PORT OF OAKLAND

Re-419

January 31, 2000

1049

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

SUBJECT: QUARTERLY GROUNDWATER MONITORING REPORT - FORMER TANK NUMBERS MF-25 AND MF-26, METROPOLITAN OAKLAND INTERNATIONAL AIRPORT, UNITED AIRLINES HANGAR AREA - ECONOMY PARKING LOT SITE, 1100 AIRPORT DRIVE, OAKLAND, CALIFORNIA

Dear Mr. Chan:

Enclosed is a copy of the January 25, 2000 "*Quarterly Groundwater Monitoring Report, October 1, through December 30, 1999, United Airlines Hangar - Economy Parking Lot Site, Metropolitan Oakland International Airport (MOIA)*", 1100 Airport Drive, Oakland, California. Monitoring activities were performed by Harding Lawson Associates, (HLA), 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 627-1118. Thank you for your on-going assistance and support on this project.

Sincerely,

Dale Klettke

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

enclosure

c: Jeff Jones - EH & SC Files
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Harding Lawson Associates

HLA

January 25, 2000

43145.4

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

Quarterly Groundwater Monitoring Report
October 1 through December 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 fourth 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 fifth 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

(diesel + mo)

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 total 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 though 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 at 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.

GROUNDWATER SAMPLING AND ANALYSIS

HLA measured dissolved oxygen (DO) concentrations in the eight monitoring wells on a monthly basis between October 1 through December 31, 1999. On November 11, 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. 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 all sampling equipment was decontaminated with a non-phosphate cleaning solution and rinsed with distilled water. HLA contained purged water 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, total xylenes (BTEX) and methyl t-butyl ether (MTBE) by EPA Test Method 8020
- TPHd, total petroleum hydrocarbons as jet fuel (TPHj) (A), TPHmo by EPA Method 8015 with a silica gel cleanup procedure
- Purgeable halocarbons by EPA Method 8010
- Ferrous Iron, Ferric Iron, Nitrate, sulfate, orthophosphate
- Total organic carbon (TOC) by EPA Method 415.2
- Halogenated/Aromatic Volatile Organics by EPA Method 8010/8020.

MONITORING RESULTS

No free product 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 forms are presented in Appendix B.

The ORC treatment appears to be stimulating the biological degradation of dissolved petroleum hydrocarbons in the vicinity of the former USTs, with the most significant improvement seen for TPHj which is the hydrocarbon range most commonly quantified by the laboratory for this site. At MW-4 (located within the former UST excavation), although TPHj remained relatively similar to last quarter's results (2,000 and 2,400 micrograms per liter [µg/L], respectively), there has been a 94-percent reduction (from 41,000 to the current 2,400 µg/L) during the 11 months since ORC application. Adjacent to the former UST excavation at MW-1, TPHg and TPHd results have increased slightly this quarter compared to last, but have decreased historically.

TPHg concentrations decreased since last quarter in MW-2 from 17,000 to 3,800 µg/L. Although TPHj has decreased since the ORC application from 31,000 to 10,000 µg/L, a review of MW-2 historic data indicates relatively minor changes in dissolved hydrocarbon concentrations. In addition, MW-2 has consistently exhibited lower Redox potential than MW-4, indicating that the area around MW-2 is much reduced and has not been influenced by the ORC last application. Based on these results, next quarter another ORC injection will be applied in the vicinity of MW-2.

Successful ORC treatment is also supported by a comparison of monitoring parameters from before and after the ORC application. Elevated DO concentrations continue to be observed at MW-1, indicating that oxygen is still being released by ORC. In comparison, microbial activity appears to be stimulated at MW-4 where oxygen is being utilized as quickly as it is being released.

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).

The Port authorized installing a second batch of ORC at the site. In January 2000, HLA plans to install 1,000 pounds of ORC at the site with emphasis being the area surrounding MW-2.

CLOSURE

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

Very Truly Yours,

HARDING LAWSON ASSOCIATES

Heather Lee
Staff Engineer

Michael J. Brink
Civil Engineer

REGISTERED PROFESSIONAL ENGINEER
MICHAEL J. BRINK
C 057035
Exp. 6/30/02
CIVIL
STATE OF CALIFORNIA

HL/MJB/mlw/43145/037548L

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 msl)	Date	Depth to Water (feet)	Groundwater Elevation (feet msl)	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	–	
		20-May-99	2.62	4.29	–	
		17-Aug-99	3.30	3.61	–	
		11-Nov-99	4.44	2.47	–	
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
	6.58	13-May-98	1.80	4.78	–	2,5
		16-Dec-98	2.60	3.98	–	
		26-Feb-99	2.06	4.52	–	
		20-May-99	2.40	4.18	–	
		17-Aug-99	2.92	3.66	–	
		11-Nov-99	3.05	3.53	–	
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

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

Well Name	Top of Casing Elevation (feet msl)	Date	Depth to Water (feet)	Groundwater Elevation (feet msl)	Product Thickness (feet)	Note
MW-3		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	–	
		20-May-99	2.96	4.40	–	
		17-Aug-99	3.64	3.72	–	
		11-Nov-99	3.88	3.48	–	
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	–	
		20-May-99	2.47	4.45	–	
		17-Aug-99	3.10	3.82	–	
		11-Nov-99	3.38	3.54	–	
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	–	
		20-May-99	2.05	3.74	–	
		17-Aug-99	2.30	3.49	–	
		11-Nov-99	2.34	3.45	–	
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	–	
		20-May-99	2.65	3.74	–	
		17-Aug-99	3.03	3.36	–	
		11-Nov-99	3.07	3.32	–	
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	–	
		20-May-99	2.23	3.63	–	
		17-Aug-99	2.57	3.29	–	
		11-Nov-99	2.57	3.29	–	
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	–	
		20-May-99	3.06	4.50	–	
		17-Aug-99	3.75	3.81	–	
		11-Nov-99	4.04	3.52	–	

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 1of 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.
– = No free product measured
msl = mean sea level

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

Monitoring Well ID	Date	Benzene (µg/L)	Toluene (µg/L)	Ethyl - benzene (µg/L)	Total Xylenes (µg/L)	MTBE (µg/L)	TPHg (µg/L)	TPH Diesel (C1-C22) (µg/L)	TPH Jet Fuel A (C9-C16) (µg/L)	TPH Motor Oil (>C16) (µg/L)	Unidentified Extractable Hydrocarbons (µg/L)	Note
MW-1	05/15/92	<0.4	<0.3	<0.3	<0.4	--	<50	--	--	--	--	1
	08/07/92	<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
	02/12/93	<0.4	<0.3	<0.3	<0.4	--	<50	--	--	--	--	1
	05/17/93	<0.4	<0.3	<0.3	<0.4	--	<50	--	--	--	--	1
	08/03/93	<0.5	<0.5	<0.5	<0.5	--	<50	5200	--	--	--	1
	11/25/93	<0.5	<0.5	<0.5	0.6	--	70	--	--	--	--	1
	05/09/94	<0.5	<0.5	<0.5	<0.5	--	<50	--	--	--	--	1
	08/29/94	<0.5	<0.5	2.7	<0.5	--	<50	--	--	--	--	1
	04/25/95	<5	<5	<5	<5	--	<50	1,400	<50	610	--	1
	08/11/95	<0.4	<0.3	<0.3	<0.4	--	<50	1,900	<50	1,200	--	1
	11/03/95	0.4	0.4	<0.3	<0.4	--	<50	4,200	<50	1,800	--	1
	06/19/96	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
	01/22/97	<0.5	<0.5	<0.5	<1.0	--	<50	220	<500	<250	--	1
	04/25/97	1.2	<0.5	1.0	1.2	--	110	<50	<500	<250	--	1
	08/06/97	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
	03/26/98	<0.5	<0.5	<0.5	<1.0	--	<50	<48	<48	<290	--	2
	12/16/98	1.8	<0.5	<0.5	<0.5	<2.5	120	640	<50	<250	340	--
	02/26/99	0.96	<0.5	<0.5	<0.5	2.6	69	670	<50	350	<50	4
	05/20/99	1.7	<0.5	<0.5	<0.5	<2.5	85	380	<50	<250	<50	--
	08/17/99	2.6	0.52	<0.5	<0.5	<2.5	54	530	<50	<500	--	--
	11/11/99	2.5	<0.5	<0.5	<0.5	<2.5	96	1100	<50	<250	--	--
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	200	400	27	360	--	3,800	<11,000	11,000	4,200	--	1
	06/19/96	--[3]	--[3]	--[3]	--[3]	--	--[3]	--[3]	--[3]	--[3]	--	1
	10/24/96	--[3]	--[3]	--[3]	--[3]	--	--[3]	--[3]	--[3]	--[3]	--	1
	01/22/97	--[3]	--[3]	--[3]	--[3]	--	--[3]	--[3]	--[3]	--[3]	--	1
	04/25/97	--[3]	--[3]	--[3]	--[3]	--	--[3]	--[3]	--[3]	--[3]	--	1
	08/06/97	170	270	92	410	--	9,900	12,000	<1,000	2,300	--	1
	12/23/97	--[3]	--[3]	--[3]	--[3]	--	--[3]	--[3]	--[3]	--[3]	--	1
	03/26/98	--[3]	--[3]	--[3]	--[3]	--	--[3]	--[3]	--[3]	--[3]	--	1
	05/13/98	150	270	94	440	--	4,000	2,600	3,400	<290	--	2,3,4
	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	--
	05/20/99	120	280	76	360	<2.5	4,700	<50	15,000	5,800	<50	--

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

Monitoring Well ID	Date	Benzene (µg/L)	Toluene (µg/L)	Ethyl - benzene (µg/L)	Total Xylenes (µg/L)	MTBE (µg/L)	TPHg (µg/L)	TPH Diesel (C1-C22) (µg/L)	TPH Jet Fuel A (C9-C16) (µg/L)	TPH Motor Oil (>C16) (µg/L)	Unidentified Extractable Hydrocarbons (µg/L)	Note
MW-2	08/17/99	55	44	57	200	<2.5	17,000	<1000	22,000	<10000	--	--
	11/11/99	60	37	78	190	<2.5	3,800	<500	10,000	<2500	--	--
MW-3	04/25/95	150	600	100	580	--	7,200	<40000	38,000	31,000	--	1
	08/11/95	--	--	--	--	--	--	--	--	--	--	1,5
	11/03/95	--	--	--	--	--	--	--	--	--	--	1,5
	06/19/96	--	--	--	--	--	--	--	--	--	--	1,5
	10/24/96	--	--	--	--	--	--	--	--	--	--	1,5
	01/22/97	--	--	--	--	--	--	--	--	--	--	1,5
	04/25/97	--	--	--	--	--	--	--	--	--	--	1,5
	08/06/97	4	16	14	90	--	4,200	1,400	<500	<250	--	1,5
	12/23/97	13	16	9	116	--	2,200	79,000	110,000	8,200	--	1,5
	03/26/98	--	--	--	--	--	--	--	--	--	--	2,5
	12/16/98	<10	12	<10	43	<50	2,300	--	--	--	--	7
	02/26/99	16	16	10	40	<100	5,700	--	--	--	--	7
	05/20/99	20	25	7.8	37	<2.5	2,700	--	--	--	--	7
	08/17/99	14	<0.5	<0.5	15	<2.5	2,100	--	--	--	--	7
	11/11/99	7.8	<0.5	<0.5	17	<2.5	3,300	--	--	--	--	7
MW-4	05/13/98	9.8	23	13	79	--	1,400	2,000	2,300	<310	--	2,3,4
	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	--
	02/26/99	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	--
	05/20/99	16	0.83	3.0	10	5.5	670	<50	1,900	560	<50	--
(Dup)	05/20/99	15	0.78	3.0	11	5.4	1,100	<50	1,200	290	<50	--
	08/17/99	22	<0.5	<0.5	<0.5	<2.5	1,000	<50	2,000	<500	<50	--
(Dup)	08/17/99	24	3.10	3.2	16	<2.5	690	<50	1,700	<500	--	--
	11/11/99	11	<0.5	<0.5	12	<2.5	1,600	<50	2,400	<50	<50	--
(Dup)	11/11/99	11	1.40	2.7	16	<2.5	1,300	<50	1,800	<50	--	--
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	--
	05/20/99	<0.5	<0.5	<0.5	<0.5	<2.5	<50	<50	<50	<250	<50	--
	08/17/99	<0.5	<0.5	<0.5	<0.5	<2.5	<50	79	<50	<500	--	--
	11/11/99	<0.5	<0.5	<0.5	<0.5	<2.5	<50	93	<50	<250	--	--
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	--
	05/20/99	<0.5	<0.5	<0.5	<0.5	<2.5	<50	<50	<50	<250	<50	--

POSSIBLE TPHd/JF+MO PRESENT.

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

Monitoring Well ID	Date	Benzene (µg/L)	Toluene (µg/L)	Ethyl - benzene (µg/L)	Total Xylenes (µg/L)	MTBE (µg/L)	TPHg (µg/L)	TPH Diesel (C1-C22) (µg/L)	TPH Jet Fuel A (C9-C16) (µg/L)	TPH Motor Oil (>C16) (µg/L)	Unidentified Extractable Hydrocarbons (µg/L)	Note
MW-6	08/17/99	<0.5	<0.5	<0.5	<0.5	<2.5	<50	72	<50	<500	--	--
	11/11/99	<0.5	<0.5	<0.5	<0.5	<2.5	<50	93	<50	<250	--	--
MW-7	05/13/98	<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	--
	05/20/99	<0.5	<0.5	<0.5	<0.5	<2.5	<50	<50	<50	<250	<50	--
	08/17/99	<0.5	<0.5	<0.5	<0.5	<2.5	<50	52	<50	<500	--	--
	11/11/99	<0.5	<0.5	<0.5	<0.5	<2.5	<50	<50	<50	<250	--	--
MW-8	05/13/98	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	6
	02/26/99	3.5	<0.5	<0.5	<0.5	2.7	<50	<50	<50	<250	<50	6
	05/20/99	2.8	<0.5	<0.5	<0.5	<2.5	<50	150	<50	<250	<50	--
	08/17/99	3.5	<0.5	<0.5	<0.5	2.9	51	190	<50	<250	--	--
	11/11/99	3.0	<0.5	<0.5	<0.5	3.2	<50	310	<50	<250	--	--
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 of Results of Additional Site Investigation, Port of Oakland, Oakland Internatinonal Airport, United Airlines Hanger Area-Economy Parking Lot Site, dated October 21, 1998 by ITSI dated October 21, 1998 by ITSI

3 - Hydrocarbons for TPHd do not match profile for laboratory standards

4 - Hydrocarbons for TPHd are lighter than indicated standard

5 - Not analyzed due to the presence of free product

6 - MTBE detected by GC methods at slightly over reporting limit has not been confirmed by MS.

7 - MW-3 has slow recovery so not enough water could be collected for all analysis.

MCLs - Maximum Contaminant Levels

- Shaded areas indicate detected concentration exceeds MCL.

-- = Not applicable/no data

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
	02/12/93	ND	ND	ND	ND	ND	ND	ND	ND	ND	--	--	--	--	1
	05/17/93	ND	ND	ND	ND	ND	ND	ND	ND	ND	--	--	--	--	1
	08/03/93	ND	ND	ND	ND	ND	ND	ND	ND	ND	--	--	--	--	1
	11/25/93	ND	ND	ND	ND	6.0	ND	ND	ND	ND	--	--	--	--	1
	05/09/94	ND	ND	ND	ND	ND	ND	ND	ND	5.5	--	--	--	--	1
	09/27/94	ND	ND	ND	ND	ND	ND	ND	ND	ND	--	--	--	--	1
	01/25/95	<20	<20	<5	<5	<5	<20	--	--	<5	--	--	--	--	1
	08/11/95	--	--	<0.5	4.3	13	--	2.0	1.8	0.6	--	--	--	--	1
	11/03/95	--	--	<0.5	1.3	3.7	--	0.6	0.5	<0.5	--	--	--	--	1
	06/19/96	--	--	<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
	01/22/97	--	--	<0.5	3.9	8.4	--	<0.5	1.7	<0.5	--	--	--	--	1
	04/25/97	--	--	<0.5	6.2	10	--	<0.5	1.2	0.62	--	--	--	--	1
	08/06/97	--	--	<0.5	14	19	--	<0.5	2.5	0.54	--	--	--	--	1
	12/23/97	--	--	<1.0	6.6	9.3	--	<1.0	<1.0	<1.0	--	--	--	--	1
	03/26/98	--	--	<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	--
	02/26/99	--	--	<0.5	15	9.8	--	2.9	<0.5	<0.5	<1.0	<0.5	0.79	<1.0	--
	05/20/99	--	--	<0.5	22	17	--	<0.5	<0.5	<0.5	<1.0	<0.5	1.5	1.2	--
	08/17/99	--	--	<0.5	23	16	--	<0.5	<0.5	<0.5	<1.0	<0.5	2.1	<1.0	--
	11/11/99	--	--	<0.5	21	19	--	<0.5	<0.5	<0.5	<1.0	<0.5	1.5	<1.0	--
MW-2	04/25/95	<200	200	<50	50	<50	<200	--	--	<50	--	--	--	--	1
	08/11/95	--	--	5.0	79	26	--	20	4.0	9.0	--	--	--	--	1
	11/03/95	--	--	<0.5	73	24	--	4.8	6.7	6.8	--	--	--	--	1
	06/19/96	--	--	--	--	--	--	--	--	--	--	--	--	--	1,2
	10/24/96	--	--	--	--	--	--	--	--	--	--	--	--	--	1,2
	01/22/97	--	--	--	--	--	--	--	--	--	--	--	--	--	1,2
	04/25/97	--	--	--	--	--	--	--	--	--	--	--	--	--	1,2
	08/06/97	--	--	<5	69	160	--	<5	<12	<5	--	--	--	--	1
	12/23/97	--	--	--	--	--	--	--	--	--	--	--	--	--	1,2
	03/26/98	--	--	--	--	--	--	--	--	--	--	--	--	--	1,2
	05/13/98	--	--	--	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	--
	02/26/99	--	--	<1.3	19	67	--	2.9	<1.3	<1.3	<2.5	<1.3	<1.3	<2.5	--
	05/20/99	--	--	<0.5	63	191.5	--	5.8	1.1	1.5	4.4	<0.5	0.82	<1.0	--
	08/17/99	--	--	<2.5	70	140	--	<2.5	<2.5	<2.5	<5.0	<2.5	<2.5	<5.0	--
	11/11/99	--	--	<2.5	48	180	--	<2.5	<2.5	<2.5	<5.0	<2.5	<2.5	<5.0	--

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	04/25/95	300	300	--	30	<30	200	--	--	<30	--	--	--	--	1
MW-3	08/11/95	--	--	--	--	--	--	--	--	--	--	--	--	--	1,2
	11/03/95	--	--	--	--	--	--	--	--	--	--	--	--	--	1,2
	06/19/96	--	--	--	--	--	--	--	--	--	--	--	--	--	1,2
	10/24/96	--	--	--	--	--	--	--	--	--	--	--	--	--	1,2
	01/22/97	--	--	--	--	--	--	--	--	--	--	--	--	--	1,2
	04/25/97	--	--	--	--	--	--	--	--	--	--	--	--	--	1,2
	08/06/97	--	--	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
	03/26/98	--	--	--	--	--	--	--	--	--	--	--	--	--	3,2
	12/16/98	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	4
	02/26/99	--	--	<0.5	4.4	<0.5	--	1.6	<0.5	<0.5	<1.0	<0.5	<0.5	<1.0	--
	05/20/99	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	4
	08/17/99	NA	NA	<0.5	3.6	<0.5	NA	<0.5	<0.5	<0.5	<1.0	<0.5	<0.5	<1.0	--
	11/11/99	--	--	<0.5	3.2	<0.5	--	2.4	<0.5	<0.5	<1.0	<0.5	<0.5	<1.0	--
MW-4	05/13/98	--	--	--	31	9.9	--	--	--	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	--
	02/26/99	--	--	<0.5	39	28	--	1.4	<0.5	0.97	6.5	<0.5	<0.5	<1.0	--
(dup)	02/26/99	--	--	<0.5	43	36	--	1.7	<0.5	1.3	8.3	<0.5	2.8	<1.0	--
	05/20/99	--	--	<0.5	46	42.1	--	<0.5	0.54	1.7	8.9	<0.5	2.8	<1.0	--
(dup)	05/20/99	--	--	<0.5	48	39.4	--	3.9	0.59	1.9	8.6	<0.5	2.5	<1.0	--
	08/17/99	--	--	<0.5	37	22	--	<0.5	0.7	1.8	4.3	<0.5	2	<1.0	--
(dup)	08/17/99	--	--	<0.5	45	0.77	--	<0.5	5.5	2	13	<0.5	2.8	<1.0	--
	11/11/99	--	--	<0.5	34	22	--	<0.5	<0.5	0.76	6.9	<0.5	1.1	<1.0	--
(dup)	11/11/99	--	--	<0.5	38	23	--	<0.5	<0.5	0.85	7.9	<0.5	1.1	<1.0	--
MW-5	05/13/98	--	--	--	<1.0	<1.0	--	--	--	<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	--
	02/26/99	--	--	<0.5	<0.5	<0.5	--	<0.5	<0.5	<0.5	<1.0	<0.5	<0.5	<1.0	--
	05/20/99	--	--	<0.5	<0.5	<0.5	--	<0.5	<0.5	<0.5	<1.0	<0.5	<0.5	<1.0	--
	08/17/99	--	--	<0.5	<0.5	<0.5	--	<0.5	<0.5	<0.5	<1.0	<0.5	<0.5	<1.0	--
	11/11/99	--	--	<0.5	<0.5	<0.5	--	<0.5	<0.5	<0.5	<1.0	<0.5	<0.5	<1.0	--
MW-6	05/13/98	--	--	--	<1.0	<1.0	--	--	--	<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	--
	02/26/99	--	--	<0.5	<0.5	<0.5	--	<0.5	<0.5	<0.5	<1.0	<0.5	<0.5	<1.0	--
	05/20/99	--	--	<0.5	<0.5	<0.5	--	<0.5	<0.5	<0.5	<1.0	<0.5	<0.5	<1.0	--
	08/17/99	--	--	<0.5	<0.5	<0.5	--	<0.5	<0.5	<0.5	<1.0	<0.5	<0.5	<1.0	--
	11/11/99	--	--	<0.5	<0.5	<0.5	--	<0.5	<0.5	<0.5	<1.0	<0.5	<0.5	<1.0	--

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-7	05/13/98	--	--	--	8	<1.0	--	--	--	<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	--
MW-7	02/26/99	--	--	<0.5	15	<0.5	--	<0.5	<0.5	<0.5	<1.0	<0.5	6.8	<1.0	--
	05/20/99	--	--	<0.5	19	0.74	--	<0.5	<0.5	<0.5	<1.0	<0.5	7.3	<1.0	--
	08/17/99	--	--	<0.5	22	0.59	--	<0.5	<0.5	0.52	<1.0	<0.5	9.6	<1.0	--
	11/11/99	--	--	<0.5	17	<0.5	--	<0.5	<0.5	<0.5	<1.0	<0.5	6.8	<1.0	--
MW-8	05/13/98	--	--	--	180	1.9	--	--	--	<1.0	<2.0	2.7	180	6.0	3
	12/16/98	--	--	<0.5	440	1.2	--	<0.5	<0.5	<0.5	<1.0	10	620	6.6	--
	02/26/99	--	--	<2.5	390	<2.5	--	<2.5	<2.5	<2.5	<5.0	6.9	490	10	--
	05/20/99	--	--	<0.5	410	1.2	--	<0.5	<0.5	<0.5	<1.0	8.3	480	3.9	--
	08/17/99	--	--	<2.5	500	<2.5	--	<2.5	<2.5	<2.5	<5	11	700	<5.0	--
	11/11/99	--	--	<5.0	300	<5.0	--	<5.0	<5.0	<5.0	<10	7.5	340	<10	--
MCLs (California/Fed)		--	--	--	5/-	6/70	--	--	5/5	5/5	--	0.5/5	6/7	0.5/2	

POSSIBLE UP GRAD. FRANCHISTS.

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 of 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

4 - MW-3 has slow recovery so not enough water could be collected for all analysis.

MCLs - Maximum Contaminant Levels

- Shaded areas indicate detected concentration exceeds MCL.

-- = Not applicable/no data

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 NO_3 (mg/L)	Sulfate (mg/L)	Ortho-phosphate PO_4 (mg/L)	TDS (mg/L)	TOC (mg/L)	Redox (millivolts)	Notes
MW-1	05/15/92	--	--	--	--	--	--	5,900	<5	--	1
	08/07/92	--	--	--	--	--	--	--	<5	--	1
	11/24/92	--	--	--	--	--	--	--	<5	--	1
	02/12/93	--	--	--	--	--	--	--	<5	--	1
	05/17/93	--	--	--	--	--	--	4,100	<5	--	1
	08/03/93	--	--	--	--	--	--	7,700	<5	--	1
	11/25/93	--	--	--	--	--	--	3,790	<5	--	1
	05/09/94	--	--	--	--	--	--	9,600	<0.93	--	1
	08/29/94	--	--	--	--	--	--	3,900	<1.0	--	1
	04/25/95	--	--	--	--	--	--	4,000	--	--	1
	08/11/95	--	--	--	--	--	--	8,500	--	--	1
	11/03/95	--	--	--	--	--	--	6,600	--	--	1
	06/19/96	--	--	--	--	--	--	3,040	--	--	1
	10/24/96	--	--	--	--	--	--	3,090	--	--	1
	01/22/97	--	--	--	--	--	--	4,240	--	--	1
	04/25/97	--	--	--	--	--	--	2,770	--	--	1
	08/06/97	--	--	--	--	--	--	2,430	--	--	1
	12/23/97	<0.2	3.9	--	<0.2	120	--	3,570	--	--	1
	03/26/98	0.41	2.1	--	<0.2	110	--	3,240	--	--	3
	12/16/98	--	--	3.3	<0.1	70	<0.5	--	32	40	--
	02/26/99	0.21	--	0.57	<0.1	110	1.1	--	30	147	--
	05/20/99	0.26	1.2	--	<0.1	97	1.5	--	22	96	--
	08/17/99	0.31	--	0.88	<0.1	100	1.3	--	74	151	--
	11/11/99	0.27	--	0.96	<0.1	110	1.3	--	108	57	--
MW-2	04/25/95	--	--	--	--	--	--	1,700	--	--	1
	08/11/95	--	--	--	--	--	--	2,500	--	--	1
	11/03/95	--	--	--	--	--	--	2,000	--	--	1
	06/19/96	--	--	--	--	--	--	--	--	--	1
	10/24/96	--	--	--	--	--	--	--	--	--	1
	01/22/97	--	--	--	--	--	--	--	--	--	1
	04/25/97	--	--	--	--	--	--	--	--	--	1
	08/06/97	--	--	--	--	--	--	--	--	--	1
	04/25/97	--	--	--	--	--	--	--	--	--	1
	12/23/97	--	--	--	--	--	--	--	--	--	1,2

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 NO_3 (mg/L)	Sulfate (mg/L)	Ortho-phosphate PO_4 (mg/L)	TDS (mg/L)	TOC (mg/L)	Redox (millivolts)	Notes
MW-2	05/13/98	0.53	8.0	--	<0.05	12	0.72	3,240	--	123	3
	12/16/98	--	--	28	<0.1	21	<0.5	--	210	146	--
	02/26/99	17	--	36	<0.1	27	0.59	--	100	-235	--
	05/20/99	8.9	36	--	<0.1	2	<1.0	--	130	-124	--
	08/17/99	0.37	--	31	0.15	33	<0.5	--	210	-110	--
	11/11/99	0.1	--	17	<0.1	10	<0.5	--	214	-145	--
MW-3	04/25/95	--	--	--	--	--	--	5,600	--	--	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	--	--	--	--	--	--	15,100	--	--	1
	04/25/97	--	--	--	--	--	--	13,900	--	--	1
	12/23/97	--	--	--	--	--	--	--	--	--	1
	03/26/98	--	--	--	--	--	--	--	--	--	3,2
	12/16/98	--	--	--	--	--	--	--	240	157	4
	02/26/99	--	--	--	--	--	--	--	100	-142	4
	05/20/99	--	--	--	--	--	--	--	84	-125	4
	08/17/99	--	--	--	--	--	--	--	290	-156	4
	11/11/99	--	--	--	--	--	--	--	217	-272	4
MW-4	05/13/98	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	--
	02/26/99	<0.01	--	2.7	1.6	56	2.8	--	60	81	--
	02/26/99	<0.01	--	2.9	1.3	54	2.9	--	95	81	--
	05/20/99	<0.01	3.7	--	<0.1	44	3.3	--	36	89	--
	05/20/99	<0.01	2.9	--	0.22	56	2.2	--	39	208	--
	08/17/99	0.36	--	0.91	<0.1	13	2.4	--	110	208	--
	08/17/99	0.017	--	1.3	<0.1	14	2.4	--	130	208	--
	11/11/99	<0.01	--	1.1	<0.1	3	2.8	--	116	122	--
	11/11/99	<0.01	--	0.89	<0.1	3	2.9	--	93.5	122	--
MW-5	05/13/98	<0.2	0.7	--	0.36	250	0.47	2,300	20	150	3

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 NO_3 (mg/L)	Sulfate (mg/L)	Ortho-phosphate PO_4 (mg/L)	TDS (mg/L)	TOC (mg/L)	Redox (millivolts)	Notes
MW-5	12/16/98	--	--	10	<0.1	340	0.57	--	32	46	--
	02/26/99	0.64	--	23	<0.1	260	1.2	--	22	230	--
	05/20/99	0.75	11	--	0.11	260	<1.0	--	15	209	--
BG	08/17/99	0.23	--	12	<0.1	350	<0.5	--	82	62	--
	11/11/99	0.046	--	2.9	<0.1	320	<0.5	--	94.5	-48	--
MW-6	05/13/98	<0.2	0.69	--	2.1	400	0.15	4,240	13	126	3
	12/16/98	--	--	26	0.45	400	0.65	--	22	47	--
	02/26/99	0.44	--	16	4.3	380	0.89	--	42	262	--
	05/20/99	1.2	8.7	--	7.5	300	<1.0	--	22	227	--
	08/17/99	3.7	--	18	2.1	470	0.64	--	92	251	--
BG	11/11/99	0.15	--	12	0.91	440	0.58	--	103	216	--
MW-7	05/13/98	<0.2	0.62	--	0.9	100	<0.03	1,380	7	132	3
	12/16/98	--	--	19	6.9	100	0.53	--	7.7	159	--
	02/26/99	0.15	--	14	8.3	82	0.78	--	20	272	--
	05/20/99	0.89	13	--	4.3	160	<1.0	--	6.8	243	--
BG	08/17/99	0.52	--	12	3.4	160	0.68	--	38	200	--
	11/11/99	0.34	--	3.7	2.9	140	<0.5	--	49.6	137	--
MW-8	05/13/98	<0.2	2.2	--	<0.5	500	0.08	8,300	99	60.4	3
	12/16/98	--	--	37	<0.1	360	<0.5	--	2.4	83	--
	02/26/99	0.076	--	26	<0.1	290	0.69	--	63	280	--
	05/20/99	2	26	--	17	440	<1.0	--	21	196	--
	08/17/99	1.4	--	3.8	<0.2	580	<1.0	--	150	-62	--
	11/11/99	<0.01	--	46	20	400	<0.5	--	163	-31	--

Notes

1 - Data from Table 4-Summary of Laboratory Results for Inorganic Anaalytes Tanks MF25 and MF26 (United Airlines Hanger Area - Economy Parking Lot Site) Metropolitan Oakland International Airport (MOIA), 1100 Airport Drive, Oakland Califomia by ITSI.

2 - Not sampled due to presence of free product in monitoring well.

3 - Data from Table 5 of Results of Additional Site Investigation, Port of Oakland, Oakland International Airport, United Airlines Hanger Area Economy Parking Lot Site, dated October 21, 1998

4 - MW-3 has slow recovery so not enough water could be collected for all analysis.

-- = No data/not applicable

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

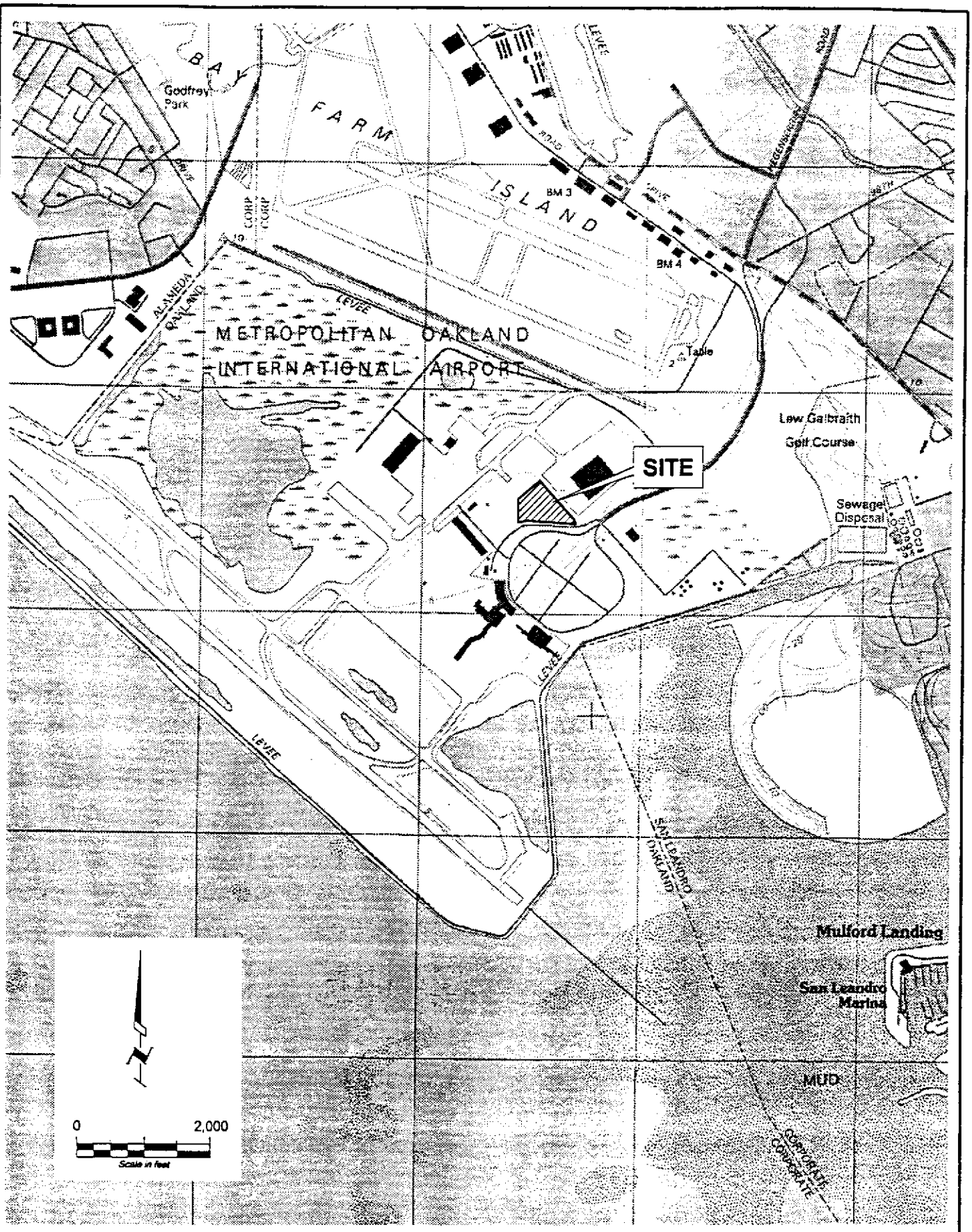
	MW-1	MW-2	MW-3	MW-4	MW-5	MW-6	MW-7	MW-8
16-Dec-98	2.0	1.2	0.5	1.2	2.0	1.1	2.4	0.8
23-Dec-98		ORC injected in former UST cavity.						
6-Jan-99	>15 [1]	1.1 [2]	0.9	>15 [1,2]	1.3	2.8	3.0	0.6
12-Jan-99	>15 [1]	0.8	1.0	8.0	0.7	2.4	3.2	0.7
22-Jan-99	>15 [1]	0.6	0.8	1.4	1.1	3.1	4.7	1.4
30-Jan-99	>15 [1]	0.6	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
20-May-99	>15	1.0 [2]	1.4 [2]	1.5	1.7	1.9	3.2	1.2
23-Jun-99	>15	0.5 [2]	0.4 [2]	0.6	0.6	1.0	0.8	0.6
26-Jul-99	>15	0.5 [2]	0.4 [2]	0.6	0.8	0.6	0.5	0.7
17-Aug-99	>15	0.3 [2]	0.45 [2]	0.5	0.2	0.3	0.8	0.6
12-Sep-99	>15	0.5 [2]	0.3 [2]	0.8	0.4	0.5	0.5	0.4
19-Oct-99	>15	0.4 [2]	0.3 [2]	0.2	0.6	0.4	0.3	0.6
11-Nov-99	10.2	0.6 [2]	0.7 [2]	0.7	0.8	0.8	1.8	1.1
22-Dec-99	>15	0.3 [2]	0.3 [2]	0.4	0.7	0.4	0.8	0.4

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

Notes:

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

ORC still present (why?)



econpark.dwg

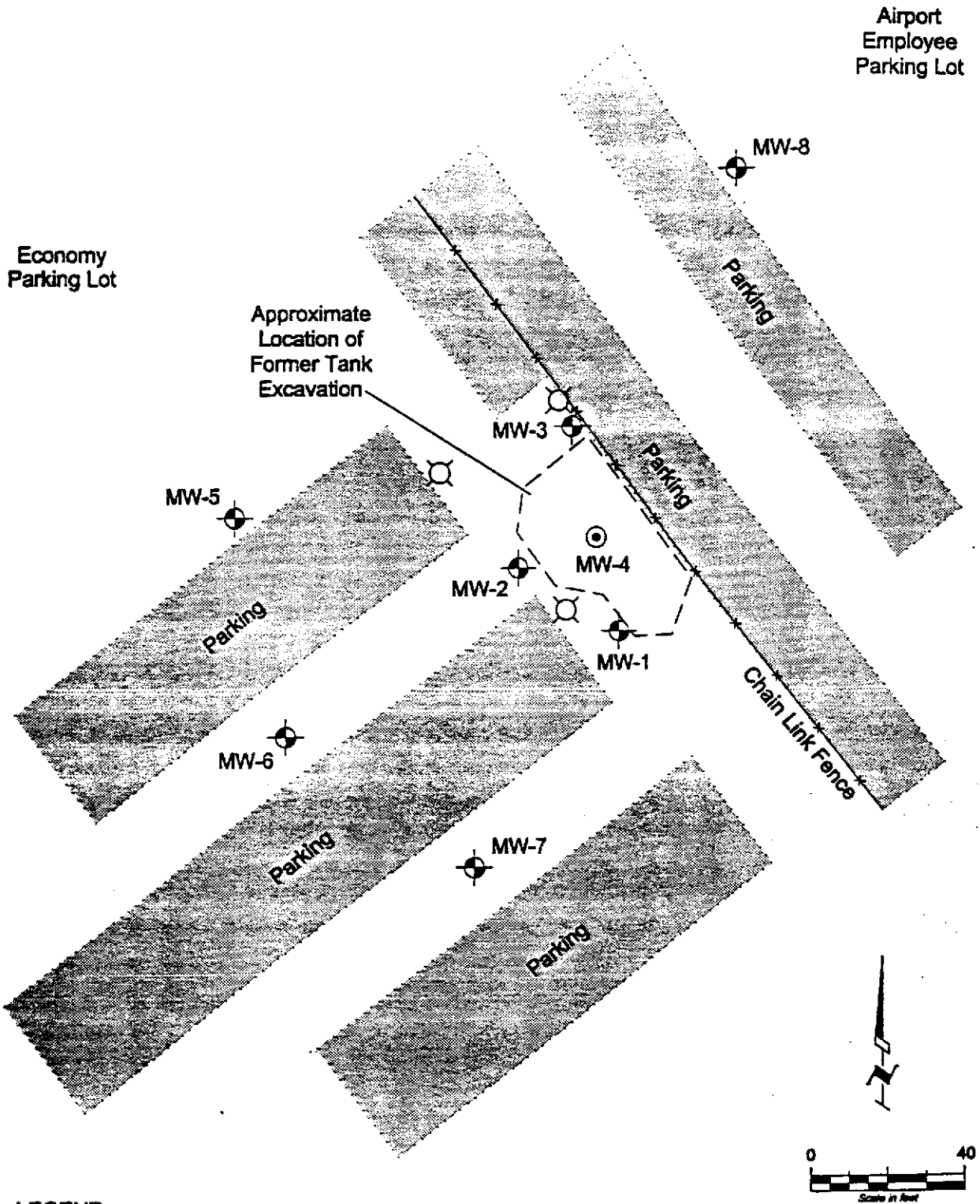
Harding Lawson Associates
Engineering and
Environmental Services

Site Location Map

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

PLATE
1

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
AJW	43145.2	MS	4/29/99	---



LEGEND:

- Monitoring Well (2-in. diameter)
- Remediation Well (4-in. diameter)
- Light Pole

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

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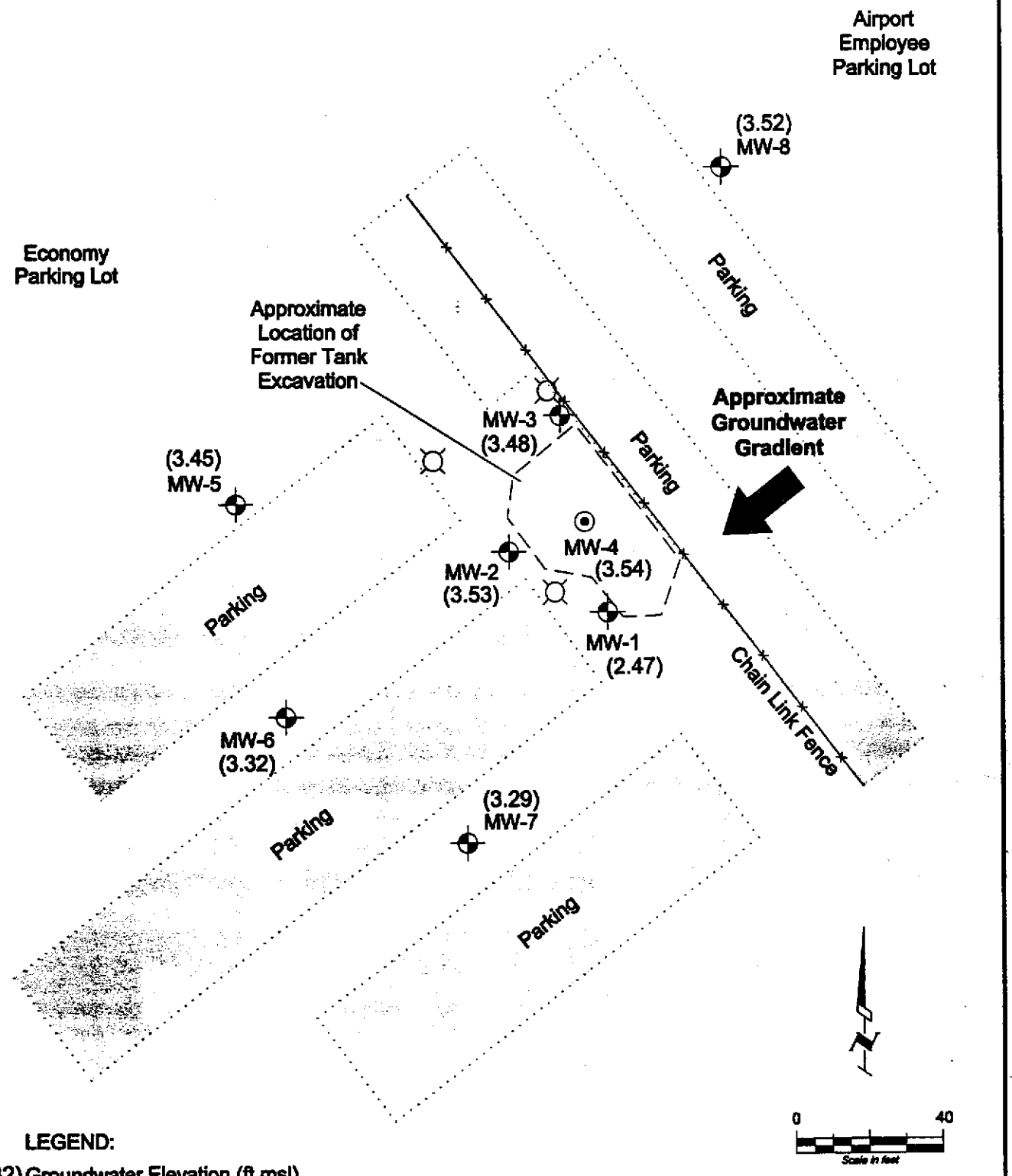
Harding Lawson Associates
Engineering and
Environmental Services

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

PLATE
2

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
AJW	43145.2	MS	4/29/99	---



LEGEND:

(3.32) Groundwater Elevation (ft msl)

Monitoring Well (2-in. diameter)

Remediation Well (4-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

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

PLATE
3

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
AJW	43145.4	HDL	12/28/99	...

APPENDIX A

GROUNDWATER SAMPLING REPORTS

Harding Lawson Associates
Engineering and
Environmental Services

GROUND-WATER SAMPLING FORM

Job Name: Port of Oakland - ORC Inj
Job Number: 43145.4
Recorded by: Heather D Lee (Signature)

Well No.: MW-1
Well Type: ☒ Monitor ☐ Extraction ☐ Other
Well Material: ☒ PVC ☐ St. Steel ☐ Other
Date: 11/11/99 Time: 1024
Sampled by: HDL (Initials)

WELL PURGING

PURGE VOLUME

Casing Diameter (D in inches):
☒ 2-inch ☐ 4-inch ☐ 6-inch ☐ Other
Total Depth of Casing (TD in feet BTOC): 13.90
Water Level Depth (WL in feet BTOC): 4.44
Number of Well Volumes to be purged (# Vols)
☒ 3 ☐ 4 ☐ 5 ☐ 10 ☐ Other

PURGE METHOD

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

PUMP INTAKE SETTING

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

PURGE VOLUME CALCULATION

$(13.90 - 4.44) \times 2^2 \times 3 \times 0.0408 = 4.63$ gallons

TD (feet), WL (feet), D (inches), # Vols, Calculated Purge Volume

PURGE TIME

1002 Start 1015 Stop 13 Elapsed

PURGE RATE

Initial ____ gpm Final ____ gpm

ACTUAL PURGE VOLUME

5 gallons

FIELD PARAMETER MEASUREMENT

Gal Since Pumping Began	pH	Cond. (µmhos/cm)	T ☐ °C ☒ °F	Other
Initial	9.49	10280	70.6	
1.5	8.82	865	71.9	
3	9.90	658	71.9	
5	9.82	615	72.0	

Minutes Since Pumping Began	pH	Cond. (µmhos/cm)	T ☐ °C ☐ °F	Other

Meter Nos. 9510

Observations During Purging (Well Condition, Turbidity, Color, Odor): milky white, no odor
Discharge Water Disposal: ☐ Sanitary Sewer ☐ Storm Sewer ☒ Other 55 gal drum

WELL SAMPLING

SAMPLING METHOD

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

SAMPLING DISTRIBUTION

Sample Series:

Sample No.	Volume/Cont.	Analysis Requested	Preservatives	Lab	Comments
9945MW-1	2 VOAs	8020/MTBE/BTEX	HCl	Sequoia	
↓	2 VOAs	TPHg	HCl	↓	
↓	1 VOA Amber	TOC	HCl	↓	
↓	1 LA	TPHd, mo, (CA)	none	↓	
↓	500mL P	Ferric Iron	HNO_3	↓	
↓	1 L P	NO_3, SO_4, PO_3	none	↓	
↓	500mL P	Ferrous Iron	none	↓	24 hr hold time

QUALITY CONTROL SAMPLES

Duplicate Samples

Original Sample No.	Duplicate Sample No.

Blank Samples

Type	Sample No.

Other Samples

Type	Sample No.

Harding Lawson Associates
Engineering and Environmental Services

GROUND-WATER SAMPLING FORM

Job Name: Port of Oakland - ORC Inj
Job Number: 43145.4
Recorded by: Heath Stone (Signature)

Well No.: MW-2
Well Type: ☒ Monitor ☐ Extraction ☐ Other
Well Material: ☒ PVC ☐ St. Steel ☐ Other
Date: 11/11/99 Time: 0948
Sampled by: HDL (Initials)

WELL PURGING

PURGE VOLUME

Casing Diameter (D in inches):
☒ 2-inch ☐ 4-inch ☐ 6-inch ☐ Other
Total Depth of Casing (TD in feet BTOC): 10.89
Water Level Depth (WL in feet BTOC): 3.05
Number of Well Volumes to be purged (# Vols)
☒ 3 ☐ 4 ☐ 5 ☐ 10 ☐ Other

PURGE METHOD

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

PUMP INTAKE SETTING

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

PURGE VOLUME CALCULATION

$(10.89 - 3.05) \times 2^2 \times 3 \times 0.0408 = 3.84$ gallons

(TD (feet) − WL (feet)) × D (inches)² × # Vols × 0.0408 = Calculated Purge Volume

PURGE TIME

0931 Start 0939 Stop 8 Elapsed

PURGE RATE

Initial ____ gpm Final ____ gpm

ACTUAL PURGE VOLUME

4 gallons

FIELD PARAMETER MEASUREMENT

Minutes Since Pumping Began	pH	Cond. (µmhos/cm)	T ☐ °C ☒ °F	Other
Initial	6.82	388	66.5	
1.5	6.81	319	69.7	
3	6.97	729	70.2	
4	7.09	819	69.8	

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

Observations During Purging (Well Condition, Turbidity, Color, Odor): fuel odor, grey, sheen
Discharge Water Disposal: ☐ Sanitary Sewer ☐ Storm Sewer ☒ Other 55 gal drum

WELL SAMPLING

SAMPLING METHOD

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

SAMPLING DISTRIBUTION

Sample Series:

Sample No.	Volume/Cont.	Analysis Requested	Preservatives	Lab	Comments
9945MW-2	3 VOAs	8020/MTBE/BTEX	HCl	Sequoia	
	2 VOAs	TPH-g	HCl		
	1 VOA Amber	TOC	HCl		
	1 LA	TPH-d, mo, jet A/D	none		
	500 mL P	Ferric Iron	HNO_3		
	1 L P	NO_3, SO_4, PO_3	none		
	500 mL P	Ferrous Iron	none		24 hr hold time

QUALITY CONTROL SAMPLES

Duplicate Samples

Original Sample No.	Duplicate Sample No.

Blank Samples

Type	Sample No.

Other Samples

Type	Sample No.

Harding Lawson Associates
Engineering and
Environmental Services

GROUND-WATER SAMPLING FORM

Well No. MW-3

Job Name Port of Oakland - ORC Inj

Job Number 43145.4

Well Type: ☒ Monitor ☐ Extraction ☐ Other _____

Well Material: ☒ PVC ☐ St. Steel ☐ Other _____

Date 11/11/99 Time 1135

Recorded by Heather Dyer (Signature)

Sampled by HDL (Initials)

WELL PURGING

PURGE VOLUME

Casing Diameter (D in inches):
☒ 2-inch ☐ 4-inch ☐ 6-inch ☐ Other _____

Total Depth of Casing (TD in feet BTOC): 11.06

Water Level Depth (WL in feet BTOC): 3.88

Number of Well Volumes to be purged (# Vols)
☒ 3 ☐ 4 ☐ 5 ☐ 10 ☐ Other _____

PURGE METHOD

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

PUMP INTAKE SETTING

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

PURGE VOLUME CALCULATION

(11.06 TD (feet) - 3.88 WL (feet)) X 2 D (inches)^2 X 3 # Vols X 0.0408 = 3.52 gallons
Calculated Purge Volume

PURGE TIME

1115 Start 1122 Stop 7 Elapsed

PURGE RATE

Initial _____ gpm Final _____ gpm

ACTUAL PURGE VOLUME

Dry @ 2gal gallons

FIELD PARAMETER MEASUREMENT

Minutes Since Pumping Began	pH	Cond. (µmhos/cm)	T ☐ °C ☒ °F	Other ____
Initial	8.70	17970	68.3	
1	8.79	19990	69.9	
Dry @ 2	8.68	19990	70.0	

Minutes Since Pumping Began	pH	Cond. (µmhos/cm)	T ☐ °C ☐ °F	Other ____
Meter Nos.	950			

Observations During Purging (Well Condition, Turbidity, Color, Odor): greenish clear, strong fuel odor, sheen

Discharge Water Disposal: ☐ Sanitary Sewer ☐ Storm Sewer ☒ Other 55 gal drum

WELL SAMPLING

SAMPLING METHOD

☒ Bailer - Type: teflon ☐ Same As Above

☐ Submersible ☐ Centrifugal ☐ Bladder; Pump No.: _____ ☐ Grab - Type: _____

☐ Other - Type: _____

SAMPLING DISTRIBUTION

Sample Series: _____

Sample No.	Volume/Cont.	Analysis Requested	Preservatives	Lab	Comments
9945MW-3	3 VOAs	8020/MTBE/BTEX	HCl	Sequoia	
	2 VOAs	TPH$_g$	HCl		
	1 VOA Amber	TOC	HCl		
	1 LA	TPH$_d$, oil&G	none		
	500mL P	Ferric Iron	HNO_3		
	1 L P	NO_3, SO_4, PO_3	none		
	500mL P	Ferrous Iron	none		24 hr holding

QUALITY CONTROL SAMPLES

Duplicate Samples

Original Sample No.	Duplicate Sample No.

Blank Samples

Type	Sample No.

Other Samples

Type	Sample No.

Harding Lawson Associates
Engineering and
Environmental Services

GROUND-WATER SAMPLING FORM

Job Name: Port of Oakland - ORC Inj
Job Number: 403145.4
Recorded by: [signature] (Signature)

Well No.: MW-4
Well Type: ☒ Monitor ☐ Extraction ☐ Other
Well Material: ☒ PVC ☐ St. Steel ☐ Other
Date: 11/11/99 Time: 1045
Sampled by: HDL (Initials)

WELL PURGING

PURGE VOLUME

Casing Diameter (D in inches):
☒ 2-inch ☒ 4-inch ☐ 6-inch ☐ Other
Total Depth of Casing (TD in feet BTOC): 9.97
Water Level Depth (WL in feet BTOC): 3.38
Number of Well Volumes to be purged (# Vols)
☒ 3 ☐ 4 ☐ 5 ☐ 10 ☐ Other

PURGE METHOD

☒ Bailer - Type: ~~teflon~~ PVC
☐ Submersible ☐ Centrifugal ☐ Bladder; Pump No.:
☐ Other - Type:

PUMP INTAKE SETTING

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

PURGE VOLUME CALCULATION

$$\left(9.97 - 3.38\right) \times 2^2 \times 3 \times 0.0408 = 12.9 \text{ gallons}$$

(TD (feet) - WL (feet)) x D (inches)² x # Vols X 0.0408 = Calculated Purge Volume

PURGE TIME

1035 Start ____ Stop ____ Elapsed

PURGE RATE

Initial ____ gpm Final ____ gpm

ACTUAL PURGE VOLUME

____ gallons

FIELD PARAMETER MEASUREMENT

~~Minutes~~ Gal Since Pumping Began	pH	Cond. (μmhos/cm)	T ☐ °C ☒ °F	Other
Initial	7.72	254	72.3	
5	9.54	469	72.6	
10	9.33	439	72.0	
13	9.28	382	72.0	

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

Observations During Purging (Well Condition, Turbidity, Color, Odor): sheen, no odor, murky brown
Discharge Water Disposal: ☐ Sanitary Sewer ☐ Storm Sewer ☒ Other 55 gal drum

WELL SAMPLING

SAMPLING METHOD

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

SAMPLING DISTRIBUTION

Sample Series:

Sample No.	Volume/Cont.	Analysis Requested	Preservatives	Lab	Comments
9945MW-4	3 VOAs	8020/MTBE/BTEX	HCl	Sequoia	
↓	2 VOAs	TPHg	HCl	↓	
	1 VOA Amber	TOC	HCl		
	1 LA	TPHd, mo, (CA)	none		
	500 mL P	Ferric Iron	HNO_3		
	1 L P	NO_3, SO_4, PO_3	none		
↓	500 mL P	Ferrous Iron	none	↓	24 hr hold time

QUALITY CONTROL SAMPLES

Duplicate Samples

Original Sample No.	Duplicate Sample No.
9945MW-4	9945MW-D
(1045)	(1100)

Blank Samples

Type	Sample No.

Other Samples

Type	Sample No.

Harding Lawson Associates
Engineering and Environmental Services

GROUND-WATER SAMPLING FORM

Job Name: Port of Oakland - ORC Inj
Job Number: 403145.4
Recorded by: (signature)

Well No. MW-5
Well Type: ☒ Monitor ☐ Extraction ☐ Other
Well Material: ☒ PVC ☐ St. Steel ☐ Other
Date 11/11/99 Time 0922
Sampled by HDL (Initials)

WELL PURGING

PURGE VOLUME

Casing Diameter (D in inches): ☒ 2-inch ☐ 4-inch ☐ 6-inch ☐ Other
Total Depth of Casing (TD in feet BTOC): 7.92
Water Level Depth (WL in feet BTOC): 2.34
Number of Well Volumes to be purged (# Vols): ☒ 3 ☐ 4 ☐ 5 ☐ 10 ☐ Other

PURGE METHOD

☒ Bailer - Type: teflon
☐ Submersible ☐ Centrifugal ☐ Bladder; Pump No.:
☐ Other - Type:

PUMP INTAKE SETTING

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

PURGE VOLUME CALCULATION

(7.92 TD (feet) - 2.34 WL (feet)) X 2^2 D (inches) X 3 # Vols X 0.0408 = 2.73 gallons Calculated Purge Volume

PURGE TIME

0905 Start 0913 Stop 12 Elapsed

PURGE RATE

Initial ___ gpm Final ___ gpm

ACTUAL PURGE VOLUME

3.0 gallons

FIELD PARAMETER MEASUREMENT

Gal Since Pumping Began	pH	Cond. (µmhos/cm)	T ☐°C ☒°F	Other
Initial	7.42	615	65.4	
1	7.56	529	68.5	
2	7.41	734	69.6	
3	7.39	793	69.7	

Minutes Since Pumping Began	pH	Cond. (µmhos/cm)	T ☐°C ☐°F	Other

Meter Nos. 950

Observations During Purging (Well Condition, Turbidity, Color, Odor): turbid brown, no odor
Discharge Water Disposal: ☐ Sanitary Sewer ☐ Storm Sewer ☒ Other 55 gal drum

WELL SAMPLING

SAMPLING METHOD

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

SAMPLING DISTRIBUTION

Sample Series:

Sample No.	Volume/Cont.	Analysis Requested	Preservatives	Lab	Comments
9945MW-5	3 VOAs	8020/MTBE/BTEX	HCl	Sequoia	
↓	2 VOAs	TPHg	HCl	↓	
	1 VOA Amber	TOC	HCl		
	1 LA	TPHd, mo, ICAD	none		
	500 mL P	Ferric Iron	HNO_3		
	1 L P	NO_3, SO_4, PO_3	none		24 hr hold time
	500 mL P	Ferrous Iron	none		

QUALITY CONTROL SAMPLES

Duplicate Samples

Original Sample No.	Duplicate Sample No.

Blank Samples

Type	Sample No.

Other Samples

Type	Sample No.

0746

RL004 Office Copy - White Field Copy - Canary

Harding Lawson Associates
Engineering and Environmental Services

GROUND-WATER SAMPLING FORM

Job Name: Port of Oakland - ORC Inj
Job Number: 43145.4
Recorded by: (Signature)

Well No.: MW-6
Well Type: ☒ Monitor ☐ Extraction ☐ Other
Well Material: ☒ PVC ☐ St. Steel ☐ Other
Date: 11/11/99 Time: 0853
Sampled by: HDL (Initials)

WELL PURGING

PURGE VOLUME

Casing Diameter (D in inches):
☒ 2-inch ☐ 4-inch ☐ 6-inch ☐ Other
Total Depth of Casing (TD in feet BTOC): 8.13
Water Level Depth (WL in feet BTOC): 3.07
Number of Well Volumes to be purged (# Vols)
☒ 3 ☐ 4 ☐ 5 ☐ 10 ☐ Other

PURGE METHOD

☒ Bailer - Type: teflon
☐ Submersible ☐ Centrifugal ☐ Bladder; Pump No.:
☐ Other - Type:

PUMP INTAKE SETTING

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

PURGE VOLUME CALCULATION

$(8.13 - 3.07) \times 2^2 \times 3 \times 0.0408 = 2.48$ gallons

(TD (feet) − WL (feet)) × D (inches)² × # Vols × 0.0408 = Calculated Purge Volume

PURGE TIME

Start 0843 Stop 7 Elapsed

PURGE RATE

Initial ____ gpm Final ____ gpm

ACTUAL PURGE VOLUME

2.75 gallons

FIELD PARAMETER MEASUREMENT

Minutes Since Pumping Began	pH	Cond. (µmhos/cm)	T ☐ °C ☒ °F	Other
Initial	7.62	553	64.5	
1	7.61	1608	68.3	
2	7.58	806	69.5	
2.75	7.59	899	69.9	

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

Observations During Purging (Well Condition, Turbidity, Color, Odor): clear to orange, no odor
Discharge Water Disposal: ☐ Sanitary Sewer ☐ Storm Sewer ☒ Other 55 gal drum

WELL SAMPLING

SAMPLING METHOD

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

SAMPLING DISTRIBUTION

Sample Series:

Sample No.	Volume/Cont.	Analysis Requested	Preservatives	Lab	Comments
9945MW-6	3 VOAs	8020/MTBE/BTEX	HCl	Sequoia	
	2 VOAs	TPH_g TOC	HCl		
	1 VOA Amber		HCl		
	1 L A	TPH_d, NO_3, SO_4	none		
	500 mL P	Ferric Iron	HNO_3		
	1 L P	NO_3, SO_4, PO_3	none		
	500 mL P	Ferrous Iron	none	↓	24 hr hold time

QUALITY CONTROL SAMPLES

Duplicate Samples

Original Sample No.	Duplicate Sample No.

Blank Samples

Type	Sample No.

Other Samples

Type	Sample No.

Harding Lawson Associates
Engineering and Environmental Services

GROUND-WATER SAMPLING FORM

Job Name: Port of Oakland - ORC Inj
Job Number: 43145.4
Recorded by: (Signature)

Well No.: MW-7
Well Type: ☒ Monitor ☐ Extraction ☐ Other
Well Material: ☒ PVC ☐ St. Steel ☐ Other
Date: 11/11/99 Time: 0825
Sampled by: HDL (Initials)

WELL PURGING

PURGE VOLUME

Casing Diameter (D in inches):
☒ 2-inch ☐ 4-inch ☐ 6-inch ☐ Other
Total Depth of Casing (TD in feet BTOC): 8.43
Water Level Depth (WL in feet BTOC): 2.57
Number of Well Volumes to be purged (# Vols)
☒ 3 ☐ 4 ☐ 5 ☐ 10 ☐ Other

PURGE METHOD

☒ Bailer - Type: teflon
☐ Submersible ☐ Centrifugal ☐ Bladder; Pump No.:
☐ Other - Type:

PUMP INTAKE SETTING

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

PURGE VOLUME CALCULATION

$(8.43 \text{ TD (feet)} - 2.57 \text{ WL (feet)}) \times 2^2 \text{ D (Inches)} \times 3 \text{ \# Vols} \times 0.0408 = 2.86$ gallons
Calculated Purge Volume

PURGE TIME

0807 Start 0816 Stop 9 Elapsed

PURGE RATE

Initial ____ gpm Final ____ gpm

ACTUAL PURGE VOLUME

3 gallons

FIELD PARAMETER MEASUREMENT

Minutes Since Pumping Began	pH	Cond. (µmhos/cm)	T ☐ °C ☒ °F	Other ____
Initial	7.49	2370	62.5	
1	7.84	2730	66.4	
2	7.83	3,980	67.0	
3	7.86	4280	67.3	

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

Observations During Purging (Well Condition, Turbidity, Color, Odor): clear to cloudy, no odor
Discharge Water Disposal: ☐ Sanitary Sewer ☐ Storm Sewer ☒ Other 55 gal drum

WELL SAMPLING

SAMPLING METHOD

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

SAMPLING DISTRIBUTION

Sample Series:

Sample No.	Volume/Cont.	Analysis Requested	Preservatives	Lab	Comments
9945MW-7	3 VOAs	8020/MTBE/BTEX	HCl	Sequoia	
	2 VOAs	TPH$_g$	HCl		
	1 VOA Amber	TOC	HCl		
	1 LA	TPH$_d$, oxy(4)	none		
	500 mL P	Ferric Iron	HNO_3		
	1 L P	NO_3, SO_4, PO_3	none		
	500 mL P	Ferrous Iron	none		24 hr hold time

QUALITY CONTROL SAMPLES

Duplicate Samples

Original Sample No.	Duplicate Sample No.

Blank Samples

Type	Sample No.

Other Samples

Type	Sample No.

Harding Lawson Associates
Engineering and
Environmental Services

GROUND-WATER SAMPLING FORM

Job Name: Port of Oakland - ORC Inj
Job Number: 43145.4
Recorded by: Heather Stec (Signature)

Well No.: MW-8
Well Type: ☒ Monitor ☐ Extraction ☐ Other
Well Material: ☒ PVC ☐ St. Steel ☐ Other
Date: 11/11/99 Time: 0755
Sampled by: HDL (Initials)

WELL PURGING

PURGE VOLUME

Casing Diameter (D in inches):
☒ 2-inch ☐ 4-inch ☐ 6-inch ☐ Other
Total Depth of Casing (TD in feet BTOC): 11.02
Water Level Depth (WL in feet BTOC): 4.04
Number of Well Volumes to be purged (# Vols)
☒ 3 ☐ 4 ☐ 5 ☐ 10 ☐ Other

PURGE METHOD

☒ Bailer - Type: teflon
☐ Submersible ☐ Centrifugal ☐ Bladder; Pump No.:
☐ Other - Type:

PUMP INTAKE SETTING

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

PURGE VOLUME CALCULATION

(11.02 (TD feet) − 4.04 (WL feet)) × 2 (D inches)^2 × 3 (# Vols) × 0.0408 = 3.4 gallons (Calculated Purge Volume)

PURGE TIME

733 Start 0742 Stop 9 Elapsed

PURGE RATE

Initial — gpm Final — gpm

ACTUAL PURGE VOLUME

3.5 gallons

FIELD PARAMETER MEASUREMENT

Minutes Since Pumping Began	pH	Cond. (µmhos/cm)	T ☐ °C ☒ °F	Other
Initial	7.11	11610	66.7	
1.25	7.13	10610	68.6	
2.5	7.15	10820	68.0	
3.5	7.22	10840	68.4	

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

Observations During Purging (Well Condition, Turbidity, Color, Odor): silty brown, no odor
Discharge Water Disposal: ☐ Sanitary Sewer ☐ Storm Sewer ☒ Other 55 gal drum

WELL SAMPLING

SAMPLING METHOD

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

SAMPLING DISTRIBUTION

Sample Series:

Sample No.	Volume/Cont.	Analysis Requested	Preservatives	Lab	Comments
9945MW-8	3 VOAs	8020/MTBE/BTEX	HCl	Sequoia	
	2 VOAs	TPH, TOC	HCl		
	1 VOA Amber		HCl		
	1 LA	TPHd, major CAT	none		
	500 mL P	Ferric Iron	HNO_3		
	1 L P	NO_3, SO_4, PO_3	none		
	500 mL P	Ferrous Iron	none		24 hr holding time

QUALITY CONTROL SAMPLES

Duplicate Samples

Original Sample No.	Duplicate Sample No.

Blank Samples

Type	Sample No.

Other Samples

Type	Sample No.

APPENDIX B

LABORATORY REPORTS

Sequoia
Analytical

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FAX (925) 988-9673

30 November, 1999

Jim McCarty
Harding-Lawson Associates - Oakland
383 Fourth Street
Oakland, CA 94607

RE: Port of Oakland

Enclosed are the results of analyses for samples received by the laboratory on 11-Nov-99 15:35. If you have any questions concerning this report, please feel free to contact me. All samples were cleaned using Silica Gel cartridges, although this cleanup was not noted on the results page for Total Extractable Petroleum Hydrocarbons.

Sincerely,

Melissa Brewer

Melissa Brewer
Project Manager

Sequoia Analytical

404 N. Wiget Lane
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FAX (925) 988-9673

Harding-Lawson Associates - Oakland 383 Fourth Street Oakland CA, 94607	Project: Port of Oakland Project Number: 43145.4 Project Manager: Jim McCarty	**Reported:** 30-Nov-99 10:59

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
9945MW-8	W911306-01	Water	11-Nov-99 00:00	11-Nov-99 15:35
9945MW-8	W911306-01	Water	11-Nov-99 07:55	11-Nov-99 15:35
9945MW-7	W911306-02	Water	11-Nov-99 00:00	11-Nov-99 15:35
9945MW-7	W911306-02	Water	11-Nov-99 08:25	11-Nov-99 15:35
9945MW-6	W911306-03	Water	11-Nov-99 00:00	11-Nov-99 15:35
9945MW-6	W911306-03	Water	11-Nov-99 08:53	11-Nov-99 15:35
9945MW-5	W911306-04	Water	11-Nov-99 00:00	11-Nov-99 15:35
9945MW-5	W911306-04	Water	11-Nov-99 09:22	11-Nov-99 15:35
9945MW-2	W911306-05	Water	11-Nov-99 00:00	11-Nov-99 15:35
9945MW-2	W911306-05	Water	11-Nov-99 09:48	11-Nov-99 15:35
9945MW-1	W911306-06	Water	11-Nov-99 00:00	11-Nov-99 15:35
9945MW-1	W911306-06	Water	11-Nov-99 10:24	11-Nov-99 15:35
9945MW-4	W911306-07	Water	11-Nov-99 00:00	11-Nov-99 15:35
9945MW-4	W911306-07	Water	11-Nov-99 10:45	11-Nov-99 15:35
9945MW-D	W911306-08	Water	11-Nov-99 00:00	11-Nov-99 15:35
9945MW-D	W911306-08	Water	11-Nov-99 11:00	11-Nov-99 15:35
9945MW-3	W911306-09	Water	11-Nov-99 00:00	11-Nov-99 15:35
9945MW-3	W911306-09	Water	11-Nov-99 11:35	11-Nov-99 15:35

Melissa Brewer, Project Manager

Sequoia Analytical

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Harding-Lawson Associates - Oakland	Project: Port of Oakland	
383 Fourth Street	Project Number: 43145.4	**Reported:**
Oakland CA, 94607	Project Manager: Jim McCarty	30-Nov-99 10:59

Total Purgeable Hydrocarbons (C6-C12), BTEX and MTBE by DHS LUFT

Sequoia Analytical - Walnut Creek

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
9945MW-8 (W911306-01) Water	**Sampled: 11-Nov-99 07:55**		**Received: 11-Nov-99 15:35**						
Purgeable Hydrocarbons	ND	50	ug/l	1	9K13001	13-Nov-99	13-Nov-99	EPA	
Benzene	**3.0**	0.50	"	"	"	"	"	8015M/8020	
Toluene	ND	0.50	"	"	"	"	"	"	
Ethylbenzene	ND	0.50	"	"	"	"	"	"	
Xylenes (total)	ND	0.50	"	"	"	"	"	"	
Methyl tert-butyl ether	**3.2**	2.5	"	"	"	"	"	"	
Surrogate: a,a,a-Trifluorotoluene		*86.7 %*	*70-130*		"	"	"	"	
9945MW-7 (W911306-02) Water	**Sampled: 11-Nov-99 08:25**		**Received: 11-Nov-99 15:35**						
Purgeable Hydrocarbons	ND	50	ug/l	1	9K13001	13-Nov-99	13-Nov-99	EPA	
Benzene	ND	0.50	"	"	"	"	"	8015M/8020	
Toluene	ND	0.50	"	"	"	"	"	"	
Ethylbenzene	ND	0.50	"	"	"	"	"	"	
Xylenes (total)	ND	0.50	"	"	"	"	"	"	
Methyl tert-butyl ether	ND	2.5	"	"	"	"	"	"	
Surrogate: a,a,a-Trifluorotoluene		*100 %*	*70-130*		"	"	"	"	
9945MW-6 (W911306-03) Water	**Sampled: 11-Nov-99 08:53**		**Received: 11-Nov-99 15:35**						
Purgeable Hydrocarbons	ND	50	ug/l	1	9K13001	13-Nov-99	13-Nov-99	EPA	
Benzene	ND	0.50	"	"	"	"	"	8015M/8020	
Toluene	ND	0.50	"	"	"	"	"	"	
Ethylbenzene	ND	0.50	"	"	"	"	"	"	
Xylenes (total)	ND	0.50	"	"	"	"	"	"	
Methyl tert-butyl ether	ND	2.5	"	"	"	"	"	"	
Surrogate: a,a,a-Trifluorotoluene		*90.0 %*	*70-130*		"	"	"	"	

Melissa Brewer, Project Manager

Sequoia Analytical

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Harding-Lawson Associates - Oakland	Project: Port of Oakland	
383 Fourth Street	Project Number: 43145.4	**Reported:**
Oakland CA, 94607	Project Manager: Jim McCarty	30-Nov-99 10:59

Total Purgeable Hydrocarbons (C6-C12), BTEX and MTBE by DHS LUFT

Sequoia Analytical - Walnut Creek

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
9945MW-5 (W911306-04) Water	**Sampled: 11-Nov-99 09:22**		**Received: 11-Nov-99 15:35**						
Purgeable Hydrocarbons	ND	50	ug/l	1	9K13001	13-Nov-99	13-Nov-99	EPA	
Benzene	ND	0.50	"	"	"	"	"	8015M/8020	
Toluene	ND	0.50	"	"	"	"	"	"	
Ethylbenzene	ND	0.50	"	"	"	"	"	"	
Xylenes (total)	ND	0.50	"	"	"	"	"	"	
Methyl tert-butyl ether	ND	2.5	"	"	"	"	"	"	
Surrogate: a,a,a-Trifluorotoluene		*96.7 %*	*70-130*		"	"	"	"	
9945MW-2 (W911306-05) Water	**Sampled: 11-Nov-99 09:48**		**Received: 11-Nov-99 15:35**						**P-07**
Purgeable Hydrocarbons	**3800**	1000	ug/l	20	9K15003	15-Nov-99	15-Nov-99	EPA	
Benzene	**60**	10	"	"	"	"	"	8015M/8020	
Toluene	**37**	10	"	"	"	"	"	"	
Ethylbenzene	**78**	10	"	"	"	"	"	"	
Xylenes (total)	**190**	10	"	"	"	"	"	"	
Methyl tert-butyl ether	ND	50	"	"	"	"	"	"	
Surrogate: a,a,a-Trifluorotoluene		*100 %*	*70-130*		"	"	"	"	
9945MW-1 (W911306-06) Water	**Sampled: 11-Nov-99 10:24**		**Received: 11-Nov-99 15:35**						**P-01**
Purgeable Hydrocarbons	**96**	50	ug/l	1	9K13001	13-Nov-99	13-Nov-99	EPA	
Benzene	**2.5**	0.50	"	"	"	"	"	8015M/8020	
Toluene	ND	0.50	"	"	"	"	"	"	
Ethylbenzene	ND	0.50	"	"	"	"	"	"	
Xylenes (total)	ND	0.50	"	"	"	"	"	"	
Methyl tert-butyl ether	ND	2.5	"	"	"	"	"	"	
Surrogate: a,a,a-Trifluorotoluene		*103 %*	*70-130*		"	"	"	"	

Melissa Brewer

Melissa Brewer, Project Manager

Sequoia Analytical

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Harding-Lawson Associates - Oakland	Project: Port of Oakland	
383 Fourth Street	Project Number: 43145.4	**Reported:**
Oakland CA, 94607	Project Manager: Jim McCarty	30-Nov-99 10:59

Total Purgeable Hydrocarbons (C6-C12), BTEX and MTBE by DHS LUFT

Sequoia Analytical - Walnut Creek

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
9945MW-4 (W911306-07) Water	**Sampled: 11-Nov-99 10:45**		**Received: 11-Nov-99 15:35**						**P-01**
Purgeable Hydrocarbons	**1600**	250	ug/l	5	9K15001	15-Nov-99	15-Nov-99	EPA	
Benzene	**11**	2.5	"	"	"	"	"	8015M/8020	
Toluene	ND	2.5	"	"	"	"	"	"	
Ethylbenzene	ND	2.5	"	"	"	"	"	"	
Xylenes (total)	**12**	2.5	"	"	"	"	"	"	
Methyl tert-butyl ether	ND	13	"	"	"	"	"	"	
Surrogate: a,a,a-Trifluorotoluene		*100 %*	*70-130*		"	"	"	"	
9945MW-D (W911306-08) Water	**Sampled: 11-Nov-99 11:00**		**Received: 11-Nov-99 15:35**						**P-03**
Purgeable Hydrocarbons	**1300**	50	ug/l	1	9K13001	13-Nov-99	13-Nov-99	EPA	
Benzene	**11**	0.50	"	"	"	"	"	8015M/8020	
Toluene	**1.4**	0.50	"	"	"	"	"	"	
Ethylbenzene	**2.7**	0.50	"	"	"	"	"	"	
Xylenes (total)	**16**	0.50	"	"	"	"	"	"	
Methyl tert-butyl ether	ND	2.5	"	"	"	"	"	"	
Surrogate: a,a,a-Trifluorotoluene		*130 %*	*70-130*		"	"	"	"	
9945MW-3 (W911306-09) Water	**Sampled: 11-Nov-99 11:35**		**Received: 11-Nov-99 15:35**						**P-01**
Purgeable Hydrocarbons	**3300**	500	ug/l	10	9K15001	15-Nov-99	15-Nov-99	EPA	
Benzene	**7.8**	5.0	"	"	"	"	"	8015M/8020	
Toluene	ND	5.0	"	"	"	"	"	"	
Ethylbenzene	ND	5.0	"	"	"	"	"	"	
Xylenes (total)	**17**	5.0	"	"	"	"	"	"	
Methyl tert-butyl ether	ND	25	"	"	"	"	"	"	
Surrogate: a,a,a-Trifluorotoluene		*107 %*	*70-130*		"	"	"	"	

Melissa Brewer

Melissa Brewer, Project Manager

Sequoia Analytical

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Harding-Lawson Associates - Oakland	Project: Port of Oakland	
383 Fourth Street	Project Number: 43145.4	**Reported:**
Oakland CA, 94607	Project Manager: Jim McCarty	29-Dec-99 11:03

Custom Extractable Hydrocarbons by DHS LUFT

Sequoia Analytical - Walnut Creek

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
9945MW-8 (W911306-01) Water	**Sampled: 11-Nov-99 07:55**		**Received: 11-Nov-99 15:35**						
Jet-A (C9-C17)	ND	50	ug/l	1	9K19014	19-Nov-99	22-Nov-99	DHS LUFT	
Diesel Range Hydrocarbons	**310**	50	"	"	"	"	"	"	D-13
Motor Oil (C16-C36)	ND	250	"	"	"	"	"	"	
Surrogate: n-Pentacosane		*48.0 %*	*50-150*		"	"	"	"	*D-08*
9945MW-7 (W911306-02) Water	**Sampled: 11-Nov-99 08:25**		**Received: 11-Nov-99 15:35**						
Jet-A (C9-C17)	ND	50	ug/l	1	9K19014	19-Nov-99	22-Nov-99	DHS LUFT	
Diesel Range Hydrocarbons	ND	50	"	"	"	"	"	"	
Motor Oil (C16-C36)	ND	250	"	"	"	"	"	"	
Surrogate: n-Pentacosane		*39.0 %*	*50-150*		"	"	"	"	*D-08*
9945MW-6 (W911306-03) Water	**Sampled: 11-Nov-99 08:53**		**Received: 11-Nov-99 15:35**						
Jet-A (C9-C17)	ND	50	ug/l	1	9K19014	19-Nov-99	22-Nov-99	DHS LUFT	
Diesel Range Hydrocarbons	**93**	50	"	"	"	"	"	"	D-13
Motor Oil (C16-C36)	ND	250	"	"	"	"	"	"	
Surrogate: n-Pentacosane		*45.0 %*	*50-150*		"	"	"	"	*D-08*
9945MW-5 (W911306-04) Water	**Sampled: 11-Nov-99 09:22**		**Received: 11-Nov-99 15:35**						
Jet-A (C9-C17)	ND	50	ug/l	1	9K19014	19-Nov-99	22-Nov-99	DHS LUFT	
Diesel Range Hydrocarbons	**93**	50	"	"	"	"	"	"	D-13
Motor Oil (C16-C36)	ND	250	"	"	"	"	"	"	
Surrogate: n-Pentacosane		*66.1 %*	*50-150*		"	"	"	"	
9945MW-2 (W911306-05) Water	**Sampled: 11-Nov-99 09:48**		**Received: 11-Nov-99 15:35**						
Jet-A (C9-C17)	**10000**	500	ug/l	10	9K19014	19-Nov-99	23-Nov-99	DHS LUFT	D-04
Diesel Range Hydrocarbons	ND	500	"	"	"	"	"	"	
Motor Oil (C16-C36)	ND	2500	"	"	"	"	"	"	
Surrogate: n-Pentacosane		*90.1 %*	*50-150*		"	"	"	"	

Melissa Brewer

Melissa Brewer, Project Manager

Sequoia Analytical

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Harding-Lawson Associates - Oakland	Project: Port of Oakland	
383 Fourth Street	Project Number: 43145.4	**Reported:**
Oakland CA, 94607	Project Manager: Jim McCarty	29-Dec-99 11:03

Custom Extractable Hydrocarbons by DHS LUFT

Sequoia Analytical - Walnut Creek

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
9945MW-1 (W911306-06) Water Sampled: 11-Nov-99 10:24 Received: 11-Nov-99 15:35									
Jet-A (C9-C17)	ND	50	ug/l	1	9K19014	19-Nov-99	22-Nov-99	DHS LUFT	
Diesel Range Hydrocarbons	**1100**	50	"	"	"	"	"	"	D-13
Motor Oil (C16-C36)	ND	250	"	"	"	"	"	"	
Surrogate: n-Pentacosane		*72.1 %*	*50-150*		"	"	"	"	
9945MW-4 (W911306-07) Water Sampled: 11-Nov-99 10:45 Received: 11-Nov-99 15:35									
Jet-A (C9-C17)	**2400**	50	ug/l	1	9K19014	19-Nov-99	22-Nov-99	DHS LUFT	D-04
Diesel Range Hydrocarbons	ND	50	"	"	"	"	"	"	
Motor Oil (C16-C36)	ND	250	"	"	"	"	"	"	
Surrogate: n-Pentacosane		*81.1 %*	*50-150*		"	"	"	"	
9945MW-D (W911306-08) Water Sampled: 11-Nov-99 11:00 Received: 11-Nov-99 15:35									
Jet-A (C9-C17)	**1800**	50	ug/l	1	9K19014	19-Nov-99	22-Nov-99	DHS LUFT	D-04
Diesel Range Hydrocarbons	ND	50	"	"	"	"	"	"	
Motor Oil (C16-C36)	ND	250	"	"	"	"	"	"	
Surrogate: n-Pentacosane		*105 %*	*50-150*		"	"	"	"	

Melissa Brewer, Project Manager

Sequoia Analytical

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Harding-Lawson Associates - Oakland 383 Fourth Street Oakland CA, 94607	Project: Port of Oakland Project Number: 43145.4 Project Manager: Jim McCarty	**Reported:** 30-Nov-99 10:59

Total Metals by EPA 200 Series Methods

Sequoia Analytical - Walnut Creek

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
9945MW-8 (W911306-01) Water	**Sampled: 11-Nov-99 07:55 Received: 11-Nov-99 15:35**								
Iron	**46**	0.010	mg/l	1	9K19012	19-Nov-99	29-Nov-99	EPA 200.7	
9945MW-7 (W911306-02) Water	**Sampled: 11-Nov-99 08:25 Received: 11-Nov-99 15:35**								
Iron	**3.7**	0.010	mg/l	1	9K19012	19-Nov-99	29-Nov-99	EPA 200.7	
9945MW-6 (W911306-03) Water	**Sampled: 11-Nov-99 08:53 Received: 11-Nov-99 15:35**								
Iron	**12**	0.010	mg/l	1	9K19012	19-Nov-99	29-Nov-99	EPA 200.7	
9945MW-5 (W911306-04) Water	**Sampled: 11-Nov-99 09:22 Received: 11-Nov-99 15:35**								
Iron	**2.9**	0.010	mg/l	1	9K19012	19-Nov-99	29-Nov-99	EPA 200.7	
9945MW-2 (W911306-05) Water	**Sampled: 11-Nov-99 09:48 Received: 11-Nov-99 15:35**								
Iron	**17**	0.010	mg/l	1	9K19012	19-Nov-99	29-Nov-99	EPA 200.7	
9945MW-1 (W911306-06) Water	**Sampled: 11-Nov-99 10:24 Received: 11-Nov-99 15:35**								
Iron	**0.96**	0.010	mg/l	1	9K19012	19-Nov-99	29-Nov-99	EPA 200.7	
9945MW-4 (W911306-07) Water	**Sampled: 11-Nov-99 10:45 Received: 11-Nov-99 15:35**								
Iron	**1.1**	0.010	mg/l	1	9K19012	19-Nov-99	29-Nov-99	EPA 200.7	
9945MW-D (W911306-08) Water	**Sampled: 11-Nov-99 11:00 Received: 11-Nov-99 15:35**								
Iron	**0.89**	0.010	mg/l	1	9K19012	19-Nov-99	29-Nov-99	EPA 200.7	

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Harding-Lawson Associates - Oakland	Project: Port of Oakland	
383 Fourth Street	Project Number: 43145.4	**Reported:**
Oakland CA, 94607	Project Manager: Jim McCarty	30-Nov-99 10:59

Total Metals by EPA 6000/7000 Series Methods

Sequoia Analytical - Walnut Creek

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
9945MW-8 (W911306-01) Water	**Sampled: 11-Nov-99 07:55**	**Received: 11-Nov-99 15:35**							
Ferrous Iron	ND	0.010	mg/l	1	9K19012	19-Nov-99	29-Nov-99	EPA 6010A	
9945MW-7 (W911306-02) Water	**Sampled: 11-Nov-99 08:25**	**Received: 11-Nov-99 15:35**							
Ferrous Iron	**0.34**	0.010	mg/l	1	9K19012	19-Nov-99	29-Nov-99	EPA 6010A	
9945MW-6 (W911306-03) Water	**Sampled: 11-Nov-99 08:53**	**Received: 11-Nov-99 15:35**							
Ferrous Iron	**0.15**	0.010	mg/l	1	9K19012	19-Nov-99	29-Nov-99	EPA 6010A	
9945MW-5 (W911306-04) Water	**Sampled: 11-Nov-99 09:22**	**Received: 11-Nov-99 15:35**							
Ferrous Iron	**0.046**	0.010	mg/l	1	9K19012	19-Nov-99	29-Nov-99	EPA 6010A	
9945MW-2 (W911306-05) Water	**Sampled: 11-Nov-99 09:48**	**Received: 11-Nov-99 15:35**							
Ferrous Iron	**0.10**	0.010	mg/l	1	9K19012	19-Nov-99	29-Nov-99	EPA 6010A	
9945MW-1 (W911306-06) Water	**Sampled: 11-Nov-99 10:24**	**Received: 11-Nov-99 15:35**							
Ferrous Iron	**0.27**	0.010	mg/l	1	9K19012	19-Nov-99	29-Nov-99	EPA 6010A	
9945MW-4 (W911306-07) Water	**Sampled: 11-Nov-99 10:45**	**Received: 11-Nov-99 15:35**							
Ferrous Iron	ND	0.010	mg/l	1	9K19012	19-Nov-99	29-Nov-99	EPA 6010A	
9945MW-D (W911306-08) Water	**Sampled: 11-Nov-99 11:00**	**Received: 11-Nov-99 15:35**							
Ferrous Iron	ND	0.010	mg/l	1	9K19012	19-Nov-99	29-Nov-99	EPA 6010A	

Melissa Brewer, Project Manager

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Harding-Lawson Associates - Oakland	Project: Port of Oakland	
383 Fourth Street	Project Number: 43145.4	**Reported:**
Oakland CA, 94607	Project Manager: Jim McCarty	30-Nov-99 10:59

Volatile Organic Compounds by EPA Method 8010B

Sequoia Analytical - Walnut Creek

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
9945MW-8 (W911306-01) Water	**Sampled: 11-Nov-99 07:55**	**Received: 11-Nov-99 15:35**							
Bromodichloromethane	ND	5.0	ug/l	10	9K22008	22-Nov-99	22-Nov-99	EPA 8010B	
Bromoform	ND	5.0	"	"	"	"	"	"	
Bromomethane	ND	10	"	"	"	"	"	"	
Carbon tetrachloride	ND	5.0	"	"	"	"	"	"	
Chlorobenzene	ND	5.0	"	"	"	"	"	"	
Chloroethane	ND	10	"	"	"	"	"	"	
Chloroform	ND	5.0	"	"	"	"	"	"	
Chloromethane	ND	10	"	"	"	"	"	"	
Dibromochloromethane	ND	5.0	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	5.0	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	5.0	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	5.0	"	"	"	"	"	"	
1,1-Dichloroethane	**300**	5.0	"	"	"	"	"	"	
1,2-Dichloroethane	**7.5**	5.0	"	"	"	"	"	"	
1,1-Dichloroethene	**340**	5.0	"	"	"	"	"	"	
cis-1,2-Dichloroethene	ND	5.0	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	5.0	"	"	"	"	"	"	
1,2-Dichloropropane	ND	5.0	"	"	"	"	"	"	
cis-1,3-Dichloropropene	ND	5.0	"	"	"	"	"	"	
trans-1,3-Dichloropropene	ND	5.0	"	"	"	"	"	"	
Methylene chloride	ND	50	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	5.0	"	"	"	"	"	"	
Tetrachloroethene	ND	5.0	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	5.0	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	5.0	"	"	"	"	"	"	
Trichloroethene	ND	5.0	"	"	"	"	"	"	
Trichlorofluoromethane	ND	5.0	"	"	"	"	"	"	
Vinyl chloride	ND	10	"	"	"	"	"	"	
Surrogate: Dibromodifluoromethane		*85.0 %*	*50-150*		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		*51.0 %*	*50-150*		"	"	"	"	

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Harding-Lawson Associates - Oakland	Project: Port of Oakland	
383 Fourth Street	Project Number: 43145.4	**Reported:**
Oakland CA, 94607	Project Manager: Jim McCarty	30-Nov-99 10:59

Volatile Organic Compounds by EPA Method 8010B

Sequoia Analytical - Walnut Creek

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
945MW-7 (W911306-02) Water Sampled: 11-Nov-99 08:25 Received: 11-Nov-99 15:35									
Bromodichloromethane	ND	0.50	ug/l	1	9K22008	22-Nov-99	22-Nov-99	EPA 8010B	
Bromoform	ND	0.50	"	"	"	"	"	"	
Bromomethane	ND	1.0	"	"	"	"	"	"	
Carbon tetrachloride	ND	0.50	"	"	"	"	"	"	
Chlorobenzene	ND	0.50	"	"	"	"	"	"	
Chloroethane	ND	1.0	"	"	"	"	"	"	
Chloroform	ND	0.50	"	"	"	"	"	"	
Chloromethane	ND	1.0	"	"	"	"	"	"	
Dibromochloromethane	ND	0.50	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	0.50	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	0.50	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	0.50	"	"	"	"	"	"	
1,1-Dichloroethane	17	0.50	"	"	"	"	"	"	
1,2-Dichloroethane	ND	0.50	"	"	"	"	"	"	
1,1-Dichloroethene	6.8	0.50	"	"	"	"	"	"	
cis-1,2-Dichloroethene	ND	0.50	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	0.50	"	"	"	"	"	"	
1,2-Dichloropropane	ND	0.50	"	"	"	"	"	"	
cis-1,3-Dichloropropene	ND	0.50	"	"	"	"	"	"	
trans-1,3-Dichloropropene	ND	0.50	"	"	"	"	"	"	
Methylene chloride	ND	5.0	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	0.50	"	"	"	"	"	"	
Tetrachloroethene	ND	0.50	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	0.50	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	0.50	"	"	"	"	"	"	
Trichloroethene	ND	0.50	"	"	"	"	"	"	
Trichlorofluoromethane	ND	0.50	"	"	"	"	"	"	
Vinyl chloride	ND	1.0	"	"	"	"	"	"	
Surrogate: Dibromodifluoromethane		*92.0 %*	*50-150*		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		*65.0 %*	*50-150*		"	"	"	"	

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Harding-Lawson Associates - Oakland	Project: Port of Oakland	
383 Fourth Street	Project Number: 43145.4	**Reported:**
Oakland CA, 94607	Project Manager: Jim McCarty	30-Nov-99 10:59

Volatile Organic Compounds by EPA Method 8010B

Sequoia Analytical - Walnut Creek

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
9945MW-6 (W911306-03) Water	**Sampled: 11-Nov-99 08:53**	**Received: 11-Nov-99 15:35**							
Bromodichloromethane	ND	0.50	ug/l	1	9K22008	22-Nov-99	22-Nov-99	EPA 8010B	
Bromoform	ND	0.50	"	"	"	"	"	"	
Bromomethane	ND	1.0	"	"	"	"	"	"	
Carbon tetrachloride	ND	0.50	"	"	"	"	"	"	
Chlorobenzene	ND	0.50	"	"	"	"	"	"	
Chloroethane	ND	1.0	"	"	"	"	"	"	
Chloroform	ND	0.50	"	"	"	"	"	"	
Chloromethane	ND	1.0	"	"	"	"	"	"	
Dibromochloromethane	ND	0.50	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	0.50	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	0.50	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	0.50	"	"	"	"	"	"	
1,1-Dichloroethane	ND	0.50	"	"	"	"	"	"	
1,2-Dichloroethane	ND	0.50	"	"	"	"	"	"	
1,1-Dichloroethene	ND	0.50	"	"	"	"	"	"	
cis-1,2-Dichloroethene	ND	0.50	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	0.50	"	"	"	"	"	"	
1,2-Dichloropropane	ND	0.50	"	"	"	"	"	"	
cis-1,3-Dichloropropene	ND	0.50	"	"	"	"	"	"	
trans-1,3-Dichloropropene	ND	0.50	"	"	"	"	"	"	
Methylene chloride	ND	5.0	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	0.50	"	"	"	"	"	"	
Tetrachloroethene	ND	0.50	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	0.50	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	0.50	"	"	"	"	"	"	
Trichloroethene	ND	0.50	"	"	"	"	"	"	
Trichlorofluoromethane	ND	0.50	"	"	"	"	"	"	
Vinyl chloride	ND	1.0	"	"	"	"	"	"	
Surrogate: Dibromodifluoromethane		*94.0 %*	*50-150*		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		*64.0 %*	*50-150*		"	"	"	"	

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Melissa Brewer, Project Manager

Sequoia Analytical

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Harding-Lawson Associates - Oakland	Project: Port of Oakland	
383 Fourth Street	Project Number: 43145.4	**Reported:**
Oakland CA, 94607	Project Manager: Jim McCarty	30-Nov-99 10:59

Volatile Organic Compounds by EPA Method 8010B

Sequoia Analytical - Walnut Creek

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
45MW-5 (W911306-04) Water Sampled: 11-Nov-99 09:22 Received: 11-Nov-99 15:35									
Bromodichloromethane	ND	0.50	ug/l	1	9K22008	22-Nov-99	22-Nov-99	EPA 8010B	
romoform	ND	0.50	"	"	"	"	"	"	
romomethane	ND	1.0	"	"	"	"	"	"	
Carbon tetrachloride	ND	0.50	"	"	"	"	"	"	
Chlorobenzene	ND	0.50	"	"	"	"	"	"	
hloroethane	ND	1.0	"	"	"	"	"	"	
hloroform	ND	0.50	"	"	"	"	"	"	
Chloromethane	ND	1.0	"	"	"	"	"	"	
bromochloromethane	ND	0.50	"	"	"	"	"	"	
3-Dichlorobenzene	ND	0.50	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	0.50	"	"	"	"	"	"	
2-Dichlorobenzene	ND	0.50	"	"	"	"	"	"	
-Dichloroethane	ND	0.50	"	"	"	"	"	"	
1,2-Dichloroethane	ND	0.50	"	"	"	"	"	"	
1,1-Dichloroethene	ND	0.50	"	"	"	"	"	"	
s-1,2-Dichloroethene	ND	0.50	"	"	"	"	"	"	
ns-1,2-Dichloroethene	ND	0.50	"	"	"	"	"	"	
1,2-Dichloropropane	ND	0.50	"	"	"	"	"	"	
s-1,3-Dichloropropene	ND	0.50	"	"	"	"	"	"	
ns-1,3-Dichloropropene	ND	0.50	"	"	"	"	"	"	
Methylene chloride	ND	5.0	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	0.50	"	"	"	"	"	"	
trachloroethene	ND	0.50	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	0.50	"	"	"	"	"	"	
1,1,2-Trichloroethene	ND	0.50	"	"	"	"	"	"	
chloroethene	ND	0.50	"	"	"	"	"	"	
richlorofluoromethane	ND	0.50	"	"	"	"	"	"	
Vinyl chloride	ND	1.0	"	"	"	"	"	"	
rrogate: Dibromodifluoromethane		*86.0 %*	*50-150*		"	"	"	"	
rrogate: 4-Bromofluorobenzene		*62.0 %*	*50-150*		"	"	"	"	

Melissa Brewer, Project Manager

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Harding-Lawson Associates - Oakland	Project: Port of Oakland	
383 Fourth Street	Project Number: 43145.4	**Reported:**
Oakland CA, 94607	Project Manager: Jim McCarty	30-Nov-99 10:59

Volatile Organic Compounds by EPA Method 8010B

Sequoia Analytical - Walnut Creek

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
9945MW-2 (W911306-05) Water	**Sampled: 11-Nov-99 09:48**		**Received: 11-Nov-99 15:35**						
Bromodichloromethane	ND	2.5	ug/l	5	9K22008	22-Nov-99	22-Nov-99	EPA 8010B	
Bromoform	ND	2.5	"	"	"	"	"	"	
Bromomethane	ND	5.0	"	"	"	"	"	"	
Carbon tetrachloride	ND	2.5	"	"	"	"	"	"	
Chlorobenzene	ND	2.5	"	"	"	"	"	"	
Chloroethane	ND	5.0	"	"	"	"	"	"	
Chloroform	ND	2.5	"	"	"	"	"	"	
Chloromethane	ND	5.0	"	"	"	"	"	"	
Dibromochloromethane	ND	2.5	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	2.5	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	2.5	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	2.5	"	"	"	"	"	"	
1,1-Dichloroethane	**48**	2.5	"	"	"	"	"	"	
1,2-Dichloroethane	ND	2.5	"	"	"	"	"	"	
1,1-Dichloroethene	ND	2.5	"	"	"	"	"	"	
cis-1,2-Dichloroethene	**180**	2.5	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	2.5	"	"	"	"	"	"	
1,2-Dichloropropane	ND	2.5	"	"	"	"	"	"	
cis-1,3-Dichloropropene	ND	2.5	"	"	"	"	"	"	
trans-1,3-Dichloropropene	ND	2.5	"	"	"	"	"	"	
Methylene chloride	ND	25	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	2.5	"	"	"	"	"	"	
Tetrachloroethene	ND	2.5	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	2.5	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	2.5	"	"	"	"	"	"	
Trichloroethene	ND	2.5	"	"	"	"	"	"	
Trichlorofluoromethane	ND	2.5	"	"	"	"	"	"	
Vinyl chloride	ND	5.0	"	"	"	"	"	"	
Surrogate: Dibromodifluoromethane		*87.0 %*	*50-150*		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		*58.0 %*	*50-150*		"	"	"	"	

Melissa Brewer

Melissa Brewer, Project Manager

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Harding-Lawson Associates - Oakland	Project: Port of Oakland	
383 Fourth Street	Project Number: 43145.4	**Reported:**
Oakland CA, 94607	Project Manager: Jim McCarty	30-Nov-99 10:59

Volatile Organic Compounds by EPA Method 8010B

Sequoia Analytical - Walnut Creek

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
945MW-1 (W911306-06) Water Sampled: 11-Nov-99 10:24 Received: 11-Nov-99 15:35									
Bromodichloromethane	ND	0.50	ug/l	1	9K22008	22-Nov-99	22-Nov-99	EPA 8010B	
Bromoform	ND	0.50	"	"	"	"	"	"	
Bromomethane	ND	1.0	"	"	"	"	"	"	
Carbon tetrachloride	ND	0.50	"	"	"	"	"	"	
Chlorobenzene	ND	0.50	"	"	"	"	"	"	
Chloroethane	ND	1.0	"	"	"	"	"	"	
Chloroform	ND	0.50	"	"	"	"	"	"	
Chloromethane	ND	1.0	"	"	"	"	"	"	
Dibromochloromethane	ND	0.50	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	0.50	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	0.50	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	0.50	"	"	"	"	"	"	
1,1-Dichloroethane	**21**	0.50	"	"	"	"	"	"	
1,2-Dichloroethane	ND	0.50	"	"	"	"	"	"	
1,1-Dichloroethene	**1.5**	0.50	"	"	"	"	"	"	
cis-1,2-Dichloroethene	**19**	0.50	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	0.50	"	"	"	"	"	"	
1,2-Dichloropropane	ND	0.50	"	"	"	"	"	"	
cis-1,3-Dichloropropene	ND	0.50	"	"	"	"	"	"	
trans-1,3-Dichloropropene	ND	0.50	"	"	"	"	"	"	
Methylene chloride	ND	5.0	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	0.50	"	"	"	"	"	"	
Tetrachloroethene	ND	0.50	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	0.50	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	0.50	"	"	"	"	"	"	
Trichloroethene	ND	0.50	"	"	"	"	"	"	
Trichlorofluoromethane	ND	0.50	"	"	"	"	"	"	
Vinyl chloride	ND	1.0	"	"	"	"	"	"	
Surrogate: Dibromodifluoromethane		*84.0 %*	*50-150*		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		*64.0 %*	*50-150*		"	"	"	"	

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Harding-Lawson Associates - Oakland	Project: Port of Oakland	
383 Fourth Street	Project Number: 43145.4	**Reported:**
Oakland CA, 94607	Project Manager: Jim McCarty	30-Nov-99 10:59

Volatile Organic Compounds by EPA Method 8010B

Sequoia Analytical - Walnut Creek

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
9945MW-4 (W911306-07) Water	**Sampled: 11-Nov-99 10:45**		**Received: 11-Nov-99 15:35**						
Bromodichloromethane	ND	0.50	ug/l	1	9K22008	22-Nov-99	22-Nov-99	EPA 8010B	
Bromoform	ND	0.50	"	"	"	"	"	"	
Bromomethane	ND	1.0	"	"	"	"	"	"	
Carbon tetrachloride	ND	0.50	"	"	"	"	"	"	
Chlorobenzene	ND	0.50	"	"	"	"	"	"	
Chloroethane	**6.9**	1.0	"	"	"	"	"	"	
Chloroform	ND	0.50	"	"	"	"	"	"	
Chloromethane	ND	1.0	"	"	"	"	"	"	
Dibromochloromethane	ND	0.50	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	0.50	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	0.50	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	0.50	"	"	"	"	"	"	
1,1-Dichloroethane	**34**	0.50	"	"	"	"	"	"	
1,2-Dichloroethane	ND	0.50	"	"	"	"	"	"	
1,1-Dichloroethene	**1.1**	0.50	"	"	"	"	"	"	
cis-1,2-Dichloroethene	**22**	0.50	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	0.50	"	"	"	"	"	"	
1,2-Dichloropropane	ND	0.50	"	"	"	"	"	"	
cis-1,3-Dichloropropene	ND	0.50	"	"	"	"	"	"	
trans-1,3-Dichloropropene	ND	0.50	"	"	"	"	"	"	
Methylene chloride	ND	5.0	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	0.50	"	"	"	"	"	"	
Tetrachloroethene	**0.76**	0.50	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	0.50	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	0.50	"	"	"	"	"	"	
Trichloroethene	ND	0.50	"	"	"	"	"	"	
Trichlorofluoromethane	ND	0.50	"	"	"	"	"	"	
Vinyl chloride	ND	1.0	"	"	"	"	"	"	
Surrogate: Dibromodifluoromethane		*110 %*	*50-150*		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		*73.0 %*	*50-150*		"	"	"	"	

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Harding-Lawson Associates - Oakland	Project: Port of Oakland	
983 Fourth Street	Project Number: 43145.4	**Reported:**
Oakland CA, 94607	Project Manager: Jim McCarty	30-Nov-99 10:59

Volatile Organic Compounds by EPA Method 8010B

Sequoia Analytical - Walnut Creek

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
45MW-D (W911306-08) Water	**Sampled: 11-Nov-99 11:00**		**Received: 11-Nov-99 15:35**						
Bromodichloromethane	ND	0.50	ug/l	1	9K22008	22-Nov-99	22-Nov-99	EPA 8010B	
omoform	ND	0.50	"	"	"	"	"	"	
omomethane	ND	1.0	"	"	"	"	"	"	
Carbon tetrachloride	ND	0.50	"	"	"	"	"	"	
hlorobenzene	ND	0.50	"	"	"	"	"	"	
hloroethane	**7.9**	1.0	"	"	"	"	"	"	
Chloroform	ND	0.50	"	"	"	"	"	"	
Chloromethane	ND	1.0	"	"	"	"	"	"	
bromochloromethane	ND	0.50	"	"	"	"	"	"	
-Dichlorobenzene	ND	0.50	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	0.50	"	"	"	"	"	"	
-Dichlorobenzene	ND	0.50	"	"	"	"	"	"	
-Dichloroethane	**38**	0.50	"	"	"	"	"	"	
1,2-Dichloroethane	ND	0.50	"	"	"	"	"	"	
1,1-Dichloroethene	**1.1**	0.50	"	"	"	"	"	"	
-1,2-Dichloroethene	**23**	0.50	"	"	"	"	"	"	
ans-1,2-Dichloroethene	ND	0.50	"	"	"	"	"	"	
1,2-Dichloropropane	ND	0.50	"	"	"	"	"	"	
-1,3-Dichloropropene	ND	0.50	"	"	"	"	"	"	
ans-1,3-Dichloropropene	ND	0.50	"	"	"	"	"	"	
Methylene chloride	ND	5.0	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	0.50	"	"	"	"	"	"	
trachloroethene	**0.85**	0.50	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	0.50	"	"	"	"	"	"	
1,1,2-Trichloroethene	ND	0.50	"	"	"	"	"	"	
chloroethene	ND	0.50	"	"	"	"	"	"	
chlorofluoromethane	ND	0.50	"	"	"	"	"	"	
Vinyl chloride	ND	1.0	"	"	"	"	"	"	
rrogate: Dibromodifluoromethane		*110 %*	*50-150*		"	"	"	"	
rrogate: 4-Bromofluorobenzene		*67.0 %*	*50-150*		"	"	"	"	

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Harding-Lawson Associates - Oakland	Project: Port of Oakland	
383 Fourth Street	Project Number: 43145.4	**Reported:**
Oakland CA, 94607	Project Manager: Jim McCarty	30-Nov-99 10:59

Volatile Organic Compounds by EPA Method 8010B

Sequoia Analytical - Walnut Creek

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
9945MW-3 (W911306-09) Water	**Sampled: 11-Nov-99 11:35**	**Received: 11-Nov-99 15:35**							
Bromodichloromethane	ND	0.50	ug/l	1	9K22008	22-Nov-99	22-Nov-99	EPA 8010B	
Bromoform	ND	0.50	"	"	"	"	"	"	
Bromomethane	ND	1.0	"	"	"	"	"	"	
Carbon tetrachloride	ND	0.50	"	"	"	"	"	"	
Chlorobenzene	ND	0.50	"	"	"	"	"	"	
Chloroethane	ND	1.0	"	"	"	"	"	"	
Chloroform	ND	0.50	"	"	"	"	"	"	
Chloromethane	ND	1.0	"	"	"	"	"	"	
Dibromochloromethane	ND	0.50	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	0.50	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	0.50	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	0.50	"	"	"	"	"	"	
1,1-Dichloroethane	**3.2**	0.50	"	"	"	"	"	"	
1,2-Dichloroethane	ND	0.50	"	"	"	"	"	"	
1,1-Dichloroethene	ND	0.50	"	"	"	"	"	"	
cis-1,2-Dichloroethene	ND	0.50	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	0.50	"	"	"	"	"	"	
1,2-Dichloropropane	ND	0.50	"	"	"	"	"	"	
cis-1,3-Dichloropropene	ND	0.50	"	"	"	"	"	"	
trans-1,3-Dichloropropene	ND	0.50	"	"	"	"	"	"	
Methylene chloride	ND	10	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	0.50	"	"	"	"	"	"	
Tetrachloroethene	ND	0.50	"	"	"	"	"	"	
1,1,1-Trichloroethane	**2.4**	0.50	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	0.50	"	"	"	"	"	"	
Trichloroethene	ND	0.50	"	"	"	"	"	"	
Trichlorofluoromethane	ND	0.50	"	"	"	"	"	"	
Vinyl chloride	ND	1.0	"	"	"	"	"	"	
Surrogate: Dibromodifluoromethane		*99.0 %*	*50-150*		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		*60.0 %*	*50-150*		"	"	"	"	

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Harding-Lawson Associates - Oakland	Project: Port of Oakland	
383 Fourth Street	Project Number: 43145.4	**Reported:**
Oakland CA, 94607	Project Manager: Jim McCarty	30-Nov-99 10:59

Conventional Chemistry Parameters by APHA/EPA Methods

Sequoia Analytical - Walnut Creek

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
9945MW-8 (W911306-01) Water	**Sampled: 11-Nov-99 07:55**	**Received: 11-Nov-99 15:35**							
Orthophosphate as PO4	ND	0.50	mg/l	1	9K15004	11-Nov-99	11-Nov-99	EPA 300.0	
9945MW-7 (W911306-02) Water	**Sampled: 11-Nov-99 08:25**	**Received: 11-Nov-99 15:35**							
Orthophosphate as PO4	ND	0.50	mg/l	1	9K15004	11-Nov-99	11-Nov-99	EPA 300.0	
9945MW-6 (W911306-03) Water	**Sampled: 11-Nov-99 08:53**	**Received: 11-Nov-99 15:35**							
Orthophosphate as PO4	**0.58**	0.50	mg/l	1	9K15004	11-Nov-99	11-Nov-99	EPA 300.0	
9945MW-5 (W911306-04) Water	**Sampled: 11-Nov-99 09:22**	**Received: 11-Nov-99 15:35**							
Orthophosphate as PO4	ND	0.50	mg/l	1	9K15004	11-Nov-99	11-Nov-99	EPA 300.0	
9945MW-2 (W911306-05) Water	**Sampled: 11-Nov-99 09:48**	**Received: 11-Nov-99 15:35**							
Orthophosphate as PO4	ND	0.50	mg/l	1	9K15004	11-Nov-99	11-Nov-99	EPA 300.0	
9945MW-1 (W911306-06) Water	**Sampled: 11-Nov-99 10:24**	**Received: 11-Nov-99 15:35**							
Orthophosphate as PO4	**1.3**	0.50	mg/l	1	9K15004	11-Nov-99	11-Nov-99	EPA 300.0	
9945MW-4 (W911306-07) Water	**Sampled: 11-Nov-99 10:45**	**Received: 11-Nov-99 15:35**							
Orthophosphate as PO4	**2.8**	0.50	mg/l	1	9K15004	11-Nov-99	11-Nov-99	EPA 300.0	
9945MW-D (W911306-08) Water	**Sampled: 11-Nov-99 11:00**	**Received: 11-Nov-99 15:35**							
Orthophosphate as PO4	**2.9**	0.50	mg/l	1	9K15004	11-Nov-99	11-Nov-99	EPA 300.0	

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Harding-Lawson Associates - Oakland	Project: Port of Oakland	
383 Fourth Street	Project Number: 43145.4	**Reported:**
Oakland CA, 94607	Project Manager: Jim McCarty	30-Nov-99 10:59

Anions by EPA Method 300.0

Sequoia Analytical - Walnut Creek

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
9945MW-8 (W911306-01) Water	**Sampled: 11-Nov-99 07:55**		**Received: 11-Nov-99 15:35**						
Nitrate as NO3	**20**	0.10	mg/l	1	9K15004	11-Nov-99	11-Nov-99	EPA 300.0	
Sulfate as SO4	**400**	10	"	100	9K17006	16-Nov-99	16-Nov-99	"	
9945MW-7 (W911306-02) Water	**Sampled: 11-Nov-99 08:25**		**Received: 11-Nov-99 15:35**						
Nitrate as NO3	**2.9**	0.10	mg/l	1	9K15004	11-Nov-99	11-Nov-99	EPA 300.0	
Sulfate as SO4	**140**	1.0	"	10	9K17006	16-Nov-99	16-Nov-99	"	
9945MW-6 (W911306-03) Water	**Sampled: 11-Nov-99 08:53**		**Received: 11-Nov-99 15:35**						
Nitrate as NO3	**0.91**	0.10	mg/l	1	9K15004	11-Nov-99	11-Nov-99	EPA 300.0	
Sulfate as SO4	**440**	5.0	"	50	9K17006	16-Nov-99	16-Nov-99	"	
9945MW-5 (W911306-04) Water	**Sampled: 11-Nov-99 09:22**		**Received: 11-Nov-99 15:35**						
Nitrate as NO3	ND	0.10	mg/l	1	9K15004	11-Nov-99	11-Nov-99	EPA 300.0	
Sulfate as SO4	**320**	5.0	"	50	9K17006	16-Nov-99	16-Nov-99	"	
9945MW-2 (W911306-05) Water	**Sampled: 11-Nov-99 09:48**		**Received: 11-Nov-99 15:35**						
Nitrate as NO3	ND	0.10	mg/l	1	9K15004	11-Nov-99	11-Nov-99	EPA 300.0	
Sulfate as SO4	**10**	0.10	"	"	9K17006	16-Nov-99	16-Nov-99	"	
9945MW-1 (W911306-06) Water	**Sampled: 11-Nov-99 10:24**		**Received: 11-Nov-99 15:35**						
Nitrate as NO3	ND	0.10	mg/l	1	9K15004	11-Nov-99	11-Nov-99	EPA 300.0	
Sulfate as SO4	**110**	1.0	"	10	9K17006	16-Nov-99	16-Nov-99	"	
9945MW-4 (W911306-07) Water	**Sampled: 11-Nov-99 10:45**		**Received: 11-Nov-99 15:35**						
Nitrate as NO3	ND	0.10	mg/l	1	9K15004	11-Nov-99	11-Nov-99	EPA 300.0	
Sulfate as SO4	**3.0**	0.10	"	"	9K17006	16-Nov-99	16-Nov-99	"	

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Harding-Lawson Associates - Oakland	Project: Port of Oakland	
383 Fourth Street	Project Number: 43145.4	**Reported:**
Oakland CA, 94607	Project Manager: Jim McCarty	30-Nov-99 10:59

Anions by EPA Method 300.0

Sequoia Analytical - Walnut Creek

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
9945MW-D (W911306-08) Water	**Sampled: 11-Nov-99 11:00**		**Received: 11-Nov-99 15:35**						
Nitrate as NO3	ND	0.10	mg/l	1	9K15004	11-Nov-99	11-Nov-99	EPA 300.0	
Sulfate as SO4	**3.0**	0.10	"	"	9K17006	16-Nov-99	16-Nov-99	"	

Melissa Brewer

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Harding-Lawson Associates - Oakland	Project: Port of Oakland	
383 Fourth Street	Project Number: 43145.4	**Reported:**
Oakland CA, 94607	Project Manager: Jim McCarty	30-Nov-99 10:59

Conventional Chemistry Parameters by APHA/EPA Methods

Sequoia Analytical - Petaluma

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
9945MW-8 (W911306-01/MW-8) Water	**Sampled: 11-Nov-99 00:00 Received: 11-Nov-99 15:35**								
Total Organic Carbon	**163**	80.0	mg/l	80	9110547	19-Nov-99	19-Nov-99	EPA 415.1	
9945MW-7 (W911306-02/MW-7) Water	**Sampled: 11-Nov-99 00:00 Received: 11-Nov-99 15:35**								
Total Organic Carbon	**49.6**	20.0	mg/l	20	9110547	19-Nov-99	19-Nov-99	EPA 415.1	
9945MW-6 (W911306-03/MW-6) Water	**Sampled: 11-Nov-99 00:00 Received: 11-Nov-99 15:35**								
Total Organic Carbon	**103**	80.0	mg/l	80	9110547	19-Nov-99	19-Nov-99	EPA 415.1	
9945MW-5 (W911306-04/MW-5) Water	**Sampled: 11-Nov-99 00:00 Received: 11-Nov-99 15:35**								
Total Organic Carbon	**94.5**	80.0	mg/l	80	9110547	19-Nov-99	19-Nov-99	EPA 415.1	
9945MW-2 (W911306-05/MW-2) Water	**Sampled: 11-Nov-99 00:00 Received: 11-Nov-99 15:35**								
Total Organic Carbon	**214**	80.0	mg/l	80	9110547	19-Nov-99	19-Nov-99	EPA 415.1	
9945MW-1 (W911306-06/MW-1) Water	**Sampled: 11-Nov-99 00:00 Received: 11-Nov-99 15:35**								
Total Organic Carbon	**108**	80.0	mg/l	80	9110547	19-Nov-99	19-Nov-99	EPA 415.1	
9945MW-4 (W911306-07/MW-4) Water	**Sampled: 11-Nov-99 00:00 Received: 11-Nov-99 15:35**								
Total Organic Carbon	**116**	80.0	mg/l	80	9110547	19-Nov-99	19-Nov-99	EPA 415.1	
9945MW-D (W911306-08/MW-D) Water	**Sampled: 11-Nov-99 00:00 Received: 11-Nov-99 15:35**								
Total Organic Carbon	**93.5**	80.0	mg/l	80	9110547	19-Nov-99	19-Nov-99	EPA 415.1	
9945MW-3 (W911306-09/MW-3) Water	**Sampled: 11-Nov-99 00:00 Received: 11-Nov-99 15:35**								
Total Organic Carbon	**217**	80.0	mg/l	80	9110547	19-Nov-99	19-Nov-99	EPA 415.1	

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Harding-Lawson Associates - Oakland	Project: Port of Oakland	
383 Fourth Street	Project Number: 43145.4	**Reported:**
Oakland CA, 94607	Project Manager: Jim McCarty	30-Nov-99 10:59

Total Purgeable Hydrocarbons (C6-C12), BTEX and MTBE by DHS LUFT - Quality Control

Sequoia Analytical - Walnut Creek

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 9K13001: Prepared 13-Nov-99 Using EPA 5030B [P/T]										
Blank (9K13001-BLK1)										
Purgeable Hydrocarbons	ND	50	ug/l							
Benzene	ND	0.50	"							
Toluene	ND	0.50	"							
Ethylbenzene	ND	0.50	"							
Xylenes (total)	ND	0.50	"							
Methyl tert-butyl ether	ND	2.5	"							
Surrogate: a,a,a-Trifluorotoluene	*31.3*		"	*30.0*		*104*	*70-130*			
LCS (9K13001-BS1)										
Benzene	21.7	0.50	ug/l	20.0		109	70-130			
Toluene	21.9	0.50	"	20.0		109	70-130			
Ethylbenzene	19.7	0.50	"	20.0		98.5	70-130			
Xylenes (total)	70.0	0.50	"	60.0		117	70-130			
Surrogate: a,a,a-Trifluorotoluene	*29.2*		"	*30.0*		*97.3*	*70-130*			
Matrix Spike (9K13001-MS1)					**Source: W911316-41**					
Benzene	20.7	0.50	ug/l	20.0	ND	104	70-130			
Toluene	20.8	0.50	"	20.0	ND	104	70-130			
Ethylbenzene	20.5	0.50	"	20.0	ND	103	70-130			
Xylenes (total)	65.6	0.50	"	60.0	ND	109	70-130			
Surrogate: a,a,a-Trifluorotoluene	*27.1*		"	*30.0*		*90.3*	*70-130*			
Matrix Spike Dup (9K13001-MSD1)					**Source: W911316-41**					
Benzene	21.8	0.50	ug/l	20.0	ND	109	70-130	5.18	20	
Toluene	22.0	0.50	"	20.0	ND	110	70-130	5.61	20	
Ethylbenzene	19.3	0.50	"	20.0	ND	96.5	70-130	6.03	20	
Xylenes (total)	69.3	0.50	"	60.0	ND	116	70-130	5.49	20	
Surrogate: a,a,a-Trifluorotoluene	*29.0*		"	*30.0*		*96.7*	*70-130*			

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Harding-Lawson Associates - Oakland	Project: Port of Oakland	
383 Fourth Street	Project Number: 43145.4	**Reported:**
Oakland CA, 94607	Project Manager: Jim McCarty	30-Nov-99 10:59

Total Purgeable Hydrocarbons (C6-C12), BTEX and MTBE by DHS LUFT - Quality Control

Sequoia Analytical - Walnut Creek

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 9K15001: Prepared 15-Nov-99 Using EPA 5030B [P/T]										
Blank (9K15001-BLK1)										
Purgeable Hydrocarbons	ND	50	ug/l							
Benzene	ND	0.50	"							
Toluene	ND	0.50	"							
Ethylbenzene	ND	0.50	"							
Xylenes (total)	ND	0.50	"							
Methyl tert-butyl ether	ND	2.5	"							
Surrogate: a,a,a-Trifluorotoluene	*28.9*		"	*30.0*		*96.3*	*70-130*			
LCS (9K15001-BS1)										
Benzene	20.4	0.50	ug/l	20.0		102	70-130			
Toluene	20.4	0.50	"	20.0		102	70-130			
Ethylbenzene	20.8	0.50	"	20.0		104	70-130			
Xylenes (total)	63.0	0.50	"	60.0		105	70-130			
Surrogate: a,a,a-Trifluorotoluene	*30.6*		"	*30.0*		*102*	*70-130*			
Matrix Spike (9K15001-MS1)					**Source: W911311-03**					
Benzene	22.5	0.50	ug/l	20.0	ND	113	70-130			
Toluene	22.7	0.50	"	20.0	ND	114	70-130			
Ethylbenzene	22.3	0.50	"	20.0	ND	111	70-130			
Xylenes (total)	69.5	0.50	"	60.0	ND	116	70-130			
Surrogate: a,a,a-Trifluorotoluene	*29.4*		"	*30.0*		*98.0*	*70-130*			
Matrix Spike Dup (9K15001-MSD1)					**Source: W911311-03**					
Benzene	21.4	0.50	ug/l	20.0	ND	107	70-130	5.01	20	
Toluene	21.6	0.50	"	20.0	ND	108	70-130	4.97	20	
Ethylbenzene	19.6	0.50	"	20.0	ND	98.0	70-130	12.9	20	
Xylenes (total)	64.7	0.50	"	60.0	ND	108	70-130	7.15	20	
Surrogate: a,a,a-Trifluorotoluene	*30.3*		"	*30.0*		*101*	*70-130*			

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Harding-Lawson Associates - Oakland	Project: Port of Oakland	
383 Fourth Street	Project Number: 43145.4	**Reported:**
Oakland CA, 94607	Project Manager: Jim McCarty	30-Nov-99 10:59

Total Purgeable Hydrocarbons (C6-C12), BTEX and MTBE by DHS LUFT - Quality Control

Sequoia Analytical - Walnut Creek

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 9K15003: Prepared 15-Nov-99 Using EPA 5030B [P/T]										
Blank (9K15003-BLK1)										
Purgeable Hydrocarbons	ND	50	ug/l							
Benzene	ND	0.50	"							
Toluene	ND	0.50	"							
Ethylbenzene	ND	0.50	"							
Xylenes (total)	ND	0.50	"							
Methyl tert-butyl ether	ND	2.5	"							
Surrogate: a,a,a-Trifluorotoluene	*35.9*		"	*30.0*		*120*	*70-130*			
LCS (9K15003-BS1)										
Benzene	16.7	0.50	ug/l	20.0		83.5	70-130			
Toluene	20.6	0.50	"	20.0		103	70-130			
Ethylbenzene	20.3	0.50	"	20.0		101	70-130			
Xylenes (total)	59.3	0.50	"	60.0		98.8	70-130			
Surrogate: a,a,a-Trifluorotoluene	*30.1*		"	*30.0*		*100*	*70-130*			
LCS Dup (9K15003-BSD1)										
Benzene	16.9	0.50	ug/l	20.0		84.5	70-130	1.19	20	
Toluene	20.8	0.50	"	20.0		104	70-130	0.966	20	
Ethylbenzene	20.7	0.50	"	20.0		104	70-130	1.95	20	
Xylenes (total)	60.9	0.50	"	60.0		102	70-130	2.66	20	
Surrogate: a,a,a-Trifluorotoluene	*28.4*		"	*30.0*		*94.7*	*70-130*			

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Harding-Lawson Associates - Oakland	Project: Port of Oakland	
383 Fourth Street	Project Number: 43145.4	**Reported:**
Oakland CA, 94607	Project Manager: Jim McCarty	30-Nov-99 10:59

Diesel Hydrocarbons (C9-C24) with Silica Gel Cleanup by DHS LUFT - Quality Control

Sequoia Analytical - Walnut Creek

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 9K19014: Prepared 19-Nov-99 Using EPA 3510B										
Blank (9K19014-BLK1)										
Diesel Range Hydrocarbons	ND	50	ug/l							
Jet-A (C9-C17)	ND	50	"							
Motor Oil (C16-C36)	ND	250	"							
Surrogate: n-Pentacosane	*28.0*		"	*33.3*		*84.1*	*50-150*			
LCS (9K19014-BS1)										
Diesel Range Hydrocarbons	546	50	ug/l	500		109	60-140			
Surrogate: n-Pentacosane	*30.0*		"	*33.3*		*90.1*	*50-150*			
LCS Dup (9K19014-BSD1)										
Diesel Range Hydrocarbons	468	50	ug/l	500		93.6	60-140	15.4	50	
Surrogate: n-Pentacosane	*26.0*		"	*33.3*		*78.1*	*50-150*			

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Harding-Lawson Associates - Oakland	Project: Port of Oakland	
383 Fourth Street	Project Number: 43145.4	**Reported:**
Oakland CA, 94607	Project Manager: Jim McCarty	30-Nov-99 10:59

Total Metals by EPA 200 Series Methods - Quality Control

Sequoia Analytical - Walnut Creek

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 9K19012: Prepared 19-Nov-99 Using 200.7										
Blank (9K19012-BLK1)										
Iron	ND	0.010	mg/l							
LCS (9K19012-BS1)										
Iron	1.07	0.010	mg/l	1.00		107	80-120			
LCS Dup (9K19012-BSD1)										
Iron	1.03	0.010	mg/l	1.00		103	80-120	3.81	20	
Matrix Spike (9K19012-MS1)					**Source: W911306-08**					
Iron	1.74	0.010	mg/l	1.00	0.89	85.0	80-120			
Matrix Spike Dup (9K19012-MSD1)					**Source: W911306-08**					
Iron	1.74	0.010	mg/l	1.00	0.89	85.0	80-120	0	20	

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Harding-Lawson Associates - Oakland	Project: Port of Oakland	
383 Fourth Street	Project Number: 43145.4	**Reported:**
Oakland CA, 94607	Project Manager: Jim McCarty	30-Nov-99 10:59

Volatile Organic Compounds by EPA Method 8010B - Quality Control

Sequoia Analytical - Walnut Creek

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 9K22008: Prepared 22-Nov-99 Using EPA 5030B [P/T]										
Blank (9K22008-BLK1)										
Bromodichloromethane	ND	0.50	ug/l							
Bromoform	ND	0.50	"							
Bromomethane	ND	1.0	"							
Carbon tetrachloride	ND	0.50	"							
Chlorobenzene	ND	0.50	"							
Chloroethane	ND	1.0	"							
Chloroform	ND	0.50	"							
Chloromethane	ND	1.0	"							
Dibromochloromethane	ND	0.50	"							
1,3-Dichlorobenzene	ND	0.50	"							
1,4-Dichlorobenzene	ND	0.50	"							
1,2-Dichlorobenzene	ND	0.50	"							
1,1-Dichloroethane	ND	0.50	"							
1,2-Dichloroethane	ND	0.50	"							
1,1-Dichloroethene	ND	0.50	"							
cis-1,2-Dichloroethene	ND	0.50	"							
trans-1,2-Dichloroethene	ND	0.50	"							
1,2-Dichloropropane	ND	0.50	"							
cis-1,3-Dichloropropene	ND	0.50	"							
trans-1,3-Dichloropropene	ND	0.50	"							
Methylene chloride	ND	5.0	"							
1,1,2,2-Tetrachloroethane	ND	0.50	"							
Tetrachloroethene	ND	0.50	"							
1,1,1-Trichloroethane	ND	0.50	"							
1,1,2-Trichloroethane	ND	0.50	"							
Trichloroethene	ND	0.50	"							
Trichlorofluoromethane	ND	0.50	"							
Vinyl chloride	ND	1.0	"							
Surrogate: Dibromodifluoromethane	*9.60*		"	*10.0*		*96.0*	*50-150*			
Surrogate: 4-Bromofluorobenzene	*6.20*		"	*10.0*		*62.0*	*50-150*			

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Harding-Lawson Associates - Oakland	Project: Port of Oakland	
383 Fourth Street	Project Number: 43145.4	**Reported:**
Oakland CA, 94607	Project Manager: Jim McCarty	30-Nov-99 10:59

Volatile Organic Compounds by EPA Method 8010B - Quality Control

Sequoia Analytical - Walnut Creek

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 9K22008: Prepared 22-Nov-99 Using EPA 5030B [P/T]										
LCS (9K22008-BS1)										
Chlorobenzene	15.0	0.50	ug/l	20.0		75.0	70-130			
1,1-Dichloroethene	20.0	0.50	"	20.0		100	65-135			
Trichloroethene	18.0	0.50	"	20.0		90.0	70-130			
Surrogate: Dibromodifluoromethane	*8.60*		"	*10.0*		*86.0*	*50-150*			
Surrogate: 4-Bromofluorobenzene	*7.50*		"	*10.0*		*75.0*	*50-150*			
Matrix Spike (9K22008-MS1)					**Source: W911306-03**					
Chlorobenzene	14.0	0.50	ug/l	20.0	ND	70.0	60-140			
1,1-Dichloroethene	17.0	0.50	"	20.0	ND	85.0	60-140			
Trichloroethene	16.0	0.50	"	20.0	ND	80.0	60-140			
Surrogate: Dibromodifluoromethane	*9.90*		"	*10.0*		*99.0*	*50-150*			
Surrogate: 4-Bromofluorobenzene	*8.60*		"	*10.0*		*86.0*	*50-150*			
Matrix Spike Dup (9K22008-MSD1)					**Source: W911306-03**					
Chlorobenzene	15.0	0.50	ug/l	20.0	ND	75.0	60-140	6.90	25	
1,1-Dichloroethene	19.0	0.50	"	20.0	ND	95.0	60-140	11.1	25	
Trichloroethene	17.0	0.50	"	20.0	ND	85.0	60-140	6.06	25	
Surrogate: Dibromodifluoromethane	*11.0*		"	*10.0*		*110*	*50-150*			
Surrogate: 4-Bromofluorobenzene	*6.80*		"	*10.0*		*68.0*	*50-150*			

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Harding-Lawson Associates - Oakland	Project: Port of Oakland	
383 Fourth Street	Project Number: 43145.4	**Reported:**
Oakland CA, 94607	Project Manager: Jim McCarty	30-Nov-99 10:59

Conventional Chemistry Parameters by APHA/EPA Methods - Quality Control
Sequoia Analytical - Walnut Creek

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 9K15004: Prepared 11-Nov-99 Using General Preparation										
Blank (9K15004-BLK3)										
Orthophosphate as PO4	ND	0.50	mg/l							
LCS (9K15004-BS3)										
Orthophosphate as PO4	21.7	0.50	mg/l	20.0		109	80-120			
Matrix Spike (9K15004-MS3)					Source: W911306-08					
Orthophosphate as PO4	24.2	1.0	mg/l	20.0	2.9	107	75-125			
Matrix Spike Dup (9K15004-MSD3)					Source: W911306-08					
Orthophosphate as PO4	24.1	1.0	mg/l	20.0	2.9	106	75-125	0.414	20	

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Harding-Lawson Associates - Oakland	Project: Port of Oakland	
383 Fourth Street	Project Number: 43145.4	**Reported:**
Oakland CA, 94607	Project Manager: Jim McCarty	30-Nov-99 10:59

Anions by EPA Method 300.0 - Quality Control

Sequoia Analytical - Walnut Creek

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 9K15004: Prepared 11-Nov-99 Using General Preparation										
Blank (9K15004-BLK2)										
Nitrate as NO3	ND	0.10	mg/l							
Blank (9K15004-BLK3)										
Nitrate as NO3	ND	0.10	mg/l							
LCS (9K15004-BS2)										
Nitrate as NO3	11.0	0.10	mg/l	10.0		110	80-120			
LCS (9K15004-BS3)										
Nitrate as NO3	10.9	0.10	mg/l	10.0		109	80-120			
Matrix Spike (9K15004-MS2)					**Source: W911301-02**					
Nitrate as NO3	206	2.0	mg/l	100	97	109	75-125			
Matrix Spike (9K15004-MS3)					**Source: W911306-08**					
Nitrate as NO3	11.5	0.20	mg/l	10.0	ND	115	75-125			
Matrix Spike Dup (9K15004-MSD2)					**Source: W911301-02**					
Nitrate as NO3	205	2.0	mg/l	100	97	108	75-125	0.487	20	
Matrix Spike Dup (9K15004-MSD3)					**Source: W911306-08**					
Nitrate as NO3	11.4	0.20	mg/l	10.0	ND	114	75-125	0.873	20	
Batch 9K17006: Prepared 16-Nov-99 Using General Preparation										
Blank (9K17006-BLK1)										
Sulfate as SO4	ND	0.10	mg/l							

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Harding-Lawson Associates - Oakland	Project: Port of Oakland	
383 Fourth Street	Project Number: 43145.4	**Reported:**
Oakland CA, 94607	Project Manager: Jim McCarty	30-Nov-99 10:59

Anions by EPA Method 300.0 - Quality Control

Sequoia Analytical - Walnut Creek

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 9K17006: Prepared 16-Nov-99 Using General Preparation										
LCS (9K17006-BS1)										
Sulfate as SO4	10.1	0.10	mg/l	10.0		101	80-120			
Matrix Spike (9K17006-MS1)					**Source: W911260-14**					
Sulfate as SO4	155	2.0	mg/l	100	55	100	75-125			
Matrix Spike Dup (9K17006-MSD1)					**Source: W911260-14**					
Sulfate as SO4	154	2.0	mg/l	100	55	99.0	75-125	0.647	20	

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Harding-Lawson Associates - Oakland	Project: Port of Oakland	
383 Fourth Street	Project Number: 43145.4	**Reported:**
Oakland CA, 94607	Project Manager: Jim McCarty	30-Nov-99 10:59

Conventional Chemistry Parameters by APHA/EPA Methods - Quality Control

Sequoia Analytical - Petaluma

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 9110547: Prepared 19-Nov-99 Using General Preparation										
Blank (9110547-BLK1)										
Total Organic Carbon	ND	1.00	mg/l							
LCS (9110547-BS1)										
Total Organic Carbon	40.5	2.00	mg/l	40.0		101	80.0-120			
Matrix Spike (9110547-MS1)					Source: P911353-02					
Total Organic Carbon	111	4.00	mg/l	100	35.8	75.2	75.0-125			
Matrix Spike Dup (9110547-MSD1)					Source: P911353-02					
Total Organic Carbon	111	4.00	mg/l	100	35.8	75.2	75.0-125	0	20.0	

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383 Fourth Street	Project Number: 43145.4	**Reported:**
Oakland CA, 94607	Project Manager: Jim McCarty	30-Nov-99 10:59

Notes and Definitions

D-03	Chromatogram Pattern: Unidentified Hydrocarbons C9-C17.
D-04	Chromatogram Pattern: Jet Fuel C9-C17.
D-08	Low surrogate recovery confirmed on other channel. There was not enough sample available for re-extraction; results should be considered estimated values.
D-12	Chromatogram Pattern: Unidentified Hydrocarbons > C16
D-13	Chromatogram Pattern: Diesel C9-C24
D-14	Chromatogram Pattern: Unidentified Hydrocarbons C9-C24
P-01	Chromatogram Pattern: Gasoline C6-C12
P-03	Chromatogram Pattern: Unidentified Hydrocarbons C6-C12
P-07	Chromatogram Pattern: Gasoline C6-C12 + Unidentified Hydrocarbons >C10
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference

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Melissa Brewer, Project Manager

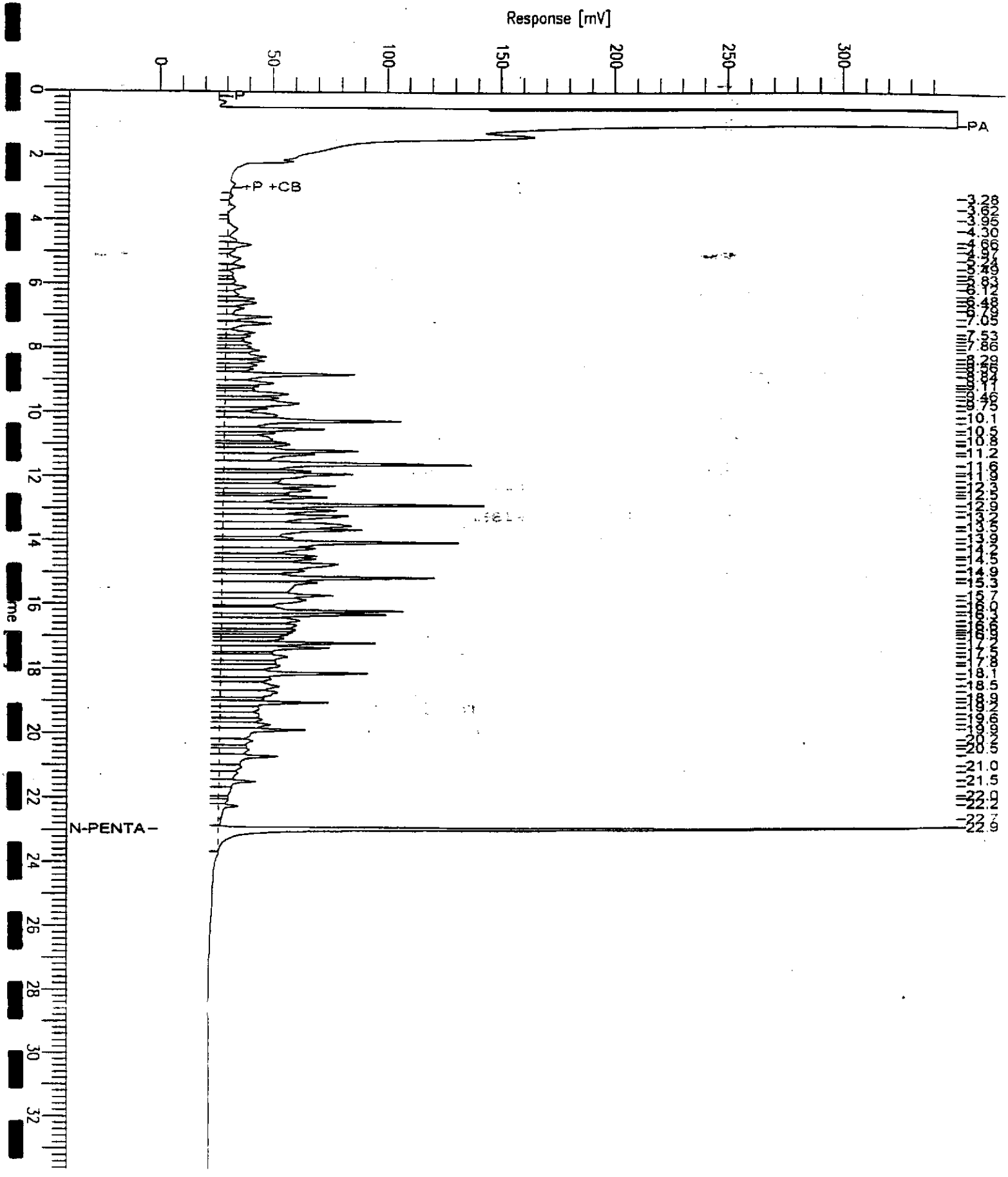
Chromatogram

diesel Std 7

Name : 9111004
me : J:\HP3DATA\3ANV414.raw
d : TPH03A
t Time : 0.00 min
le Factor: 0.0

End Time : 33.65 min
Plot Offset: 0 mV

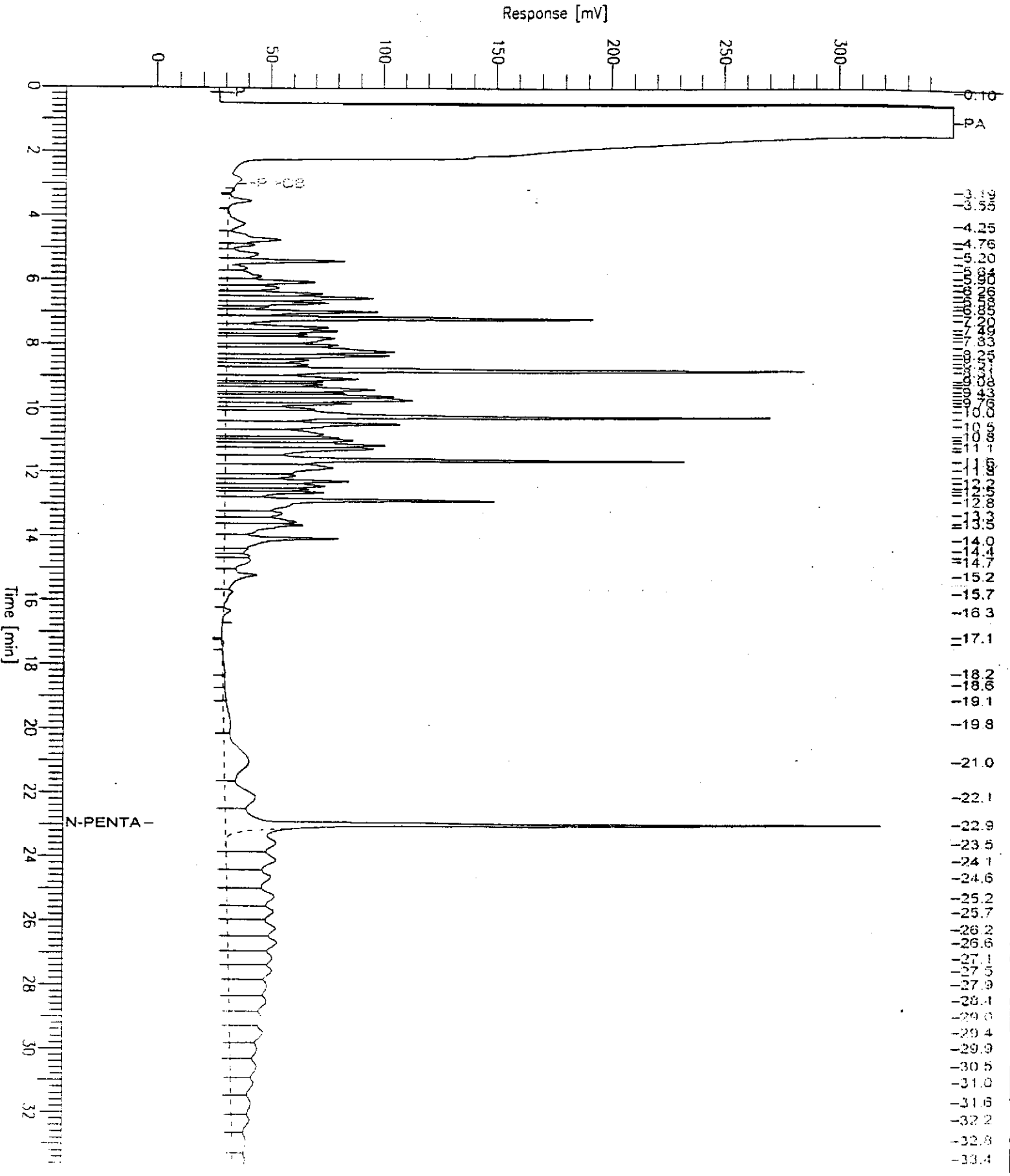
Sample #: 500ppm ccv
Date : 11/23/99 10:42 AM
Time of Injection: 11/23/99 10:05 AM
Low Point : 0.00 mV
Plot Scale: 350.0 mV



Chromatogram

Name : 9101402
Name : J:\HP3DATA\3ANV422.raw
thod : TPH03A
Start Time : 0.00 min End Time : 33.65 min
Scale Factor: 0.0 Plot Offset: 0 mV

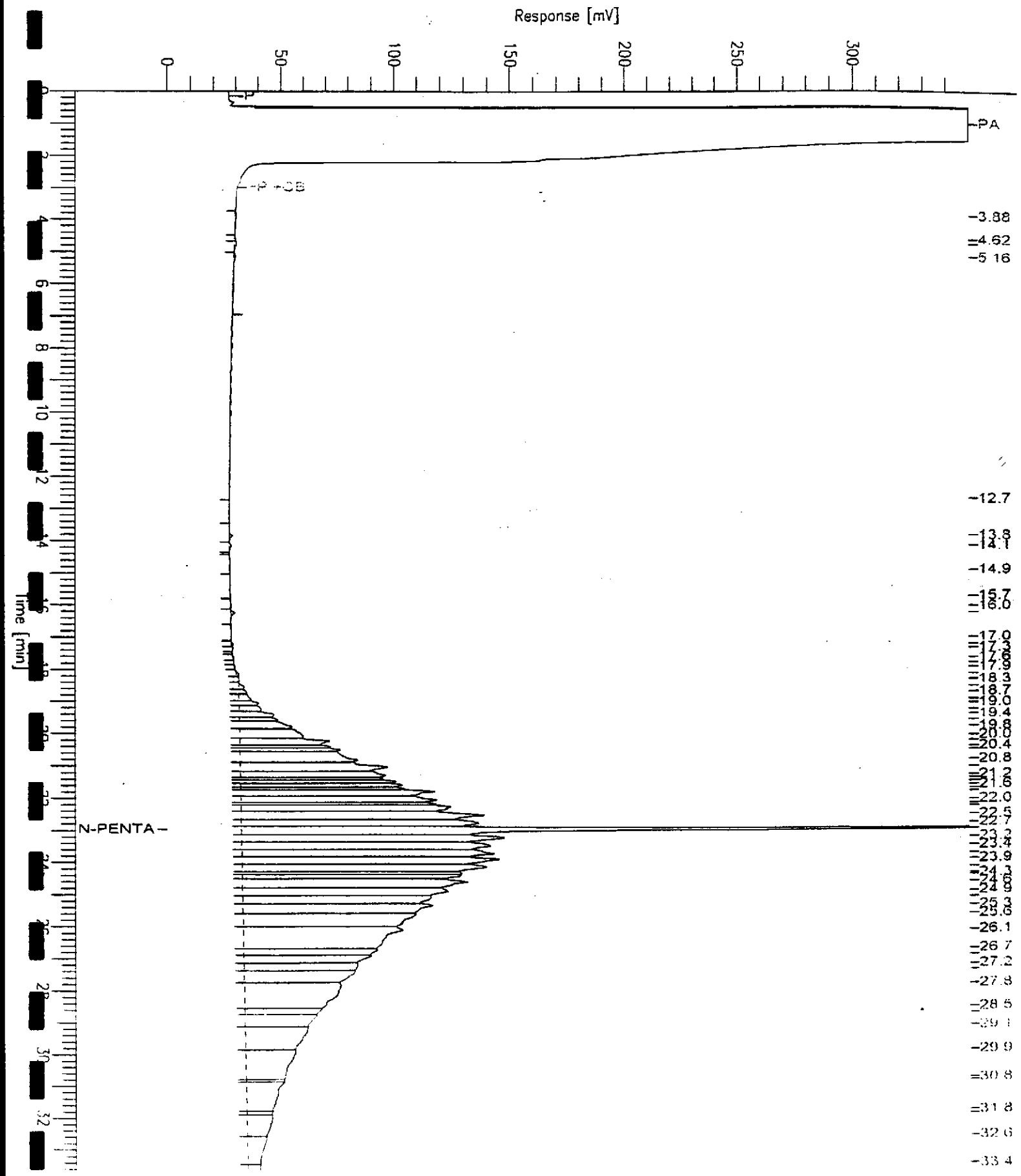
Sample #: 500PPM JFA Page 1 of 1
Date : 11/23/99 07:17 PM
Time of Injection: 11/23/99 06:40 PM
Low Point : 0.00 mV High Point : 350.00 mV
Plot Scale: 350.0 mV



Chromatogram

e Name : 9101905
eName : J:\HP3DATA\3ANV423.raw
hod : TPH03A
t Time : 0.00 min End Time : 33.65 min
e Factor: 0.0 Plot Offset: 0 mV

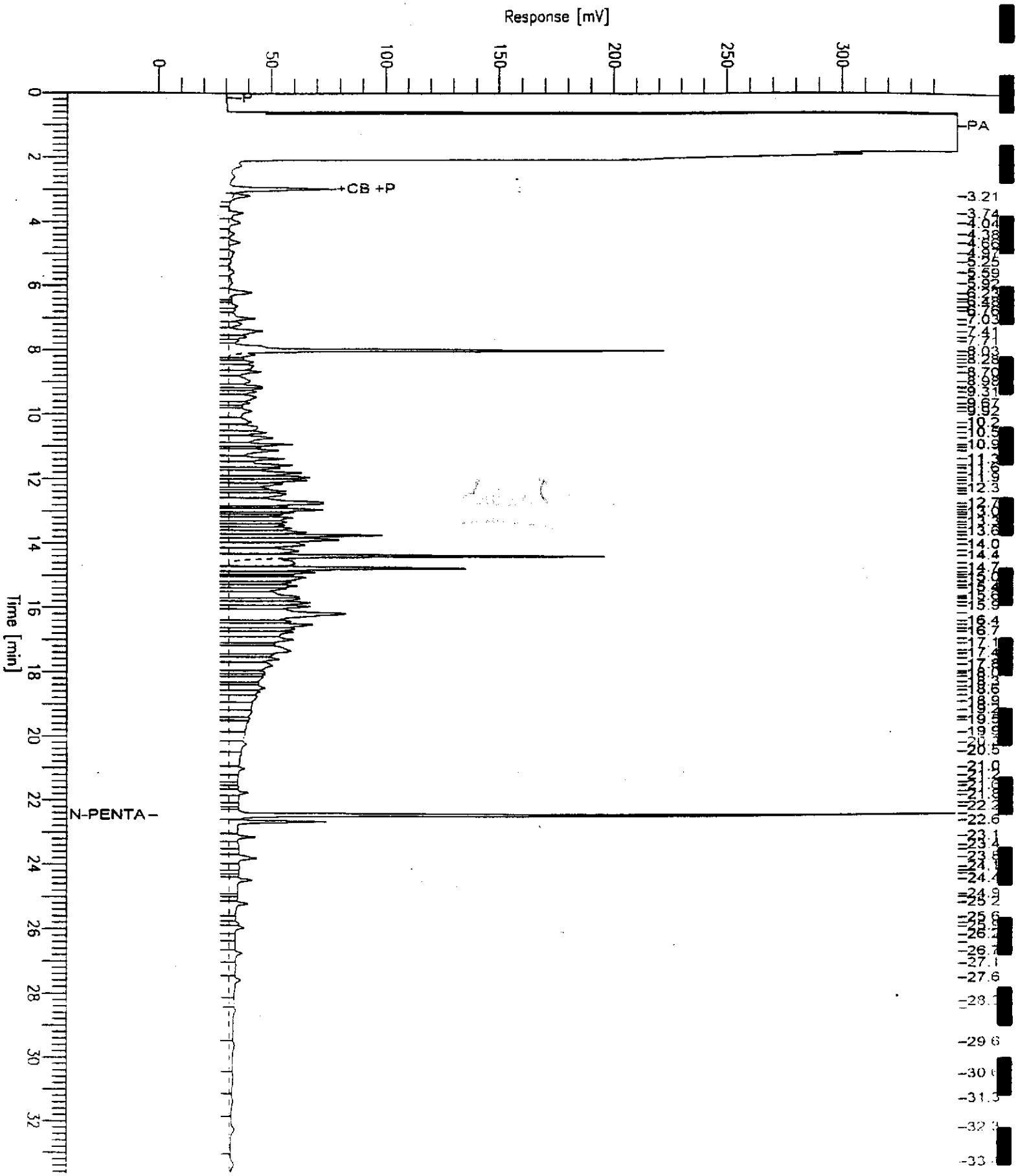
Sample #: 1000PPM MO Page 1 of 1
Date : 11/23/99 08:02 PM
Time of Injection: 11/23/99 07:25 PM
Low Point : 0.00 mV High Point : 350.00 mV
Plot Scale: 350.0 mV



Chromatogram

Le Name : W911306-01
eName : J:\HP3DATA\3BNV401.raw
ethod : TPH03A
Start Time : 0.00 min End Time : 33.65 min
Scale Factor: 0.0 Plot Offset: 0 mV

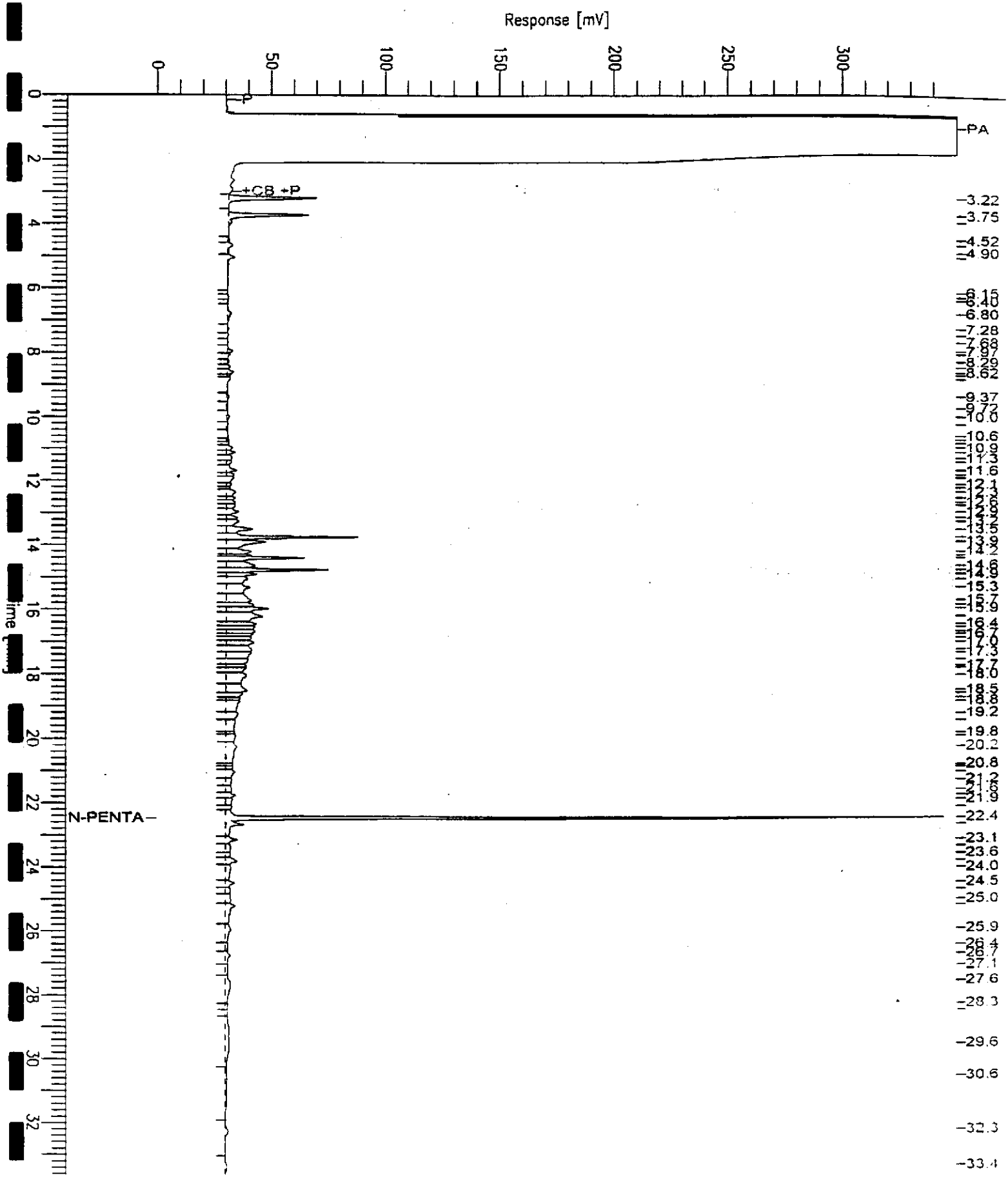
Sample #: HLA Page 1 of 1
Date : 11/22/99 06:33 PM
Time of Injection: 11/22/99 05:56 PM
Low Point : 0.00 mV High Point : 350.00 mV
Plot Scale: 350.0 mV



Chromatogram

Name : W911306-03
Name : J:\HP3DATA\3BNV403.raw
Method : TPH03A
Start Time : 0.00 min End Time : 33.65 min
Scale Factor: 0.0 Plot Offset: 0 mV

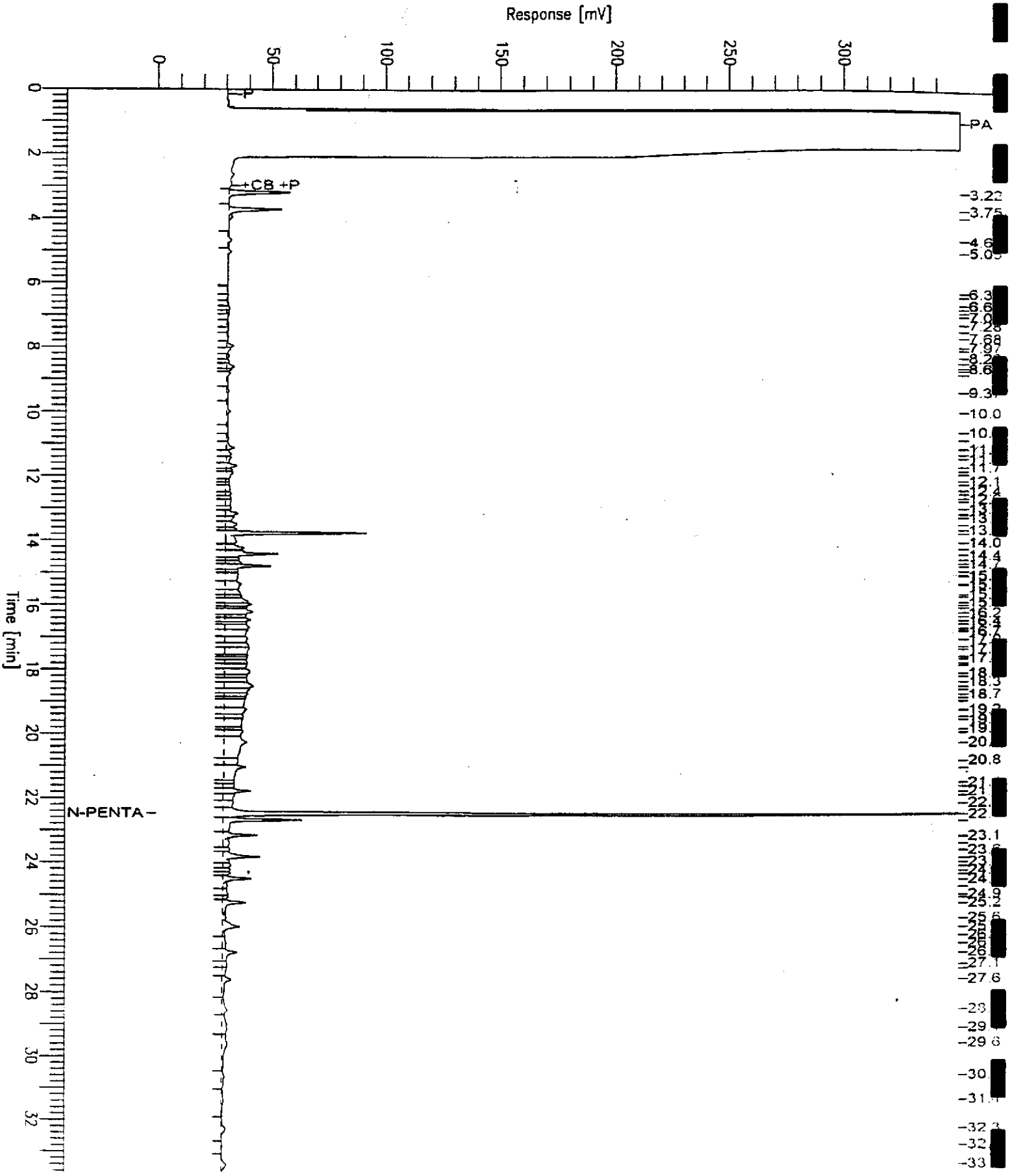
Sample #: HLA
Date : 11/22/99 08:02 PM
Time of Injection: 11/22/99 07:25 PM
Low Point : 0.00 mV High Point : 350.00 mV
Plot Scale: 350.0 mV



Chromatogram

ame : W911306-04
e : J:\HP3DATA\3BNV405.raw
: TPH03A
Time : 0.00 min End Time : 33.65 min
e Factor: 0.0 Plot Offset: 0 mV

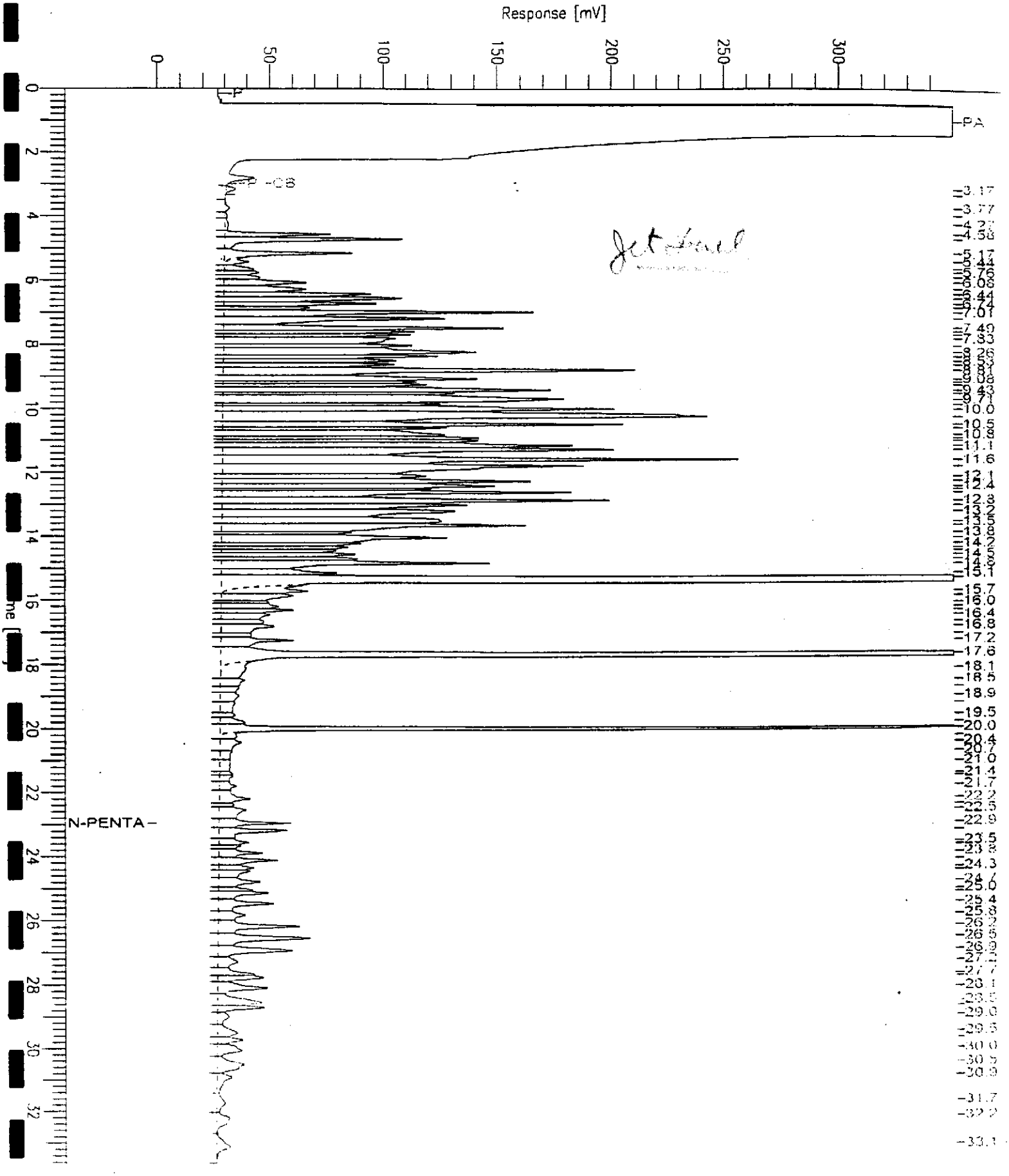
Sample #: HLA Page 1 of 1
Date : 11/23/99 09:54 AM
Time of Injection: 11/22/99 08:54 PM
Low Point : 0.00 mV High Point : 350.00 mV
Plot Scale: 350.0 mV



Chromatogram

ple Name : W911306-05
leName : J:\HP3DATA\...ANV428.raw
ethod : TPHO3A
art Time : 0.00 min End Time : 33.65 min
ale Factor: 0.0 Plot Offset: 0 mV

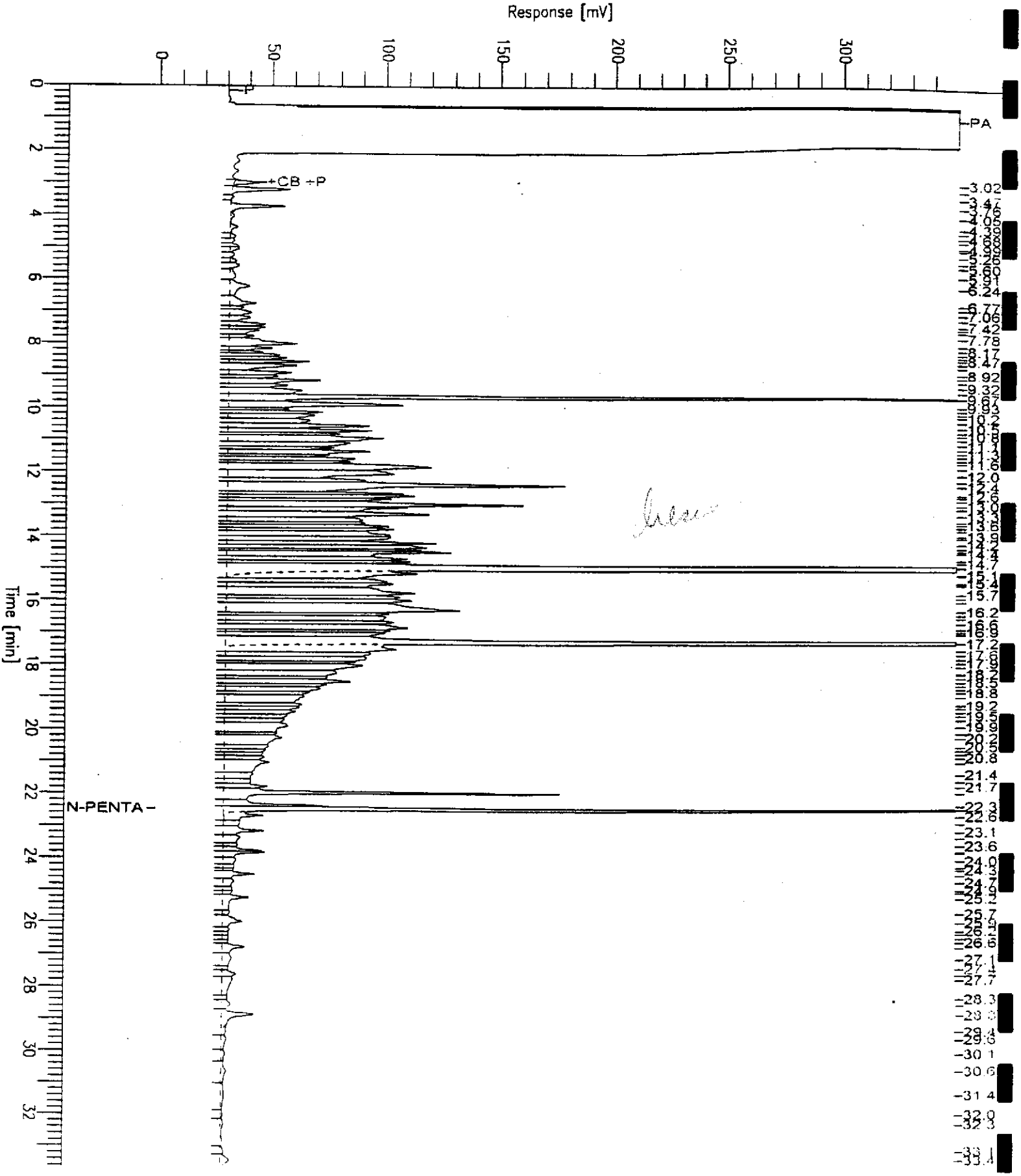
Sample #: HLA Page 1 of 1
Date : 11/23/99 11:43 PM
Time of Injection: 11/23/99 11:06 PM
Low Point : 0.00 mV High Point : 350.00 mV
Plot Scale: 350.0 mV



Chromatogram

ıple Name : W911306-06
ıleName : J:\HP3DATA\3BNV406.raw
Method : TPH03A
Start Time : 0.00 min End Time : 33.65 min
Scale Factor: 0.0 Plot Offset: 0 mV

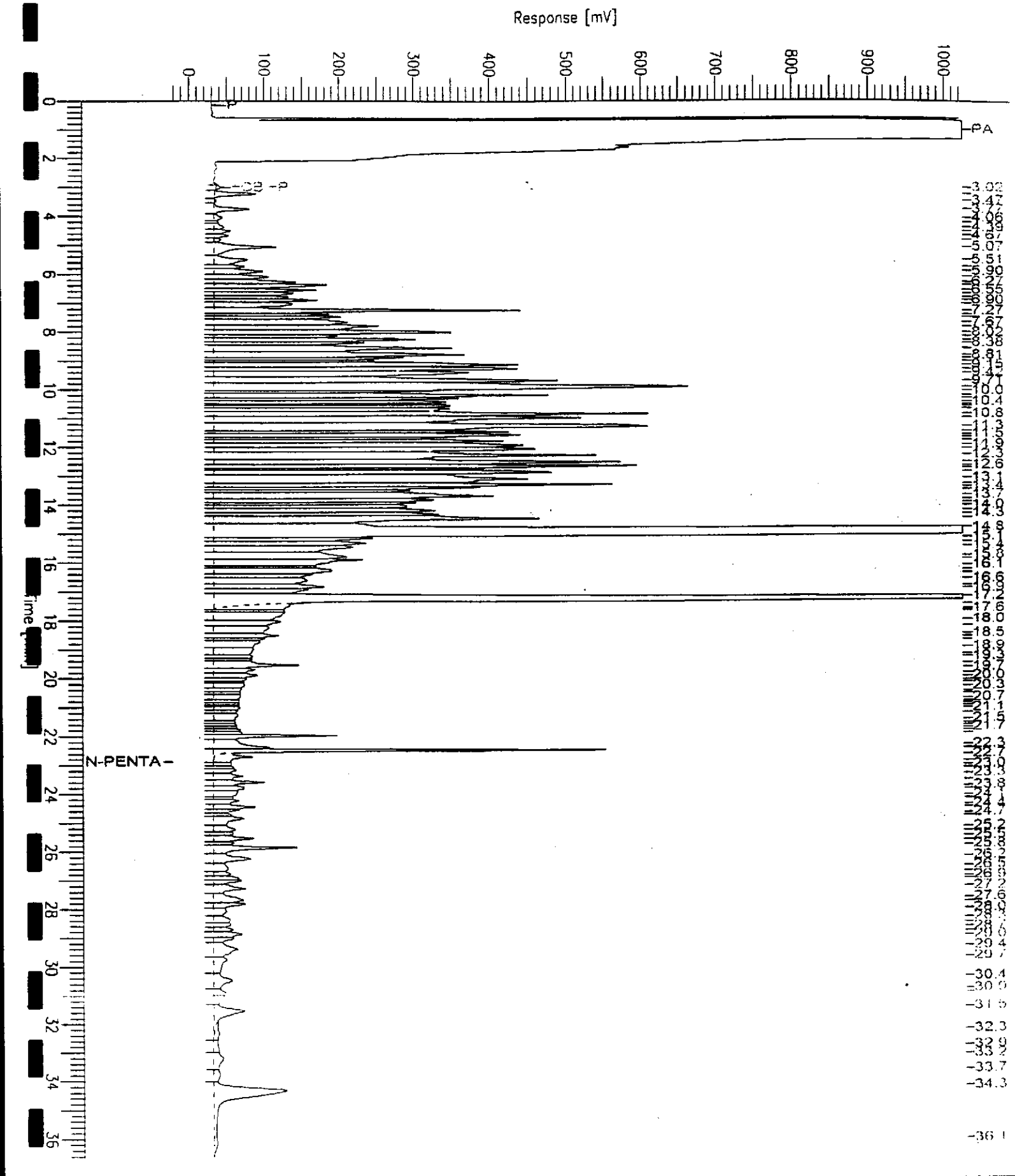
Sample #: HLA Page 1 of 1
Date : 11/23/99 09:55 AM
Time of Injection: 11/22/99 09:39 PM
Low Point : 0.00 mV High Point : 350.00 mV
Plot Scale: 350.0 mV



Chromatogram

ple Name : W911306-07
leName : J:\HP3DATA\3BNV407.RAW
thod :
art Time : 0.00 min End Time : 36.65 min
ale Factor: 0.0 Plot Offset: -22 mV

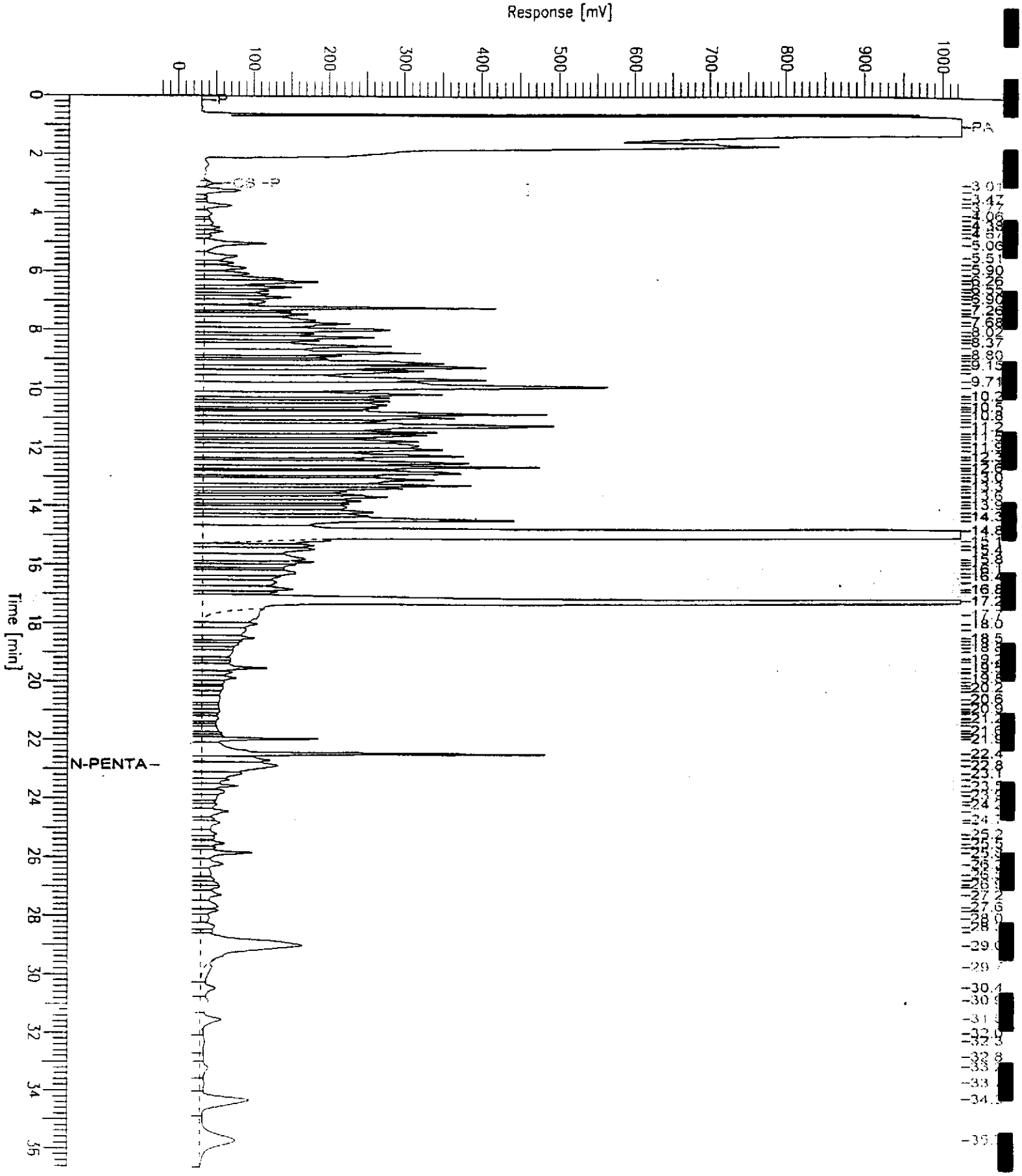
Sample #: HLA Page 1 of 1
Date : 11/24/99 05:42 PM
Time of Injection: 11/22/99 10:23 PM
Low Point : -22.32 mV High Point : 1024.00 mV
Plot Scale: 1046.3 mV



Chromatogram

ame : W911306-08
e : J:\HP3DATA\3BNV408.RAW
:
Time : 0.00 min End Time : 36.65 min
le Factor: 0.0 Plot Offset: -22 mV

Sample #: HLA Page 1 of 1
Date : 11/24/99 05:42 PM
Time of Injection: 11/22/99 11:07 PM
Low Point : -22.33 mV High Point : 1024.00 mV
Plot Scale: 1046.3 mV



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

CHAIN OF CUSTODY FORM VV311506

N: 6413

Lab: Sequoia

Samplers: Heather Lee

Job Number: 43145.4

Name/Location: Port of Oakland - ORC Injection

Project Manager: Jim McCarty

Recorder: Heather Lee (Signature Required)

SOURCE CODE	MATRIX: Water	Sediment	Soil	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
	X				3		1	5		9	9	45 MW-8	9	1	1	1700	01 A~I
	X				3		1	5		9	9	45 MW-7	9	1	1	0825	02
	X				3		1	5		9	9	45 MW-6	9	1	1	0853	03
	X				3		1	5		9	9	45 MW-5	9	1	1	0922	04
	X				3		1	5		9	9	45 MW-2	9	1	1	0948	05
	X				3		1	5		9	9	45 MW-1	9	1	1	1024	06
	X				3		1	5		9	9	45 MW-4	9	1	1	1045	07
	X				3		1	5		9	9	45 MW-D	9	1	1	1100	08
	X							5		9	9	45 MW-3	9	1	1	1135	09 A~I

ANALYSIS REQUESTED

EPA 8010 Purgeable Hydrocarbons	EPA 8020	EPA 8260	EPA 8270	METALS	EPA 8015M/TPHG	EPA 8020/BTEX/MTBE	EPA 8015M/TPHd,o TPH mo, TPHj(A)	TOC (EPA 415.1)	Nitrate	Sulfate	Orthophosphate	Ferric Iron	Ferrous Iron
X					X	X	X	X	X	X	X	X	X
X					X	X	X	X	X	X	X	X	X
X					X	X	X	X	X	X	X	X	X
X					X	X	X	X	X	X	X	X	X
X					X	X	X	X	X	X	X	X	X
X					X	X	X	X	X	X	X	X	X
X					X	X	X	X	X	X	X	X	X
X					X	X	X	X	X	X	X	X	X
X					X	X		X					

LAB NUMBER: Yr	Wk	Seq	DEPTH IN FEET	COL MTD CD	QA CODE

MISCELLANEOUS

* 24 hr hold time

TPHmo, TPHd, TPHj(A) w/ silica gel cleanup

Standard TAT

CHAIN OF CUSTODY RECORD

RELINQUISHED BY: (Signature) Heather Lee	RECEIVED BY: (Signature) Will H	DATE/TIME 11/11/99 14:50
RELINQUISHED BY: (Signature) Will H 11/11/99 15:25	RECEIVED BY: (Signature) [illegible] (HLA)	DATE/TIME 11/11 15:35
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)	DATE/TIME

METHOD OF SHIPMENT

SAMPLE CONDITION WHEN RECEIVED BY THE LABORATORY

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