above the stated limit of detection.

SEQUOIA ANALYTICAL, #1271

Please Note:

* Surrogate recovery below control limit due to matrix interference.

Melissa A. Brewer

Melissa A. Brewer
Project Manager





Sequoia Analytical

680 Chesapeake Drive
404 N. Wiget Lane
819 Striker Avenue, Suite 8
1455 McDowell Blvd, North, Ste. D

Redwood City, CA 94063
Walnut Creek, CA 94598
Sacramento, CA 95834
Petaluma, CA 94954

(650) 364-9600
(925) 988-9600
(916) 921-9600
(707) 792-1865

FAX (650) 364-9233
FAX (925) 988-9673
FAX (916) 921-0100
FAX (707) 792-0342

Harding Lawson Associates
383 Fourth Street, 3rd Floor
Oakland, CA 94607
Attention: Mike Sides

Client Project ID: Port of Oakland #43145.4
Sample Descript: Water, 9908EP08
Analysis Method: EPA 8010
Lab Number: 902-2500

Sampled: Feb 26, 1999
Received: Feb 26, 1999
Analyzed: Mar 11, 1999
Reported: Mar 12, 1999

QC Batch Number: GC031199801006A

Instrument ID: HP-6

HALOGENATED VOLATILE ORGANICS (EPA 8010)

Analyte	Detection Limit µg/L	Sample Results µg/L
Bromodichloromethane.....	1.3	N.D.
Bromoform.....	1.3	N.D.
Bromomethane.....	2.5	N.D.
Carbon tetrachloride.....	1.3	N.D.
Chlorobenzene.....	1.3	N.D.
Chloroethane.....	2.5	N.D.
Chloroform.....	1.3	N.D.
Chloromethane.....	2.5	N.D.
Dibromochloromethane.....	1.3	N.D.
1,3-Dichlorobenzene.....	1.3	N.D.
1,4-Dichlorobenzene.....	1.3	N.D.
1,2-Dichlorobenzene.....	1.3	N.D.
1,1-Dichloroethane.....	1.3	19
1,2-Dichloroethane.....	1.3	N.D.
1,1-Dichloroethene.....	1.3	N.D.
cis-1,2-Dichloroethene.....	1.3	57
trans-1,2-Dichloroethene.....	1.3	N.D.
1,2-Dichloropropane.....	1.3	N.D.
cis-1,3-Dichloropropene.....	1.3	N.D.
trans-1,3-Dichloropropene.....	1.3	N.D.
Methylene chloride.....	1.3	N.D.
1,1,2,2-Tetrachloroethane.....	1.3	N.D.
Tetrachloroethene.....	1.3	N.D.
1,1,1-Trichloroethane.....	1.3	2.9
1,1,2-Trichloroethane.....	1.3	N.D.
Trichloroethene.....	1.3	N.D.
Trichlorofluoromethane.....	1.3	N.D.
Vinyl chloride.....	2.5	N.D.

Surrogates	Control Limit %	% Recovery
Dibromodifluoromethane.....	50	150
4-Bromofluorobenzene.....	50	150

Analytes reported as N.D. were not present above the stated limit of detection. Because matrix effects and/or other factors required additional sample dilution, detection limits for this sample have been raised.

SEQUOIA ANALYTICAL, #1271

Melissa A. Brewer

Melissa A. Brewer
Project Manager





Sequoia Analytical

680 Chesapeake Drive
404 N. Wiget Lane
819 Striker Avenue, Suite 8
1455 McDowell Blvd. North, Ste. D

Redwood City, CA 94063
Walnut Creek, CA 94598
Sacramento, CA 95834
Petaluma, CA 94954

(650) 364-9600
(925) 988-9600
(916) 921-9600
(707) 792-1865

FAX (650) 364-9233
FAX (925) 988-9673
FAX (916) 921-0100
FAX (707) 792-0342

Harding Lawson Associates
383 Fourth Street, 3rd Floor
Oakland, CA 94607
Attention: Mike Sides

Client Project ID: Port of Oakland #43145.4
Sample Descript: Water, 9908EP09
Analysis Method: EPA 8010
Lab Number: 902-2501

Sampled: Feb 26, 1999
Received: Feb 26, 1999
Analyzed: Mar 11, 1999
Reported: Mar 12, 1999

QC Batch Number: GC031199801006A

Instrument ID: HP-6

HALOGENATED VOLATILE ORGANICS (EPA 8010)

Analyte	Detection Limit µg/L	Sample Results µg/L
Bromodichloromethane.....	0.50	N.D.
Bromoform.....	0.50	N.D.
Bromomethane.....	1.0	N.D.
Carbon tetrachloride.....	0.50	N.D.
Chlorobenzene.....	0.50	N.D.
Chloroethane.....	1.0	N.D.
Chloroform.....	0.50	N.D.
Chloromethane.....	1.0	N.D.
Dibromochloromethane.....	0.50	N.D.
1,3-Dichlorobenzene.....	0.50	N.D.
1,4-Dichlorobenzene.....	0.50	N.D.
1,2-Dichlorobenzene.....	0.50	N.D.
1,1-Dichloroethane.....	0.50	15
1,2-Dichloroethane.....	0.50	N.D.
1,1-Dichloroethene.....	0.50	0.79
cis-1,2-Dichloroethene.....	0.50	9.8
trans-1,2-Dichloroethene.....	0.50	N.D.
1,2-Dichloropropane.....	0.50	N.D.
cis-1,3-Dichloropropene.....	0.50	N.D.
trans-1,3-Dichloropropene.....	0.50	N.D.
Methylene chloride.....	5.0	N.D.
1,1,2,2-Tetrachloroethane.....	0.50	N.D.
Tetrachloroethene.....	0.50	N.D.
1,1,1-Trichloroethane.....	0.50	2.9
1,1,2-Trichloroethane.....	0.50	N.D.
Trichloroethene.....	0.50	N.D.
Trichlorofluoromethane.....	0.50	N.D.
Vinyl chloride.....	1.0	N.D.
Surrogates	Control Limit %	% Recovery
Dibromodifluoromethane.....	50	150..... 88
4-Bromofluorobenzene.....	50	150..... 84

Analytes reported as N.D. were not present above the stated limit of detection.

SEQUOIA ANALYTICAL, #1271

Melissa A. Brewer

Melissa A. Brewer
Project Manager





Sequoia Analytical

680 Chesapeake Drive
404 N. Wiget Lane
819 Striker Avenue, Suite 8
1455 McDowell Blvd. North, Ste. D

Redwood City, CA 94063
Walnut Creek, CA 94598
Sacramento, CA 95834
Petaluma, CA 94954

(650) 364-9600
(925) 988-9600
(916) 921-9600
(707) 792-1865

FAX (650) 364-9233
FAX (925) 988-9673
FAX (916) 921-0100
FAX (707) 792-0342

Harding Lawson Associates
383 Fourth Street, 3rd Floor
Oakland, CA 94607
Attention: Mike Sides

Client Project ID: Port of Oakland #43145.4
Sample Descript: Water
Analysis for: Total Iron
First Sample #: 902-2493

Sampled: Feb 26, 1999
Received: Feb 26, 1999
Digested: Mar 1, 1999
Analyzed: Mar 9, 1999
Reported: Mar 12, 1999

LABORATORY ANALYSIS FOR: Total Iron

Sample Number	Sample Description	Detection Limit mg/L	Sample Result mg/L	QC Batch Number	Instrument ID
902-2493	9908EP01	0.010	26	ME0301992007MDA	MV-3
902-2494	9908EP02	0.010	14	ME0301992007MDA	MV-3
902-2495	9908EP03	0.010	16	ME0301992007MDA	MV-3
902-2496	9908EP04	0.010	23	ME0301992007MDA	MV-3
902-2497	9908EP05	0.010	2.9	ME0301992007MDA	MV-3
902-2498	9908EP06	0.010	2.7	ME0301992007MDA	MV-3
902-2500	9908EP08	0.010	36	ME0301992007MDA	MV-3
902-2501	9908EP09	0.010	0.57	ME0301992007MDA	MV-3

Analytes reported as N.D. were not present above the stated limit of detection.

SEQUOIA ANALYTICAL, #1271

Melissa A. Brewer
Project Manager





Sequoia Analytical

680 Chesapeake Drive
404 N. Wiget Lane
819 Striker Avenue, Suite 8
1455 McDowell Blvd. North, Ste. D

Redwood City, CA 94063
Walnut Creek, CA 94598
Sacramento, CA 95834
Petaluma, CA 94954

(650) 364-9600
(925) 988-9600
(916) 921-9600
(707) 792-1865

FAX (650) 364-9233
FAX (925) 988-9673
FAX (916) 921-0100
FAX (707) 792-0342

Harding Lawson Associates
383 Fourth Street, 3rd Floor
Oakland, CA 94607
Attention: Mike Sides

Client Project ID: Port of Oakland #43145.4
Sample Descript: Water
Analysis for: Ferrous Iron
First Sample #: 902-2493

Sampled: Feb 26, 1999
Received: Feb 26, 1999
Digested: Mar 1, 1999
Analyzed: Mar 9, 1999
Reported: Mar 12, 1999

LABORATORY ANALYSIS FOR: Ferrous Iron

Sample Number	Sample Description	Detection Limit mg/L	Sample Result mg/L	QC Batch Number	Instrument ID
902-2493	9908EP01	0.010	0.076	ME0301992007MDA	MV-3
902-2494	9908EP02	0.010	0.15	ME0301992007MDA	MV-3
902-2495	9908EP03	0.010	0.44	ME0301992007MDA	MV-3
902-2496	9908EP04	0.010	0.64	ME0301992007MDA	MV-3
902-2497	9908EP05	0.010	N.D.	ME0301992007MDA	MV-3
902-2498	9908EP06	0.010	N.D.	ME0301992007MDA	MV-3
902-2500	9908EP08	0.010	17	ME0301992007MDA	MV-3
902-2501	9908EP09	0.010	0.21	ME0301992007MDA	MV-3

Analytes reported as N.D. were not present above the stated limit of detection.

SEQUOIA ANALYTICAL, #1271

Melissa A. Brewer
Project Manager





Sequoia Analytical

680 Chesapeake Drive
404 N. Wiget Lane
819 Striker Avenue, Suite 8
1455 McDowell Blvd. North, Ste. D

Redwood City, CA 94063
Walnut Creek, CA 94598
Sacramento, CA 95834
Petaluma, CA 94954

(650) 364-9600
(925) 988-9600
(916) 921-9600
(707) 792-1865

FAX (650) 364-9233
FAX (925) 988-9673
FAX (916) 921-0100
FAX (707) 792-0342

Harding Lawson Associates
383 Fourth Street, 3rd Floor
Oakland, CA 94607
Attention: Mike Sides

Client Project ID: Port of Oakland #43145.4
Sample Descript: Water
Analysis for: Nitrate as NO3
First Sample #: 902-2493

Sampled: Feb 26, 1999
Received: Feb 26, 1999
Analyzed: Feb 26, 1999
Reported: Mar 12, 1999

LABORATORY ANALYSIS FOR: Nitrate as NO3

Sample Number	Sample Description	Detection Limit mg/L	Sample Result mg/L	QC Batch Number	Instrument ID
902-2493	9908EP01	0.10	N.D.	IN0226993000I1B	INIC-1
902-2494	9908EP02	0.10	8.3	IN0226993000I1B	INIC-1
902-2495	9908EP03	0.10	4.3	IN0226993000I1B	INIC-1
902-2496	9908EP04	0.10	N.D.	IN0226993000I1B	INIC-1
902-2497	9908EP05	0.10	1.6	IN0226993000I1B	INIC-1
902-2498	9908EP06	0.10	1.3	IN0226993000I1B	INIC-1
902-2500	9908EP08	0.10	N.D.	IN0226993000I1B	INIC-1
902-2501	9908EP09	0.10	N.D.	IN0226993000I1B	INIC-1

Analytes reported as N.D. were not present above the stated limit of detection.

SEQUOIA ANALYTICAL, #1271

Melissa A. Brewer
Project Manager





Sequoia Analytical

680 Chesapeake Drive
404 N. Wiget Lane
819 Striker Avenue, Suite 8
1455 McDowell Blvd. North, Ste. D

Redwood City, CA 94063
Walnut Creek, CA 94598
Sacramento, CA 95834
Petaluma, CA 94954

(650) 364-9600
(925) 988-9600
(916) 921-9600
(707) 792-1865

FAX (650) 364-9233
FAX (925) 988-9673
FAX (916) 921-0100
FAX (707) 792-0342

Harding Lawson Associates
383 Fourth Street, 3rd Floor
Oakland, CA 94607
Attention: Mike Sides

Client Project ID: Port of Oakland #43145.4
Sample Descript: Water
Analysis for: Orthophosphate as PO4
First Sample #: 902-2493

Sampled: Feb 26, 1999
Received: Feb 26, 1999
Analyzed: Feb 26, 1999
Reported: Mar 12, 1999

LABORATORY ANALYSIS FOR: Orthophosphate as PO4

Sample Number	Sample Description	Detection Limit mg/L	Sample Result mg/L	QC Batch Number	Instrument ID
902-2493	9908EP01	0.50	0.69	IN022699300011B	INIC-1
902-2494	9908EP02	0.50	0.78	IN022699300011B	INIC-1
902-2495	9908EP03	0.50	0.89	IN022699300011B	INIC-1
902-2496	9908EP04	0.50	1.2	IN022699300011B	INIC-1
902-2497	9908EP05	0.50	2.9	IN022699300011B	INIC-1
902-2498	9908EP06	0.50	2.8	IN022699300011B	INIC-1
902-2500	9908EP08	0.50	0.59	IN022699300011B	INIC-1
902-2501	9908EP09	0.50	1.1	IN022699300011B	INIC-1

Analytes reported as N.D. were not present above the stated limit of detection.

SEQUOIA ANALYTICAL, #1271

Melissa A. Brewer

Melissa A. Brewer
Project Manager

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Sequoia Analytical

680 Chesapeake Drive
404 N. Wiget Lane
819 Striker Avenue, Suite 8
1455 McDowell Blvd. North, Ste. D

Redwood City, CA 94063
Walnut Creek, CA 94598
Sacramento, CA 95834
Petaluma, CA 94954

(650) 364-9600
(925) 988-9600
(916) 921-9600
(707) 792-1865

FAX (650) 364-9233
FAX (925) 988-9673
FAX (916) 921-0100
FAX (707) 792-0342

Harding Lawson Associates
383 Fourth Street, 3rd Floor
Oakland, CA 94607
Attention: Mike Sides

Client Project ID: Port of Oakland #43145.4
Sample Description: Water
Analysis for: Sulfate
First Sample #: 902-2493

Sampled: Feb 26, 1999
Received: Feb 26, 1999
Analyzed: Mar 4, 1999
Reported: Mar 12, 1999

LABORATORY ANALYSIS FOR: Sulfate

Sample Number	Sample Description	Detection Limit mg/L	Sample Result mg/L	QC Batch Number	Instrument ID
902-2493	9908EP01	0.10	290	IN030499300011B	INIC-1
902-2494	9908EP02	0.10	82	IN030499300011B	INIC-1
902-2495	9908EP03	0.10	380	IN030499300011B	INIC-1
902-2496	9908EP04	0.10	260	IN030499300011B	INIC-1
902-2497	9908EP05	0.10	56	IN030499300011B	INIC-1
902-2498	9908EP06	0.10	54	IN030499300011B	INIC-1
902-2500	9908EP08	0.10	27	IN030499300011B	INIC-1
902-2501	9908EP09	0.10	110	IN030499300011B	INIC-1

Analytes reported as N.D. were not present above the stated limit of detection.

SEQUOIA ANALYTICAL, #1271

Melissa A. Brewer

Melissa A. Brewer
Project Manager





Sequoia Analytical

680 Chesapeake Drive
404 N. Wiget Lane
819 Striker Avenue, Suite B
1455 McDowell Blvd. North, Ste. D

Redwood City, CA 94063
Walnut Creek, CA 94598
Sacramento, CA 95834
Petaluma, CA 94954

(650) 364-9600
(925) 988-9600
(916) 921-9600
(707) 792-1865

FAX (650) 364-9233
FAX (925) 988-9673
FAX (916) 921-0100
FAX (707) 792-0342

Harding Lawson Associates
383 Fourth Street, 3rd Floor
Oakland, CA 94607
Attention: Mike Sides

Client Project ID: Port of Oakland #43145.4
Sample Descript: Water
Analysis for: Total Organic Carbon
First Sample #: 902-2493

Sampled: Feb 26, 1999
Received: Feb 26, 1999
Analyzed: Mar 3, 1999
Reported: Mar 12, 1999

LABORATORY ANALYSIS FOR: Total Organic Carbon

Sample Number	Sample Description	Detection Limit mg/L	Sample Result mg/L	QC Batch Number	Instrument ID
902-2493	9908EP01	1.0	63	IN0303994151TCA	TOC-1
902-2494	9908EP02	1.0	20	IN0303994151TCA	TOC-1
902-2495	9908EP03	1.0	42	IN0303994151TCA	TOC-1
902-2496	9908EP04	1.0	22	IN0303994151TCA	TOC-1
902-2497	9908EP05	1.0	60	IN0303994151TCA	TOC-1
902-2498	9908EP06	1.0	95	IN0303994151TCA	TOC-1
902-2499	9908EP07	5.0	100	IN0303994151TCA	TOC-1
902-2500	9908EP08	5.0	100	IN0303994151TCA	TOC-1
902-2501	9908EP09	5.0	30	IN0303994151TCA	TOC-1

Analytes reported as N.D. were not present above the stated limit of detection.

SEQUOIA ANALYTICAL, #1210

Melissa A. Brewer
Project Manager





Sequoia Analytical

680 Chesapeake Drive
404 N. Wiget Lane
819 Striker Avenue, Suite 8
1455 McDowell Blvd. North, Ste. D

Redwood City, CA 94063
Walnut Creek, CA 94598
Sacramento, CA 95834
Petaluma, CA 94954

(650) 364-9600
(925) 988-9600
(916) 921-9600
(707) 792-1865

FAX (650) 364-9233
FAX (925) 988-9673
FAX (916) 921-0100
FAX (707) 792-0342

Harding Lawson Associates
383 Fourth Street, 3rd Floor
Oakland, CA 94607
Attention: Mike Sides

Client Project ID: Port of Oakland #43145.4
Matrix: Liquid

QC Sample Group: 9022493-501

Reported: Mar 12, 1999

QUALITY CONTROL DATA REPORT

Analyte:	Benzene	Toluene	Ethyl Benzene	Xylenes	Diesel
QC Batch#:	GC030699 802005A	GC030699 802005A	GC030699 802005A	GC030699 802005A	SP030499 8015EXA
Analy. Method:	EPA 8020	EPA 8020	EPA 8020	EPA 8020	EPA 8015
Prep. Method:	EPA 5030	EPA 5030	EPA 5030	EPA 5030	EPA 3510
Analyst:	J. Minkel	J. Minkel	J. Minkel	J. Minkel	K. Grubb
MS/MSD #:	9022400	9022400	9022400	9022400	BLK030499
Sample Conc.:	N.D.	N.D.	N.D.	N.D.	N.D.
Prepared Date:	3/6/99	3/6/99	3/6/99	3/6/99	3/4/99
Analyzed Date:	3/6/99	3/6/99	3/6/99	3/6/99	3/4/99
Instrument I.D.#:	HP-5	HP-5	HP-5	HP-5	HP-3A
Conc. Spiked:	20 µg/L	20 µg/L	20 µg/L	60 µg/L	500 µg/L
Result:	21	22	21	66	470
MS % Recovery:	105	110	105	110	94
Dup. Result:	22	23	22	68	500
MSD % Recov.:	110	115	110	113	100
RPD:	4.7	4.4	4.7	3.0	6.2
RPD Limit:	0-20	0-20	0-20	0-20	0-50

LCS #:	5LCS030799	5LCS030799	5LCS030799	5LCS030799	LCS030499
Prepared Date:	3/7/99	3/7/99	3/7/99	3/7/99	3/4/99
Analyzed Date:	3/7/99	3/7/99	3/7/99	3/7/99	3/4/99
Instrument I.D.#:	HP-5	HP-5	HP-5	HP-5	HP-3A
Conc. Spiked:	20 µg/L	20 µg/L	20 µg/L	60 µg/L	500 µg/L
LCS Result:	22	22	22	69	460
LCS % Recov.:	110	110	110	115	92

MS/MSD LCS Control Limits	70-130	70-130	70-130	70-130	35-125
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Please Note:

The LCS is a control sample of known, interferent-free matrix that is analyzed using the same reagents, preparation, and analytical methods employed for the samples. The matrix spike is an aliquot of sample fortified with known quantities of specific compounds and subjected to the entire analytical procedure. If the recovery of analytes from the matrix spike does not fall within specified control limits due to matrix interference, the LCS recovery is to be used to validate the batch.

** MS = Matrix Spike, MSD = MS Duplicate, RPD = Relative % Difference

SEQUOIA ANALYTICAL, #1271

Melissa A. Brewer

Melissa A. Brewer
Project Manager





Sequoia Analytical

680 Chesapeake Drive
404 N. Wiger Lane
819 Striker Avenue, Suite 8
1455 McDowell Blvd. North, Ste. D

Redwood City, CA 94063
Walnut Creek, CA 94598
Sacramento, CA 95834
Petaluma, CA 94954

(650) 364-9600
(925) 988-9600
(916) 921-9600
(707) 792-1865

FAX (650) 364-9233
FAX (925) 988-9673
FAX (916) 921-0100
FAX (707) 792-0342

Harding Lawson Associates
383 Fourth Street, 3rd Floor
Oakland, CA 94607
Attention: Mike Sides

Client Project ID: Port of Oakland #43145.4
Matrix: Liquid

QC Sample Group: 9022493-501

Reported: Mar 12, 1999

QUALITY CONTROL DATA REPORT

Analyte:	Benzene	Toluene	Ethyl Benzene	Xylenes
QC Batch#:	GC030899 802005A	GC030899 802005A	GC030899 802005A	GC030899 802005A
Analy. Method:	EPA 8020	EPA 8020	EPA 8020	EPA 8020
Prep. Method:	EPA 5030	EPA 5030	EPA 5030	EPA 5030
Analyst:	J. Minkel	J. Minkel	J. Minkel	J. Minkel
MS/MSD #:	9022496	9022496	9022496	9022496
Sample Conc.:	N.D.	N.D.	N.D.	N.D.
Prepared Date:	3/8/99	3/8/99	3/8/99	3/8/99
Analyzed Date:	3/8/99	3/8/99	3/8/99	3/8/99
Instrument I.D.#:	HP-5	HP-5	HP-5	HP-5
Conc. Spiked:	20 µg/L	20 µg/L	20 µg/L	60 µg/L
Result:	26	26	26	82
MS % Recovery:	130	130	130	137
Dup. Result:	23	23	23	73
MSD % Recov.:	115	115	115	122
RPD:	12	12	12	12
RPD Limit:	0-20	0-20	0-20	0-20

LCS #:	5LCS030899	5LCS030899	5LCS030899	5LCS030899
Prepared Date:	3/8/99	3/8/99	3/8/99	3/8/99
Analyzed Date:	3/8/99	3/8/99	3/8/99	3/8/99
Instrument I.D.#:	HP-5	HP-5	HP-5	HP-5
Conc. Spiked:	20 µg/L	20 µg/L	20 µg/L	60 µg/L
LCS Result:	22	22	21	67
LCS % Recov.:	110	110	105	112

MS/MSD LCS Control Limits	70-130	70-130	70-130	70-130
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Please Note:

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** MS = Matrix Spike, MSD = MS Duplicate, RPD = Relative % Difference

SEQUOIA ANALYTICAL, #1271

Melissa A. Brewer

Melissa A. Brewer
Project Manager





Sequoia Analytical

680 Chesapeake Drive
404 N. Wiget Lane
819 Striker Avenue, Suite 8
1455 McDowell Blvd. North, Ste. D

Redwood City, CA 94063
Walnut Creek, CA 94598
Sacramento, CA 95834
Petaluma, CA 94954

(650) 364-9600
(925) 988-9600
(916) 921-9600
(707) 792-1865

FAX (650) 364-9233
FAX (925) 988-9673
FAX (916) 921-0100
FAX (707) 792-0342

Harding Lawson Associates
383 Fourth Street, 3rd Floor
Oakland, CA 94607
Attention: Mike Sides

Client Project ID: Port of Oakland #43145.4
Matrix: Liquid

QC Sample Group: 9022493-501

Reported: Mar 12, 1999

QUALITY CONTROL DATA REPORT

Analyte:	Benzene	Toluene	Ethyl Benzene	Xylenes
QC Batch#:	GC030999 802002A	GC030999 802002A	GC030999 802002A	GC030999 802002A
Analy. Method:	EPA 8020	EPA 8020	EPA 8020	EPA 8020
Prep. Method:	EPA 5030	EPA 5030	EPA 5030	EPA 5030
Analyst:	C. Westwater	C. Westwater	C. Westwater	C. Westwater
MS/MSD #:	9030238	9030238	9030238	9030238
Sample Conc.:	N.D.	N.D.	N.D.	N.D.
Prepared Date:	3/9/99	3/9/99	3/9/99	3/9/99
Analyzed Date:	3/9/99	3/9/99	3/9/99	3/9/99
Instrument I.D.#:	HP-2	HP-2	HP-2	HP-2
Conc. Spiked:	20 µg/L	20 µg/L	20 µg/L	60 µg/L
Result:	21	20	21	67
MS % Recovery:	105	100	105	112
Dup. Result:	16	15	16	53
MSD % Recov.:	80	75	80	88
RPD:	27	29	27	23
RPD Limit:	0-20	0-20	0-20	0-20

LCS #:	2LCS030999	2LCS030999	2LCS030999	2LCS030999
Prepared Date:	3/9/99	3/9/99	3/9/99	3/9/99
Analyzed Date:	3/9/99	3/9/99	3/9/99	3/9/99
Instrument I.D.#:	HP-2	HP-2	HP-2	HP-2
Conc. Spiked:	20 µg/L	20 µg/L	20 µg/L	60 µg/L
LCS Result:	22	20	21	68
LCS % Recov.:	110	100	105	113

MS/MSD LCS Control Limits	70-130	70-130	70-130	70-130
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Please Note:
The LCS is a control sample of known, interferent-free matrix that is analyzed using the same reagents, preparation, and analytical methods employed for the samples. The matrix spike is an aliquot of sample fortified with known quantities of specific compounds and subjected to the entire analytical procedure. If recovery of analytes from the matrix spike does not fall within specified control limits due to matrix interference, the LCS recovery is to be used to validate the batch.

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SEQUOIA ANALYTICAL, #1271

Melissa A. Brewer

Melissa A. Brewer
Project Manager





Sequoia Analytical

680 Chesapeake Drive
404 N. Wiget Lane
819 Striker Avenue, Suite 8
1455 McDowell Blvd. North, Ste. D

Redwood City, CA 94063
Walnut Creek, CA 94598
Sacramento, CA 95834
Petaluma, CA 94954

(650) 364-9600
(925) 988-9600
(916) 921-9600
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FAX (916) 921-0100
FAX (707) 792-0342

Harding Lawson Associates
383 Fourth Street, 3rd Floor
Oakland, CA 94607
Attention: Mike Sides

Client Project ID: Port of Oakland #43145.4
Matrix: Liquid

QC Sample Group: 9022493-501

Reported: Mar 12, 1999

QUALITY CONTROL DATA REPORT

Analyte:	Benzene	Toluene	Ethyl Benzene	Xylenes
QC Batch#:	GC030999 802005A	GC030999 802005A	GC030999 802005A	GC030999 802005A
Analy. Method:	EPA 8020	EPA 8020	EPA 8020	EPA 8020
Prep. Method:	EPA 5030	EPA 5030	EPA 5030	EPA 5030
Analyst:	C. Westwater	C. Westwater	C. Westwater	C. Westwater
MS/MSD #:	9030149	9030149	9030149	9030149
Sample Conc.:	N.D.	N.D.	N.D.	N.D.
Prepared Date:	3/9/99	3/9/99	3/9/99	3/9/99
Analyzed Date:	3/9/99	3/9/99	3/9/99	3/9/99
Instrument I.D.#:	HP-5	HP-5	HP-5	HP-5
Conc. Spiked:	20 µg/L	20 µg/L	20 µg/L	60 µg/L
Result:	22	21	21	64
MS % Recovery:	110	105	105	107
Dup. Result:	24	23	22	69
MSD % Recov.:	120	115	110	115
RPD:	8.7	9.1	4.7	7.5
RPD Limit:	0-20	0-20	0-20	0-20

LCS #:	5LCS030999	5LCS030999	5LCS030999	5LCS030999
Prepared Date:	3/9/99	3/9/99	3/9/99	3/9/99
Analyzed Date:	3/9/99	3/9/99	3/9/99	3/9/99
Instrument I.D.#:	HP-5	HP-5	HP-5	HP-5
Conc. Spiked:	20 µg/L	20 µg/L	20 µg/L	60 µg/L
LCS Result:	20	21	21	65
LCS % Recov.:	100	105	105	108

MS/MSD LCS Control Limits	70-130	70-130	70-130	70-130

Please Note:

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** MS = Matrix Spike, MSD = MS Duplicate, RPD = Relative % Difference

SEQUOIA ANALYTICAL, #1271

Melissa A. Brewer

Melissa A. Brewer
Project Manager





Sequoia Analytical

680 Chesapeake Drive
404 N. Wiget Lane
819 Striker Avenue, Suite 8
1455 McDowell Blvd. North, Ste. D

Redwood City, CA 94063
Walnut Creek, CA 94598
Sacramento, CA 95834
Petaluma, CA 94954

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(925) 988-9600
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FAX (925) 988-9673
FAX (916) 921-0100
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Harding Lawson Associates
383 Fourth Street, 3rd Floor
Oakland, CA 94607
Attention: Mike Sides

Client Project ID: Port of Oakland #43145.4
Matrix: Liquid

QC Sample Group: 9022493-501

Reported: Mar 12, 1999

QUALITY CONTROL DATA REPORT

Analyte:	Benzene	Toluene	Ethyl Benzene	Xylenes
QC Batch#:	GC031099 802002A	GC031099 802002A	GC031099 802002A	GC031099 802002A
Analy. Method:	EPA 8020	EPA 8020	EPA 8020	EPA 8020
Prep. Method:	EPA 5030	EPA 5030	EPA 5030	EPA 5030
Analyst:	J. Minkel	J. Minkel	J. Minkel	J. Minkel
MS/MSD #:	9030368	9030368	9030368	9030368
Sample Conc.:	N.D.	N.D.	N.D.	N.D.
Prepared Date:	3/10/99	3/10/99	3/10/99	3/10/99
Analyzed Date:	3/10/99	3/10/99	3/10/99	3/10/99
Instrument I.D.#:	HP-2	HP-2	HP-2	HP-2
Conc. Spiked:	20 µg/L	20 µg/L	20 µg/L	60 µg/L
Result:	20	19	20	61
MS % Recovery:	100	95	100	102
Dup. Result:	19	18	19	61
MSD % Recov.:	95	90	95	102
RPD:	5.1	5.4	5.1	0.0
RPD Limit:	0-20	0-20	0-20	0-20

LCS #:	2LCS031099	2LCS031099	2LCS031099	2LCS031099
Prepared Date:	3/10/99	3/10/99	3/10/99	3/10/99
Analyzed Date:	3/10/99	3/10/99	3/10/99	3/10/99
Instrument I.D.#:	HP-2	HP-2	HP-2	HP-2
Conc. Spiked:	20 µg/L	20 µg/L	20 µg/L	60 µg/L
LCS Result:	20	19	20	65
LCS % Recov.:	100	95	100	108

MS/MSD LCS Control Limits	70-130	70-130	70-130	70-130
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Please Note:

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** MS=Matrix Spike, MSD=MS Duplicate, RPD=Relative % Difference

SEQUOIA ANALYTICAL, #1271

Melissa A. Brewer

Melissa A. Brewer
Project Manager





Sequoia Analytical

680 Chesapeake Drive
404 N. Wiget Lane
819 Striker Avenue, Suite 8
1455 McDowell Blvd. North, Ste. D

Redwood City, CA 94063
Walnut Creek, CA 94598
Sacramento, CA 95834
Petaluma, CA 94954

(650) 364-9600
(925) 988-9600
(916) 921-9600
(707) 792-1865

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Harding Lawson Associates
383 Fourth Street, 3rd Floor
Oakland, CA 94607
Attention: Mike Sides

Client Project ID: Port of Oakland #43145.4
Matrix: Liquid

QC Sample Group: 9022493-501

Reported: Mar 12, 1999

QUALITY CONTROL DATA REPORT

Analyte:	1,1-Dichloro-ethene	Trichloro-ethene	Chloro-benzene	1,1-Dichloro-ethene	Trichloro-ethene	Chloro-benzene
QC Batch#:	GC031099 801006A	GC031099 801006A	GC031099 801006A	GC031199 801006A	GC031199 801006A	GC031199 801006A
Analy. Method:	EPA 8010	EPA 8010	EPA 8010	EPA 8010	EPA 8010	EPA 8010
Prep. Method:	EPA 5030	EPA 5030	EPA 5030	EPA 5030	EPA 5030	EPA 5030
Analyst:	P. Kosovskaya	P. Kosovskaya	P. Kosovskaya	P. Kosovskaya	P. Kosovskaya	P. Kosovskaya
MS/MSD #:	9022441	9022441	9022441	9022495	9022495	9022495
Sample Conc.:	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
Prepared Date:	3/10/99	3/10/99	3/10/99	3/11/99	3/11/99	3/11/99
Analyzed Date:	3/10/99	3/10/99	3/10/99	3/11/99	3/11/99	3/11/99
Instrument I.D.#:	HP-6	HP-6	HP-6	HP-6	HP-6	HP-6
Conc. Spiked:	20 µg/L	20 µg/L	20 µg/L	20 µg/L	20 µg/L	20 µg/L
Result:	25	25	26	19	22	24
MS % Recovery:	125	125	130	95	110	120
Dup. Result:	24	23	24	22	25	26
MSD % Recov.:	120	115	120	110	125	130
RPD:	4.1	8.3	8.0	15	13	8.0
RPD Limit:	0-25	0-25	0-25	0-25	0-25	0-25

LCS #:	LCS031099	LCS031099	LCS031099	LCS031199	LCS031199	LCS031199
Prepared Date:	3/10/99	3/10/99	3/10/99	3/11/99	3/11/99	3/11/99
Analyzed Date:	3/10/99	3/10/99	3/10/99	3/11/99	3/11/99	3/11/99
Instrument I.D.#:	HP-6	HP-6	HP-6	HP-6	HP-6	HP-6
Conc. Spiked:	20 µg/L	20 µg/L	20 µg/L	20 µg/L	20 µg/L	20 µg/L
LCS Result:	22	23	25	22	24	23
LCS % Recov.:	110	115	125	110	120	115

MS/MSD LCS Control Limits	65-135	70-130	70-130	65-135	70-130	70-130
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SEQUOIA ANALYTICAL, #1271

Melissa A. Brewer

Melissa A. Brewer
Project Manager





Sequoia Analytical

680 Chesapeake Drive
404 N. Wiget Lane
819 Striker Avenue, Suite 8
1455 McDowell Blvd. North, Ste. D

Redwood City, CA 94063
Walnut Creek, CA 94598
Sacramento, CA 95834
Petaluma, CA 94954

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(925) 988-9600
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383 Fourth Street, 3rd Floor
Oakland, CA 94607
Attention: Mike Sides

Client Project ID: Port of Oakland #43145.4
Matrix: Liquid

QC Sample Group: 9022493-501

Reported: Mar 12, 1999

QUALITY CONTROL DATA REPORT

Analyte:	Nitrate as NO3	Orthophosphate as PO4	Sulfate	Iron	Total Organic Carbon
QC Batch#:	IN022699 300011B	IN022699 300011B	IN030499 300011B	ME030199 2007MDA	IN030399 4151TCA
Analy. Method:	EPA 300.0	EPA 300.0	EPA 300.0	EPA 200.7	EPA 415.1
Prep. Method:	EPA 300.0	EPA 300.0	EPA 300.0	EPA 200.7	-
Analyst:	K. Anderson	K. Anderson	K. Anderson	J. Kelly	B.E.
MS/MSD #:	9022494	9022494	9022470	9022493	9903036-1A
Sample Conc.:	8.3 mg/L	0.78 mg/L	20 mg/L	26 mg/L	2.2 mg/L
Prepared Date:	2/26/99	2/26/99	3/4/99	3/1/99	3/3/99
Analyzed Date:	2/26/99	2/26/99	3/4/99	3/9/99	3/3/99
Instrument I.D.#:	INIC-1	INIC-1	INIC-1	MV-3	TOC-1
Conc. Spiked:	10 mg/L	20 mg/L	100 mg/L	1.0 mg/L	10 mg/L
Result:	19	17	110	23	14
MS % Recovery:	107	81	90	-	118
Dup. Result:	19	17	110	23	14
MSD % Recov.:	107	81	90	-	118
RPD:	0.0	0.0	0.0	0.0	0.0
RPD Limit:	0-20	0-20	0-20	0-20	0-20

LCS #:	LCS022699B	LCS022699B	LCS030499B	LCS030199	LCS030399
Prepared Date:	2/25/99	2/25/99	3/4/99	3/1/99	3/3/99
Analyzed Date:	2/26/99	2/26/99	3/4/99	3/9/99	3/3/99
Instrument I.D.#:	INIC-1	INIC-1	INIC-1	MV-3	TOC-1
Conc. Spiked:	10 mg/L	20 mg/L	10 mg/L	1.0 mg/L	10 mg/L
LCS Result:	10	18	9.7	1.0	11
LCS % Recov.:	100	90	97	100	110

MS/MSD LCS Control Limits	80-120	80-120	80-120	80-120	80-120
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** MS = Matrix Spike, MSD = MS Duplicate, RPD = Relative % Difference

SEQUOIA ANALYTICAL, #1271
& #1210

Melissa A. Brewer

Melissa A. Brewer
Project Manager

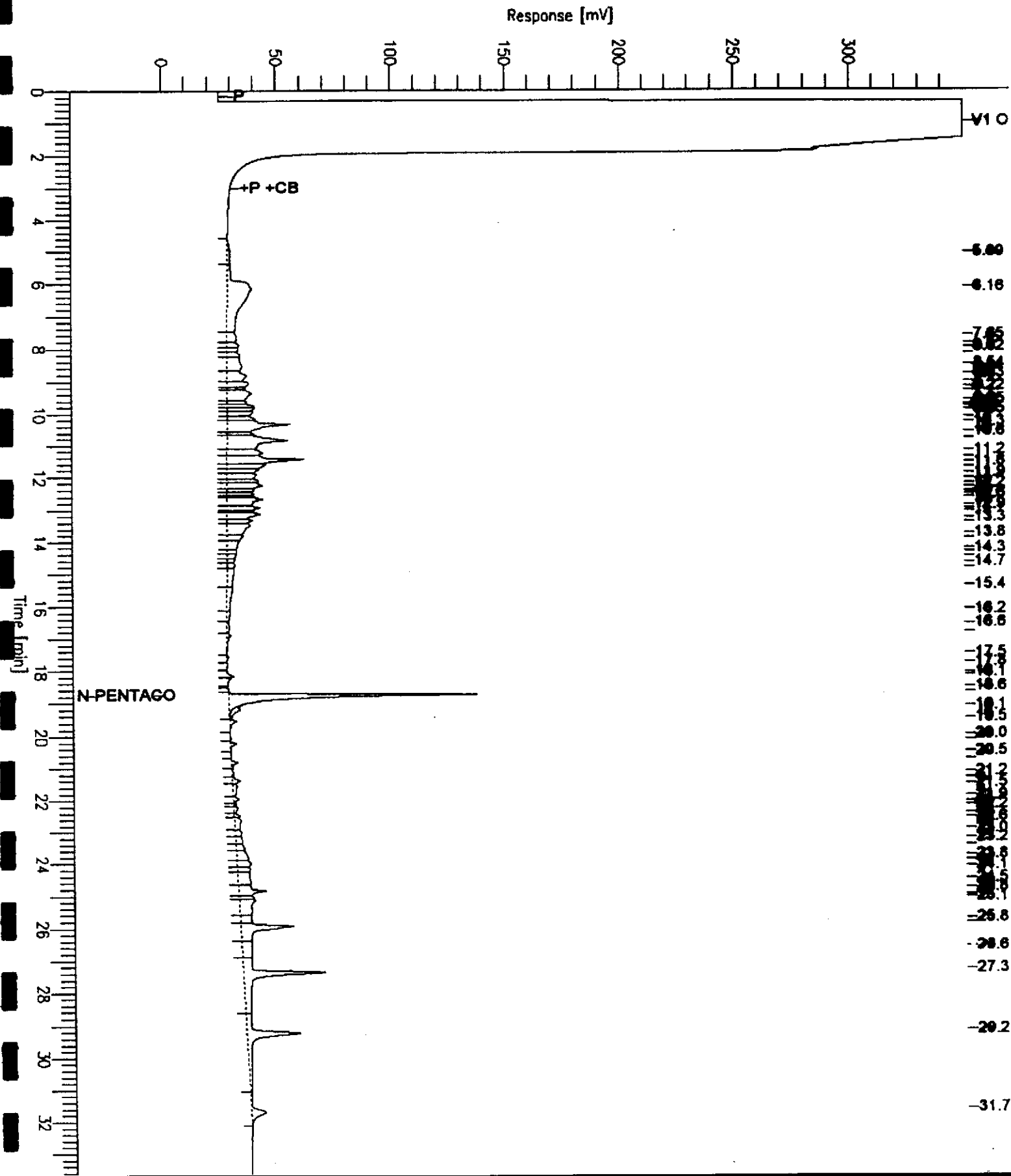


Chromatogram

Sample Name : HLA
FileName : J:\HP3DATA\3AMA104.raw
Method : TPH03A
Start Time : 0.00 min
Scale Factor: 0.0

End Time : 33.65 min
Plot Offset: 0 mV

Sample #: 9022493
Date : 3/5/99 12:07 AM
Time of Injection: 3/4/99 11:34 PM
Low Point : 0.00 mV
Plot Scale: 350.0 mV
Page 1 of 1
High Point : 350.00 mV



Chromatogram

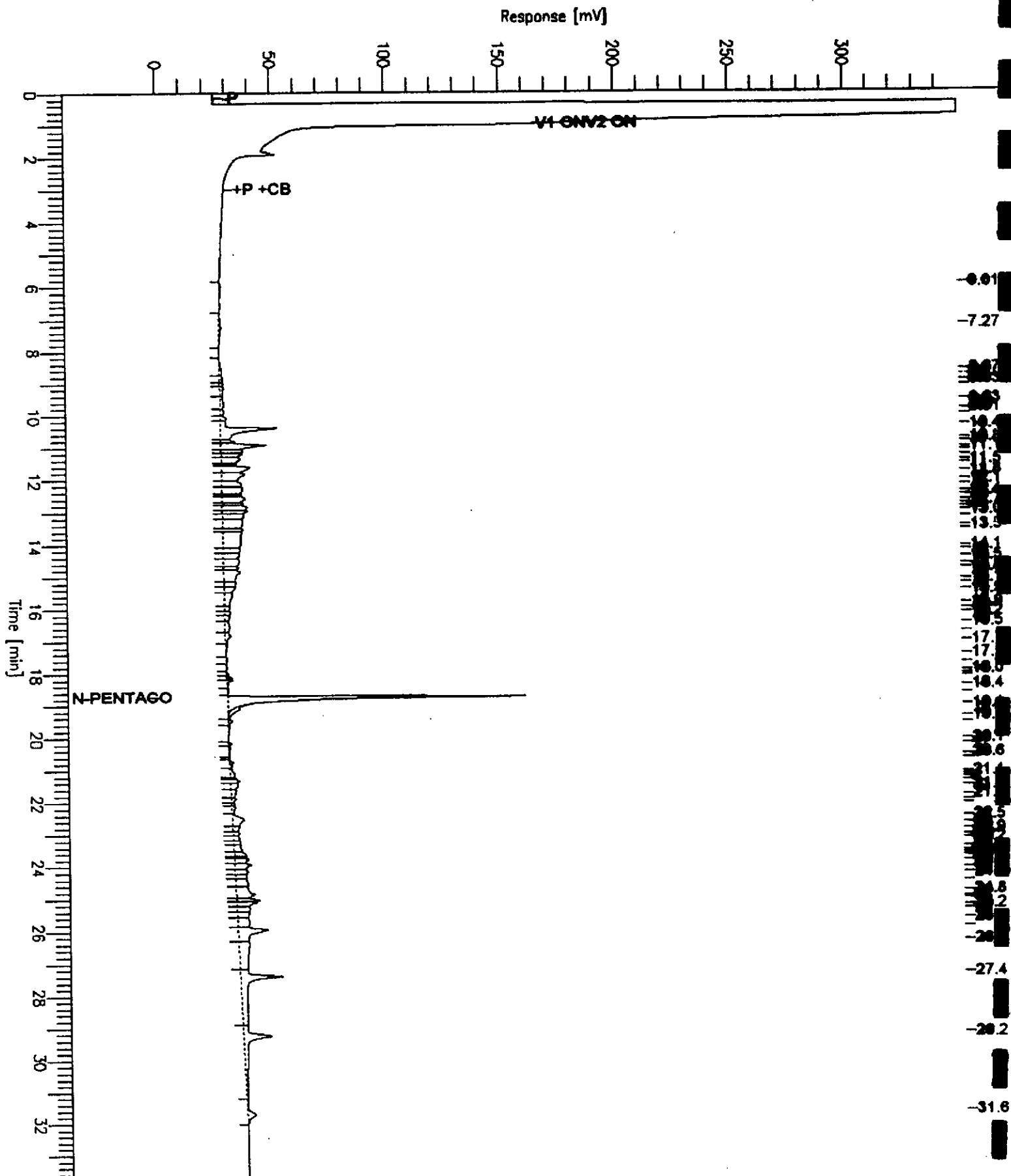
Sample Name : HLA
FileName : J:\HP3DATA\3AMA119.raw
Method : TPHO3A
Start Time : 0.00 min
Scale Factor: 0.0

End Time : 33.65 min
Plot Offset: 0 mV

Sample #: 9022495
Date : 3/5/99 6:32 PM
Time of Injection: 3/5/99 5:58 PM
Low Point : 0.00 mV
Plot Scale: 350.0 mV

Page 1 of 1

High Point : 350.00 mV



Chromatogram

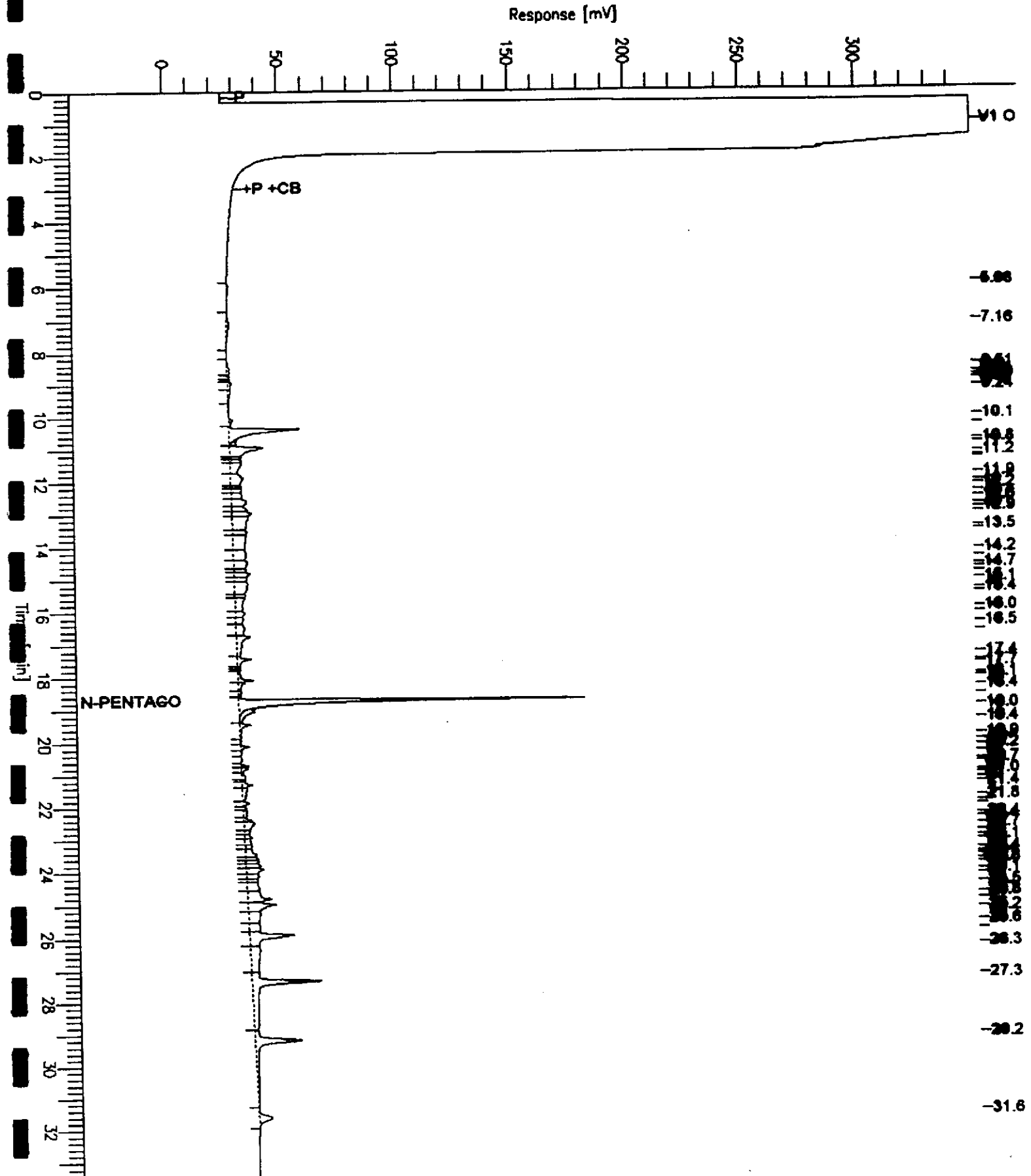
Sample Name : HLA
Sample Name : J:\HP3DATA\3AMA120.raw
Method : TPH03A
Start Time : 0.00 min
Scale Factor: 0.0

End Time : 33.65 min
Plot Offset: 0 mV

Sample #: 9022496
Date : 3/5/99 7:13 PM
Time of Injection: 3/5/99 6:39 PM
Low Point : 0.00 mV
Plot Scale: 350.0 mV

Page 1 of 1

High Point : 350.00 mV



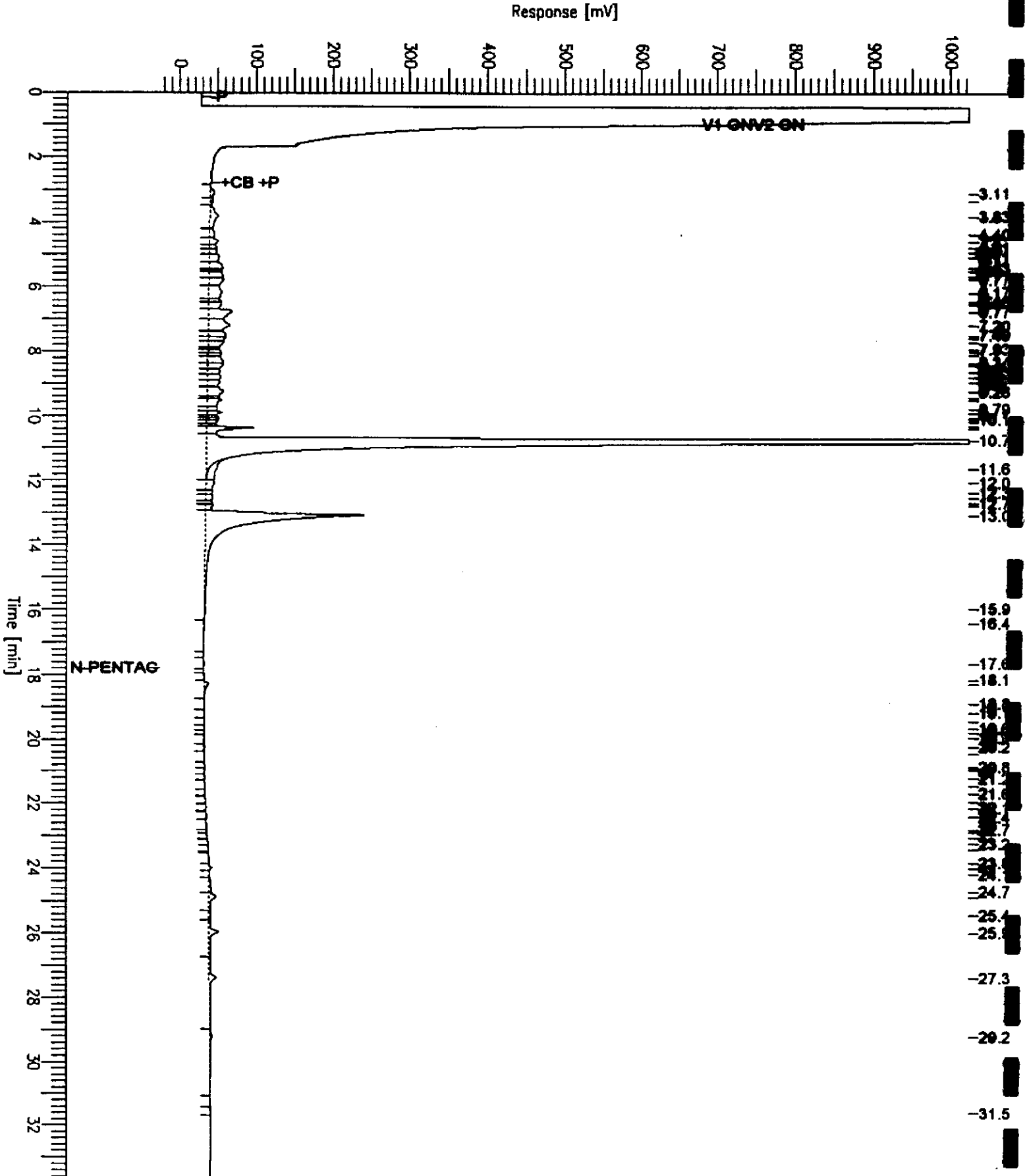
Chromatogram

Sample Name : HLA
File Name : J:\HP3DATA\3BMA176.RAW
Start Time : 0.00 min
Injection Volume Factor : 0.0

End Time : 33.65 min
Plot Offset : -25 mV

Sample #: 9022497DIL
Date : 3/10/99 8:19 AM
Time of Injection: 3/9/99 10:03 PM
Low Point : -24.90 mV
High Point : 1024.00 mV
Plot Scale: 1048.9 mV

Page 1 of 1

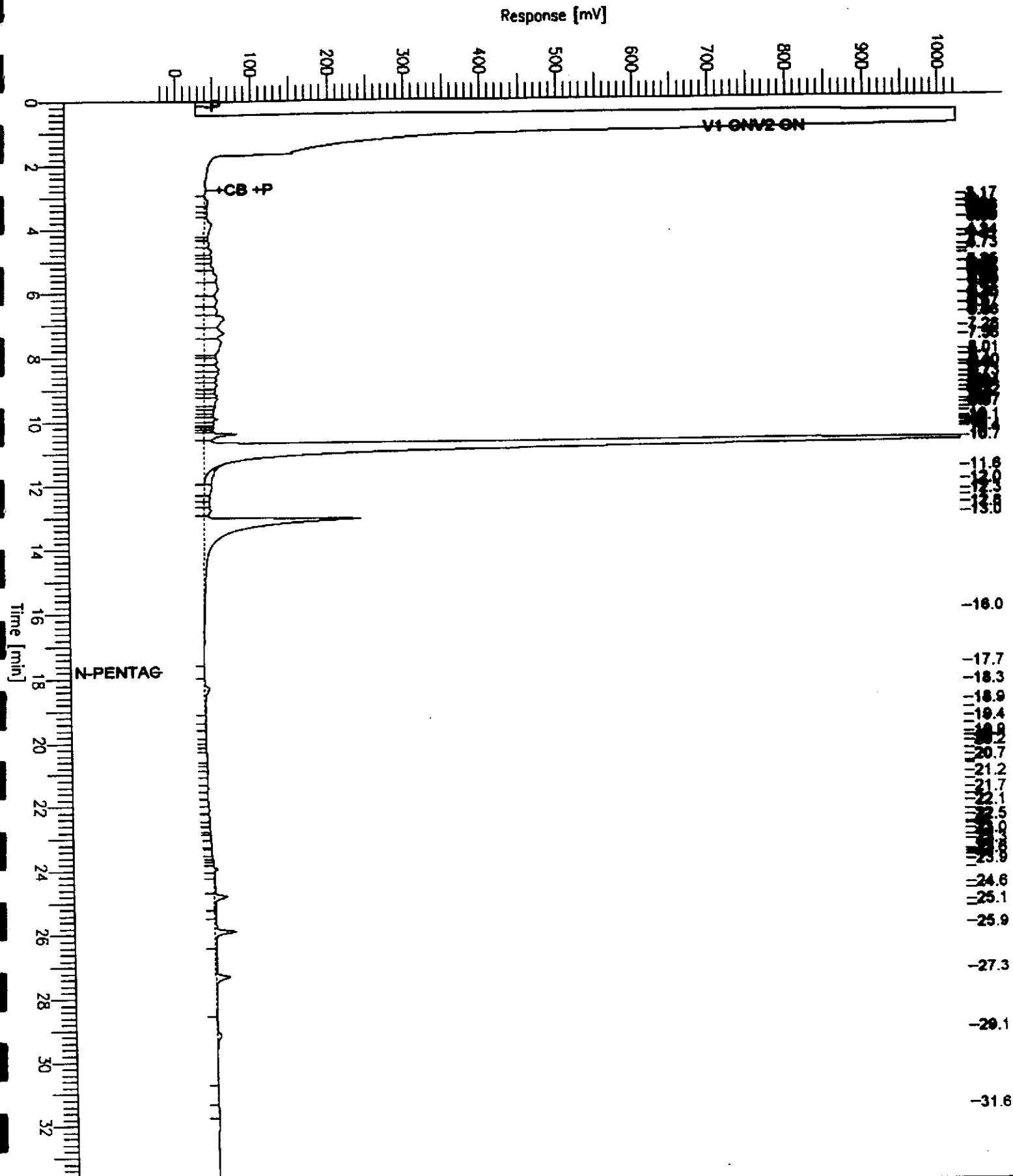


Chromatogram

Sample Name : HLA
FileName : J:\HP3DATA\3BMA177.RAW
Method :
Start Time : 0.00 min
Scale Factor: 0.0

End Time : 33.65 min
Plot Offset: -25 mV

Sample #: 9022498DIL
Date : 3/10/99 8:22 AM
Time of Injection: 3/9/99 10:44 PM
Low Point : -24.94 mV
Plot Scale: 1048.9 mV
High Point : 1024.00 mV



Chromatogram

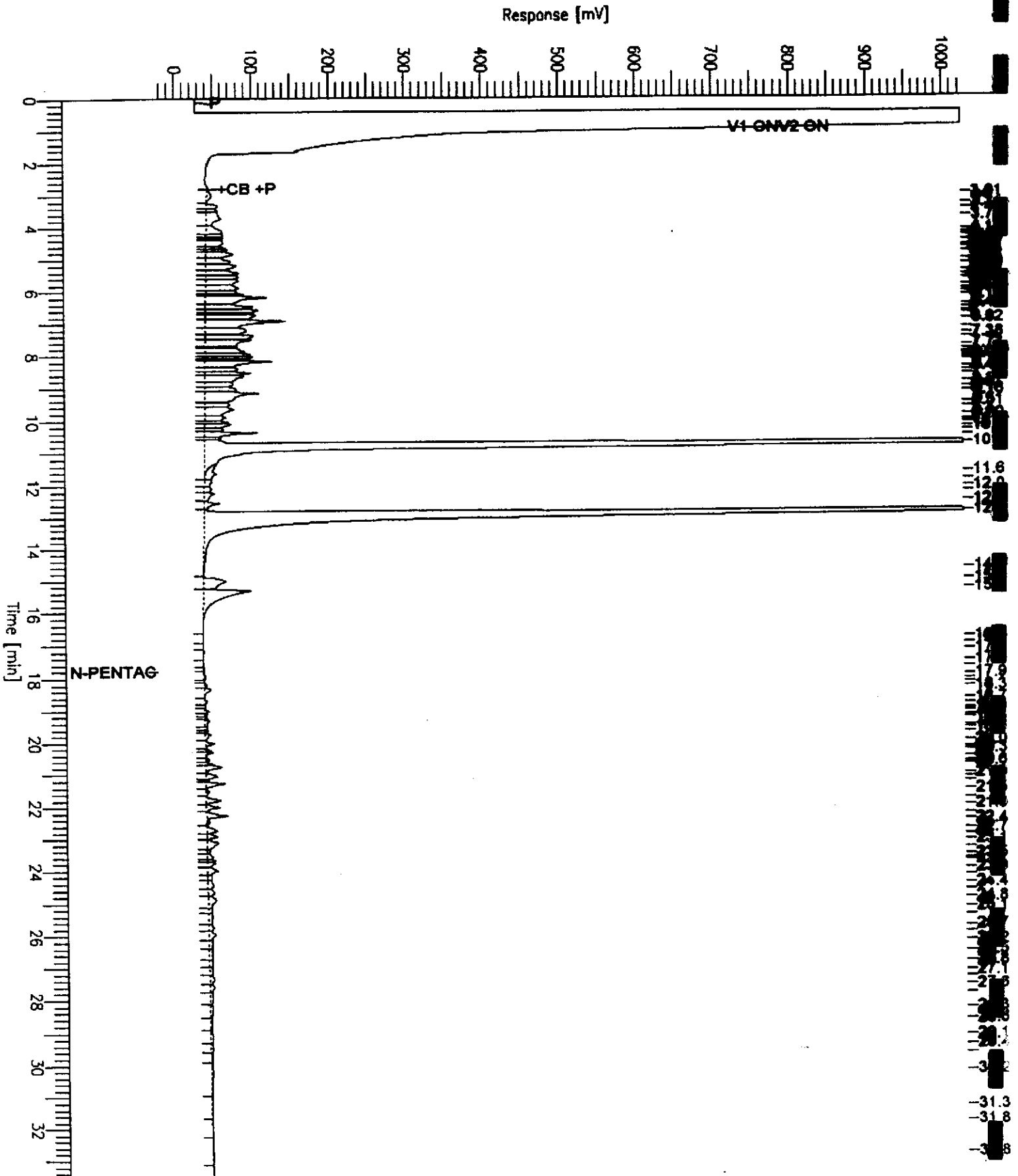
Sample Name : HLA
FileName : J:\HP3DATA\3BMA178.RAW
Method :
Start Time : 0.00 min
Scale Factor: 0.0

End Time : 33.65 min
Plot Offset: -25 mV

Sample #: 9022500DIL
Date : 3/10/99 8:23 AM
Time of Injection: 3/9/99 11:25 PM
Low Point : -24.95 mV
Plot Scale: 1049.0 mV

Page 1 of 1

High Point : 1024.00 mV



Chromatogram

File Name : HLA
Sample Name : J:\HP3DATA\3AMA123.raw
Method : TPH03A
Start Time : 0.00 min
Scale Factor: 0.0

End Time : 33.65 min
Plot Offset: 0 mV

Sample #: 9022501
Date : 3/5/99 9:17 PM
Time of Injection: 3/5/99 8:43 PM
Low Point : 0.00 mV
Plot Scale: 350.0 mV
Page 1 of 1
High Point : 350.00 mV

