Harding Lawson Associates

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1600 63rd Street Associates, Inc.
c/o Wareham Property Group
1120 Nye Street, Suite 400
San Rafael, California 94901

Attention: Mr. Dan Nourse

Gentlemen:

Fourth Quarter Groundwater Monitoring
1600 63rd Street
Emeryville, California

This report presents the results of the fourth quarter groundwater monitoring conducted by Harding Lawson Associates (HLA) at 1600 63rd Street, Emeryville, California. HLA installed five groundwater monitoring wells at this site (Plate 1) in May and June 1989. The results of initial groundwater sampling and analyses, evaluation of water-level measurements, and a summary of investigations and remediation performed at the site by HLA and others are presented in HLA's October 2, 1989, report, *Groundwater Quality Investigation, 1600 63rd Street, Emeryville, California.* Details of the investigations and remediations conducted prior to HLA's involvement were presented in a report prepared by Engineering Science (ES), Berkeley, California, dated December 1988.

In the October 2, 1989, report, HLA recommended that groundwater monitoring continue at the site for one year to document the distribution of chemicals in the groundwater. The monitoring program comprises quarterly water-level and product thickness (if present) measurements, groundwater sampling, and chemical analyses for a suite of analytes. This report presents the results of the fourth and last sampling conducted during the first year of quarterly sampling at the site.

FIELD INVESTIGATION

Fourth quarter monitoring was conducted on March 20, 1990. Additionally, because concentrations of some of the chemicals in the groundwater sample collected from Well MW-2 on that date had increased from those detected previously, Well MW-2 was sampled on May 11, 1990. Split groundwater samples were collected from Well MW-2 to evaluate the results found during the March 1990 sampling round. The

field investigation was performed in accordance with the procedures and recommendations outlined in HLA's October 1989 report.

On March 20, 1990, an electronic oil-water interface probe was used to measure groundwater levels and product thickness, if encountered, in the monitoring wells. The groundwater surface in each well was also visually inspected for the presence of floating product by carefully lowering a clear Lucite bailer into the well, removing it, and observing the water/product in the bailer. On May 11, 1990, the presence of floating product in Well MW-2 was again evaluated by lowering a Lucite bailer into the well as previously described.

After water levels were measured, the wells were purged using a PVC bailer. Measurements of pH, conductivity, turbidity, and temperature were collected during well purging. Wells MW-1 and MW-2 were purged of approximately three well casing volumes. Well MW-1 was purged of approximately 25 gallons; Well MW-2 was purged of approximately 27 gallons on March 20, 1990, and of approximately 30 gallons on May 11, 1990. Wells MW-3, MW-4 and MW-5 were purged of approximately 19, 25 and 33 gallons of water, respectively (approximately 1.4 to 1.8 well casing volumes), at which time the wells were evacuated. Wells MW-3, MW-4, and MW-5 were allowed to recover approximately 3, 1.75 and 0.5 hours, respectively, until the water levels had risen to within 97 percent, 92 percent and 89 percent, respectively, of the initial water level. All purged water was placed in 55-gallon steel drums and stored onsite in a secured steel containment structure.

Immediately following purging, groundwater samples were collected from the wells using a clean stainless steel bailer and decanted into laboratory-prepared bottles. The sample bottles were labeled, placed in a refrigerated environment, and transported under chain of custody to the analytical laboratories.

All water-level measurement and sampling equipment was decontaminated prior to use. The water-level measurement equipment was decontaminated by washing with a low-phosphorous soap and water mixture then double rinsing with tap water. The sampling equipment had been steam cleaned at HLA and wrapped in clean plastic before being transported to the site. Sufficient equipment was provided so that decontaminating the sampling equipment at the site was not required.

GROUNDWATER GRADIENT AND FLOW DIRECTION

Groundwater elevations and product thicknesses measured throughout this investigation are presented in Table 1. The water-level elevations in the wells have risen between 0.22 and 0.56 foot since the previous monitoring on December 20, 1989. The change in water-level elevations may represent a typical seasonal fluctuation of the water table.

Review of water-level elevations measured during the March 1990 sampling round indicates that groundwater flows onto the site from the east. Groundwater flow diverges in the central area of the site and discharges from the site toward the west, northwest, and southwest. The groundwater gradient throughout the site on March 20, 1990 was 0.013. The groundwater flow direction and gradient are generally consistent with those calculated throughout this investigation.

No product was measured in the wells during sampling on March 20, 1990; however, a sheen was observed on the water surface in Well MW-2. During resampling of Well MW-2, a product thickness of about 0.01 foot was measured inside the bailer.

LABORATORY ANALYSIS AND RESULTS

The groundwater samples collected on March 20, 1990, were analyzed by Curtis & Tompkins, Ltd. (C&T), Berkeley, California, a California-certified laboratory. The samples were analyzed for total petroleum hydrocarbons (TPH) as gasoline, kerosene, and diesel using the analytical methods described in the Regional Water Quality Control Board's *Leaking Underground Fuel Tank* (LUFT) *Field Manual*, dated October 1989; for volatile organics using Environmental Protection Agency (EPA) Test Method 8240; for organochlorine pesticides and polychlorinated biphenyls (PCBs) using EPA Test Method 8080; for base/neutral and acid extractable organics using EPA Test Method 8270; and for the priority pollutant metals using EPA Test Methods 6010, 7470, and 7841. The split groundwater samples collected from Well MW-2 on May 11, 1990, were submitted to both C&T and Enseco, Inc., of Sacramento, California. Both laboratories are California-certified for the analyses performed. The samples were analyzed for TPH as gasoline, kerosene, and diesel using the LUFT methodology and for volatile organics using EPA Test Method 8240. In addition, Enseco analyzed the samples for TPH as Stoddard solvent, aviation fuel, and unknown hydrocarbons.

Analytical results for selected analyses performed during this sampling round and the previous quarterly sampling events are summarized in Table 2; data for those analytes which have been detected are included. Copies of the laboratory reports and chain of custody forms for this sampling round are included in the attachment.

Results of Analyses for Organic Compounds

No detectable concentrations of volatile organics, TPH as gasoline, diesel, or kerosene, organochlorine pesticides or PCBs, or base/neutral and acid extractable organics were reported in the samples collected from all wells, except Well MW-2 during this sampling round. The sample collected from Well MW-2 on March 20, 1990, contained acetone at 0.044 parts per million (ppm); TPH as gasoline and diesel at 0.42 and 49 ppm, respectively; gamma-BHC (Lindane) at 0.00035 ppm; fluorene at 0.0061 ppm;

2-methylnaphthalene at 0.018 ppm; and phenanthrene at 0.0055 ppm. No other organic constituents were detected in the sample from Well MW-2.

A trip blank sample was collected and analyzed for volatile organics (EPA Test Method 8240), as a quality control check. No volatile organics were detected in this sample.

As previously mentioned, split groundwater samples were collected from Well MW-2 on May 11, 1990, to evaluate the acetone and TPH concentrations found during the fourth quarter sampling round. Acetone was not detected by either laboratory; however, several tentatively identified compounds were observed using EPA Test Method 8240. Enseco identified 8 organic compounds with estimated concentrations ranging from 0.140 to 0.270 ppm (Attachment). According to John Goyette of C&T, 12 tentatively identified compounds were observed by C & T; however, the compounds were not included in the laboratory report because the certainty of their identification was less than 80 percent.

TPH was detected by both laboratories. TPH as gasoline, kerosene, Stoddard solvent, aviation fuel, and diesel were not detected by Enseco. However, Enseco did report 15 ppm of an unknown hydrocarbon in about the C-7 to C-23 carbon range. C&T reported the petroleum hydrocarbons detected as 1.2 ppm of TPH as gasoline and 8.4 ppm of TPH in the diesel range. According to Mr. Goyette and the "case narrative" included in C&T's laboratory report, the gas chromatograph patterns for these petroleum hydrocarbons did not match the gasoline or diesel standards; the TPH reported as gasoline was in the C-5 to C-10 carbon range and the TPH reported as diesel was in the C-12 to C-26 carbon range. The TPH results reported by both laboratories are similar and may represent a mixture of petroleum hydrocarbons or weathered petroleum hydrocarbons.

Results of Analyses for Metals

Four priority pollutant metals were detected in the groundwater samples collected during the fourth quarter sampling round. Barium and zinc were detected in the samples collected from all the wells at concentrations ranging from 0.038 to 0.21 ppm. Nickel was detected in the sample collected from Well MW-1 at a concentration of 0.082 ppm and arsenic was detected in the sample from Well MW-2 at the detection limit (0.05 ppm). No other metals were detected during the fourth quarter sampling round.

DISCUSSION AND CONCLUSION

This section summarizes and discusses the results of the four quarters of groundwater monitoring conducted to date.

Organic Compounds

No organic compounds have been detected in Wells MW-3 and MW-4. Only two organic compounds have been detected in Wells MW-1 and MW-5. Endrin aldehyde and PCB 1260 were found in the groundwater samples collected from Wells MW-1 and MW-5 during the second quarter sampling round. However, these chemicals have not been detected during subsequent sampling rounds. Several organic compounds have been found in the groundwater samples from Well MW-2. TPH concentrations have increased since the third quarter sampling round. The TPH concentrations detected prior to the fourth quarter sampling round ranged from 0.3 to 2.2 ppm. Up to 49 ppm of TPH was reported during the fourth quarter. The concentration of 2-methylnaphthalene in Well MW-2 has increased slightly from not detected during the initial sampling round to 0.018 ppm in the fourth sampling round.

A concentration of 0.044 ppm of acetone was detected in the groundwater sample collected from Well MW-2 on March 20, 1990. As indicated in the 1988 ES report, acetone had been detected in groundwater samples collected from the onsite water well which is now abandoned. However, because acetone is a common laboratory contaminant and was detected only once previously, it is likely that the sample collected from Well MW-2 on March 20, 1990, was contaminated in the laboratory.

Gamma-BHC, which is an organochlorine pesticide, was found in Well MW-2 at a concentration of 0.00035 ppm during the fourth quarter sampling round. This concentration is below California Department of Health Services (DHS) drinking water action level of 0.004 ppm. Prior to the fourth quarter, gamma-BHC was not detected at a detection limit of 0.00005 ppm. The 1988 ES report indicates that gamma-BHC was not detected during the investigations performed prior to HLA's involvement.

Concentrations of fluorene, bis(2-ethylhexyl)phthalate, and phenanthrene in Well MW-2 have ranged from not detected to slightly above the laboratory's detection limits. Heptachlor and 4,4'-DDD were detected in Well MW-2 during the second quarterly sampling round; however, they were not detected during the subsequent or previous sampling rounds.

HLA's October 2, 1989 report identified several industries or facilities upgradient that have the potential to impact the groundwater at the site. According to Mr. Dennis Byrne of the Alameda County Department of Health, an underground fuel tank at the Liquid Sugar Company recently failed a precision test; however, no subsurface investigation has been performed.

Metals

In general, only barium and zinc have been consistently found in the groundwater samples from all wells. Barium concentrations have been similar throughout the sampling period and zinc concentrations have increased slightly or have generally been consistent. Nickel concentrations in the samples from Well MW-1 have decreased slightly; arsenic concentrations in the samples from Well MW-2 have been relatively consistent. Molybdenum, copper, cadmium, and thallium concentrations have ranged from not detected to slightly above the laboratory's detection limits.

Except for arsenic and cadmium, all of the metals concentrations detected are below the drinking water action levels established by the DHS or EPA. The EPA maximum contaminant levels for arsenic and cadmium are 0.050 and 0.010 ppm, respectively. Arsenic was detected once above its action level in Well MW-5 and cadmium was detected above its action level once each in Wells MW-1 and MW-3. Well MW-3 appears to be the most upgradient well; therefore, concentrations found in this well may represent background concentrations.

ADDITIONAL MONITORING

Because the TPH concentrations increased significantly in Well MW-2 during the fourth quarter sampling round and gamma-BHC was detected, groundwater monitoring will be performed quarterly for an additional year. The purpose of the additional sampling will be to monitor the chemicals found in the groundwater to evaluate whether the chemicals are migrating from the offsite area and to evaluate whether remediation of the groundwater is necessary. The groundwater samples will be analyzed for TPH as gasoline, kerosene, and diesel (using LUFT methodology); for benzene, toluene, ethylbenzene, and xylenes using EPA Test Method 602; and for organochlorine pesticides using EPA Test Method 8080. Because the priority pollutant metals and the other EPA Test Methods 8240 and 8270 compounds were either not detected, detected below established drinking water action levels, or inconsistently detected, analyses for these compounds are not believed to be necessary at this time.

Prior to sampling each well, the presence of product layer will be evaluated and, if present, measured. For quality control purposes, a field or travel blank sample and/or a duplicate sample will be collected and analyzed during each sampling round. After each sampling round, a written report presenting the results will be prepared and submitted to the regulatory agencies.

The next quarterly water-quality monitoring round was performed on July 20, 1990. A report will be prepared after the chemical data are available. If you have any questions, please call.

Yours very truly,

HARDING LAWSON ASSOCIATES

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cc: Dennis Byrne, Alameda County, Department of Health
Steven Ritchie, California Regional Water Quality Control Board, San Francisco Bay Region

Attachments:
Table 1 - Groundwater Elevations
Table 2 - Results of Groundwater Analyses
Plate 1 - Site Map
Laboratory Reports and Chain of Custody Form

TABLE 1. Groundwater Elevations
1600 63rd Street, Emeryville

WELL	TOP OF CASING ELEVATION (FT Above MSL)	DATE MEASURED	DEPTH TO PRODUCT FROM TOP OF CASING (FT)	DEPTH TO WATER FROM TOP OF CASING (FT)	PRODUCT THICKNESS (FT)	PRODUCT LEVEL ELEVATION (FT)	WATER LEVEL-ELEVATION, CORR. FOR PRODUCT (FT)	CHANGE IN WATER-LEVEL ELEVATION * (FT)	NOTES
MW-1	15.12	03-Aug-89	NO PRODUCT	5.99	0.00	NO PRODUCT	9.13		
	15.12	21-Sep-89	NO PRODUCT	5.81	0.00	NO PRODUCT	9.31	9.31	
	15.12	20-Oct-89	NO PRODUCT	6.24	0.00	NO PRODUCT	8.88	8.88	
	15.12	20-Dec-89	NO PRODUCT	6.09	0.00	NO PRODUCT	9.03	9.03	
	15.12	20-Mar-90	NO PRODUCT	5.87	0.00	NO PRODUCT	9.25	9.25	
MW-2	14.43	03-Aug-89	NO PRODUCT	6.66	0.00	NO PRODUCT	7.77		
	14.43	21-Sep-89	NO PRODUCT	6.32	0.00	NO PRODUCT	8.11	-1.20	
	14.43	20-Oct-89	NO PRODUCT	6.78	0.00	NO PRODUCT	7.65	-1.23	
	14.43	20-Dec-89	NO PRODUCT	7.32	0.00	NO PRODUCT	7.11	-1.92	
	14.43	20-Mar-90	NO PRODUCT	6.76	0.00	NO PRODUCT	7.67	-1.58	
	14.43	11-May-90	6.66	6.65	0.01	7.77	7.78	0.11	
MW-3	15.90	03-Aug-89	NO PRODUCT	4.06	0.00	NO PRODUCT	11.84		
	15.90	21-Sep-89	NO PRODUCT	3.77	0.00	NO PRODUCT	12.13	4.48	
	15.90	20-Oct-89	NO PRODUCT	4.49	0.00	NO PRODUCT	11.41	4.30	
	15.90	20-Dec-89	NO PRODUCT	4.32	0.00	NO PRODUCT	11.58	3.91	
	15.90	20-Mar-90	NO PRODUCT	3.78	0.00	NO PRODUCT	12.12	4.34	
MW-4	14.04	03-Aug-89	NO PRODUCT	7.10	0.00	NO PRODUCT	6.94		
	14.04	21-Sep-89	NO PRODUCT	6.90	0.00	NO PRODUCT	7.14	-4.99	
	14.04	20-Oct-89	NO PRODUCT	6.95	0.00	NO PRODUCT	7.09	-4.32	
	14.04	20-Dec-89	NO PRODUCT	7.24	0.00	NO PRODUCT	6.80	-4.78	
	14.04	20-Mar-90	NO PRODUCT	6.94	0.00	NO PRODUCT	7.10	-5.02	
MW-5	15.21	03-Aug-89	NO PRODUCT	4.35	0.00	NO PRODUCT	10.86		
	15.21	21-Sep-89	NO PRODUCT	4.38	0.00	NO PRODUCT	10.83	3.69	
	15.21	20-Oct-89	NO PRODUCT	4.37	0.00	NO PRODUCT	10.84	3.75	
	15.21	20-Dec-89	NO PRODUCT	4.48	0.00	NO PRODUCT	10.73	3.93	
	15.21	20-Mar-90	NO PRODUCT	4.07	0.00	NO PRODUCT	11.14	4.04	

* Change from previous measurement. Negative sign denotes decrease in water level.

Table 2. Results of Groundwater Analyses
1600 63rd Street, Emeryville
Concentrations in mg/l (ppm)

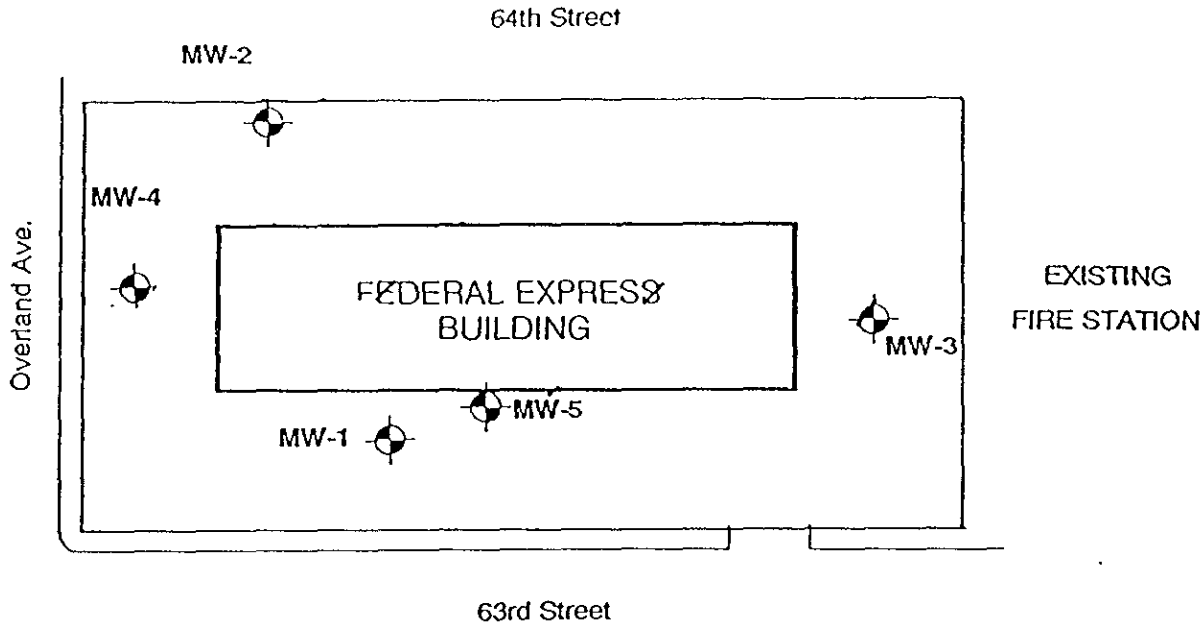
Well	Sampling Date	Sampling Event	Acetone EPA 8240	Benzene EPA 8240	Toluene EPA 8240	Ethyl-benzene EPA 8240	Xylenes EPA 8240	TPH (gasoline) EPA 8015/ 3510-5030	TPH (diesel) EPA 8015/ 3510	TPH (kerosene) EPA 8015/ 3510	Barium EPA 6010	Copper EPA 6010	Nickel EPA 6010	Zinc EPA 6010	Molybdenum EPA 6010
MW-1	18-Jun-89	INITIAL SAMPLING	<0.01	<0.001	<0.001	<0.001	<0.001	<0.5	<0.5	<0.5	0.13	0.01	0.08	0.06	<0.01
	21-Sep-89	2ND QTR SAMPLING	<0.01	<0.005	<0.005	<0.005	<0.005	<0.5	<0.5	<0.5	0.15	<0.01	0.10	0.03	<0.01
	20-Dec-89	3RD QTR SAMPLING	<0.01	<0.005	<0.005	<0.005	<0.005	<0.05	<0.5	<0.5	0.19	<0.02	0.11	<0.01	<0.01
	20-Mar-90	4TH QTR SAMPLING	<0.01	<0.005	<0.005	<0.005	<0.005	<0.05	<0.5	<0.5	0.16	<0.02	0.082	0.038	<0.01
MW-2	25-Jun-89	INITIAL SAMPLING	<0.01	<0.005	<0.005	<0.005	<0.005	0.3	<0.5	<0.5	0.12	<0.01	<0.01	0.07	<0.01
	21-Sep-89	2ND QTR SAMPLING	<0.01	<0.005	<0.005	<0.005	<0.005	<0.5	1.0	<0.5	0.16	<0.01	<0.01	0.05	0.02
	20-Dec-89	3RD QTR SAMPLING	<0.01	<0.005	<0.005	<0.005	<0.005	0.53	<0.5	2.2	0.17	<0.02	<0.01	0.01	0.01
	20-Mar-90	4TH QTR SAMPLING	0.044	<0.005	<0.005	<0.005	<0.005	0.42	49	<1.0	0.21	<0.02	<0.01	0.081	<0.01
	11-May-90	RESAMPLING(C&T)	<0.01	<0.005	<0.005	<0.005	<0.005	1.2	8.4	<0.5	NT	NT	NT	NT	NT
	11-May-90	RESAMPLING(Enseco) *	<0.02	<0.01	<0.01	<0.01	<0.01	<0.05	<2.5	<2.5	NT	NT	NT	NT	NT
MW-3	18-Jun-89	INITIAL SAMPLING	<0.01	<0.001	<0.001	<0.001	<0.001	<0.5	<0.5	<0.5	0.06	0.01	<0.01	0.07	<0.01
	21-Sep-89	2ND QTR SAMPLING	<0.01	<0.005	<0.005	<0.005	<0.005	<0.5	<0.5	<0.5	0.06	<0.01	<0.01	0.05	<0.01
	20-Dec-89	3RD QTR SAMPLING	<0.01	<0.005	<0.005	<0.005	<0.005	<0.05	<0.5	<0.5	0.06	<0.02	<0.01	<0.01	<0.01
	20-Mar-90	4TH QTR SAMPLING	<0.01	<0.005	<0.005	<0.005	<0.005	<0.05	<0.5	<0.5	0.053	<0.02	<0.01	0.18	<0.01
MW-4	25-Jun-89	INITIAL SAMPLING	<0.01	<0.005	<0.005	<0.005	<0.005	<0.05	<0.5	<0.5	0.17	0.02	<0.01	0.10	<0.01
	21-Sep-89	2ND QTR SAMPLING	<0.01	<0.005	<0.005	<0.005	<0.005	<0.5	<0.5	<0.5	0.19	0.01	0.01	0.04	<0.01
	20-Dec-89	3RD QTR SAMPLING	<0.01	<0.005	<0.005	<0.005	<0.005	<0.05	<0.5	<0.5	0.20	<0.02	<0.01	<0.01	<0.01
	20-Mar-90	4TH QTR SAMPLING	<0.01	<0.005	<0.005	<0.005	<0.005	<0.05	<0.5	<0.5	0.18	<0.02	<0.01	0.20	<0.01
MW-5	30-Jun-89	INITIAL SAMPLING	<0.01	<0.005	<0.005	<0.005	<0.005	<0.05	<0.5	<0.5	NT	<0.01	<0.01	0.09	NT
	21-Sep-89	2ND QTR SAMPLING	<0.01	<0.005	<0.005	<0.005	<0.005	<0.5	<0.5	<0.5	0.15	<0.01	<0.01	0.05	<0.01
	20-Dec-89	3RD QTR SAMPLING	<0.01	<0.005	<0.005	<0.005	<0.005	<0.05	<0.5	<0.5	0.21	<0.02	<0.01	0.02	<0.01
	20-Mar-90	4TH QTR SAMPLING	<0.01	<0.005	<0.005	<0.005	<0.005	<0.05	<0.5	<0.5	0.20	<0.02	<0.01	0.077	<0.01
FB	30-Jun-89	INITIAL SAMPLING	<0.01	<0.005	<0.005	<0.005	<0.005	<0.05	<0.5	<0.5	NT	<0.01	<0.01	<0.01	NT
FB	21-Sep-89	2ND QTR SAMPLING	<0.01	<0.005	<0.005	<0.005	<0.005	<0.5	<0.5	<0.5	<0.01	<0.01	<0.01	<0.01	<0.01
MW-4DUP	20-Dec-89	3RD QTR SAMPLING	<0.01	<0.005	<0.005	<0.005	<0.005	NT	NT	NT	NT	NT	NT	NT	NT
TB	20-Mar-90	4TH QTR SAMPLING	<0.01	<0.005	<0.005	<0.005	<0.005	NT	NT	NT	NT	NT	NT	NT	NT

NOTES:
All unlisted 8080, 8240 and 8270 analytes not detected.
All unlisted Priority Pollutant metals analytes not detected.
NT = Not tested
FB = Field Blank
DUP= Duplicate
TB = Trip Blank
* Sample contained 15 ppm of unknown hydrocarbons in about the C-7 to C-23 carbon range and 8 tentatively identified organic compounds, see laboratory report in the attachment.

Table 2. Results of Groundwater Analyses
1600 63rd Street, Emeryville
Concentrations in mg/l (ppm)

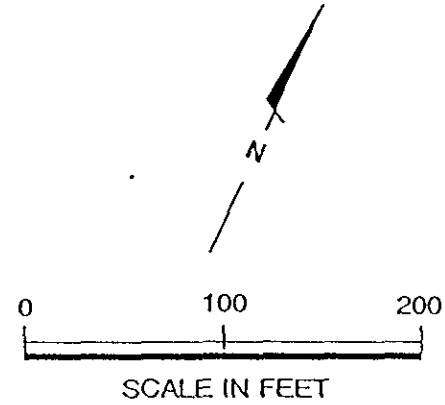
Well	Sampling Date	Sampling Event	Arsenic EPA 6010	Cadmium EPA 6010	Thallium EPA 7841	Endrin Aldehyde EPA 8080	PCB 1260 EPA 8080	Heptachlor EPA 8080	4,4'-DDD EPA 8080	Gamma-BHC EPA 8080	Fluorene EPA 8270	Bis (2-ethyl-hexyl) phthalate EPA 8270	2-Methyl-naphthalene EPA 8270	Phen-anthrene EPA 8270
MW-1	18-Jun-89	INITIAL SAMPLING	<0.10	<0.01	<0.01	NT	NT	NT	NT	<0.00005	<0.005	<0.005	<0.005	<0.005
	21-Sep-89	2ND QTR SAMPLING	<0.05	0.03	<0.10	0.00010	0.00050	<0.00005	<0.00005	<0.00005	<0.005	<0.005	<0.005	<0.005
	20-Dec-89	3RD QTR SAMPLING	<0.05	<0.01	<0.10	<0.00005	<0.0005	<0.00005	<0.00005	<0.00005	<0.005	<0.005	<0.005	<0.005
	20-Mar-90	4TH QTR SAMPLING	<0.05	<0.01	<0.01	<0.00005	<0.0005	<0.00005	<0.00005	<0.00005	<0.005	<0.005	<0.005	<0.005
MW-2	25-Jun-89	INITIAL SAMPLING	<0.10	<0.01	<0.10	NT	<0.0005	<0.00005	NT	<0.00005	trace	<0.005	<0.005	<0.005
	21-Sep-89	2ND QTR SAMPLING	<0.05	<0.01	<0.10	<0.00005	<0.0005	0.00016	0.00015	<0.00005	0.006	0.005	0.0061	<0.005
	20-Dec-89	3RD QTR SAMPLING	0.05	<0.01	0.11	<0.00005	<0.0005	<0.00005	<0.00005	<0.00005	<0.005	<0.005	0.012	<0.005
	20-Mar-90	4TH QTR SAMPLING	0.05	<0.01	<0.01	<0.00005	<0.0005	<0.00005	<0.00005	0.00035	0.0061	<0.005	0.018	0.0055
	11-May-90	RESAMPLING(C&T)	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
	11-May-90	RESAMPLING(Enseco) *	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
MW-3	18-Jun-89	INITIAL SAMPLING	<0.10	<0.01	<0.10	NT	NT	NT	NT	<0.00005	<0.005	<0.005	<0.005	<0.005
	21-Sep-89	2ND QTR SAMPLING	<0.05	0.03	<0.05	<0.00005	<0.0005	<0.00005	<0.00005	<0.00005	<0.005	<0.005	<0.005	<0.005
	20-Dec-89	3RD QTR SAMPLING	<0.05	<0.01	<0.10	<0.00005	<0.0005	<0.00005	<0.00005	<0.00005	<0.005	<0.005	<0.005	<0.005
	20-Mar-90	4TH QTR SAMPLING	<0.05	<0.01	<0.01	<0.00005	<0.0005	<0.00005	<0.00005	<0.00005	<0.005	<0.005	<0.005	<0.005
MW-4	25-Jun-89	INITIAL SAMPLING	<0.10	<0.01	<0.10	NT	<0.0005	<0.00005	NT	<0.00005	<0.005	<0.005	<0.005	<0.005
	21-Sep-89	2ND QTR SAMPLING	<0.05	<0.01	<0.05	<0.00005	<0.0005	<0.00005	<0.00005	<0.00005	<0.005	<0.005	<0.005	<0.005
	20-Dec-89	3RD QTR SAMPLING	<0.05	<0.01	<0.10	<0.00005	<0.0005	<0.00005	<0.00005	<0.00005	<0.005	<0.005	<0.005	<0.005
	20-Mar-90	4TH QTR SAMPLING	<0.05	<0.01	<0.01	<0.00005	<0.0005	<0.00005	<0.00005	<0.00005	<0.005	<0.005	<0.005	<0.005
MW-5	30-Jun-89	INITIAL SAMPLING	<0.10	<0.01	<0.1	NT	NT	NT	NT	<0.00005	<0.005	<0.005	<0.005	<0.005
	21-Sep-89	2ND QTR SAMPLING	0.1	<0.01	<0.05	0.00015	0.00090	<0.00005	<0.00005	<0.00005	<0.005	<0.005	<0.005	<0.005
	20-Dec-89	3RD QTR SAMPLING	<0.05	<0.01	<0.10	<0.00005	<0.0005	<0.00005	<0.00005	<0.00005	<0.005	<0.005	<0.005	<0.005
	20-Mar-90	4TH QTR SAMPLING	<0.05	<0.01	<0.01	<0.00005	<0.0005	<0.00005	<0.00005	<0.00005	<0.005	<0.005	<0.005	<0.005
FB	30-Jun-89	INITIAL SAMPLING	<0.10	<0.01	NT	NT	NT	NT	NT	NT	<0.005	<0.005	<0.005	<0.005
FB	21-Sep-89	2ND QTR SAMPLING	<0.05	<0.01	<0.05	<0.00005	<0.00050	<0.00005	<0.00005	<0.00005	<0.005	<0.005	<0.005	<0.005
MW-4DUP	20-Dec-89	3RD QTR SAMPLING	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
TB	20-Mar-90	4TH QTR SAMPLING	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT

14011



EXPLANATION

MW-1 Monitoring Well



Harding Lawson Associates
Engineering and
Environmental Services

Site Plan
1600 63rd Street Association
Emeryville, California

PLATE
1

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
EH	18452,020.02		8/89	

ATTACHMENT

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

DATE RECEIVED: 03/20/90
DATE REPORTED: 04/02/90

LAB NUMBER: 19948

CLIENT: HARDING LAWSON ASSOCIATES

REPORT ON: 6 WATER SAMPLES

PROJECT #: 18452,016.02
LOCATION: WAREHAM

RESULTS: SEE ATTACHED

QA/QC Approval

Final Approval

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 19948
CLIENT: HARDING LAWSON ASSOCIATES
JOB #: 18452,016.02
LOCATION: WAREHAM

DATE RECEIVED: 03/20/90
DATE EXTRACTED: 03/28/90
DATE ANALYZED: 03/30/90
DATE REPORTED: 04/02/90

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

LAB ID	CLIENT ID	KEROSENE RANGE (mg/L)	DIESEL RANGE (mg/L)	REPORTING LIMIT (mg/L)
19948-1	90122001 mw-3	ND	ND	0.50
19948-2	90122002 mw-2	ND	49	1.0
19948-3	90122003 mw-4	ND	ND	0.50
19948-5	90122005 mw-1	ND	ND	0.50
19948-6	90122006 mw-5	ND	ND	0.50

ND = Not Detected at or above reporting limit.

QA/QC SUMMARY

Duplicate: Relative % Difference	4
Spike: % Recovery	94

Curtis & Tompkins, Ltd

LABORATORY NUMBER: 19948
CLIENT: HARDING LAWSON ASSOCIATES
JOB #: 18452,016.02
LOCATION: WAREHAM

DATE RECEIVED: 03/20/90
DATE ANALYZED: 03/29/90
DATE REPORTED: 04/02/90

Total Volatile Hydrocarbons as Gasoline in Aqueous Solutions
California DOHS Method
LUFT Manual October 1989

LAB ID	CLIENT ID		TVH AS GASOLINE (ug/L)	REPORTING LIMIT (ug/L)
19948-1	90122001	mw-3	ND	50
19948-2	90122002	mw-2	420	50
19948-3	90122003	mw-4	ND	50
19948-5	90122005	mw-1	ND	50
19948-6	90122006	mw-5	ND	50

ND = Not Detected.

QA/QC SUMMARY

RPD,%	4
Spike, % Recovery	84

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 19948-1
CLIENT: HARDING LAWSON ASSOCIATES
JOB #: 18452,016.02
LOCATION: WAREHAM
SAMPLE ID: 90122001 mw-3

DATE RECEIVED: 03/20/90
DATE ANALYZED: 03/22/90
DATE REPORTED: 04/02/90

Title 26 Metals in Aqueous Solutions

METAL	RESULT mg/L	DETECTION LIMIT mg/L	METHOD
Antimony	ND	0.10	EPA 6010
Arsenic	ND	0.050	EPA 6010
Barium	0.053	0.010	EPA 6010
Beryllium	ND	0.010	EPA 6010
Cadmium	ND	0.010	EPA 6010
Chromium (total)	ND	0.010	EPA 6010
Cobalt	ND	0.010	EPA 6010
Copper	ND	0.020	EPA 6010
Lead	ND	0.050	EPA 6010
Mercury	ND	0.0010	EPA 7470
Molybdenum	ND	0.010	EPA 6010
Nickel	ND	0.010	EPA 6010
Selenium	ND	0.050	EPA 6010
Silver	ND	0.020	EPA 6010
Thallium	ND	0.010	EPA 7841
Vanadium	ND	0.020	EPA 6010
Zinc	0.18	0.010	EPA 6010

ND = Not Detected

QA/QC SUMMARY

	RPD,%	RECOVERY,%		RPD,%	RECOVERY,%
Antimony	5	102	Mercury	<1	78
Arsenic	8	113	Molybdenum	<1	94
Barium	1	108	Nickel	<1	111
Beryllium	3	118	Selenium	1	93
Cadmium	<1	95	Silver	<1	86
Chromium	3	110	Thallium	15	83
Cobalt	<1	109	Vanadium	15	110
Copper	5	110	Zinc	3	96
Lead	9	96			

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 19948-2
CLIENT: HARDING LAWSON ASSOCIATES
JOB #: 18452,016.02
LOCATION: WAREHAM
SAMPLE ID: 90122002 mw-2

DATE RECEIVED: 03/20/90
DATE ANALYZED: 03/22/90
DATE REPORTED: 04/02/90

Title 26 Metals in Aqueous Solutions

METAL	RESULT mg/L	DETECTION LIMIT mg/L	METHOD
Antimony	ND	0.10	EPA 6010
Arsenic	ND	0.050	EPA 7060
Barium	0.21	0.010	EPA 6010
Beryllium	ND	0.010	EPA 6010
Cadmium	ND	0.010	EPA 6010
Chromium (total)	ND	0.010	EPA 6010
Cobalt	ND	0.010	EPA 6010
Copper	ND	0.020	EPA 6010
Lead	ND	0.050	EPA 6010
Mercury	ND	0.0010	EPA 7470
Molybdenum	ND	0.010	EPA 6010
Nickel	ND	0.010	EPA 6010
Selenium	ND	0.050	EPA 6010
Silver	ND	0.020	EPA 6010
Thallium	ND	0.010	EPA 6010
Vanadium	ND	0.020	EPA 6010
Zinc	0.081	0.010	EPA 6010

ND = Not Detected

QA/QC SUMMARY

	RPD,%	RECOVERY,%		RPD,%	RECOVERY,%
Antimony	5	102	Mercury	<1	78
Arsenic	8	113	Molybdenum	<1	94
Barium	1	108	Nickel	<1	111
Beryllium	3	118	Selenium	1	93
Cadmium	<1	95	Silver	<1	86
Chromium	3	110	Thallium	15	83
Cobalt	<1	109	Vanadium	15	110
Copper	5	110	Zinc	3	96
Lead	9	96			

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 19948-3
CLIENT: HARDING LAWSON ASSOCIATES
JOB #: 18452,016.02
LOCATION: WAREHAM
SAMPLE ID: 90122003 mw-4

DATE RECEIVED: 03/20/90
DATE ANALYZED: 03/22/90
DATE REPORTED: 04/02/90

Title 26 Metals in Aqueous Solutions

METAL	RESULT mg/L	DETECTION LIMIT mg/L	METHOD
Antimony	ND	0.10	EPA 6010
Arsenic	ND	0.050	EPA 6010
Barium	0.18	0.010	EPA 6010
Beryllium	ND	0.010	EPA 6010
Cadmium	ND	0.010	EPA 6010
Chromium (total)	ND	0.010	EPA 6010
Cobalt	ND	0.010	EPA 6010
Copper	ND	0.020	EPA 6010
Lead	ND	0.050	EPA 6010
Mercury	ND	0.0010	EPA 7470
Molybdenum	ND	0.010	EPA 6010
Nickel	ND	0.010	EPA 6010
Selenium	ND	0.050	EPA 6010
Silver	ND	0.020	EPA 6010
Thallium	ND	0.010	EPA 7841
Vanadium	ND	0.020	EPA 6010
Zinc	0.20	0.010	EPA 6010

ND = Not Detected

QA/QC SUMMARY

	RPD,%	RECOVERY,%		RPD,%	RECOVERY,%
Antimony	5	102	Mercury	<1	78
Arsenic	8	113	Molybdenum	<1	94
Barium	1	108	Nickel	<1	111
Beryllium	3	118	Selenium	1	93
Cadmium	<1	95	Silver	<1	86
Chromium	3	110	Thallium	15	83
Cobalt	<1	109	Vanadium	15	110
Copper	5	110	Zinc	3	96
Lead	9	96			

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 19948-5
CLIENT: HARDING LAWSON ASSOCIATES
JOB #: 18452,016.02
LOCATION: WAREHAM
SAMPLE ID: 90122005 mw-1

DATE RECEIVED: 03/20/90
DATE ANALYZED: 03/22/90
DATE REPORTED: 04/02/90

Title 26 Metals in Aqueous Solutions

METAL	RESULT mg/L	DETECTION LIMIT mg/L	METHOD
Antimony	ND	0.10	EPA 6010
Arsenic	ND	0.050	EPA 7060
Barium	0.16	0.010	EPA 6010
Beryllium	ND	0.010	EPA 6010
Cadmium	ND	0.010	EPA 6010
Chromium (total)	ND	0.010	EPA 6010
Cobalt	ND	0.010	EPA 6010
Copper	ND	0.020	EPA 6010
Lead	ND	0.050	EPA 6010
Mercury	ND	0.0010	EPA 7470
Molybdenum	ND	0.010	EPA 6010
Nickel	0.082	0.010	EPA 6010
Selenium	ND	0.050	EPA 6010
Silver	ND	0.020	EPA 6010
Thallium	ND	0.010	EPA 7841
Vanadium	ND	0.020	EPA 6010
Zinc	0.038	0.010	EPA 6010

ND = Not Detected

QA/QC SUMMARY

	RPD,%	RECOVERY,%		RPD,%	RECOVERY,%
Antimony	5	102	Mercury	<1	78
Arsenic	8	113	Molybdenum	<1	94
Barium	1	108	Nickel	<1	111
Beryllium	3	118	Selenium	1	93
Cadmium	<1	95	Silver	<1	86
Chromium	3	110	Thallium	15	83
Cobalt	<1	109	Vanadium	15	110
Copper	5	110	Zinc	3	96
Lead	9	96			

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 19948-6
CLIENT: HARDING LAWSON ASSOCIATES
JOB #: 18452,016.02
LOCATION: WAREHAM
SAMPLE ID: 90122006 mw-5

DATE RECEIVED: 03/20/90
DATE ANALYZED: 03/22/90
DATE REPORTED: 04/02/90

Title 26 Metals in Aqueous Solutions

METAL	RESULT mg/L	DETECTION LIMIT mg/L	METHOD
Antimony	ND	0.10	EPA 6010
Arsenic	ND	0.050	EPA 6010
Barium	0.20	0.010	EPA 6010
Beryllium	ND	0.010	EPA 6010
Cadmium	ND	0.010	EPA 6010
Chromium (total)	ND	0.010	EPA 6010
Cobalt	ND	0.010	EPA 6010
Copper	ND	0.020	EPA 6010
Lead	ND	0.050	EPA 6010
Mercury	ND	0.0010	EPA 7470
Molybdenum	ND	0.010	EPA 6010
Nickel	ND	0.010	EPA 6010
Selenium	ND	0.050	EPA 6010
Silver	ND	0.020	EPA 6010
Thallium	ND	0.010	EPA 6010
Vanadium	ND	0.020	EPA 6010
Zinc	0.077	0.010	EPA 6010

ND = Not Detected

QA/QC SUMMARY

	RPD,%	RECOVERY,%		RPD,%	RECOVERY,%
Antimony	5	102	Mercury	<1	78
Arsenic	8	113	Molybdenum	<1	94
Barium	1	108	Nickel	<1	111
Beryllium	3	118	Selenium	1	93
Cadmium	<1	95	Silver	<1	86
Chromium	3	110	Thallium	15	83
Cobalt	<1	109	Vanadium	15	110
Copper	5	110	Zinc	3	96
Lead	9	96			

Curtis & Tompkins, Ltd

LABORATORY NUMBER: 19948-1
CLIENT: HARDING LAWSON ASSOCIATES
JOB #: 18452,016.02
LOCATION: WAREHAM
SAMPLE ID: 90122001 MW-3

DATE RECEIVED: 03/20/90
DATE EXTRACTED: 03/23/90
DATE ANALYZED: 03/28/90
DATE REPORTED: 04/02/90

EPA 8080: Organochlorine Pesticides and PCBs in Water
Extraction Method: EPA 3510

COMPOUND	RESULT ug/L	QUANTITATION LIMIT ug/L
alpha-BHC	ND	0.050
beta-BHC	ND	0.050
gamma-BHC	ND	0.050
delta-BHC	ND	0.050
Heptachlor	ND	0.050
Aldrin	ND	0.050
Heptachlor Epoxide	ND	0.050
Endosulfan I	ND	0.050
Dieldrin	ND	0.050
4,4'-DDE	ND	0.050
Endrin	ND	0.050
Endosulfan II	ND	0.050
Endosulfan Sulfate	ND	0.050
4,4'-DDD	ND	0.050
Endrin Aldehyde	ND	0.050
4,4'-DDT	ND	0.050
Chlordane	ND	0.50
Methoxychlor	ND	0.50
Toxaphene	ND	0.50
Aroclor 1016	ND	0.50
Aroclor 1221	ND	0.50
Aroclor 1232	ND	0.50
Aroclor 1242	ND	0.50
Aroclor 1248	ND	0.50
Aroclor 1254	ND	0.50
Aroclor 1260	ND	0.50

ND = Not detected at or above quantitation limit.

QA/QC SUMMARY:

Duplicate: Relative % Difference	25
Average Spike Recovery %	95

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 19948-2
CLIENT: HARDING LAWSON ASSOCIATES
JOB #: 18452,016.02
LOCATION: WAREHAM
SAMPLE ID: 90122002 mw-2

DATE RECEIVED: 03/20/90
DATE EXTRACTED: 03/23/90
DATE ANALYZED: 03/28/90
DATE REPORTED: 04/02/90

EPA 8080: Organochlorine Pesticides and PCBs in Water
Extraction Method: EPA 3510

COMPOUND	RESULT ug/L	QUANTITATION LIMIT ug/L
alpha-BHC	ND	0.050
beta-BHC	ND	0.050
gamma-BHC	0.35	0.050
delta-BHC	ND	0.050
Heptachlor	ND	0.050
Aldrin	ND	0.050
Heptachlor Epoxide	ND	0.050
Endosulfan I	ND	0.050
Dieldrin	ND	0.050
4,4'-DDE	ND	0.050
Endrin	ND	0.050
Endosulfan II	ND	0.050
Endosulfan Sulfate	ND	0.050
4,4'-DDD	ND	0.050
Endrin Aldehyde	ND	0.050
4,4'-DDT	ND	0.050
Chlordane	ND	0.50
Methoxychlor	ND	0.50
Toxaphene	ND	0.50
Aroclor 1016	ND	0.50
Aroclor 1221	ND	0.50
Aroclor 1232	ND	0.50
Aroclor 1242	ND	0.50
Aroclor 1248	ND	0.50
Aroclor 1254	ND	0.50
Aroclor 1260	ND	0.50

ND = Not detected at or above quantitation limit.

QA/QC SUMMARY:

Duplicate: Relative % Difference	25
Average Spike Recovery %	95

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 19948-3
CLIENT: HARDING LAWSON ASSOCIATES
JOB #: 18452,016.02
LOCATION: WAREHAM
SAMPLE ID: 90122003 mw-4

DATE RECEIVED: 03/20/90
DATE EXTRACTED: 03/23/90
DATE ANALYZED: 03/28/90
DATE REPORTED: 04/02/90

EPA 8080: Organochlorine Pesticides and PCBs in Water
Extraction Method: EPA 3510

COMPOUND	RESULT ug/L	QUANTITATION LIMIT ug/L
alpha-BHC	ND	0.050
beta-BHC	ND	0.050
gamma-BHC	ND	0.050
delta-BHC	ND	0.050
Heptachlor	ND	0.050
Aldrin	ND	0.050
Heptachlor Epoxide	ND	0.050
Endosulfan I	ND	0.050
Dieldrin	ND	0.050
4,4'-DDE	ND	0.050
Endrin	ND	0.050
Endosulfan II	ND	0.050
Endosulfan Sulfate	ND	0.050
4,4'-DDD	ND	0.050
Endrin Aldehyde	ND	0.050
4,4'-DDT	ND	0.050
Chlordane	ND	0.50
Methoxychlor	ND	0.50
Toxaphene	ND	0.50
Aroclor 1016	ND	0.50
Aroclor 1221	ND	0.50
Aroclor 1232	ND	0.50
Aroclor 1242	ND	0.50
Aroclor 1248	ND	0.50
Aroclor 1254	ND	0.50
Aroclor 1260	ND	0.50

ND = Not detected at or above quantitation limit.

QA/QC SUMMARY:

Duplicate: Relative % Difference	25
Average Spike Recovery %	95

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 19948-5
CLIENT: HARDING LAWSON ASSOCIATES
JOB #: 18452,016.02
LOCATION: WAREHAM
SAMPLE ID: 90122005 MW-1

DATE RECEIVED: 03/20/90
DATE EXTRACTED: 03/23/90
DATE ANALYZED: 03/28/90
DATE REPORTED: 04/02/90

EPA 8080: Organochlorine Pesticides and PCBs in Water
Extraction Method: EPA 3510

COMPOUND	RESULT ug/L	QUANTITATION LIMIT ug/L
alpha-BHC	ND	0.050
beta-BHC	ND	0.050
gamma-BHC	ND	0.050
delta-BHC	ND	0.050
Heptachlor	ND	0.050
Aldrin	ND	0.050
Heptachlor Epoxide	ND	0.050
Endosulfan I	ND	0.050
Dieldrin	ND	0.050
4,4'-DDE	ND	0.050
Endrin	ND	0.050
Endosulfan II	ND	0.050
Endosulfan Sulfate	ND	0.050
4,4'-DDD	ND	0.050
Endrin Aldehyde	ND	0.050
4,4'-DDT	ND	0.050
Chlordane	ND	0.50
Methoxychlor	ND	0.50
Toxaphene	ND	0.50
Aroclor 1016	ND	0.50
Aroclor 1221	ND	0.50
Aroclor 1232	ND	0.50
Aroclor 1242	ND	0.50
Aroclor 1248	ND	0.50
Aroclor 1254	ND	0.50
Aroclor 1260	ND	0.50

ND = Not detected at or above quantitation limit.

QA/QC SUMMARY:

Duplicate: Relative % Difference	25
Average Spike Recovery %	95

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 19948-6
CLIENT: HARDING LAWSON ASSOCIATES
JOB #: 18452,016.02
LOCATION: WAREHAM
SAMPLE ID: 90122006 MW-5

DATE RECEIVED: 03/20/90
DATE EXTRACTED: 03/23/90
DATE ANALYZED: 03/28/90
DATE REPORTED: 04/02/90

EPA 8080: Organochlorine Pesticides and PCBs in Water
Extraction Method: EPA 3510

COMPOUND	RESULT ug/L	QUANTITATION LIMIT ug/L
alpha-BHC	ND	0.050
beta-BHC	ND	0.050
gamma-BHC	ND	0.050
delta-BHC	ND	0.050
Heptachlor	ND	0.050
Aldrin	ND	0.050
Heptachlor Epoxide	ND	0.050
Endosulfan I	ND	0.050
Dieldrin	ND	0.050
4,4'-DDE	ND	0.050
Endrin	ND	0.050
Endosulfan II	ND	0.050
Endosulfan Sulfate	ND	0.050
4,4'-DDD	ND	0.050
Endrin Aldehyde	ND	0.050
4,4'-DDT	ND	0.050
Chlordane	ND	0.50
Methoxychlor	ND	0.50
Toxaphene	ND	0.50
Aroclor 1016	ND	0.50
Aroclor 1221	ND	0.50
Aroclor 1232	ND	0.50
Aroclor 1242	ND	0.50
Aroclor 1248	ND	0.50
Aroclor 1254	ND	0.50
Aroclor 1260	ND	0.50

ND = Not detected at or above quantitation limit.

QA/QC SUMMARY:

Duplicate: Relative % Difference	25
Average Spike Recovery %	95

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 19948-1
CLIENT: HARDING LAWSON ASSOCIATES
JOB #: 18452,016.02
SAMPLE ID: 90122001 mw-3

DATE RECEIVED: 03/20/90
DATE ANALYZED: 03/26/90
DATE REPORTED: 04/02/90

EPA METHOD 8240: VOLATILE ORGANICS IN WATER
Extraction Method: EPA 5030 - Purge & Trap

COMPOUND	Result ug/L	Detection Limit ug/L
chloromethane	ND	10
bromomethane	ND	10
vinyl chloride	ND	10
chloroethane	ND	10
methylene chloride	ND	5.0
trichlorofluoromethane	ND	5.0
1,1-dichloroethene	ND	5.0
1,1-dichloroethane	ND	5.0
trans-1,2-dichloroethene	ND	5.0
chloroform	ND	5.0
1,2-dichloroethane	ND	5.0
1,1,1-trichloroethane	ND	5.0
carbon tetrachloride	ND	5.0
bromodichloromethane	ND	5.0
1,2-dichloropropane	ND	5.0
cis-1,3-dichloropropene	ND	5.0
trichloroethylene	ND	5.0
dibromochloromethane	ND	5.0
1,1,2-trichloroethane	ND	5.0
benzene	ND	5.0
trans-1,3-dichloropropene	ND	5.0
2-chloroethylvinyl ether	ND	10
bromoform	ND	5.0
1,1,2,2-tetrachloroethane	ND	5.0
tetrachloroethylene	ND	5.0
toluene	ND	5.0
chlorobenzene	ND	5.0
ethyl benzene	ND	5.0
Non-Priority Hazardous Pollutant Substances List Compounds		
acetone	ND	10
carbon disulfide	ND	5.0
2-butanone	ND	10
vinyl acetate	ND	10
2-hexanone	ND	10
4-methyl-2-pentanone	ND	10
styrene	ND	5.0
total xylenes	ND	5.0

QA/QC SUMMARY: SURROGATE RECOVERIES	
1,2-Dichloroethane-d4	108%
Toluene-d8	98%
Bromofluorobenzene	99%

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 19948-2
CLIENT: HARDING LAWSON ASSOCIATES
JOB #: 18452,016.02
SAMPLE ID: 90122002 MW-2

DATE RECEIVED: 03/20/90
DATE ANALYZED: 03/26/90
DATE REPORTED: 04/02/90

EPA METHOD 8240: VOLATILE ORGANICS IN WATER
Extraction Method: EPA 5030 - Purge & Trap

COMPOUND	Result ug/L	Detection Limit ug/L
chloromethane	ND	10
bromomethane	ND	10
vinyl chloride	ND	10
chloroethane	ND	10
methylene chloride	ND	5.0
trichlorofluoromethane	ND	5.0
1,1-dichloroethene	ND	5.0
1,1-dichloroethane	ND	5.0
trans-1,2-dichloroethene	ND	5.0
chloroform	ND	5.0
1,2-dichloroethane	ND	5.0
1,1,1-trichloroethane	ND	5.0
carbon tetrachloride	ND	5.0
bromodichloromethane	ND	5.0
1,2-dichloropropane	ND	5.0
cis-1,3-dichloropropene	ND	5.0
trichloroethylene	ND	5.0
dibromochloromethane	ND	5.0
1,1,2-trichloroethane	ND	5.0
benzene	ND	5.0
trans-1,3-dichloropropene	ND	5.0
2-chloroethylvinyl ether	ND	10
bromoform	ND	5.0
1,1,2,2-tetrachloroethane	ND	5.0
tetrachloroethylene	ND	5.0
toluene	ND	5.0
chlorobenzene	ND	5.0
ethyl benzene	ND	5.0

Non-Priority Hazardous Pollutant Substances List Compounds

acetone	44	10
carbon disulfide	ND	5.0
2-butanone	ND	10
vinyl acetate	ND	10
2-hexanone	ND	10
4-methyl-2-pentanone	ND	10
styrene	ND	5.0
total xylenes	ND	5.0

QA/QC SUMMARY: SURROGATE RECOVERIES

1,2-Dichloroethane-d4	104%
Toluene-d8	100%
Bromofluorobenzene	113%

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 19948-3
CLIENT: HARDING LAWSON ASSOCIATES
JOB #: 18452,016.02
SAMPLE ID: 90122003 mw-4

DATE RECEIVED: 03/20/90
DATE ANALYZED: 03/26/90
DATE REPORTED: 04/02/90

EPA METHOD 8240: VOLATILE ORGANICS IN WATER
Extraction Method: EPA 5030 - Purge & Trap

COMPOUND	Result ug/L	Detection Limit ug/L
chloromethane	ND	10
bromomethane	ND	10
vinyl chloride	ND	10
chloroethane	ND	10
methylene chloride	ND	5.0
trichlorofluoromethane	ND	5.0
1,1-dichloroethene	ND	5.0
1,1-dichloroethane	ND	5.0
trans-1,2-dichloroethene	ND	5.0
chloroform	ND	5.0
1,2-dichloroethane	ND	5.0
1,1,1-trichloroethane	ND	5.0
carbon tetrachloride	ND	5.0
bromodichloromethane	ND	5.0
1,2-dichloropropane	ND	5.0
cis-1,3-dichloropropene	ND	5.0
trichloroethylene	ND	5.0
dibromochloromethane	ND	5.0
1,1,2-trichloroethane	ND	5.0
benzene	ND	5.0
trans-1,3-dichloropropene	ND	5.0
2-chloroethylvinyl ether	ND	10
bromoform	ND	5.0
1,1,2,2-tetrachloroethane	ND	5.0
tetrachloroethylene	ND	5.0
toluene	ND	5.0
chlorobenzene	ND	5.0
ethyl benzene	ND	5.0
Non-Priority Hazardous Pollutant Substances List Compounds		
acetone	ND	10
carbon disulfide	ND	5.0
2-butanone	ND	10
vinyl acetate	ND	10
2-hexanone	ND	10
4-methyl-2-pentanone	ND	10
styrene	ND	5.0
total xylenes	ND	5.0

QA/QC SUMMARY: SURROGATE RECOVERIES

1,2-Dichloroethane-d4	113%
Toluene-d8	101%
Bromofluorobenzene	100%

Curtis & Tompkins, Ltd

LABORATORY NUMBER: 19948-4
CLIENT: HARDING LAWSON ASSOCIATES
JOB #: 18452,016.02
SAMPLE ID: 90122004 Trip Blank

DATE RECEIVED: 03/20/90
DATE ANALYZED: 03/26/90
DATE REPORTED: 04/02/90

EPA METHOD 8240: VOLATILE ORGANICS IN WATER
Extraction Method: EPA 5030 - Purge & Trap

COMPOUND	Result ug/L	Detection Limit ug/L
chloromethane	ND	10
bromomethane	ND	10
vinyl chloride	ND	10
chloroethane	ND	10
methylene chloride	ND	5.0
trichlorofluoromethane	ND	5.0
1,1-dichloroethene	ND	5.0
1,1-dichloroethane	ND	5.0
trans-1,2-dichloroethene	ND	5.0
chloroform	ND	5.0
1,2-dichloroethane	ND	5.0
1,1,1-trichloroethane	ND	5.0
carbon tetrachloride	ND	5.0
bromodichloromethane	ND	5.0
1,2-dichloropropane	ND	5.0
cis-1,3-dichloropropene	ND	5.0
trichloroethylene	ND	5.0
dibromochloromethane	ND	5.0
1,1,2-trichloroethane	ND	5.0
benzene	ND	5.0
trans-1,3-dichloropropene	ND	5.0
2-chloroethylvinyl ether	ND	10
bromoform	ND	5.0
1,1,2,2-tetrachloroethane	ND	5.0
tetrachloroethylene	ND	5.0
toluene	ND	5.0
chlorobenzene	ND	5.0
ethyl benzene	ND	5.0
Non-Priority Hazardous Pollutant Substances List Compounds		
acetone	ND	10
carbon disulfide	ND	5.0
2-butanone	ND	10
vinyl acetate	ND	10
2-hexanone	ND	10
4-methyl-2-pentanone	ND	10
styrene	ND	5.0
total xylenes	ND	5.0

QA/QC SUMMARY: SURROGATE RECOVERIES	
1,2-Dichloroethane-d4	114%
Toluene-d8	99%
Bromofluorobenzene	98%

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 19948-5
CLIENT: HARDING LAWSON ASSOCIATES
JOB #: 18452,016.02
SAMPLE ID: 90122005 MW5-1

DATE RECEIVED: 03/20/90
DATE ANALYZED: 03/26/90
DATE REPORTED: 04/02/90

EPA METHOD 8240: VOLATILE ORGANICS IN WATER
Extraction Method: EPA 5030 - Purge & Trap

COMPOUND	Result ug/L	Detection Limit ug/L
chloromethane	ND	10
bromomethane	ND	10
vinyl chloride	ND	10
chloroethane	ND	10
methylene chloride	ND	5.0
trichlorofluoromethane	ND	5.0
1,1-dichloroethene	ND	5.0
1,1-dichloroethane	ND	5.0
trans-1,2-dichloroethene	ND	5.0
chloroform	ND	5.0
1,2-dichloroethane	ND	5.0
1,1,1-trichloroethane	ND	5.0
carbon tetrachloride	ND	5.0
bromodichloromethane	ND	5.0
1,2-dichloropropane	ND	5.0
cis-1,3-dichloropropene	ND	5.0
trichloroethylene	ND	5.0
dibromochloromethane	ND	5.0
1,1,2-trichloroethane	ND	5.0
benzene	ND	5.0
trans-1,3-dichloropropene	ND	5.0
2-chloroethylvinyl ether	ND	10
bromoform	ND	5.0
1,1,2,2-tetrachloroethane	ND	5.0
tetrachloroethylene	ND	5.0
toluene	ND	5.0
chlorobenzene	ND	5.0
ethyl benzene	ND	5.0
Non-Priority Hazardous Pollutant Substances List Compounds		
acetone	ND	10
carbon disulfide	ND	5.0
2-butanone	ND	10
vinyl acetate	ND	10
2-hexanone	ND	10
4-methyl-2-pentanone	ND	10
styrene	ND	5.0
total xylenes	ND	5.0

QA/QC SUMMARY: SURROGATE RECOVERIES

1,2-Dichloroethane-d4	107%
Toluene-d8	98%
Bromofluorobenzene	100%

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 19948-6
CLIENT: HARDING LAWSON ASSOCIATES
JOB #: 18452,016.02
SAMPLE ID: 90122006 MW-5

DATE RECEIVED: 03/20/90
DATE ANALYZED: 03/26/90
DATE REPORTED: 04/02/90

EPA METHOD 8240: VOLATILE ORGANICS IN WATER
Extraction Method: EPA 5030 - Purge & Trap

COMPOUND	Result ug/L	Detection Limit ug/L
chloromethane	ND	10
bromomethane	ND	10
vinyl chloride	ND	10
chloroethane	ND	10
methylene chloride	ND	5.0
trichlorofluoromethane	ND	5.0
1,1-dichloroethene	ND	5.0
1,1-dichloroethane	ND	5.0
trans-1,2-dichloroethene	ND	5.0
chloroform	ND	5.0
1,2-dichloroethane	ND	5.0
1,1,1-trichloroethane	ND	5.0
carbon tetrachloride	ND	5.0
bromodichloromethane	ND	5.0
1,2-dichloropropane	ND	5.0
cis-1,3-dichloropropene	ND	5.0
trichloroethylene	ND	5.0
dibromochloromethane	ND	5.0
1,1,2-trichloroethane	ND	5.0
benzene	ND	5.0
trans-1,3-dichloropropene	ND	5.0
2-chloroethylvinyl ether	ND	10
bromoform	ND	5.0
1,1,2,2-tetrachloroethane	ND	5.0
tetrachloroethylene	ND	5.0
toluene	ND	5.0
chlorobenzene	ND	5.0
ethyl benzene	ND	5.0
Non-Priority Hazardous Pollutant Substances List Compounds		
acetone	ND	10
carbon disulfide	ND	5.0
2-butanone	ND	10
vinyl acetate	ND	10
2-hexanone	ND	10
4-methyl-2-pentanone	ND	10
styrene	ND	5.0
total xylenes	ND	5.0

QA/QC SUMMARY: SURROGATE RECOVERIES	
1,2-Dichloroethane-d4	108%
Toluene-d8	97%
Bromofluorobenzene	99%

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 19948-1
CLIENT: HARDING LAWSON ASSOCIATES
JOB #: 18452,016.02
LOCATION: WAREHAM
CLIENT ID: 90122001 MW-2

DATE RECEIVED: 03/20/90
DATE EXTRACTED: 03/26/90
DATE ANALYZED: 03/28/90
DATE REPORTED: 04/02/90

EPA 8270: Base/Neutral and Acid Extractables in Water
Extraction Method: EPA 3510 Liquid/Liquid

ACID COMPOUNDS	RESULT ug/L	LOD ug/L
Phenol	ND	5.0
2-Chlorophenol	ND	5.0
2-Nitrophenol	ND	25
2,4-Dimethylphenol	ND	5.0
2,4-Dichlorophenol	ND	5.0
4-Chloro-3-methylphenol	ND	5.0
2,4,6-Trichlorophenol	ND	5.0
2,4-Dinitrophenol	ND	25
4-Nitrophenol	ND	25
4,6-Dinitro-2-methylphenol	ND	25
Pentachlorophenol	ND	25
BASE/NEUTRAL COMPOUNDS		
N-Nitrosodimethylamine	ND	5.0
Bis(2-chloroethyl)ether	ND	5.0
1,3-Dichlorobenzene	ND	5.0
1,4-Dichlorobenzene	ND	5.0
1,2-Dichlorobenzene	ND	5.0
Bis(2-chloroisopropyl)ether	ND	5.0
N-Nitroso-di-n-propylamine	ND	5.0
Hexachloroethane	ND	5.0
Nitrobenzene	ND	5.0
Isophorone	ND	5.0
Bis(2-chloroethoxy)methane	ND	5.0
1,2,4-Trichlorobenzene	ND	5.0
Naphthalene	ND	5.0
Hexachlorobutadiene	ND	5.0
Hexachlorocyclopentadiene	ND	5.0
2-Chloronaphthalene	ND	5.0
Dimethylphthalate	ND	5.0
Acenaphthylene	ND	5.0
2,6-Dinitrotoluene	ND	5.0
Acenaphthene	ND	5.0
2,4-Dinitrotoluene	ND	5.0
Diethylphthalate	ND	5.0
4-Chlorophenyl-phenylether	ND	5.0
Fluorene	ND	5.0
N-Nitrosodiphenylamine	ND	5.0

LABORATORY NUMBER: 19948-1
CLIENT ID: 90122001 mw-3

BASE/NEUTRAL COMPOUNDS	RESULT ug/L	LOD ug/L
Azobenzene	ND	5.0
4-Bromophenyl-phenylether	ND	5.0
Hexachlorobenzene	ND	5.0
Phenanthrene	ND	5.0
Anthracene	ND	5.0
Di-n-butylphthalate	ND	5.0
Fluoranthene	ND	5.0
Benzidine	ND	5.0
Pyrene	ND	5.0
Butylbenzylphthalate	ND	5.0
3,3'-Dichlorobenzidine	ND	25
Benzo (a) anthracene	ND	5.0
Chrysene	ND	5.0
Bis (2-ethylhexyl)phthalate	ND	5.0
Di-n-octylphthalate	ND	5.0
Benzo (b) fluoranthene	ND	5.0
Benzo (k) fluoranthene	ND	5.0
Benzo (a) pyrene	ND	5.0
Indeno (1,2,3-cd) pyrene	ND	5.0
Dibenzo (a,h) anthracene	ND	5.0
Benzo (g,h,i) perylene	ND	5.0
HSL COMPOUNDS		
Aniline	ND	5.0
Benzoic Acid	ND	25
2-Methylphenol	ND	5.0
4-Methylphenol	ND	5.0
2,4,5-Trichlorophenol	ND	25
Benzyl Alcohol	ND	5.0
4-Chloroaniline	ND	5.0
2-Methylnaphthalene	ND	5.0
2-Nitroaniline	ND	25
3-Nitroaniline	ND	25
Dibenzofuran	ND	5.0
4-Nitroaniline	ND	25

ND = None Detected, Limit of Detection (LOD) appears in right column

QA/QC SUMMARY: SURROGATE RECOVERIES

Compound	%Recovery	Compound	%Recovery
2-Fluorophenol	85	Nitrobenzene-d5	90
Phenol-d5	86	2-Fluorobiphenyl	100
2,4,6-tribromophenol	111	Terphenyl	104

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 19948-2
CLIENT: HARDING LAWSON ASSOCIATES
JOB #: 18452,016.02
LOCATION: WAREHAM
CLIENT ID: 90122002 MW-2

DATE RECEIVED: 03/20/90
DATE EXTRACTED: 03/26/90
DATE ANALYZED: 03/28/90
DATE REPORTED: 04/02/90

EPA 8270: Base/Neutral and Acid Extractables in Water
Extraction Method: EPA 3510 Liquid/Liquid

ACID COMPOUNDS	RESULT ug/L	LOD ug/L
Phenol	ND	5.0
2-Chlorophenol	ND	5.0
2-Nitrophenol	ND	25
2,4-Dimethylphenol	ND	5.0
2,4-Dichlorophenol	ND	5.0
4-Chloro-3-methylphenol	ND	5.0
2,4,6-Trichlorophenol	ND	5.0
2,4-Dinitrophenol	ND	25
4-Nitrophenol	ND	25
4,6-Dinitro-2-methylphenol	ND	25
Pentachlorophenol	ND	25
BASE/NEUTRAL COMPOUNDS		
N-Nitrosodimethylamine	ND	5.0
Bis(2-chloroethyl)ether	ND	5.0
1,3-Dichlorobenzene	ND	5.0
1,4-Dichlorobenzene	ND	5.0
1,2-Dichlorobenzene	ND	5.0
Bis(2-chloroisopropyl)ether	ND	5.0
N-Nitroso-di-n-propylamine	ND	5.0
Hexachloroethane	ND	5.0
Nitrobenzene	ND	5.0
Isophorone	ND	5.0
Bis(2-chloroethoxy)methane	ND	5.0
1,2,4-Trichlorobenzene	ND	5.0
Naphthalene	ND	5.0
Hexachlorobutadiene	ND	5.0
Hexachlorocyclopentadiene	ND	5.0
2-Chloronaphthalene	ND	5.0
Dimethylphthalate	ND	5.0
Acenaphthylene	ND	5.0
2,6-Dinitrotoluene	ND	5.0
Acenaphthene	ND	5.0
2,4-Dinitrotoluene	ND	5.0
Diethylphthalate	ND	5.0
4-Chlorophenyl-phenylether	ND	5.0
Fluorene	6.1	5.0
N-Nitrosodiphenylamine	ND	5.0

LABORATORY NUMBER: 19948-2
CLIENT ID: 90122002 mw-2

BASE/NEUTRAL COMPOUNDS	RESULT ug/L	LOD ug/L
Azobenzene	ND	5.0
4-Bromophenyl-phenylether	ND	5.0
Hexachlorobenzene	ND	5.0
Phenanthrene	5.5	5.0
Anthracene	ND	5.0
Di-n-butylphthalate	ND	5.0
Fluoranthene	ND	5.0
Benzidine	ND	5.0
Pyrene	ND	5.0
Butylbenzylphthalate	ND	5.0
3,3'-Dichlorobenzidine	ND	25
Benzo (a) anthracene	ND	5.0
Chrysene	ND	5.0
Bis (2-ethylhexyl)phthalate	ND	5.0
Di-n-octylphthalate	ND	5.0
Benzo (b) fluoranthene	ND	5.0
Benzo (k) fluoranthene	ND	5.0
Benzo (a) pyrene	ND	5.0
Indeno (1,2,3-cd) pyrene	ND	5.0
Dibenzo (a,h) anthracene	ND	5.0
Benzo (g,h,i) perylene	ND	5.0
HSL COMPOUNDS		
Aniline	ND	5.0
Benzoic Acid	ND	25
2-Methylphenol	ND	5.0
4-Methylphenol	ND	5.0
2,4,5-Trichlorophenol	ND	25
Benzyl Alcohol	ND	5.0
4-Chloroaniline	ND	5.0
2-Methylnaphthalene	18	5.0
2-Nitroaniline	ND	25
3-Nitroaniline	ND	25
Dibenzofuran	ND	5.0
4-Nitroaniline	ND	25

ND = None Detected, Limit of Detection (LOD) appears in right column

QA/QC SUMMARY: SURROGATE RECOVERIES

Compound	%Recovery	Compound	%Recovery
2-Fluorophenol	51	Nitrobenzene-d5	63
Phenol-d5	41	2-Fluorobiphenyl	78
2,4,6-tribromophenol	79	Terphenyl	72

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 19948-3
CLIENT: HARDING LAWSON ASSOCIATES
JOB #: 18452,016.02
LOCATION: WAREHAM
CLIENT ID: 90122003 mw-4

DATE RECEIVED: 03/20/90
DATE EXTRACTED: 03/26/90
DATE ANALYZED: 03/28/90
DATE REPORTED: 04/02/90

EPA 8270: Base/Neutral and Acid Extractables in Water
Extraction Method: EPA 3510 Liquid/Liquid

ACID COMPOUNDS	RESULT ug/L	LOD ug/L
Phenol	ND	5.0
2-Chlorophenol	ND	5.0
2-Nitrophenol	ND	25
2,4-Dimethylphenol	ND	5.0
2,4-Dichlorophenol	ND	5.0
4-Chloro-3-methylphenol	ND	5.0
2,4,6-Trichlorophenol	ND	5.0
2,4-Dinitrophenol	ND	25
4-Nitrophenol	ND	25
4,6-Dinitro-2-methylphenol	ND	25
Pentachlorophenol	ND	25
BASE/NEUTRAL COMPOUNDS		
N-Nitrosodimethylamine	ND	5.0
Bis(2-chloroethyl)ether	ND	5.0
1,3-Dichlorobenzene	ND	5.0
1,4-Dichlorobenzene	ND	5.0
1,2-Dichlorobenzene	ND	5.0
Bis(2-chloroisopropyl)ether	ND	5.0
N-Nitroso-di-n-propylamine	ND	5.0
Hexachloroethane	ND	5.0
Nitrobenzene	ND	5.0
Isophorone	ND	5.0
Bis(2-chloroethoxy)methane	ND	5.0
1,2,4-Trichlorobenzene	ND	5.0
Naphthalene	ND	5.0
Hexachlorobutadiene	ND	5.0
Hexachlorocyclopentadiene	ND	5.0
2-Chloronaphthalene	ND	5.0
Dimethylphthalate	ND	5.0
Acenaphthylene	ND	5.0
2,6-Dinitrotoluene	ND	5.0
Acenaphthene	ND	5.0
2,4-Dinitrotoluene	ND	5.0
Diethylphthalate	ND	5.0
4-Chlorophenyl-phenylether	ND	5.0
Fluorene	ND	5.0
N-Nitrosodiphenylamine	ND	5.0

LABORATORY NUMBER: 19948-3
CLIENT ID: 90122003 MW-4

BASE/NEUTRAL COMPOUNDS	RESULT ug/L	LOD ug/L
Azobenzene	ND	5.0
4-Bromophenyl-phenylether	ND	5.0
Hexachlorobenzene	ND	5.0
Phenanthrene	ND	5.0
Anthracene	ND	5.0
Di-n-butylphthalate	ND	5.0
Fluoranthene	ND	5.0
Benzidine	ND	5.0
Pyrene	ND	5.0
Butylbenzylphthalate	ND	5.0
3,3'-Dichlorobenzidine	ND	25
Benzo (a) anthracene	ND	5.0
Chrysene	ND	5.0
Bis (2-ethylhexyl)phthalate	ND	5.0
Di-n-octylphthalate	ND	5.0
Benzo (b) fluoranthene	ND	5.0
Benzo (k) fluoranthene	ND	5.0
Benzo (a) pyrene	ND	5.0
Indeno (1,2,3-cd) pyrene	ND	5.0
Dibenzo (a,h) anthracene	ND	5.0
Benzo (g,h,i) perylene	ND	5.0
HSL COMPOUNDS		
Aniline	ND	5.0
Benzoic Acid	ND	25
2-Methylphenol	ND	5.0
4-Methylphenol	ND	5.0
2,4,5-Trichlorophenol	ND	25
Benzyl Alcohol	ND	5.0
4-Chloroaniline	ND	5.0
2-Methylnaphthalene	ND	5.0
2-Nitroaniline	ND	25
3-Nitroaniline	ND	25
Dibenzofuran	ND	5.0
4-Nitroaniline	ND	25

ND = None Detected, Limit of Detection (LOD) appears in right column

QA/QC SUMMARY: SURROGATE RECOVERIES

Compound	%Recovery	Compound	%Recovery
2-Fluorophenol	80	Nitrobenzene-d5	85
Phenol-d5	82	2-Fluorobiphenyl	93
2,4,6-tribromophenol	106	Terphenyl	98

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 19948-5
CLIENT: HARDING LAWSON ASSOCIATES
JOB #: 18452,016.02
LOCATION: WAREHAM
CLIENT ID: 90122005 mw-1

DATE RECEIVED: 03/20/90
DATE EXTRACTED: 03/26/90
DATE ANALYZED: 03/28/90
DATE REPORTED: 04/02/90

EPA 8270: Base/Neutral and Acid Extractables in Water
Extraction Method: EPA 3510 Liquid/Liquid

ACID COMPOUNDS	RESULT ug/L	LOD ug/L
Phenol	ND	5.0
2-Chlorophenol	ND	5.0
2-Nitrophenol	ND	25
2,4-Dimethylphenol	ND	5.0
2,4-Dichlorophenol	ND	5.0
4-Chloro-3-methylphenol	ND	5.0
2,4,6-Trichlorophenol	ND	5.0
2,4-Dinitrophenol	ND	25
4-Nitrophenol	ND	25
4,6-Dinitro-2-methylphenol	ND	25
Pentachlorophenol	ND	25
BASE/NEUTRAL COMPOUNDS		
N-Nitrosodimethylamine	ND	5.0
Bis(2-chloroethyl)ether	ND	5.0
1,3-Dichlorobenzene	ND	5.0
1,4-Dichlorobenzene	ND	5.0
1,2-Dichlorobenzene	ND	5.0
Bis(2-chloroisopropyl)ether	ND	5.0
N-Nitroso-di-n-propylamine	ND	5.0
Hexachloroethane	ND	5.0
Nitrobenzene	ND	5.0
Isophorone	ND	5.0
Bis(2-chloroethoxy)methane	ND	5.0
1,2,4-Trichlorobenzene	ND	5.0
Naphthalene	ND	5.0
Hexachlorobutadiene	ND	5.0
Hexachlorocyclopentadiene	ND	5.0
2-Chloronaphthalene	ND	5.0
Dimethylphthalate	ND	5.0
Acenaphthylene	ND	5.0
2,6-Dinitrotoluene	ND	5.0
Acenaphthene	ND	5.0
2,4-Dinitrotoluene	ND	5.0
Diethylphthalate	ND	5.0
4-Chlorophenyl-phenylether	ND	5.0
Fluorene	ND	5.0
N-Nitrosodiphenylamine	ND	5.0

LABORATORY NUMBER: 19948-5
CLIENT ID: 90122005 mw-1

BASE/NEUTRAL COMPOUNDS	RESULT ug/L	LOD ug/L
Azobenzene	ND	5.0
4-Bromophenyl-phenylether	ND	5.0
Hexachlorobenzene	ND	5.0
Phenanthrene	ND	5.0
Anthracene	ND	5.0
Di-n-butylphthalate	ND	5.0
Fluoranthene	ND	5.0
Benzidine	ND	5.0
Pyrene	ND	5.0
Butylbenzylphthalate	ND	5.0
3,3'-Dichlorobenzidine	ND	25
Benzo (a) anthracene	ND	5.0
Chrysene	ND	5.0
Bis (2-ethylhexyl)phthalate	ND	5.0
Di-n-octylphthalate	ND	5.0
Benzo (b) fluoranthene	ND	5.0
Benzo (k) fluoranthene	ND	5.0
Benzo (a) pyrene	ND	5.0
Indeno (1,2,3-cd) pyrene	ND	5.0
Dibenzo (a,h) anthracene	ND	5.0
Benzo (g,h,i) perylene	ND	5.0
HSL COMPOUNDS		
Aniline	ND	5.0
Benzoic Acid	ND	25
2-Methylphenol	ND	5.0
4-Methylphenol	ND	5.0
2,4,5-Trichlorophenol	ND	25
Benzyl Alcohol	ND	5.0
4-Chloroaniline	ND	5.0
2-Methylnaphthalene	ND	5.0
2-Nitroaniline	ND	25
3-Nitroaniline	ND	25
Dibenzofuran	ND	5.0
4-Nitroaniline	ND	25

ND = None Detected, Limit of Detection (LOD) appears in right column

QA/QC SUMMARY: SURROGATE RECOVERIES

Compound	%Recovery	Compound	%Recovery
2-Fluorophenol	70	Nitrobenzene-d5	81
Phenol-d5	67	2-Fluorobiphenyl	95
2,4,6-tribromophenol	100	Terphenyl	100

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 19948-6
CLIENT: HARDING LAWSON ASSOCIATES
JOB #: 18452,016.02
LOCATION: WAREHAM
CLIENT ID: 90122006 MW-5

DATE RECEIVED: 03/20/90
DATE EXTRACTED: 03/26/90
DATE ANALYZED: 03/28/90
DATE REPORTED: 04/02/90

EPA 8270: Base/Neutral and Acid Extractables in Water
Extraction Method: EPA 3510 Liquid/Liquid

ACID COMPOUNDS	RESULT ug/L	LOD ug/L
Phenol	ND	5.0
2-Chlorophenol	ND	5.0
2-Nitrophenol	ND	25
2,4-Dimethylphenol	ND	5.0
2,4-Dichlorophenol	ND	5.0
4-Chloro-3-methylphenol	ND	5.0
2,4,6-Trichlorophenol	ND	5.0
2,4-Dinitrophenol	ND	25
4-Nitrophenol	ND	25
4,6-Dinitro-2-methylphenol	ND	25
Pentachlorophenol	ND	25
BASE/NEUTRAL COMPOUNDS		
N-Nitrosodimethylamine	ND	5.0
Bis(2-chloroethyl)ether	ND	5.0
1,3-Dichlorobenzene	ND	5.0
1,4-Dichlorobenzene	ND	5.0
1,2-Dichlorobenzene	ND	5.0
Bis(2-chloroisopropyl)ether	ND	5.0
N-Nitroso-di-n-propylamine	ND	5.0
Hexachloroethane	ND	5.0
Nitrobenzene	ND	5.0
Isophorone	ND	5.0
Bis(2-chloroethoxy)methane	ND	5.0
1,2,4-Trichlorobenzene	ND	5.0
Naphthalene	ND	5.0
Hexachlorobutadiene	ND	5.0
Hexachlorocyclopentadiene	ND	5.0
2-Chloronaphthalene	ND	5.0
Dimethylphthalate	ND	5.0
Acenaphthylene	ND	5.0
2,6-Dinitrotoluene	ND	5.0
Acenaphthene	ND	5.0
2,4-Dinitrotoluene	ND	5.0
Diethylphthalate	ND	5.0
4-Chlorophenyl-phenylether	ND	5.0
Fluorene	ND	5.0
N-Nitrosodiphenylamine	ND	5.0

Curtis & Tompkins, Ltd

LABORATORY NUMBER: 19948-6
CLIENT ID: 90122006 MW-5

EPA 8270

BASE/NEUTRAL COMPOUNDS	RESULT ug/L	LOD ug/L
Azobenzene	ND	5.0
4-Bromophenyl-phenylether	ND	5.0
Hexachlorobenzene	ND	5.0
Phenanthrene	ND	5.0
Anthracene	ND	5.0
Di-n-butylphthalate	ND	5.0
Fluoranthene	ND	5.0
Benzidine	ND	5.0
Pyrene	ND	5.0
Butylbenzylphthalate	ND	5.0
3,3'-Dichlorobenzidine	ND	25
Benzo (a) anthracene	ND	5.0
Chrysene	ND	5.0
Bis (2-ethylhexyl)phthalate	ND	5.0
Di-n-octylphthalate	ND	5.0
Benzo (b) fluoranthene	ND	5.0
Benzo (k) fluoranthene	ND	5.0
Benzo (a) pyrene	ND	5.0
Indeno (1,2,3-cd) pyrene	ND	5.0
Dibenzo (a,h) anthracene	ND	5.0
Benzo (g,h,i) perylene	ND	5.0
HSL COMPOUNDS		
Aniline	ND	5.0
Benzoic Acid	ND	25
2-Methylphenol	ND	5.0
4-Methylphenol	ND	5.0
2,4,5-Trichlorophenol	ND	25
Benzyl Alcohol	ND	5.0
4-Chloroaniline	ND	5.0
2-Methylnaphthalene	ND	5.0
2-Nitroaniline	ND	25
3-Nitroaniline	ND	25
Dibenzofuran	ND	5.0
4-Nitroaniline	ND	25

ND = None Detected, Limit of Detection (LOD) appears in right column

QA/QC SUMMARY: SURROGATE RECOVERIES

Compound	%Recovery	Compound	%Recovery
2-Fluorophenol	79	Nitrobenzene-d5	89
Phenol-d5	73	2-Fluorobiphenyl	88
2,4,6-tribromophenol	96	Terphenyl	94

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

DATE RECEIVED: 05/11/90
DATE REPORTED: 05/18/90

LAB NUMBER: 100461

CLIENT: HARDING LAWSON ASSOCIATES

REPORT ON: 1 WATER SAMPLE

PROJECT #: 18452,016.02
LOCATION: WAREHAM/63rd St

RESULTS: SEE ATTACHED

QA/QC Approval

Final Approval

Curtis & Tompkins, Ltd

LABORATORY NUMBER: 100461
CLIENT: HARDING LAWSON ASSOCIATES
JOB #: 18452,016.02
LOCATION: WAREHAM/63rd ST.

DATE RECEIVED: 05/11/90
DATE REPORTED: 05/18/90

CASE NARRATIVE

Sample 100461 (Client ID 90051101) was analyzed for both Total Volatile Hydrocarbons (TVH) and Total Extractable Hydrocarbons (TEH). The quantitations for these analyses are based on gasoline and diesel respectively. The above sample showed hits in both hydrocarbon ranges which were quantitated and are reported in the following pages. The chromatograms for both analyses, however, showed hydrocarbons that did not match either the gasoline or diesel standards. The chromatograms for both sample and standard for each analysis are also enclosed.

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 100461
CLIENT: HARDING LAWSON ASSOCIATES
JOB #: 18452,016.02
LOCATION: WAREHAM/63rd ST.

DATE RECEIVED: 05/11/90
DATE ANALYZED: 05/18/90
DATE REPORTED: 05/18/90

Total Volatile Hydrocarbons as Gasoline in Aqueous Solutions
California DOHS Method
LUFT Manual October 1989

LAB ID	CLIENT ID	TVH AS GASOLINE (ug/L)	REPORTING LIMIT (ug/L)
100461-1	90051101	1,200	500

ND = Not detected at or above reporting limit.

QA/QC SUMMARY

RPD, %	<1
RECOVERY, %	88

Curtis & Tompkins, Ltd

LABORATORY NUMBER: 100461
CLIENT: HARDING LAWSON ASSOCIATES
JOB #: 18452,016.02
LOCATION: WAREHAM/63rd ST.

DATE RECEIVED: 05/11/90
DATE EXTRACTED: 05/16/90
DATE ANALYZED: 05/18/90
DATE REPORTED: 05/18/90

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

LAB ID	CLIENT ID	KEROSENE RANGE (mg/L)	DIESEL RANGE (mg/L)	REPORTING LIMIT (mg/L)
100461-1	90051101	ND	8.4	0.5

ND = Not detected at or above reporting limit.

QA/QC SUMMARY

RPD, %	12
RECOVERY, %	77

Curtis & Tompkins, Ltd

LABORATORY NUMBER: 100461
CLIENT: HARDING LAWSON ASSOCIATES
JOB #: 18452,016.02
SAMPLE ID: 90051101

DATE RECEIVED: 05/11/90
DATE ANALYZED: 05/18/90
DATE REPORTED: 05/18/90

EPA METHOD 8240: VOLATILE ORGANICS IN WATER
Extraction Method: EPA 5030 - Purge & Trap

COMPOUND	Result ug/L	Reporting Limit ug/L
chloromethane	ND	10
bromomethane	ND	10
vinyl chloride	ND	10
chloroethane	ND	10
methylene chloride	ND	5.0
acetone	ND	10
carbon disulfide	ND	5.0
trichlorofluoromethane	ND	5.0
1,1-dichloroethene	ND	5.0
1,1-dichloroethane	ND	5.0
1,2-dichloroethene (total)	ND	5.0
chloroform	ND	5.0
1,2-dichloroethane	ND	5.0
2-butanone	ND	10
1,1,1-trichloroethane	ND	5.0
carbon tetrachloride	ND	5.0
vinyl acetate	ND	10
bromodichloromethane	ND	5.0
1,2-dichloropropane	ND	5.0
cis-1,3-dichloropropene	ND	5.0
trichloroethylene	ND	5.0
dibromochloromethane	ND	5.0
1,1,2-trichloroethane	ND	5.0
benzene	ND	5.0
trans-1,3-dichloropropene	ND	5.0
2-chloroethylvinyl ether	ND	10
bromoform	ND	5.0
2-hexanone	ND	10
4-methyl-2-pentanone	ND	10
1,1,2,2-tetrachloroethane	ND	5.0
tetrachloroethylene	ND	5.0
toluene	ND	5.0
chlorobenzene	ND	5.0
ethyl benzene	ND	5.0
styrene	ND	5.0
total xylenes	ND	5.0

ND = Not detected at or above reporting limit.

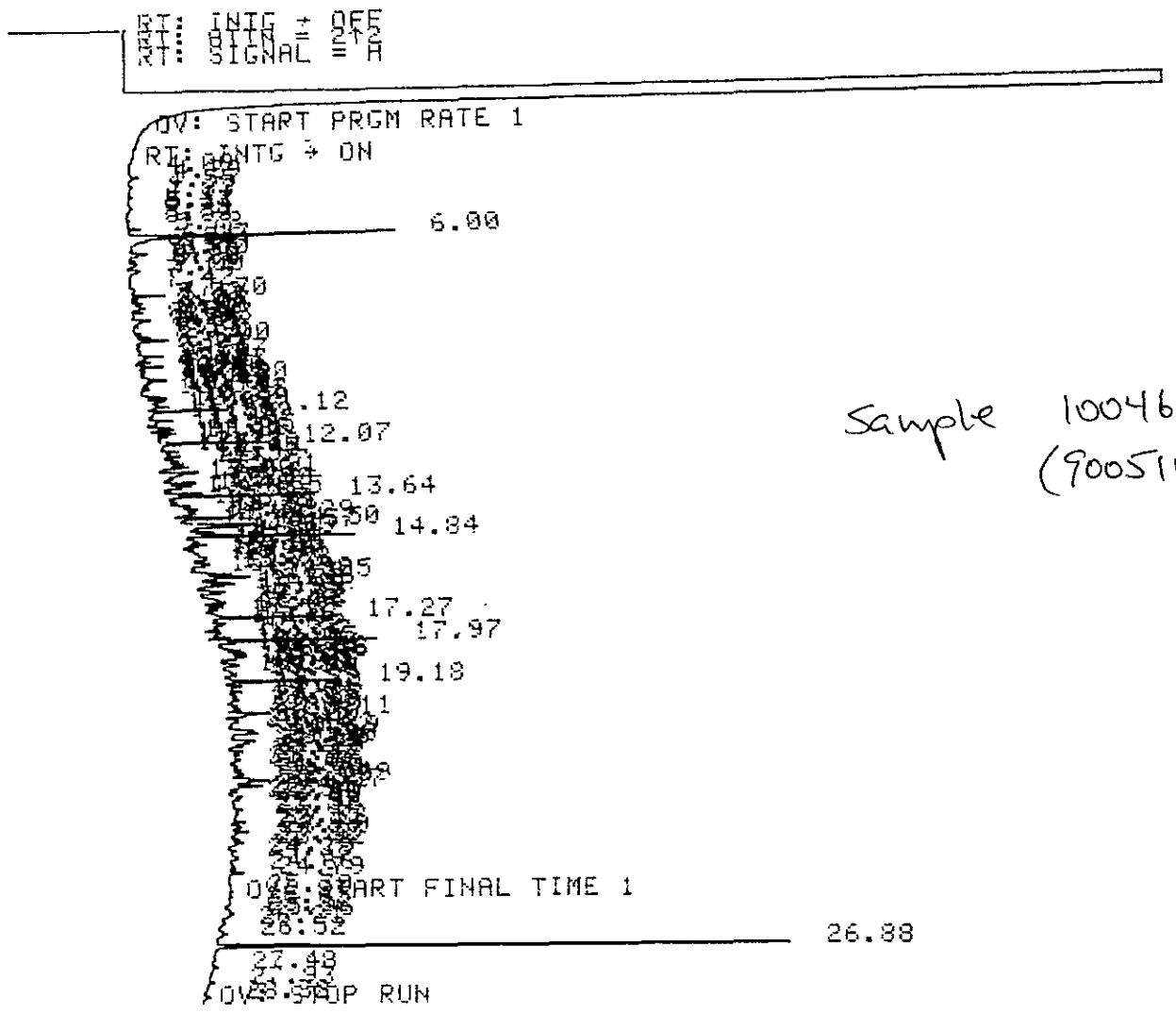
QA/QC SUMMARY: SURROGATE RECOVERIES

1,2-Dichloroethane-d4	109
Toluene-d8	97
Bromofluorobenzene	98

RUN

ENTER THE NUMBER OF THE FIRST BOTTLE: 25

ENTER THE NUMBER OF THE LAST BOTTLE: 25
OVEN TEMP NOT READY
INJ 2 TEMP NOT READY



Sample 100461-1
(90051101)

[hp] 5880A SAMPLER INJECTION @ 09:44 MAY 18, 1990
SAMPLE # : ID CODE :
25

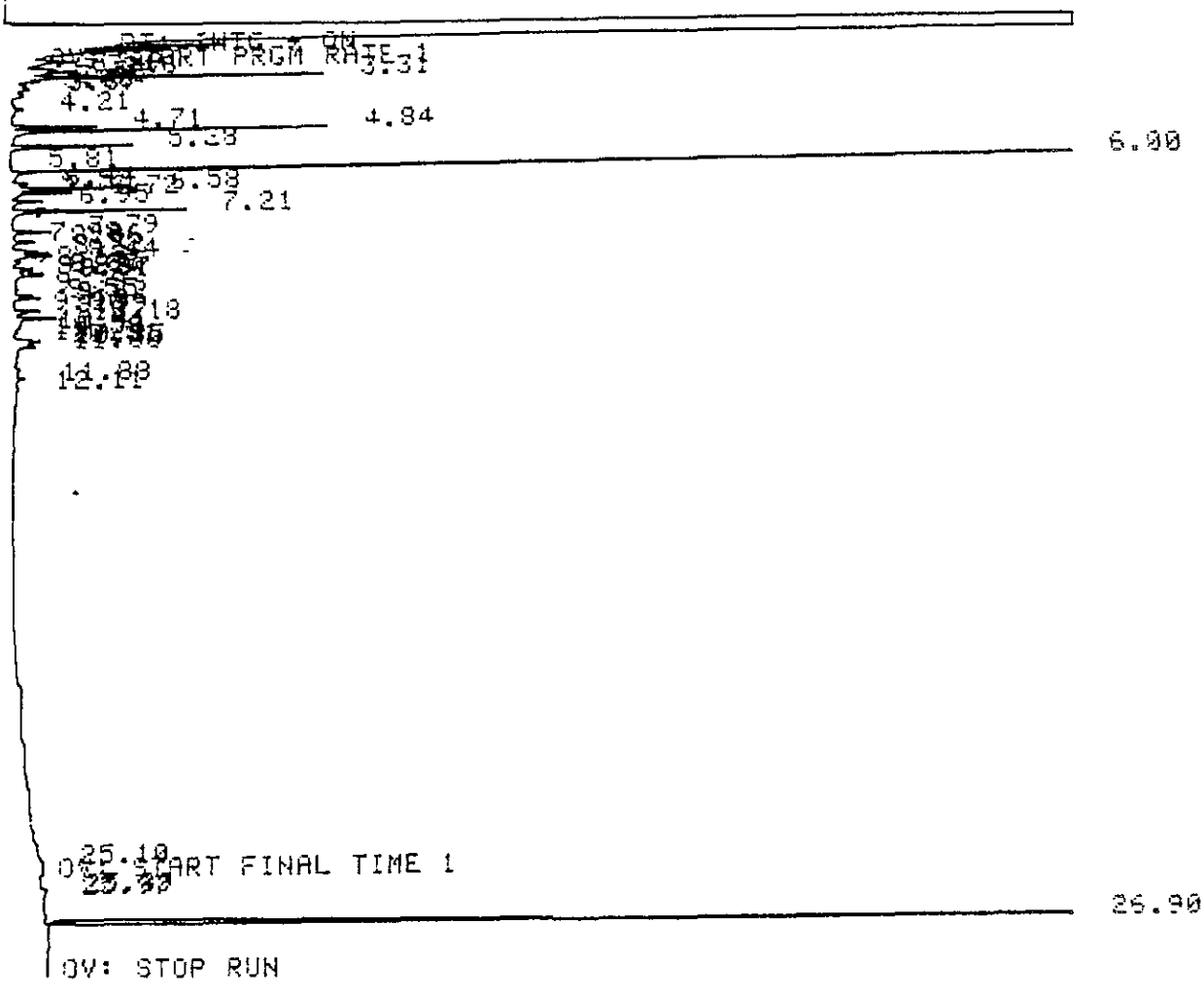
ESTD

RT	EXP RT	AREA	TYPE	WIDTH	CAL	AMOUNT	NAME
0.00			BASELINE @ START RUN = 9.25				
0.00			THRESHOLD @ START RUN = -1				
0.00			PEAK WIDTH @ START RUN = 0.04				
0.01			RT: INTG = OFF				
3.90			RT: INTG = ON				
4.09		0.57	BB	-----		0.567	
4.29		1.14	BB	-----		1.144	
4.55		1.14	BB	-----		1.137	
4.83		1.07	BB	-----		1.075	
5.11		0.57	BB	-----		0.568	

ER THE NUMBER OF THE FIRST BOTTLE: 11

ENTER THE NUMBER OF THE LAST BOTTLE: 11

RT: INTG = OFF
RT: BLN = 2^5
RT: SIGNAL = A

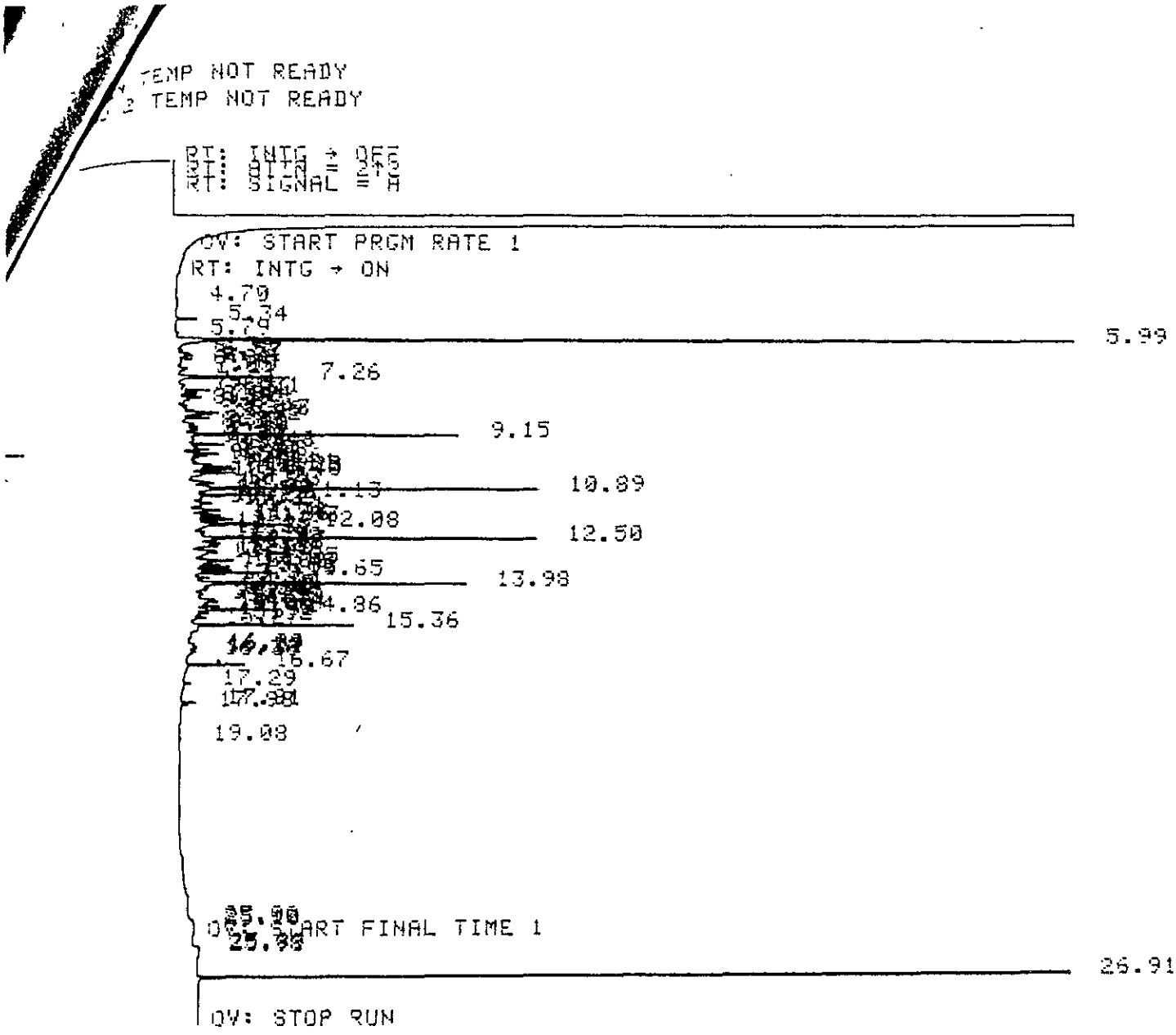


[hp] 5880A SAMPLER INJECTION @ 11:12 MAY 18, 1990
SAMPLE # : ID CODE :
11 GAS219

Gasoline 219 ppm

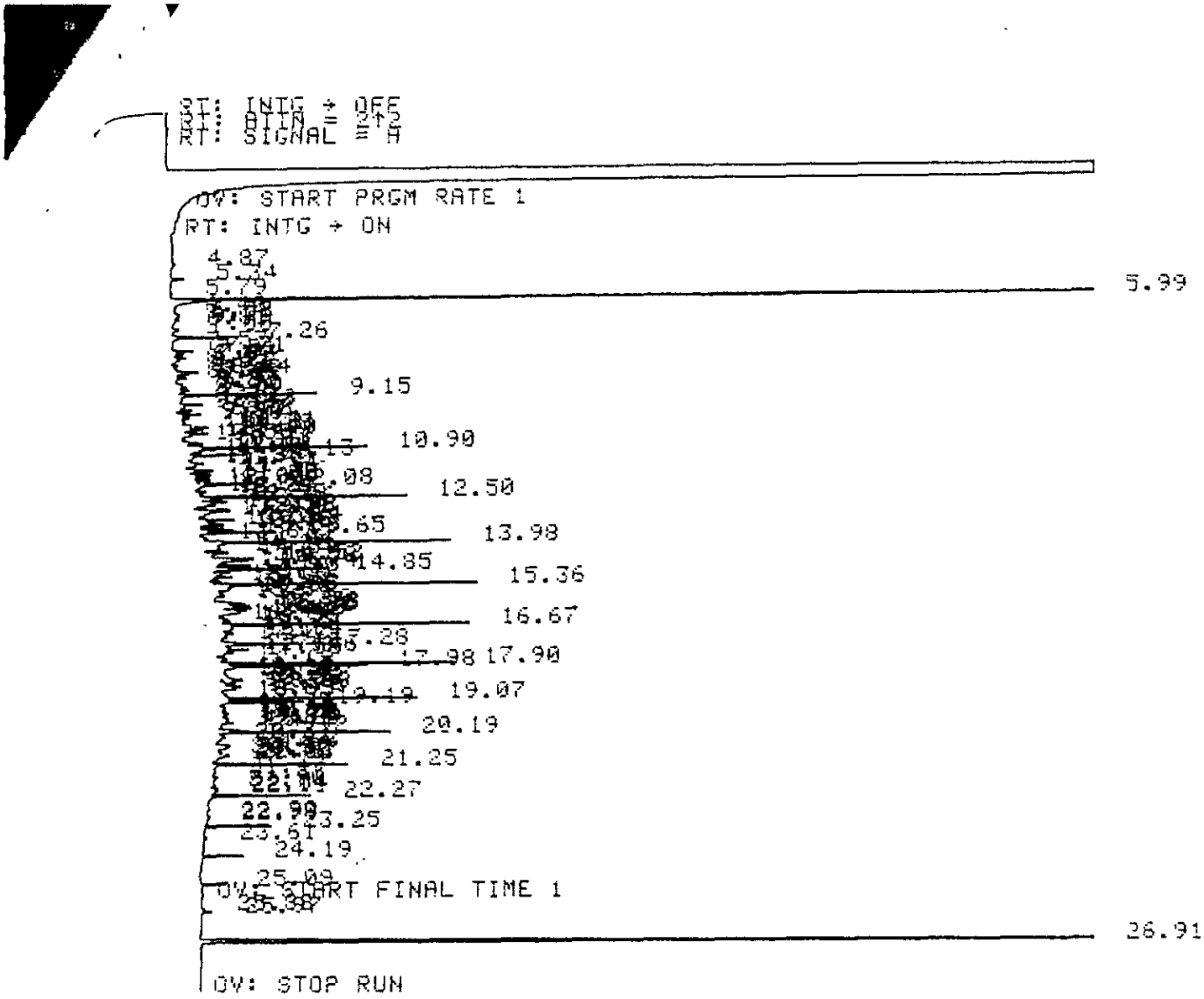
ESTD

RT	EXP RT	AREA	TYPE	WIDTH	CAL	AMOUNT	NAME
0.00			BASELINE @ START RUN = 8.91				
0.00			THRESHOLD @ START RUN = -1				
0.00			PEAK WIDTH @ START RUN = 0.04				
0.01			RT: INTG = OFF				
2.60			RT: INTG = ON				
2.87		10.72	BB	0.071		10.716	
3.09		4.85	BV	-----		4.848	
3.16		9.56	VV	-----		9.565	
3.24		4.23	VV	-----		4.231	
3.31		50.02	VV	0.047		50.019	
3.45		4.02	VB	-----		4.021	
3.58		2.62	BV	-----		2.621	
3.67		3.28	VB	-----		3.282	
4.21		2.28	BB	-----		2.280	



[hp] 5880A SAMPLER INJECTION @ 19:03 MAY 17, 1990
SAMPLE # : ID CODE :
3 KEROS246 Kerosene 246 ppm
REF NOT FOUND
METHOD ABORTED
AREA %

RT	AREA	TYPE	WIDTH	HEIGHT	BASELINE	AREA %
0.00			BASELINE @ START RUN = 8.53			
0.00			THRESHOLD @ START RUN = -1			
0.00			PEAK WIDTH @ START RUN = 0.04			
0.01			RT: INTG → OFF			
3.90			RT: INTG → ON			
4.70	0.86	BB	-----	0.28	8.59	0.982
5.34	4.26	BB	0.044	1.52	8.58	0.410
5.79	1.09	BB	-----	0.40	8.56	0.105
5.99	213.85	BB	0.038	87.39	9.07	20.543
6.39	1.05	BB	-----	0.44	8.72	0.100
6.52	2.79	BV	-----	0.87	8.76	0.268
6.57	3.19	VP	-----	1.00	8.77	0.307
6.71	2.11	PB	-----	0.93	8.81	0.202
6.81	0.42	BB	-----	0.20	8.89	0.041



[hp] 5880A SAMPLER INJECTION @ 19:41 MAY 17, 1990
SAMPLE # : ID CODE :
4 DIES513 Diesel 513 ppm
REF NOT FOUND
METHOD ABORTED
AREA %

RT	AREA	TYPE	WIDTH	HEIGHT	BASELINE	AREA %
0.00			BASELINE @ START RUN = 8.75			
0.00			THRESHOLD @ START RUN = -1			
0.00			PEAK WIDTH @ START RUN = 0.04			
0.01			RT: INTG + OFF			
3.90			RT: INTG + ON			
4.87	1.51	BB	-----	0.36	8.99	0.119
5.34	2.91	BB	-----	0.92	8.94	0.230
5.79	0.85	BB	-----	0.34	8.88	0.067
5.99	233.26	BB	0.04 +	92.19	9.01	18.458
6.40	0.36	BB	-----	0.17	9.04	0.028
6.52	1.79	BV	-----	0.55	9.07	0.141
6.58	1.83	VB	-----	0.56	9.07	0.145
6.71	1.09	BB	-----	0.50	9.08	0.086
6.81	0.38	BB	-----	0.18	9.13	0.030
7.00	0.89	BB	-----	0.41	9.17	0.070
7.26	10.28	BB	0.040	4.06	9.39	0.813

Harding Lawson Associates
7655 Redwood Boulevard
P.O. Box 578
Novato, California 94948
415/892-0821
Telecopy: 415/892-0831
Telex 340523

CHAIN OF CUSTODY FORM

Lab: Curtis & Tompkins 10046

Samplers: James W. Anderson

Job Number: 18452.016.02

Name/Location: Wareham / L 3rd St.

Project Manager: Diana Dickerson

Recorder: James W. Anderson (Signature Required)

SOURCE CODE	MATRIX: Water	Sediment	Soil	Oil	#CONTAINERS & PRESERV.: Unpres.	H_2SO_4	HNO_3	SAMPLE NUMBER OR LAB NUMBER: Yr	Wk	Seq	DATE: Yr	Mo	Dy	Time	STATION DESCRIPTION/ NOTES	ANALYSIS REQUESTED: EPA 601/8010	EPA 602/8020	EPA 624/8240	EPA 625/8270	Priority Pllnt. Metals	Benzene/Toluene/Xylene	Total Petrol. Hydrocarb.	EPA 8015 (TVH & TEH)
SW	X				4			90	05	101	90	05	11	1245				X					X
SW																							

LAB NUMBER: Yr	Wk	Seq	DEPTH IN FEET	COL MTD CD	QA CODE	MISCELLANEOUS
						Request detection limits of 50 ppb for TVH & TEH
						One week turn around time - Contact Diana Dickerson w/ results

CHAIN OF CUSTODY RECORD

RELINQUISHED BY: (Signature)	RECEIVED BY: (Signature)	DATE/TIME
RELINQUISHED BY: (Signature)	RECEIVED BY: (Signature)	DATE/TIME
RELINQUISHED BY: (Signature)	RECEIVED BY: (Signature)	DATE/TIME
RELINQUISHED BY: (Signature)	RECEIVED BY: (Signature)	DATE/TIME
DISPATCHED BY: (Signature) DATE/TIME: 5/11/95 13:54	RECEIVED FOR LAB BY: (Signature)	DATE/TIME: 5/11/95 2007
METHOD OF SHIPMENT		

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

6533

Enseco
A CORNING Company

May 21, 1990
Lab ID: 052828

Diana Dickerson
Harding Lawson Associates
200 Rush Landing Road
Novato, CA 94948

Dear Ms. Dickerson:

Enclosed is the report for the two aqueous samples for your Wareham 63rd Street Project, under Job Number 18452,016.02, which were received at Enseco-Cal Lab on 11 May 1990.

The report consists of the following sections:

I Sample Description
II Analysis Request
III Quality Control Report
IV Analysis Results

Preliminary analytical results were transferred in their entirety via facsimile on 17 May 1990 per your request.

The requested analytical reporting limits were not always technically achievable due to the nature of the sample matrix. The 8240 GC/MS library search indicated numerous branched-alkane compounds present in the sample and these "Tentatively Identified Compounds" have been reported free-of-charge. This situation was discussed in our 17 May 1990 phone conversation.

Please note, three additional VOA vials were received with the project samples. These VOA vials were neither identified on the container label nor listed on the project chain of custody.

If you have any questions, please feel free to call.

Sincerely,

Roy W. Roenbeck
Program Administrator

sf

Enseco Incorporated
2544 Industrial Boulevard
West Sacramento, California 95691
916/372-1393 Fax: 916/372-7768

I Sample Description

See the attached Sample Description Information.

The samples were received under chain-of-custody.

II Analysis Request

The following analytical tests were requested.

Lab ID	Analysis Description
052828-0001	Volatile Organics
	Gasoline
	Total Petroleum Hydrocarbons (Extractable)

III Quality Control

A. Project Specific QC. No project specific QC (i.e., spikes and/or duplicates) was requested.

B. Method Blank Results. A method blank is a laboratory-generated sample which assesses the degree to which laboratory operations and procedures cause false-positive analytical results for your samples.

No target parameters were detected in the method blanks associated with your samples at the reporting limit levels noted on the Method Blank Report.

C. Laboratory Control Samples - The LCS Program

Duplicate Control Samples. A DCS is a well-characterized matrix (blank water, sand or celite) which is spiked with certain target parameters and analyzed at approximately 10% of the sample load in order to establish method-specific control limits. The DCS results associated with your samples are on the attached Duplicate Control Sample Report.

Single Control Sample. An SCS consists of a control matrix that is spiked with surrogate compounds appropriate to the method being used. In cases where no surrogate is available, (e.g. metals or conventional analyses) a single control sample identical to the DCS serves as the control sample. An SCS is prepared for each sample lot. Accuracy is calculated identically to the DCS. The SCS results associated with your samples are on the attached Single Control Sample Report.

Accuracy is measured by Percent Recovery as in:

$$\% \text{ recovery} = \frac{(\text{measured concentration})}{(\text{actual concentration})} \times 100$$

Precision is measured using duplicate tests by Relative Percent Difference (RPD) as in:

$$RPD = \frac{(\% \text{ recovery test 1} - \% \text{ recovery test 2})}{(\% \text{ recovery test 1} + \% \text{ recovery test 2})/2} \times 100$$

Control limits for accuracy (percent recovery) are based on the average, historical percent recovery +/-3 standard deviation units. Control limits for precision (relative percent difference) range from 0 (identical duplicate DCS results) to the average, historical relative percent difference + 3 standard deviation units. In cases where there is not enough historical data, EPA limits or advisory limits are set, with the approval of the Quality Assurance department.

IV Analysis Results

Test methods may include minor modifications of published EPA Methods such as reporting limits or parameter lists. Reporting limits are adjusted to reflect dilution of the sample, when appropriate. Solid and waste samples are reported on an "as received" basis, i.e., no correction is made for moisture content, unless the method requires or the client requests that such correction be made.

Results are on the attached data sheets.

Enseco
A CORNING Company

SAMPLE DESCRIPTION INFORMATION
for
Harding Lawson Associates Novato

Lab ID	Client ID	Matrix	Sampled Date	Sampled Time	Received Date
052828-0001-SA	90051102 mw-2	AQUEOUS	11 MAY 90	12:58	11 MAY 90
052828-0002-SA	NO SAMPLE ID	AQUEOUS			11 MAY 90

Enseco
A CORNING Company

QC LOT ASSIGNMENT REPORT
Volatile Organics by GC/MS

Laboratory Sample Number	QC Matrix	QC Category	QC Lot Number (DCS)	QC Run Number (SCS/BLANK)
052828-0001-SA	AQUEOUS	624-A	24 APR 90-02A	15 MAY 90-02A

Enseco
A CORNING Company

METHOD BLANK REPORT
Volatile Organics by GC/MS

Test: 8240-TCL-A
Matrix: AQUEOUS
QC Lot: 24 APR 90-02A QC Run: 15 MAY 90-02A

Analyte	Result	Units	Reporting Limit
Chloromethane	ND	ug/L	10
Bromomethane	ND	ug/L	10
Vinyl chloride	ND	ug/L	10
Chloroethane	ND	ug/L	10
Methylene chloride	ND	ug/L	5.0
Acetone	ND	ug/L	10
Carbon disulfide	ND	ug/L	5.0
1,1-Dichloroethene	ND	ug/L	5.0
1,1-Dichloroethane	ND	ug/L	5.0
1,2-Dichloroethene (cis/trans)	ND	ug/L	5.0
Chloroform	ND	ug/L	5.0
1,2-Dichloroethane	ND	ug/L	5.0
2-Butanone	ND	ug/L	10
1,1,1-Trichloroethane	ND	ug/L	5.0
Carbon tetrachloride	ND	ug/L	5.0
Vinyl acetate	ND	ug/L	10
Bromodichloromethane	ND	ug/L	5.0
1,2-Dichloropropane	ND	ug/L	5.0
cis-1,3-Dichloropropene	ND	ug/L	5.0
Trichloroethene	ND	ug/L	5.0
Dibromochloromethane	ND	ug/L	5.0
1,1,2-Trichloroethane	ND	ug/L	5.0
Benzene	ND	ug/L	5.0
trans-1,3-Dichloropropene	ND	ug/L	5.0
2-Chloroethyl vinyl ether	ND	ug/L	10
Bromoform	ND	ug/L	5.0
4-Methyl-2-pentanone	ND	ug/L	10
2-Hexanone	ND	ug/L	10
1,1,2,2-Tetrachloroethane	ND	ug/L	5.0
Tetrachloroethene	ND	ug/L	5.0
Toluene	ND	ug/L	5.0
Chlorobenzene	ND	ug/L	5.0
Ethyl benzene	ND	ug/L	5.0
Styrene	ND	ug/L	5.0
Xylenes (total)	ND	ug/L	5.0

DUPLICATE CONTROL SAMPLE REPORT
Volatile Organics by GC/MS

Analyte	Concentration Spiked	Measured DCS1	Measured DCS2	AVG	Accuracy Average(%) DCS	Accuracy Limits	Precision (RPD) DCS	Precision Limit
Category: 624-A Matrix: AQUEOUS QC Lot: 24 APR 90-02A Concentration Units: ug/L								
1,1-Dichloroethene	50	54.9	52.5	53.7	107	61-145	4.5	14
Trichloroethene	50	52.6	50.2	51.4	103	71-120	4.7	14
Benzene	50	54.4	52.7	53.6	107	76-127	3.2	11
Toluene	50	51.3	49.6	50.4	101	76-125	3.4	13
Chlorobenzene	50	54.5	53.0	53.8	108	75-130	2.8	13

Calculations are performed before rounding to avoid round-off errors in calculated results.

SINGLE CONTROL SAMPLE REPORT
Volatile Organics by GC/MS

Analyte	Concentration Spiked	Concentration Measured	Accuracy(%) SCS	Accuracy(%) Limits
Category: 624-A				
Matrix: AQUEOUS				
QC Lot: 24 APR 90-02A QC Run: 15 MAY 90-02A				
Concentration Units: ug/L				
1,2-Dichloroethane-d4	50.0	52.0	104	76-114
4-Bromofluorobenzene	50.0	51.3	103	86-115
Toluene-d8	50.0	49.2	98	88-110

Calculations are performed before rounding to avoid round-off errors in calculated results.

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QC LOT ASSIGNMENT REPORT
Volatile Organics by GC

Laboratory Sample Number	QC Matrix	QC Category	QC Lot Number (DCS)	QC Run Number (SCS/BLANK)
052828-0001-SA	AQUEOUS	TPH-GAS-A	07 MAY 90-A	15 MAY 90-19A

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METHOD BLANK REPORT
Volatile Organics by GC

Analyte	Result	Units	Reporting Limit
Test: TPH-GC-GAS-A			
Matrix: AQUEOUS			
QC Lot: 07 MAY 90-A QC Run: 15 MAY 90-A			
Gasoline	ND	ug/L	50

DUPLICATE CONTROL SAMPLE REPORT
Volatile Organics by GC

Analyte	Concentration Spiked	Measured DCS1	Measured DCS2	Measured AVG	Accuracy Average(%) DCS	Accuracy Limits	Precision (RPD) DCS	Precision Limit
Category: TPH-GAS-A Matrix: AQUEOUS QC Lot: 07 MAY 90-A Concentration Units: ug/L								
Gasoline	5000	5360	5360	5360	107	81-114	0.0	13

Calculations are performed before rounding to avoid round-off errors in calculated results.

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QC LOT ASSIGNMENT REPORT
Semivolatile Organics by GC

Laboratory Sample Number	QC Matrix	QC Category	QC Lot Number (DCS)	QC Run Number (SCS/BLANK)
052828-0001-SA	AQUEOUS	TPH-D-A	09 MAY 90-A	14 MAY 90-A

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METHOD BLANK REPORT
Semivolatile Organics by GC

Analyte	Result	Units	Reporting Limit
Test: TPH-GC-D-A			
Matrix: AQUEOUS			
QC Lot: 09 MAY 90-A QC Run: 14 MAY 90-A			
Kerosene	ND	mg/L	0.10
Stoddard Solvent	ND	mg/L	0.10
Aviation Fuel (JP4)	ND	mg/L	0.10
Diesel Fuel	ND	mg/L	0.10
Unknown Hydrocarbons	ND	mg/L	0.10

DUPLICATE CONTROL SAMPLE REPORT
Semivolatile Organics by GC

Analyte	Concentration Spiked	Measured DCS1	Measured DCS2	Measured AVG	Accuracy Average(%) DCS	Accuracy Limits	Precision (RPD) DCS	Precision Limit
Category: TPH-D-A Matrix: AQUEOUS QC Lot: 09 MAY 90-A Concentration Units: mg/L								
Diesel Fuel	5000	3630	3560	3600	72	50-130	1.9	40

Calculations are performed before rounding to avoid round-off errors in calculated results.

SINGLE CONTROL SAMPLE REPORT
Semivolatile Organics by GC

Analyte	Concentration Spiked	Concentration Measured	Accuracy(%) SCS	Accuracy(%) Limits
Category: TPH-D-A				
Matrix: AQUEOUS				
QC Lot: 09 MAY 90-A QC Run: 14 MAY 90-A				
Concentration Units: mg/L				
Diesel Fuel	5.00	4.78	96	50-130

Calculations are performed before rounding to avoid round-off errors in calculated results.

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TCL Volatile Organics

Method 8240

Client Name: Harding Lawson Associates Novato
Client ID: 90051102
Lab ID: 052828-0001-SA Enseco ID: 149029
Matrix: AQUEOUS Sampled: 11 MAY 90 Received: 11 MAY 90
Authorized: 11 MAY 90 Prepared: NA Analyzed: 15 MAY 90

Parameter	Result	Units	Reporting Limit	
Chloromethane	ND	ug/L	20	j
Bromomethane	ND	ug/L	20	
Vinyl chloride	ND	ug/L	20	
Chloroethane	ND	ug/L	20	
Methylene chloride	ND	ug/L	10	
Acetone	ND	ug/L	20	
Carbon disulfide	ND	ug/L	10	
1,1-Dichloroethene	ND	ug/L	10	
1,1-Dichloroethane	ND	ug/L	10	
1,2-Dichloroethene (cis/trans)	ND	ug/L	10	
Chloroform	ND	ug/L	10	
1,2-Dichloroethane	ND	ug/L	10	
2-Butanone	ND	ug/L	20	
1,1,1-Trichloroethane	ND	ug/L	10	
Carbon tetrachloride	ND	ug/L	10	
Vinyl acetate	ND	ug/L	20	
Bromodichloromethane	ND	ug/L	10	
1,2-Dichloropropane	ND	ug/L	10	
cis-1,3-Dichloropropene	ND	ug/L	10	
Trichloroethene	ND	ug/L	10	
Dibromochloromethane	ND	ug/L	10	
1,1,2-Trichloroethane	ND	ug/L	10	
Benzene	ND	ug/L	10	
trans-1,3-Dichloropropene	ND	ug/L	10	
2-Chloroethyl vinyl ether	ND	ug/L	20	
Bromoform	ND	ug/L	10	
4-Methyl-2-pentanone	ND	ug/L	20	
2-Hexanone	ND	ug/L	20	
1,1,2,2-Tetrachloroethane	ND	ug/L	10	
Tetrachloroethene	ND	ug/L	10	
Toluene	ND	ug/L	10	
Chlorobenzene	ND	ug/L	10	
Ethyl benzene	ND	ug/L	10	
Styrene	ND	ug/L	10	
Xylenes (total)	ND	ug/L	10	
1,2-Dichloroethane-d4	106	%	--	
Toluene-d8	98	%	--	
4-Bromofluorobenzene	113	%	--	

(continued on following page)

ND = Not detected
NA = Not applicable

Reported By: James Hedin Approved By: Phil Hartwick

The cover letter is an integral part of this report.
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TCL Volatile Organics (CONT.)

Method 8240

Client Name:	Harding Lawson Associates	Novato	
Client ID:	90051102		
Lab ID:	052828-0001-SA	Enseco ID: 149029	
Matrix:	AQUEOUS	Sampled: 11 MAY 90	Received: 11 MAY 90
Authorized:	11 MAY 90	Prepared: NA	Analyzed: 15 MAY 90

Note j : All Reporting Limits for this sample raised due to matrix interferences.

ND = Not detected
NA = Not applicable

Reported By: James Hedin Approved By: Phil Hartwick

The cover letter is an integral part of this report.
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Tentatively Identified Compounds

Method 8240

Lab Sample No. 052828-0001-SA

Compound Name or Type	Estimated Conc. ug/L	
Unknown	170	A
2,6-Dimethyl Octane	140	
Unknown	150	A
Unknown	220	A
2,6-Dimethyl Nonane	200	
Unknown	240	A
2,3-Dihydro-1-methyl 1H-Indene	210	
2,6-Dimethyl Undecane	270	

Note A : Identification of unknown compound not possible by spectral match.

Enseco
A CORNING Company

Total Petroleum Hydrocarbons (Gasoline)

Purge and Trap Method TPH-GC/FID

Client Name: Harding Lawson Associates Novato
Client ID: 90051102
Lab ID: 052828-0001-SA Enseco ID: 149029
Matrix: AQUEOUS Sampled: 11 MAY 90 Received: 11 MAY 90
Authorized: 11 MAY 90 Prepared: NA Analyzed: 15 MAY 90

Parameter	Result	Units	Reporting Limit
Gasoline	ND	ug/L	50

ND = Not detected
NA = Not applicable

Reported By: Kris Rogers Approved By: Marcia Reed

The cover letter is an integral part of this report.
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Total Petroleum Hydrocarbons (Diesel)

Method 3510/GC/FID

Client Name: Harding Lawson Associates Novato
Client ID: 90051102
Lab ID: 052828-0001-SA Enseco ID: 149029
Matrix: AQUEOUS Sampled: 11 MAY 90 Received: 11 MAY 90
Authorized: 11 MAY 90 Prepared: 14 MAY 90 Analyzed: 15 MAY 90

Parameter	Result	Units	Reporting Limit	
Kerosene	ND	mg/L	2.5	R
Stoddard Solvent	ND	mg/L	2.5	
Aviation Fuel (JP4)	ND	mg/L	2.5	
Diesel Fuel	ND	mg/L	2.5	
Unknown Hydrocarbons	15	mg/L	1.0	1

Note R : Raised reporting limit(s) due to high analyte level(s).

Note 1 : The hydrocarbons present in this sample represent an unknown mixture in the range of about C-7 to C-23. Quantitation was based upon a diesel reference. This mixture elutes in the general range of diesel and the baseline rise is similar. However, specific diesel peaks are inconsistent with those found in the standard.

ND = Not detected
NA = Not applicable

Reported By: Sherry Barnash Approved By: Kris Rogers

The cover letter is an integral part of this report.
Rev 230787

Harding Lawson Associates
7655 Redwood Boulevard
P O Box 578
Novato California 94948
415 892-0821
Telecopy 415 892-0831
Telex 340523

CHAIN OF CUSTODY FORM

Lab: ENSECO

Samplers: JAMES W. ANDERSON

Job Number: 18452.016.02

Name/Location: WAREHAM / 163RD ST

Project Manager: DIANA DICKERSON

Recorder: James W. Anderson (Signature Required)

SOURCE CODE	MATRIX: Water	Sediment	Soil	Oil	#CONTAINERS & PRESERV.: Unpres.	H_2SO_4	HNO_3	HCl	SAMPLE NUMBER OR LAB NUMBER: Yr	Wk	Seq	DATE: Yr	Mo	Dy	Time	STATION DESCRIPTION/ NOTES	ANALYSIS REQUESTED: EPA 601/8010	EPA 602/8020	EPA 624/8240	EPA 625/8270	Priority Pllnt. Metals	Benzene/Toluene/Xylene	Total Petrol. Hydrocarb.	EPA 8015 (TVH & TEH)
23	X				2		6		900511	029		900511			1258	Note: 3-40 VOAs rec'd w/o sample ID & not listed on COC. All other samples rec'd in good condition			X					X

LAB NUMBER: Yr	Wk	Seq	DEPTH IN FEET	COL MTD CD	QA CODE	MISCELLANEOUS
						REQUEST DETECTION LIMITS OF 50 ppb FOR TVH & TEH.
						ONE WEEK TURN AROUND TIME. CONTACT DIANA DICKERSON W/RESULTS

CHAIN OF CUSTODY RECORD

RELINQUISHED BY: (Signature)	RECEIVED BY: (Signature)	DATE/TIME
James W. Anderson	Dudley S Silva	5-11-90 15:58
RELINQUISHED BY: (Signature)	RECEIVED BY: (Signature)	DATE/TIME
RELINQUISHED BY: (Signature)	RECEIVED BY: (Signature)	DATE/TIME
RELINQUISHED BY: (Signature)	RECEIVED BY: (Signature)	DATE/TIME
DISPATCHED BY: (Signature) DATE/TIME	RECEIVED FOR LAB BY: (Signature)	DATE/TIME
METHOD OF SHIPMENT		5/11/90 1830

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

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