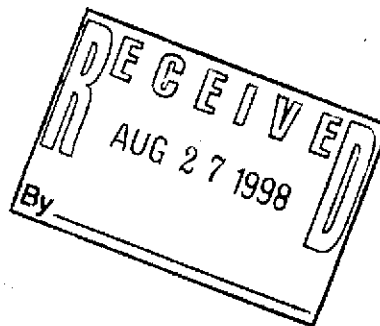


Harding Lawson Associates



June 16, 1992

I.P. No. 16419

Alameda County Department of
Environmental Health
80 Swan Way, Room 210
Oakland, California 94621

Attention: Ms. Susan Hugo

California Regional Water Quality Control Board
San Francisco Bay Region
2101 Webster Street, Suite 500
Oakland, California 94612

Attention: Mr. Rich Hiatt

Dear Ms. Hugo and Mr. Hiatt:

**Response to Request for Work Plan
Hydrocarbon Release from
Underground Storage Tanks
Chinatown Redevelopment Project Area
Oakland, California**

This letter report has been prepared by Harding Lawson Associates (HLA) on behalf of the Redevelopment Agency of the City of Oakland (Agency). It responds to a letter dated January 13, 1992, from the Alameda County Department of Environmental Health (ACDEH) to Pacific Renaissance Associates II (PRA II) and the City of Oakland (City). The letter requested, among other items, submittal of a work plan to characterize the extent of soil contamination associated with the release of petroleum hydrocarbons from underground storage tanks (USTs) near the corner of Franklin Street and the former location of 10th Street, Oakland (Plate 1) in the Chinatown Redevelopment Project Area (Project Area), and to investigate whether groundwater has been affected by releases from the USTs.

BACKGROUND

During excavation for installation of service ducts as part of construction at the Pacific Renaissance Plaza (PRP) site, two USTs were discovered in the sidewalk area adjacent to the site, on the east side of Franklin Street and north of the former location of 10th Street. The tanks were approximately 10 feet long by 6 feet in diameter and buried approximately 6 to 12 feet below ground surface (bgs).

Engineers
and
Geoscientists

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June 16, 1992

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Alameda County Department of
Environmental Health

Ms. Susan Hugo

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After removal of the tanks, three samples were collected, one of stockpiled soil from above the tanks, and one from below the former location of each tank. Samples were analyzed by EPA Test Methods 3550/5030, 8020, 8240, and 8270, for hazardous waste characteristics, and for cyanide, cadmium, chromium, lead, nickel, and zinc. Analyses were performed by NET Pacific, Inc., a California-certified laboratory in Santa Rosa, California. Sample results indicated the presence of petroleum hydrocarbons in the gasoline and diesel ranges and trace levels of the chlorinated hydrocarbons trichloroethene (TCE) and 1,1,1-trichloroethane (1,1,1-TCA). Results, presented in NET Pacific's laboratory report dated December 27, 1991, are attached to this letter (Attachment A).

At the request of ACDEH staff and as discussed at a December 24, 1991, meeting among representatives of ACDEH, the California Regional Water Quality Control Board, San Francisco Bay Region (RWQCB), PRA II, and HLA, additional samples were collected at the base of the duct excavation, approximately 20 feet bgs. Four soil samples were collected in each of four areas and were composited by NET into four samples which were analyzed by EPA Test Methods 3550/5030, 8010, 8020, and 8270. Results indicated nondetectable or low (<2 milligrams/kilogram [mg/kg]) concentrations of petroleum hydrocarbons in three of the four composites. The composite from the northernmost area indicated the presence of petroleum hydrocarbons as gasoline and diesel at concentrations of 420 and 52 mg/kg, respectively. No chlorinated hydrocarbons were detected in the samples. Laboratory analytical results are presented in NET's laboratory report dated January 22, 1992, and are included in this letter as Attachment B.

OBJECTIVES AND SCOPE OF THIS REPORT

The overall objective of this report is to respond to the request for a work plan presented in Item 3) of a letter dated January 13, 1992, from ACDEH to PRA II and the City. In discussions with Paul Smith of ACDEH, it was agreed that an acceptable response to the request could consist of a plan that does not propose additional soil borings or monitoring well installations, with the rationale to support such a plan. This approach has been followed in this report. The scope of this report includes the following items:

- o Description of the known extent of petroleum hydrocarbons in soil and groundwater near the former location of the USTs;
- o Discussion of groundwater flow directions in the Project Area in general and near the former tank locations in particular; and
- o Presentation of recommendations for additional monitoring in the Project Area and a rationale indicating that the existing characterization of the extent of hydrocarbons is sufficient.

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Discussions of the hydrocarbon extent and groundwater flow direction draw on:

- Observations and analytical results from excavation and shoring stages of construction of the East Bay Municipal Utility District (EBMUD) administration building and the adjacent PRP building;
- Observations and analytical results from excavation for removal of the USTs at the PRP site; and
- Results of periodic groundwater monitoring in the Project Area from March 1988 to the present, as reported to the RWQCB.

NATURE AND EXTENT OF PETROLEUM HYDROCARBONS IN SOIL

Results of laboratory analyses of soil samples from near the USTs indicate the presence of petroleum hydrocarbons in the gasoline and diesel ranges (Attachment A). The area containing soils showing the presence of hydrocarbons based on laboratory analysis is closely correlated with soils showing sensory evidence of hydrocarbons such as odor or staining. The area containing these soils is referred to here as the release area. With the exception of one sample collected immediately below one UST, laboratory results do not indicate chlorinated hydrocarbons or other chemicals of concern were present in the release area.

The current and historical areal extent of elevated levels of petroleum hydrocarbons in soil in the vicinity of the USTs is presented on Plate 1. The historical extent of hydrocarbons within EBMUD and PRP property boundaries is based on observations made during excavation activities when soils containing petroleum hydrocarbons were encountered between 20 to 30 feet bgs. No soil containing petroleum hydrocarbons remains within the property boundaries, because the excavation depth for each building exceeded 30 feet (approximately 40 feet bgs for EBMUD and approximately 38 feet bgs for PRP).

The lateral extent of hydrocarbons in soil beyond the property boundaries has been estimated based on observations made during shoring construction activities for the two buildings and known migration patterns of hydrocarbons released at other locations in the Project Area. The lateral extent beneath Franklin Street, west of the EBMUD building, has been estimated based on observations of soil cutting returns from borings for soil nails, which are approximately 35 feet long and were drilled at an angle of approximately 30° below the horizontal. The lateral extent west of the PRP site has been estimated based on observations from 60-foot-long tieback borings, also drilled at angles of approximately 30° below the horizontal. The lateral extent is constrained to the southwest by the location of Monitoring Well MW-7. Observations made during installation of this well did not indicate that elevated levels of hydrocarbons were present in the soil (HLA, 1989).

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Hydrocarbon releases in the Project Area tend to migrate vertically downward to the water table and then laterally in the general direction of groundwater flow in the uppermost shallow aquifer. In this area, groundwater flow in the shallow aquifer prior to the construction of the two buildings is estimated to have been westerly (HLA, 1989); migration of gasoline released from USTs at the southeast corner of the PRP site (at 9th and Webster Streets) was also generally westerly (HLA, 1988). The estimation of the extent of hydrocarbons in soil (shown on Plate 1) draws on these previous observations.

The ambient westerly direction of groundwater flow was altered by EBMUD and PRP construction dewatering activities from March 1988 to July 1991. Recent measurements of groundwater elevations in the Project Area indicate that foundation and shoring features of the buildings have also had permanent effects on local groundwater flow directions, as shown on Plate 1. The primary contributor to these effects is the PRP building. The shoring design for the building includes a low-permeability soil-and-concrete wall that extends along the entire 9th Street property boundary and approximately 150 feet north along both Franklin and Webster Streets. The excavation for the building removed soil to a depth of 38 feet bgs to the top of a clay layer underlying the silty sands that comprise the uppermost, shallow aquifer in the Project Area. The building foundation was constructed directly on native soil at 38 feet bgs. For these reasons, the building acts as a barrier to groundwater flow, with shallow aquifer groundwater flowing around the structure.

The EBMUD building has a key difference in its foundation as compared to the PRP building: a 1-foot-thick drain blanket of coarse gravel was placed between native soil and the concrete mat foundation of the building. This gravel layer appears to provide good hydraulic connection beneath the EBMUD building; a groundwater flow pathway is believed to exist beneath the building.

The potentiometric contours shown on Plate 1 were constructed using water-level elevations measured in December 1991 and incorporate the estimated effect of the PRP building on groundwater flow. Measurements made in September 1991 and March 1992 show a generally similar pattern. Groundwater flow lines were constructed using the potentiometric contours, standard techniques of flow net construction, and Darcy's Law for groundwater flow. Key assumptions reflected in the flow net presented on Plate 1 include:

- o The PRP building acts as an impermeable barrier to regional groundwater flow. Groundwater flow theory states that flow lines will divide and flow around such an obstacle.
- o Flow around an impermeable barrier must be parallel to the boundary of the obstacle; otherwise, there would be a component of flow through the obstacle, which contradicts the fact that the building foundation is an impermeable

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barrier. This results in two flow lines, diverging around the building and running parallel to the building footprint.

- Flow lines are constructed perpendicular to potentiometric contours. This assumes that the aquifer of interest is homogeneous in its properties. Based on numerous soil borings, well installations, and foundation excavations in the Project Area, the shallow aquifer has been observed to comprise silty sands in this area and can be considered homogeneous.

Several key points can be drawn from examination of the resultant flow net.

- Groundwater flow is generally westerly in the Project Area but is diverted around the PRP building.
- Well MW-7 is positioned approximately 60 feet downgradient of the estimated lateral extent of the soil release area.

The observation that MW-7 is downgradient of the soil release area is further supported by groundwater chemistry data from samples collected in December 1991 and March 1992. The data indicate slightly elevated levels of total petroleum hydrocarbons (TPH) and gasoline constituents including benzene, toluene, ethylbenzene, and xylenes (BTEX) in groundwater at this location (HLA, 1992).

RESPONSE TO REQUEST FOR WORK PLAN

The following activities are proposed to monitor hydrocarbons in groundwater in the release area.

- Continue to monitor groundwater chemistry conditions at Well MW-7.
- Continue to monitor groundwater flow directions in the Project Area.

Additional soil borings or monitoring wells are not proposed in the release area. Further characterization of the extent of hydrocarbons in soil below Franklin Street is not proposed for the following reasons.

- The nature and extent of hydrocarbons in soil are adequately characterized for purposes of assessing the need for and possible types of remedial action.
- The objectives and benefits of further characterization have not been established. Discussion of possible responses to the existence of hydrocarbons beneath the public right-of-way is a prerequisite to assessing the need for and benefits of further characterization. In particular, it does not appear that further characterization will provide regulatory decision-makers with any

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information that will materially change the understanding of the problem or the options available for addressing the problem.

- o Groundwater elevation and chemistry data indicate that Well MW-7 is properly positioned to monitor groundwater conditions downgradient of the soil release area.
- o Subsurface exploration in the street is dangerous with respect to both health and safety and because of the presence of underground utilities. Franklin Street is an urban, high-volume traffic area; work in the street area exposes drilling crews and the public to unnecessary hazards. With respect to underground utilities, the Pacific Bell fiber optic cable beneath Franklin Street is of particular concern; this cable is a main telecommunications service link in the East Bay.

The Agency would be pleased to discuss this letter, its contents and any related issues at a time convenient for ACDEH and the RWQCB, and would be particularly interested in discussing ACDEH and RWQCB objectives with respect to further characterization of hydrocarbons in the release area.

If you have questions regarding this letter please call David Leland at (415) 899-7352 or Peter Chen of the Agency at (510) 238-3692.

Yours very truly,

HARDING LAWSON ASSOCIATES



David F. Leland, P.E.
Associate Engineer



R. Bruce Scheibach
Principal Hydrogeologist

DFL/RBS/mm/A22505-H

June 16, 1992
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Alameda County Department of
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Ms. Susan Hugo
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Attachments: A Laboratory Analytical Results of Soil Samples Below USTs
B Laboratory Analytical Results of Soil Samples Collected at Bottom of
Duct Excavation

Plate 1 - Plan of Sites and Vicinity and Groundwater Flow Net -
December 1991

cc: Ariu Levi, Alameda County Department of Environmental Health
Lester Feldman, California Regional Water Quality Control Board
Peter Chen, Redevelopment Agency of the City of Oakland
Donnell Choy, City of Oakland Attorney's Office
Julie Carver, City of Oakland Office of Public Works, Real Estate

References:

- Harding Lawson Associates, 1988. *Site Characterization, Pacific Renaissance Plaza, Chinatown Redevelopment Project Area, Oakland, California.* December 22.
- Harding Lawson Associates, 1989. *A-Aquifer Monitoring Report, Chinatown Redevelopment Project Area, Oakland, California.* January 31.
- Harding Lawson Associates, 1992. *Report of Groundwater Monitoring, December 1991, Chinatown Redevelopment Project Area, Oakland, California.* May 6.



NATIONAL
ENVIRONMENTAL
TESTING, INC.

NET Pacific, Inc.
435 Tesconi Circle
Santa Rosa, CA 95401
Tel: (707) 526-7200
Fax: (707) 526-9623

Dave Leland
Harding Lawson Associates
200 Rush Landing
Novato, CA 94947

Date: 12/27/1991
NET Client Acct. No: 28100
NET Pacific Log No: 91.1274
Received: 12/16/1991

Client Reference Information

Franklin St., Oakland, Job: 91005,928.02

Sample analysis in support of the project referenced above has been completed and results are presented on following pages. Please refer to the enclosed "Key to Abbreviations" for definition of terms. Should you have questions regarding procedures or results, please feel welcome to contact Client Services.

Approved by:

A handwritten signature in black ink, appearing to read "Jules Skamarack", is written over a horizontal line.

Jules Skamarack
Laboratory Manager

Enclosure(s)



Client Acct: 28100
 Client Name: Harding Lawson Associates
 NET Log No: 91.1274

Date: 12/27/1991
 Page: 2

NET Pacific, Inc

Ref: Franklin St., Oakland, Job: 91005,928.02

SAMPLE DESCRIPTION: 91121601
 Date Taken: 12/16/1991
 Time Taken: 12:05
 LAB Job No: (-108002)

Parameter	Method	Reporting Limit	Results	Units
pH - Corrosivity	150.1	N/A	7.5	pH units
Flashpoint/Ignitability	1010	80	>140	F
Oil & Grease (IR,Total)	5520C	50	6,300	mg/Kg
Oil & Grease (IR,Non-Polar)	5520CEF	50	6,300	mg/Kg
Cyanide (Total)	9010	0.2	ND	mg/Kg
Cadmium (ICP)	EPA 6010	2.0	ND	mg/Kg
Chromium (ICP)	EPA 6010	2.0	40	mg/Kg
Lead (GFAA)	EPA 7421	0.2	7.8	mg/Kg
Nickel (ICP)	EPA 6010	5.0	29	mg/Kg
Zinc (ICP)	EPA 6010	2.0	29	mg/Kg
TPH (Gas/BTXE,Solid)				
METHOD 5030 (GC,FID)				
DATE ANALYZED			12-18-91	
DILUTION FACTOR*			1	
as Gasoline	5030	1	1.5	mg/Kg
METHOD 8020 (GC,Solid)				
DATE ANALYZED			12-18-91	
DILUTION FACTOR*			1	
Benzene	8020	2.5	ND	ug/Kg
Ethlybenzene	8020	2.5	ND	ug/Kg
Toluene	8020	2.5	3.2	ug/Kg
Xylenes (Total)	8020	2.5	2.5	ug/Kg
METHOD 3550 (GC,FID)				
DILUTION FACTOR*			1	
DATE EXTRACTED			12-17-91	
DATE ANALYZED			12-18-91	
as Creosote	3550	10	ND	mg/Kg
as Diesel	3550	10	16	mg/Kg
as Motor Oil	3550	10	83	mg/Kg



NET Pacific, Inc

Ref: Franklin St., Oakland, Job: 91005,928.02

SAMPLE DESCRIPTION: 91121602
 Date Taken: 12/16/1991
 Time Taken: 14:40
 LAB Job No: (-108003)

Parameter	Method	Reporting Limit	Results	Units
pH - Corrosivity	150.1	N/A	8.0	pH units
Flashpoint/Ignitability	1010	80	88	F
Oil & Grease (IR,Total)	5520C	50	400	mg/Kg
Oil & Grease (IR,Non-Polar)	5520CEF	50	310	mg/Kg
Cyanide (Total)	9010	0.02	ND	mg/Kg
Cadmium (ICP)	EPA 6010	2.0	2.8	mg/Kg
Chromium (ICP)	EPA 6010	2.0	45	mg/Kg
Lead (GFAA)	EPA 7421	0.2	4.2	mg/Kg
Nickel (ICP)	EPA 6010	5.0	36	mg/Kg
Zinc (ICP)	EPA 6010	2.0	23	mg/Kg
TPH (Gas/BTXE,Solid)				
METHOD 5030 (GC,FID)			--	
DATE ANALYZED			12-18-91	
DILUTION FACTOR*			2,000	
as Gasoline	5030	1	19,000	mg/Kg
METHOD 8020 (GC,Solid)			--	
DATE ANALYZED			12-18-91	
DILUTION FACTOR*			2,000	
Benzene	8020	2.5	53,000	ug/Kg
Ethlybenzene	8020	2.5	150,000	ug/Kg
Toluene	8020	2.5	340,000	ug/Kg
Xylenes (Total)	8020	2.5	580,000	ug/Kg
METHOD 3550 (GC,FID)				
DILUTION FACTOR*			100	
DATE EXTRACTED			12-17-91	
DATE ANALYZED			12-18-91	
as Creosote	3550	10	ND	mg/Kg
as Diesel	3550	10	4,100	mg/Kg
as Motor Oil	3550	10	ND	mg/Kg



Client Acct: 28100
 Client Name: Harding Lawson Associates
 NET Log No: 91.1274

Date: 12/27/1991
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NET Pacific, Inc

Ref: Franklin St., Oakland, Job: 91005,928.02

SAMPLE DESCRIPTION: 91121602
 Date Taken: 12/16/1991
 Time Taken: 14:40
 LAB Job No: (-108003)

Parameter	Method	Reporting Limit	Results	Units
METHOD 8240(GCMS,Solid)				
DATE ANALYZED			12-19-91	
DILUTION FACTOR*			1250	
Benzene	8240	5	ND	ug/Kg
Acetone	8240	10	ND	ug/Kg
Bromodichloromethane	8240	5	ND	ug/Kg
Bromoform	8240	5	ND	ug/Kg
Bromomethane	8240	5	ND	ug/Kg
2-Butanone	8240	10	ND	ug/Kg
Carbon disulfide	8240	5	ND	ug/Kg
Carbon tetrachloride	8240	5	ND	ug/Kg
Chlorobenzene	8240	5	ND	ug/Kg
Chloroethane	8240	5	ND	ug/Kg
2-Chloroethyl vinyl ether	8240	10	ND	ug/Kg
Chloroform	8240	5	ND	ug/Kg
Chloromethane	8240	5	ND	ug/Kg
Dibromochloromethane	8240	5	ND	ug/Kg
1,2-Dichlorobenzene	8240	5	ND	ug/Kg
1,3-Dichlorobenzene	8240	5	ND	ug/Kg
1,4-Dichlorobenzene	8240	5	ND	ug/Kg
1,1-Dichloroethane	8240	5	ND	ug/Kg
1,2-Dichloroethane	8240	5	ND	ug/Kg
1,1-Dichloroethene	8240	5	ND	ug/Kg
trans-1,2-Dichloroethene	8240	5	ND	ug/Kg
1,2-Dichloropropane	8240	5	ND	ug/Kg
cis-1,3-Dichloropropene	8240	5	ND	ug/Kg
trans-1,3-Dichloropropene	8240	5	ND	ug/Kg
Ethyl benzene	8240	5	33,000	ug/Kg
2-Hexanone	8240	10	ND	ug/Kg
Methylene chloride	8240	5	ND	ug/Kg
4-Methyl-2-pentanone	8240	10	ND	ug/Kg
Styrene	8240	5	ND	ug/Kg
1,1,2,2-Tetrachloroethane	8240	5	ND	ug/Kg
Tetrachloroethene	8240	5	ND	ug/Kg
Toluene	8240	5	96,000	ug/Kg
1,1,1-Trichloroethane	8240	5	ND	ug/Kg
1,1,2-Trichloroethane	8240	5	ND	ug/Kg
Trichloroethene	8240	5	ND	ug/Kg
Trichlorofluoromethane	8240	5	ND	ug/Kg
Vinyl acetate	8240	10	ND	ug/Kg
Vinyl chloride	8240	5	ND	ug/Kg
Xylenes (total)	8240	5	460,000	ug/Kg
SURROGATE RESULTS				
Toluene-d8	8240		109	%
Bromofluorobenzene	8240		117	%
1,2-Dichloroethane-d4	8240		74	%



Client Acct: 28100
 Client Name: Harding Lawson Associates
 NET Log No: 91.1274

Date: 12/27/1991
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NET Pacific, Inc

Ref: Franklin St., Oakland, Job: 91005,928.02

SAMPLE DESCRIPTION: 91121602
 Date Taken: 12/16/1991
 Time Taken: 14:40
 LAB Job No: (-108003)

Parameter	Method	Reporting Limit	Results	Units
METHOD 8270(GCMS,Solid)				
DATE EXTRACTED			12-17-91	
DATE ANALYZED			12-18-91	
DILUTION FACTOR*			1	
Acenaphthene	8270	330	ND	ug/Kg
Acenaphthylene	8270	330	ND	ug/Kg
Aldrin	8270	1600	ND	ug/Kg
Anthracene	8270	330	ND	ug/Kg
Benzidine	8270	1600	ND	ug/Kg
Benzo(a)anthracene	8270	330	ND	ug/Kg
Benzo(b)fluoranthene	8270	330	ND	ug/Kg
Benzo(k)fluoranthene	8270	330	ND	ug/Kg
Benzo(a)pyrene	8270	330	ND	ug/Kg
Benzo(g,h,i)perylene	8270	330	ND	ug/Kg
Benzoic acid	8270	1600	ND	ug/Kg
Benzyol alcohol	8270	330	ND	ug/Kg
Butyl benzyl phthalate	8270	330	ND	ug/Kg
delta-BHC	8270	1600	ND	ug/Kg
gamma-BHC	8270	1600	ND	ug/Kg
bis(2-Chloroethyl)ether	8270	330	ND	ug/Kg
bis(2-Chloroethoxy)methan	8270	330	ND	ug/Kg
bis(2-Chloroisopropyl)eth	8270	330	ND	ug/Kg
bis(2-Ethylhexyl)phthalat	8270	330	ND	ug/Kg
4-Bromophenyl phenyl ethe	8270	330	ND	ug/Kg
4-Chloroaniline	8270	330	ND	ug/Kg
2-Chloronaphthalene	8270	330	ND	ug/Kg
4-Chlorophenyl phenyl eth	8270	330	ND	ug/Kg
Chrysene	8270	330	ND	ug/Kg
4,4'-DDD	8270	1600	ND	ug/Kg
4,4'-DDE	8270	1600	ND	ug/Kg
4,4'-DDT	8270	1600	ND	ug/Kg
Dibenzo(a,h)anthracene	8270	330	ND	ug/Kg
Dibenzofuran	8270	330	ND	ug/Kg
Di-n-butylphthalate	8270	330	ND	ug/Kg
1,2-Dichlorobenzene	8270	330	ND	ug/Kg
1,3-Dichlorobenzene	8270	330	ND	ug/Kg
1,4-Dichlorobenzene	8270	330	ND	ug/Kg
3,3'-Dichlorobenzidine	8270	660	ND	ug/Kg
Dieldrin	8270	1600	ND	ug/Kg
Diethylphthalate	8270	330	ND	ug/Kg
Dimethyl phthalate	8270	330	ND	ug/Kg
2,4-Dinitrotoluene	8270	330	ND	ug/Kg
2,6-Dinitrotoluene	8270	330	ND	ug/Kg



Client Acct: 28100
 Client Name: Harding Lawson Associates
 NET Log No: 91.1274

Date: 12/27/1991
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NET Pacific, Inc

Ref: Franklin St., Oakland, Job: 91005,928.02

SAMPLE DESCRIPTION: 91121602
 Date Taken: 12/16/1991
 Time Taken: 14:40
 LAB Job No: (-108003)

Parameter	Method	Reporting Limit	Results	Units
Di-n-octyl phthalate	8270	330	ND	ug/Kg
Endrin aldehyde	8270	1600	ND	ug/Kg
Fluoranthene	8270	330	ND	ug/Kg
Fluorene	8270	330	ND	ug/Kg
Heptachlor	8270	1600	ND	ug/Kg
Heptachlor epoxide	8270	1600	ND	ug/Kg
Hexachlorobenzene	8270	330	ND	ug/Kg
Hexachlorobutadiene	8270	330	ND	ug/Kg
Hexachlorocyclopentadiene	8270	330	ND	ug/Kg
Hexachloroethane	8270	330	ND	ug/Kg
Indeno(1,2,3-cd)pyrene	8270	330	ND	ug/Kg
Isophorone	8270	330	ND	ug/Kg
2-Methylnaphthalene	8270	330	2,100	ug/Kg
Naphthalene	8270	330	2,300	ug/Kg
2-Nitroaniline	8270	1600	ND	ug/Kg
3-Nitroaniline	8270	1600	ND	ug/Kg
4-Nitroaniline	8270	1600	ND	ug/Kg
Nitrobenzene	8270	330	ND	ug/Kg
N-Nitroso-Di-N-propylamin	8270	330	ND	ug/Kg
N-Nitrosodiphenylamine	8270	330	ND	ug/Kg
Phenanthrene	8270	330	ND	ug/Kg
Pyrene	8270	330	ND	ug/Kg
1,2,4-Trichlorobenzene	8270	330	ND	ug/Kg
ACID EXTRACTABLES			--	
4-Chloro-3-methylphenol	8270	330	ND	ug/Kg
2-Chlorophenol	8270	330	ND	ug/Kg
2,4-Dichlorophenol	8270	330	ND	ug/Kg
2,4-Dimethylphenol	8270	330	ND	ug/Kg
2,4-Dinitrophenol	8270	1600	ND	ug/Kg
4,6-Dinitro-2-methylpheno	8270	1600	ND	ug/Kg
2-Nitrophenol	8270	330	ND	ug/Kg
4-Nitrophenol	8270	1600	ND	ug/Kg
Pentachlorophenol	8270	1600	ND	ug/Kg
Phenol	8270	330	ND	ug/Kg
2,4,6-Trichlorophenol	8270	330	ND	ug/Kg
2-Methylphenol	8270	330	ND	ug/Kg
4-Methylphenol	8270	330	ND	ug/Kg
2,4,5-Trichlorophenol	8270	1600	ND	ug/Kg



Client Acct: 28100
Client Name: Harding Lawson Associates
NET Log No: 91.1274

Date: 12/27/1991
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NET Pacific, Inc

Ref: Franklin St., Oakland, Job: 91005,928.02

SAMPLE DESCRIPTION: 91121602
Date Taken: 12/16/1991
Time Taken: 14:40
LAB Job No: (-108003)

Parameter	Method	Reporting Limit	Results	Units
SURROGATE RESULTS				
Nitrobenzene-d5	8270		46	%
2-Fluorobiphenyl	8270		46	%
p-Terphenyl-d14	8270		58	%
Phenol-d5	8270		37	%
2-Fluorophenol	8270		39	%
2,4,6-Tribromophenol	8270		56	%



Client Acct: 28100
 Client Name: Harding Lawson Associates
 NET Log No: 91.1274

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NET Pacific, Inc

Ref: Franklin St., Oakland, Job: 91005,928.02

SAMPLE DESCRIPTION: 91121602
 Date Taken: 12/16/1991
 Time Taken: 14:40
 LAB Job No: (-108003)

Parameter	Method	Reporting Limit	Results	Units
METHOD 8270(GCMS,Solid,PCB				
DATE EXTRACTED			12-17-91	
DATE ANALYZED			12-18-91	
DILUTION FACTOR*			1	
POLYCHLORINATED BIPHENYLS				
Aroclor 1016	8270	660	ND	ug/Kg
Aroclor 1221	8270	660	ND	ug/Kg
Aroclor 1232	8270	660	ND	ug/Kg
Aroclor 1242	8270	660	ND	ug/Kg
Aroclor 1248	8270	660	ND	ug/Kg
Aroclor 1254	8270	660	ND	ug/Kg
Aroclor 1260	8270	660	ND	ug/Kg



NET Pacific, Inc

Client Acct: 28100
Client Name: Harding Lawson Associates
NET Log No: 91.1274

Date: 12/27/1991
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Ref: Franklin St., Oakland, Job: 91005,928.02

SAMPLE DESCRIPTION: 91121603
Date Taken: 12/16/1991
Time Taken: 14:30
LAB Job No: (-108004)

Parameter	Method	Reporting Limit	Results	Units
Oil & Grease (IR,Total)		50	ND	mg/Kg
Oil & Grease (IR,Non-Polar)		50	ND	mg/Kg
Cadmium (ICP)	EPA 6010	2.0	2.6	mg/Kg
Chromium (ICP)	EPA 6010	2.0	46	mg/Kg
Lead (GFAA)	EPA 7421	0.2	4.7	mg/Kg
Nickel (ICP)	EPA 6010	5.0	36	mg/Kg
Zinc (ICP)	EPA 6010	2.0	60	mg/Kg
TPH (Gas/BTXE,Solid)				
METHOD 5030 (GC,FID)				
DATE ANALYZED			12-18-91	
DILUTION FACTOR*			1	
as Gasoline	5030	1	3.1	mg/Kg
METHOD 8020 (GC,Solid)				
DATE ANALYZED			12-18-91	
DILUTION FACTOR*			1	
Benzene	8020	2.5	46	ug/Kg
Ethlybenzene	8020	2.5	77	ug/Kg
Toluene	8020	2.5	130	ug/Kg
Xylenes (Total)	8020	2.5	370	ug/Kg
METHOD 3550 (GC,FID)				
DILUTION FACTOR*			1	
DATE EXTRACTED			12-17-91	
DATE ANALYZED			12-18-91	
as Creosote	3550	10	ND	mg/Kg
as Diesel	3550	10	5.9	mg/Kg
as Motor Oil	3550	10	ND	mg/Kg



NET Pacific, Inc

Ref: Franklin St., Oakland, Job: 91005,928.02

SAMPLE DESCRIPTION: 91121603
 Date Taken: 12/16/1991
 Time Taken: 14:30
 LAB Job No: (-108004)

Parameter	Method	Reporting Limit	Results	Units
METHOD 8240(GCMS,Solid)				
DATE ANALYZED			12-19-91	
DILUTION FACTOR*			5	
Benzene	8240	5	35	ug/Kg
Acetone	8240	10	ND	ug/Kg
Bromodichloromethane	8240	5	ND	ug/Kg
Bromoform	8240	5	ND	ug/Kg
Bromomethane	8240	5	ND	ug/Kg
2-Butanone	8240	10	ND	ug/Kg
Carbon disulfide	8240	5	ND	ug/Kg
Carbon tetrachloride	8240	5	ND	ug/Kg
Chlorobenzene	8240	5	ND	ug/Kg
Chloroethane	8240	5	ND	ug/Kg
2-Chloroethyl vinyl ether	8240	10	ND	ug/Kg
Chloroform	8240	5	ND	ug/Kg
Chloromethane	8240	5	ND	ug/Kg
Dibromochloromethane	8240	5	ND	ug/Kg
1,2-Dichlorobenzene	8240	5	ND	ug/Kg
1,3-Dichlorobenzene	8240	5	ND	ug/Kg
1,4-Dichlorobenzene	8240	5	ND	ug/Kg
1,1-Dichloroethane	8240	5	ND	ug/Kg
1,2-Dichloroethane	8240	5	ND	ug/Kg
1,1-Dichloroethene	8240	5	ND	ug/Kg
trans-1,2-Dichloroethene	8240	5	ND	ug/Kg
1,2-Dichloropropane	8240	5	ND	ug/Kg
cis-1,3-Dichloropropene	8240	5	ND	ug/Kg
trans-1,3-Dichloropropene	8240	5	ND	ug/Kg
Ethyl benzene	8240	5	70	ug/Kg
2-Hexanone	8240	10	ND	ug/Kg
Methylene chloride	8240	5	ND	ug/Kg
4-Methyl-2-pentanone	8240	10	ND	ug/Kg
Styrene	8240	5	ND	ug/Kg
1,1,2,2-Tetrachloroethane	8240	5	ND	ug/Kg
Tetrachloroethene	8240	5	ND	ug/Kg
Toluene	8240	5	340	ug/Kg
1,1,1-Trichloroethane	8240	5	28	ug/Kg
1,1,2-Trichloroethane	8240	5	ND	ug/Kg
Trichloroethene	8240	5	50	ug/Kg
Trichlorofluoromethane	8240	5	ND	ug/Kg
Vinyl acetate	8240	10	ND	ug/Kg
Vinyl chloride	8240	5	ND	ug/Kg
Xylenes (total)	8240	5	800	ug/Kg
SURROGATE RESULTS				
Toluene-d8	8240		98	%
Bromofluorobenzene	8240		107	%
1,2-Dichloroethane-d4	8240		70	%



Client Acct: 28100
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NET Pacific, Inc

Ref: Franklin St., Oakland, Job: 91005,928.02

SAMPLE DESCRIPTION: 91121603
 Date Taken: 12/16/1991
 Time Taken: 14:30
 LAB Job No: (-108004)

Parameter	Method	Reporting Limit	Results	Units
METHOD 8270(GCMS,Solid)				
DATE EXTRACTED			12-07-91	
DATE ANALYZED			12-18-91	
DILUTION FACTOR*			1	
Acenaphthene	8270	330	ND	ug/Kg
Acenaphthylene	8270	330	ND	ug/Kg
Aldrin	8270	1600	ND	ug/Kg
Anthracene	8270	330	ND	ug/Kg
Benzidine	8270	1600	ND	ug/Kg
Benzo(a)anthracene	8270	330	ND	ug/Kg
Benzo(b)fluoranthene	8270	330	ND	ug/Kg
Benzo(k)fluoranthene	8270	330	ND	ug/Kg
Benzo(a)pyrene	8270	330	ND	ug/Kg
Benzo(g,h,i)perylene	8270	330	ND	ug/Kg
Benzoic acid	8270	1600	ND	ug/Kg
Benzyl alcohol	8270	330	ND	ug/Kg
Butyl benzyl phthalate	8270	330	ND	ug/Kg
delta-BHC	8270	1600	ND	ug/Kg
gamma-BHC	8270	1600	ND	ug/Kg
bis(2-Chloroethyl)ether	8270	330	ND	ug/Kg
bis(2-Chloroethoxy)methan	8270	330	ND	ug/Kg
bis(2-Chloroisopropyl)eth	8270	330	ND	ug/Kg
bis(2-Ethylhexyl)phthalat	8270	330	ND	ug/Kg
4-Bromophenyl phenyl ethe	8270	330	ND	ug/Kg
4-Chloroaniline	8270	330	ND	ug/Kg
2-Chloronaphthalene	8270	330	ND	ug/Kg
4-Chlorophenyl phenyl eth	8270	330	ND	ug/Kg
Chrysene	8270	330	ND	ug/Kg
4,4'-DDD	8270	1600	ND	ug/Kg
4,4'-DDE	8270	1600	ND	ug/Kg
4,4'-DDT	8270	1600	ND	ug/Kg
Dibenzo(a,h)anthracene	8270	330	ND	ug/Kg
Dibenzofuran	8270	330	ND	ug/Kg
Di-n-butylphthalate	8270	330	ND	ug/Kg
1,2-Dichlorobenzene	8270	330	ND	ug/Kg
1,3-Dichlorobenzene	8270	330	ND	ug/Kg
1,4-Dichlorobenzene	8270	330	ND	ug/Kg
3,3'-Dichlorobenzidine	8270	660	ND	ug/Kg
Dieldrin	8270	1600	ND	ug/Kg
Diethylphthalate	8270	330	ND	ug/Kg
Dimethyl phthalate	8270	330	ND	ug/Kg
2,4-Dinitrotoluene	8270	330	ND	ug/Kg
2,6-Dinitrotoluene	8270	330	ND	ug/Kg



NET Pacific, Inc

Ref: Franklin St., Oakland, Job: 91005,928.02

SAMPLE DESCRIPTION: 91121603
 Date Taken: 12/16/1991
 Time Taken: 14:30
 LAB Job No: (-108004)

Parameter	Method	Reporting Limit	Results	Units
Di-n-octyl phthalate	8270	330	ND	ug/Kg
Endrin aldehyde	8270	1600	ND	ug/Kg
Fluoranthene	8270	330	ND	ug/Kg
Fluorene	8270	330	ND	ug/Kg
Heptachlor	8270	1600	ND	ug/Kg
Heptachlor epoxide	8270	1600	ND	ug/Kg
Hexachlorobenzene	8270	330	ND	ug/Kg
Hexachlorobutadiene	8270	330	ND	ug/Kg
Hexachlorocyclopentadiene	8270	330	ND	ug/Kg
Hexachloroethane	8270	330	ND	ug/Kg
Indeno(1,2,3-cd)pyrene	8270	330	ND	ug/Kg
Isophorone	8270	330	ND	ug/Kg
2-Methylnaphthalene	8270	330	6,400	ug/Kg
Naphthalene	8270	330	6,300	ug/Kg
2-Nitroaniline	8270	1600	ND	ug/Kg
3-Nitroaniline	8270	1600	ND	ug/Kg
4-Nitroaniline	8270	1600	ND	ug/Kg
Nitrobenzene	8270	330	ND	ug/Kg
N-Nitroso-Di-N-propylamin	8270	330	ND	ug/Kg
N-Nitrosodiphenylamine	8270	330	ND	ug/Kg
Phenanthrene	8270	330	ND	ug/Kg
Pyrene	8270	330	ND	ug/Kg
1,2,4-Trichlorobenzene	8270	330	ND	ug/Kg
ACID EXTRACTABLES			--	
4-Chloro-3-methylphenol	8270	330	ND	ug/Kg
2-Chlorophenol	8270	330	ND	ug/Kg
2,4-Dichlorophenol	8270	330	ND	ug/Kg
2,4-Dimethylphenol	8270	330	ND	ug/Kg
2,4-Dinitrophenol	8270	1600	ND	ug/Kg
4,6-Dinitro-2-methylpheno	8270	1600	ND	ug/Kg
2-Nitrophenol	8270	330	ND	ug/Kg
4-Nitrophenol	8270	1600	ND	ug/Kg
Pentachlorophenol	8270	1600	ND	ug/Kg
Phenol	8270	330	ND	ug/Kg
2,4,6-Trichlorophenol	8270	330	ND	ug/Kg
2-Methylphenol	8270	330	ND	ug/Kg
4-Methylphenol	8270	330	ND	ug/Kg
2,4,5-Trichlorophenol	8270	1600	ND	ug/Kg



Client Acct: 28100
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NET Pacific, Inc

Ref: Franklin St., Oakland, Job: 91005,928.02

SAMPLE DESCRIPTION: 91121603
Date Taken: 12/16/1991
Time Taken: 14:30
LAB Job No: (-108004)

Parameter	Method	Reporting Limit	Results	Units
SURROGATE RESULTS				
Nitrobenzene-d5	8270		44	%
2-Fluorobiphenyl	8270		59	%
p-Terphenyl-d14	8270		69	%
Phenol-d5	8270		36	%
2-Fluorophenol	8270		49	%
2,4,6-Tribromophenol	8270		93	%



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NET Pacific, Inc

Ref: Franklin St., Oakland, Job: 91005,928.02

SAMPLE DESCRIPTION: 91121603
 Date Taken: 12/16/1991
 Time Taken: 14:30
 LAB Job No: (-108004)

Parameter	Method	Reporting Limit	Results	Units
METHOD 8270(GCMS,Solid,PCB				
DATE EXTRACTED			12-17-91	
DATE ANALYZED			12-18-91	
DILUTION FACTOR*			1	
POLYCHLORINATED BIPHENYLS				
Aroclor 1016	8270	660	ND	ug/Kg
Aroclor 1221	8270	660	ND	ug/Kg
Aroclor 1232	8270	660	ND	ug/Kg
Aroclor 1242	8270	660	ND	ug/Kg
Aroclor 1248	8270	660	ND	ug/Kg
Aroclor 1254	8270	660	ND	ug/Kg
Aroclor 1260	8270	660	ND	ug/Kg



NET Pacific, Inc

Ref: Franklin St., Oakland, Job: 91005,928.02

QUALITY CONTROL DATA

Parameter	Reporting Limits	Units	Cal Verif Stand % Recovery	Blank Data	Spike % Recovery	Duplicate Spike % Recovery	RPD
Diesel	1	mg/Kg	91	ND	N/A	N/A	9.3
Motor Oil	10	mg/Kg	116	ND	N/A	N/A	N/A
O&G (Total)	50	mg/Kg	102	ND	92	98	6.1
O&G(Non-Polar)	50	mg/Kg	111	ND	N/A	N/A	N/A
Gasoline	1	mg/Kg	89	ND	91	86	4.8
pH	N/A	pH units	100	N/A	N/A	N/A	< 1
Flashpoint	80	F	100	ND	N/A	N/A	4.5
Cyanide	0.2	mg/Kg	98	ND	82	91	11
Cadmium	2.0	mg/Kg	107	ND	88	87	1.1
Chromium	2.0	mg/Kg	107	ND	87	87	< 1
Lead	0.2	mg/Kg	109	ND	92	90	2.9
Nickel	5.0	mg/Kg	110	ND	90	90	< 1
Zinc	2.0	mg/Kg	106	ND	84	88	3.7

QUALITY CONTROL DATA

Parameter	Reporting Limits	Units	Cal Verif Stand % Recovery	Blank Data	Spike % Recovery	Duplicate Spike % Recovery	RPD
Chlorobenzene	5	ug/Kg	94	ND	111	111	< 1
1,1-Dichloroethene	5	ug/Kg	76	ND	117	119	1.0
Trichloroethene	5	ug/Kg	94	ND	113	116	3.0
Toluene	5	ug/Kg	99	ND	102	99	3.0
Benzene	5	ug/Kg	96	ND	96	97	< 1

COMMENT: Blank Results were ND on other analytes tested.

Phenol	330	ug/Kg	112	ND	43	42	3.0
2-Chlorophenol	330	ug/Kg	108	ND	43	42	3.0
1,4-Dichlorobenzene	330	ug/Kg	107	ND	42	40	4.0
1,2,4-Trichlorobenzene	330	ug/Kg	77	ND	76	61	22
Pyrene	330	ug/Kg	99	ND	84	74	13

COMMENT: Blank Results were ND on other analytes tested.



NET Pacific, Inc

KEY TO ABBREVIATIONS and METHOD REFERENCES

- < : Less than; When appearing in results column indicates analyte not detected at the value following. This datum supercedes the listed Reporting Limit.
- * : Reporting Limits are a function of the dilution factor for any given sample. To obtain the actual reporting limits for this sample, multiply the stated Reporting Limits by the dilution factor (but do not multiply reported values).
- ICVS : Initial Calibration Verification Standard (External Standard).
- mean : Average; sum of measurements divided by number of measurements.
- mg/Kg (ppm) : Concentration in units of milligrams of analyte per kilogram of sample, wet-weight basis (parts per million).
- mg/L : Concentration in units of milligrams of analyte per liter of sample.
- mL/L/hr : Milliliters per liter per hour.
- MPN/100 mL : Most probable number of bacteria per one hundred milliliters of sample.
- N/A : Not applicable.
- NA : Not analyzed.
- ND : Not detected; the analyte concentration is less than applicable listed reporting limit.
- NTU : Nephelometric turbidity units.
- RPD : Relative percent difference, $100 \text{ [Value 1 - Value 2]}/\text{mean value}$.
- SNA : Standard not available.
- ug/Kg (ppb) : Concentration in units of micrograms of analyte per kilogram of sample, wet-weight basis (parts per billion).
- ug/L : Concentration in units of micrograms of analyte per liter of sample.
- umhos/cm : Micromhos per centimeter.

Method References

Methods 100 through 493: see "Methods for Chemical Analysis of Water & Wastes", U.S. EPA, 600/4-79-020, rev. 1983.

Methods 601 through 625: see "Guidelines Establishing Test Procedures for the Analysis of Pollutants" U.S. EPA, 40 CFR, Part 136, rev. 1988.

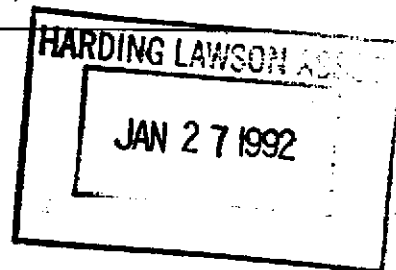
Methods 1000 through 9999: see "Test Methods for Evaluating Solid Waste", U.S. EPA SW-846, 3rd edition, 1986.

SM: see "Standard Methods for the Examination of Water & Wastewater, 16th Edition, APHA, 1985.



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David Leland
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Novato, CA 94947

Date: 01/22/1992
NET Client Acct No: 28100
NET Pacific Log No: 91.1676
Received: 01/03/1992

Client Reference Information

PRP (PRA II), 91005,928.02

Sample analysis in support of the project referenced above has been completed and results are presented on following pages. Please refer to the enclosed "Key to Abbreviations" for definition of terms. Should you have questions regarding procedures or results, please feel welcome to contact Client Services.

Approved by:


Jules Skamarack
Laboratory Manager

JS:rct
Enclosure(s)



Client No: 28100
 Client Name: Harding Lawson Associates
 NET Log No: 91.1676

Date: 01/22/1992

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NET Pacific, Inc.

Ref: PRP (PRA II), 91005,928.02

Descriptor, Lab No. and Results

Parameter	Method	Reporting Limit	91123001-911	91123005-911	Units
			12/30/1991 14:13	12/30/1991 14:27	
			110105 <i>COMPOSITE 1 (NORTH)</i>	110106 <i>COMPOSITE 2</i>	
TPH (Gas/BTXE,Solid)			--	--	
METHOD 5030 (GC,FID)					
DATE ANALYZED			01-10-92	01-10-92	
DILUTION FACTOR*			100	1	
as Gasoline		1	420	1.4	mg/Kg
METHOD 8020 (GC,Solid)			--	--	
DATE ANALYZED			01-10-91	01-10-91	
DILUTION FACTOR*			100	1	
Benzene		2.5	330	ND	ug/Kg
Ethylbenzene		2.5	3,700	3.5	ug/Kg
Toluene		2.5	7,100	ND	ug/Kg
Xylenes (Total)		2.5	19,000	12	ug/Kg
METHOD 3550 (GC,FID)					
DILUTION FACTOR*			1	1	
DATE EXTRACTED			01-13-92	01-13-92	
DATE ANALYZED			01-14-92	01-14-92	
as Diesel		1	52 **	1.5	mg/Kg

** Petroleum hydrocarbons quantified as diesel appear to be a lighter hydrocarbon than diesel.



Client No: 28100
 Client Name: Harding Lawson Associates
 NET Log No: 91.1676

Date: 01/22/1992
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NET Pacific, Inc.

Ref: PRP (PRA II), 91005,928.02

Descriptor, Lab No. and Results

Parameter	Method	Reporting Limit	91123001-911	91123005-911	Units
			12/30/1991 14:13	12/30/1991 14:27	
			110105	110106	
METHOD 8010 (GC,Solid)					
DATE ANALYZED			01-14-92	01-14-92	
DILUTION FACTOR*			1	1	
Bromodichloromethane	2.0	ND	ND	ND	ug/Kg
Bromoform	2.0	ND	ND	ND	ug/Kg
Bromomethane	2.0	ND	ND	ND	ug/Kg
Carbon tetrachloride	2.0	ND	ND	ND	ug/Kg
Chlorobenzene	2.0	ND	ND	ND	ug/Kg
Chloroethane	2.0	ND	ND	ND	ug/Kg
2-Chloroethylvinyl ether	5.0	ND	ND	ND	ug/Kg
Chloroform	2.0	ND	ND	ND	ug/Kg
Chloromethane	2.0	ND	ND	ND	ug/Kg
Dibromochloromethane	2.0	ND	ND	ND	ug/Kg
1,2-Dichlorobenzene	2.0	ND	ND	ND	ug/Kg
1,3-Dichlorobenzene	2.0	ND	ND	ND	ug/Kg
1,4-Dichlorobenzene	2.0	ND	ND	ND	ug/Kg
Dichlorodifluoromethane	2.0	ND	ND	ND	ug/Kg
1,1-Dichloroethane	2.0	ND	ND	ND	ug/Kg
1,2-Dichloroethane	2.0	ND	ND	ND	ug/Kg
1,1-Dichloroethene	2.0	ND	ND	ND	ug/Kg
trans-1,2-Dichloroethene	2.0	ND	ND	ND	ug/Kg
1,2-Dichloropropane	2.0	ND	ND	ND	ug/Kg
cis-1,3-Dichloropropene	2.0	ND	ND	ND	ug/Kg
trans-1,3-Dichloropropene	2.0	ND	ND	ND	ug/Kg
Methylene chloride	50	ND	ND	ND	ug/Kg
1,1,2,2-Tetrachloroethane	2.0	ND	ND	ND	ug/Kg
Tetrachloroethene	2.0	ND	ND	ND	ug/Kg
1,1,1-Trichloroethane	2.0	ND	ND	ND	ug/Kg
1,1,2-Trichloroethane	2.0	ND	ND	ND	ug/Kg
Trichloroethene	2.0	ND	ND	ND	ug/Kg
Trichlorofluoromethane	2.0	ND	ND	ND	ug/Kg
Vinyl chloride	2.0	ND	ND	ND	ug/Kg



NET Pacific, Inc.

Client No: 28100
Client Name: Harding Lawson Associates
NET Log No: 91.1676

Date: 01/22/1992

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Ref: PRP (PRA II), 91005,928.02

Descriptor, Lab No. and Results

Parameter	Method	Reporting Limit	Descriptor, Lab No. and Results		Units
			91123001-911 12/30/1991 14:13	91123005-911 12/30/1991 14:27	
METHOD 8270(GCMS,Solid)			110105	110106	
DATE EXTRACTED			1/08/92	1/08/92	
DATE ANALYZED			1/13/92	1/13/92	
DILUTION FACTOR*			1	1	
Acenaphthene	330	ND	ND	ND	ug/Kg
Acenaphthylene	330	ND	ND	ND	ug/Kg
Aldrin	1600	ND	ND	ND	ug/Kg
Anthracene	330	ND	ND	ND	ug/Kg
Benzidine	1600	ND	ND	ND	ug/Kg
Benzo(a)anthracene	330	ND	ND	ND	ug/Kg
Benzo(b)fluoranthene	330	ND	ND	ND	ug/Kg
Benzo(k)fluoranthene	330	ND	ND	ND	ug/Kg
Benzo(a)pyrene	330	ND	ND	ND	ug/Kg
Benzo(g,h,i)perylene	330	ND	ND	ND	ug/Kg
Benzoic acid	1600	ND	ND	ND	ug/Kg
Benzyl alcohol	330	ND	ND	ND	ug/Kg
Butyl benzyl phthalate	330	ND	ND	ND	ug/Kg
delta-BHC	1600	ND	ND	ND	ug/Kg
gamma-BHC	1600	ND	ND	ND	ug/Kg
bis(2-Chloroethyl)ether	330	ND	ND	ND	ug/Kg
bis(2-Chloroethoxy)methan	330	ND	ND	ND	ug/Kg
bis(2-Chloroisopropyl)eth	330	ND	ND	ND	ug/Kg
bis(2-Ethylhexyl)phthalat	330	ND	ND	ND	ug/Kg
4-Bromophenyl phenyl ethe	330	ND	ND	ND	ug/Kg
4-Chloroaniline	330	ND	ND	ND	ug/Kg
2-Chloronaphthalene	330	ND	ND	ND	ug/Kg
4-Chlorophenyl phenyl eth	330	ND	ND	ND	ug/Kg
Chrysene	330	ND	ND	ND	ug/Kg
4,4'-DDD	1600	ND	ND	ND	ug/Kg
4,4'-DDE	1600	ND	ND	ND	ug/Kg
4,4'-DDT	1600	ND	ND	ND	ug/Kg
Dibenzo(a,h)anthracene	330	ND	ND	ND	ug/Kg
Dibenzofuran	330	ND	ND	ND	ug/Kg
Di-n-butylphthalate	330	ND	ND	ND	ug/Kg
1,2-Dichlorobenzene	330	ND	ND	ND	ug/Kg
1,3-Dichlorobenzene	330	ND	ND	ND	ug/Kg
1,4-Dichlorobenzene	330	ND	ND	ND	ug/Kg
3,3'-Dichlorobenzidine	660	ND	ND	ND	ug/Kg
Dieldrin	1600	ND	ND	ND	ug/Kg
Diethylphthalate	330	ND	ND	ND	ug/Kg
Dimethyl phthalate	330	ND	ND	ND	ug/Kg
2,4-Dinitrotoluene	330	ND	ND	ND	ug/Kg
2,6-Dinitrotoluene	330	ND	ND	ND	ug/Kg
Di-n-octyl phthalate	330	ND	ND	ND	ug/Kg
Endrin aldehyde	1600	ND	ND	ND	ug/Kg



NET Pacific, Inc.

Client No: 28100
 Client Name: Harding Lawson Associates
 NET Log No: 91.1676

Date: 01/22/1992

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Ref: PRP (PRA II), 91005,928.02

Descriptor, Lab No. and Results

Parameter	Method	Reporting Limit	91123001-911 91123005-911		Units
			12/30/1991 14:13	12/30/1991 14:27	
			110105	110106	
Fluoranthene		330	ND	ND	ug/Kg
Fluorene		330	ND	ND	ug/Kg
Heptachlor		1600	ND	ND	ug/Kg
Heptachlor epoxide		1600	ND	ND	ug/Kg
Hexachlorobenzene		330	ND	ND	ug/Kg
Hexachlorobutadiene		330	ND	ND	ug/Kg
Hexachlorocyclopentadiene		330	ND	ND	ug/Kg
Hexachloroethane		330	ND	ND	ug/Kg
Indeno(1,2,3-cd)pyrene		330	ND	ND	ug/Kg
Isophorone		330	ND	ND	ug/Kg
2-Methylnaphthalene		330	ND	ND	ug/Kg
Naphthalene		330	900	ND	ug/Kg
2-Nitroaniline		1600	910	ND	ug/Kg
3-Nitroaniline		1600	ND	ND	ug/Kg
4-Nitroaniline		1600	ND	ND	ug/Kg
Nitrobenzene		330	ND	ND	ug/Kg
N-Nitroso-Di-N-propylamin		330	ND	ND	ug/Kg
N-Nitrosodiphenylamine		330	ND	ND	ug/Kg
Phenanthrene		330	ND	ND	ug/Kg
Pyrene		330	ND	ND	ug/Kg
1,2,4-Trichlorobenzene		330	ND	ND	ug/Kg
ACID EXTRACTABLES			--	--	
4-Chloro-3-methylphenol		330	ND	ND	ug/Kg
2-Chlorophenol		330	ND	ND	ug/Kg
2,4-Dichlorophenol		330	ND	ND	ug/Kg
2,4-Dimethylphenol		330	ND	ND	ug/Kg
2,4-Dinitrophenol		1600	ND	ND	ug/Kg
4,6-Dinitro-2-methylpheno		1600	ND	ND	ug/Kg
2-Nitrophenol		330	ND	ND	ug/Kg
4-Nitrophenol		1600	ND	ND	ug/Kg
Pentachlorophenol		1600	ND	ND	ug/Kg
Phenol		330	ND	ND	ug/Kg
2,4,6-Trichlorophenol		330	ND	ND	ug/Kg
2-Methylphenol		330	ND	ND	ug/Kg
4-Methylphenol		330	ND	ND	ug/Kg
2,4,5-Trichlorophenol		1600	ND	ND	ug/Kg
SURROGATE RESULTS			--	--	
Nitrobenzene-d5			46	49	% rec
2-Fluorobiphenyl			43	50	% rec
p-Terphenyl-d14			79	79	% rec
Phenol-d5			44	54	% rec
2-Fluorophenol			41	50	% rec
2,4,6-Tribromophenol			58	59	% rec



Client No: 28100
 Client Name: Harding Lawson Associates
 NET Log No: 91.1676

Date: 01/22/1992
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NET Pacific, Inc.

Ref: PRP (PRA II), 91005,928.02

Descriptor, Lab No. and Results

Parameter	Method	Reporting Limit	91123009-911	91123013-911	Units
			12/30/1991 14:42	12/30/1991 15:14	
			110107 COMPOSITE 3	110108 COMPOSITE 4 (SOUTH)	
TPH (Gas/BTXE,Solid)			--	--	
METHOD 5030 (GC,FID)					
DATE ANALYZED			01-10-92	01-10-92	
DILUTION FACTOR*			1	1	
as Gasoline		1	ND	ND	mg/Kg
METHOD 8020 (GC,Solid)			--	--	
DATE ANALYZED			01-10-91	01-10-91	
DILUTION FACTOR*			1	1	
Benzene		2.5	ND	ND	ug/Kg
Ethylbenzene		2.5	ND	ND	ug/Kg
Toluene		2.5	ND	ND	ug/Kg
Xylenes (Total)		2.5	ND	ND	ug/Kg
METHOD 3550 (GC,FID)					
DILUTION FACTOR*			1	1	
DATE EXTRACTED			01-13-92	01-13-92	
DATE ANALYZED			01-14-92	01-14-92	
as Diesel		1	ND	ND	mg/Kg



NET Pacific, Inc.

Ref: PRP (PRA II), 91005,928.02

Descriptor, Lab No. and Results

Parameter	Method	Reporting Limit	91123009-911	91123013-911	Units
			12/30/1991 14:42	12/30/1991 15:14	
			110107	110108	
METHOD 8270(GCMS,Solid)					
DATE EXTRACTED			1/08/92	1/08/92	
DATE ANALYZED			1/13/92	1/13/92	
DILUTION FACTOR*			1	1	
Acenaphthene		330	ND	ND	ug/Kg
Acenaphthylene		330	ND	ND	ug/Kg
Aldrin		1600	ND	ND	ug/Kg
Anthracene		330	ND	ND	ug/Kg
Benzidine		1600	ND	ND	ug/Kg
Benzo(a)anthracene		330	ND	ND	ug/Kg
Benzo(b)fluoranthene		330	ND	ND	ug/Kg
Benzo(k)fluoranthene		330	ND	ND	ug/Kg
Benzo(a)pyrene		330	ND	ND	ug/Kg
Benzo(g,h,i)perylene		330	ND	ND	ug/Kg
Benzoic acid		1600	ND	ND	ug/Kg
Benzyl alcohol		330	ND	ND	ug/Kg
Butyl benzyl phthalate		330	ND	ND	ug/Kg
delta-BHC		1600	ND	ND	ug/Kg
gamma-BHC		1600	ND	ND	ug/Kg
bis(2-Chloroethyl)ether		330	ND	ND	ug/Kg
bis(2-Chloroethoxy)methan		330	ND	ND	ug/Kg
bis(2-Chloroisopropyl)eth		330	ND	ND	ug/Kg
bis(2-Ethylhexyl)phthalat		330	ND	ND	ug/Kg
4-Bromophenyl phenyl ethe		330	ND	ND	ug/Kg
4-Chloroaniline		330	ND	ND	ug/Kg
2-Chloronaphthalene		330	ND	ND	ug/Kg
4-Chlorophenyl phenyl eth		330	ND	ND	ug/Kg
Chrysene		330	ND	ND	ug/Kg
4,4'-DDD		1600	ND	ND	ug/Kg
4,4'-DDE		1600	ND	ND	ug/Kg
4,4'-DDT		1600	ND	ND	ug/Kg
Dibenzo(a,h)anthracene		330	ND	ND	ug/Kg
Dibenzofuran		330	ND	ND	ug/Kg
Di-n-butylphthalate		330	ND	ND	ug/Kg
1,2-Dichlorobenzene		330	ND	ND	ug/Kg
1,3-Dichlorobenzene		330	ND	ND	ug/Kg
1,4-Dichlorobenzene		330	ND	ND	ug/Kg
3,3'-Dichlorobenzidine		660	ND	ND	ug/Kg
Dieldrin		1600	ND	ND	ug/Kg
Diethylphthalate		330	ND	ND	ug/Kg
Dimethyl phthalate		330	ND	ND	ug/Kg
2,4-Dinitrotoluene		330	ND	ND	ug/Kg
2,6-Dinitrotoluene		330	ND	ND	ug/Kg
Di-n-octyl phthalate		330	ND	ND	ug/Kg
Endrin aldehyde		1600	ND	ND	ug/Kg



NET Pacific, Inc.

Ref: PRP (PRA II), 91005,928.02

QUALITY CONTROL DATA

Parameter	Reporting Limits	Units	Cal Verif Stand % Recovery	Blank Data	Spike % Recovery	Duplicate Spike % Recovery	RPD
Gasoline	1.0	mg/Kg	102	ND	95	94	< 1
Benzene	2.5	ug/Kg	98	ND	80	81	< 1
Toluene	2.5	ug/Kg	104	ND	92	93	1.3
Diesel	1	mg/Kg	110	ND	84	95	12
Motor Oil	10	mg/Kg	121	ND	N/A	N/A	N/A
Benzene	2.0	mg/Kg	116	ND	242	266	9.3
Toluene	2.0	mg/Kg	111	ND	390	394	1.2
1,1-DCE	2.0	mg/Kg	100	ND	95	96	1.3
TCE	2.0	mg/Kg	100	ND	92	99	7.2
Chlorobenzene	2.0	mg/Kg	110	ND	104	104	< 1
Phenol	330	ug/Kg	112	ND	46	48	3.0
2-Chlorophen	330	ug/Kg	106	ND	43	45	3.0
1,4-DCB	330	ug/Kg	114	ND	36	36	1.0
N-Nitroso	330	ug/Kg	127	ND	47	46	1.0
1,2,4-TCB	330	ug/Kg	109	ND	43	49	12
4-Chloro-3	330	ug/Kg	100	ND	84	75	11
Acenaphthene	330	ug/Kg	115	ND	67	68	2.0
4-Nitrophen	1600	ug/Kg	43	ND	114	98	15
2,4-Dinitro	1600	ug/Kg	96	ND	78	70	10
Pentachloro	1600	ug/Kg	105	ND	93	89	4.0
Pyrene	330	ug/Kg	98	ND	86	80	7.0

COMMENT: Blank Results were ND on other analytes tested.

- < : Less than; When appearing in results column indicates analyte not detected at the value following. This datum supercedes the listed Reporting Limit.
- * : Reporting Limits are a function of the dilution factor for any given sample. To obtain the actual reporting limits for this sample, multiply the stated Reporting Limits by the dilution factor (but do not multiply reported values).
- ICVS : Initial Calibration Verification Standard (External Standard).
- mean : Average; sum of measurements divided by number of measurements.
- mg/Kg (ppm) : Concentration in units of milligrams of analyte per kilogram of sample, wet-weight basis (parts per million).
- mg/L : Concentration in units of milligrams of analyte per liter of sample.
- mL/L/hr : Milliliters per liter per hour.
- MPN/100 mL : Most probable number of bacteria per one hundred milliliters of sample.
- N/A : Not applicable.
- NA : Not analyzed.
- ND : Not detected; the analyte concentration is less than applicable listed reporting limit.
- NTU : Nephelometric turbidity units.
- RPD : Relative percent difference, $100 \frac{(\text{Value 1} - \text{Value 2})}{\text{mean value}}$.
- SNA : Standard not available.
- ug/Kg (ppb) : Concentration in units of micrograms of analyte per kilogram of sample, wet-weight basis (parts per billion).
- ug/L : Concentration in units of micrograms of analyte per liter of sample.
- umhos/cm : Micromhos per centimeter.

Method References

Methods 100 through 493: see "Methods for Chemical Analysis of Water & Wastes", U.S. EPA, 600/4-79-020, rev. 1983.

Methods 601 through 625: see "Guidelines Establishing Test Procedures for the Analysis of Pollutants" U.S. EPA, 40 CFR, Part 136, rev. 1988.

Methods 1000 through 9999: see "Test Methods for Evaluating Solid Waste", U.S. EPA SW-846, 3rd edition, 1986.

SM: see "Standard Methods for the Examination of Water & Wastewater, 16th Edition, APHA, 1985.

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 Novato, CA 94948
 (415) 892-0821

CHAIN OF CUSTODY FORM

Job Number: 91005, 928.02
 Name/Location: PRP (PRAID)
 Project Manager: David Deland
 Samplers: Robert L. Nelson
 Recorder: Robert L. Nelson
 (Signature Required)

ANALYSIS REQUESTED	
<input type="checkbox"/>	EPA 601/6010
<input type="checkbox"/>	EPA 602/8020
<input type="checkbox"/>	EPA 624/8240
<input checked="" type="checkbox"/>	EPA 624/8270 * Priority Plltnt. Metals
<input type="checkbox"/>	Benzene/Toluene/Xylene
<input type="checkbox"/>	Total Petrol. Hydrocarb.
<input type="checkbox"/>	<u>TPA Gas & Diesel</u>
<input type="checkbox"/>	<u>BTEX</u>

SOURCE CODE	MATRIX				#CONTAINERS & PRESERV.			SAMPLE NUMBER OR LAB NUMBER			DATE				STATION DESCRIPTION/NOTES
	Water	Sediment	Soil	Oil	Unpres.	H ₂ SO ₄	HNO ₃	Yr	Wk	Seq	Yr	Mo	Dy	Time	
4B			X		1			9	1	23	0	1	7	42	
4B			X		1			9	1	23	0	1	7	45	
4B			X		1			9	1	23	0	1	7	48	
4B			X		1			9	1	23	0	1	7	55	
4B			X		1			9	1	23	0	1	7	54	
4B			X		1			9	1	23	0	1	7	17	
4B			X		1			9	1	23	0	1	7	20	
4B			X		1			9	1	23	0	1	7	25	

LAB NUMBER			DEPTH IN FEET	COL MTD CD	QA CODE	MISCELLANEOUS
Yr	Wk	Seq				
						<i>Composite Sampler</i>
						<i>Standard Turranand</i>
						<i>*8270 for</i> <i>Naphthalene and</i> <i>2-methylnaphthalene</i>

CHAIN OF CUSTODY RECORD			
RELINQUISHED BY: <i>(Signature)</i> <u>Robert L. Nelson</u>	RECEIVED BY: <i>(Signature)</i> <u>SK Ford</u>	DATE/TIME <u>1/6/92 2:15 pm</u>	
RELINQUISHED BY: <i>(Signature)</i> <u>SK Ford</u>	RECEIVED BY: <i>(Signature)</i>	DATE/TIME	
RELINQUISHED BY: <i>(Signature)</i>	RECEIVED BY: <i>(Signature)</i>	DATE/TIME	
RELINQUISHED BY: <i>(Signature)</i>	RECEIVED BY: <i>(Signature)</i>	DATE/TIME	
DISPATCHED BY: <i>(Signature)</i>	DATE/TIME	RECEIVED FOR LAB BY: <i>(Signature)</i>	DATE/TIME
METHOD OF SHIPMENT <u>ice chest with blue ice</u>			