


A Report Prepared for


City of Oakland  
Redevelopment Agency  
One City Hall Plaza  
Oakland, California 94612

**SITE CHARACTERIZATION  
PACIFIC RENAISSANCE PLAZA  
CHINATOWN REDEVELOPMENT PROJECT AREA  
OAKLAND, CALIFORNIA**

HLA Job No. 9382,030.02

by

  
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415/892-0821

December 22, 1988

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CALIFORNIA REGIONAL WATER

JUN 17 1990 SL

QUALITY CONTROL BOARD

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## I INTRODUCTION

This report discusses site characterization activities and presents a preliminary screening of cleanup alternatives for a site in Oakland's Chinatown Redevelopment Project Area (Plate 1). This work has been performed by Harding Lawson Associates (HLA) on behalf of the City of Oakland Redevelopment Agency (Agency). The site comprises the area bounded by 9th, Webster, and Franklin streets and the East Bay Municipal District (EBMUD) property line between 10th and 11th streets (Plate 1). Work discussed in this report includes the tasks described in HLA's April 29, 1988 letter proposal to the Agency entitled *Work Plan, Soil and Ground-Water Contamination Investigation, Chinatown Redevelopment Project Area*, and additional tasks agreed upon in discussions between HLA and the Agency during the course of the project.

Construction of the Pacific Renaissance Plaza (PRP), a development of high-rise commercial and retail buildings, is scheduled to begin at the site in June 1989. The property is currently an at-grade asphalt-surfaced parking lot.

Several previous subsurface investigations have been conducted at the site. Associated Geotechnical Engineers (AGE) completed at least two exploratory borings within the block and several borings nearby. Kaldveer Associates drilled four exploratory borings on site, three of which are completed as piezometers. Woodward-Clyde-Sherard and Associates (WCS) completed a series of borings along 9th Street as part of investigations for the Bay Area Rapid Transit (BART) system. Locations of these borings are shown on Plate 2. AGE borings are designated PB-5 and PB-6. Kaldveer borings and piezometers are designated EB-1, EB-2, EB-3 and EB-4. WCS borings are designated PB-17, PB-18, PB-19, and PB-20.

HLA completed a boring and installed a monitoring well, designated MW-9, at the former location of a gasoline station at 925 Webster Street, as part of ground-water monitoring activities for the neighboring block. Results and discussion of analysis of soil and ground-water samples from MW-9 are presented in an HLA draft report (1988b). Results of analyses of soil samples from this location indicate the presence of petroleum and volatile hydrocarbons, with the highest levels, 2950 milligrams/kilograms (mg/kg), equivalent to parts per million (ppm), of total petroleum hydrocarbons (TPH), occurring at 15 feet below ground surface. Analyses of ground-water samples from this well indicate the presence of petroleum hydrocarbons and volatile organic compounds.



## II SITE ASSESSMENT

To evaluate the potential that hazardous materials are present in soils or ground water at the PRP site, HLA conducted an assessment of the history of the site and the surrounding areas. The assessment comprised the following tasks:

- o Reviewing aerial photographs and documents related to historical uses of the site and adjacent property.
- o Contacting appropriate regulatory agencies for information concerning potential hazardous materials contamination of the site or surrounding areas; e.g., reports of toxic spills and the presence or leakage of underground storage tanks.

Information reviewed included:

- o Aerial photographs obtained from Pacific Aerial Surveys of Oakland, California, for 1943, 1947, 1953, 1959, 1963, 1966, 1977, 1981, 1985, and 1988;
- o Sanborne Maps from 1903, 1912, 1921, 1951, and a 1988 update from the City of Oakland Building Department; and
- o Alameda County Assessor's files.

These sources indicate that historical uses of the area include housing, retail shops, and light industry. Facilities on the site have included tenement housing and apartments, a wholesale plumbing supplier, a blacksmith, iron fence works, a hand laundry, auto parking, and a Chevron (Standard Oil) gasoline station. Of these facilities, the gasoline station located at 925 Webster Street and occupying the full length of the block between 9th and 10th streets (Plate 2) is the most likely potential source of contamination to the site. Review of aerial photos indicates that the station was built between 1963 and 1966. Ownership of the parcel was transferred from Standard Oil to Chevron in 1964.

To evaluate whether any underground storage tanks are or were located at or near the site, and whether any toxic spills or violations of pollution emission standards have occurred in the area, HLA contacted the regulatory agencies listed below:

- o Alameda County Department of Environmental Health (ACDEH), Division of Hazardous Materials
- o California Regional Water Quality Control Board, San Francisco Bay Region (RWQCB), Oakland;
- o RWQCB, Industrial Division;
- o California Department of Health Services (DHS), Toxic Substances Control Division;
- o The City of Oakland Fire Department; and
- o The City of Oakland Structural and Engineering Department.

The ACDEH was contacted to obtain information regarding the underground storage tanks at the Chevron station, but the station went out of business before the ACDEH began keeping records of underground tank locations, removal, and replacement.

Records obtained from the City of Oakland Structural and Engineering Department indicated that underground fuel tanks were located in the southeastern corner of the block approximately 50 to 80 feet from 9th Street, and 25 to 65 feet from Webster Street. The station's pump islands and service area were located at the northern end of the property (Plate 2). The property was purchased by the City of Oakland in 1978, and the station was demolished and the underground tanks removed by the City in 1980.

RWQCB fuel leak records did not indicate any present or past cases of leaking above- or below-ground fuel tanks in the study area. ACDEH records identify a 2,000-gallon underground tank for unleaded gasoline at 301 12th Street, although there

are no reports of leakage. Conversations with personnel from the RWQCB, the RWQCB Industrial Division, the DHS, and the Oakland Fire Department did not indicate the presence of known potential sources of soil or ground-water contamination.

### III FIELD INVESTIGATION

#### A. Soil Borings and Monitoring Well Installation

Locations for 22 borings were selected prior to the start of field activities, based on results of sampling at MW-9, the site assessment, knowledge of ground-water flow directions, and the goal of assessing the potential presence of contaminants in soils and ground water at this site. Nineteen borings were drilled and sampled at the site between July 25 and August 5, 1988, at locations shown on Plate 2. The 19 borings are designated B-1 through B-22. B-9, B-11, and B-15 were not drilled based on observations made during the course of field investigation. The borings were drilled to depths ranging from 35.5 to 50 feet below ground surface. Two borings were completed as monitoring wells; MW-11 was installed in Boring B-18, and MW-10 was placed in a boring drilled 3 feet north of B-21, since B-21 had already been grouted when it was decided to install a monitoring well at that location. Drilling was performed by HEW Drilling Company, Inc., of Palo Alto, California, using a CME 55 hollow-stem auger rig. An HLA geologist supervised the drilling and well installation and collected soil samples for lithologic characterization and chemical analyses. Logs of the borings and well completion details are presented in Appendix A. Borings were logged using the Unified Soil Classification System (USCS) and Munsell Color Index Chart, which are included as Plate A1.

Soil samples were collected at approximately 5-foot intervals from ground surface to below the water table, and in most cases to the total depth of the boring. Samples were collected with a Modified California split-barrel sampler lined with 2.5-inch-diameter stainless steel tubes. The ends of the sample tubes were sealed with foil-lined plastic caps taped to the tubes. Soil samples were screened in the field for

volatile organic compounds using a Century portable organic vapor analyzer (OVA), and checked for the presence of hydrocarbon odors and evidence of staining. One to four soil samples from each boring were selected for chemical analysis, depending on the results of initial field screening. For borings where field observations did not indicate the presence of chemicals, one or two samples were submitted to the laboratory for confirmation purposes. For borings where field observations indicated the presence of chemicals, two to four samples were submitted for analysis. Water samples were collected from selected borings using a stainless steel bailer lowered through the drill augers.

All samples were stored on ice until delivery with completed chain of custody forms to Pace Laboratories, Inc., of Novato, California, for analysis. Soil samples were analyzed for total petroleum hydrocarbons (TPH) as gasoline and diesel by U.S. Environmental Protection Agency (EPA) Test Method 3550/8015; for purgeable halocarbons by EPA Test Method 8010; and for purgeable aromatic compounds by EPA Test Method 8020. Four soil samples were analyzed for acid base/neutral compounds by EPA Test Method 8270, and 12 soil samples were tested for lead. Ten ground-water samples were analyzed for TPH as gasoline by EPA Test Method 8015; for purgeable halocarbons by EPA Test Method 8010; for purgeable aromatic compounds by EPA Test Method 8020, and for lead.

Monitoring Wells MW-10 and MW-11 were completed on August 4, 1988, in a boring 3 feet north of B-21 and in Boring B-18, respectively. The borings for MW-10 and MW-11 were drilled to depths of 35 and 40 feet using a 10-inch-diameter bit, and terminated at or slightly below the top of the clay unit underlying the uppermost A aquifer, here termed the A-aquifer. The wells were constructed of 4-inch-diameter PVC casing with sufficient well screen to allow monitoring above the water table. The

wells were cased from the ground surface to 19.5 feet below ground surface with Schedule 40 flush-threaded PVC casing and screened with machine-slotted 0.020-inch PVC screen from 19.5 feet below ground surface to the bottom of the borings. The annulus of each well was packed with Lonestar #3 sand from the bottom of the borings to 18 feet below ground surface. A 2-foot-thick bentonite pellet seal was placed above the sand. Cement-bentonite grout was used to grout the remaining annulus to ground surface. The wells were completed below grade with a locking well cap and a Christy box.

Two additional borings, designated B-23 and B-24, were completed on September 22, 1988, for the purpose of collecting samples to be used in the evaluation of biodegradation as a cleanup alternative. The borings were drilled to depths of 34 and 35 feet respectively. Drilling was performed by Spectrum Drilling Company, Inc., using a CME-75 hollow-stem auger rig. An HLA geologist supervised the drilling and collected soil samples from depth intervals where the results of chemical analyses indicated the presence of contamination. Borings were logged using the USCS and Munsell Color Index Chart (Plate A1). Logs of the borings are presented in Appendix A.

Soil samples were collected at depths of approximately 20 and 25 feet at B-23, and 25 and 30 feet at B-24. Samples were collected with a Modified California split-barrel sampler lined with 2.5-inch-diameter sample tubes. The ends of the sample tubes were sealed with foil-lined plastic caps taped to the tubes. All samples were stored on ice until delivery with completed chain of custody forms to HLA's microbiology laboratory facilities in Novato, California. A discussion of the biodegradation evaluation performed using these samples is presented as Appendix B.

Equipment used for drilling and soil sampling was decontaminated prior to and after use. Drilling augers, drill rods, and drill bits were steam cleaned (high pressure, hot water rinse) prior to use at the site. Soil sampling equipment was steam cleaned prior to use in each boring, and washed in a phosphate-free detergent solution and rinsed in clean water between sampling. Wash solutions and rinse water were replaced prior to each boring. Casing, screen, and caps used in monitoring well installation were steam cleaned prior to installation. Bailers for ground-water sampling were steam cleaned prior to each use, and string used with bailers was replaced after each sample collection. Well sounders were wiped clean and rinsed with an Alconox solution after each use.

Borings not completed as monitoring wells were grouted to the surface and patched with asphalt. Drill cuttings were aerated on site to reduce levels of petroleum hydrocarbons, prior to disposal at a Class III landfill.

KCA Engineers, Inc. (KCA), of San Francisco, California surveyed horizontal coordinates and top of casing and ground surface elevations for Wells MW-9, MW-10 and MW-11.

**B. Monitoring Well Development and Ground-Water Sampling**

Wells MW-10 and MW-11 were developed on September 9, 1988, by pumping a minimum of 10 well volumes or until the discharge water cleared. Prior to its discharge to the storm sewer, all development water was first contained and then transferred to a Baker tank for processing by the dewatering effluent treatment system in operation at 10th and Webster streets. The dewatering effluent treatment system operates under NPDES Permit CA 0029354 adopted by the RWQCB July 20, 1988.

Samples were collected from Wells MW-10 and MW-11 on September 9, September 30, and November 4, 1988. Ground-water sampling followed standard HLA protocol. A trip blank was included with each sampling round.

Depth to water prior to the purging of each well was measured using a graduated steel tape and chalk until two measurements with a difference of no more than 0.02 feet were obtained. Water elevations were calculated using depth-to-water data and surveyed top-of-casing elevations.

After water levels were measured, each well was purged using a submersible pump placed near the bottom of the well or by bailing with a stainless steel bailer. During purging, a volume of water equal to a least three times the static-water volume in the casing was removed. Indicator parameters (pH, conductivity and temperature) were monitored during purging. The stability of these readings following the removal of three casing volumes provided additional evidence that static water in the well had been removed. Water produced during well purging was collected and stored on site in a Baker tank prior to its treatment by the dewatering effluent treatment system on the adjacent property and its subsequent discharge to the storm sewer system.

Ground-water samples were collected using a clean stainless steel bailer. All ground-water samples were analyzed for: 1) purgeable halocarbons using EPA Test Method 8010, 2) purgeable aromatics using EPA Test Method 8020, and 3) TPH using EPA Test Methods 3550/8015. Samples collected on November 4 were also analyzed for ethylene dibromide by EPA Test Method 504, for purgeable organic compounds by EPA Test Method 8240, for acid/base neutral extractable compounds by EPA Test Method 8270, and for priority pollutant metals. Samples for TPH analyses were transferred to clean 1-liter amber glass bottles. Samples for purgeable aromatics and purgeable halocarbons analyses were transferred to 40-milliliter glass volatile organic



analysis (VOA) vials. All ground-water samples were stored on blue ice and submitted under chain of custody to Pace Laboratories of Novato, California.

## IV RESULTS

### A. Site Geologic Setting and Aquifer Conditions

Logs of borings drilled by HLA during this and previous investigations and those drilled by previous consultants indicate that the uppermost geologic unit at this site consists of approximately 40 feet of medium-sorted to poorly-sorted sand with a small percentage of silt and clay. The borings completed at this site confirm that a locally continuous clay unit identified in previous investigations on the adjacent properties exists at approximately 35-45 feet below ground surface (Plate 3).

Ground-water elevations measured at Monitoring Wells MW-9, MW-10, and MW-11 are summarized in Table 1. On the basis of data collected in March, the hydraulic gradient in the A-aquifer prior to activation of dewatering wells on the 10th and Webster streets site was approximately  $2.1 \times 10^{-3}$  towards the west (HLA, 1988b) with a depth to water at MW-9 of 23.25 feet on March 9. On the basis of recent water-level measurements in Wells MW-9, MW-10, and MW-11, gradients at the present time are generally toward the north, in the direction of the 10th and Webster streets site. These data are in agreement with data collected at other HLA wells in the area which indicate ground-water gradients toward the 10th and Webster streets excavation, most likely as a result of pumping of the dewatering wells (HLA, 1988b).

Estimates of hydraulic conductivity calculated from previously performed aquifer tests at the site (HLA, 1988a) range from 2.2 to 6.3 ft/day.

### B. Distribution of Chemicals in Soil

Results of laboratory analysis of soil samples are presented in Tables 2 and 3, and copies of the laboratory reports are included as Appendix C. Fifty-two soil samples were analyzed. Duplicate analysis of soil extract was performed on three samples.

Petroleum hydrocarbons were detected in 34 samples from 14 borings. Highest measured TPH values were in samples from the 25.5 to 26.0-foot depth interval in Borings B-12 (3,000 mg/kg), B-13 (4,600 mg/kg) and B-16 (4,800 mg/kg). TPH values exceeded 100 mg/kg in 9 samples, from Borings B-1, B-12, B-13, B-16, B-17, B-18, B-19, and B-21. (See Section V for a discussion of RWQCB guidance regarding cleanup and disposal of soils containing elevated levels of petroleum hydrocarbons.) Five of these 9 samples were collected at the 25.0 to 26.0 foot depth interval. The sample from Boring B-21 and one of the samples from B-13 were collected from the 21.5 to 22.0 foot depth interval, while the samples from B-1 and B-18 were collected from the 30.0 to 30.5 foot depth interval. The distribution of TPH values as a function of depth is presented on Plates 4 through 10. Representative cross sections showing TPH values are presented on Plates 11 and 12; cross section locations are shown on Plate 2.

EPA Test Method 8020 compounds detected in soil samples were benzene, toluene, ethylbenzene and xylenes (BTEX), which were detected in 33, 43, 29, and 34 samples, respectively. The highest concentrations of BTEX compounds occurred in samples from Borings B-12, B-13, and B-16, results that closely agree with the locations of the highest measured TPH values. Maximum concentrations of each of these compounds occurred in Sample B-13:25.5 (i.e., the sample from the 25.5-foot depth at Boring B-13) where TPH was measured at 4600 mg/kg. In general, highest concentrations of BTEX compounds occurred in samples from the 25.0- to 26.0-foot depth interval. Exceptions include Samples B-1:30.0, B-13:21.5, and B-21:21.5.

Ten compounds included in EPA Test Method 8010 were detected in laboratory analyses of soil samples: 1,1-dichloroethene (1,1-DCE), methylene chloride, trans-1,2-dichloroethene, 1,1-dichloroethane (1,1-DCA), chloroform, 1,1,1-trichloroethane (1,1,1-TCA), 1,2-dichloroethane (1,2-DCA), trichloroethene (TCE), 1,2-dichloropropane

and dibromochloromethane. Three compounds were present in samples from more than three borings: methylene chloride, chloroform, and 1,2-DCA. Methylene chloride was detected in 27 samples at concentrations ranging from 0.5 to 550  $\mu\text{g}/\text{kg}$  (micrograms per kilogram, equivalent to parts per billion). Chloroform was detected in 8 samples at concentrations ranging from 0.9 to 7.9  $\mu\text{g}/\text{kg}$ . 1,2-DCA was detected in 15 samples at concentrations ranging from 0.7 to 140  $\mu\text{g}/\text{kg}$ . Highest measured concentrations of Method 8010 compounds were methylene chloride at 550  $\mu\text{g}/\text{kg}$  in sample B-22:25.0, 1,1,1-TCA at 160  $\mu\text{g}/\text{kg}$  and 1,2-DCA at 140  $\mu\text{g}/\text{kg}$  in sample B-13:25.5, and 1,2-DCA at 18  $\mu\text{g}/\text{l}$  in sample B-21:25.5.

C. Distribution of Chemicals in Ground Water

Ground-water samples were collected through the drill augers from ten borings: B-2, B-7, B-8, B-10, B-12, B-13, B-17, B-20, B-21, and B-22. Analytical results are presented in Tables 4 and 5 and laboratory reports are included as Appendix D. Results indicate the presence of petroleum hydrocarbons and BTEX compounds in nine of ten samples, with the exception of the sample from B-2. Halogenated organics were detected in all seven samples analyzed using Method 8010: B-2, B-10, B-13, B-17, B-20, B-21, and B-22. The compounds detected, with the number of occurrences in parentheses, were: dichlorodifluoromethane (Freon 12) (5), 1,1-DCE (6), methylene chloride (4), 1,1-DCA (4), chloroform (3), 1,1,1-TCA (2), 1,2-DCA (5), TCE (3), 1,1,2-TCA (1), and chlorobenzene (1).

Four or more compounds were detected in all samples except the sample from B-2 in which only chloroform was detected.

Samples from B-2, B-8, B-10, B-12, B-13, B-17, B-20, and B-21 were analyzed for lead. Lead was detected in samples from B-10, B-13 and B-20.

Results of analyses of ground-water samples from Wells MW-9, MW-10, and MW-11 are presented in Tables 6 and 7. Results indicate the presence of petroleum hydrocarbons and BTEX compounds at all three locations. TPH values ranged from 91 to 4700  $\mu\text{g/l}$  (micrograms/liter, equivalent to parts per billion) at MW-9, from 1380 to 2900  $\mu\text{g/l}$  at MW-10, and from 1200 to 6500  $\mu\text{g/l}$  at MW-11.

Analysis of samples from MW-9, MW-10 and MW-11 also indicated the presence of halogenated organics, including dichlorodifluoromethane, chloromethane, 1,1-DCE, methylene chloride, 1,1-DCA, chloroform, 1,1,1-TCA, 1,2-DCA, TCE, and tetrachloroethene (PCE). PCE was detected on one occasion, at MW-9 on March 10. Chloromethane was detected once, in MW-9 on July 15. Freon 12 was detected on one occasion, at MW-9 on September 29. Methylene chloride was detected in all three samples collected November 1. Chloroform and 1,1,1-TCA have occurred at least once in Wells MW-9 and MW-11, and the other four compounds have occurred at least once at each of the three wells. Concentrations in samples collected in September exceeded DHS Drinking Water Action Levels for 1,1-DCE at MW-10, 1,2-DCA at all three wells, and TCE at MW-10 and MW-11. The maximum concentrations of halogenated compounds measured at these three wells are 130  $\mu\text{g/l}$  1,2-DCA at MW-11 on September 29, and 73  $\mu\text{g/l}$  TCE at MW-10 on the same date.

Results of EPA Method 504 analysis of ground-water samples collected November 1 indicate the presence of ethylene dibromide (EDB) at concentrations of 0.15  $\mu\text{g/l}$  at MW-9, 0.03  $\mu\text{g/l}$  at MW-10 and 0.16  $\mu\text{g/l}$  at MW-11.

Results of EPA Method 8240 analysis of ground-water samples collected November 1 indicate the presence of ten Method 8240 compounds: chloroethane, 1,1-DCE, methylene chloride, 1,1-DCA, 1,2-DCA, benzene, TCE, toluene, ethylbenzene, xylenes, and 1,1,2,2-tetrachloroethane. Three of these compounds have

not been observed in previous samples collected from these wells. These first reports include chloroethane at MW-11, methylene chloride at all three wells, and 1,1,2,2-tetrachloroethane at MW-11. For the other seven compounds, Method 8240 results confirm the results of Method 8010 and Method 8020 analyses from these wells.

Results of EPA Method 8270 analysis of ground-water samples collected November 1 indicate the presence of diethyl phthalate in samples from MW-9 and MW-11, and bis (2-ethylhexyl) phthalate in the sample from MW-11. No other Method 8270 compounds were reported.

Results of ground-water samples for priority pollutant metals indicate the presence of two metals at concentrations above the applicable detection limit: barium (Ba) at concentrations of 0.15 mg/l, 0.11 mg/l and 0.078 mg/l at MW-9, MW-10, and MW-11, respectively, and zinc (Zn), at concentrations of 0.077, 0.093, and 0.066 mg/l at MW-9, MW-10, and MW-11, respectively.

D. Discussion

Several compounds detected in soil and ground water are not considered indicative of site chemical conditions. Methylene chloride and chloroform are common laboratory contaminants and have been observed in sample results from Pace and other laboratories in the past. It is likely that some, and possibly most, of the observed detections of these compounds represent laboratory contamination. Phthalates, which are plasticizer compounds, are often introduced into samples during field and laboratory handling and processing activities.

Results of analysis of soil samples indicate the presence of petroleum hydrocarbons characteristic of gasoline in site soils. Highest concentrations occur primarily in the southern portion of the site at a depth of 25 feet below ground surface

(Plate 8). The distribution of gasoline compounds in soil is consistent with that which would result from leakage at underground storage tanks at the former gas station at 925 Webster Street. Gasoline appears to have moved vertically downward as a separate phase to the water table, where further vertical migration was prevented because all soil pores are saturated with water. Gasoline has also moved horizontally at the approximate elevation of the water table in a direction generally consistent with the direction of ground-water flow in the absence of pumping stresses or other perturbations. In addition, gasoline has dissolved in ground water and moved in a downgradient direction with ground water. Gasoline contamination of soils is present as an elongate area generally west and somewhat south of the former tank locations and vertically located at the position of the ambient water table, approximately 25 feet below ground surface. The in-place volume of soil with TPH values in excess of 100 ppm is estimated to be approximately 7000 cubic yards (cu yd). The volume of gasoline in this 7000 cubic yards is estimated to be about 2000 gallons.

For the two priority pollutant metals reported in ground-water samples collected November 1, concentrations are less than the applicable drinking water standard of 1.0 mg/l for Ba and 5.0 mg/l for Zn, by a factor of approximately 7 for Ba, and by a factor of 50 for Zn.

To summarize, constituents present in ground water indicate elevated levels of volatile organics at all three site wells. The constituents present indicate that gasoline is the primary source of contamination of ground water.

## V PRELIMINARY SCREENING OF CLEANUP ALTERNATIVES

For soils showing elevated levels of gasoline constituents, guidance developed by the RWQCB classifies those with TPH values exceeding 1000 ppm as hazardous waste and those with TPH values between 100 and 1000 ppm as designated waste. Soil at this site falls into both of these categories and requires either treatment to reduce concentrations or, in the absence of treatment, disposal at a Class I or Class II landfill. This section discusses possible treatment and disposal options and evaluates these options against screening criteria to assess the feasibility of these various alternatives to reduce levels of gasoline constituents in soil to below 100 ppm, thus making the soil suitable for handling and disposal as neither a hazardous nor a designated waste.

### A. Screening Criteria

The cleanup technologies described in the following sections were screened on the basis of the following three criteria:

1. Implementability: Technologies must be appropriate, simple, easy to fabricate, and implementable at the site. Three key site-specific items with respect to implementability are:
  - o A Bay Area Rapid Transit (BART) system tunnel runs immediately adjacent to the site, along 9th Street. BART has established guidelines for activities, such as construction, that might affect the structural integrity of the tunnel. One of the guidelines of particular interest for this site limits changes in the ambient water table to less than 2 feet.
  - o Because of space limitations at the site, it will not be possible to treat soils on site during the course of excavation activities.
  - o Technologies for soil cleanup must also be able to meet the objective of reducing hydrocarbon concentrations to less than 100 ppm by June 1, 1989. Construction of the Pacific Renaissance Plaza is scheduled to begin June 1, 1989, and soil cleanup must be completed by that date. This criterion does not apply to technologies that involve excavation as a first step.



2. **Demonstrated Performance:** Technologies must have been applied successfully in a full-scale field installation to treatment of constituents similar to those encountered at this site.
3. **Institutional (Regulatory) Acceptance:** Technologies must be appropriate for the remediation objectives and must comply with DHS, Bay Area Air Quality Management District (BAAQMD), RWQCB, and ACDEH requirements. In addition, any disposal to landfills or discharge to city sewers must meet local administrative requirements.

Current soil cleanup and disposal guidelines can be described as follows. The RWQCB generally allows treated soil with TPH as gasoline concentrations up to 1000 ppm to remain in place. They sometimes permit higher concentrations under certain conditions. In general, soil with TPH concentrations above 1000 ppm must either be treated to reduce the hydrocarbon concentration, removed and treated, or disposed at a Class I landfill. More stringent guidelines may be published prior to cleanup of the site and the final design and cost of the remediation system will depend on such designated cleanup levels.

RWQCB guidance classifies soil showing TPH values between 100 ppm and 1000 ppm as designated waste, which must be treated to reduce concentrations or be disposed at a Class II landfill.

Current RWQCB guidelines allow for disposal of soils at Class III landfills for use as daily cover if TPH values do not exceed 100 ppm.

BAAQMD Regulation 8-40 places limits on the volume of soil containing volatile petroleum hydrocarbons that may be aerated each day. BAAQMD also regulates emissions of petroleum hydrocarbons from fixed sources, which would include both off-site and in situ treatment technologies.

Because the site is located in an urban neighborhood and land uses in the vicinity of the site include residential, commercial, retail, and office activities, public health and safety during cleanup are important issues with regard to acceptability to regulatory agencies of particular cleanup alternatives. ACDEH is responsible for monitoring aspects of cleanup that might affect public health.

**B. Soil Cleanup Alternatives**

Cleanup alternatives available for removing gasoline hydrocarbons from soil are listed below:

1. Excavation and off-site disposal

2. **Excavation and off-site treatment**
  - o aeration
  - o enhanced biodegradation (landfarming)
  - o chemical oxidation
  - o incineration
3. **In situ biodegradation**
4. **In situ soil venting**
5. **In situ steam injection**

Each of these technologies is discussed briefly in the following paragraphs.

1. **Excavation and Off-Site Disposal**

Soil with elevated concentrations of gasoline hydrocarbons can be excavated and disposed at Class I, Class II, or Class III landfills in accordance with RWQCB guidelines regarding TPH levels in the soil. Off-site disposal of hazardous and designated waste is expensive and has potential long-term liability.

2. **Excavation and Off-Site Treatment**

Several technologies are available for treatment of hydrocarbon-bearing soils after excavation, including aeration, enhanced biodegradation (landfarming), chemical oxidation, and incineration. Because there will not be space available at the site for soil treatment once excavation commences, implementing any of these technologies will necessitate the use of an off-site treatment location and transportation thereto. Each technology is described below.

- o **Soil Aeration**

Excavated soil is spread to a depth of 1 to 3 feet in the treatment area and periodically mixed by mechanical equipment. The volatile hydrocarbons present in the soil are released to the atmosphere during the

treatment period. Once TPH levels are reduced to less than 100 ppm, the treated soil can be disposed at a Class III landfill for use as daily cover. Volatilization rates can be calculated and treatment periods estimated based upon the average concentration of hydrocarbons present in the soil.

The temporary off site treatment area would require a containment liner and leachate collection system, water and electric lines, and a security fence.

The BAAQMD must be notified and approve the proposed aeration. In addition, approval of the RWQCB would be required to set up and operate a temporary aeration area.

- o Enhanced Biodegradation (Landfarming)

Landfarming is an established technology widely used in the petroleum industry for treating petroleum hydrocarbon-contaminated soils. Landfarming achieves destruction of hydrocarbon wastes by enhancing bacterial metabolism in the contaminated soils. Contaminated soils are excavated and hauled to a treatment area where nutrients are added to the soil to increase and sustain the indigenous microbial population. These microorganisms use hydrocarbons for growth, thus reducing the concentrations of hydrocarbons in the soil.

The temporary off site treatment area would require a containment liner and leachate collection system, water and electric lines, and a security fence. Landfarming would require approval of the RWQCB and BAAQMD.

- o Chemical Oxidation

Hydrogen peroxide and a catalyst are added to hydrocarbon-bearing soils. The hydrogen peroxide oxidizes the hydrocarbons present in the soil to carbon dioxide and water. To achieve chemical oxidation, adequate contact between the hydrocarbons and the reagents is required. The contaminated soils must be excavated and processed in a designated treatment area or an aboveground reactor. This relatively new technology has been demonstrated at two separate sites and is currently being evaluated by the regulatory agencies. A treatability study would be needed to demonstrate the effectiveness of this process. A permit for treatment would be required by the appropriate regulatory agencies including RWQCB, DHS, and BAAQMD.

- o Incineration

Incineration is an effective process for thermal destruction of soil containing hydrocarbons. The hydrocarbon-bearing soil is excavated and incinerated in a kiln having a typical oxidation temperature of 1,500°F. Hydrocarbons present in gasoline are oxidized to carbon dioxide and

**C. Screening of Soil Cleanup Alternatives**

The results of the screening analysis are discussed in the following paragraphs and summarized in Table 8. Excavation and off-site disposal of gasoline-contaminated soil is implementable at this site and currently meets with regulatory agency approval. Excavation of contaminated soils has the potential for public health and worker health impacts, however, and the acceptability of excavating soils contaminated with volatile hydrocarbons in an urban neighborhood is an issue of particular concern for ACDEH. A plan based on such an approach may not meet with this agency's approval.

Excavation and off-site treatment would be implementable if a suitable site were available. The four candidate treatment technologies have been shown to be effective in reducing volatile hydrocarbon levels in soils. For example, aeration was used to reduce TPH levels in soils excavated from the adjacent site. Establishment of a temporary off-site treatment area has been permitted at other sites by the DHS, and would appear to be feasible for aeration, landfarming, or possibly chemical oxidation of soil from this site. It is currently extremely difficult to obtain a permit for incineration. This alternative would also require excavation of contaminated soils, with the same potential concerns for public health as noted above for excavation with disposal.

In situ biodegradation is an applicable cleanup technology for the volatile hydrocarbons at this site. This technology has been demonstrated to be effective in the field for cleanup of gasoline and its constituents. Because of the BART tunnel and associated restrictions on water-table fluctuations, implementation of the required ground-water extraction system would be complicated, but appears to be feasible. Past experience indicates that this technology would require an estimated minimum of six months of operation to reduce TPH levels to acceptable values. Therefore this technology is marginal with respect to the implementability criterion.

Soil venting is also an applicable remedial technology for permeable soil containing volatile hydrocarbons. The technology uses readily available equipment and would be implementable at this site. It has been demonstrated to be effective for reducing levels of volatile hydrocarbons in field situations. It would require at least three months to reduce levels to less than 100 ppm. The technological concept is acceptable to the appropriate regulatory agencies although BAAQMD review typically requires at least two months. Thus, soil venting is marginally feasible with respect to the implementability criterion, primarily as a result of schedule concerns.

Steam injection technology uses readily available equipment. It is implementable at this site and is appropriate for treatment of volatile hydrocarbons. The technology does not satisfy the demonstrated performance criterion because this particular application of the technology has not been implemented at full-scale in the field. The time required to reduce TPH levels to less than 100 ppm is estimated to be one month.

**D. Evaluation of Ground-Water Cleanup Alternatives**

Dewatering of the site will be required prior to excavation for construction and also for several of the cleanup alternatives. Analyses of ground-water samples from Wells MW-9, MW-10, and MW-11 indicate that volatile organic compounds are present at concentrations that require treatment of dewatering effluent prior to discharge.

At this time, only one ground-water treatment alternative is being considered. The existing ground-water treatment system at the 10th and Webster streets site is appropriate for treating constituents identified in ground water at this site. Using the existing system is an appropriate, feasible, and cost-effective means of ground-water cleanup. Discussions with the RWQCB indicate that it should be possible to modify the existing NPDES permit to accept dewatering effluent from this site.

**E. Estimated Costs**

Costs of excavation and off-site disposal were estimated using the following assumptions. Volume of excavated soil requiring disposal at a Class I facility is estimated to be 6,000 cu yd (4,500 cu yd plus a swell factor of 33%). Costs for disposal and transportation are estimated at \$400/cu yd. Class II volumes and costs for disposal and transportation are estimated to be 3,300 cu yd (2,500 cu yd + 33%) and \$150/cu yd respectively. Total costs for transportation and disposal are estimated to be approximately \$3 million.

For the four off-site treatment subalternatives, aeration and landfarming are typically the least costly. Chemical oxidation is intermediate in cost, and incineration is the most costly. Costs of aerating or landfarming soils from this site can be expected to be substantially less than costs for excavation and off-site disposal.

Costs associated with the three in situ treatment technologies are roughly comparable, and fall in the range of \$400-800 thousand, on the basis of an order-of-magnitude estimate.

Costs presented here should be considered as very approximate, but appropriate for screening purposes. The costs do not include confirmation, water treatment, construction monitoring, permitting, reporting, or project management.

**F. Summary of Cleanup Alternatives**

In summary, as indicated in Table 8, none of the soil cleaning alternatives identified meets all of the screening criteria. It is necessary that the Agency weigh the advantages and disadvantages of each alternative in relation to estimated costs, the anticipated start date for construction on the property, and potential solutions to the implementability and regulatory concerns expressed herein.

Because of the above concerns, HLA recommends that the following alternatives be carried forward for further evaluation: excavation and off-site aeration, in situ biodegradation, and in situ steam injection. We recommend that excavation and off-site disposal be dropped from further consideration because of cost considerations. With respect to soil venting, we recommend that this alternative not be considered explicitly, but be treated as a special case of the steam injection alternative.

## VI CONCLUSIONS

- Petroleum hydrocarbons characteristic of gasoline occur at levels up to 4800 ppm TPH in soils in the southern portion of the PRP site adjacent to 9th and Webster streets. An additional, small area showing TPH values up to 2500 ppm occurs at the corner of 10th and Franklin streets. The volume of soil containing petroleum hydrocarbons in excess of 100 ppm TPH is estimated to be about 7,000 cu yd in place.
- Ten halogenated organic compounds were detected in soil samples from the site. The most frequently occurring halogenated organic was methylene chloride, a common laboratory contaminant. Highest levels of other halogenated volatiles were less than 200 µg/l.
- Petroleum hydrocarbons characteristic of gasoline occur in ground-water samples from Wells MW-9, MW-10, and MW-11 at concentrations up to 6500 µg/l.
- Ten halogenated organic compounds occur in ground-water samples from Wells MW-9, MW-10, and MW-11. In the most recently collected samples, compounds measured in excess of applicable DHS drinking water action levels are 1,1-DCE, 1,2-DCA, TCE, and EDB.
- Five soil cleanup alternatives were considered: excavation and off-site disposal, excavation and off-site treatment, in situ biodegradation, in situ soil venting, and in situ steam injection.
- Off-site disposal and off-site treatment meet implementability and performance criteria but may not meet the regulatory acceptance criterion, primarily because of the potential for public and worker exposure to hydrocarbons during excavation.
- Soil cleanup by steam injection meets the implementability criterion, fails the demonstrated performance criterion, and may not meet the regulatory acceptance criterion.
- In situ biodegradation and soil venting meet the performance and regulatory acceptance criteria but are marginally acceptable with respect to the implementability criterion, primarily because of concerns related to the current construction schedule.
- The following soil cleanup alternatives are recommended for further evaluation: excavation followed by off-site aeration, in situ biodegradation, and in situ steam injection.
- It is recommended that site ground water be treated in conjunction with site dewatering, using the existing carbon adsorption treatment system to reduce hydrocarbon concentrations to acceptable levels prior to discharge.



**VII REFERENCES**

Harding Lawson Associates, 1988a. *Ground-Water Investigation, Chinatown  
Redevelopment Project Area, Oakland, California.* April.

Harding Lawson Associates, 1988b. *A-Aquifer Monitoring Report, Chinatown  
Redevelopment Project Area, Oakland, California.* Draft Report. November.

Table 1. Ground Water Elevations\*, March - November 1988  
 Pacific Renaissance Plaza  
 Chinatown Redevelopment Project Area  
 Oakland, California

WELL NO:	MW-9		MW-10		MW-11	
	GROUND SURFACE	TOP OF CASING	GROUND SURFACE	TOP OF CASING	GROUND SURFACE	TOP OF CASING
	38.69	38.50	36.81	36.86	37.99	37.56
-----						
DATE (1988)	Depth to Water	Elevation	Depth to Water	Elevation	Depth to Water	Elevation
-----						
03/09	23.25	15.25	.	.	.	.
03/10	23.13	15.37	.	.	.	.
03/18	24.86	13.64	.	.	.	.
03/21	25.33	13.17	.	.	.	.
06/30	28.83	9.67	.	.	.	.
07/15	29.28	9.22	.	.	.	.
07/27	29.54	8.96	.	.	.	.
08/12	.	.	.	.	.	.
08/26	30.02	8.48	.	.	.	.
09/09	30.15	8.35	27.02	9.84	28.97	8.59
09/23	30.31	8.19	27.20	9.66	29.11	8.45
09/30	30.39	8.11	27.25	9.61	29.15	8.41
11/02	30.53	7.97	27.47	9.39	29.39	8.17

*Screen*  
 19.5' — bottom  
 @ 35' 40"

\* Elevations are in feet above mean sea level (MSL)

Harding Lawson Associates

Table 2. Results of Chemical Analyses of Soil Samples  
 Petroleum Hydrocarbons (EPA Method 8015)  
 Purgeable Aromatics (EPA Method 8020)  
 Lead

Harding Lawson Associates

BORING No.	SAMPLE DEPTH (feet)	DATE	BENZENE		TOLUENE		ETHYL- BENZENE		TOTAL XYLENES		TOTAL PETRO- LEUM HYDRO- CARBONS (gasoline)		TOTAL PETRO- LEUM HYDRO- CARBONS (diesel)		LEAD
			ST	ug/Kg	ST	ug/Kg	ST	ug/Kg	ST	ug/Kg	ST	ug/Kg	ST	ug/Kg	
B-1	30.0	8/02/88		3300.0		35000.0		32000.0		170000.0		2500.00	ND	10	NT
	36.5	8/02/88		0.7		6.3		0.6		2.3	ND	0.05	ND	10	NT
B-2	30.0	8/01/88	ND	0.2		1.5	ND	0.2	ND	0.2	ND	0.05	ND	10	NT
B-3	25.5	7/29/88		7.0	ND	0.2		2.5		4.4		0.49	ND	10	NT
B-4	15.5	7/25/88	ND	0.2		0.6	ND	0.2	ND	0.2	ND	0.05	ND	10	NT
B-5	10.0	7/25/88	ND	0.2	ND	0.2	ND	0.2	ND	0.2	ND	0.05	ND	10	NT
B-6	25.5	8/01/88	ND	0.2		28.0	ND	0.2	ND	0.2	ND	0.05	ND	10	NT
B-7	5.5	8/01/88	ND	0.2		21.0	ND	0.2	ND	0.2	ND	0.05		185	NT
	10.0	8/01/88	ND	0.2		1.3	ND	0.2	ND	0.2	ND	0.05	ND	10	NT
	30.0	8/02/88		33.0		16.0		1.0		5.4		0.19	ND	10	1.87
	35.5	8/02/88	ND	0.2		1.6	ND	0.2		0.9	ND	0.05	ND	10	NT
B-8 dup	5.5	8/05/88	ND	0.2		1.4	ND	0.2	ND	0.2	ND	0.05	ND	10	NT
	25.5	8/05/88		480.0		1000.0		1100.0		6300.0		14.00	ND	10	ND 2.00
	25.5	8/05/88		540.0		910.0		1100.0		5800.0		17.00	NT		ND 2.00
	30.0	8/05/88		29.0		19.0		1.3		12.0		0.089	ND	10	NT
	35.5	8/05/88	ND	0.2	ND	0.2	ND	0.2	ND	0.2	ND	0.05	ND	10	NT
B-10	32.0	7/25/88		4.2		24.0		13.0		76.0		0.73	ND	10	NT
	35.5	7/25/88	ND	0.2		0.6	ND	0.2	ND	0.2	ND	0.05	ND	10	NT
B-12	5.5	8/05/88	ND	0.2		6.1	ND	0.2	ND	0.2	ND	0.05	ND	10	NT
	25.5	8/05/88		10000.0		130000.0		38000.0		210000.0		3000.00	ND	10	ND 2.00
	30.0	8/05/88	NT		NT		NT		NT			7.70	ND	10	NT
	35.5	8/05/88		0.9		4.6	ND	0.2		2.8	ND	0.05	ND	10	NT
B-13	15.5	7/27/88		250.0		120.0		4.8		36.0		2.10	ND	10	1.98
	20.5	7/27/88		50000.0		110000.0		1000.0		460000.0		470.00	ND	10	NT
	25.5	7/27/88		85000.0		630000.0		140000.0		820000.0		4600.00	ND	10	NT
	29.5	7/27/88	NT		NT		NT		NT			11.00	ND	10	NT
	35.5	7/27/88	NT		NT		NT		NT			0.32	NT		NT
B-14	10.0	8/02/88	ND	0.2		0.7	ND	0.2	ND	0.2	ND	0.05	ND	10	NT
	25.5	8/02/88		1.8		1.6	ND	0.2	ND	0.2	ND	0.05	ND	10	NT

Table 2. Results of Chemical Analyses of Soil Samples  
 Petroleum Hydrocarbons (EPA Method 8015)  
 Purgeable Aromatics (EPA Method 8020)  
 Lead

Harding Lawson Associates

BORING No.	SAMPLE DEPTH (feet)	DATE	BENZENE		TOLUENE		ETHYL- BENZENE		TOTAL XYLENES		TOTAL PETRO- LEUM HYDRO- CARBONS (gasoline)	TOTAL PETRO- LEUM HYDRO- CARBONS (diesel)	LEAD		
			ST	ug/Kg	ST	ug/Kg	ST	ug/Kg	ST	ug/Kg	ST	mg/Kg		ST	mg/Kg
B-16	15.5	8/03/88		93.0		19.0		8.6		63.0	0.15	185	NT		
	25.5	8/03/88		15000.0		280000.0		88000.0		500000.0	4000.00	ND	10	NT	
	dup	25.5	8/03/88		10000.0		220000.0		81000.0		470000.0	4800.00	NT	NT	
	30.0	8/03/88		1200.0		180.0		120.0		230.0	3.00	ND	10	NT	
	35.5	8/03/88		3.1		13.0		3.0		18.0	0.12	ND	10	NT	
B-17	15.5	7/28/88		79.0		37.0		4.7		27.0	0.086	ND	10	NT	
	20.0	7/28/88		140.0		34.0		0.8		4.6	0.43	ND	10	NT	
	25.5	7/28/88		5800.0		57000.0		21000.0		130000.0	880.00	ND	10	1.08	
	35.5	7/28/88	NT		NT		NT		NT		ND	0.05	NT	NT	
B-18	25.5	8/04/88		38.0		86.0		12.0		78.0	0.10	ND	10	2.55	
	30.5	8/04/88		400.0		6800.0		4300.0		27000.0	160.00	ND	10	NT	
B-19	10.5	7/29/88	ND	0.2	ND	0.2	ND	0.2	ND	0.2	ND	0.05	ND	10	NT
	20.5	7/29/88		13.0		13.0		0.6		4.5	0.12	ND	10	NT	
	25.0	7/29/88		11000.0		88000.0		23000.0		130000.0	960.00	ND	10	1.26	
	35.5	7/29/88	NT		NT		NT		NT		0.16	ND	10	NT	
B-20	15.5	7/28/88		130.0		100.0		13.0		98.0	0.29	ND	10	NT	
	20.0	7/28/88		3.2		2.4	ND	0.2		0.7	0.21	ND	10	NT	
	25.0	7/28/88		990.0		2000.0		430.0		2800.0	59.00	ND	10	1.06	
B-21	15.5	7/27/88		180.0		4.9		0.9		66.0	0.23	ND	10	NT	
	21.5	7/27/88		9800.0		52000.0		19000.0		120000.0	260.00	ND	10	NT	
	25.5	7/27/88		3900.0		3300.0		310.0		1000.0	16.00	ND	10	ND	1.00
	30.0	7/27/88		2.4		2.4	ND	0.2		1.8	ND	0.05	ND	10	NT
B-22	15.5	8/03/88	ND	0.2		0.5	ND	0.2	ND	0.2	ND	0.05	ND	10	NT
	25.0	8/03/88	ND	40.0		260.0		18000.0		12000.0	14.00	ND	10	ND	2.00
	dup	25.0	8/03/88	ND	40.0		240.0		1700.0		12000.0	13.00	NT	NT	
	30.5	8/03/88		18.0		3.9	ND	0.2		50.0	0.18	ND	10	NT	

NOTES: ST: Status.

ND: Not detected at level shown.

NT: Not tested.

Table 3. Results of Chemical Analyses of Soil Samples  
Purgeable Halocarbons (EPA Method 8010)

BORING No.	SAMPLE DEPTH (feet)	SAMPLE DATE	DICHLORO-DIFLUORO-METHANE		1,1 DI-CHLORO-ETHENE		METHYLENE CHLORIDE		TRANS 1,2 DICHLORO-ETHENE		1,1 DI-CHLORO-ETHANE		CHLORO-FORM		1,1,1 TRI-CHLORO-ETHANE		1,2 DI-CHLORO-ETHANE		TRI-CHLORO-ETHENE		1,2 DI-CHLORO-PROPANE		1,1,2 TRI-CHLORO-ETHANE		DIBROMO-CHLORO-METHANE		CHLORO-BENZENE					
			ST ug/Kg	ST ug/Kg	ST ug/Kg	ST ug/Kg	ST ug/Kg	ST ug/Kg	ST ug/Kg	ST ug/Kg	ST ug/Kg	ST ug/Kg	ST ug/Kg	ST ug/Kg	ST ug/Kg	ST ug/Kg	ST ug/Kg	ST ug/Kg	ST ug/Kg	ST ug/Kg	ST ug/Kg	ST ug/Kg	ST ug/Kg	ST ug/Kg	ST ug/Kg	ST ug/Kg	ST ug/Kg	ST ug/Kg	ST ug/Kg			
B-1	30.0-30.5	06/02/88	ND	2.0	ND	0.5		1.0	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	0.9	ND	0.5	ND	0.5	ND	0.5	0.6	ND	0.5		
	36.5	06/02/88	ND	2.0	ND	0.5		1.1	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	0.9	ND	0.5	ND	0.5	ND	0.5	0.6	ND	0.5		
B-2	30.0	06/01/88	ND	2.0	ND	0.5		1.6	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5		
B-4	15.5	07/25/88	ND	2.0		0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5		
B-5	10.0	07/25/88	ND	2.0	ND	0.5	ND	0.5	ND	0.5	ND	0.5	1.4		1.4	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	
B-6	25.5	06/01/88	ND	2.0	ND	0.5		0.9	ND	0.5	ND	0.5	1.2	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	
B-7	5.5-6.0	06/01/88	ND	2.0	ND	0.5		0.7	ND	0.5	ND	0.5	0.6	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	
	10.0-10.5	06/01/88	ND	2.0	ND	0.5		0.8	ND	0.5	ND	0.5	0.6	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	
	30.0-30.5	06/02/88	ND	2.0	ND	0.5		0.6	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5
	35.5	06/02/88	ND	2.0	ND	0.5		0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	2.3	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	
B-8	25.5-26.0	06/05/88	ND	2.0	ND	0.5		1.7	ND	0.5	ND	0.5	1.7	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	
	35.5	06/05/88	ND	2.0	ND	0.5		1.2	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5
B-10	32.5	07/25/88	ND	2.0	ND	0.5		0.6	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5
	35.5	07/25/88	ND	2.0	ND	0.5		0.6	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5
B-12	25.5-26.0	06/05/88	ND	10.0	ND	10.0	ND	10.0	ND	10.0	ND	10.0	ND	10.0	ND	10.0	0.8	ND	10.0	ND	10.0	ND	10.0	ND	10.0	ND	10.0	ND	10.0	ND	10.0	
	35.5	06/05/88	ND	2.0	ND	0.5		1.2	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5

SOILS2TB.WK1 REVISION DATE 30-Nov-88

Table 3. Results of Chemical Analyses of Soil Samples  
Purgeable Halocarbons (EPA Method 8010)

BORING No.	SAMPLE DEPTH (feet)	SAMPLE DATE	DICHLORO-DIFLUORO-METHANE		1,1 DI-CHLORO-ETHYLENE		TRANS 1,2 DICHLORO-ETHYLENE		1,1 DI-CHLORO-ETHANE		1,1,1 TRI-CHLORO-ETHANE		1,2 DI-CHLORO-ETHANE		TRI-CHLORO-ETHYLENE		1,2 DI-CHLORO-PROPANE		1,1,2 TRI-CHLORO-ETHANE		DIBROMO-CHLORO-METHANE		CHLORO-BENZENE			
			ST ug/Kg	ST ug/Kg	ST ug/Kg	ST ug/Kg	ST ug/Kg	ST ug/Kg	ST ug/Kg	ST ug/Kg	ST ug/Kg	ST ug/Kg	ST ug/Kg	ST ug/Kg	ST ug/Kg	ST ug/Kg	ST ug/Kg	ST ug/Kg	ST ug/Kg	ST ug/Kg	ST ug/Kg	ST ug/Kg	ST ug/Kg	ST ug/Kg	ST ug/Kg	
B-13	15.5	07/27/88	ND	2.0	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	7.7	ND	0.5	ND	0.5	ND	0.5	
	20.5-21.0	07/27/88	ND	2.0	ND	0.5	ND	0.5	ND	0.5	ND	0.5	7.9	ND	0.5	2.6	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5
	25.5-26.0	07/27/88	ND	20.0	ND	50.0	ND	50.0	ND	50.0	ND	50.0	ND	50.0	160.0	ND	50.0	ND	50.0	ND	50.0	ND	50.0	ND	50.0	
	35.5	07/27/88	ND	2.0	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5
B-14	10.0-10.5	08/02/88	ND	2.0	ND	0.5	ND	1.0	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5
	25.5	08/02/88	ND	2.0	ND	0.5	ND	3.1	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5
B-16	15.5-16.0	08/03/88	ND	2.0	ND	0.5	ND	1.3	ND	0.5	ND	0.5	ND	0.9	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5
	25.5-26.0	08/03/88	ND	100.0	ND	25.0	ND	25.0	ND	25.0	ND	25.0	ND	25.0	ND	25.0	ND	25.0	ND	25.0	ND	25.0	ND	25.0	ND	25.0
	dup 25.5-26.0	08/03/88	ND	100.0	ND	25.0	ND	25.0	ND	25.0	ND	25.0	ND	25.0	ND	25.0	ND	25.0	ND	25.0	ND	25.0	ND	25.0	ND	25.0
	30.0	08/03/88	ND	2.0	ND	0.5	ND	2.2	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	18.0	ND	0.5	ND	0.5	ND	0.5	ND	0.5
	35.5	08/03/88	ND	2.0	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	1.7	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5
B-17	15.5-16.0	07/28/88	ND	2.0	ND	0.5	ND	3.0	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5
	20.0	07/28/88	ND	2.0	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5
	25.5-26.0	07/28/88	ND	2.0	ND	0.5	ND	1.4	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	2.4	ND	0.5	ND	0.5	ND	0.5	ND	0.5
	35.5	07/28/88	ND	2.0	ND	1.5	ND	0.5	ND	1.4	ND	0.6	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5
B-18	25.5-26.0	08/04/88	ND	2.0	ND	0.5	ND	0.9	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.7	ND	0.5	ND	0.5	ND	0.5	ND	0.5
	30.5	08/04/88	ND	2.0	ND	0.5	ND	2.0	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	2.9	ND	0.5	ND	0.5	ND	0.5	ND	0.5
B-19	10.5	07/29/88	ND	2.0	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5

*new 11*  
*W. from carbon*

Table 3. Results of Chemical Analyses of Soil Samples  
Purgeable Halocarbons (EPA Method 8010)

BORING No.	SAMPLE DEPTH (feet)	SAMPLE DATE	DICHLORO-DIFLUORO-METHANE		1,1 DI-CHLORO-ETHENE		TRANS 1,2-DICHLORO-ETHENE		1,1 DI-CHLORO-ETHANE		CHLORO-FORM	1,1,1 TRI-CHLORO-ETHANE		1,2 DI-CHLORO-ETHANE		TRI-CHLORO-ETHENE	1,2 DI-CHLORO-PROPANE		1,1,2 TRI-CHLORO-ETHANE		DIBROMO-CHLORO-METHANE		CHLORO-BENZENE			
			ST ug/Kg	ND	ST ug/Kg	ND	ST ug/Kg	ND	ST ug/Kg	ND		ST ug/Kg	ND	ST ug/Kg	ND		ST ug/Kg	ND	ST ug/Kg	ND	ST ug/Kg	ND		ST ug/Kg	ND	
	20.5	07/29/88	ND	2.0	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5		
	25.0-25.5	07/29/88	ND	500.0	ND	500.0	ND	500.0	ND	500.0	ND	500.0	ND	500.0	ND	500.0	ND	500.0	ND	500.0	ND	500.0	ND	500.0		
	35.5	07/29/88	ND	2.0	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	5.8	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	
B-20	15.5-16.0	07/28/88	ND	2.0	ND	0.5	0.8	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	
	20.0-20.5	07/28/88	ND	2.0	ND	0.5	2.0	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	
	25.0-25.5	07/28/88	ND	2.0	ND	0.5	2.1	ND	0.5	ND	0.5	ND	0.5	ND	0.5	5.3	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5
B-21	15.5	07/27/88	ND	2.0	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	0.7	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	
	21.5-22.0	07/27/88	ND	2.0	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	7.4	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	
	25.5-26.0	07/27/88	ND	2.0	ND	0.5	0.8	ND	0.5	ND	0.5	ND	0.5	ND	0.5	18.0	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5
	30.0-30.5	07/27/88	ND	2.0	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	2.1	6.9	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5
B-22	15.5-16.0	08/03/88	ND	20.0	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5
	25.0-25.5	08/03/88	ND	20.0	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5
dup	25.0-25.5	08/03/88	ND	20.0	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5
	30.5	08/03/88	ND	2.0	ND	0.5	0.7	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	

NOTES: ST: Status.  
ND: Not detected at level shown.  
NT: Not tested.

Table 4. Results of Chemical Analyses of Ground-Water Samples from Borings  
 Petroleum Hydrocarbons (EPA Method 8015)  
 Purgeable Aromatics (EPA Method 602)  
 Lead

BORING No.	DATE	BENZENE		TOLUENE		ETHYL- BENZENE		TOTAL XYLENES		TOTAL PETRO- LEUM HYDRO- CARBONS (gasoline)		LEAD	
		ST	ug/l	ST	ug/l	ST	ug/l	ST	ug/l	ST	mg/l	ST	mg/l
B-2	08/01/88	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.05	ND	0.10
B-7	08/01/88		5300.0		11000.0		1200.0		6600.0		340.0	NT	
B-8	08/05/88		370.0		780.0		150.0		880.0		3.8	ND	0.01
dup.	08/05/88		390.0		650.0		130.0		670.0		3.1	ND	0.01
B-10	07/25/88		160.0		410.0		200.0		920.0		3.5		0.32
B-12	08/05/88		1400.0		2900.0		360.0		1700.0		10.0	ND	0.01
dup.	08/05/88		1300.0		2600.0		310.0		1500.0		9.1	ND	0.01
B-13	07/27/88		8800.0		11000.0		990.0		4400.0		44.0		0.02
B-17	07/28/88		10000.0		6000.0		820.0		3500.0		26.0	ND	0.01
B-20	07/28/88		6200.0		14000.0		1700.0		8800.0		48.0		0.60
B-21	07/27/88		1600.0		2300.0		550.0		2900.0		17.0	ND	0.01
B-22	08/03/88		43.0		11.0		93.0		570.0		3.1	NT	

NOTES: ST: Status.  
 ND: Not detected at level shown.  
 NT: Not tested.



Table 5. Results of Chemical Analyses of Ground-Water Samples from Borings Purgeable Halocarbons (EPA Method 8010)

BORING No.	SAMPLE DATE	DICHLORO-DIFLUORO-METHANE		1,1 DI-CHLORO-ETHENE		TRANS 1,2-DICHLORO-ETHENE		1,1 DI-CHLORO-ETHANE		CHLORO-FORM		1,1,1 TRI-CHLORO-ETHANE		1,2 DI-CHLORO-ETHANE		TRI-CHLORO-ETHENE		1,2 DI-CHLORO-PROPANE		1,1,2 TRI-CHLORO-ETHANE		DIBROMO-CHLORO-METHANE		CHLORO-BENZENE				
		ST	ug/l	ST	ug/l	ST	ug/l	ST	ug/l	ST	ug/l	ST	ug/l	ST	ug/l	ST	ug/l	ST	ug/l	ST	ug/l	ST	ug/l	ST	ug/l			
B-2	06/01/88	ND	2.0	ND	0.5	ND	0.5	ND	0.5	1.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5		
B-10	07/25/88		200.0		2.8	ND	0.5	ND	0.5	1.2	3.3	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	
B-13	07/27/88		13.0		0.7		0.6	ND	0.5	ND	0.5	ND	0.5	ND	0.5	44.0	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	1.0	
B-17	07/28/88		3.5		0.9		2.1	ND	0.5	ND	0.5	ND	0.5	ND	0.5	62.0	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5
B-20	07/28/88		13.0		11.0		5.8	ND	0.5	6.3	ND	0.5	ND	0.5	29.0	1.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5
B-21	07/27/88	ND	2.0		63.0		1.3	ND	0.5	25.0	0.3	0.9	10.0	16.0	ND	0.5		1.7	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5
B-22	08/03/88		10.0		14.0	ND	0.5	ND	0.5	4.3	ND	0.5	2.2	3.3	4.1	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	

NOTES: ST: Status.  
 ND: Not detected at level shown.

Table 6. Results of Chemical Analyses of Monitoring Well Ground-Water Samples  
Purgeable Aromatics (EPA Method 8020)  
Petroleum Hydrocarbons (EPA Method 8015)

WELL	DATE	BENZENE		TOLUENE		CHLORO-BENZENE		ETHYL-BENZENE		XYLENES		1,3 DI-CHLORO-BENZENE		1,4 DI-CHLORO-BENZENE		1,2 DI-CHLORO-BENZENE		TPH AS GASOLINE		TPH AS DIESEL	
		ST	ug/l	ST	ug/l	ST	ug/l	ST	ug/l	ST	ug/l	ST	ug/l	ST	ug/l	ST	ug/l	ST	ug/l	ST	ug/l
DHS Action Level		0.7		100		30		680		620		130	LOQ	0.2		130		--		--	
MW-9	03/10	110.0		95.0		ND	0.4		16.0		230.0	ND	0.4	ND	0.4	ND	0.4		4700	ND	10.0
	03/21	400.0		184.0		ND	0.4	ND	0.2	ND	0.2	ND	0.2	ND	0.2	ND	0.2		3400	ND	1.0
*	06/30	160.0		83.0		ND	6.0	ND	7.2	NT		ND	6.0	ND	6.0	ND	6.0		91	NT	
	07/15	200.0		170.0		ND	0.2	ND	0.2		81.0	ND	0.2	ND	0.2	ND	0.2		880	NT	
	07/15	110.0		77.0		ND	0.2	ND	0.2		46.0	ND	0.2	ND	0.2	ND	0.2		180	NT	
	08/26	65.0		28.0		ND	0.2	ND	0.2		40.0	ND	0.2	ND	0.2	ND	0.2		970	NT	
	09/29	75.0		113.0		ND	0.2	ND	0.2		53.0	ND	0.2	ND	0.2	ND	0.2		140	NT	
	11/01	140.0		63.0		ND	0.2	ND	0.2		40.0	ND	0.2	ND	0.2	ND	0.2		480	NT	
MW-10	09/09	910.0		690.0		ND	4.0		42.0		270.0	ND	4.0	ND	4.0	ND	4.0		2900	NT	
	09/29	140.0		16.0		ND	0.2	ND	0.2		230.0	ND	0.2	ND	0.2	ND	0.2		1700	NT	
	11/01	200.0		55.0		ND	0.2	ND	0.2		250.0	ND	0.2	ND	0.2	ND	0.2		1380	NT	
MW-11	09/09	520.0		670.0		ND	2.0		13.0		180.0	ND	2.0	ND	2.0	ND	2.0		1200	NT	
	09/29	3.6		1.2		ND	0.2	ND	0.2		250.0	ND	0.2	ND	0.2	ND	0.2		1700	NT	
	11/01	1300.0		1900.0		ND	0.2		91.0		820.0	ND	0.2	ND	0.2	ND	0.2		6500	NT	

NOTES:

- ST: Status.
- ND: Not detected at level shown.
- NT: Not tested.
- LOQ: Limit of Quantification.
- \* : Analysis performed by NET Pacific using EPA Test Method 624.

Table 7. Results of Chemical Analyses of Monitoring Well Ground-Water Samples  
 Purgeable Halocarbons (EPA Method 8010)  
 Ethylene Dibromide (EPA Method 504)

WELL	DATE	DICHLORO-	CHLORO-	1,1 DI-	METHYLENE	1,1 DI-	CHLORO-	1,1,1 TRI-	1,2 DI-	TRICHLORO-	TETRA-	ALL	ETHYLENE
		DIFLUORO- METHANE	CHLORO- METHANE	CHLORO- ETHENE	CHLORIDE	CHLORO- ETHANE	CHLORO- FORM	CHLORO- ETHANE	CHLORO- ETHANE	ETHENE	CHLORO- ETHENE	OTHER 601 COMPOUNDS	DIBROMIDE
		ST ug/l	ST ug/l	ST ug/l	ST ug/l	ST ug/l	ST ug/l	ST ug/l	ST ug/l	ST ug/l	ST ug/l	ST ug/l	ST ug/l
DHS ACTION LEVEL		--	--	6.0	40.0	20.0	--	200.0	1.0	5.0	4.0	--	--
MW-9													
	03/10	ND 2.0	ND 2.0	9.0	ND 0.5	2.6	ND 0.5	2.3	3.5	ND 0.5	0.6	ND 0.5	NT
	03/21	ND 2.0	ND 2.0	12.6	ND 0.5	3.0	ND 0.5	2.6	5.0	1.0	ND 0.5	ND 0.5	NT
*	06/30	ND 2.0	ND 2.0	ND 2.8	ND 2.8	ND 4.7	ND 1.6	ND 3.8	ND 2.8	ND 1.9	ND 4.1	ND	NT
	07/15	ND 2.0	17.0	5.8	ND 0.5	1.1	ND 6.0	0.7	1.3	1.2	ND 0.5	ND	NT
	07/15	ND 2.0	31.0	4.7	ND 0.5	1.0	5.4	0.6	1.0	0.7	ND 0.5	ND	NT
	08/26	ND 2.0	ND 2.0	1.5	ND 0.5	0.7	5.7	ND 0.5	2.1	ND 0.5	ND 0.5	ND	NT
	09/29	42.0	ND 2.0	1.6	ND 0.5	0.8	4.8	ND 0.5	1.8	ND 0.5	ND 0.5	ND	NT
	11/01	ND 1.0	ND 1.0	ND 1.0	16.0	1.0	5.1	ND 1.0	ND 1.0	ND 1.0	ND 1.0	ND 1.0	0.15
MW-10													
	09/09	ND 2.0	ND 2.0	16.0	ND 0.5	4.1	ND 0.5	ND 0.5	17.0	62	ND 0.5	ND	NT
	09/29	ND 2.0	ND 2.0	9.1	ND 0.5	2.5	ND 0.5	ND 0.5	40.0	73	ND 0.5	ND	NT
	11/01	ND 1.0	ND 1.0	10.7	13.7	3.0	ND 1.0	ND 1.0	7.5	55.0	ND 1.0	ND 1.0	0.03
MW-11													
	09/09	ND 2.0	ND 2.0	2.6	ND 0.5	2.7	ND 0.5	1.4	28.0	5.6	ND 0.5	ND	NT
	09/29	ND 2.0	ND 2.0	0.6	ND 0.5	0.6	3.3	ND 0.5	130.0	4.4	ND 0.5	ND	NT
	11/01	ND 1.0	ND 1.0	ND 1.0	15.9	ND 1.0	ND 1.0	ND 1.0	27.0	ND 1.0	ND 1.0	ND 1.0	0.16

NOTES:

ST: Status.

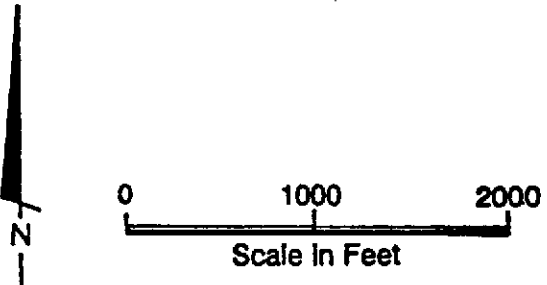
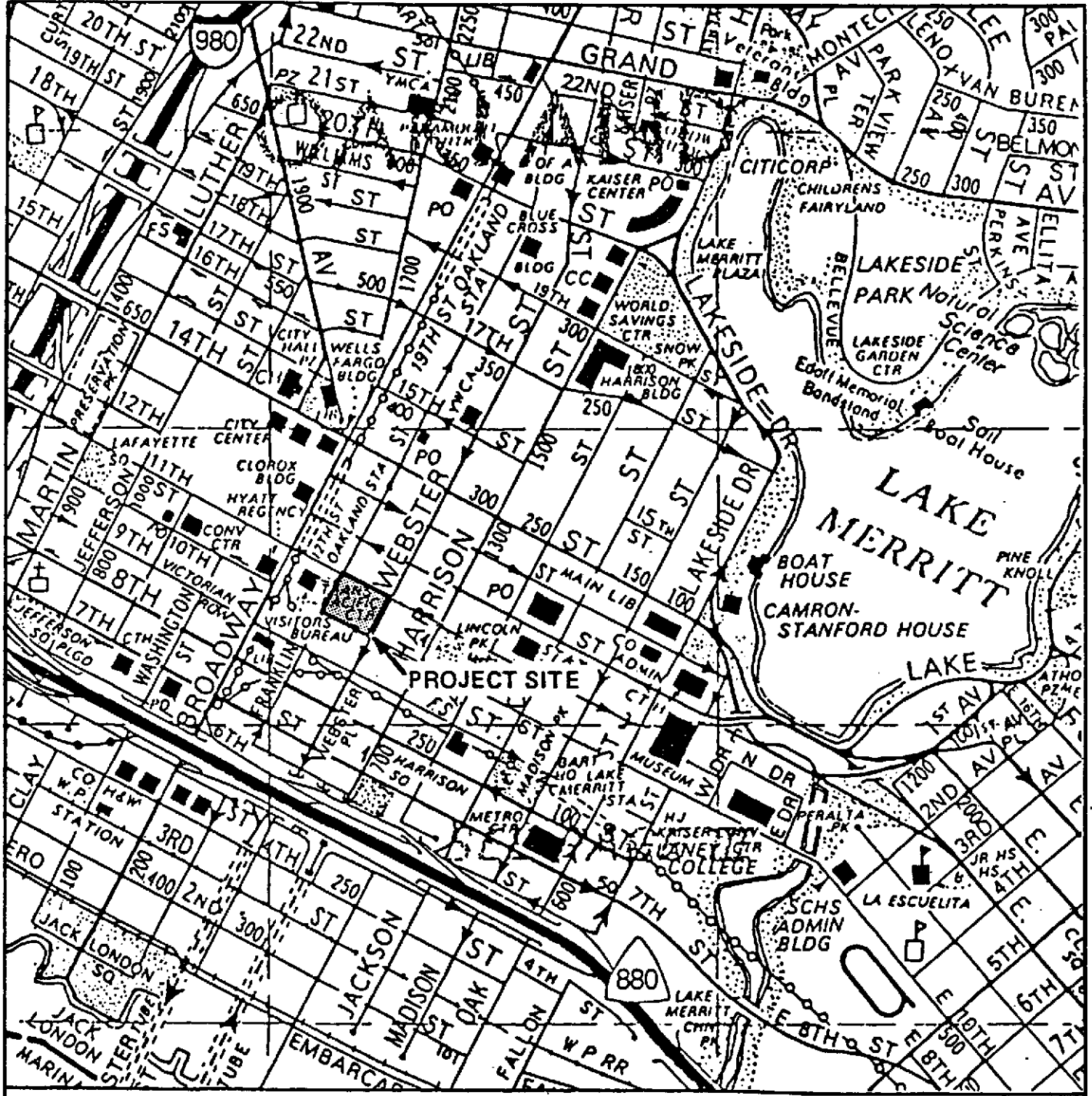
ND: Not detected at level shown.

NT: Not tested.

\* : Analysis performed by NET Pacific using EPA Test Method 624

**Table 8**  
**SUMMARY OF CLEANUP ALTERNATIVES**

<b>Alternative</b>	<b>Implementability</b>	<b>Demonstrated Performance</b>	<b>Regulatory Acceptance</b>
Excavation/Disposal	Yes	Yes	?
Excavation/Treatment	Yes	Yes	?
In Situ Biodegradation	?	Yes	Yes
In Situ Soil Venting	?	Yes	Yes
In Situ Steam Injection	Yes	No	?



**Harding Lawson Associates**  
Engineers and Geoscientists

**Location Map**  
**A-Aquifer Monitoring Report**  
Chinatown Redevelopment Project Area  
Oakland, California

PLATE  
**1**

DRAWN  
DM

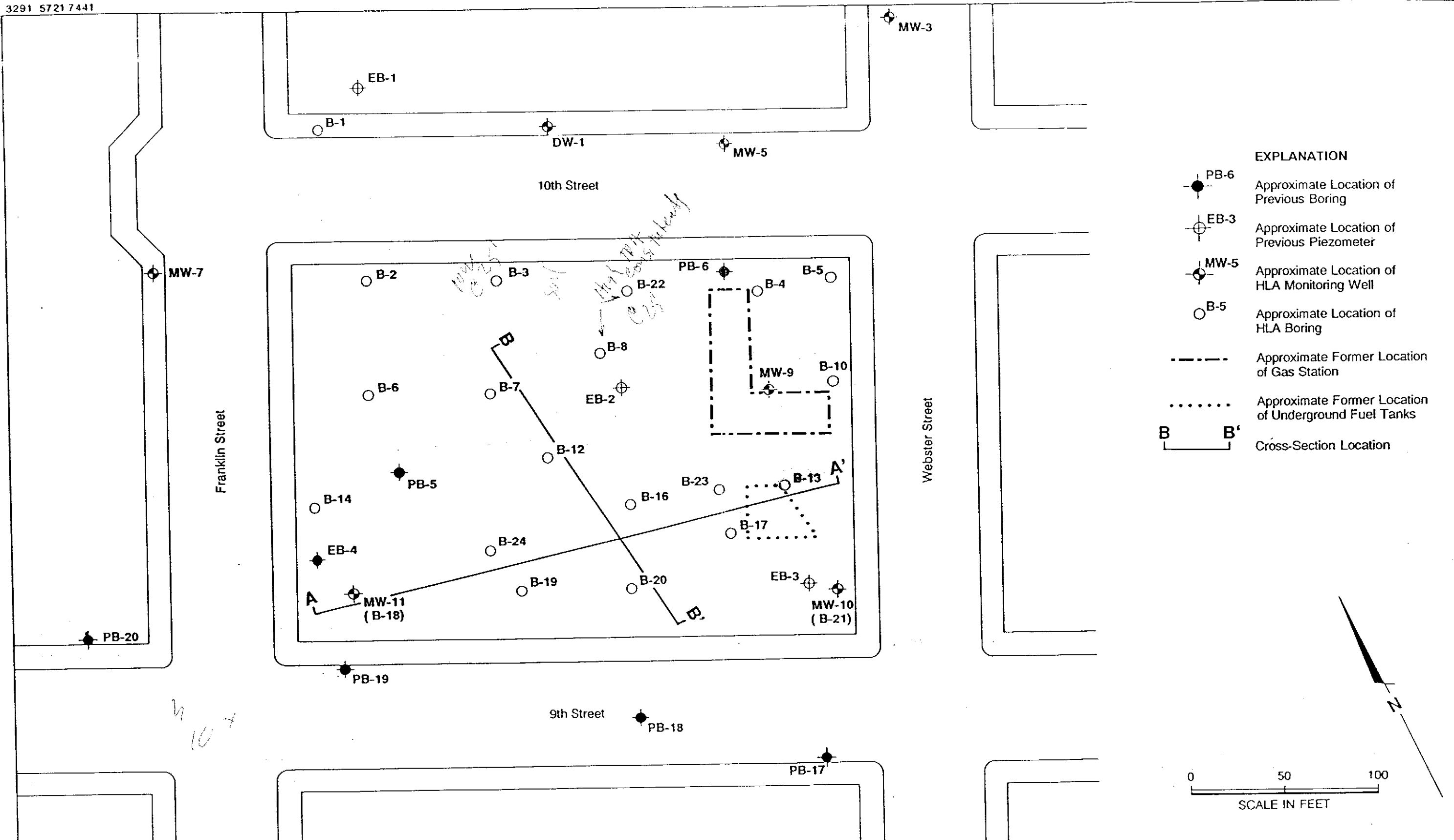
JOB NUMBER  
9382,023.02

APPROVED  
*DFland*

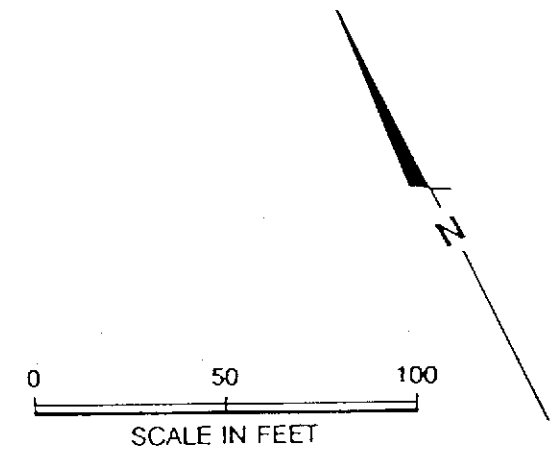
DATE  
6/88

REVISED

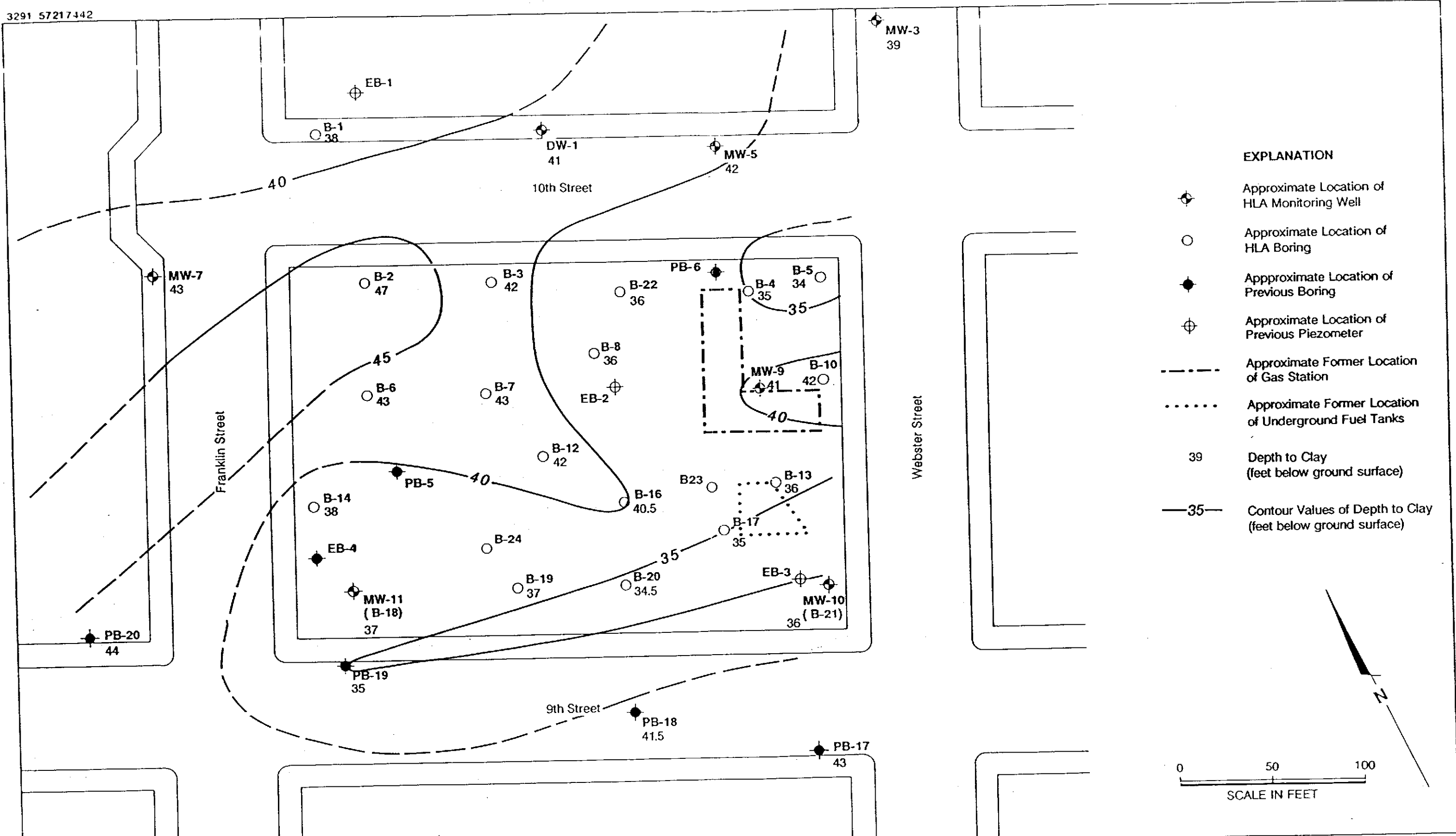
DATE



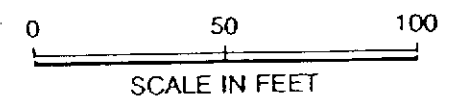
- EXPLANATION**
- PB-6 Approximate Location of Previous Boring
  - EB-3 Approximate Location of Previous Piezometer
  - MW-5 Approximate Location of HLA Monitoring Well
  - B-5 Approximate Location of HLA Boring
  - Approximate Former Location of Gas Station
  - Approximate Former Location of Underground Fuel Tanks
  - Cross-Section Location



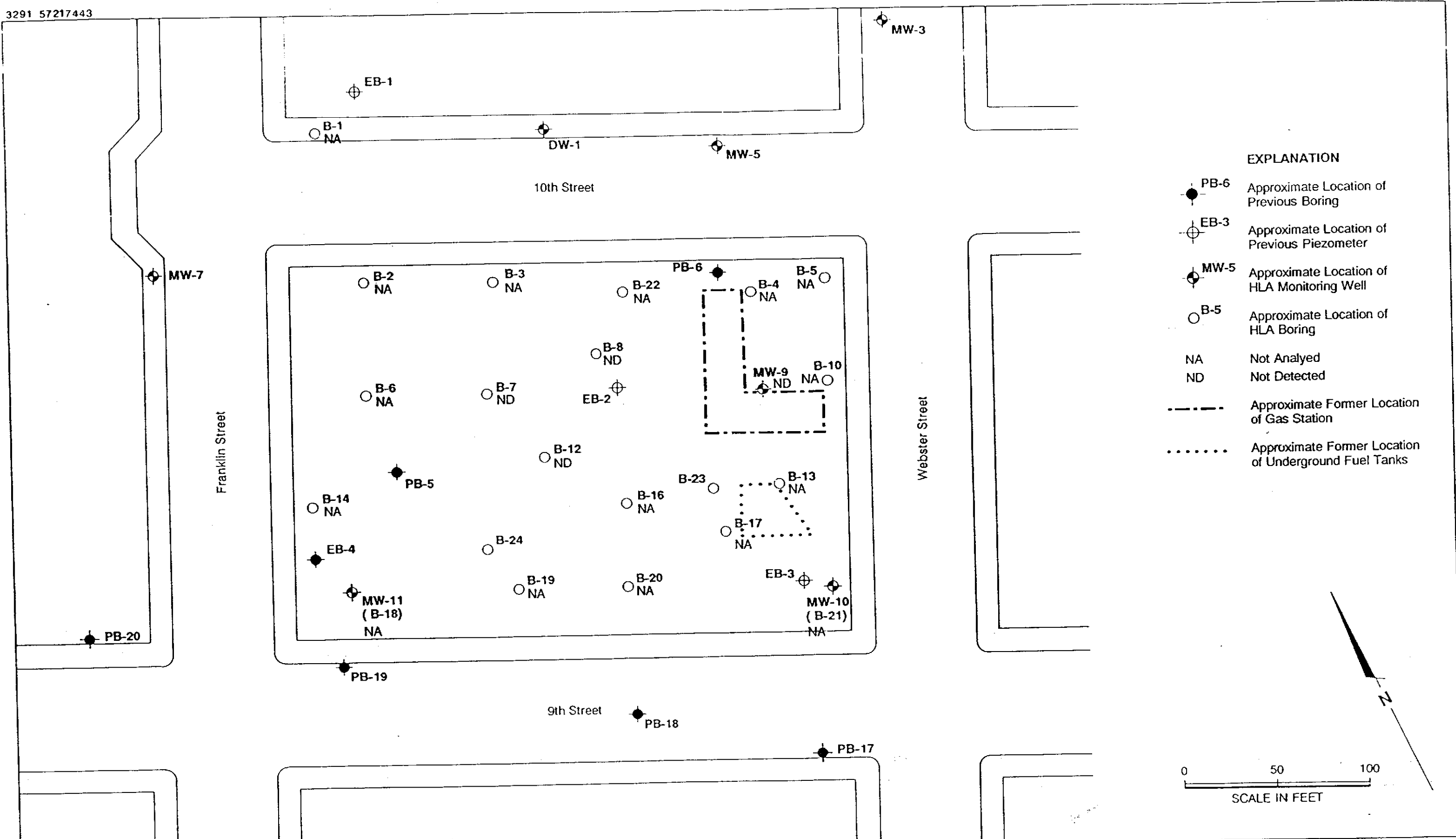
<p><b>Harding Lawson Associates</b> Engineers and Geoscientists</p>	<p>Site Plan and Location of Cross-Sections Pacific Renaissance Plaza Chinatown Redevelopment Project Area Oakland, California</p>		<p>PLATE <b>2</b></p>
	<p>DRAWN ML</p>	<p>JOB NUMBER 9382,030.02</p>	<p>APPROVED <i>DF Island</i></p>



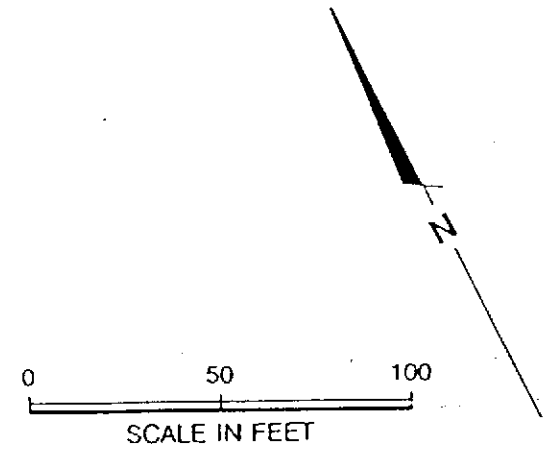
- EXPLANATION**
- ⊕ Approximate Location of HLA Monitoring Well
  - Approximate Location of HLA Boring
  - ◆ Approximate Location of Previous Boring
  - ⊕ Approximate Location of Previous Piezometer
  - - - - - Approximate Former Location of Gas Station
  - ..... Approximate Former Location of Underground Fuel Tanks
  - 39 Depth to Clay (feet below ground surface)
  - 35— Contour Values of Depth to Clay (feet below ground surface)




<p><b>Harding Lawson Associates</b> Engineers and Geoscientists</p>	<p><b>Isopach of Depth to Clay Layer</b> Pacific Renaissance Plaza Chinatown Redevelopment Project Area Oakland, California</p>		<p>PLATE <b>3</b></p>
	<p>DRAWN ML</p>	<p>INR NUMBER 9382,030.02</p>	<p>APPROVED <i>DF Wilson</i></p>

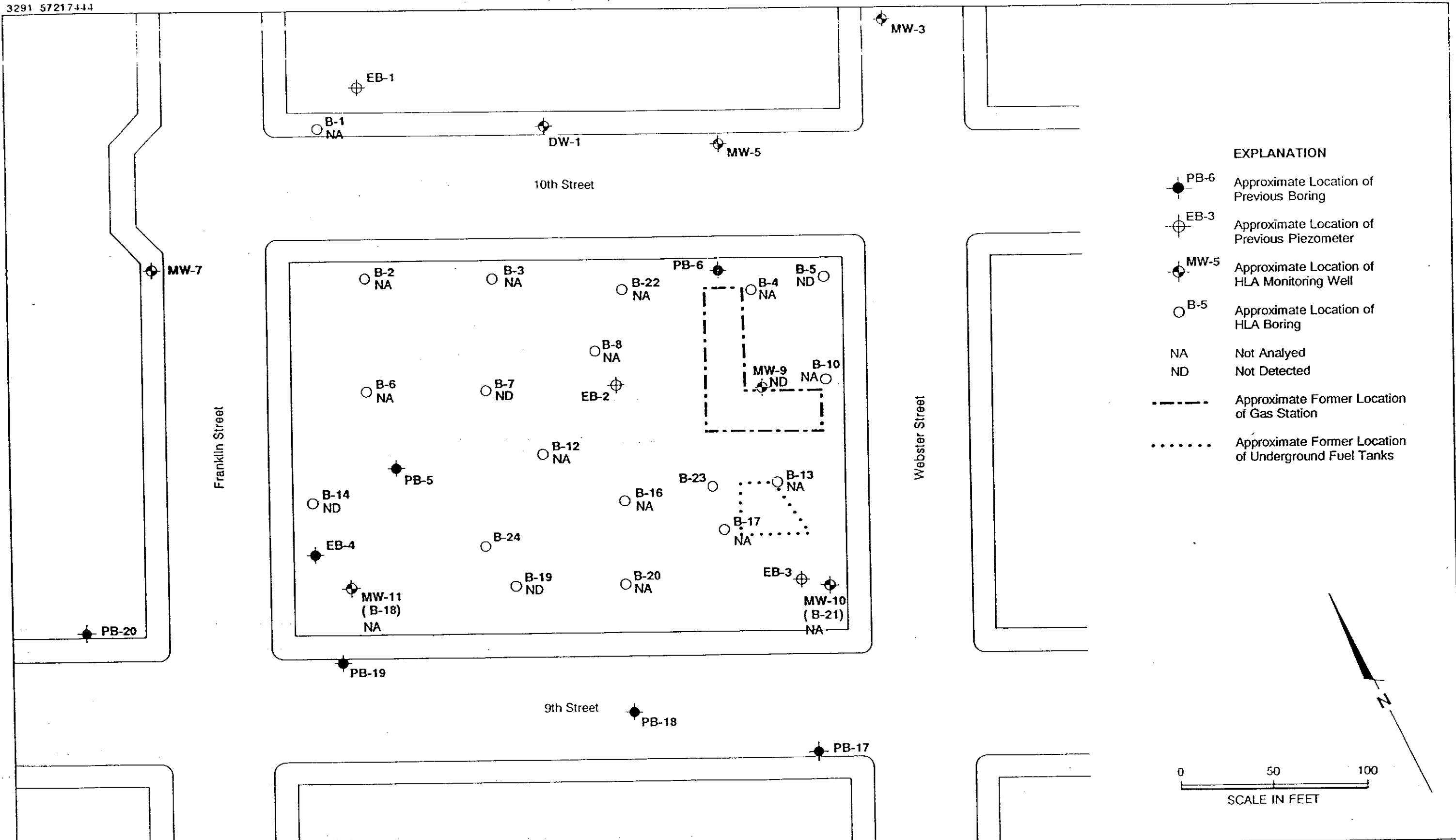


- EXPLANATION**
- PB-6 Approximate Location of Previous Boring
  - EB-3 Approximate Location of Previous Piezometer
  - MW-5 Approximate Location of HLA Monitoring Well
  - B-5 Approximate Location of HLA Boring
  - NA Not Analyzed
  - ND Not Detected
  - Approximate Former Location of Gas Station
  - Approximate Former Location of Underground Fuel Tanks

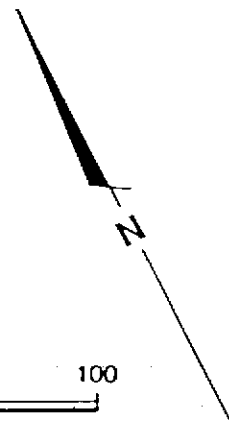



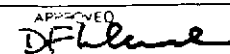
 <p><b>Harding Lawson Associates</b> Engineers and Geoscientists</p>	<p><b>TPH as Gasoline in Soil at 5 feet bgs</b> Pacific Renaissance Plaza Chinatown Redevelopment Project Area Oakland, California</p>	<p>PLATE <b>4</b></p>
<p>DRAWN ML</p>	<p>ICR NUMBER 9382,030.02</p>	<p>APPROVED <i>DF Wood</i> DATE 11/88</p>

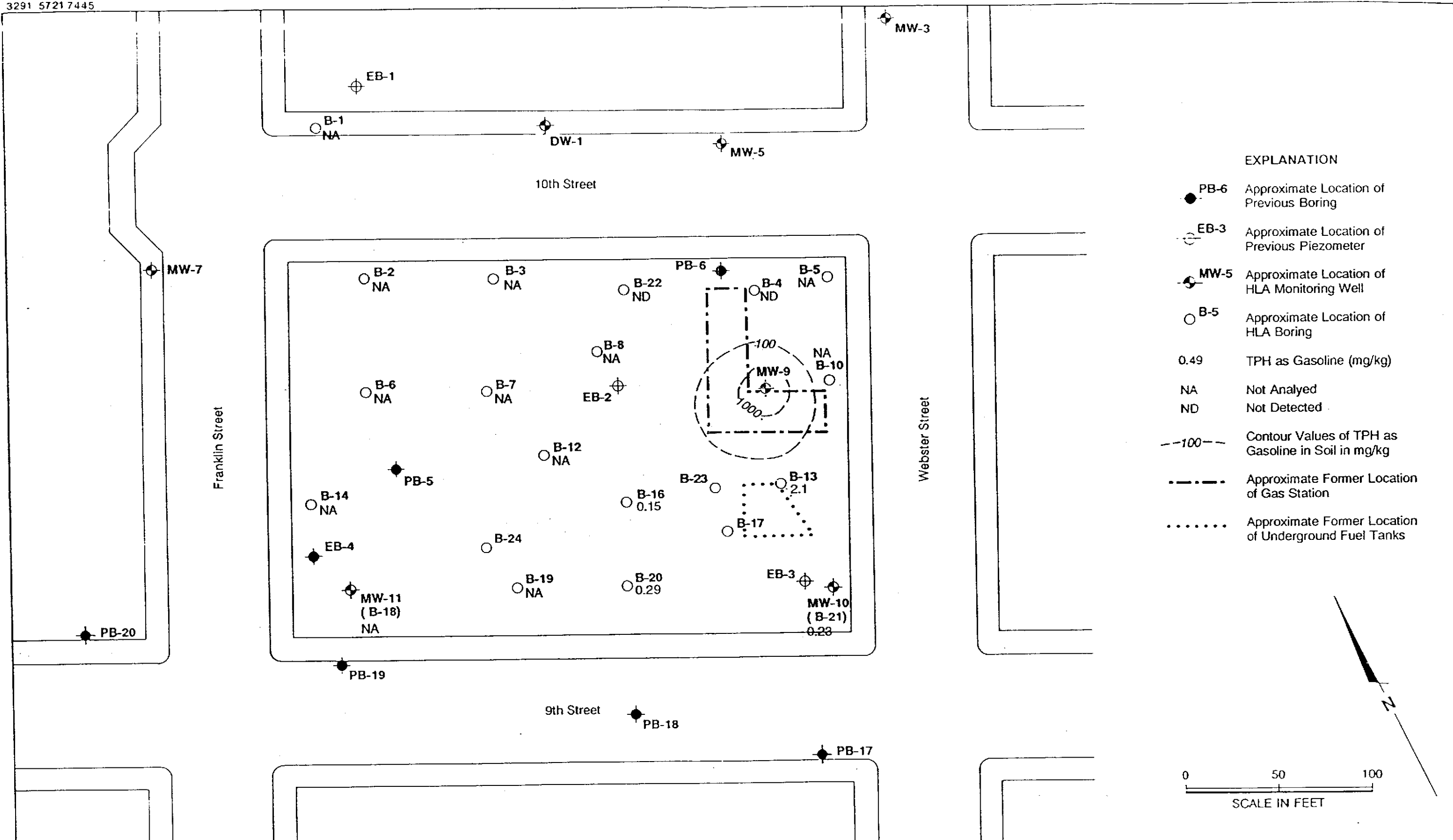




- EXPLANATION**
- PB-6 Approximate Location of Previous Boring
  - ⊕ EB-3 Approximate Location of Previous Piezometer
  - ⊕ MW-5 Approximate Location of HLA Monitoring Well
  - B-5 Approximate Location of HLA Boring
  - NA Not Analyzed
  - ND Not Detected
  - - - - - Approximate Former Location of Gas Station
  - ..... Approximate Former Location of Underground Fuel Tanks

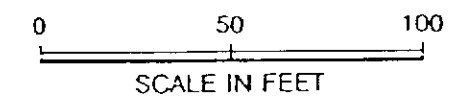



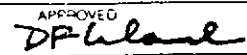
 <b>Harding Lawson Associates</b> Engineers and Geoscientists	<b>TPH as Gasoline in Soil at 10 feet bgs</b> Pacific Renaissance Plaza Chinatown Redevelopment Project Area Oakland, California		5
	DRAWN ML	JOB NUMBER 9382,030.02	APPROVED 

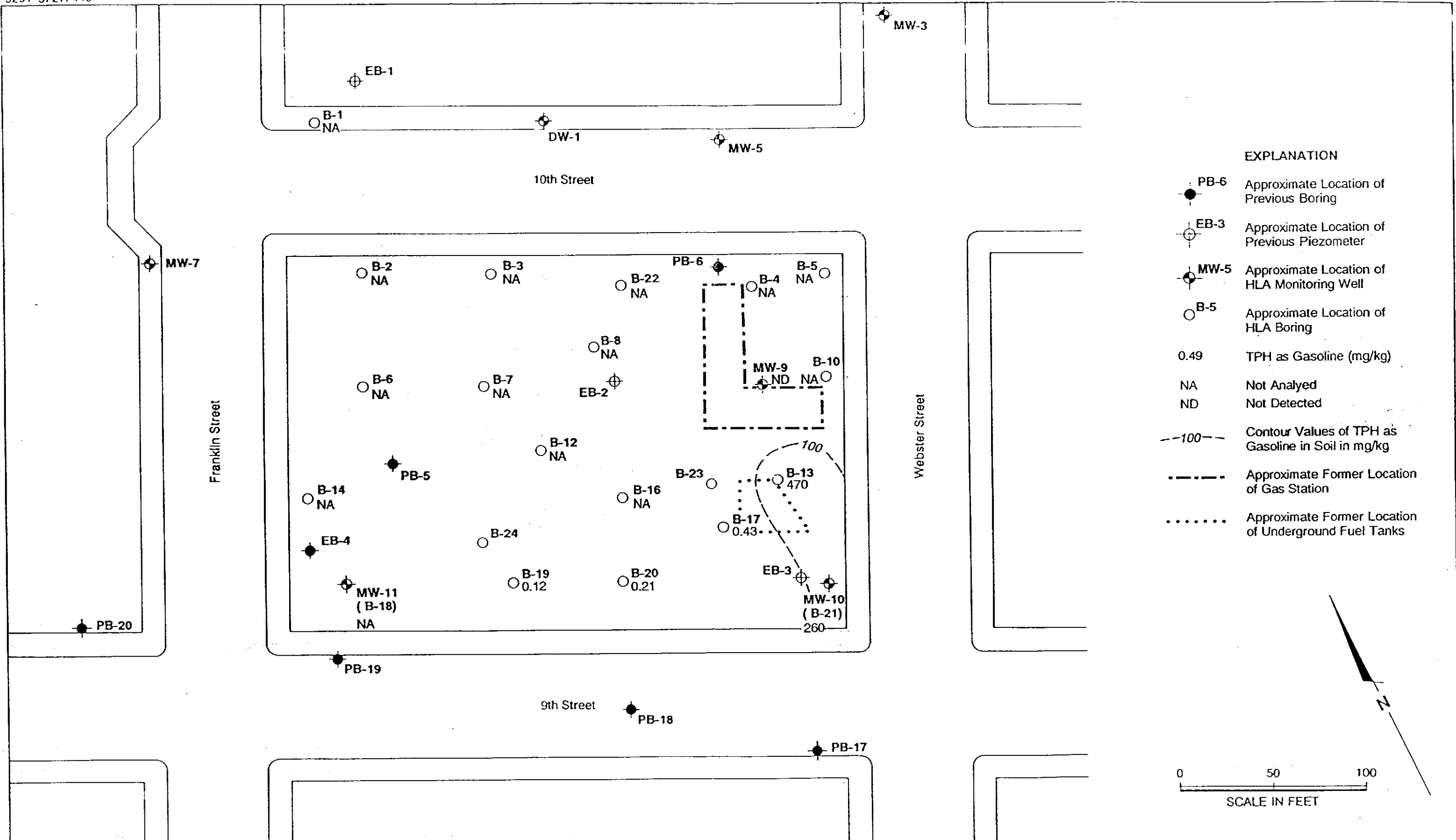


**EXPLANATION**

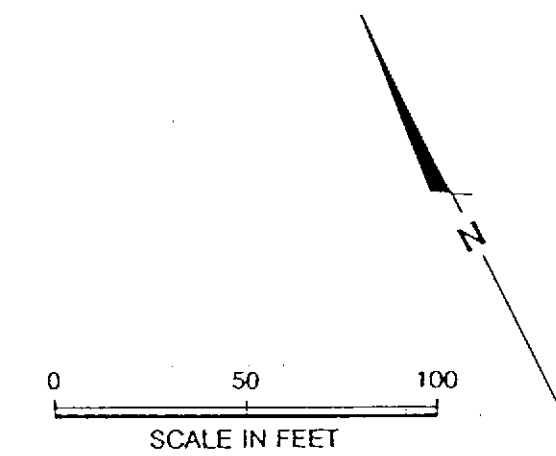
- PB-6 Approximate Location of Previous Boring
- ⊕ EB-3 Approximate Location of Previous Piezometer
- ⊕ MW-5 Approximate Location of HLA Monitoring Well
- B-5 Approximate Location of HLA Boring
- 0.49 TPH as Gasoline (mg/kg)
- NA Not Analyzed
- ND Not Detected
- - - 100 - - - Contour Values of TPH as Gasoline in Soil in mg/kg
- - - - - Approximate Former Location of Gas Station
- ..... Approximate Former Location of Underground Fuel Tanks




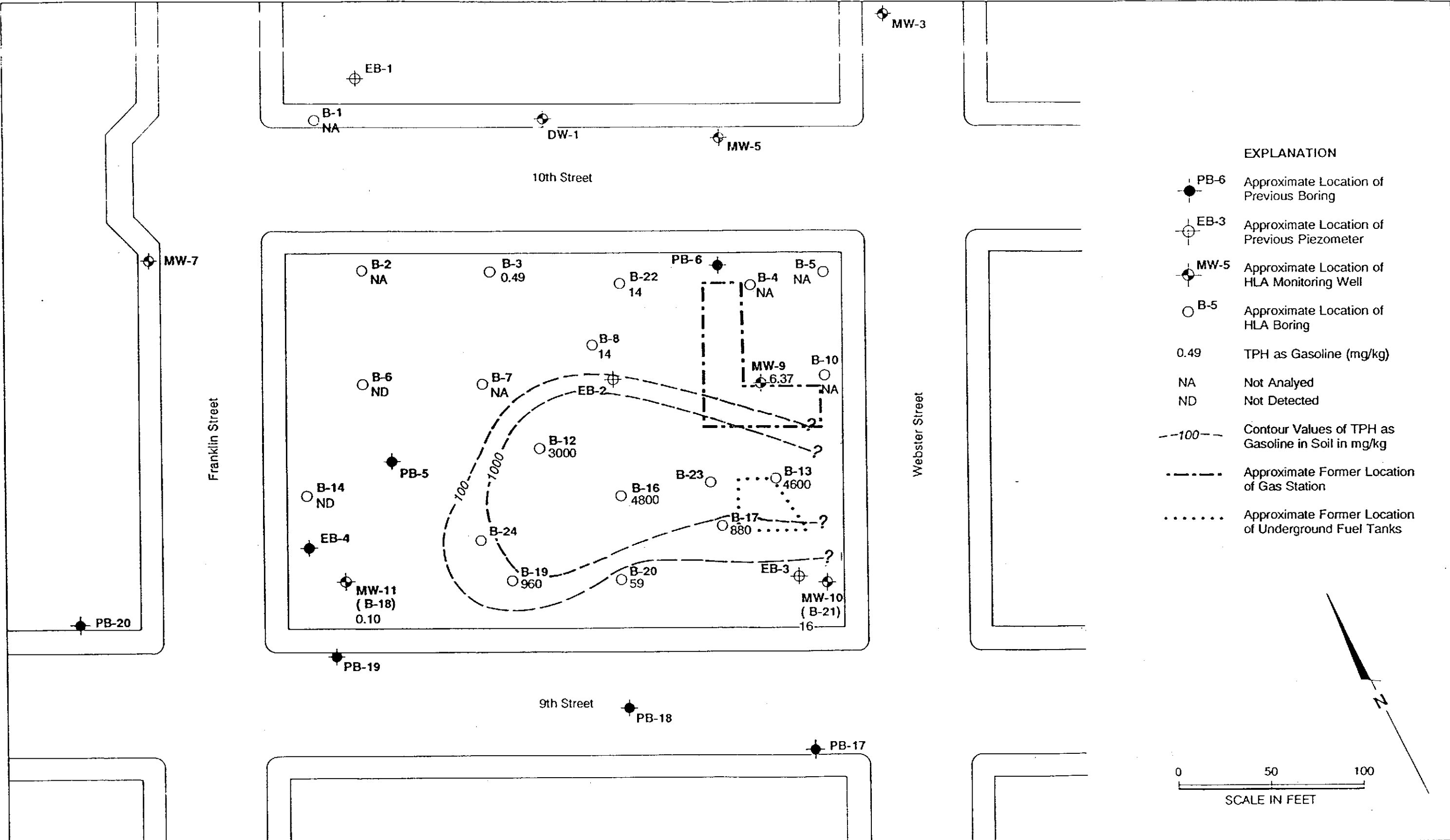
 <b>Harding Lawson Associates</b> Engineers and Geoscientists	<b>TPH as Gasoline in Soil at 15 feet bgs</b> Pacific Renaissance Plaza Chinatown Redevelopment Project Area Oakland, California		PLATE <b>6</b>
	DRAWN ML	ITR NUMBER 9382,030.02	APPROVED  DATE 11/88



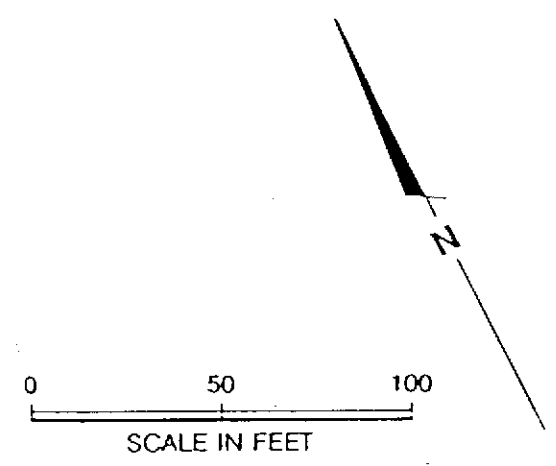
- EXPLANATION**
- PB-6 Approximate Location of Previous Boring
  - EB-3 Approximate Location of Previous Piezometer
  - MW-5 Approximate Location of HLA Monitoring Well
  - B-5 Approximate Location of HLA Boring
  - 0.49 TPH as Gasoline (mg/kg)
  - NA Not Analyzed
  - ND Not Detected
  - 100 Contour Values of TPH as Gasoline in Soil in mg/kg
  - Approximate Former Location of Gas Station
  - Approximate Former Location of Underground Fuel Tanks




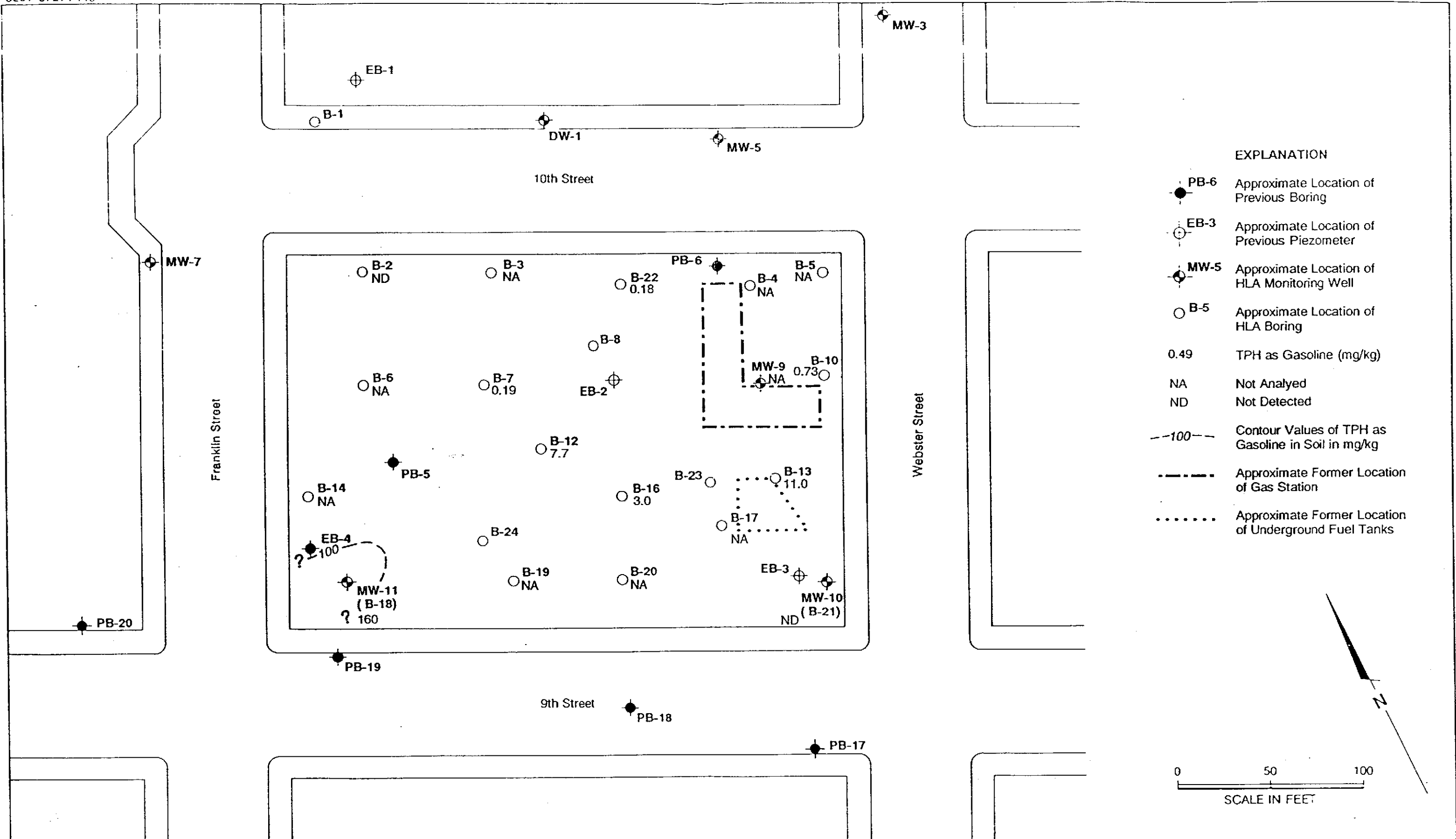
 <p><b>Harding Lawson Associates</b> Engineers and Geoscientists</p>	<p style="text-align: center;"><b>TPH as Gasoline in Soil at 20 feet bgs</b> Pacific Renaissance Plaza Chinatown Redevelopment Project Area Oakland, California</p>	<p>PLATE <b>7</b></p>	<table border="0" style="width: 100%; font-size: small;"> <tr> <td style="width: 25%;">DRAWN ML</td> <td style="width: 25%;">JOB NUMBER 9382,030.02</td> <td style="width: 25%;">APPROVED <i>DF</i></td> <td style="width: 25%;">DATE 11/88</td> </tr> <tr> <td></td> <td></td> <td style="text-align: right;">REVISED</td> <td style="text-align: right;">DATE</td> </tr> </table>	DRAWN ML	JOB NUMBER 9382,030.02	APPROVED <i>DF</i>	DATE 11/88			REVISED	DATE
DRAWN ML	JOB NUMBER 9382,030.02	APPROVED <i>DF</i>	DATE 11/88								
		REVISED	DATE								



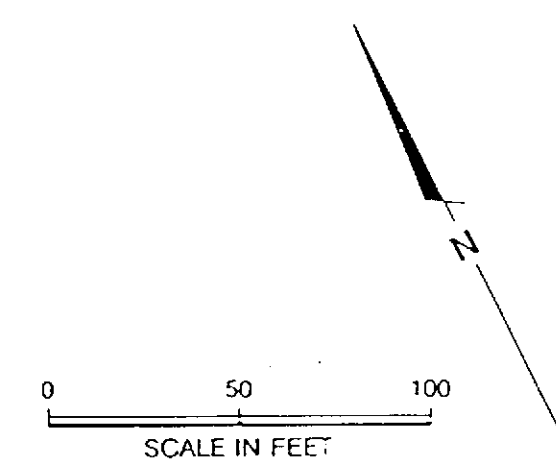
- EXPLANATION**
- PB-6 Approximate Location of Previous Boring
  - ⊕ EB-3 Approximate Location of Previous Piezometer
  - ⊕ MW-5 Approximate Location of HLA Monitoring Well
  - B-5 Approximate Location of HLA Boring
  - 0.49 TPH as Gasoline (mg/kg)
  - NA Not Analyzed
  - ND Not Detected
  - - - 100 - - - Contour Values of TPH as Gasoline in Soil in mg/kg
  - - - - - Approximate Former Location of Gas Station
  - ..... Approximate Former Location of Underground Fuel Tanks



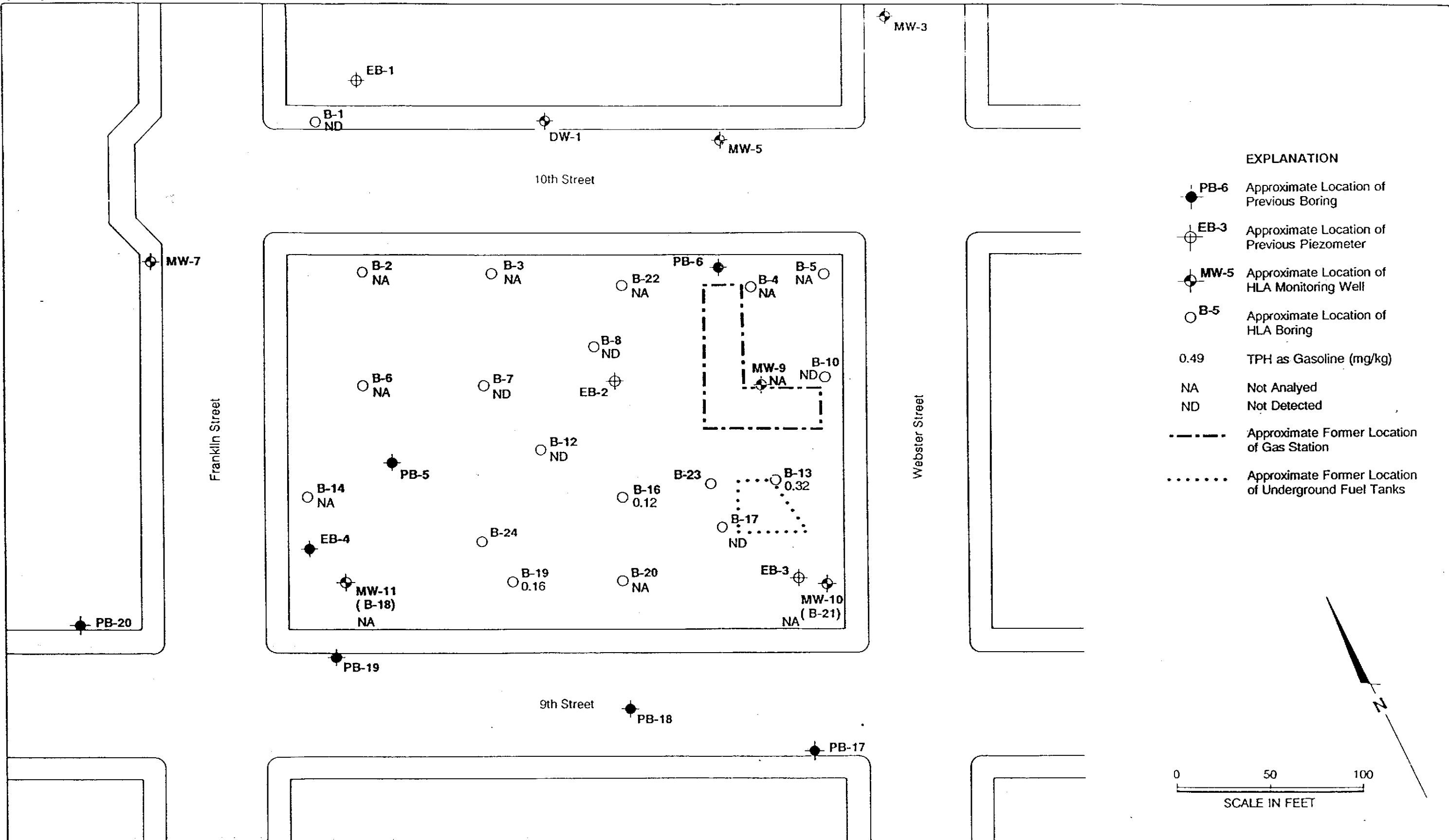
	<b>Harding Lawson Associates</b> Engineers and Geoscientists		TPH as Gasoline in Soil at 25 feet bgs Pacific Renaissance Plaza Chinatown Redevelopment Project Area Oakland, California			PLATE <b>8</b>
	Drawn: ML	HLA NUMBER: 9382,030.02	Approved: <i>DF</i>	DATE: 11/88	REVISED:	DATE:



- EXPLANATION**
- PB-6 Approximate Location of Previous Boring
  - EB-3 Approximate Location of Previous Piezometer
  - MW-5 Approximate Location of HLA Monitoring Well
  - B-5 Approximate Location of HLA Boring
  - 0.49 TPH as Gasoline (mg/kg)
  - NA Not Analyzed
  - ND Not Detected
  - 100- Contour Values of TPH as Gasoline in Soil in mg/kg
  - - - - - Approximate Former Location of Gas Station
  - ..... Approximate Former Location of Underground Fuel Tanks

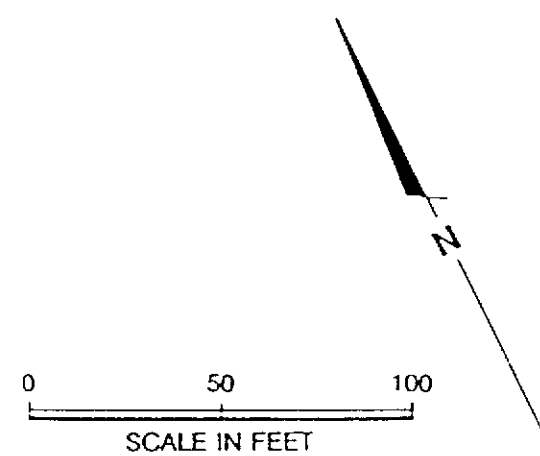


<p><b>Harding Lawson Associates</b> Engineers and Geoscientists</p>	<p>TPH as Gasoline in Soil at 30 feet bgs Pacific Renaissance Plaza Chinatown Redevelopment Project Area Oakland, California</p>		<p>PLATE <b>9</b></p>
	<p>DRAWN ML</p>	<p>JOB NUMBER 9382,030.02</p>	<p>APPROVED <i>DF</i></p>



**EXPLANATION**

- PB-6 Approximate Location of Previous Boring
- EB-3 Approximate Location of Previous Piezometer
- MW-5 Approximate Location of HLA Monitoring Well
- B-5 Approximate Location of HLA Boring
- 0.49 TPH as Gasoline (mg/kg)
- NA Not Analyzed
- ND Not Detected
- Approximate Former Location of Gas Station
- Approximate Former Location of Underground Fuel Tanks

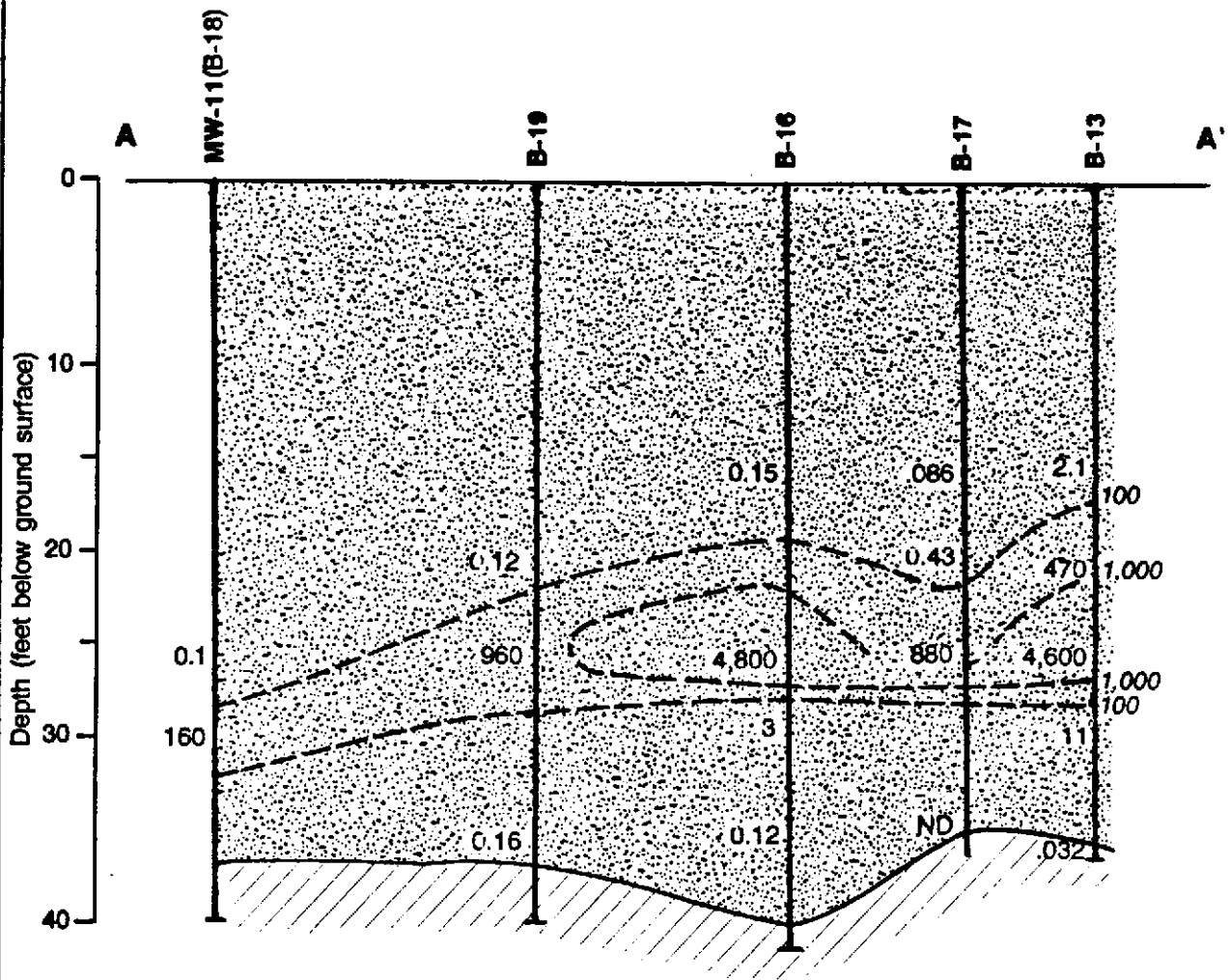


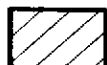
**Harding Lawson Associates**  
 Engineers and Geoscientists


TPH as Gasoline in Soil at 35 feet bgs  
 Pacific Renaissance Plaza  
 Chinatown Redevelopment Project Area  
 Oakland, California

PLATE  
**10**

DRAWN ML	FOR NUMBER 9382,030.02	APPROVED <i>[Signature]</i>	DATE 11/88	RE-USED	DATE
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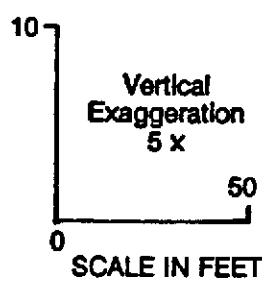
 CLAYEY SOILS { Silty Clay, Sandy Clay, Gravelly Clay


 SANDY SOILS { Sand, Clayey Sand, Silty Sand, Gravelly Sand

3,000 TPH as Gasoline in Soil in mg/kg

---1,000--- Estimated Contour Values of TPH as Gasoline in Soil in mg/kg

ND = Not Detected

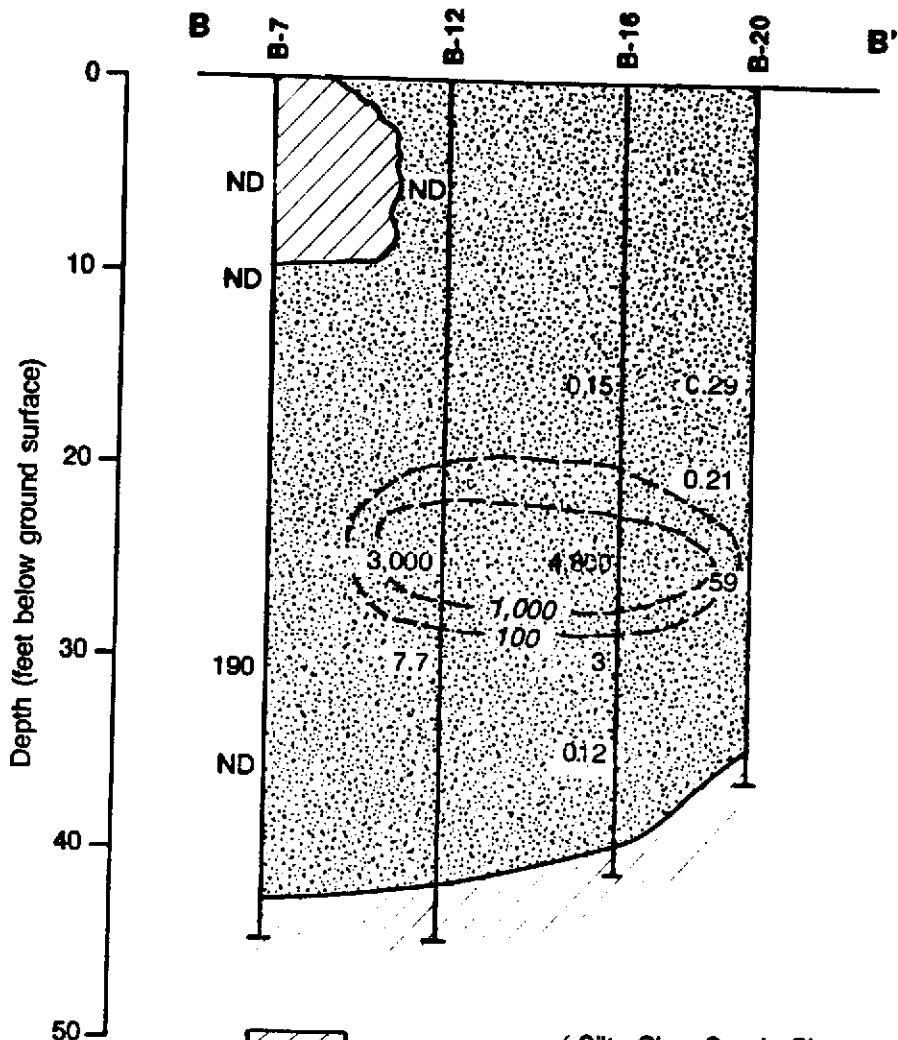


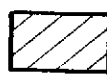

 **Harding Lawson Associates**  
Engineers and Geoscientists

**Cross Section A-A'**  
Pacific Renaissance Plaza  
Chinatown Redevelopment Project Area  
Oakland, California

11


DRAWN <b>AM</b>	JOB NUMBER <b>9382,030.02</b>	APPROVED <i>DF Wland</i>	DATE <b>10/88</b>	REVISED	DATE
--------------------	----------------------------------	-----------------------------	----------------------	---------	------



 CLAYEY SOILS { Silty Clay, Sandy Clay, Gravelly Clay  
 SANDY SOILS { Sand, Clayey Sand, Silty Sand, Gravelly Sand

3,000  
 --- 1,000 ---  
 TPH as Gasoline in Soil in ug/kg  
 Contour Values of TPH as Gasoline in Soil in ug/kg

10  
 0  
 Vertical Exaggeration 5 x  
 50  
 SCALE IN FEET

 **Harding Lawson Associates**  
 Engineers and Geoscientists

**Cross Section B-B'**  
 Pacific Renaissance Plaza  
 Chinatown Redevelopment Project Area  
 Oakland, California

PLATE  
**12**

DRAWN AM      JOB NUMBER 9382,030.02      APPROVED *DFuland*      DATE 10/88      REVISED      DATE



**Appendix A**

**LOGS OF BORINGS AND WELL COMPLETION DETAILS**

**APPENDIX A**  
**LIST OF ILLUSTRATIONS**

---

A1	Soil Classification Chart
A2	Log of Boring B-1
A3	Log of Boring B-2
A4	Log of Boring B-3
A5	Log of Boring B-4
A6	Log of Boring B-5
A7	Log of Boring B-6
A8	Log of Boring B-7
A9	Log of Boring B-8
A10	Log of Boring B-10
A11	Log of Boring B-12
A12	Log of Boring B-13
A13	Log of Boring B-14
A14	Log of Boring B-16
A15	Log of Boring B-17
A16	Log of Boring B-18 and Well Completion Detail MW-11
A17	Log of Boring B-19
A18	Log of Boring B-20
A19	Log of Boring B-21 and Well Completion Detail MW-10
A20	Log of Boring B-22
A21	Log of Boring B-23
A22	Log of Boring B-24

MAJOR DIVISIONS					TYPICAL NAMES
COARSE-GRAINED SOILS MORE THAN HALF IS COARSER THAN NO. 200 SIEVE	GRAVELS  MORE THAN HALF COARSE FRACTION IS LARGER THAN NO. 4 SIEVE SIZE	CLEAN GRAVELS WITH LITTLE OR NO FINES	GW		WELL GRADED GRAVELS WITH OR WITHOUT SAND, LITTLE OR NO FINES
			GP		POORLY GRADED GRAVELS WITH OR WITHOUT SAND, LITTLE OR NO FINES
		GRAVELS WITH OVER 12% FINES	GM		SILTY GRAVELS, SILTY GRAVELS WITH SAND
			GC		CLAYEY GRAVELS, CLAYEY GRAVELS WITH SAND
	SANDS  MORE THAN HALF COARSE FRACTION IS SMALLER THAN NO. 4 SIEVE SIZE	CLEAN SANDS WITH LITTLE OR NO FINES	SW		WELL GRADED SANDS WITH OR WITHOUT GRAVEL, LITTLE OR NO FINES
			SP		POORLY GRADED SANDS WITH OR WITHOUT GRAVEL, LITTLE OR NO FINES
		SANDS WITH OVER 12% FINES	SM		SILTY SANDS WITH OR WITHOUT GRAVEL
			SC		CLAYEY SANDS WITH OR WITHOUT GRAVEL
FINE-GRAINED SOILS MORE THAN HALF IS FINER THAN NO. 200 SIEVE	SILTS AND CLAYS  LIQUID LIMIT 50% OR LESS	ML		INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTS WITH SANDS AND GRAVELS	
		CL		INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, CLAYS WITH SANDS AND GRAVELS, LEAN CLAYS	
		OL		ORGANIC SILTS OR CLAYS OF LOW PLASTICITY	
	SILTS AND CLAYS  LIQUID LIMIT GREATER THAN 50%	MH		INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS, FINE SANDY OR SILTY SOILS, ELASTIC SILTS	
		CH		INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS	
		OH		ORGANIC SILTS OR CLAYS OF MEDIUM TO HIGH PLASTICITY	
HIGHLY ORGANIC SOILS		PI		PEAT AND OTHER HIGHLY ORGANIC SOILS	

UNIFIED SOIL CLASSIFICATION - ASTM D2487-85

Undisturbed Sample

Bulk Sample

(10YR 3/3) Munsell Color Index



Harding Lawson Associates  
Engineers and Geoscientists

Unified Soil Classification Chart  
City of Oakland Chinatown Redevelopment Area  
Ground-Water Investigation  
Oakland, California

PLATE

A1

DRAWN

JOB NUMBER  
9382.013.02

APPROVED

DATE  
1/88

REVISED

DATE

Equipment B<sup>1</sup> Hollow Stem Auger

Elevation NA Date 8/2/88

Depth (ft) Sample

0

5

10

15

20

25

30

35

40

45

50

Fill

DARK YELLOWISH BROWN (10YR 4/6) CLAYEY SAND (SC) medium dense, dry to moist

DARK BROWN (10YR 3/3) SILTY SAND (SM) medium dense, moist, trace clay

DARK YELLOWISH BROWN (10YR 4/4) CLAYEY SAND (SC) very dense, moist, fine- to very fine-grained sand

DARK YELLOWISH BROWN (10YR 4/4) SILTY SAND (SM) medium dense, moist

change to very dense

dark yellowish brown (5Y 4/2.5) with olive gray mottling, strong solvent odor

OLIVE GRAY (5Y 4/2) SILTY SAND (SM) very dense, moist, strong solvent odor

OLIVE GRAY (5Y 4/2) CLAYEY SAND (SC) very dense, moist, solvent odor

OLIVE GRAY (5Y 5/2) CLAY (CL) medium stiff, saturated

bottom of boring at 40.0 ft



**Harding Lawson Associates**  
Engineers and Geoscientists

**Log of Boring B-1**  
Pacific Renaissance Plaza  
Chinatown Redevelopment Project Area  
Oakland, California

PLATE

**A2**

DRAWN

JOB NUMBER

8382, 030.02

APPROVED

*DFL*

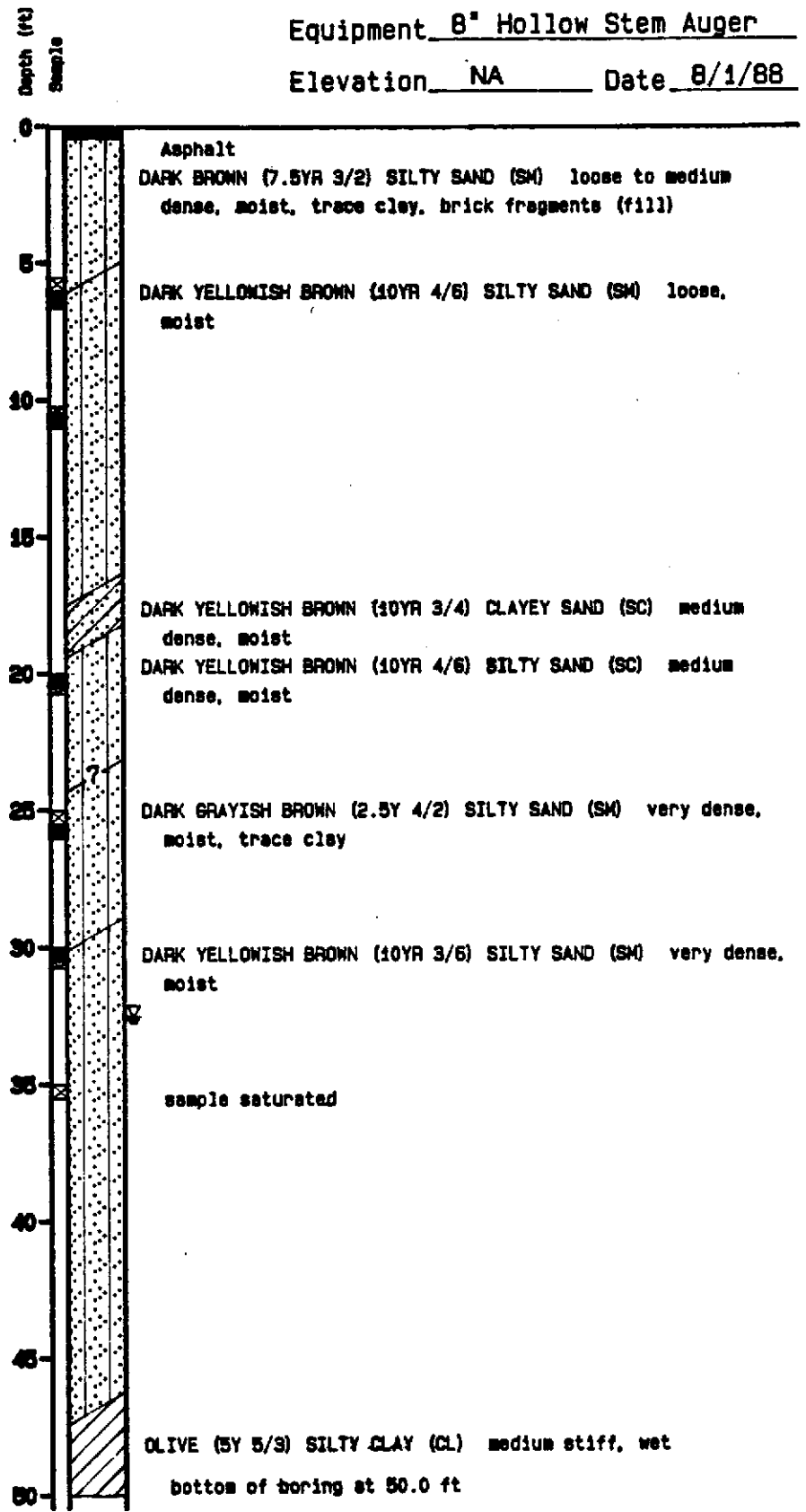
DATE

10/88

REVISED

DATE

Equipment 8" Hollow Stem Auger  
 Elevation NA Date 8/1/88



**Harding Lawson Associates**  
 Engineering and  
 Environmental Services

**Log of Boring B-2**  
 Pacific Renaissance Plaza  
 Chinatown Redevelopment Project Area  
 Oakland, California

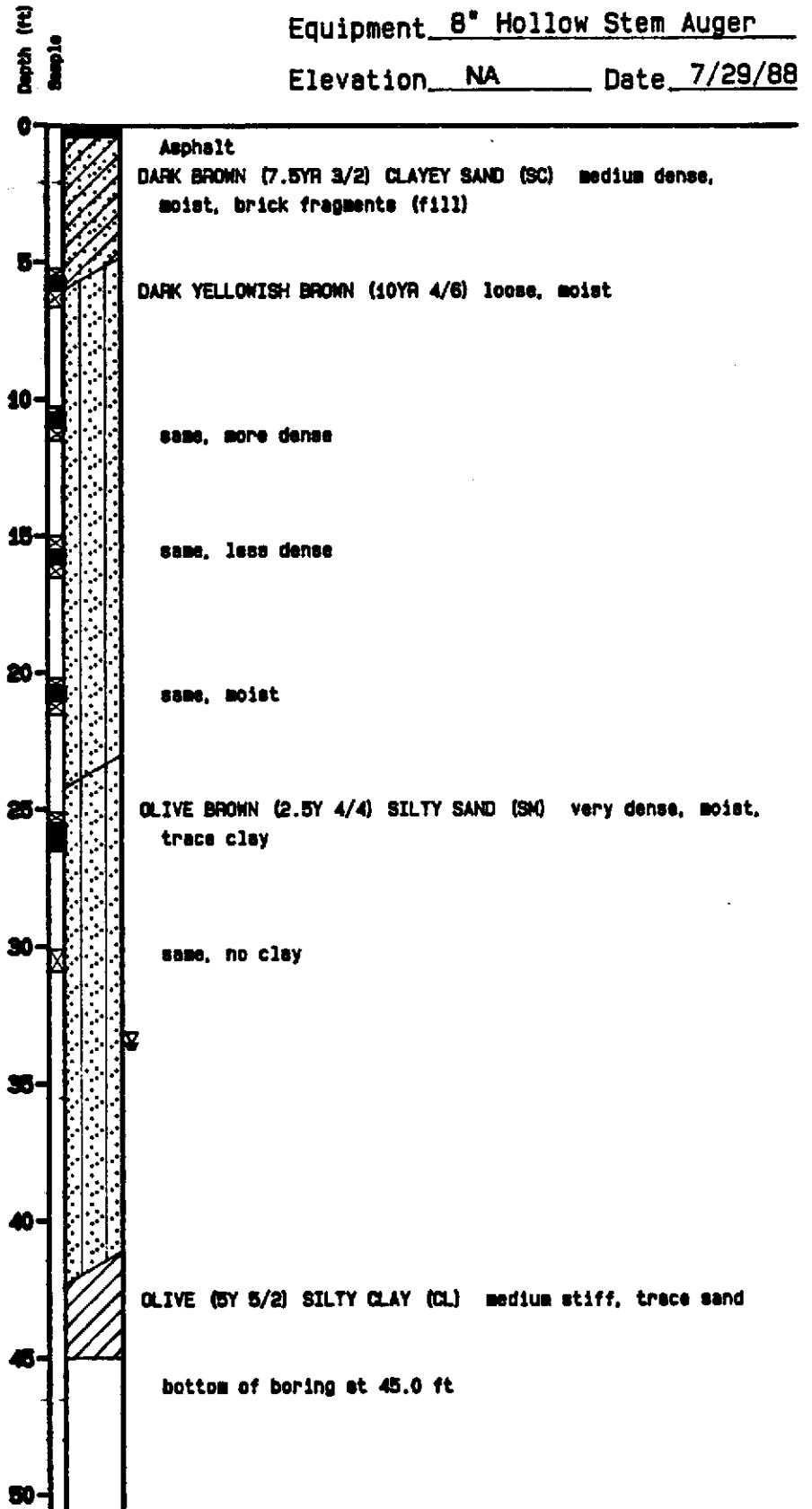
PLATE

**A3**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	9382, 030.02	<i>DFL</i>	10/88		

Equipment 8" Hollow Stem Auger

Elevation NA Date 7/29/88



**Harding Lawson Associates**  
Engineering and  
Environmental Services

**Log of Boring B-3**  
Pacific Renaissance Plaza  
Chinatown Redevelopment Project Area  
Oakland, California

PLATE

**A4**

DRAWN

JOB NUMBER

9382, 030.02

APPROVED

*DFL*

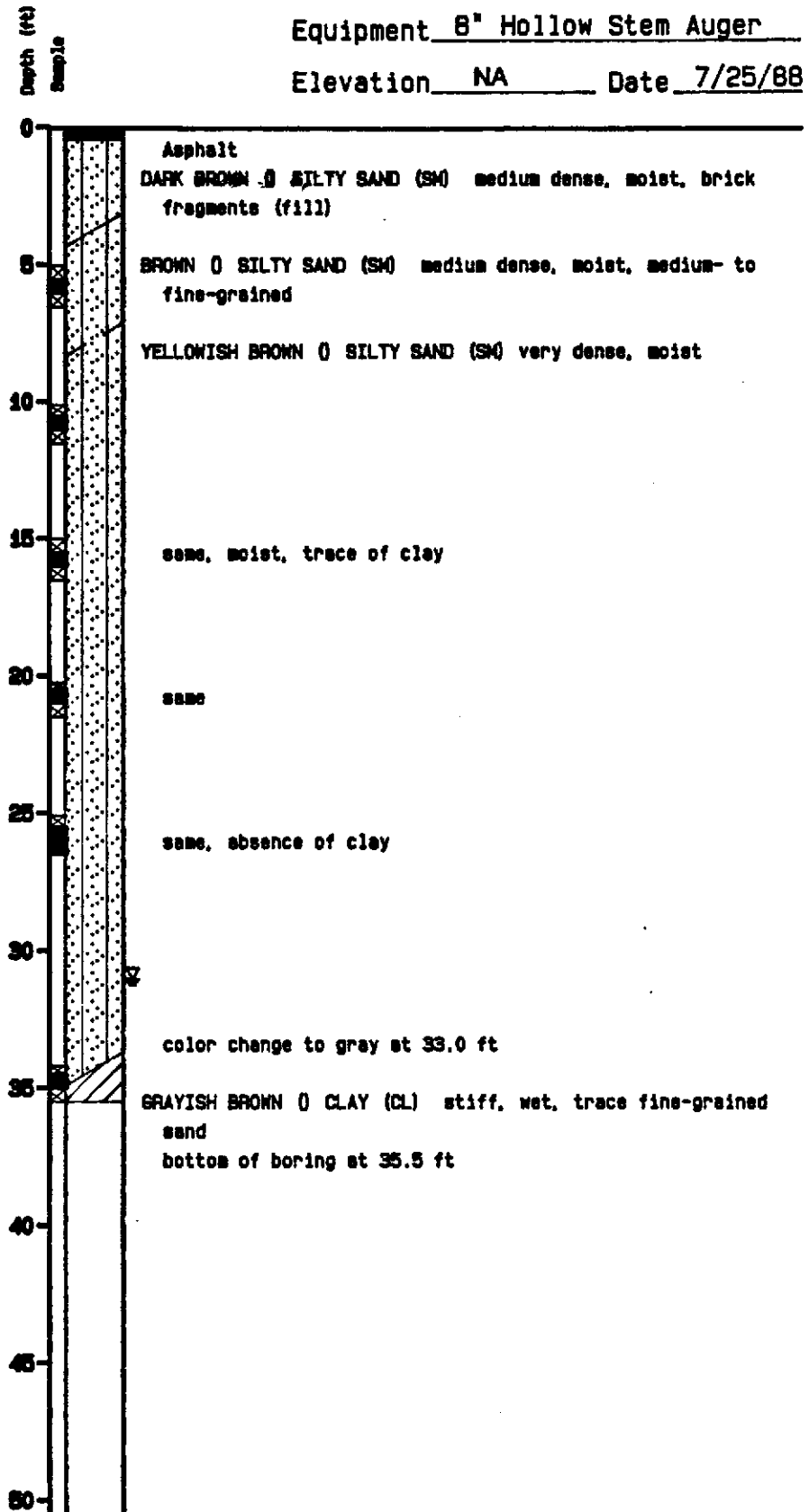
DATE

10/88

REVISED

DATE

Equipment 8" Hollow Stem Auger  
 Elevation NA Date 7/25/88



**Harding Lawson Associates**  
 Engineering and  
 Environmental Services

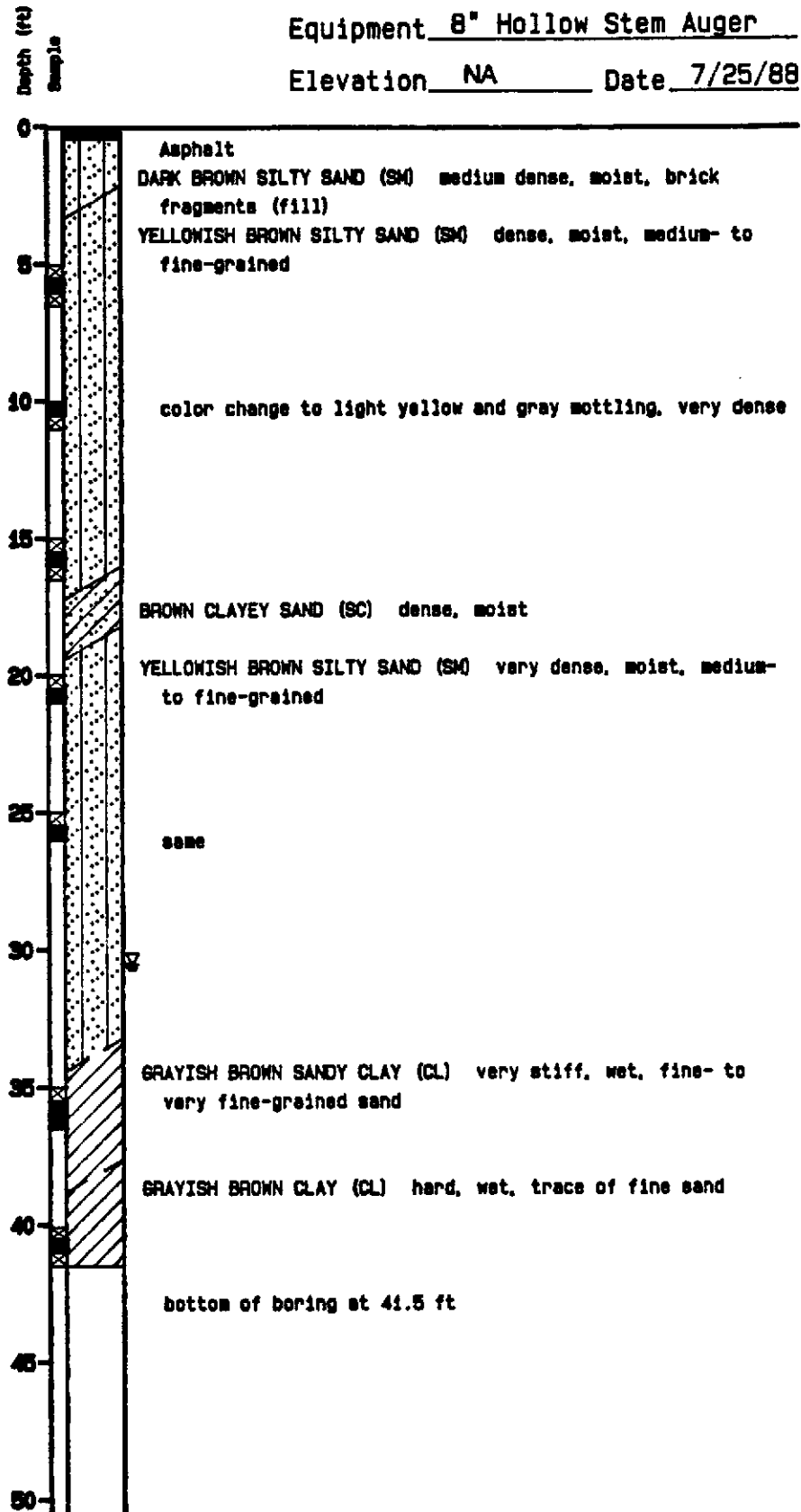
**Log of Boring B-4**  
 Pacific Renaissance Plaza  
 Chinatown Redevelopment Project Area  
 Oakland, California

PLATE

**A5**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	9382, 030.02	DFL	10/88		

Equipment 8" Hollow Stem Auger  
 Elevation NA Date 7/25/88



**Harding Lawson Associates**  
 Engineering and  
 Environmental Services

**Log of Boring B-5**  
 Pacific Renaissance Plaza  
 Chinatown Redevelopment Project Area  
 Oakland, California

PLATE

**A6**

DRAWN

JOB NUMBER  
 9382, 030.02

APPROVED

*DL*

DATE

10/88

REVISED

DATE



Equipment 8" Hollow Stem Auger

Elevation NA Date 8/1/88

Depth (ft)  
Sample  
0  
5  
10  
15  
20  
25  
30  
35  
40  
45  
50

Asphalt

DARK BROWN (10YR 3/3) SILTY SAND (SM) loose, moist, fine- to very fine-grained, brick fragments (fill)

DARK YELLOWISH BROWN (10YR 4/6) SILTY SAND (SM) dense, moist, medium- to very fine-grained, trace of clay

same

GRAY (10YR 5/1) SILTY SAND (SM) with brown (7.5YR 4/6) mottling, dense, moist, trace clay

DARK YELLOWISH BROWN (10YR 4/6) SILTY SAND (SM) very dense, moist

GRAYISH BROWN (2.5Y 5/2) SILTY SAND (SM) very dense, moist

DARK YELLOWISH BROWN (10YR 4/6) SILTY SAND (SM) very dense, wet

same, saturated

LIGHT OLIVE BROWN (2.5Y 5/4) SILTY SAND (SM) very dense, saturated

OLIVE GRAY (5Y 5/2) CLAY (CL) very stiff

bottom of boring at 45.0 ft



Log of Boring B-6  
Pacific Renaissance Plaza  
Chinatown Redevelopment Project Area  
Oakland, California

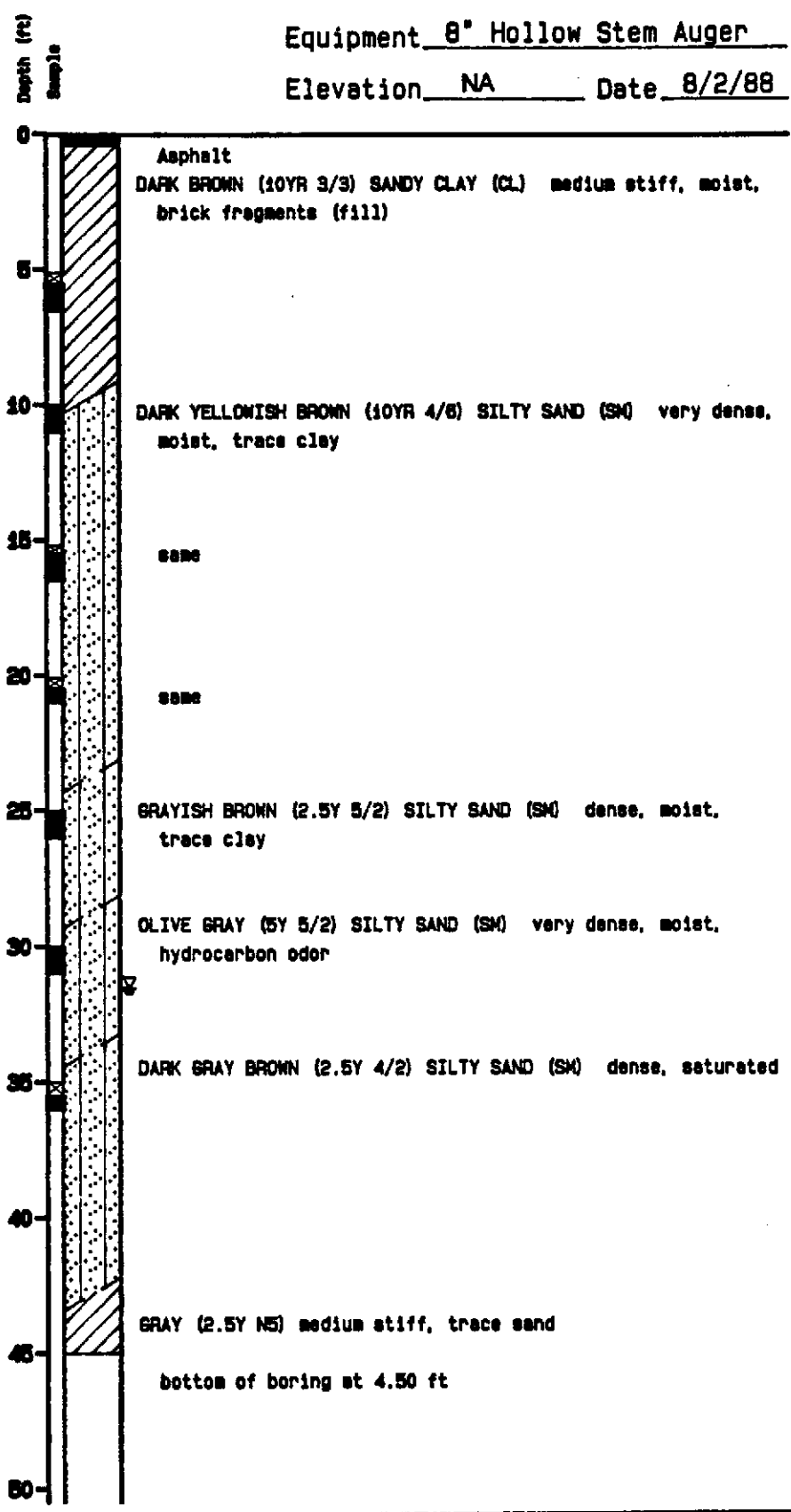
PLATE


**A7**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	9382, 030.02	<i>[Signature]</i>	10/88		

Equipment 8" Hollow Stem Auger

Elevation NA Date 8/2/88



 **Harding Lawson Associates**  
Engineering and Environmental Services

**Log of Boring B-7**  
Pacific Renaissance Plaza  
Chinatown Redevelopment Project Area  
Oakland, California

PLATE

**A8**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	9382, 030.02	DFL	10/88		

Equipment 8" Hollow Stem Auger

Elevation NA Date 8/5/88

Depth (ft)  
Sample  
0  
5  
10  
15  
20  
25  
30  
35  
40  
45  
50



Asphalt

DARK YELLOWISH BROWN (10YR 4/4) GRAVELLY SAND (SP) medium dense, moist, 30% pebbles

DARK GRAYISH BROWN (0) SANDY CLAY (CL) medium stiff, moist, fewer pebbles

YELLOWISH BROWN (10YR 5/6) SILTY SAND (SM) medium dense, moist

color change to dark yellowish brown (10YR 4/6) and increase in density

BROWN (7.5YR 5/6) CLAYEY SAND (SC) medium dense, moist

DARK YELLOWISH BROWN (10YR 4/6) SILTY SAND (SM) very dense, moist

OLIVE GRAY (5Y 4/2) SILTY SAND (SM) dense, moist, hydrocarbon odor

GRAYISH BROWN (2.5Y 5/2) SILTY CLAY (CL) very stiff, saturated, trace sand  
bottom of boring at 36.5 ft



**Harding Lawson Associates**  
Engineering and  
Environmental Services

**Log of Boring B-8**  
Pacific Renaissance Plaza  
Chinatown Redevelopment Project Area  
Oakland, California

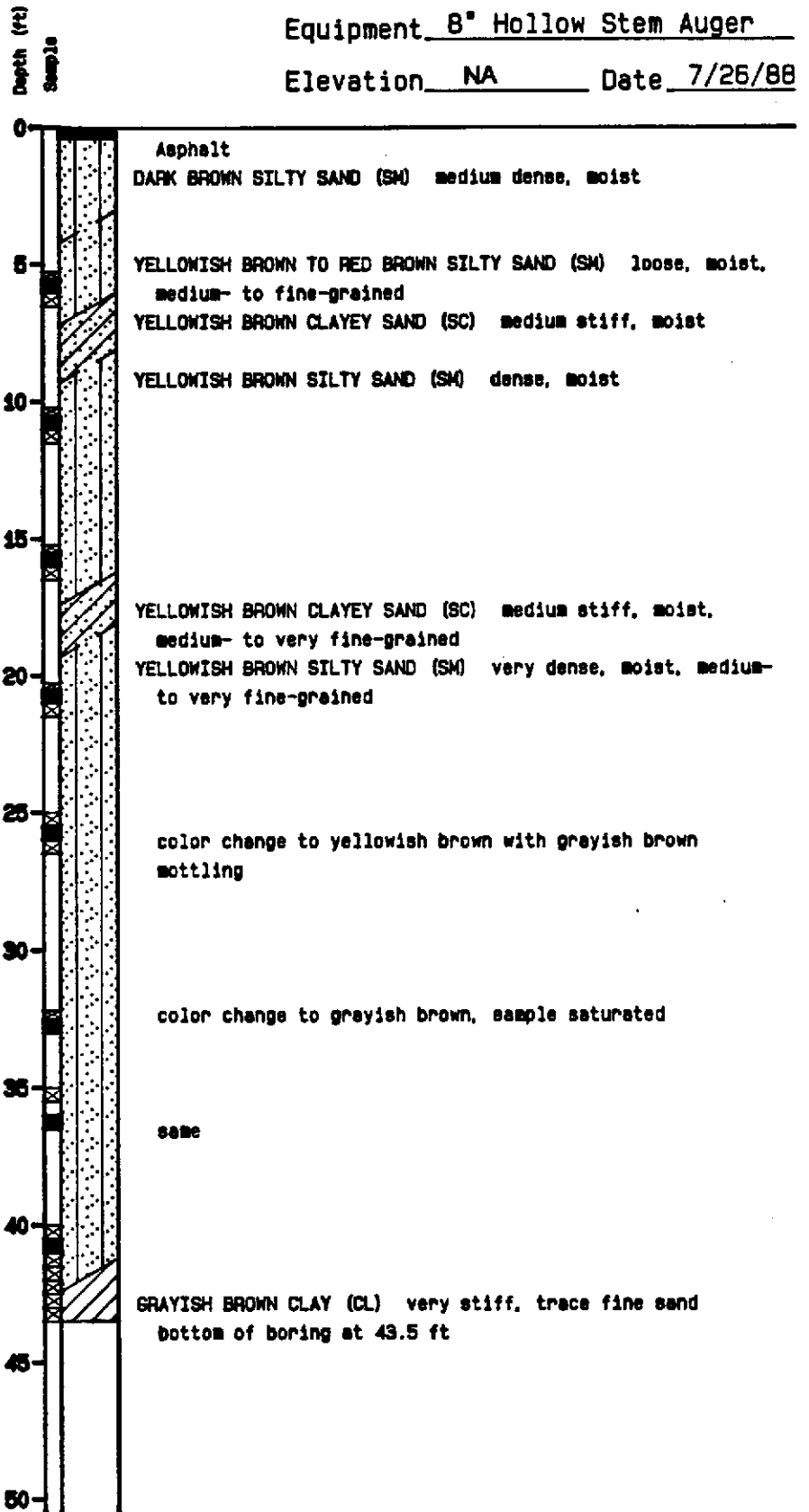
PLATE

**A9**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	9382, 030.02	DFL	10/88		

Equipment 8" Hollow Stem Auger

Elevation NA Date 7/26/88



**Harding Lawson Associates**  
Engineers and Geoscientists

**Log of Boring B-10**  
Pacific Renaissance Plaza  
Chinatown Redevelopment Project Area  
Oakland, California

PLATE

**A10**

DRAWN

JOB NUMBER

9382.030.02

APPROVED

**DFL**

DATE

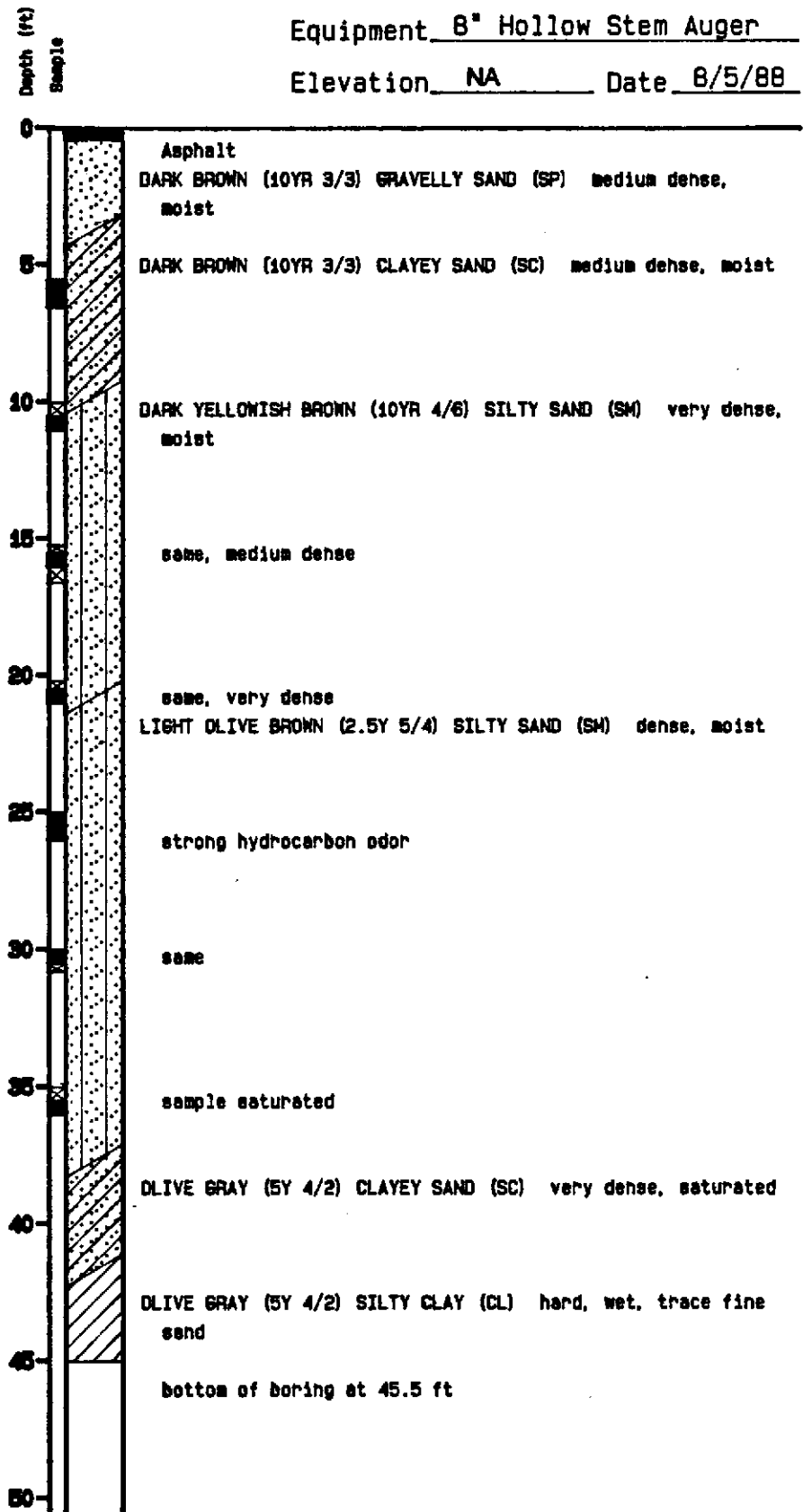
11/88

REVISED

DATE

Equipment 8" Hollow Stem Auger

Elevation NA Date 8/5/88



**Harding Lawson Associates**  
Engineers and Geoscientists

**Log of Boring B-12**  
Pacific Renaissance Plaza  
Chinatown Redevelopment Project Area  
Oakland, California

PLATE

**A11**

DRAWN

JOB NUMBER

9382, 030.02

APPROVED

*DFL*

DATE

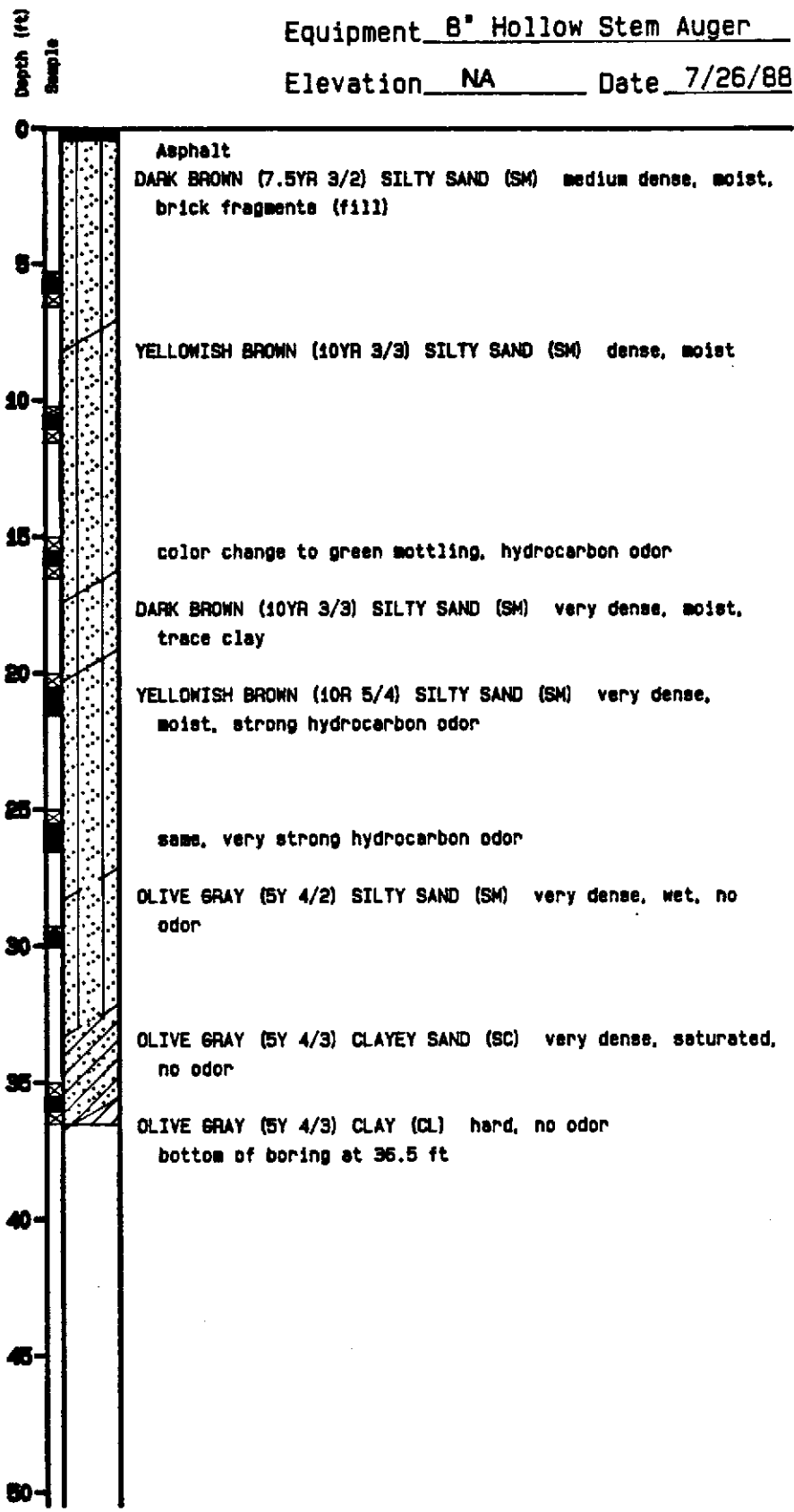
10/88

REVISED

DATE

Equipment B<sup>o</sup> Hollow Stem Auger

Elevation NA Date 7/26/88



**Harding Lawson Associates**  
Engineers and Geoscientists

**Log of Boring B-13**  
Pacific Renaissance Plaza  
Chinatown Redevelopment Project Area  
Oakland, California

PLATE

**A12**

DRAWN

JOB NUMBER

9382, 030.02

APPROVED

*DFL*

DATE

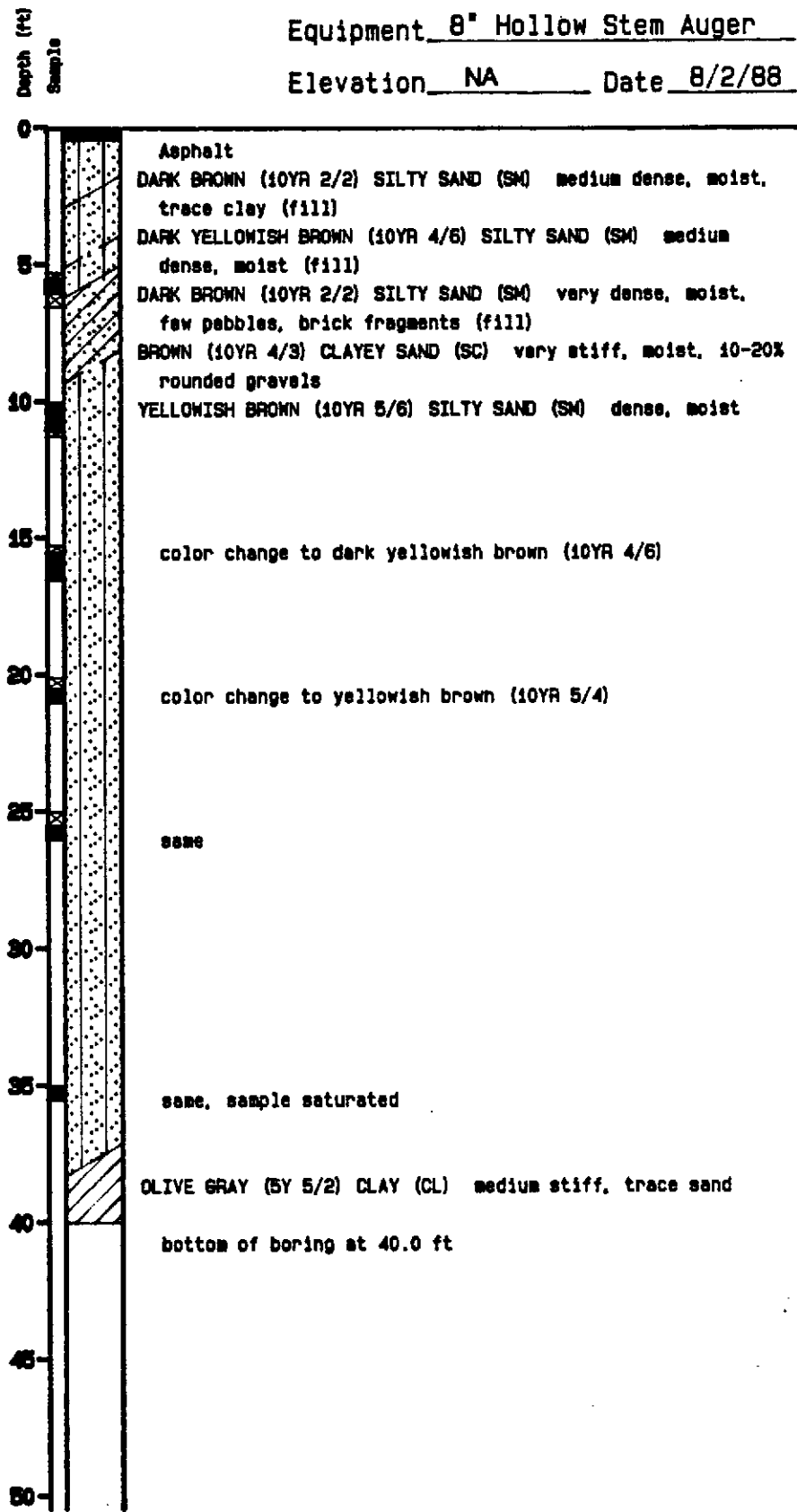
10/88

REVISED

DATE

Equipment 8" Hollow Stem Auger

Elevation NA Date 8/2/88



**Harding Lawson Associates**  
Engineers and Geoscientists

**Log of Boring B-14**  
Pacific Renaissance Plaza  
Chinatown Redevelopment Project Area  
Oakland, California

PLATE

**A13**

DRAWN

JOB NUMBER

9382, 030.02

APPROVED

DFL

DATE

10/88

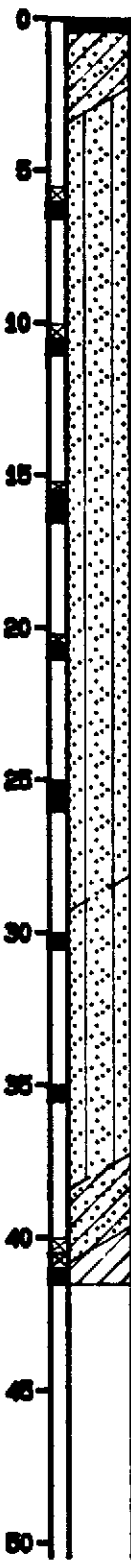
REVISED

DATE

Equipment 8" Hollow Stem Auger

Elevation NA Date 8/3/88

Depth (ft)  
Sample



Asphalt

DARK BROWN (7.5YR 3/2) CLAYEY SAND (SC) medium dense, moist

DARK YELLOWISH BROWN (10YR 4/4) SILTY SAND (SM) dense, moist

same

same, trace clay

same

same, strong hydrocarbon odor

OLIVE GRAY (5Y 4/2) SILTY SAND (SM) very dense, saturated (below 30')

same, no odor

OLIVE GRAY (5Y 4/2) CLAYEY SAND (SC) very dense, saturated

OLIVE GRAY (5Y 4/2) SILTY CLAY (CL) hard, wet, fine- to very fine-grained sand  
bottom of boring at 41.5 ft



Harding Lawson Associates  
Engineers and Geoscientists

Log of Boring B-16  
Pacific Renaissance Plaza  
Chinatown Redevelopment Project Area  
Oakland, California

PLATE

**A14**

DRAWN

JOB NUMBER

9382, 030.02

APPROVED

DFL

DATE

10/88

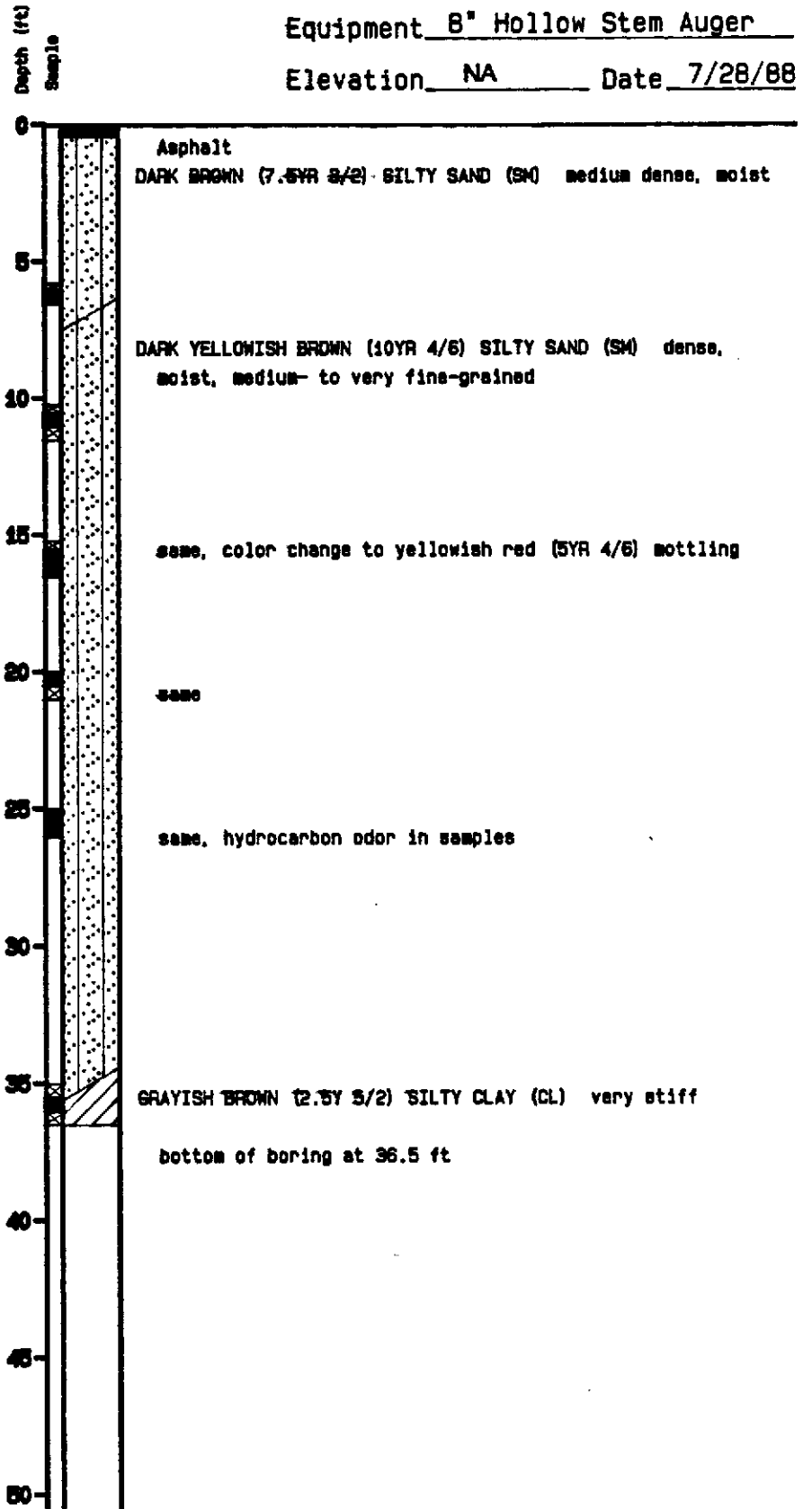
REVISED

DATE



Equipment B" Hollow Stem Auger

Elevation NA Date 7/28/88



**Harding Lawson Associates**  
Engineers and Geoscientists

**Log of Boring B-17**  
Pacific Renaissance Plaza  
Chinatown Redevelopment Project Area  
Oakland, California

PLATE

**A15**

DRAWN

JOB NUMBER

9382, 030.02

APPROVED

*DFL*

DATE

10/88

REVISED

DATE

Top of PVC Casing  
Elevation 37.56 ft

Equipment 8" Hollow Stem Auger

Elevation 37.99 Date 8/4/88

GROUND SURFACE

See below for  
Well Top Detail

Blows/foot

Core Recov.  
%/RHD

Depth (ft)

Sample

10 INCH DIAMETER BORING  
0 to 40 ft

4 INCH DIAMETER SCH 40  
PVC BLANK CASING  
0.5 to 19.5 ft  
BENTONITE-CEMENT SEAL  
1 to 16 ft

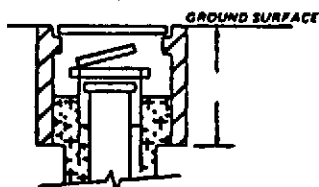
BENTONITE PELLET SEAL  
16 to 18 ft

SANDPACK (Lonestar #3)  
18 to 39.5 ft

4 INCH DIAMETER SLOTTED  
PVC SCREEN  
(0.020" slot size)  
19.5 to 39.5 ft

BOTTOM WELL CAP  
HOLE CLEANED OUT TO 39.5 ft

Well Top Detail



Asphalt  
DARK BROWN (10YR 2/2) CLAYEY SAND (SC)  
medium stiff, moist, brick fragments (fill)

DARK YELLOWISH BROWN (10YR 4/4) CLAYEY SAND  
(SC) medium stiff, moist

BLACK (2.5Y N2/) SILTY SAND (SM) medium  
dense, moist, waste oil odor  
increase in gravels

DARK YELLOWISH BROWN (10YR 4/6) SILTY SAND  
(SM) very dense, moist, trace clay

same

same

OLIVE (5Y 5/3) SILTY SAND (SM) dense, moist,  
hydrocarbon odor

DARK YELLOWISH BROWN SILTY SAND (SM) dense,  
moist  
wet below 30.7 ft

GRAYISH BROWN (2.5Y 5/2) SILTY CLAY (CL)  
medium stiff

bottom of boring at 40.0 ft



**Harding Lawson Associates**  
Engineering and  
Environmental Services

Log of Boring B-18 and  
Well Completion Detail MW-11  
Pacific Renaissance Plaza  
Chinatown Redevelopment Project Area  
Oakland, California

PLATE

**A16**

DRAWN

JOB NUMBER

9382, 030.02

APPROVED

**DFL**

DATE

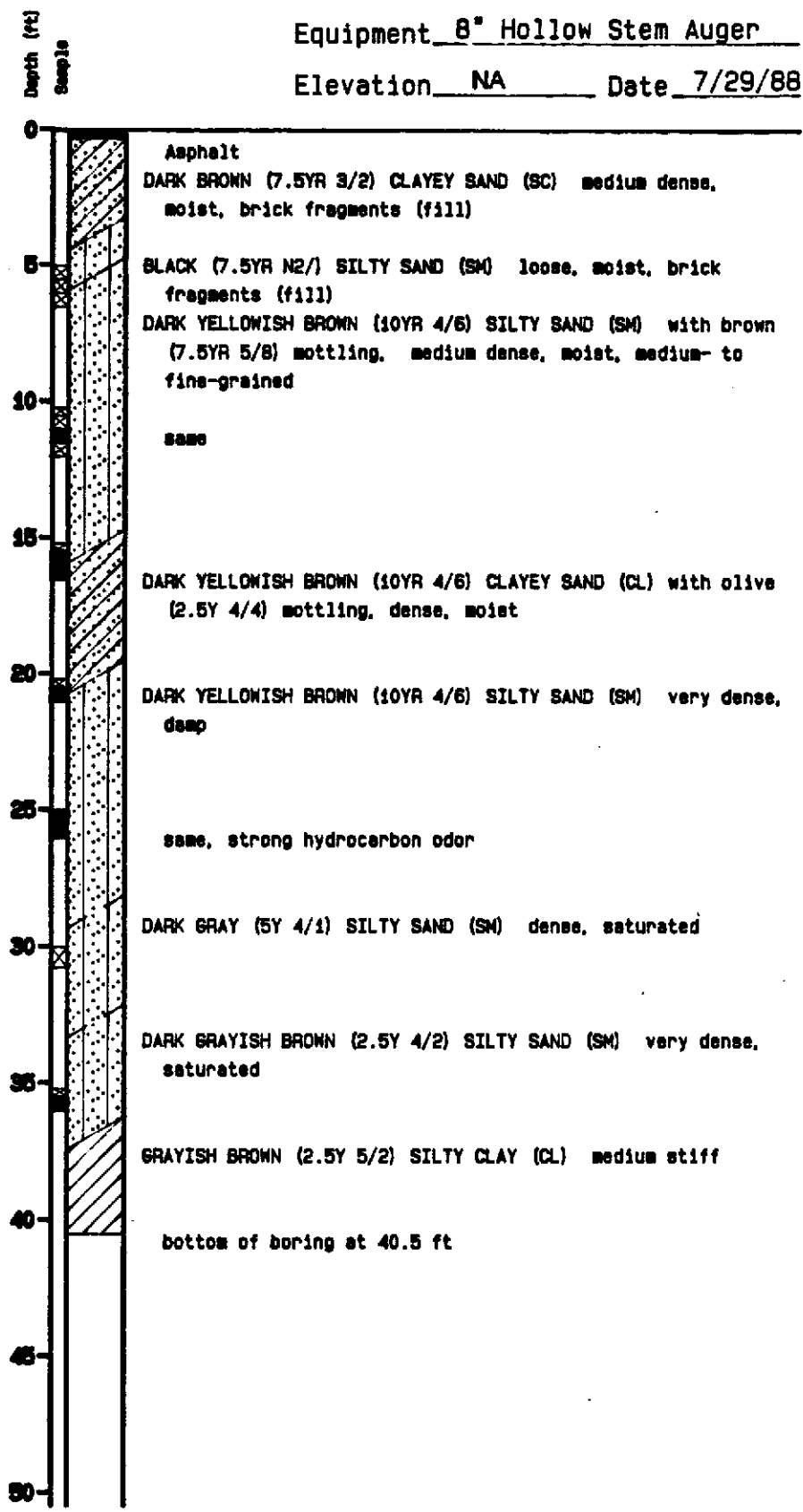
10/88

REVISED

DATE

Equipment 8" Hollow Stem Auger

Elevation NA Date 7/29/88



Harding Lawson Associates  
Engineers and Geoscientists

Log of Boring B-19  
Pacific Renaissance Plaza  
Chinatown Redevelopment Project Area  
Oakland, California

PLATE

**A17**

DRAWN

JOB NUMBER

9382, 030.02

APPROVED

DFL

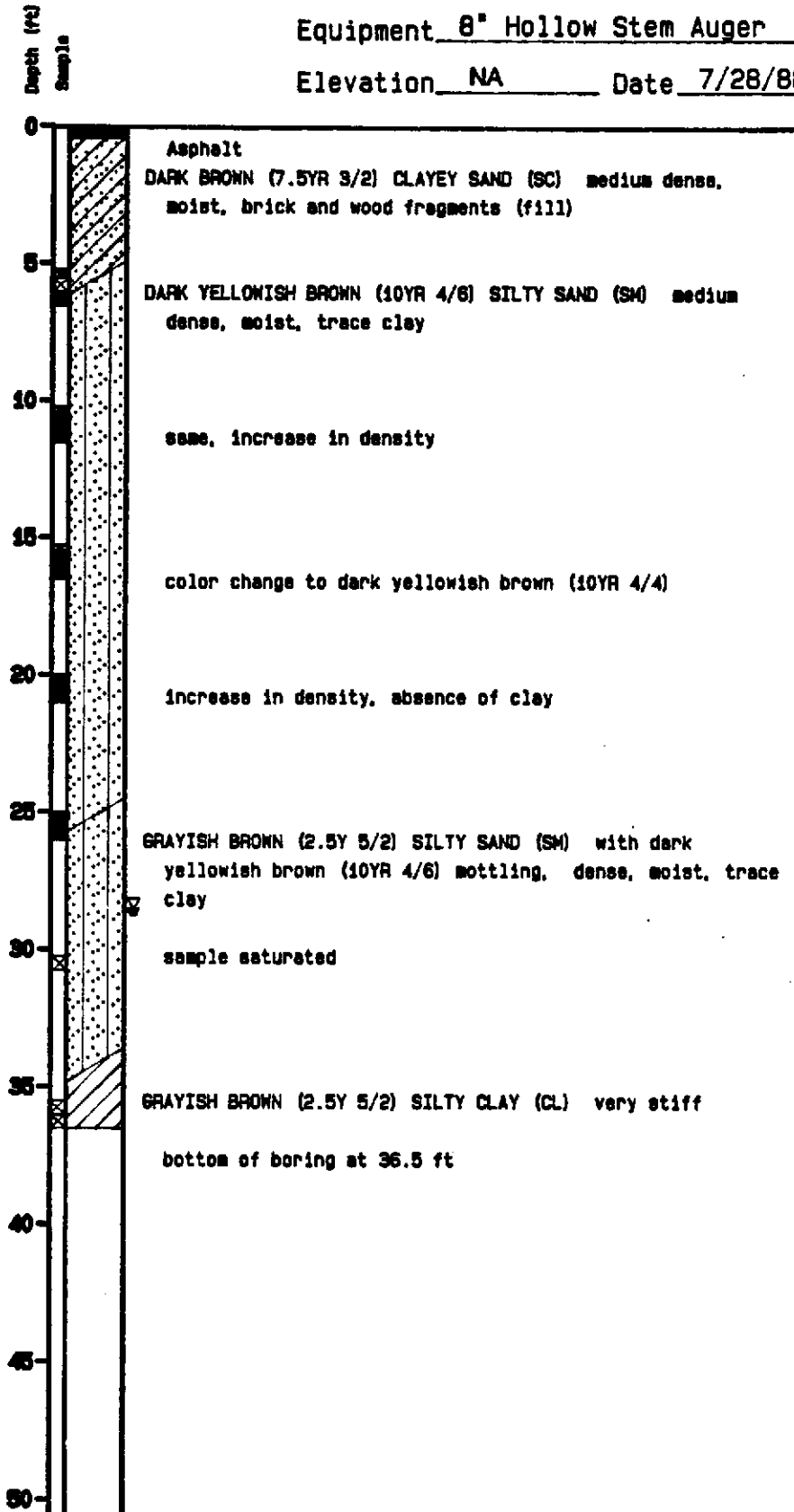
DATE

10/88

REVISED

DATE

Equipment 8" Hollow Stem Auger  
 Elevation NA Date 7/28/88



**Harding Lawson Associates**  
 Engineering and  
 Environmental Services

**Log of Boring B-20**  
 Pacific Renaissance Plaza  
 Chinatown Redevelopment Project Area  
 Oakland, California

PLATE

**A18**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	9382, 030.02	<i>DFL</i>	10/88		

Top of PVC Casing  
Elevation 36.36 ft

Equipment 8" Hollow Stem Auger

Elevation 36.81 Date 7/28/88

GROUND SURFACE

See below for  
Well Top Detail

10 INCH DIAMETER BORING  
0 to 34.5 ft

4 INCH DIAMETER SCH 40  
PVC BLANK CASING  
0.5 to 19.5 ft  
BENTONITE-CEMENT SEAL  
1 to 16 ft

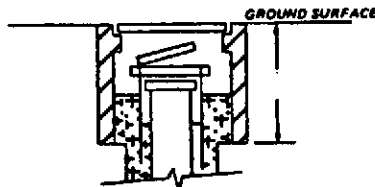
BENTONITE PELLET SEAL  
16 to 18 ft

SANDPACK (Lonestar #3)  
18 to 34.5 ft

4 INCH DIAMETER SLOTTED  
PVC SCREEN  
(0.020" slot size)  
19.5 to 34.5 ft

BOTTOM WELL CAP  
HOLE CLEANED OUT TO 34.5 ft

Well Top Detail  
NOT TO SCALE



Depth (ft)  
Sample

0  
5  
10  
15  
20  
25  
30  
35  
40  
45  
50

Asphalt  
DARK BROWN (7.5YR 4/4) CLAYEY SAND (SC)  
medium stiff, moist, glass and brick  
fragments (fill)

DARK BROWN (7.5YR 4/4) SILTY SAND (SM)  
dense, moist, trace clay

same

same

color change to brown (7.5YR 5/6), absence  
of clay

GRAY (2.5Y N5/) SILTY SAND (SM) very dense,  
wet, hydrocarbon odor

OLIVE BROWN (2.5Y 4/4) SILTY SAND (SM) very  
dense, wet

GRAYISH BROWN (2.5Y 5/2) SILTY SAND (CL)  
very stiff, trace fine-grained sand  
bottom of boring at 36.5 ft



**Harding Lawson Associates**  
Engineering and  
Environmental Services

Log of Boring B-21 and  
Well Completion Detail MW-10  
Pacific Renaissance Plaza  
Chinatown Redevelopment Project Area  
Oakland, California

PLATE

**A19**

DRAWN

JOB NUMBER

9382, 030.02

APPROVED

DFL

DATE

10/88

REVISED

DATE

Equipment 8" Hollow Stem Auger

Elevation NA Date 8/3/88

Depth (ft)  
Sample

0  
5  
10  
15  
20  
25  
30  
35  
40  
45  
50

Asphalt

DARK BROWN (10YR 4/3) SILTY SAND (SM) medium dense, moist  
BLACK (10YR 2/1) CLAYEY SAND (SC) medium dense, moist

YELLOWISH BROWN (10YR 5/6) SILTY SAND (SM) medium dense, moist

case

LIGHT OLIVE BROWN (2.5Y 5/4) SILTY SAND (SM) very stiff, moist, trace clay

DARK YELLOWISH BROWN (10YR 4/6) SILTY SAND (SM) dense, moist

GRAYISH BROWN (2.5Y 5/2) SILTY SAND (SM) with gray (2.5Y N5/) mottling, very dense, moist, hydrocarbon odor, trace clay

DARK YELLOWISH BROWN (10YR 4/6) SILTY SAND (SM) dense, moist

GRAYISH BROWN (2.5Y 5/2) SILTY SAND (SM) dense, wet

GRAYISH BROWN (2.5Y 5/2) CLAY (CL) very stiff, wet  
bottom of boring at 36.5 ft



**Harding Lawson Associates**  
Engineering and  
Environmental Services

**Log of Boring B-22**  
Pacific Renaissance Plaza  
Chinatown Redevelopment Project Area  
Oakland, California

PLATE

**A20**

DRAWN

JOB NUMBER

9382, 030, 02

APPROVED

*DFC*

DATE

10/88

REVISED

DATE

Equipment 8" Hollow Stem Auger

Elevation ft Date 9/22/88

Depth (ft)  
Sample

0  
5  
10  
15  
20  
25  
30  
35  
40  
45  
50



ASPHALT  
DARK BROWN CLAY (FILL)

YELLOWISH BROWN SILTY SAND (SM) 10YR 5/6 moist,  
medium-grained sand, minor clay content

color change to light olive-brown 2.5Y 5/4

bottom of boring at 34.0 ft



**Harding Lawson Associates**  
Engineers and Geoscientists

**Log of Boring B-23**  
Pacific Renaissance Plaza  
Chinatown Redevelopment Project Area  
City of Oakland, California

PLATE

**A21**

DRAWN

JOB NUMBER

9382, 030.02

APPROVED

*DFC*

DATE

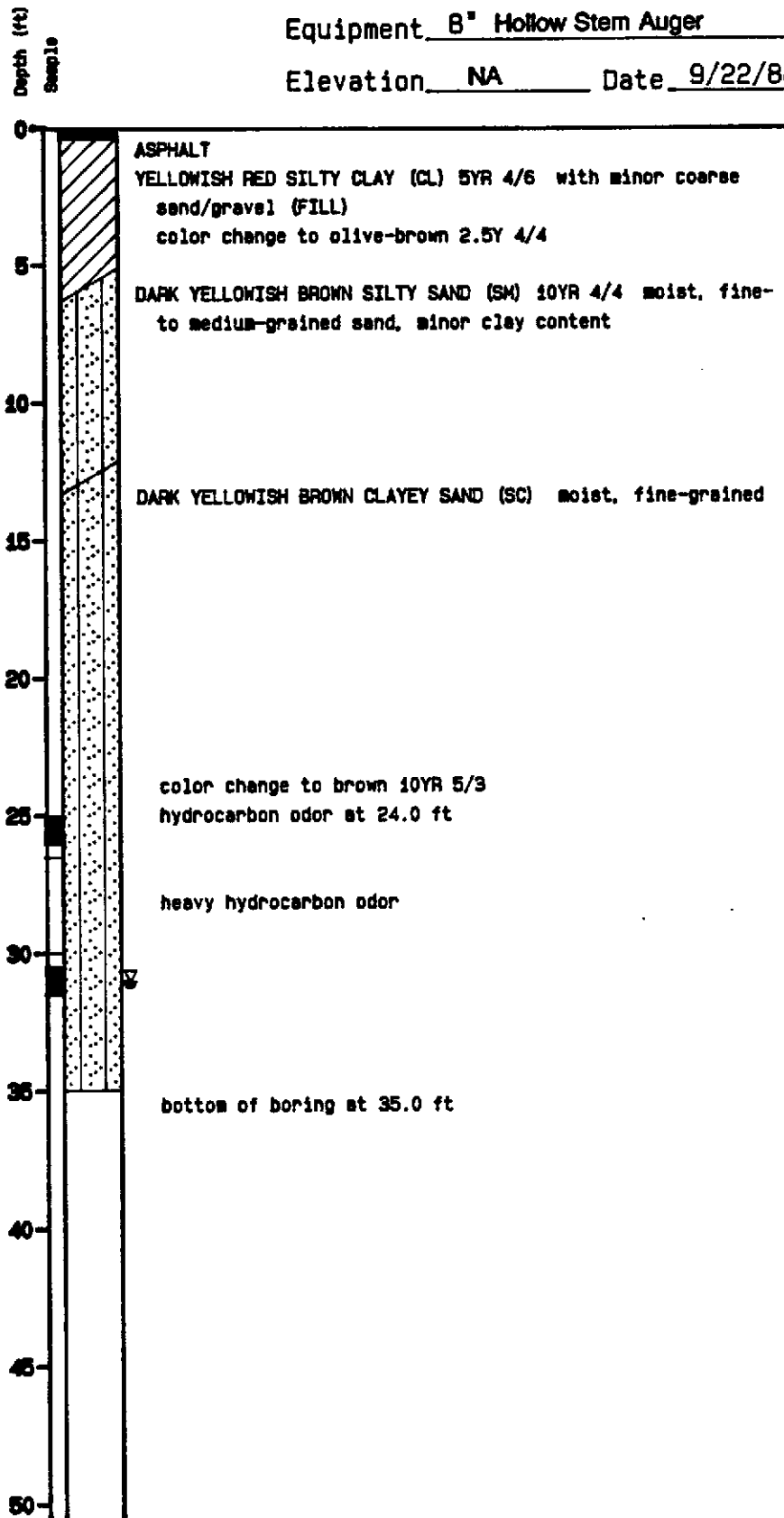
11/88

REVISED

DATE

Equipment 8" Hollow Stem Auger

Elevation NA Date 9/22/88



**Harding Lawson Associates**  
Engineers and Geoscientists

**Log of Boring B-24**  
Pacific Renaissance Plaza  
Chinatown Redevelopment Project Area  
City of Oakland, California

PLATE

**A22**

DRAWN

JOB NUMBER

9382, 030.02

APPROVED

DFL

DATE

11/88

REVISED

DATE



**Appendix B**  
**BIODEGRADATION EVALUATION**

**E6577-R**

**BIODEGRADATION EVALUATION  
CHINATOWN REDEVELOPMENT AREA  
CITY OF OAKLAND  
OAKLAND, CALIFORNIA**

The presence of an indigenous population of microorganisms that can utilize hydrocarbons for growth has been observed in many types of leak/spill situations on soil, in surface water, and in ground water. A recent and innovative technique for aquifer remediation involves stimulating the indigenous microorganisms to degrade subsurface contamination. Stimulation of these native microorganisms can result in the complete destruction of the contaminants, whereas chemical and physical treatment results in incomplete destruction or transfer of the contaminant to another phase within the environment. Biostimulation is often achieved by the addition of nutrients (electron acceptors and inorganic nutrients) that are often limited in the presence of high contaminant concentrations. Field investigations over the past fifteen years have shown that the conditions necessary to establish a maximum rate of degradation vary from aquifer to aquifer. It is, therefore, necessary to conduct laboratory studies to evaluate the specific characteristics of the aquifer in order to obtain information concerning the nutrient supplements required to optimize biodegradation.

The purpose of this study was to evaluate the site soil and ground water with regard to chemical and microbiological factors that would require manipulation in order to stimulate the biological degradation of petroleum hydrocarbon at the site. The laboratory evaluation study was designed to:

- o Evaluate soil and ground-water chemistry factors that could influence the rate of biological degradation of petroleum hydrocarbons.

- o Evaluate the existing microbial populations capable of degrading petroleum hydrocarbons in site soil and ground water.
- o Evaluate and recommend required supplements and/or techniques to stimulate the indigenous microbial population to degrade petroleum hydrocarbons at the site.

**Soil and Ground-Water Samples**

Eight soil cores were collected by HLA personnel from the following borings:

- o Borehole B-23: 20.0, 20.5, 25.0, and 25.5 feet
- o Borehole B-24: 25.0, 25.5, 30.0, and 30.5 feet

Additionally, 2-liter water samples were collected from the following:

- o Borehole B-23, at 31 feet
- o Borehole B-24, at 31 feet
- o Monitoring Well MW-11

**Chemical Analyses**

Also, for each sample location, soil chemistry profiles were developed and included nitrogen as ammonia and nitrate, phosphate as orthophosphate, bicarbonate, sulfate, cation exchange capacity, pH, available iron, manganese, magnesium, calcium, and potassium were developed.

Also, for each sample location, ground-water chemistry profiles were developed and included nitrogen as ammonium and nitrate, phosphate as orthophosphate, carbonate, bicarbonate, total alkalinity, pH and dissolved iron, manganese, magnesium, calcium, and potassium were developed.

**Microbiological Analyses**

Each soil and ground-water sample was analyzed to estimate the total heterotrophic microbial population and the microbial population capable of utilizing hydrocarbon (gasoline) as a source of carbon and energy.

Data Analysis and Interpretation

Microbial Population in Soil and Ground Water

Results of the microbial evaluation of soil and ground-water samples are summarized in Table B-1. The evaluation estimated the total number of heterotrophic microorganisms per sample and, of these, those microorganisms that have the metabolic capability to utilize hydrocarbons (in this case gasoline) as a primary source of carbon and energy. Although there is variation in the size of the hydrocarbon-utilizing population throughout the site, microorganisms capable of degrading petroleum hydrocarbons were present at each sample location. The percentage of gasoline-utilizers as a portion of the total population ranges from 0.01 percent to 0.04 percent. These results indicate that the existing microbial population contains a subpopulation of microorganisms capable of utilizing gasoline as a primary source of carbon and that this subpopulation is distributed throughout the sampled areas. The stimulation of this gasoline-utilizing microbial population to increase their percentage of the total microbial population should result in a concomitant decrease in the petroleum hydrocarbon concentrations present in the soil and ground water.

Inorganic Chemical Factors in Soil and Ground-Water

Generally, certain elements are necessary for the normal growth of microorganisms and must be present and available to the microorganisms in a usable form and appropriate concentration. When an organic chemical enters the soil or ground-water system, the supply of elements is almost always inadequate to support accelerated biodegradation rates. The results of the soil and ground-water chemistry analyses are summarized in Table B-2. These analyses indicate that the nutrients nitrogen as ammonia and nitrate, and phosphorus as orthophosphate may be limiting the potential for microbial degradation of the hydrocarbons in the soil and ground-water

environment. Therefore, the stimulation of the indigenous microbial population capable of degrading hydrocarbon in the soil and ground-water environment would require the addition of nitrate and phosphate.

#### Additional Factors

In the majority of soil and ground-water environments the supply of oxygen available to the microorganisms is inadequate to support accelerated microbial degradation of hydrocarbon. Thus, the addition of oxygen is necessary to stimulate the microbial degradation of hydrocarbon in soil or ground-water environments. Also, effective microbial stimulation requires maintenance of the pH of the soil or ground-water environment in the range of 6 to 8.

#### Summary and Recommendations

The evaluation study indicates that the existing microbial population contains a subpopulation of gasoline-utilizing microorganisms that are distributed throughout the sample locations. The soil and ground-water chemistry results indicate that low concentration of several inorganic nutrients (nitrogen and phosphate) could be limiting the metabolism of the existing microorganisms capable of degrading the hydrocarbons in soil and ground water. The addition of these limiting nutrients and oxygen to the soil and ground-water environments should stimulate the gasoline-utilizing microorganisms, resulting in a reduction in the concentrations of hydrocarbons in soil and ground water.

HLA recommends that a laboratory treatability study be conducted to evaluate the effect of the proposed additions to soil and ground-water environments. The treatability study will utilize site soil and ground water to simulate the field conditions during the treatment process.

Table B-2 Geochemical Results of Soil and Groundwater Analyses  
Chinatown Redevelopment Area, Oakland, California.

Parameter	Soil			
	Boring B-23 20.0-20.5	Boring B-23 25.0-25.5	Boring B-24 25.0-25.5	Boring B-24 30.0-30.5
pH	7.8	7.1	7.2	8.2
Ammonia-N	8	11	8	6
Nitrate-N	ND	ND	ND	ND
Orthophosphate-P	6.2	3.8	2	2
Carbonate	25.4	28	64.5	46
Sulfate	125	100	37.5	250
Available Iron	5.8	5.8	7.1	25.4
Available Manganese	4.9	6.5	1.2	36
Available Magnesium	8.1	28.9	6.3	14.9
Available Calcium	5.6	23.4	6.7	14.5
Available Potassium	423	176	116	164
Electrical Conductivity	380	500	250	650

Notes: All analytical results are reported in milligrams per kilograms (mg/kg) except electrical conductivity in umhos/cm and pH in standard units

ND Not Detectable

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Groundwater		
Parameter	Boring B-23, B-24 Composite	Well MW-11
pH	7.65	6.9
Ammonium-N	0.27	0.1
Nitrate-N	31	1.9
Orthophosphate-P	13.5	10.5
Bicarbonate	873	871
Sulfate	5,500	670
Dissolved Iron	23.8	7.1
Dissolved Manganese	1.7	0.2
Dissolved Magnesium	57.6	52.3
Dissolved Calcium	77.6	66.9
Dissolved Potassium	1.2	1.4
Electrical Conductivity	1,350	1,050

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Notes: All analytical results are reported in milligrams/liter (mg/l) except electrical conductivity in umhos/cm and pH which is in standard units

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**Appendix C**

**RESULTS OF LABORATORY ANALYSIS OF SOIL SAMPLES**



FORMERLY WESCO LABORATORIES

Report date: August 13, 1988  
Client: Harding Lawson Associates  
200 Rush Landing Road  
Novato, CA 94947  
Attn.: D. Leland

Pace job #: HLA 0814401-L

Date sampled: July 25, 1988  
Sampled by: R. Stolzman

Site: City of Oakland

Date received: July 25, 1988  
Submitted by: R. Stolzman

P.O.: 9382.030.02

Lab #	Client ID	Matrix	Analysis
8- 7046	B-4-05.5	soil	
8- 7047	B-4-10.5	soil	
8- 7048	B-4-15.5	soil	Diesel 3550/8015
8- 7048	B-4-15.5	soil	TPH only 5030/8015
8- 7048	B-4-15.5	soil	Vol Org. Cpds. 8010+8020
8- 7049	B-4-20.5	soil	
8- 7050	B-4-25.5	soil	
8- 7051	B-4-34.5	soil	
8- 7052	B-5-05.5	soil	
8- 7053	B-5-10.0	soil	Diesel 3550/8015
8- 7053	B-5-10.0	soil	TPH only 5030/8015
8- 7053	B-5-10.0	soil	Vol Org. Cpds. 8010+8020
8- 7054	B-5-15.5	soil	
8- 7055	B-5-20.5	soil	
8- 7056	B-5-25.5	soil	
8- 7057	B-5-35.5	soil	
8- 7058	B-5-40.5	soil	

FORMERLY WESCO LABORATORIES

Report date: August 13, 1988

Pace job #: HLA 0814401-L

Client: Harding Lawson Associates  
200 Rush Landing Road  
Novato, CA 94947

Attn.: D. Leland

Date sampled: July 25, 1988  
Sampled by: R. Stolzman

Site: City of Oakland

Date received: July 25, 1988  
Submitted by: R. Stolzman

P.O.: 9382.030.02

Lab #	Client ID	Matrix	Analysis
-------	-----------	--------	----------

Dear Client,

No problems were encountered with the analysis of your samples. We will store samples for 30 days after the report date. The samples will be returned to the client after the 30-day period, unless other arrangements are made. If you have any questions, please feel free to call, (415)883-6100.

  
-----  
Sample Controller

Report Date: 12-Aug-88 Extract/Purge Date: 28-Jul-88  
 PACE JOB #: HLA 08144.01-L Completion Date: 28-Jul-88  
 Analytical Method: EPA 3550/8015 Analyst: CLARK  
 MATRIX: SOIL

LAB #	CLIENT ID	Total Petroleum Hydrocarbons (heavy) (mg/kg)	Quantified As	Detection Limit(mg/kg)
8-7048	B-4-15.5	N.D.		10
8-7053	B-5-10.0	N.D.		10

QUALITY CONTROL DATA PACE JOB #: HLA 08144.01

COMPOUND	Blank (mg/l)	Spike Duplicate % deviation	Spike % recovery
Diesel	N.D.	11	89

N.D.: Not Detected



-----  
Analytical Supervisor

Report Date: 12-Aug-88  
 PACE JOB #: HLA 08144.01-L  
 Analytical Method: EPA 5030/8015  
 MATRIX: SOIL

Extract/Purge Date: 28-Jul-88  
 Completion Date: 28-Jul-88  
 Analyst: ARNTZEN

LAB #: 8-7048 CLIENT'S ID: B-4-15.5  
 =====  
 COMPOUND RESULT Detection  
 (ug/kg) Limit(ug/kg)  
 Total Petroleum Hydrocarbons (light)--- N.D. 50.0  
 -----

QUALITY CONTROL DATA Surrogate Spike % Recovery  
 Fluorobenzene 91 %

LAB #: 8-7053 CLIENT'S ID: B-5-10.0  
 =====  
 COMPOUND RESULT Detection  
 (ug/kg) Limit(ug/kg)  
 Total Petroleum Hydrocarbons (light)--- N.D. 50.0  
 -----

QUALITY CONTROL DATA Surrogate Spike % Recovery  
 Fluorobenzene 102 %

QUALITY CONTROL DATA  
 METHOD: EPA 5030/8015 PACE JOB #: HLA 08144.01-L  
 =====  
 COMPOUND Blank Spike Duplicate Spike  
 ug/l % deviation % recovery  
 =====  
 Gasoline----- N.D. 4 120  
 -----

QUALITY CONTROL DATA  
 Surrogate Spike % Recovery  
 Fluorobenzene 98 % 90 % 100 %

N.D.: Not Detected

  
 -----  
 Analytical Supervisor

REPORT OF LABORATORY ANALYSIS

**pace**  
laboratories, inc.  
FORMERLY WESCO LABORATORIES

Minneapolis, Minnesota  
Tampa, Florida  
Coralville, Iowa  
Novato, California

Report Date: 12-Aug-88  
PACE JOB #: HLA 08144.02-L  
Analytical Method: EPA 5030/8015  
MATRIX: SOIL

Extract/Purge Date: 28-Jul-88  
Completion Date: 28-Jul-88  
Analyst: ATTIA

LAB #: 8-7096 CLIENT'S ID: B10-32.5  
=====

COMPOUND	RESULT (ug/kg)	Detection Limit (ug/kg)
Total Petroleum Hydrocarbons (light)---	730	50.0

-----

QUALITY CONTROL DATA  
Surrogate Spike & Recovery  
Fluorobenzene 124 % M.I.

LAB #: 8-7097 CLIENT'S ID: B10-35.5  
=====

COMPOUND	RESULT (ug/kg)	Detection Limit (ug/kg)
Total Petroleum Hydrocarbons (light)---	N.D.	50.0

-----

QUALITY CONTROL DATA  
Surrogate Spike & Recovery  
Fluorobenzene 100 %

QUALITY CONTROL DATA  
METHOD: EPA 5030/8015 PACE JOB #: HLA 08144.02-L  
=====

COMPOUND	Blank ug/l	Spike Duplicate % deviation	Spike % recovery
Gasoline-----	N.D.	4	120

-----

QUALITY CONTROL DATA  
Surrogate Spike & Recovery  
Fluorobenzene 98 % 90 % 100 %

N.D.: Not Detected  
M.I.: Matrix Interference

*Attia*  
-----  
Analytical Supervisor

Report Date: 12-Aug-88  
PACE JOB #: HLA 08144.01-L  
Analytical Method: EPA 8020  
MATRIX: SOIL

Extract/Purge Date: 03-Aug-88  
Completion Date: 03-Aug-88  
Analyst: ARNTZEN

LAB #: 8-7048 8-7053  
CLIENT'S ID: B-4-15.5 B-5-10.0

COMPOUND	RESULT (ug/kg)	RESULT (ug/kg)	Detection Limit (ug/kg)
Benzene	N.D.	N.D.	0.2
Toluene	0.6	N.D.	0.2
Chlorobenzene	N.D.	N.D.	0.2
Ethylbenzene	N.D.	N.D.	0.2
Xylene	N.D.	N.D.	0.2
1,3-Dichlorobenzene	N.D.	N.D.	0.2
1,4-Dichlorobenzene	N.D.	N.D.	0.2
1,2-Dichlorobenzene	N.D.	N.D.	0.2

QUALITY CONTROL DATA

Surrogate Spike Percent Recovery  
Fluorobenzene 86% 88%

QUALITY CONTROL DATA

METHOD: EPA 8020 PACE JOB#: HLA 08144.01-

COMPOUND	Blank (ug/l)	Spike Duplicate % deviation	Spike % recovery
Benzene	N.D.	0	98
Toluene	N.D.	1	99
p-Xylene	N.D.	1	101

QUALITY CONTROL DATA

Surrogate Spike % Recovery  
Fluorobenzene 97 % 97 % 97 %

N.D.: Not Detected

*Arntzen*  
-----  
Analytical Supervisor

FORMERLY WESCO LABORATORIES

Report Date: 12-Aug-88  
PACE JOB #: HLA 08144.01-L  
Analytical Method: EPA 8010  
MATRIX: SOIL

Extract/Purge Date: 03-Aug-88  
Completion Date: 03-Aug-88  
Analyst: ARNTZEN

LAB #: 8-7048 8-7053  
CLIENT'S ID: B-4-15.5 B-5-10.0

COMPOUND	RESULT (ug/kg)	RESULT (ug/kg)	Detection Limit (ug/kg)
Dichlorodifluoromethane	N.D.	N.D.	2.0
Chloromethane	N.D.	N.D.	2.0
Vinyl Chloride	N.D.	N.D.	2.0
Bromomethane	N.D.	N.D.	2.0
Chloroethane	N.D.	N.D.	2.0
Trichlorofluoromethane	N.D.	N.D.	2.0
1,1-Dichloroethene	0.5	N.D.	0.5
Methylene Chloride	N.D.	N.D.	0.5
trans-1,2-Dichloroethene	N.D.	N.D.	0.5
1,1-Dichloroethane	N.D.	N.D.	0.5
Chloroform	N.D.	1.4	0.5
1,1,1-Trichloroethane (TCA)	N.D.	1.4	0.5
Carbon Tetrachloride	N.D.	N.D.	0.5
1,2-Dichloroethane (EDC)	N.D.	N.D.	0.5
Trichloroethene (TCE)	N.D.	N.D.	0.5
1,2-Dichloropropane	N.D.	N.D.	0.5
Bromodichloromethane	N.D.	N.D.	0.5
2-Chloroethylvinyl ether	N.D.	N.D.	0.5
trans-1,3-Dichloropropene	N.D.	N.D.	0.5
cis-1,3-Dichloropropene	N.D.	N.D.	0.5
1,1,2-Trichloroethane	N.D.	N.D.	0.5
Tetrachloroethene	N.D.	N.D.	0.5
Dibromochloromethane	N.D.	N.D.	0.5
Chlorobenzene	N.D.	N.D.	0.5
Bromoform	N.D.	N.D.	0.5
1,1,2,2-Tetrachloroethane	N.D.	N.D.	0.5
1,3-Dichlorobenzene	N.D.	N.D.	0.5
1,4-Dichlorobenzene	N.D.	N.D.	0.5
1,2-Dichlorobenzene	N.D.	N.D.	0.5

QUALITY CONTROL DATA

Surrogate Spike	Percent Recovery	
Bromochloromethane	80%	90%
1,4-Dichlorobutane	114%	109%

N.D.: Not Detected



Analytical Supervisor

BLANK, SPIKE DUPLICATE AND SPIKE REPORT JOB #  
METHOD : EPA 8010

HLA 08144.01-L

COMPOUND	Blank (ug/l)	Spike Duplicate % deviation	Spike % recovery
Dichlorodifluoromethane	N.D.	-	N.S.
Chloromethane	N.D.	-	N.S.
Vinyl Chloride	N.D.	-	N.S.
Bromomethane	N.D.	-	N.S.
Chloroethane	N.D.	-	N.S.
Trichlorofluoromethane	N.D.	-	N.S.
1,1-Dichloroethene	N.D.	-	N.S.
Methylene Chloride	N.D.	-	N.S.
trans-1,2-Dichloroethene	N.D.	-	N.S.
1,1-Dichloroethane (M.S.)	N.D.	1	106
Chloroform	N.D.	-	N.S.
1,1,1-Trichloroethane (TCA)	N.D.	-	N.S.
Carbon Tetrachloride	N.D.	-	N.S.
1,2-Dichloroethane (EDC)	N.D.	-	N.S.
Trichloroethene (TCE) (M.S.)	N.D.	8	108
1,2-Dichloropropane	N.D.	-	N.S.
Bromodichloromethane	N.D.	-	N.S.
2-Chloroethylvinyl ether	N.D.	-	N.S.
trans-1,3-Dichloropropene	N.D.	3	113
cis-1,3-Dichloropropene	N.D.	-	N.S.
1,1,2-Trichloroethane	N.D.	-	N.S.
Tetrachloroethene (M.S.)	N.D.	6	114
Dibromochloromethane	N.D.	-	N.S.
Chlorobenzene	N.D.	-	N.S.
Bromoform	N.D.	-	N.S.
1,1,2,2-Tetrachloroethane	N.D.	-	N.S.
1,3-Dichlorobenzene	N.D.	-	N.S.
1,4-Dichlorobenzene	N.D.	-	N.S.
1,2-Dichlorobenzene	N.D.	-	N.S.

QUALITY CONTROL DATA

Surrogate Spike % Recovery

Bromochloromethane	86 %	101 %	95 %
1,4-Dichlorobutane	97 %	108 %	117 %

N.D.: Not Detected

N.S.: Not Spiked

*Alfatto*  
Analytical Supervisor





**Harding Lawson Associates**  
Environmental Services Division  
200 Rush Landing Road  
Novato, California 94947  
(415) 892-0821

## CHAIN OF CUSTODY FORM

HLA 08144.01

Job Number: 9382.030.02  
Name/Location: City of Oakland  
Project Manager: David F. Leland

Samplers: R. Stolzman

Recorder: Roberta A. Stolzman  
(Signature Required)

SOURCE CODE	MATRIX				#CONTAINERS & PRESERV.			SAMPLE NUMBER OR LAB NUMBER			DATE				STATION DESCRIPTION/NOTES	
	Water	Sediment	Soil	Oil	Unpres.	H <sub>2</sub> SO <sub>4</sub>	HNO <sub>3</sub>	Yr	Wk	Seq	Yr	Mo	Dy	Time		
50			X		1			B	5	25	50	7	25	58	1005	Hold
50			X		1			B	5	35	55				1050	Hold
50			X		1			B	5	40	55				1110	Hold

ANALYSIS REQUESTED							
EPA 601/8010	EPA 602/8020	EPA 624/8240	EPA 625/8270	Priority Pflnt. Metals	Benzene/Toluene/Xylene	Total Petrol. Hydrocarb.	

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

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	RECEIVED FOR LAB BY: (Signature)
Robert A. Stolzman	7-25-88 / 1613	L. Sontag, 7/25 / 4:15 PM
METHOD OF SHIPMENT		



Harding Lawson Associates  
Environmental Services Division  
200 Rush Landing Road  
Novato, California 94947  
(415) 892-0821

### CHAIN OF CUSTODY FORM

HLA 08144.01

Job Number: 9382.030.02

Name/Location: City of Oakland

Project Manager: David F. Leland

Samplers: R. Stolzman

Recorder: Robert A. Stolzman  
(Signature Required)

SOURCE CODE	MATRIX				#CONTAINERS & PRESERV.				SAMPLE NUMBER OR LAB NUMBER			DATE				STATION DESCRIPTION/ NOTES		
	Water	Sediment	Soil	Oil	Unpres.	H <sub>2</sub> SO <sub>4</sub>	HNO <sub>3</sub>				Yr	Wk	Seq	Yr	Mo		Dy	Time
50			X		1					B-4-05.5	07	25	88	12	40		Hold	
50			X		1					B-4-10.5								Hold
50			X		1					B-4-15.5								Hold
50			X		1					B-4-20.5								Hold
50			X		1					B-4-25.5								Hold
50			X		1					B-4-34.5								Hold
50			X		1					B-5-05.5								Hold
50			X		1					B-5-10.0								Hold
50			X		1					B-5-15.5								Hold
50			X		1					B-5-20.5								Hold

ANALYSIS REQUESTED							
EPA 601/8010	EPA 602/8020	EPA 624/8240	EPA 625/8270	Priority Plltnt. Metals	Benzene/Toluene/Xylene	Total Petrol. Hydrocarb.	TPH-L&A by SOLS

LAB NUMBER			DEPTH IN FEET	COL MTD CD	QA CODE	MISCELLANEOUS	CHAIN OF CUSTODY RECORD			
Yr	Wk	Seq					RELINQUISHED BY: (Signature)	RECEIVED BY: (Signature)	DATE/TIME	

HARDING LAWSON ASSOC.

AUG 16 1988

Pace job #: HLA 0814402-L

Report date: August 13, 1988  
Client: Harding Lawson Associates  
200 Rush Landing Road  
Novato, CA 94947  
Attn.: D. Leland

Date sampled: July 26, 1988 Site: City of Oakland  
Sampled by: R. Stolzman

Date received: July 26, 1988 P.O.: 9382.030.02  
Submitted by: R. Stolzman

Lab #	Client ID	Matrix	Analysis
8- 7101	88300001	water	Purg. Org. Hal. 601
8- 7102	88300001	water	Lead 7421
8- 7101	88300001	water	TPH with BTXE
8- 7091	B10-05.5	soil	
8- 7092	B10-10.5	soil	
8- 7093	B10-15.5	soil	
8- 7094	B10-20.5	soil	
8- 7095	B10-25.5	soil	
8- 7096	B10-32.5	soil	Lead 7420
8- 7096	B10-32.5	soil	Diesel 3550/8015
8- 7096	B10-32.5	soil	TPH only 5030/8015
8- 7096	B10-32.5	soil	Vol Org. Cpds. 8010+8020
8- 7097	B10-35.5	soil	Diesel 3550/8015
8- 7097	B10-35.5	soil	TPH only 5030/8015
8- 7097	B10-35.5	soil	Vol Org. Cpds. 8010+8020
8- 7098	B10-40.5	soil	
8- 7099	B13-05.5	soil	
8- 7100	B13-10.5	soil	

FORMERLY WESCO LABORATORIES

Report date: August 13, 1988  
Client: Harding Lawson Associates  
200 Rush Landing Road  
Novato, CA 94947  
Attn.: D. Leland

Pace job #: HLA 0814402-L

Date sampled: July 26, 1988  
Sampled by: R. Stolzman

Site: City of Oakland

Date received: July 26, 1988  
Submitted by: R. Stolzman

P.O.: 9382.030.02

Lab #	Client ID	Matrix	Analysis
-------	-----------	--------	----------

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Dear Client,

No problems were encountered with the analysis of your samples. We will store samples for 30 days after the report date. The samples will be returned to the client after the 30-day period, unless other arrangements are made. If you have any questions, please feel free to call, (415)883-6100.



Sample Controller

Report Date: 13-Aug-88  
 PACE JOB #: HLA 08144.02-L  
 Analytical Method: EPA 8020  
 MATRIX: SOIL

Extract/Purge Date: 03-Aug-88  
 Completion Date: 03-Aug-88  
 Analyst: LEWIS

LAB #:	8-7096	8-7097	
CLIENT'S ID:	B10-32.5	B10-35.5	
=====	=====	=====	=====
COMPOUND	RESULT (ug/kg)	RESULT (ug/kg)	Detection Limit (ug/kg)
Benzene-----	4.2	N.D.	0.2
Toluene-----	24	0.6	0.2
Chlorobenzene-----	N.D.	N.D.	0.2
Ethylbenzene-----	13	N.D.	0.2
Xylene-----	76	N.D.	0.2
1,3-Dichlorobenzene-----	N.D.	N.D.	0.2
1,4-Dichlorobenzene-----	N.D.	N.D.	0.2
1,2-Dichlorobenzene-----	N.D.	N.D.	0.2

QUALITY CONTROL DATA

Surrogate Spike	Percent Recovery	
Fluorobenzene	87 %	86%

QUALITY CONTROL DATA

METHOD: EPA 8020

PACE JOB#: HLA 08144.02-

=====	=====	=====	=====
COMPOUND	Blank (ug/l)	Spike Duplicate % deviation	Spike % recovery
=====	=====	=====	=====
Benzene-----	N.D.	0	98
Toluene-----	N.D.	1	99
p-Xylene-----	N.D.	1	101

QUALITY CONTROL DATA

Surrogate Spike % Recovery

Fluorobenzene	97 %	97 %	97 %
---------------	------	------	------

N.D.: Not Detected



-----  
 Analytical Supervisor

Report Date: 13-Aug-88 Extract/Purge Date: 27-Jul-88  
 PACE JOB #: HLA 08144.02-L Completion Date: 27-Jul-88  
 Analytical Method: EPA 5030/8015/602 Analyst: ATTIA  
 MATRIX: WATER

LAB #: 8-7101 CLIENT'S ID: 300001

COMPOUND	RESULT (ug/l)	Detection Limit (ug/l)
Benzene-----	160	5
Toluene-----	410	5
Ethylbenzene-----	200	5
Xylene-----	920	5
Total Petroleum Hydrocarbons (light)---	3,500	500

QUALITY CONTROL DATA

Surrogate Spike % Recovery  
 Fluorobenzene 105 %


QUALITY CONTROL DATA

COMPOUND	Blank ug/l	Spike Duplicate % deviation	Spike % recovery
Benzene-----	N.D.	2	102
Toluene-----	N.D.	6	89
p-Xylene-----	N.D.	4	110
Gasoline-----	N.D.	4	98

QUALITY CONTROL DATA

Surrogate Spike % Recovery  
 Fluorobenzene 89 % 103 % 96 %

N.D.: Not Detected

  
 -----  
 Analytical Supervisor

Report Date: 13-Aug-88  
 PACE JOB #: HLA 08144.02-L  
 Analytical Method: EPA 7000 SERIES  
 MATRIX: SOIL and WATER

Extract/Purge Date: 03-Aug-88  
 Analysis Completion: 03-Aug-88  
 Analyst: LIBBY

LAB #	CLIENT ID	Lead Pb (mg/kg)	Lead Pb (mg/l)
8-7096	B10-32.5	1.1	-
8-7102	300001	-	0.32
Detection limit:		1.0	0.10
Method #:		EPA 7420	EPA 7420

QUALITY CONTROL DATA	Lead Pb (mg/kg)	Lead Pb (mg/l)
Blank (mg/l)	N.D.	N.D.
Spike Duplicate % deviation:	0.4	0
Spike % Recovery:	100	104

*Libby*

-----  
 Analytical Supervisor

Report Date: 13-Aug-88 Extract/Purge Date: 01-Aug-88  
 PACE JOB #: HLA 08144.02-L Completion Date: 04-Aug-88  
 Analytical Method: EPA 3550/8015 Analyst: CLARK  
 MATRIX: SOIL

LAB #	CLIENT ID	Total Petroleum Hydrocarbons (heavy) (mg/kg)	Quantified As	Detection Limit(mg/kg)
8-7096	B10-32.5	N.D.		10
8-7097	B10-35.5	N.D.		10

QUALITY CONTROL DATA PACE JOB #: HLA 08144.02-L

COMPOUND	Blank (mg/l)	Spike Duplicate % deviation	Spike % recovery
Diesel	N.D.	11	89

N.D.: Not Detected



-----  
 Analytical Supervisor



Report Date: 13-Aug-88  
PACE JOB #: HLA 08144.02-L  
Analytical Method: EPA 5030/8015  
MATRIX: SOIL

Extract/Purge Date: 28-Jul-88  
Completion Date: 28-Jul-88  
Analyst: ATTIA

LAB #: 8-7096 CLIENT'S ID: B10-32.5  
=====

COMPOUND	RESULT (ug/kg)	Detection Limit (ug/kg)
Total Petroleum Hydrocarbons (light)---	730	50.0
-----		
QUALITY CONTROL DATA		
Surrogate Spike % Recovery		
Fluorobenzene	124 %	M.I.

LAB #: 8-7097 CLIENT'S ID: B10-35.5  
=====

COMPOUND	RESULT (ug/kg)	Detection Limit (ug/kg)
Total Petroleum Hydrocarbons (light)---	N.D.	50.0
-----		
QUALITY CONTROL DATA		
Surrogate Spike % Recovery		
Fluorobenzene	100 %	

QUALITY CONTROL DATA  
METHOD: EPA 5030/8015 PACE JOB #: HLA 08144.02-L  
=====

COMPOUND	Blank ug/l	Spike Duplicate % deviation	Spike % recovery
Gasoline-----	N.D.	4	120
-----			
QUALITY CONTROL DATA			
Surrogate Spike % Recovery			
Fluorobenzene	98 %	90 %	100 %

N.D.: Not Detected  
M.I.: Matrix Interference



-----  
Analytical Supervisor

Report Date: 12-Aug-88  
PACE JOB #: HLA 08144.02-L  
Analytical Method: EPA 8010  
MATRIX: SOIL

Extract/Purge Date: 03-Aug-88  
Completion Date: 03-Aug-88  
Analyst: LEWIS

LAB #: 8-7096 8-7097  
CLIENT'S ID: B10-32.5 B10-35.5

COMPOUND	RESULT (ug/kg)	RESULT (ug/kg)	Detection Limit(ug/kg)
Dichlorodifluoromethane	N.D.	N.D.	2.0
Chloromethane	N.D.	N.D.	2.0
Vinyl Chloride	N.D.	N.D.	2.0
Bromomethane	N.D.	N.D.	2.0
Chloroethane	N.D.	N.D.	2.0
Trichlorofluoromethane	N.D.	N.D.	2.0
1,1-Dichloroethene	N.D.	N.D.	0.5
Methylene Chloride	0.6	0.6	0.5
trans-1,2-Dichloroethene	N.D.	N.D.	0.5
1,1-Dichloroethane	N.D.	N.D.	0.5
Chloroform	0.5	0.5	0.5
1,1,1-Trichloroethane (TCA)	N.D.	N.D.	0.5
Carbon Tetrachloride	N.D.	N.D.	0.5
1,2-Dichloroethane (EDC)	N.D.	N.D.	0.5
Trichloroethene (TCE)	N.D.	N.D.	0.5
1,2-Dichloropropane	N.D.	N.D.	0.5
Bromodichloromethane	N.D.	N.D.	0.5
2-Chloroethylvinyl ether	N.D.	N.D.	0.5
trans-1,3-Dichloropropene	N.D.	N.D.	0.5
cis-1,3-Dichloropropene	N.D.	N.D.	0.5
1,1,2-Trichloroethane	N.D.	N.D.	0.5
Tetrachloroethene	N.D.	N.D.	0.5
Dibromochloromethane	N.D.	N.D.	0.5
Chlorobenzene	N.D.	N.D.	0.5
Bromoform	N.D.	N.D.	0.5
1,1,2,2-Tetrachloroethane	N.D.	N.D.	0.5
1,3-Dichlorobenzene	N.D.	N.D.	0.5
1,4-Dichlorobenzene	N.D.	N.D.	0.5
1,2-Dichlorobenzene	N.D.	N.D.	0.5

QUALITY CONTROL DATA

Surrogate Spike	Percent Recovery	
Bromochloromethane	83%	85%
1,4-Dichlorobutane	97%	111%

N.D.: Not Detected

*A. Hotta*  
Analytical Supervisor

BLANK, SPIKE DUPLICATE AND SPIKE REPORT JOB #  
METHOD : EPA 8010

HLA 08144.02-L

COMPOUND	Blank (ug/l)	Spike Duplicate % deviation	Spike % recovery
Dichlorodifluoromethane	N.D.	-	N.S.
Chloromethane	N.D.	-	N.S.
Vinyl Chloride	N.D.	-	N.S.
Bromomethane	N.D.	-	N.S.
Chloroethane	N.D.	-	N.S.
Trichlorofluoromethane	N.D.	-	N.S.
1,1-Dichloroethene	N.D.	-	N.S.
Methylene Chloride	N.D.	-	N.S.
trans-1,2-Dichloroethene	N.D.	-	N.S.
1,1-Dichloroethane (M.S.)	N.D.	1	106
Chloroform	N.D.	-	N.S.
1,1,1-Trichloroethane (TCA)	N.D.	-	N.S.
Carbon Tetrachloride	N.D.	-	N.S.
1,2-Dichloroethane (EDC)	N.D.	-	N.S.
Trichloroethene (TCE) (M.S.)	N.D.	8	108
1,2-Dichloropropane	N.D.	-	N.S.
Bromodichloromethane	N.D.	-	N.S.
2-Chloroethylvinyl ether	N.D.	-	N.S.
trans-1,3-Dichloropropene	N.D.	3	113
cis-1,3-Dichloropropene	N.D.	-	N.S.
1,1,2-Trichloroethane	N.D.	-	N.S.
Tetrachloroethene (M.S.)	N.D.	6	114
Dibromochloromethane	N.D.	-	N.S.
Chlorobenzene	N.D.	-	N.S.
Bromoform	N.D.	-	N.S.
1,1,2,2-Tetrachloroethane	N.D.	-	N.S.
1,3-Dichlorobenzene	N.D.	-	N.S.
1,4-Dichlorobenzene	N.D.	-	N.S.
1,2-Dichlorobenzene	N.D.	-	N.S.

QUALITY CONTROL DATA

Surrogate Spike % Recovery

Bromochloromethane	86 %	101 %	95 %
1,4-Dichlorobutane	117 %	108 %	117 %

N.D.: Not Detected

N.S.: Not Spiked



Analytical Supervisor

Report Date: 12-Aug-88  
PACE JOB #: HLA 08144.02-L  
Analytical Method: EPA 8010  
MATRIX: WATER

Extract/Purge Date: 28-Jul-88  
Completion Date: 28-Jul-88  
Analyst: LEWIS

LAB #: 8-7101 CLIENT'S ID: 300001

COMPOUND	RESULT (ug/l)	Detection Limit (ug/l)
Dichlorodifluoromethane-----	200	2.0
Chloromethane-----	N.D.	2.0
Vinyl Chloride-----	N.D.	2.0
Bromomethane-----	N.D.	2.0
Chloroethane-----	N.D.	2.0
Trichlorofluoromethane-----	N.D.	2.0
1,1-Dichloroethene-----	2.8	0.5
Methylene Chloride-----	N.D.	0.5
trans-1,2-Dichloroethene-----	N.D.	0.5
1,1-Dichloroethane-----	1.2	0.5
Chloroform-----	3.3	0.5
1,1,1-Trichloroethane (TCA)-----	N.D.	0.5
Carbon Tetrachloride-----	N.D.	0.5
1,2-Dichloroethane (EDC)-----	N.D.	0.5
Trichloroethene (TCE)-----	N.D.	0.5
1,2-Dichloropropane-----	N.D.	0.5
Bromodichloromethane-----	N.D.	0.5
2-Chloroethylvinyl ether-----	N.D.	0.5
trans-1,3-Dichloropropene-----	N.D.	0.5
cis-1,3-Dichloropropene-----	N.D.	0.5
1,1,2-Trichloroethane-----	N.D.	0.5
Tetrachloroethene-----	N.D.	0.5
Dibromochloromethane-----	N.D.	0.5
Chlorobenzene-----	N.D.	0.5
Bromoform-----	N.D.	0.5
1,1,2,2-Tetrachloroethane-----	N.D.	0.5
1,3-Dichlorobenzene-----	N.D.	0.5
1,4-Dichlorobenzene-----	N.D.	0.5
1,2-Dichlorobenzene-----	N.D.	0.5

QUALITY CONTROL DATA

Surrogate Spike	Percent Recovery
Bromochloromethane	96 %
1,4-Dichlorobutane	102 %

N.D.: Not Detected



-----  
Analytical Supervisor

BLANK, SPIKE DUPLICATE AND SPIKE REPORT JOB #  
METHOD : EPA 8010  
SAMPLE #: 8-7101

HLA 08144.02-L

COMPOUND	Blank (ug/l)	Spike Duplicate % deviation	Spike % recovery
Dichlorodifluoromethane	N.D.	-	N.S.
Chloromethane	N.D.	-	N.S.
Vinyl Chloride	N.D.	-	N.S.
Bromomethane	N.D.	-	N.S.
Chloroethane	N.D.	-	N.S.
Trichlorofluoromethane	N.D.	-	N.S.
1,1-Dichloroethene	N.D.	-	N.S.
Methylene Chloride	N.D.	-	N.S.
trans-1,2-Dichloroethene	N.D.	-	N.S.
1,1-Dichloroethane (M.S.)	N.D.	7	105
Chloroform	N.D.	-	N.S.
1,1,1-Trichloroethane (TCA)	N.D.	-	N.S.
Carbon Tetrachloride	N.D.	-	N.S.
1,2-Dichloroethane (EDC)	N.D.	-	N.S.
Trichloroethene (TCE) (M.S.)	N.D.	6	105
1,2-Dichloropropane	N.D.	-	N.S.
Bromodichloromethane	N.D.	-	N.S.
2-Chloroethylvinyl ether	N.D.	-	N.S.
trans-1,3-Dichloropropene	N.D.	5	107
cis-1,3-Dichloropropene	N.D.	-	N.S.
1,1,2-Trichloroethane	N.D.	-	N.S.
Tetrachloroethene (M.S.)	N.D.	2	110
Dibromochloromethane	N.D.	-	N.S.
Chlorobenzene	N.D.	-	N.S.
Bromoform	N.D.	-	N.S.
1,1,2,2-Tetrachloroethane	N.D.	-	N.S.
1,3-Dichlorobenzene	N.D.	-	N.S.
1,4-Dichlorobenzene	N.D.	-	N.S.
1,2-Dichlorobenzene	N.D.	-	N.S.

QUALITY CONTROL DATA

Surrogate Spike % Recovery

Bromochloromethane	84 %	97 %	83 %
1,4-Dichlorobutane	102 %	114 %	102 %

N.D.: Not Detected

N.S.: Not Spiked

*Abbott*

Analytical Supervisor



**Harding Lawson Associates**  
Environmental Services Division  
200 Rush Landing Road  
Novato, California 94947  
(415) 892-0821

# CHAIN OF CUSTODY FORM

HLA 08144.01

Job Number: 9382.030.02

Name/Location: City of Oakland

Project Manager: David F. Leland

Samplers: R. Stolzman

Recorder: Robert A. Stolzman  
(Signature Required)

SOURCE CODE	MATRIX				#CONTAINERS & PRESERV.			SAMPLE NUMBER OR LAB NUMBER			DATE				STATION DESCRIPTION/ NOTES
	Water	Sediment	Soil	Oil	Unpres.	H <sub>2</sub> SO <sub>4</sub>	HNO <sub>3</sub>	Yr	Wk	Seq	Yr	Mo	Dy	Time	
50		X			1			B-4-05	5	07	25	88	12	40	Hold
50		X			1			B-4-10	5					1300	Hold
50		X			1			B-4-15	5					1320	
50		X			1			B-4-20	5					1330	Hold
50		X			1			B-4-25	5					1345	Hold
50		X			1			B-4-34	5					1430	Hold
50		X			1			B-5-05	5					0900	Hold
50		X			1			B-5-10	0					0920	
50		X			1			B-5-15	5					0935	Hold
50		X			1			B-5-20	5					0950	Hold

ANALYSIS REQUESTED										
EPA 601/8010	EPA 602/8020	EPA 624/8240	EPA 625/8270	Priority Pestic. Metals	Benzene/Toluene/Xylene	Total Petrol. Hydrocarb.	TPH-Lt-Hvy by SOLS			
							X			
		XX					X			
		XX					X			

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

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	RECEIVED FOR LAB BY: (Signature) DATE/TIME
METHOD OF SHIPMENT		



Harding Lawson Associates  
Environmental Services Division  
200 Rush Landing Road  
Novato, California 94947  
(415) 892-0821

# CHAIN OF CUSTODY FORM

HLA 08144.01

Samplers: R. Stolzman

Job Number: 9382.030.02

Name/Location: City of Oakland

Project Manager: David F. Leland

Recorder: Roberta Stolzman  
(Signature Required)

SOURCE CODE	MATRIX					#CONTAINERS & PRESERV.			SAMPLE NUMBER OR LAB NUMBER				DATE				STATION DESCRIPTION/NOTES
	Water	Sediment	Soil	Oil	Unpres.	H <sub>2</sub> SO <sub>4</sub>	HNO <sub>3</sub>	Yr	Wk	Seq	Yr	Mo	Dy	Time			
50			X		1			B-5-25.5	7	25	8	10	05	Hold			
50			X		1			B-5-35.5					1050	Hold			
50			X		1			B-5-40.5					1110	Hold			

ANALYSIS REQUESTED											
EPA 601/8010	EPA 602/8020	EPA 624/8240	EPA 625/8270	Priority Pflnt. Metals	Benzene/Toluene/Xylene	Total Petrol. Hydrocarb.					

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

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	RECEIVED FOR LAB BY: (Signature)
<u>Roberta Stolzman</u>	<u>7-25-88 1615</u>	<u>L. Sonntag 7/25/88 4:15 PM</u>
METHOD OF SHIPMENT		

HARDING LAWSON ASSOC.  
AUG 25 1988

Report date: August 23, 1988  
Client: Harding Lawson Associates  
P.O. Box 578  
Novato, CA 94947  
Attn.: David Leland

Page job #: HLA 0814403-L

Date sampled: July 27, 1988  
Sampled by: R. Stolzman

Site: City of Oakland

Date received: July 27, 1988  
Submitted by: R. Stolzman

P.O.: 9382, 030.02

Lab #	Client ID	Matrix	Analysis
8- 7128	8830 - 0002	water	Purg. Halocarbons 601
8- 7128	8830 - 0002	water	TPH light w/ BTXE
8- 7129	8830 - 0002	water	Lead 7420
8- 7130	B13 - 15.5	soil	Diesel 3550/8015
8- 7130	B13 - 15.5	soil	TPH light only 5030/8015
8- 7130	B13 - 15.5	soil	Vol Org. Cpds. 8010+8020
8- 7131	B13 - 20.5	soil	Purg. Halocarbons 8010
8- 7131	B13 - 20.5	soil	Diesel 3550/8015
8- 7131	B13 - 20.5	soil	TPH light only 5030/8015
8- 7132	B13 - 21.0	soil	Purg. Aromatics 8020
8- 7133	B13 - 25.5	soil	Purg. Halocarbons 8010
8- 7133	B13 - 25.5	soil	Lead 7420
8- 7133	B13 - 25.5	soil	Diesel 3550/8015
8- 7133	B13 - 25.5	soil	TPH light only 5030/8015
8- 7134	B13 - 26.0	soil	Purg. Aromatics 8020
8- 7135	B13 - 29.5	soil	Diesel 3550/8015
8- 7135	B13 - 29.5	soil	TPH light only 5030/8015
8- 7136	B13 - 35.5	soil	Purg. Halocarbons 8010 (4 d ru)
8- 7136	B13 - 35.5	soil	Diesel 3550/8015 (4 day rush)
8- 7136	B13 - 35.5	soil	TPH only 5030/8015 (4 day rush)
8- 7137	B21 - 05.5	soil	
8- 7138	B21 - 10.5	soil	
8- 7139	B21 - 15.5	soil	Diesel 3550/8015
8- 7139	B21 - 15.5	soil	TPH light only 5030/8015
8- 7139	B21 - 15.5	soil	Vol Org. Cpds. 8010+8020
8- 7122	B21 - 21.5	soil	Purg. Halocarbons 8010
8- 7122	B21 - 21.5	soil	Diesel 3550/8015



Report date: August 23, 1988  
Client: Harding Lawson Associates  
P.O Box 578  
Novato, CA 94947  
Attn.: David Leland

Face job #: HLA 0814403-L

Date sampled: July 27, 1988  
Sampled by: R. Stolzman

Site: City of Oakland

Date received: July 27, 1988  
Submitted by: R. Stolzman

P.O.: 9382, 030.02

Lab #	Client ID	Matrix	Analysis
8- 7122	B21 - 21.5	soil	TPH light only 5030/8015
8- 7123	B21 - 22.0	soil	Purg. Aromatics 8020
8- 7124	B21 - 25.5	soil	Purg. Halocarbons 8010
8- 7124	B21 - 25.5	soil	Lead 7420
8- 7124	B21 - 25.5	soil	Diesel 3550/8015
8- 7124	B21 - 25.5	soil	TPH light only 5030/8015
8- 7125	B21 - 26.0	soil	Purg. Aromatics 8020
8- 7126	B21 - 30.0	soil	Purg. Halocarbons 8010
8- 7126	B21 - 30.0	soil	Diesel 3550/8015
8- 7126	B21 - 30.0	soil	TPH light only 5030/8015
8- 7127	B21 - 30.5	soil	Purg. Aromatics 8020

Dear Client,

No problems were encountered with the analysis of your samples. We will store samples for 30 days after the report date. The samples will be returned to the client after the 30-day period, unless other arrangements are made. If you have any questions, please feel free to call, (415)883-6100.

Please note due to computer error the date on your report was printed incorrectly and was corrected by hand. If you need a report with the correct date printed by the computer please call.

*C. Sontag*  
-----  
Sample Controller

Report Date: 27-Sep-88  
 PACE JOB #: HLA 08144.03-L  
 Analytical Method: EPA 8010  
 MATRIX: SOIL

Extract/Purge Date: 04-Aug-88  
 Completion Date: 04-Aug-88  
 Analyst: LEWIS


LAB #: 8-7122 8-7124 8-7126  
 CLIENT'S ID: B21-21.5 B21-25.5 B-21-30.0

COMPOUND	RESULT (ug/kg)	RESULT (ug/kg)	RESULT (ug/kg)	Detection Limit (ug/kg)
Dichlorodifluoromethane-----	N.D.	N.D.	N.D.	2.0
Chloromethane-----	N.D.	N.D.	N.D.	2.0
Vinyl Chloride-----	N.D.	N.D.	N.D.	2.0
Bromomethane-----	N.D.	N.D.	N.D.	2.0
Chloroethane-----	N.D.	N.D.	N.D.	2.0
Trichlorofluoromethane-----	N.D.	N.D.	N.D.	2.0
1,1-Dichloroethene-----	N.D.	N.D.	N.D.	0.5
Methylene Chloride-----	N.D.	0.8	N.D.	0.5
trans-1,2-Dichloroethene-----	N.D.	N.D.	N.D.	0.5
1,1-Dichloroethane-----	N.D.	N.D.	N.D.	0.5
Chloroform-----	N.D.	N.D.	N.D.	0.5
1,1,1-Trichloroethane (TCA)-----	N.D.	N.D.	N.D.	0.5
Carbon Tetrachloride-----	N.D.	N.D.	N.D.	0.5
1,2-Dichloroethane (EDC)-----	7.4	18	2.1	0.5
Trichloroethene (TCE)-----	N.D.	N.D.	6.9	0.5
1,2-Dichloropropane-----	N.D.	N.D.	N.D.	0.5
Bromodichloromethane-----	N.D.	N.D.	N.D.	0.5
2-Chloroethylvinyl ether-----	N.D.	N.D.	N.D.	0.5
trans-1,3-Dichloropropene-----	N.D.	N.D.	N.D.	0.5
cis-1,3-Dichloropropene-----	N.D.	N.D.	N.D.	0.5
1,1,2-Trichloroethane-----	N.D.	N.D.	N.D.	0.5
Tetrachloroethene-----	N.D.	N.D.	N.D.	0.5
Dibromochloromethane-----	N.D.	N.D.	N.D.	0.5
Chlorobenzene-----	N.D.	N.D.	N.D.	0.5
Bromoform-----	N.D.	N.D.	N.D.	0.5
1,1,2,2-Tetrachloroethane-----	N.D.	N.D.	N.D.	0.5
1,3-Dichlorobenzene-----	N.D.	N.D.	N.D.	0.5
1,4-Dichlorobenzene-----	N.D.	N.D.	N.D.	0.5
1,2-Dichlorobenzene-----	N.D.	N.D.	N.D.	0.5

QUALITY CONTROL DATA

Surrogate Spike	Percent Recovery		
Bromochloromethane	91%	106%	86%
1,4-Dichlorobutane	109%	113%	96%

N.D.: Not Detected

  
 -----  
 Analytical Supervisor

Report Date: 27-Sep-88  
 PACE JOB #: HLA 08144.03-L  
 Analytical Method: EPA 8010  
 MATRIX: SOIL

Extract/Purge Date: 08-Aug-88  
 Completion Date: 08-Aug-88  
 Analyst: LEWIS

LAB #: 8-7130 8-7131  
 CLIENT'S ID: B13-15.5 B13-20.5

COMPOUND	RESULT (ug/kg)	RESULT (ug/kg)	Detection Limit (ug/kg)
Dichlorodifluoromethane-----	N.D.	N.D.	2.0
Chloromethane-----	N.D.	N.D.	2.0
Vinyl Chloride-----	N.D.	N.D.	2.0
Bromomethane-----	N.D.	N.D.	2.0
Chloroethane-----	N.D.	N.D.	2.0
Trichlorofluoromethane-----	N.D.	N.D.	2.0
1,1-Dichloroethene-----	N.D.	N.D.	0.5
Methylene Chloride-----	N.D.	N.D.	0.5
trans-1,2-Dichloroethene-----	N.D.	N.D.	0.5
1,1-Dichloroethane-----	N.D.	N.D.	0.5
Chloroform-----	N.D.	7.9	0.5
1,1,1-Trichloroethane (TCA)----	N.D.	N.D.	0.5
Carbon Tetrachloride-----	N.D.	N.D.	0.5
1,2-Dichloroethane (EDC)-----	N.D.	2.6	0.5
Trichloroethene (TCE)-----	N.D.	N.D.	0.5
1,2-Dichloropropane-----	7.7	N.D.	0.5
Bromodichloromethane-----	N.D.	N.D.	0.5
2-Chloroethylvinyl ether-----	N.D.	N.D.	0.5
trans-1,3-Dichloropropene-----	N.D.	N.D.	0.5
cis-1,3-Dichloropropene-----	N.D.	N.D.	0.5
1,1,2-Trichloroethane-----	N.D.	N.D.	0.5
Tetrachloroethene-----	N.D.	N.D.	0.5
Dibromochloromethane-----	N.D.	N.D.	0.5
Chlorobenzene-----	N.D.	N.D.	0.5
Bromoform-----	N.D.	N.D.	0.5
1,1,2,2-Tetrachloroethane-----	N.D.	N.D.	0.5
1,3-Dichlorobenzene-----	N.D.	N.D.	0.5
1,4-Dichlorobenzene-----	N.D.	N.D.	0.5
1,2-Dichlorobenzene-----	N.D.	N.D.	0.5

QUALITY CONTROL DATA

Surrogate Spike	Percent Recovery	
Bromochloromethane	78%	85%
1,4-Dichlorobutane	101%	75%

N.D.: Not Detected

*AH*  
 Analytical Supervisor

Report Date: 27-Sep-88  
PACE JOB #: HLA 08144.03-L  
Analytical Method: EPA 8010  
MATRIX: SOIL

Extract/Purge Date: SEE BELOW  
Completion Date: SEE BELOW  
Analyst: LEWIS

LAB #: 8-7133\* 8-7136  
CLIENT'S ID: B13-25.5 B-13-35.5  
DATE COMPLETE: 08-Aug-88 05-Aug-88

COMPOUND	RESULT (ug/kg)	Detection Limit (ug/kg)	RESULT (ug/kg)	Detection Limit (ug/kg)
Dichlorodifluoromethane-----	N.D.	20	N.D.	2.0
Chloromethane-----	N.D.	20	N.D.	2.0
Vinyl Chloride-----	N.D.	20	N.D.	2.0
Bromomethane-----	N.D.	20	N.D.	2.0
Chloroethane-----	N.D.	20	N.D.	2.0
Trichlorofluoromethane-----	N.D.	20	N.D.	2.0
1,1-Dichloroethene-----	N.D.	50	0.8	0.5
Methylene Chloride-----	N.D.	50	N.D.	0.5
trans-1,2-Dichloroethene-----	N.D.	50	N.D.	0.5
1,1-Dichloroethane-----	N.D.	50	N.D.	0.5
Chloroform-----	N.D.	50	N.D.	0.5
1,1,1-Trichloroethane (TCA)----	160	50	N.D.	0.5
Carbon Tetrachloride-----	N.D.	50	N.D.	0.5
1,2-Dichloroethane (EDC)-----	140	50	N.D.	0.5
Trichloroethene (TCE)-----	N.D.	50	N.D.	0.5
1,2-Dichloropropane-----	N.D.	50	N.D.	0.5
Bromodichloromethane-----	N.D.	50	N.D.	0.5
2-Chloroethylvinyl ether-----	N.D.	50	N.D.	0.5
trans-1,3-Dichloropropene-----	N.D.	50	N.D.	0.5
cis-1,3-Dichloropropene-----	N.D.	50	N.D.	0.5
1,1,2-Trichloroethane-----	N.D.	50	N.D.	0.5
Tetrachloroethene-----	N.D.	50	N.D.	0.5
Dibromochloromethane-----	N.D.	50	N.D.	0.5
Chlorobenzene-----	N.D.	50	N.D.	0.5
Bromoform-----	N.D.	50	N.D.	0.5
1,1,2,2-Tetrachloroethane-----	N.D.	50	N.D.	0.5
1,3-Dichlorobenzene-----	N.D.	50	N.D.	0.5
1,4-Dichlorobenzene-----	N.D.	50	N.D.	0.5
1,2-Dichlorobenzene-----	N.D.	50	N.D.	0.5

QUALITY CONTROL DATA

Surrogate Spike	Percent Recovery	
Bromochloromethane	92%	91%
1,4-Dichlorobutane	108%	96%

N.D.: Not Detected

\* Dilution due to presence of hydrocarbons.

Analytical Supervisor

Report Date: 27-Sep-88  
 PACE JOB #: HLA 08144.03-L  
 Analytical Method: EPA 8010  
 MATRIX: SOIL

Extract/Purge Date: 09-Aug-88  
 Completion Date: 09-Aug-88  
 Analyst: LEWIS


LAB #: 8-7139  
 CLIENT'S ID: B21-15.5

COMPOUND	RESULT (ug/kg)	Detection Limit (ug/kg)
Dichlorodifluoromethane-----	N.D.	2.0
Chloromethane-----	N.D.	2.0
Vinyl Chloride-----	N.D.	2.0
Bromomethane-----	N.D.	2.0
Chloroethane-----	N.D.	2.0
Trichlorofluoromethane-----	N.D.	2.0
1,1-Dichloroethene-----	N.D.	0.5
Methylene Chloride-----	N.D.	0.5
trans-1,2-Dichloroethene-----	N.D.	0.5
1,1-Dichloroethane-----	N.D.	0.5
Chloroform-----	N.D.	0.5
1,1,1-Trichloroethane (TCA)-----	N.D.	0.5
Carbon Tetrachloride-----	N.D.	0.5
1,2-Dichloroethane (EDC)-----	0.7	0.5
Trichloroethene (TCE)-----	N.D.	0.5
1,2-Dichloropropane-----	N.D.	0.5
Bromodichloromethane-----	N.D.	0.5
2-Chloroethylvinyl ether-----	N.D.	0.5
trans-1,3-Dichloropropene-----	N.D.	0.5
cis-1,3-Dichloropropene-----	N.D.	0.5
1,1,2-Trichloroethane-----	N.D.	0.5
Tetrachloroethene-----	N.D.	0.5
Dibromochloromethane-----	N.D.	0.5
Chlorobenzene-----	N.D.	0.5
Bromoform-----	N.D.	0.5
1,1,2,2-Tetrachloroethane-----	N.D.	0.5
1,3-Dichlorobenzene-----	N.D.	0.5
1,4-Dichlorobenzene-----	N.D.	0.5
1,2-Dichlorobenzene-----	N.D.	0.5

QUALITY CONTROL DATA

Surrogate Spike                      Percent Recovery  
 Bromochloromethane                      68 %  
 1,4-Dichlorobutane                      85 %

N.D.: Not Detected

  
 Analytical Supervisor

REPORT OF LABORATORY ANALYSIS

Minneapolis, Minnesota  
Tampa, Florida  
Coralville, Iowa  
Novato, California

**pace**  
laboratories, inc.  
FORMERLY WESCO LABORATORIES

BLANK, SPIKE DUPLICATE AND SPIKE REPORT JOB #

HLA 08144.03-L

METHOD: EPA 8010

SAMPLE #: 8-7122, 8-7124, 8-7126

COMPOUND	Blank (ug/l)	Spike Duplicate % deviation	Spike % recovery
Dichlorodifluoromethane	N.D.	-	N.S.
Chloromethane	N.D.	-	N.S.
Vinyl Chloride	N.D.	-	N.S.
Bromomethane	N.D.	-	N.S.
Chloroethane	N.D.	-	N.S.
Trichlorofluoromethane	N.D.	-	N.S.
1,1-Dichloroethene	N.D.	-	N.S.
Methylene Chloride	N.D.	-	N.S.
trans-1,2-Dichloroethene	N.D.	-	N.S.
1,1-Dichloroethane (M.S.)	N.D.	3	104
Chloroform	N.D.	-	N.S.
1,1,1-Trichloroethane (TCA)	N.D.	-	N.S.
Carbon Tetrachloride	N.D.	-	N.S.
1,2-Dichloroethane (EDC)	N.D.	-	N.S.
Trichloroethene (TCE) (M.S.)	N.D.	6	100
1,2-Dichloropropane	N.D.	-	N.S.
Bromodichloromethane	N.D.	-	N.S.
2-Chloroethylvinyl ether	N.D.	-	N.S.
trans-1,3-Dichloropropene	N.D.	6	106
cis-1,3-Dichloropropene	N.D.	-	N.S.
1,1,2-Trichloroethane	N.D.	-	N.S.
Tetrachloroethene (M.S.)	N.D.	9	104
Dibromochloromethane	N.D.	-	N.S.
Chlorobenzene	N.D.	-	N.S.
Bromoform	N.D.	-	N.S.
1,1,2,2-Tetrachloroethane	N.D.	-	N.S.
1,3-Dichlorobenzene	N.D.	-	N.S.
1,4-Dichlorobenzene	N.D.	-	N.S.
1,2-Dichlorobenzene	N.D.	-	N.S.

QUALITY CONTROL DATA

Surrogate Spike % Recovery

Bromochloromethane	103 %	82 %	90%
1,4-Dichlorobutane	114 %	99 %	104%

N.D.: Not Detected

N.S.: Not Spiked

(Pg.1 of4)

FORMERLY WESCO LABORATORIES

BLANK, SPIKE DUPLICATE AND SPIKE REPORT JOB #

HLA 08144.03-L

METHOD : EPA 8010

SAMPLE #: 8-7130, 8-7131, 8-7133

COMPOUND	Blank (ug/l)	Spike Duplicate % deviation	Spike % recovery
Dichlorodifluoromethane	N.D.	-	N.S.
Chloromethane	N.D.	-	N.S.
Vinyl Chloride	N.D.	-	N.S.
Bromomethane	N.D.	-	N.S.
Chloroethane	N.D.	-	N.S.
Trichlorofluoromethane	N.D.	-	N.S.
1,1-Dichloroethene	N.D.	-	N.S.
Methylene Chloride	N.D.	-	N.S.
trans-1,2-Dichloroethene	N.D.	-	N.S.
1,1-Dichloroethane (M.S.)	N.D.	3	98
Chloroform	N.D.	-	N.S.
1,1,1-Trichloroethane (TCA)	N.D.	-	N.S.
Carbon Tetrachloride	N.D.	-	N.S.
1,2-Dichloroethane (EDC)	N.D.	-	N.S.
Trichloroethene (TCE) (M.S.)	N.D.	3	97
1,2-Dichloropropane	N.D.	-	N.S.
Bromodichloromethane	N.D.	-	N.S.
2-Chloroethylvinyl ether	N.D.	-	N.S.
trans-1,3-Dichloropropene	N.D.	4	100
cis-1,3-Dichloropropene	N.D.	-	N.S.
1,1,2-Trichloroethane	N.D.	-	N.S.
Tetrachloroethene (M.S.)	N.D.	1	100
Dibromochloromethane	N.D.	-	N.S.
Chlorobenzene	N.D.	-	N.S.
Bromoform	N.D.	-	N.S.
1,1,2,2-Tetrachloroethane	N.D.	-	N.S.
1,3-Dichlorobenzene	N.D.	-	N.S.
1,4-Dichlorobenzene	N.D.	-	N.S.
1,2-Dichlorobenzene	N.D.	-	N.S.

QUALITY CONTROL DATA

Surrogate Spike % Recovery

Bromochloromethane	85 %	81 %	97 %
1,4-Dichlorobutane	86 %	98 %	101 %

N.D.: Not Detected

N.S.: Not Spiked

REPORT OF LABORATORY ANALYSIS

Offices:  
 Minneapolis, Minnesota  
 Tampa, Florida  
 Coralville, Iowa  
 Novato, California

**pace**  
 laboratories, inc.  
 FORMERLY WESCO LABORATORIES

BLANK, SPIKE DUPLICATE AND SPIKE REPORT JOB # HLA 08144.03-L  
 METHOD : EPA 8010  
 SAMPLE #: 8-7128, 8-7136

COMPOUND	Blank (ug/l)	Spike Duplicate % deviation	Spike % recovery
Dichlorodifluoromethane	N.D.	-	N.S.
Chloromethane	N.D.	-	N.S.
Vinyl Chloride	N.D.	-	N.S.
Bromomethane	N.D.	-	N.S.
Chloroethane	N.D.	-	N.S.
Trichlorofluoromethane	N.D.	-	N.S.
1,1-Dichloroethene	N.D.	-	N.S.
Methylene Chloride	N.D.	-	N.S.
trans-1,2-Dichloroethene	N.D.	-	N.S.
1,1-Dichloroethane (M.S.)	N.D.	0	105
Chloroform	N.D.	-	N.S.
1,1,1-Trichloroethane (TCA)	N.D.	-	N.S.
Carbon Tetrachloride	N.D.	-	N.S.
1,2-Dichloroethane (EDC)	N.D.	-	N.S.
Trichloroethene (TCE) (M.S.)	N.D.	1	101
1,2-Dichloropropane	N.D.	-	N.S.
Bromodichloromethane	N.D.	-	N.S.
2-Chloroethylvinyl ether	N.D.	-	N.S.
trans-1,3-Dichloropropene	N.D.	6	106
cis-1,3-Dichloropropene	N.D.	-	N.S.
1,1,2-Trichloroethane	N.D.	-	N.S.
Tetrachloroethene (M.S.)	N.D.	4	98
Dibromochloromethane	N.D.	-	N.S.
Chlorobenzene	N.D.	-	N.S.
Bromoform	N.D.	-	N.S.
1,1,2,2-Tetrachloroethane	N.D.	-	N.S.
1,3-Dichlorobenzene	N.D.	-	N.S.
1,4-Dichlorobenzene	N.D.	-	N.S.
1,2-Dichlorobenzene	N.D.	-	N.S.

QUALITY CONTROL DATA

Surrogate Spike % Recovery			
Bromochloromethane	95 %	86 %	102
1,4-Dichlorobutane	94 %	100 %	101

N.D.: Not Detected  
 N.S.: Not Spiked



BLANK, SPIKE DUPLICATE AND SPIKE REPORT JOB #

HLA 08144.03-L

METHOD : EPA 8010

SAMPLE #: 8-7139

COMPOUND	Blank (ug/l)	Spike Duplicate % deviation	Spike % recovery
Dichlorodifluoromethane	N.D.	-	N.S.
Chloromethane	N.D.	-	N.S.
Vinyl Chloride	N.D.	-	N.S.
Bromomethane	N.D.	-	N.S.
Chloroethane	N.D.	-	N.S.
Trichlorofluoromethane	N.D.	-	N.S.
1,1-Dichloroethene	N.D.	-	N.S.
Methylene Chloride	N.D.	-	N.S.
trans-1,2-Dichloroethene	N.D.	-	N.S.
1,1-Dichloroethane (M.S.)	N.D.	3	99
Chloroform	N.D.	-	N.S.
1,1,1-Trichloroethane (TCA)	N.D.	-	N.S.
Carbon Tetrachloride	N.D.	-	N.S.
1,2-Dichloroethane (EDC)	N.D.	-	N.S.
Trichloroethene (TCE) (M.S.)	N.D.	7	98
1,2-Dichloropropane	N.D.	-	N.S.
Bromodichloromethane	N.D.	-	N.S.
2-Chloroethylvinyl ether	N.D.	-	N.S.
trans-1,3-Dichloropropene	N.D.	3	98
cis-1,3-Dichloropropene	N.D.	-	N.S.
1,1,2-Trichloroethane	N.D.	-	N.S.
Tetrachloroethene (M.S.)	N.D.	1	96
Dibromochloromethane	N.D.	-	N.S.
Chlorobenzene	N.D.	-	N.S.
Bromoform	N.D.	-	N.S.
1,1,2,2-Tetrachloroethane	N.D.	-	N.S.
1,3-Dichlorobenzene	N.D.	-	N.S.
1,4-Dichlorobenzene	N.D.	-	N.S.
1,2-Dichlorobenzene	N.D.	-	N.S.


QUALITY CONTROL DATA

Surrogate Spike % Recovery

Bromochloromethane	82 %	97 %	95%
1,4-Dichlorobutane	104 %	99 %	99%

N.D.: Not Detected

N.S.: Not Spiked

  
Analytical Supervisor

(Pg.4 of 4

Report Date: 28-Oct-88  
 PACE JOB #: HLA 08144.03  
 Analytical Method: EPA 3550/8015  
 MATRIX: SOIL

Extract/Purge Date: 03-Aug-88  
 Completion Date: 04-Aug-88  
 Analyst: CLARK

LAB #	CLIENT ID	Total Petroleum Hydrocarbons (heavy) (mg/kg)	Quantified As	Detection Limit (mg/kg)
8-7122	B21-21.5	N.D.		10
8-7124	B21-25.5	N.D.		10
8-7126	B21-30.0	N.D.		10
8-7130	B13-15.5	N.D.		10
8-7133	B13-25.5	N.D.		10
8-7135	B13-29.5	N.D.		10
8-7139	B21-15.5	N.D.		10

QUALITY CONTROL DATA

PACE JOB #: HLA 08144.03-L

COMPOUND	Blank (mg/l)	Spike Duplicate % deviation	Spike % recovery
Diesel	N.D.	11	89

N.D.: Not Detected



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 Analytical Supervisor

Report Date: 28-Oct-88 Extract/Purge: 03-AUG-88  
 PACE JOB #: HLA 08144.03-L Completion Date: 04-AUG-88  
 Analytical Method: 3550/8015 Analyst: CLARK  
 MATRIX: SOIL

LAB #	CLIENT ID	Total Petroleum Hydrocarbons (heavy) (mg/kg)	Calibration Standard	Identifiable as	Detection limit (mg/kg)
8-7131	B13-20.5	N.D.	N.A.	N.I.	10

QUALITY CONTROL DATA

PACE JOB #: HLA 08144.03-L

COMPOUND	Blank mg/l	Spike Duplicate % deviation	Spike % recovery
Diesel	N.D.	11	89

N.D.: Not Detected  
 N.A.: Not Applicable  
 N.I.: Not Identified



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 Analytical Supervisor

Report date: 28-Oct-88  
 PACE JOB #: HLA 08144.03-L  
 Analytical Method: EPA 5030/8015  
 MATRIX: SOIL

Extract/Purge Date: SEE BELOW  
 Completion Date: SEE BELOW  
 Analyst: ATTIA

LAB #: 8-7122 CLIENT'S ID: B21-21.5  
 DATE COMPLETE: 29-Jul-88

COMPOUND	RESULT (ug/kg)	Detection Limit (ug/kg)
Total Petroleum Hydrocarbons (light)---	260,000	50,000

QUALITY CONTROL DATA Surrogate Spike % Recovery  
 Fluorobenzene 125 % M.I.

LAB #: 8-7124 CLIENT'S ID: B21-25.5  
 DATE COMPLETE: 01-Aug-88

COMPOUND	RESULT (ug/kg)	Detection Limit (ug/kg)
Total Petroleum Hydrocarbons (light)---	16,000	2,500


QUALITY CONTROL DATA Surrogate Spike % Recovery  
 Fluorobenzene 123 % M.I.

LAB #: 8-7126 CLIENT'S ID: B21-30.0  
 DATE COMPLETE: 29-Jul-88

COMPOUND	RESULT (ug/kg)	Detection Limit (ug/kg)
Total Petroleum Hydrocarbons (light)---	N.D.	50.0

QUALITY CONTROL DATA Surrogate Spike % Recovery  
 Fluorobenzene 100 %

N.D.: Not Detected  
 M.I. : Matrix Interference

  
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 Analytical Supervisor

Report date: 28-Oct-88  
PACE JOB #: HLA 08144.03-L  
Analytical Method: EPA 5030/8015  
MATRIX: SOIL

Extract/Purge Date: 02-Aug-88  
Completion Date: 02-Aug-88  
Analyst: ATTIA

LAB #: 8-7130 CLIENT'S ID: B13-15.5

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COMPOUND	RESULT (ug/kg)	Detection Limit(ug/kg)
Total Petroleum Hydrocarbons (light)---	2,100	500

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QUALITY CONTROL DATA Surrogate Spike % Recovery  
Fluorobenzene 103 %

LAB #: 8-7131 CLIENT'S ID: B13-20.5

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COMPOUND	RESULT (ug/kg)	Detection Limit(ug/kg)
Total Petroleum Hydrocarbons (light)---	470,000	50,000

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QUALITY CONTROL DATA Surrogate Spike % Recovery  
Fluorobenzene 91 %

LAB #: 8-7133 CLIENT'S ID: B13-25.5


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COMPOUND	RESULT (ug/kg)	Detection Limit(ug/kg)
Total Petroleum Hydrocarbons (light)---	4,600,000	250,000

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QUALITY CONTROL DATA Surrogate Spike % Recovery  
Fluorobenzene 126 % M.I.

N.D.: Not detected  
M.I.: Matrix Interference

  
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Analytical Supervisor

Report date: 28-Oct-88  
 PACE JOB #: HLA 08144.03-L  
 Analytical Method: EPA 5030/8015  
 MATRIX: SOIL

Extract/Purge Date: SEE BELOW  
 Completion Date: SEE BELOW  
 Analyst: ATTIA

LAB #: 8-7135  
 DATE COMPLETED: 02-Aug-88

CLIENT'S ID: B13-29.5

COMPOUND	RESULT (ug/kg)	Detection Limit (ug/kg)
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Total Petroleum Hydrocarbons (light)---	11,000	2,000
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QUALITY CONTROL DATA	Surrogate Spike % Recovery
Fluorobenzene	99 %

LAB #: 8-7136  
 DATE COMPLETED: 02-Aug-88

CLIENT'S ID: B13-35.5

COMPOUND	RESULT (ug/kg)	Detection Limit (ug/kg)
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Total Petroleum Hydrocarbons (light)---	320	50.0
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QUALITY CONTROL DATA	Surrogate Spike % Recovery
Fluorobenzene	110 %

LAB #: 8-7139  
 DATE COMPLETED: 02-Aug-88

CLIENT'S ID: B21-15.5

COMPOUND	RESULT (ug/kg)	Detection Limit (ug/kg)
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Total Petroleum Hydrocarbons (light)---	230	50.0
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QUALITY CONTROL DATA	Surrogate Spike % Recovery
Fluorobenzene	94 %

N.D.; Not detected

  
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 Analytical Supervisor

FORMERLY WESCO LABORATORIES

QUALITY CONTROL DATA

METHOD: EPA 5030/8015 PACE JOB #: HLA 08144.03-L  
SAMPLE #: 8-7122, 8-7126

COMPOUND	Blank ug/l	Spike Duplicate % deviation	Spike % recovery
Gasoline-----	N.D.	14	115

QUALITY CONTROL DATA

Surrogate Spike % Recovery  
Fluorobenzene 81 % 119 % 113 %

QUALITY CONTROL DATA

METHOD: EPA 5030/8015 PACE JOB #: HLA 08144.03-L  
SAMPLE #: 8-7124

COMPOUND	Blank ug/l	Spike Duplicate % deviation	Spike % recovery
Gasoline-----	N.D.	2	98

QUALITY CONTROL DATA

Surrogate Spike % Recovery  
Fluorobenzene 94 % 100 % 103 %

FORMERLY WESCO LABORATORIES

QUALITY CONTROL DATA (cont.)

QUALITY CONTROL DATA

METHOD: EPA 5030/8015 PACE JOB #: HLA 08144.03-L  
SAMPLE #: 8-7130, 8-7131, 8-7133, 8-7135, 8-7139

COMPOUND	Blank ug/l	Spike Duplicate % deviation	Spike % recovery
Gasoline-----	N.D.	3	126

QUALITY CONTROL DATA

Surrogate Spike % Recovery  
Fluorobenzene 78 % 108 % 94 %

QUALITY CONTROL DATA

METHOD: EPA 5030/8015 PACE JOB #: HLA 08144.03-L  
SAMPLE #: 8-7136

COMPOUND	Blank ug/l	Spike Duplicate % deviation	Spike % recovery
Gasoline-----	N.D.	1	90

QUALITY CONTROL DATA

Surrogate Spike % Recovery  
Fluorobenzene 73 % 106 % 104 %

N.D.; Not detected



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Analytical Supervisor



Report Date: 28-Oct-88  
PACE JOB #: HLA 08144.03-L  
Analytical Method: EPA 8020  
MATRIX: SOIL

Extract/Purge Date: SEE BELOW  
Completion Date: SEE BELOW  
Analyst: LEWIS

LAB #:	8-7123	807125
CLIENT'S ID:	B21-22.0	B21-26.0
DATE COMPLETE:	08-Aug-88	08-Aug-88

COMPOUND	RESULT (ug/kg)	Detection Limit (ug/kg)	RESULT (ug/kg)	Detection Limit (ug/kg)
Benzene-----	9,800	200	3,900	10
Toluene-----	52,000	200	3,300	10
Chlorobenzene-----	N.D.	200	N.D.	10
Ethylbenzene-----	19,000	200	310	10
Xylene-----	120,000	200	1,000	10
1,3-Dichlorobenzene-----	N.D.	200	N.D.	10
1,4-Dichlorobenzene-----	N.D.	200	N.D.	10
1,2-Dichlorobenzene-----	N.D.	200	N.D.	10

QUALITY CONTROL DATA

Surrogate Spike	Percent Recovery	
Fluorobenzene	97 %	98 %

LAB #:	8-7127	8-7130
CLIENT'S ID:	B21-30.5	B13-15.5
DATE COMPLETE:	04-Aug-88	04-Aug-88

COMPOUND	RESULT (ug/kg)	Detection Limit (ug/kg)	RESULT (ug/kg)	Detection Limit (ug/kg)
Benzene-----	2.4	0.2	250	0.2
Toluene-----	2.4	0.2	120	0.2
Chlorobenzene-----	N.D.	0.2	N.D.	0.2
Ethylbenzene-----	N.D.	0.2	4.8	0.2
Xylene-----	1.8	0.2	36	0.2
1,3-Dichlorobenzene-----	N.D.	0.2	N.D.	0.2
1,4-Dichlorobenzene-----	N.D.	0.2	N.D.	0.2
1,2-Dichlorobenzene-----	N.D.	0.2	N.D.	0.2

QUALITY CONTROL DATA

Surrogate Spike	Percent Recovery	
Fluorobenzene	89 %	92 %

N.D.: Not detected

  
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Analytical Supervisor

FORMERLY WESCO LABORATORIES

Report Date: 04-Jan-89 (23-Aug-88)  
PACE JOB #: HLA 08144.03-L  
Analytical Method: EPA 8020  
MATRIX: SOIL

Extract/Purge Date: SEE BELOW  
Completion Date: SEE BELOW  
Analyst: LEWIS

LAB #:	8-7132	8-7134
CLIENT'S ID:	B13-21.0	B13--26.0
DATE COMPLETE:	04-Aug-88	04-Aug-88

COMPOUND	RESULT (ug/kg)	Detection Limit (ug/kg)	RESULT (ug/kg)	Detection Limit (ug/kg)
Benzene-----	50,000	100	85,000	500
Toluene-----	110,000	100	630,000	500
Chlorobenzene-----	N.D.	100	N.D.	500
Ethylbenzene-----	1,000	100	140,000	500
Xylene-----	460,000	100	820,000	500
1,3-Dichlorobenzene-----	N.D.	100	N.D.	500
1,4-Dichlorobenzene-----	N.D.	100	N.D.	500
1,2-Dichlorobenzene-----	N.D.	100	N.D.	500

QUALITY CONTROL DATA

Surrogate Spike	Percent Recovery	
Fluorobenzene	141 % M.I.	85 %


LAB #:	8-7139
CLIENT'S ID:	B21-15.5
DATE COMPLETE:	09-Aug-88

COMPOUND	RESULT (ug/kg)	Detection Limit (ug/kg)
Benzene-----	180	0.2
Toluene-----	4.9	0.2
Chlorobenzene-----	N.D.	0.2
Ethylbenzene-----	0.9	0.2
Xylene-----	66	0.2
1,3-Dichlorobenzene-----	N.D.	0.2
1,4-Dichlorobenzene-----	N.D.	0.2
1,2-Dichlorobenzene-----	N.D.	0.2

QUALITY CONTROL DATA

Surrogate Spike	Percent Recovery	
Fluorobenzene	94 %	

N.D.: Not detected  
M.I.: Matrix Interference

  
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Analytical Supervisor

QUALITY CONTROL DATA

METHOD: EPA 8020

PACE JOB#: HLA 08144.03-L

SAMPLE #: 8-7123, 8-7125

COMPOUND	Blank (ug/l)	Spike Duplicate % deviation	Spike % recovery
Benzene	N.D.	10	99
Toluene	N.D.	11	96
p-Xylene	N.D.	5	100

QUALITY CONTROL DATA

Surrogate Spike % Recovery

Fluorobenzene 98 % 96 % 99%

QUALITY CONTROL DATA

METHOD: EPA 8020

PACE JOB#: HLA 08144.03-L

SAMPLE #: 8-7127, 8-7132, 8-7134

COMPOUND	Blank (ug/l)	Spike Duplicate % deviation	Spike % recovery
Benzene	N.D.	1	96
Toluene	N.D.	2	96
p-Xylene	N.D.	0	99

QUALITY CONTROL DATA

Surrogate Spike % Recovery

Fluorobenzene 96 % 98 % 97

QUALITY CONTROL DATA (cont.)

QUALITY CONTROL DATA

METHOD: EPA 8020

PACE JOB#: HLA 08144.03-L

SAMPLE #: 8-7139

COMPOUND	Blank (ug/l)	Spike Duplicate % deviation	Spike % recovery
Benzene	N.D.	1	89
Toluene	N.D.	1	95
p-Xylene	N.D.	1	100

QUALITY CONTROL DATA

Surrogate Spike % Recovery

Fluorobenzene 39 % 95 % 98

QUALITY CONTROL DATA

METHOD: EPA 8020

PACE JOB#: HLA 08144.03-L

SAMPLE #: 8-7130

COMPOUND	Blank (ug/l)	Spike Duplicate % deviation	Spike % recovery
Benzene	N.D.	10	99
Toluene	N.D.	11	96
p-Xylene	N.D.	5	100

QUALITY CONTROL DATA

Surrogate Spike % Recovery

Fluorobenzene 98 % 96 % 99%

N.D.: Not detected

  
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Analytical Supervisor

Report Date: 28-Oct-88  
PACE JOB #: HLA 08144.03-L  
Analytical Method: SEE BELOW  
MATRIX: SOIL

Extract/Purge Date: 04-Aug-88  
Analysis Completion 04-Aug-88  
Analyst: WALKER

LAB #	CLIENT ID	LEAD Pb (mg/kg)
8-7124	B21-25.5	N.D.
8-7133	B13-25.5	1.98

Detection Limit Method 1.00  
EPA 7420

QUALITY CONTROL DATA PACE JOB #:HLA 08144.03-L

COMPOUND	Blank (mg/l)	Spike Duplicate % deviation	Spike % recovery
LEAD	N.D.	6	89



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Analytical Supervisor

Report Date: 22-Aug-88  
 PACE JOB #: HLA 08144.03-L  
 Analytical Method: EPA 8010  
 MATRIX: WATER

Extract/Purge Date: 05-Aug-88  
 Completion Date: 05-Aug-88  
 Analyst: LEWIS


LAB #: 8-7128  
 CLIENT'S ID: 300002

COMPOUND	RESULT (ug/l)	Detection Limit (ug/l)
Dichlorodifluoromethane-----	13	2.0
Chloromethane-----	N.D.	2.0
Vinyl Chloride-----	N.D.	2.0
Bromomethane-----	N.D.	2.0
Chloroethane-----	N.D.	2.0
Trichlorofluoromethane-----	N.D.	2.0
1,1-Dichloroethene-----	0.7	0.5
Methylene Chloride-----	0.6	0.5
trans-1,2-Dichloroethene-----	N.D.	0.5
1,1-Dichloroethane-----	N.D.	0.5
Chloroform-----	N.D.	0.5
1,1,1-Trichloroethane (TCA)-----	N.D.	0.5
Carbon Tetrachloride-----	N.D.	0.5
1,2-Dichloroethane (EDC)-----	44	0.5
Trichloroethene (TCE)-----	N.D.	0.5
1,2-Dichloropropane-----	N.D.	0.5
Bromodichloromethane-----	N.D.	0.5
2-Chloroethylvinyl ether-----	N.D.	0.5
trans-1,3-Dichloropropene-----	N.D.	0.5
cis-1,3-Dichloropropene-----	N.D.	0.5
1,1,2-Trichloroethane-----	N.D.	0.5
Tetrachloroethene-----	N.D.	0.5
Dibromochloromethane-----	N.D.	0.5
Chlorobenzene-----	1.0	0.5
Bromoform-----	N.D.	0.5
1,1,2,2-Tetrachloroethane-----	N.D.	0.5
1,3-Dichlorobenzene-----	N.D.	0.5
1,4-Dichlorobenzene-----	N.D.	0.5
1,2-Dichlorobenzene-----	N.D.	0.5

QUALITY CONTROL DATA

Surrogate Spike	Percent Recovery
Bromochloromethane	86 %
1,4-Dichlorobutane	103 %

N.D.: Not Detected

  
 -----  
 Analytical Supervisor

Report Date: 28-Oct-88 Extract/Purge Date: 08-Aug-88  
 PACE JOB #: HLA 08144.03-L Completion Date: 08-Aug-88  
 Analytical Method: EPA 5030/8015/602 Analyst: ATTIA  
 MATRIX: WATER

LAB #: 8-7128 CLIENT'S ID: 300002

COMPOUND	RESULT (ug/l)	Detection Limit (ug/l)
Benzene-----	8,800	2.5
Toluene-----	11,000	2.5
Ethylbenzene-----	990	2.5
Xylene-----	4,600	2.5
Total Petroleum Hydrocarbons (light)---	44,000*	25,000


QUALITY CONTROL DATA  
 Surrogate Spike % Recovery  
 Fluorobenzene 97 %

QUALITY CONTROL DATA  
 METHOD: EPA 5030/8015/602 PACE JOB #:HLA 08144.03-L

COMPOUND	Blank ug/l	Spike Duplicate % deviation	Spike % recovery
Benzene-----	N.D.	3	94
Toluene-----	N.D.	2	95
p-Xylene-----	N.D.	4	95
Gasoline-----	N.D.	10	94

QUALITY CONTROL DATA  
 Surrogate Spike % Recovery  
 Fluorobenzene 88 % 97 % 97%

N.D.: Not Detected  
 \*: TPH quantified at 50 times dilution.

  
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 Analytical Supervisor



Harding Lawson Associates  
 7655 Redwood Blvd.  
 P.O. Box 578  
 Novato, CA 94948  
 (415) 892-0821

### CHAIN OF CUSTODY FORM

HLA 08144.03-L

page 1 of 2

Job Number: 9382.030.02

Name/Location: City of Oakland

Project Manager: David F. Leland

Samplers: R. Stolzman

Recorder: Robert A. Stolzman  
(Signature Required)

SOURCE CODE	MATRIX				#CONTAINERS & PRESERV.				SAMPLE NUMBER OR LAB NUMBER				DATE			
	Water	Sediment	Soil	Oil	Unpres.	H <sub>2</sub> SO <sub>4</sub>	HNO <sub>3</sub>		Yr	Wk	Seq	Yr	Mo	Dy	Time	
50		X			1				88	21	-21	5	88	07	27	1445
		X			1				88	21	-22	0				1445
		X			1				88	21	-25	5				1500
		X			1				88	21	-26	0				1500
		X			1				88	21	-30	0				1520
		X			1				88	21	-30	5				1520
10	X				3				88	30	0000	2				1030

STATION DESCRIPTION/NOTES

ANALYSIS REQUESTED											
X	X	X	X					X	X	X	X
	X										
X								X	X		
	X										
X								X			
	X										
X									X	X	X

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

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	RECEIVED FOR LAB BY: (Signature)
Robert A. Stolzman	7/27/88 1800	Jontay 7/27/88 6pm
METHOD OF SHIPMENT		



7655 Redwood Blvd.  
P.O. Box 578  
Novato, CA 94948  
(415) 892-0821

# CHAIN OF CUSTODY FORM

HLA 08144.03 L

page 2 of 2

Job Number: 9382.030.02  
Name/Location: City of Oakland  
Project Manager: David F. Leland

Samplers: R. Stolzman  
Recorder: Robert A. Stolzman  
(Signature Required)

SOURCE CODE	MATRIX				#CONTAINERS & PRESERV.			SAMPLE NUMBER OR LAB NUMBER			DATE						
	Water	Sediment	Soil	Oil	Unpres.	H <sub>2</sub> SO <sub>4</sub>	HNO <sub>3</sub>	Yr	Wk	Seq	Yr	Mo	Dy	Time			
50		X			1			8	13	-15	.5	8	8	07	27	08	25
		X			1			8	13	-20	.5					08	45
		X			1			8	13	-21	.0					08	45
		X			1			8	13	-25	.5					09	00
		X			1			8	13	-26	.0					09	00
		X			1			8	13	-29	.5					09	30
		X			1			8	13	-35	.5					10	00
		X			1			8	21	-05	.5					13	45
		X			1			8	21	-10	.5					14	00
		X			1			8	21	-15	.5					14	20

STATION DESCRIPTION/NOTES

HOLD

HOLD

HOLD

ANALYSIS REQUESTED										
EPA 601/8010	EPA 602/8020	EPA 624/8240	EPA 625/8270	Priority Pllnt. Metals	Benzene/Toluene/Xylene	Total Petrol. Hydrocarb.	TPH-Lithy by EOL	Lead		
X	X						X	X		
X	X	X					X	X		
X										
X										
							X			
X										

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

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	RECEIVED FOR LAB BY: (Signature) DATE/TIME
<u>Robert A. Stolzman</u>	<u>7-27-88 1600</u>	<u>C. Ponting</u> <u>7/27 6pm</u>
METHOD OF SHIPMENT		

Report date: August 25, 1988  
Client: Harding Lawson Associates  
200 Rush Landing Road  
Novato, CA 94947  
Attn.: D. Leland

Pace job #: HLA 0814404-L

Date sampled: July 28, 1988  
Sampled by: R. Stolzman

Site: City of Oakland

Date received: July 29, 1988  
Submitted by: R. Stolzman

P.O.: 9382.030.02

Lab #	Client ID	Matrix	Analysis
8- 7160	B20-06.0	soil	
8- 7161	B20-10.5	soil	
8- 7162	B20-11.0	soil	
8- 7163	B20-15.5	soil	Purg. Halocarbons 8010
8- 7163	B20-15.5	soil	Diesel 3550/8015
8- 7163	B20-15.5	soil	TPH light only 5030/8015
8- 7164	B20-16.0	soil	Purg. Aromatics 8020
8- 7164	B20-16.0	soil	GC/MS Extr. Org. 8270 (5 d.rus
8- 7165	B20-20.0	soil	Purg. Halocarbons 8010
8- 7165	B20-20.0	soil	Diesel 3550/8015
8- 7165	B20-20.0	soil	TPH light only 5030/8015
8- 7166	B20-20.5	soil	Purg. Aromatics 8020
8- 7167	B20-25.0	soil	Purg. Halocarbons 8010
8- 7167	B20-25.0	soil	Diesel 3550/8015
8- 7167	B20-25.0	soil	TPH light only 5030/8015
8- 7168	B20-25.5	soil	Purg. Aromatics 8020
8- 7168	B20-25.5	soil	Lead 7420
8- 7159	B21-35.5	soil	

Report date: August 25, 1988  
Client: Harding Lavson Associates  
200 Rush Landing Road  
Novato, CA 94947  
Attn.: D. Leland

Pace job #: HLA 0814404-L

Date sampled: July 28, 1988  
Sampled by: R. Stolzman

Site: City of Oakland

Date received: July 29, 1988  
Submitted by: R. Stolzman

P.O.: 9382.030.02

Lab #	Client ID	Matrix	Analysis
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Dear Client,

No problems were encountered with the analysis of your samples. We will store samples for 30 days after the report date. The samples will be returned to the client after the 30-day period, unless other arrangements are made. If you have any questions, please feel free to call, (415)883-6100.

*C. Santay*  
-----  
Sample Controller

Report Date: 25-Aug-88  
 PACE JOB #: HLA 08144.07-L  
 Analytical Method: EPA 7000 SERIES  
 MATRIX: SEE BELOW

Extract/Purge Date: SEE BELOW  
 Analysis Completion: SEE BELOW  
 Analyst: WALKER

LAB #	CLIENT ID	LEAD Pb (mg/kg)	LEAD Pb (mg/l)
DATE COMPLETED:		09-AUG-88	09-AUG-88
MATRIX:		SOIL	WATER
8-7320	B7-30.5	1.87	-
8-7339	310002	-	0.62

DETECTION LIMIT: 2.00 0.10  
 METHOD #: EPA 7420 EPA 7420

QUALITY CONTROL DATA

PACE JOB #: HLA 08144.07-L

COMPOUND	Blank (mg/l)	Spike Duplicate % deviation	Spike % recovery
LEAD (SOIL)	N.D.	1	108
LEAD (WATER)	N.D.	1	108



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 Analytical Supervisor

Report Date: 24-Aug-88  
 PACE JOB #: HLA 08144.04-L  
 Analytical Method: EPA 8010  
 MATRIX: WATER

Extract/Purge Date: 11-Aug-88  
 Completion Date: 11-Aug-88  
 Analyst: ATTIA

LAB #:	8-7177	8-7179	8-7181	
CLIENT'S ID:	300003	300004	300005	
COMPOUND	RESULT (ug/l)	RESULT (ug/l)	RESULT (ug/l)	Detection Limit (ug/l)
Dichlorodifluoromethane	N.D.	3.5	13	2.0
Chloromethane	N.D.	N.D.	N.D.	2.0
Vinyl Chloride	N.D.	N.D.	N.D.	2.0
Bromomethane	N.D.	N.D.	N.D.	2.0
Chloroethane	N.D.	N.D.	N.D.	2.0
Trichlorofluoromethane	N.D.	N.D.	N.D.	2.0
1,1-Dichloroethene	63	0.9	11	0.5
Methylene Chloride	1.3	2.1	5.8	0.5
trans-1,2-Dichloroethene	N.D.	N.D.	N.D.	0.5
1,1-Dichloroethane	25	N.D.	6.3	0.5
Chloroform	0.5	N.D.	N.D.	0.5
1,1,1-Trichloroethane (TCA)	0.9	N.D.	N.D.	0.5
Carbon Tetrachloride	N.D.	N.D.	N.D.	0.5
1,2-Dichloroethane (EDC)	10	62	29	0.5
Trichloroethene (TCE)	16	N.D.	1.5	0.5
1,2-Dichloropropane	N.D.	N.D.	N.D.	0.5
Bromodichloromethane	N.D.	N.D.	N.D.	0.5
2-Chloroethylvinyl ether	N.D.	N.D.	N.D.	0.5
trans-1,3-Dichloropropene	N.D.	N.D.	N.D.	0.5
cis-1,3-Dichloropropene	N.D.	N.D.	N.D.	0.5
1,1,2-Trichloroethane	1.7	N.D.	N.D.	0.5
Tetrachloroethene	N.D.	N.D.	N.D.	0.5
Dibromochloromethane	N.D.	N.D.	N.D.	0.5
Chlorobenzene	N.D.	N.D.	N.D.	0.5
Bromoform	N.D.	N.D.	N.D.	0.5
1,1,2,2-Tetrachloroethane	N.D.	N.D.	N.D.	0.5
1,3-Dichlorobenzene	N.D.	N.D.	N.D.	0.5
1,4-Dichlorobenzene	N.D.	N.D.	N.D.	0.5
1,2-Dichlorobenzene	N.D.	N.D.	N.D.	0.5

**QUALITY CONTROL DATA**

Surrogate Spike	Percent Recovery		
Bromochloromethane	91%	92%	99%
1,4-Dichlorobutane	94%	89%	90%

N.D.: Not Detected

*Attia*

Analytical Supervisor

FORMERLY WESCO LABORATORIES  
Report Date: 24-Aug-88  
PACE JOB #: NLA 08144.04-L  
Analytical Method: EPA 8010  
MATRIX: SOIL

Extract/Purge Date: 08-Aug-88  
Completion Date: 08-Aug-88  
Analyst: ATTIA

CLIENT'S ID:	0-7163 020-15.5	0-7165 020-20.0	0-7167 020-25.0	0-7171 017-15.5	Detection Limit (ug/kg)
POUND	RESULT (ug/kg)	RESULT (ug/kg)	RESULT (ug/kg)	RESULT (ug/kg)	
Chlorodifluoromethane-----	N.D.	N.D.	N.D.	N.D.	2.0
Chloromethane-----	N.D.	N.D.	N.D.	N.D.	2.0
Methyl Chloride-----	N.D.	N.D.	N.D.	N.D.	2.0
Bromoethane-----	N.D.	N.D.	N.D.	N.D.	2.0
Chloroethane-----	N.D.	N.D.	N.D.	N.D.	2.0
Dichlorofluoromethane-----	N.D.	N.D.	N.D.	N.D.	0.5
1,1-Dichloroethene-----	N.D.	N.D.	N.D.	N.D.	0.5
Ethylene Chloride-----	0.8	2.0	2.1	3.0	0.5
trans-1,2-Dichloroethene-----	N.D.	N.D.	N.D.	N.D.	0.5
1,1-Dichloroethane-----	N.D.	N.D.	N.D.	N.D.	0.5
Chloroform-----	N.D.	N.D.	N.D.	N.D.	0.5
1,1,1-Trichloroethane (TCA)-----	N.D.	N.D.	N.D.	N.D.	0.5
Carbon Tetrachloride-----	N.D.	N.D.	N.D.	N.D.	0.5
1,2-Dichloroethane (EDC)-----	N.D.	N.D.	5.3	N.D.	0.5
Dichloroethene (TCE)-----	N.D.	N.D.	N.D.	N.D.	0.5
1,2-Dichloropropane-----	N.D.	N.D.	N.D.	N.D.	0.5
Bromodichloroethane-----	N.D.	N.D.	N.D.	N.D.	0.5
Chloroethylvinyl ether-----	N.D.	N.D.	N.D.	N.D.	0.5
trans-1,3-Dichloropropene-----	N.D.	N.D.	N.D.	N.D.	0.5
cis-1,3-Dichloropropene-----	N.D.	N.D.	N.D.	N.D.	0.5
1,1,2-Trichloroethane-----	N.D.	N.D.	N.D.	N.D.	0.5
Tetrachloroethene-----	N.D.	N.D.	N.D.	N.D.	0.5
Bromochloroethane-----	N.D.	N.D.	N.D.	N.D.	0.5
Chlorobenzene-----	N.D.	N.D.	N.D.	N.D.	0.5
Bromoform-----	N.D.	N.D.	N.D.	N.D.	0.5
1,1,1,2-Tetrachloroethane-----	N.D.	N.D.	N.D.	N.D.	0.5
1,3-Dichlorobenzene-----	N.D.	N.D.	N.D.	N.D.	0.5
1,4-Dichlorobenzene-----	N.D.	N.D.	N.D.	N.D.	0.5
1,2-Dichlorobenzene-----	N.D.	N.D.	N.D.	N.D.	0.5

QUALITY CONTROL DATA

Surrogate Spike	Percent Recovery	03 %	99 %	100 %	00 %
Bromochloroethane		87 %	93 %	97 %	88 %
1,4-Dichlorobutane					

N.D.: Not Detected

*ATTIA*  
Analytical Supervisor

LINK, SPIKE DUPLICATE AND SPIKE REPORT JOB # MLA 08144.04-L  
 METHOD: EPA 8010  
 SAMPLE #: B-7163, B-7165, B-7167, B-7171, B-7175, B-7176

POUND	Blank (ug/l)	Spike Duplicate % deviation	Spike % recovery
Chlorodifluoromethane	N.D.	-	N.S.
Chloroethane	N.D.	-	N.S.
Vinyl Chloride	N.D.	-	N.S.
Chloroethane	N.D.	-	N.S.
Chloroethane	N.D.	-	N.S.
Dichlorofluoromethane	N.D.	-	N.S.
1,1-Dichloroethene	N.D.	-	N.S.
Ethylene Chloride	N.D.	-	N.S.
trans-1,2-Dichloroethene	N.D.	-	103
1,1-Dichloroethane (H.S.)	N.D.	8	N.S.
Chloroform	N.D.	-	N.S.
1,1,1-Trichloroethane (TCA)	N.D.	-	N.S.
Carbon Tetrachloride	N.D.	-	100
1,2-Dichloroethane (EDC)	N.D.	4	N.S.
Dichloroethene (TCE) (H.S.)	N.D.	-	N.S.
1,2-Dichloropropane	N.D.	-	N.S.
Bromodichloromethane	N.D.	-	N.S.
Chloroethylvinyl ether	N.D.	-	97
trans-1,3-Dichloropropene	N.D.	1	N.S.
cis-1,3-Dichloropropene	N.D.	-	N.S.
1,1,2-Trichloroethane	N.D.	-	100
Tetrachloroethene (H.S.)	N.D.	5	N.S.
Dibromochloroethane	N.D.	-	N.S.
Chlorobenzene	N.D.	-	N.S.
Bromoform	N.D.	-	N.S.
1,1,1,2-Tetrachloroethane	N.D.	-	N.S.
1,3-Dichlorobenzene	N.D.	-	N.S.
1,4-Dichlorobenzene	N.D.	-	N.S.
1,2-Dichlorobenzene	N.D.	-	N.S.

**QUALITY CONTROL DATA**

Surrogate Spike % Recovery			
Bromo-chloromethane	88 %	96 %	98 %
1,4-Dichlorobutane	94 %	94 %	94 %

N.D.: Not Detected  
 N.S.: Not Spiked

*[Signature]*  
 Analytical Supervisor

FORMERLY WESCO LABORATORIES

BLANK, SPIKE DUPLICATE AND SPIKE REPORT JOB # NLA 06144.04-L  
METHOD : EPA 8010  
SAMPLE 010-7177, 0-7179, 0-7181

COMPOUND	Blank (ug/l)	Spike Duplicate % deviation	Spike % recovery
Dichlorodifluoroethane	N.D.	-	N.S.
Chloroethane	N.D.	-	N.S.
Methyl Chloride	N.D.	-	N.S.
Bromoethane	N.D.	-	N.S.
Chloroethane	N.D.	-	N.S.
Trichlorofluoroethane	N.D.	-	N.S.
1,1-Dichloroethene	N.D.	-	N.S.
Methylene Chloride	N.D.	-	N.S.
trans-1,2-Dichloroethene	N.D.	-	N.S.
1,1-Dichloroethane (N.S.)	N.D.	3	108
Chloroform	N.D.	-	N.S.
1,1,1-Trichloroethane (TCA)	N.D.	-	N.S.
Carbon Tetrachloride	N.D.	-	N.S.
1,2-Dichloroethane (EDC)	N.D.	-	N.S.
Trichloroethene (TCE) (N.S.)	N.D.	2	101
1,2-Dichloropropane	N.D.	-	N.S.
1,1-Dichloroethane	N.D.	-	N.S.
2-Chloroethylvinyl ether	N.D.	-	N.S.
trans-1,3-Dichloropropene	N.D.	0	102
cis-1,3-Dichloropropene	N.D.	-	N.S.
1,1,2-Trichloroethane	N.D.	-	N.S.
Tetrachloroethene (N.S.)	N.D.	1	107
Bromochloroethane	N.D.	-	N.S.
Chlorobenzene	N.D.	-	N.S.
Bromoform	N.D.	-	N.S.
1,1,2,2-Tetrachloroethane	N.D.	-	N.S.
1,3-Dichlorobenzene	N.D.	-	N.S.
1,4-Dichlorobenzene	N.D.	-	N.S.
1,2-Dichlorobenzene	N.D.	-	N.S.

QUALITY CONTROL DATA

Surrogate Spike % Recovery			
Bromochloroethane	105 %	100 %	105 %
1,4-Dichlorobutane	102 %	100 %	104 %

N.D.: Not Detected  
N.S.: Not Spiked

*A. H. Holt*  
Analytical Supervisor



BLANK, SPIKE DUPLICATE AND SPIKE REPORT JOB # **MLA 08144.04-L**  
 METHOD : EPA 8010  
 SAMPLE #: 8-7173

COMPOUND	Blank (ug/l)	Spike Duplicate % deviation	Spike % recovery
Dichlorodifluoromethane	N.D.	-	N.S.
Chloroethane	N.D.	-	N.S.
Vinyl Chloride	N.D.	-	N.S.
Bromoethane	N.D.	-	N.S.
Chloroethane	N.D.	-	N.S.
Trichlorofluoroethane	N.D.	-	N.S.
1,1-Dichloroethane	N.D.	-	N.S.
Methylene Chloride	N.D.	-	N.S.
trans-1,2-Dichloroethene	N.D.	-	N.S.
1,1-Dichloroethane (N.S.)	N.D.	3	99
Chloroform	N.D.	-	N.S.
1,1,1-Trichloroethane (TCA)	N.D.	-	N.S.
Carbon Tetrachloride	N.D.	-	N.S.
1,2-Dichloroethane (EDC)	N.D.	-	N.S.
Trichloroethene (TCE) (N.S.)	N.D.	7	98
1,2-Dichloropropane	N.D.	-	N.S.
Bromodichloromethane	N.D.	-	N.S.
2-Chloroethylvinyl ether	N.D.	-	N.S.
trans-1,3-Dichloropropene	N.D.	3	98
cis-1,3-Dichloropropene	N.D.	-	N.S.
1,1,2-Trichloroethane	N.D.	-	N.S.
Tetrachloroethene (N.S.)	N.D.	1	96
Dibromochloromethane	N.D.	-	N.S.
Chlorobenzene	N.D.	-	N.S.
Bromoform	N.D.	-	N.S.
1,1,2,2-Tetrachloroethane	N.D.	-	N.S.
1,3-Dichlorobenzene	N.D.	-	N.S.
1,4-Dichlorobenzene	N.D.	-	N.S.
1,2-Dichlorobenzene	N.D.	-	N.S.

QUALITY CONTROL DATA

Surrogate Spike % Recovery			
Bromochloromethane	82 %	97 %	95 %
1,4-Dichlorobutane	104 %	99 %	99 %

N.D.: Not Detected  
 N.S.: Not Spiked

*A. H. Hall*  
 Analytical Supervisor

FORMERLY WESCO LABORATORIES

BLANK, SPIKE DUPLICATE AND SPIKE REPORT JOB # NLA 08144.04-L

METHOD: EPA 8010

SAMPLE #s: 0-7163, 0-7165, 0-7167, 0-7171, 0-7175, 0-7176

COMPOUND	Blank (ug/l)	Spike Duplicate % deviation	Spike % recovery
1,1-Dichloroethane	N.D.	-	N.S.
1,2-Dichloroethane	N.D.	-	N.S.
Vinyl Chloride	N.D.	-	N.S.
Bromochloroethane	N.D.	-	N.S.
1,1-Dichloroethane	N.D.	-	N.S.
Trichlorofluoroethane	N.D.	-	N.S.
1,1-Dichloroethene	N.D.	-	N.S.
Ethylene Chloride	N.D.	-	N.S.
trans-1,2-Dichloroethene	N.D.	-	N.S.
1,1-Dichloroethane (N.S.)	N.D.	0	103
Chloroform	N.D.	-	N.S.
1,1,1-Trichloroethane (TCA)	N.D.	-	N.S.
Carbon Tetrachloride	N.D.	-	N.S.
1,2-Dichloroethane (EDC)	N.D.	4	100
Trichloroethene (TCE) (N.S.)	N.D.	-	N.S.
1,2-Dichloropropane	N.D.	-	N.S.
Bromodichloroethane	N.D.	-	N.S.
2-Chloroethylvinyl ether	N.D.	-	N.S.
trans-1,3-Dichloropropene	N.D.	1	97
cis-1,3-Dichloropropene	N.D.	-	N.S.
1,1,2-Trichloroethane	N.D.	-	N.S.
Tetrachloroethene (N.S.)	N.D.	5	100
Dibromochloroethane	N.D.	-	N.S.
Chlorobenzene	N.D.	-	N.S.
Bromobenzene	N.D.	-	N.S.
1,1,1,2-Tetrachloroethane	N.D.	-	N.S.
1,3-Dichlorobenzene	N.D.	-	N.S.
1,4-Dichlorobenzene	N.D.	-	N.S.
1,2-Dichlorobenzene	N.D.	-	N.S.

QUALITY CONTROL DATA

Surrogate Spike % Recovery

Bromochloroethane	88 %	96 %	98 %
1,4-Dichlorobutane	94 %	94 %	94 %

N.D.: Not Detected

N.S.: Not Spiked

*A. Kalle*  
Analytical Supervisor

Report Date: 24-Aug-88  
 PACE JOB #: HLA 08144.04-L  
 Analytical Method: EPA 8020  
 MATRIX: SOIL

Extract/Purge Date: 08-Aug-88  
 Completion Date: 08-Aug-88  
 Analyst: LEWIS/ATTIA

LAB #:	8-7164		8-7166	
CLIENT'S ID:	B20-16.0		B20-20.5	
COMPOUND	RESULT (ug/kg)	Detection Limit (ug/kg)	RESULT (ug/kg)	Detection Limit (ug/kg)
Benzene-----	130	0.5	3.2	0.2
Toluene-----	100	0.5	2.4	0.2
Chlorobenzene-----	N.D.	0.5	N.D.	0.2
Ethylbenzene-----	13	0.5	N.D.	0.2
Xylene-----	98	0.5	0.7	0.2
1,3-Dichlorobenzene-----	N.D.	0.5	N.D.	0.2
1,4-Dichlorobenzene-----	N.D.	0.5	N.D.	0.2
1,2-Dichlorobenzene-----	N.D.	0.5	N.D.	0.2

**QUALITY CONTROL DATA**

Surrogate Spike                      Percent Recovery  
 Fluorobenzene                                      99 %                                      96 %

LAB #:	8-7168		8-7172	
CLIENT'S ID:	B20-25.5		B17-16.0	
COMPOUND	RESULT (ug/kg)	Detection Limit (ug/kg)	RESULT (ug/kg)	Detection Limit (ug/kg)
Benzene-----	990	20	79	0.2
Toluene-----	2,000	20	37	0.2
Chlorobenzene-----	N.D.	20	N.D.	0.2
Ethylbenzene-----	430	20	4.7	0.2
Xylene-----	2,800	20	27	0.2
1,3-Dichlorobenzene-----	N.D.	20	N.D.	0.2
1,4-Dichlorobenzene-----	N.D.	20	N.D.	0.2
1,2-Dichlorobenzene-----	N.D.	20	N.D.	0.2

**QUALITY CONTROL DATA**

Surrogate Spike                      Percent Recovery  
 Fluorobenzene                                      93 %                                      100 %

N.D.: Not Detected

Report date: 24-Aug-88  
PACE JOB #: HLA 08144.04-L  
Analytical Method: EPA 5030/8015  
MATRIX: SOIL

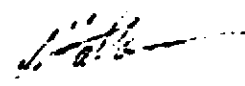
Extract/Purge Date: 02-Aug-88  
Completion Date: 02-Aug-88  
Analyst: ARNTZEN

LAB #: 8-7163 CLIENT'S ID: B20-15.5  
-----  
COMPOUND RESULT Detection  
(ug/kg) Limit(ug/kg)  
Total Petroleum Hydrocarbons (light)--- 290 50.0  
-----  
QUALITY CONTROL DATA Surrogate Spike & Recovery  
Fluorobenzene 101 %

LAB #: 8-7165 CLIENT'S ID: B20-20.0  
-----  
COMPOUND RESULT Detection  
(ug/kg) Limit(ug/kg)  
Total Petroleum Hydrocarbons (light)--- 210 50.0  
-----  
QUALITY CONTROL DATA Surrogate Spike & Recovery  
Fluorobenzene 95 %

LAB #: 8-7167 CLIENT'S ID: B20-25.0  
-----  
COMPOUND RESULT Detection  
(ug/kg) Limit(ug/kg)  
Total Petroleum Hydrocarbons (light)--- 59,000 2,500  
-----  
QUALITY CONTROL DATA Surrogate Spike & Recovery  
Fluorobenzene 98 %

N.D.: Not Detected

  
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Analytical Supervisor

QUALITY CONTROL DATA  
 METHOD: EPA 5030/8015 PACE JOB #: HLA 08144.04-L  
 SAMPLE #: 8-7163, 8-7165, 8-7167, 8-7171, 8-7173, 8-7174

COMPOUND	Blank ug/l	Spike Duplicate % deviation	Spike % recovery
Gasoline	N.D.	7	84

QUALITY CONTROL DATA  
 Surrogate Spike % Recovery  
 Fluorobenzene 96 % 100 % 100 %

QUALITY CONTROL DATA  
 METHOD: EPA 5030/8015 PACE JOB #: HLA 08144.04-L  
 SAMPLE #: 8-7177, 8-7179, 8-7181

COMPOUND	Blank ug/l	Spike Duplicate % deviation	Spike % recovery
Gasoline	N.D.	13	96

QUALITY CONTROL DATA  
 Surrogate Spike % Recovery  
 Fluorobenzene 96 % 97 % 97 %

QUALITY CONTROL DATA  
 METHOD: EPA 5030/8015 PACE JOB #: HLA 08144.04-L  
 SAMPLE #: 8-7176

COMPOUND	Blank ug/l	Spike Duplicate % deviation	Spike % recovery
Gasoline	N.D.	3	102

QUALITY CONTROL DATA  
 Surrogate Spike % Recovery  
 Fluorobenzene 93 % 98 % 98 %

N.D.: Not detected

*[Signature]*  
 Analytical Supervisor

Report Date: 24-Aug-88  
PACE JOB #: HLA 08144.05-L  
Analytical Method: EPA 5030/8015  
MATRIX: SOIL

Extract/Purge Date: 02-AUG-88  
Completion Date: 02-AUG-88  
Analyst: LEWIS

LAB #:	8-7171	CLIENT'S ID:	B17-15.5
-----			
COMPOUND		RESULT (ug/kg)	Detection Limit(ug/kg)
Total Petroleum Hydrocarbons (light)---		86	50.0
-----			
QUALITY CONTROL DATA		Surrogate Spike & Recovery	
Fluorobenzene		103 %	

LAB #:	8-7173	CLIENT'S ID:	B17-20.0
-----			
COMPOUND		RESULT (ug/kg)	Detection Limit(ug/kg)
Total Petroleum Hydrocarbons (light)---		430	50.0
-----			
QUALITY CONTROL DATA		Surrogate Spike & Recovery	
Fluorobenzene		112 %	

LAB #:	8-7174	CLIENT'S ID:	B17-25.5
-----			
COMPOUND		RESULT (ug/kg)	Detection Limit(ug/kg)
Total Petroleum Hydrocarbons (light)---		880,000	25,000
-----			
QUALITY CONTROL DATA		Surrogate Spike & Recovery	
Fluorobenzene		110 %	

N.D.: Not Detected

-----  
Analytical Supervisor

Report Date: 06-Sep-88  
 PACE JOB #: HLA 08144.04-L  
 Analytical Method: EPA 8020  
 MATRIX: SOIL

Extract/Purge Date: SEE BELOW  
 Completion Date: SEE BELOW  
 Analyst: LEWIS/ATTIA

LAB #:	8-7173	8-7174
CLIENT'S ID:	B17-20.0	B17-25.5
Completion Date:	09-Aug-88	08-Aug-88

COMPOUND	RESULT (ug/kg)	Detection Limit (ug/kg)	RESULT (ug/kg)	Detection Limit (ug/kg)
Benzene-----	140	0.2	5,800	100
Toluene-----	34	0.2	57,000	100
Chlorobenzene-----	N.D.	0.2	N.D.	100
Ethylbenzene-----	0.8	0.2	21,000	100
Xylene-----	4.6	0.2	130,000	100
1,3-Dichlorobenzene-----	N.D.	0.2	N.D.	100
1,4-Dichlorobenzene-----	N.D.	0.2	N.D.	100
1,2-Dichlorobenzene-----	N.D.	0.2	N.D.	100

QUALITY CONTROL DATA

Surrogate Spike	Percent Recovery	
Fluorobenzene	100 %	92 %

N.D.: Not Detected



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 Analytical Supervisor

Report date: 24-Aug-88  
 PACE JOB #: HLA 08144.04-L  
 Analytical Method: EPA 5030/8015  
 MATRIX: SEE BELOW

Extract/Purge Date: 02-Aug-88  
 Completion Date: 02-Aug-88  
 Analyst: ARNTZEN

CLIENT'S ID: B17-35.5

LAB #: 8-7176  
 MATRIX: SOIL

COMPOUND	RESULT (ug/kg)	Detection Limit(ug/kg)
Total Petroleum Hydrocarbons (light)---	N.D.	50.0
QUALITY CONTROL DATA		
Fluorobenzene	Surrogate Spike & Recovery 90 %	

CLIENT'S ID: 300003

LAB #: 8-7177  
 MATRIX: WATER

COMPOUND	RESULT (ug/l)	Detection Limit(ug/l)
Benzene-----	1,600	25
Toluene-----	2,300	25
Ethylbenzene-----	550	25
Xylene-----	2,900	25
Total Petroleum Hydrocarbons (light)---	17,000	2,500
QUALITY CONTROL DATA		
Fluorobenzene	Surrogate Spike & Recovery 99 %	

CLIENT'S ID: 300004

LAB #: 8-7179  
 MATRIX: WATER

COMPOUND	RESULT (ug/l)	Detection Limit(ug/l)
Benzene-----	10,000	50
Toluene-----	6,000	50
Ethylbenzene-----	820	50
Xylene-----	3,500	50
Total Petroleum Hydrocarbons (light)---	26,000	5,000
QUALITY CONTROL DATA		
Fluorobenzene	Surrogate Spike & Recovery 105 %	

*W. Hall*



COMPOUNDS (cont.)

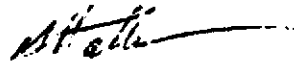
PACE JOB #: HLA 08144.04-L Analytical Method: EPA 5030/8015  
LAB #: 8-7181 CLIENT'S ID: 300005  
MATRIX: WATER

COMPOUND	RESULT (ug/l)	Detection Limit(ug/l)
Benzene-----	6,200	50
Toluene-----	14,000	50
Ethylbenzene-----	1,700	50
Xylene-----	8,800	50
Total Petroleum Hydrocarbons (light)---	48,000	5,000

QUALITY CONTROL DATA  
Fluorobenzene

Surrogate Spike & Recovery  
98 %

N.D.: Not Detected



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Analytical Supervisor

Report Date: 06-Sep-88 Extract/Purge Date: 03-Aug-88  
 PACE JOB #: HLA 08144.04-L Completion Date: 08-Aug-88  
 Analytical Method: EPA 3550/8015 Analyst: CLARK  
 MATRIX: SOIL

LAB #	CLIENT ID	Total Petroleum Hydrocarbons (heavy) (mg/kg)	Quantified As	Detection Limit(mg/kg)
8-7163	B20-15.5	N.D.		10
8-7165	B20-20.0	N.D.		10
8-7167	B20-25.0	N.D.		10
8-7171	B17-15.5	N.D.		10
8-7173	B17-20.0	N.D.		10
8-7174	B17-25.5	N.D.		10

QUALITY CONTROL DATA PACE JOB #: HLA 08144.04-L

COMPOUND	Blank (mg/l)	Spike Duplicate % deviation	Spike % recovery
Diesel	N.D.	7	94

N.D.: Not Detected



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 Analytical Supervisor

Report Date: 24-Aug-88 Extract/Purge Date: SEE BELOW  
 PACE JOB #: HLA 08144.04-L Analysis Completion: SEE BELOW  
 Analytical Method: EPA 7000 SERIES Analyst: WALKER  
 MATRIX: SEE BELOW

LAB #	CLIENT ID	LEAD Pb (mg/kg)	LEAD Pb (mg/l)
DATE COMPLETED:		04-AUG-88	09-AUG-88
MATRIX:		SOIL	WATER
8-7168	B20-25.0	1.06	-
8-7175	B17-26.0	1.08	-
8-7178	300003	-	N.D.
8-7180	300004	-	N.D.
8-7182	300005	-	0.6
DETECTION LIMIT:		1.00	0.1
METHOD #:		EPA 7420	EPA 7420

QUALITY CONTROL DATA	PACE JOB #:		HLA 08144.04-L
COMPOUND	Blank (mg/l)	Spike Duplicate % deviation	Spike % recovery
LEAD (SOIL)	N.D.	6	89
LEAD (WATER)	N.D.	1	109

*Attali*

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 Analytical Supervisor

Report Date: 06-Sep-88 Extract/Purge Date: 03-Aug-88  
 PACE JOB #: HLA 08144.04-L Completion Date: 08-Aug-88  
 Analytical Method: EPA 3550/8015 Analyst: CLARK  
 MATRIX: SOIL

LAB #	CLIENT ID	Total Petroleum Hydrocarbons (heavy) (mg/kg)	Quantified As	Detection Limit(mg/kg)
8-7163	B20-15.5	N.D.		10
8-7165	B20-20.0	N.D.		10
8-7167	B20-25.0	N.D.		10
8-7171	B17-15.5	N.D.		10
8-7173	B17-20.0	N.D.		10
8-7174	B17-25.5	N.D.		10

QUALITY CONTROL DATA PACE JOB #: HLA 08144.04-L

COMPOUND	Blank (mg/l)	Spike Duplicate % deviation	Spike % recovery
Diesel	N.D.	7	94

N.D.: Not Detected



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Analytical Supervisor

FORMERLY WESCO LABORATORIES  
Report Date: 24-Aug-88  
PACE JOB #: HLA 08144.04-L  
Analytical Method: EPA 8270  
MATRIX: SOIL

Extract/Purge Date: 05-Aug-88  
Completion Date: 08-Aug-88  
Analyst: Siegmund/MOEZZI

-----  
LAB #: 8-7164 CLIENT'S ID: B20-16.0  
-----

BASE NEUTRALS	RESULT (ug/kg)	Detection Limit (ug/kg)
N-Nitrosodimethylamine	N.D.	n.d.
Aniline	N.D.	n.d.
Bis(2-chloroethyl) ether	N.D.	44
1,3-Dichlorobenzene	N.D.	44
1,4-Dichlorobenzene	N.D.	44
1,2-Dichlorobenzene	N.D.	44
Bis(2-chloroisopropyl)ether	N.D.	44
N-Nitroso-di-N-propylamine	N.D.	44
Hexachloroethane	N.D.	44
Nitrobenzene	N.D.	44
Isophorone	N.D.	44
Bis(2-chloroethoxy)methane	N.D.	44
1,2,4-Trichlorobenzene	N.D.	44
Naphthalene	N.D.	44
Hexachlorobutadiene	N.D.	44
Hexachlorocyclopentadiene	N.D.	44
2-Chloronaphthalene	N.D.	44
Dimethylphthalate	N.D.	44
Acenaphthylene	N.D.	44
2,6-Dinitrotoluene	N.D.	44
Acenaphthene	N.D.	44
Dibenzofuran	N.D.	44
2,4-Dinitrotoluene	N.D.	44
Diethyl phthalate	N.D.	44
Fluorene	N.D.	44
4-Chlorophenylphenyl ether	N.D.	44
N-Nitrosodiphenyl amine	N.D.	n.d.
1,2-Diphenylhydrazine	N.D.	44
4-Bromophenylphenyl ether	N.D.	44
Hexachlorobenzene	N.D.	44
Phenanthrene	N.D.	44
Anthracene	N.D.	44
Di-n-butyl phthalate	N.D.	44
Fluoranthene	N.D.	44
Benzidine	N.D.	n.d.
Pyrene	N.D.	44
Butylbenzyl phthalate	N.D.	44
Benzo(a)anthracene	N.D.	44
3,3'-Dichlorobenzidine	N.D.	87
Chrysene	N.D.	44

BASE NEUTRALS (cont)

PACE JOB #: HLA 08144.04-L Analytical Method: EPA 8270

	RESULT (ug/kg)	Detection (ug/kg)	Limit
Bis(2-ethylhexyl) phthalate	N.D.	44	
Di-n-octyl phthalate	N.D.	44	
Benzo(b)fluoranthene	N.D.	44	
Benzo(k)fluoranthene	N.D.	44	
Benzo(a)pyrene	N.D.	44	
Indeno(1,2,3-cd)pyrene	N.D.	44	
Dibenzo(a,h)anthracene	N.D.	44	
Benzo(g,h,i)perylene	N.D.	44	

QUALITY CONTROL DATA	Base/Neutral Surrogate Spike Recovery
Nitrobenzene-d5	88 %
2-Fluorobiphenyl	94 %
Terphenyl-d14	80 %

ACID COMPOUNDS	RESULT (ug/kg)	Detection (ug/kg)	Limit
Phenol	N.D.	44	
2-Chlorophenol	N.D.	44	
2-Methylphenol	N.D.	44	
4-Methylphenol	N.D.	44	
2-Nitrophenol	N.D.	44	
2,4-Dimethylphenol	N.D.	44	
Benzoic Acid	N.D.	220	
2,4-Dichlorophenol	N.D.	44	
4-Chloro-3-methylphenol	N.D.	87	
2,4,6-Trichlorophenol	N.D.	44	
2,4,5-Trichlorophenol	N.D.	44	
2,4-Dinitrophenol	N.D.	220	
4-Nitrophenol	N.D.	220	
2-Methyl-4,6-dinitrophenol	N.D.	220	
Pentachlorophenol	N.D.	220	

QUALITY CONTROL DATA	Acid Surrogate Spike Recovery
2-Fluorophenol	34 %
Phenol-d5	34 %
2,4,6-Tribromophenol	29 %

COMPOUNDS (cont.)

PACE JOB #: HLA 08144.04-L Analytical Method: EPA 8270

PESTICIDE COMPOUNDS	RESULT (ug/kg)	Detection Limit (ug/kg)
alpha-BHC	N.D.	n.d.
beta-BHC	N.D.	n.d.
gamma-BHC	N.D.	n.d.
delta-BHC	N.D.	n.d.
Heptachlor	N.D.	n.d.
Aldrin	N.D.	n.d.
Heptachlor epoxide	N.D.	n.d.
Endosulfan I	N.D.	n.d.
4,4'-DDE	N.D.	n.d.
Dieldrin	N.D.	n.d.
Endrin	N.D.	n.d.
Endosulfan II	N.D.	n.d.
4,4'-DDD	N.D.	n.d.
Endrin Aldehyde	N.D.	n.d.
4,4'-DDT	N.D.	n.d.
Endosulfan Sulfate	N.D.	n.d.

QUALITY CONTROL DATA	Pesticide Surrogate Spike Recovery
Nitrobenzene-d5	88 %
2-Fluorobiphenyl	94 %
Terphenyl-d14	80 %

OTHER EXTRACTABLES	RESULT (ug/kg)	Detection Limit (ug/kg)
Acetophenone	N.D.	n.d.
4-Aminobiphenyl	N.D.	n.d.
Arochlors	N.D.	n.d.
Benzyl Alcohol	N.D.	n.d.
Chlordane	N.D.	n.d.
4-Chloroaniline	N.D.	n.d.
1-Chloronaphthalene	N.D.	n.d.
Dibenz(a,j)acridine	N.D.	n.d.
2,6-Dichlorophenol	N.D.	n.d.
p-Dimethylaminoazobenzene	N.D.	n.d.
7,12-Dimethylbenz(a)-anthracene	N.D.	n.d.
alpha,alpha-Dimethylphenethylamine	N.D.	n.d.
Endrin Ketone	N.D.	n.d.
Ethylmethane sulfonate	N.D.	n.d.
Methoxychlor	N.D.	n.d.
3-Methylchloranthene	N.D.	n.d.

**OTHER EXTRACTABLES (cont.)**

**PAGE JOB #:** HLA 08144.04-L **Analytical Method:** EPA 8270

	<b>RESULT</b> (ug/kg)	<b>Detection Limit</b> (ug/kg)
Methylmethane sulfonate	N.D.	n.d.
2-Methylnaphthalene	N.D.	n.d.
1-Naphthylamine	N.D.	n.d.
2-Naphthylamine	N.D.	n.d.
2-Nitroaniline	N.D.	n.d.
3-Nitroaniline	N.D.	n.d.
4-Nitroaniline	N.D.	n.d.
N-Nitrosophenylamine	N.D.	n.d.
N-Nitrosopiperidine	N.D.	n.d.
Pentachlorobenzene	N.D.	n.d.
Pentachloronitrobenzene	N.D.	n.d.
2-Picoline	N.D.	n.d.
Pronamide	N.D.	n.d.
1,2,4,5-Tetrachlorobenzene	N.D.	n.d.
2,3,4,6-Tetrachlorobenzene	N.D.	n.d.
Toxaphene	N.D.	n.d.
Biphenyl	N.D.	n.d.
Diphenylamine	N.D.	n.d.
beta-Naphthylamine	N.D.	n.d.
Dibenzothiophene	N.D.	n.d.

N.D.: Not Detected  
 N.A.: Not Applicable

n.d.: not determined



**Analytical Supervisor**



FORMERLY WESCO LABORATORIES

QUALITY CONTROL DATA  
 METHOD EPA 8270

PACE JOB#:

HLA 08144.04-L

COMPOUND	Blank (ug/l)	Spike Duplicate & Deviation	Spike & Recovery
<b>BASE NEUTRAL COMPOUNDS</b>			
N-Nitrosodimethylamine	N.D.	n.s.	n.s.
Aniline	N.D.	n.s.	n.s.
Bis(2-chloroethyl) ether	N.D.	n.s.	n.s.
1,3-Dichlorobenzene	N.D.	n.s.	n.s.
1,4-Dichlorobenzene (MS)	N.D.	8	88
1,2-Dichlorobenzene	N.D.	n.s.	n.s.
Bis(2-chloroisopropyl) ether	N.D.	n.s.	n.s.
N-Nitroso-di-N-propylamine	N.D.	n.s.	n.s.
Hexachloroethane	N.D.	n.s.	n.s.
Nitrobenzene-d5 (SS)	N.D.	5	83
Nitrobenzene	N.D.	n.s.	n.s.
Isophorone	N.D.	n.s.	n.s.
Bis(2-chloroethoxy)methane	N.D.	n.s.	n.s.
1,2,4-Trichlorobenzene	N.D.	n.s.	n.s.
Naphthalene	N.D.	n.s.	n.s.
Hexachlorobutadiene	N.D.	n.s.	n.s.
Hexachlorocyclopentadiene	N.D.	n.s.	n.s.
2-Fluorobiphenyl (SS)	N.D.	12	107
2-Chloronaphthalene	N.D.	n.s.	n.s.
Dimethylphthalate	N.D.	n.s.	n.s.
Acenaphthylene	N.D.	n.s.	n.s.
2,6-Dinitrotoluene	N.D.	n.s.	n.s.
Acenaphthene (MS)	N.D.	13	41
Dibenzofuran	N.D.	n.s.	n.s.
2,4-Dinitrotoluene (MS)	N.D.	11	85
Diethyl phthalate	N.D.	n.s.	n.s.
Fluorene	N.D.	n.s.	n.s.
4-Chlorophenylphenyl ether	N.D.	n.s.	n.s.
N-Nitrosodiphenyl amine	N.D.	n.s.	n.s.
1,2-Diphenylhydrazine	N.D.	n.s.	n.s.
4-Bromophenylphenyl ether	N.D.	n.s.	n.s.
Hexachlorobenzene	N.D.	n.s.	n.s.
Phenanthrene	N.D.	n.s.	n.s.
Anthracene	N.D.	n.s.	n.s.
Di-n-butyl phthalate	N.D.	n.s.	n.s.
Fluoranthene	N.D.	n.s.	n.s.
Benzidine	N.D.	n.s.	n.s.
Pyrene (MS)	N.D.	24	42
Terphenyl-d12 (SS)	N.D.	9	102
Butylbenzyl phthalate	N.D.	n.s.	n.s.
Benzo(a)anthracene	N.D.	n.s.	n.s.
3,3'-Dichlorobenzidine	N.D.	n.s.	n.s.
Chrysene	N.D.	n.s.	n.s.
Bis(2-ethylhexyl) phthalate	N.D.	n.s.	n.s.
Di-n-octyl phthalate	N.D.	n.s.	n.s.

QUALITY CONTROL DATA (cont.)

METHOD EPA 8270

PACE JOB#: \_\_\_\_\_

HLA 08144.04-L

COMPOUND	Blank (ug/l)	Spike Duplicate & Deviation	Spike % Recovery
Benzo(b)fluoranthene	N.D.	n.s.	n.s.
Benzo(k)fluoranthene	N.D.	n.s.	n.s.
Benzo(a)pyrene	N.D.	n.s.	n.s.
Indeno(1,2,3-cd)pyrene	N.D.	n.s.	n.s.
Dibenzo(a,h)anthracene	N.D.	n.s.	n.s.
Benzo(g,h,i)perylene	N.D.	n.s.	n.s.
2-Fluorophenol (SS)	N.D.	6	36
Phenol-d5 (SS)	N.D.	9	36
Phenol (MS)	N.D.	10	62
2-Chlorophenol	N.D.	n.s.	n.s.
2-Methylphenol	N.D.	n.s.	n.s.
4-Methylphenol	N.D.	n.s.	n.s.
2-Nitrophenol	N.D.	n.s.	n.s.
2,4-Dimethylphenol	N.D.	n.s.	n.s.
Benzoic Acid	N.D.	n.s.	n.s.
2,4-Dichlorophenol	N.D.	n.s.	n.s.
4-Chloro-3-methylphenol (MS)	N.D.	11	68
2,4,6-Trichlorophenol	N.D.	n.s.	n.s.
2,4,5-Trichlorophenol	N.D.	n.s.	n.s.
2,4-Dinitrophenol	N.D.	n.s.	n.s.
4-Nitrophenol	N.D.	10	61
2-Methyl-4,6-dinitrophenol	N.D.	n.s.	n.s.
2,4,6-Tribromophenol (SS)	N.D.	18	42
Pentachlorophenol (MS)	N.D.	0	86

PESTICIDES

alpha-BHC	N.D.	n.s.	n.s.
beta-BHC	N.D.	n.s.	n.s.
gamma-BHC	N.D.	n.s.	n.s.
delta-BHC	N.D.	n.s.	n.s.
Heptachlor	N.D.	n.s.	n.s.
Aldrin	N.D.	n.s.	n.s.
Heptachlor epoxide	N.D.	n.s.	n.s.
Endosulfan I	N.D.	n.s.	n.s.
4,4'-DDE	N.D.	n.s.	n.s.
4-Terphenyl-d14 (SS)	N.A.		
Dieldrin	N.D.	n.s.	n.s.
Endrin	N.D.	n.s.	n.s.

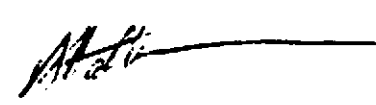
QUALITY CONTROL DATA (cont.)

METHOD	EPA 8270	PACE JOB#:	HLA 08144.04-L
Endosulfan II	N.D.	n.s.	n.s.
4,4'-DDD	N.D.	n.s.	n.s.
Endrin Aldehyde	N.D.	n.s.	n.s.
4,4'-DDT	N.D.	n.s.	n.s.
Endosulfan Sulfate	N.D.	n.s.	n.s.

QUALITY CONTROL DATA

Base/Neutral Blank S. S. Recovery	Acid Blank S. S. Recovery	
Nitrobenzene-d5	2-Fluorophenol	38
2-Fluorobiphenyl	Phenol-d5	37
Terphenyl-d14	2,4,6-Tribromophenol	28

N.D.: Not Detected (SS): Surrogate Spike  
 N.R.: Not Recovered (MS): Matrix Spike  
 n.s.: not spiked N.A.: Not Applicable



Analytical Supervisor

Job Number: 9382.030.02  
 Name/Location: City of Oakland  
 Project Manager: David F. Leland

Samplers: R. Stolzman  
 Recorder: Robert A. Stolzman  
(Signature Required)

SOURCE CODE	MATRIX				#CONTAINERS & PRESERV.			SAMPLE NUMBER OR LAB NUMBER			DATE			
	Water	Sediment	Soil	Oil	Unpres.	H <sub>2</sub> SO <sub>4</sub>	HNO <sub>3</sub>	Yr	Wk	Seq	Yr	Mo	Dy	Time
50			X		1			B21	-35.5	07	28	20	08	40
			X		1			B20	-06.0	08	07	28	13	15
			X		1			B20	-10.5				13	25
			X		1			B20	-11.0				13	25
			X		1			B20	-15.5				13	40
			X		1			B20	-16.0				13	40
			X		1			B20	-20.0				13	55
			X		1			B20	-20.5				13	55
			X		1			B20	-25.0				14	15
			X		1			B20	-25.5				14	15

STATION DESCRIPTION/NOTES
HOLD
HOLD
HOLD
HOLD

ANALYSIS REQUESTED											
EPA 601/8010											
EPA 602/8020											
EPA 624/8240											
EPA 625/8270											
Priority Pestic. Metals											
Benzene/Toluene/Xylene											
Total Petrol. Hydrocarb.											
TPH-LH-HV by 6015											
Lead											

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

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	RECEIVED FOR LAB BY: (Signature)
Robert A. Stolzman	7-21-88 1720	C. Prouty / 21 520 PM
METHOD OF SHIPMENT		



**Harding Lawson Associates**  
 Environmental Services Division  
 200 Rush Landing Road  
 Novato, California 94947  
 (415) 892-0821

**CHAIN OF CUSTODY FORM**

HLA 08144.04

Job Number: 9382030.02  
 Name/Location: City of Oakland  
 Project Manager: David F. Leland

Samplers: R. Stolzman

Recorder: Robert A. Stolzman  
 (Signature Required)

SOURCE CODE	MATRIX				#CONTAINERS & PRESERV.			SAMPLE NUMBER OR LAB NUMBER				DATE				STATION DESCRIPTION/ NOTES
	Water	Sediment	Soil	Oil	Unpres.	H <sub>2</sub> SO <sub>4</sub>	HNO <sub>3</sub>	Yr	Wk	Seq	Yr	Mo	Dy	Time		
10	X				3			88	30	0005	88	07	28	15	15	12

ANALYSIS REQUESTED										
EPA 601/8010	EPA 602/8020	EPA 624/8240	EPA 625/8270	Priority Pfitnt. Metals	Benzene/Toluene/Xylene	Total Petrol. Hydrocarb.	X TPH-L only	X BTX	X Lead	

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

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	RECEIVED FOR LAB BY: (Signature)
<u>Robert A. Stolzman</u>	<u>2-24-12 1720</u>	<u>C. Portney 7/28/52</u>
METHOD OF SHIPMENT		



Harding Lawson Associates  
Environmental Services Division  
200 Rush Landing Road  
Novato, California 94947  
(415) 892-0821

# CHAIN OF CUSTODY FORM

ⓧ Altered by

DL 8/4/88

HLA 08144.04-L

Samplers: P. Shilgman

Job Number: 9382.030.02

Name/Location: City of Oakland

Project Manager: David F. Leland

Recorder: Robert A. Shilgman  
(Signature Required)

## ANALYSIS REQUESTED

SOURCE CODE	MATRIX				#CONTAINERS & PRESERV.			SAMPLE NUMBER OR LAB NUMBER			DATE				STATION DESCRIPTION/ NOTES		
	Water	Sediment	Soil	Oil	Unpres.	H <sub>2</sub> SO <sub>4</sub>	HNO <sub>3</sub>	Yr	Wk	Seq	Yr	Mo	Dy	Time			
SC		X			1			817	-06	.0	7	2	8	10	00	HOLD	
		X			1			817	-10	.5	8	0	7	28	10	10	HOLD
		X			1			817	-15	.5					10	30	
		X			1			817	-16	.0					10	30	
		X			1			817	-20	.0					10	45	
		X			1			817	-25	.5					11	15	
		X			1			817	-26	.0					11	15	
		X			1			817	-35	.5					11	50	
10	X				3			8830	0000	2					09	15	
10	X				3			8830	0000	4					12	40	

EPA 601/6010	EPA 602/6020	EPA 624/6240	EPA 625/6270	Priority Pollut. Metals	Benzene/Toluene/Xylene	Total Petrol. Hydrocarb.	TPH (Total Hydrocarbons)	Lead	Cu	Zn
						X				
	X									
	Y	X				X				
	X					X				
	Y							X		
	ⓧ					ⓧ				
	X							X	X	X
	Y							X	X	X

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

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	RECEIVED FOR LAB BY: (Signature) DATE/TIME
METHOD OF SHIPMENT		



laboratories, inc.

FORMERLY WESCO LABORATORIES

REPORT OF LABORATORY ANALYSIS

HARDING LAYSON ASSOCIATES

AUG 24 1988

Offices: Minneapolis, Minnesota  
Tampa, Florida  
Coralville, Iowa  
Novato, California

Peace job #: HLA 0814405-L

Report date: August 19, 1988

Client: Harding Layson Associates  
200 Rush Landing Road  
Novato, CA 94947

Attn.: David Leland

Date sampled: July 29, 1988

Site: City of Oakland

Sampled by: R. Stolzman

Date received: July 29, 1988

P.O.: 9382, 030.02

Submitted by: R. Stolzman

Lab #	Client ID	Matrix	Analysis
8- 7219	B19 - 10.5	soil	Diesel 3550/8015
8- 7219	B19 - 10.5	soil	TPH light only 5030/8015
8- 7219	B19 - 10.5	soil	Vol Org. Cpds. 8010+8020
8- 7220	B19 - 15.5	soil	
8- 7221	B19 - 16.0	soil	
8- 7222	B19 - 20.5	soil	Diesel 3550/8015
8- 7222	B19 - 20.5	soil	TPH light only 5030/8015
8- 7222	B19 - 20.5	soil	Vol Org. Cpds. 8010+8020
8- 7223	B19 - 25.0	soil	Purg. Halocarbons 8010
8- 7223	B19 - 25.0	soil	Diesel 3550/8015
8- 7223	B19 - 25.0	soil	TPH light only 5030/8015
8- 7224	B19 - 25.5	soil	Purg. Aromatics 8020
8- 7224	B19 - 25.5	soil	Lead 7420
8- 7225	B19 - 35.5	soil	Purg. Halocarbons 8010 (5 d ru)
8- 7225	B19 - 35.5	soil	Diesel 3550/8015 (5 day rush)
8- 7225	B19 - 35.5	soil	TPH only 5030/8015 (5 day rush)
8- 7226	B3 - 05.5	soil	
8- 7227	B3 - 10.5	soil	
8- 7228	B3 - 15.5	soil	
8- 7229	B3 - 20.5	soil	
8- 7230	B3 - 25.5	soil	Purg. Halocarbons 8010
8- 7230	B3 - 25.5	soil	Diesel 3550/8015
8- 7230	B3 - 25.5	soil	TPH light only 5030/8015
8- 7231	B3 - 26.0	soil	Purg. Aromatics 8020
8- 7231	B3 - 26.0	soil	GC/MS Extr. Org. 8270 (5 d.rush)





laboratories, inc.

FORMERLY WESCO LABORATORIES

REPORT OF LABORATORY ANALYSIS

Offices:

Minneapolis, Minnesota  
Tampa, Florida  
Coralville, Iowa  
Novato, California

Report date: August 19, 1988  
Client: Harding Lawson Associates  
200 Rush Landing Road  
Novato, CA 94947  
Attn.: David Leland

Pace job #: HLA 0814405-L

Date sampled: July 29, 1988  
Sampled by: R. Stolzman

Site: City of Oakland

Date received: July 29, 1988  
Submitted by: R. Stolzman

P.O.: 9382, 030.02

Lab #	Client ID	Matrix	Analysis
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Dear Client,

No problems were encountered with the analysis of your samples. We will store samples for 30 days after the report date. The samples will be returned to the client after the 30-day period, unless other arrangements are made. If you have any questions, please feel free to call, (415)883-6100.

*C. Santag*  
-----  
Sample Controller

Report Date: 17-Aug-88 Extract/Purge Date: 04-Aug-88  
 PACE JOB #: HLA 08144.05-L Completion Date: 09-Aug-88  
 Analytical Method: EPA 3550/8015 Analyst: CLARK  
 MATRIX: SOIL

LAB #	CLIENT ID	Total Petroleum Hydrocarbons (heavy) (mg/kg)	Quantified As	Detection Limit(mg/kg)
8-7219	B19-10.5	N.D.		10
8-7222	B19-20.5	N.D.		10
8-7223	B19-25.0	N.D.		10
8-7225	B19-35.5	N.D.		10
8-7230	B3-25.5	N.D.		10

QUALITY CONTROL DATA PACE JOB #: HLA 08144.05

COMPOUND	Blank (mg/l)	Spike Duplicate % deviation	Spike % recovery
Diesel	N.D.	0	91

N.D.: Not Detected

  
 -----  
 Analytical Supervisor

Report date: 17-Aug-88  
 PACE JOB #: HLA 08144.05-L  
 Analytical Method: EPA 5030/8015  
 MATRIX: SOIL

Extract/Purge Date: 03-Aug-88  
 Completion Date: 03-Aug-88  
 Analyst: LEWIS

LAB #: 8-7219 CLIENT'S ID: B19-10.5  
 =====  
 COMPOUND RESULT Detection  
 (ug/kg) Limit(ug/kg)  
 Total Petroleum Hydrocarbons (light)--- N.D. 50.0  
 -----  
 QUALITY CONTROL DATA Surrogate Spike & Recovery  
 Fluorobenzene 93 %

LAB #: 8-7222 CLIENT'S ID: B19-20.5  
 =====  
 COMPOUND RESULT Detection  
 (ug/kg) Limit(ug/kg)  
 Total Petroleum Hydrocarbons (light)--- 120.0 50.0  
 -----  
 QUALITY CONTROL DATA Surrogate Spike & Recovery  
 Fluorobenzene 90 %

LAB #: 8-7223 CLIENT'S ID: B19-25.0  
 =====  
 COMPOUND RESULT Detection  
 (ug/kg) Limit(ug/kg)  
 Total Petroleum Hydrocarbons (light)--- 960,000 50.0  
 -----  
 QUALITY CONTROL DATA Surrogate Spike & Recovery  
 Fluorobenzene 124 % M.I.

N.D.: Not Detected



-----  
 Analytical Supervisor

Report Date: 17-Aug-88  
 PACE JOB #: HLA 08144.05-L  
 Analytical Method: EPA 5030/8015  
 MATRIX: SOIL

Extract/Purge Date: SEE BELOW  
 Completion Date: SEE BELOW  
 Analyst: LEWIS

LAB #: 8-7230  
 DATE COMPLETED: 03-AUG-88  
 CLIENT'S ID: B3-25.5

COMPOUND	RESULT (ug/kg)	Detection Limit(ug/kg)
Total Petroleum Hydrocarbons (light)---	490	50.0

QUALITY CONTROL DATA  
 Fluorobenzene Surrogate Spike & Recovery  
 130 % M.I.

LAB #: 8-7225  
 DATE COMPLETED: 12-AUG-88  
 CLIENT'S ID: B19-35.5

COMPOUND	RESULT (ug/kg)	Detection Limit(ug/kg)
Total Petroleum Hydrocarbons (light)---	160	50.0

QUALITY CONTROL DATA  
 Fluorobenzene Surrogate Spike & Recovery  
 85 %

N.D.: Not Detected



-----  
 Analytical Supervisor

Report Date: 17-Aug-88  
 PACE JOB #: HLA 08144.05-L  
 Analytical Method: EPA 5030/8015  
 MATRIX: SOIL

Extract/Purge Date: 05-May-88  
 Completion Date: 05-May-88  
 Analyst: LEWIS

QUALITY CONTROL DATA

METHOD: EPA 5030/8015 PACE JOB #: HLA 08144.05-L  
 SAMPLE #: 8-7219, 8-7222, 8-7223, 8-7230

COMPOUND	Blank ug/l	Spike Duplicate % deviation	Spike % recovery
Gasoline-----	N.D.	17	100

QUALITY CONTROL DATA

Surrogate Spike % Recovery  
 Fluorobenzene 75 % 103 % 101 %

QUALITY CONTROL DATA

METHOD: EPA 5030/8015 PACE JOB #: HLA 08144.05-L  
 SAMPLE #: 8-7225

COMPOUND	Blank ug/l	Spike Duplicate % deviation	Spike % recovery
Gasoline-----	N.D.	13	96

QUALITY CONTROL DATA

Surrogate Spike % Recovery  
 Fluorobenzene 96 % 101 % 107 %

N.D.: Not detected



-----  
 Analytical Supervisor

Report Date: 17-Aug-88  
PACE JOB #: MLA 08144.05-L  
Analytical Method: EPA 8010  
MATRIX: SOIL

Extract/Purge Date: 11-Aug-88  
Completion Date: 11-Aug-88  
Analyst: ATTIA

LAB #: 8-7219 8-7222 8-7225 8-7230  
CLIENT'S ID: 019-10.5 019-20.5 019-35.5 03-25.5

COMPOUND	RESULT (ug/kg)	RESULT (ug/kg)	RESULT (ug/kg)	RESULT (ug/kg)	Detection Limit (ug/kg)
Dichlorodifluoroethane	N.D.	N.D.	N.D.	N.D.	2.0
Chloroethane	N.D.	N.D.	N.D.	N.D.	2.0
Vinyl Chloride	N.D.	N.D.	N.D.	N.D.	2.0
Bromoethane	N.D.	N.D.	N.D.	N.D.	2.0
Chloroethane	N.D.	N.D.	N.D.	N.D.	2.0
Trichlorofluoroethane	N.D.	N.D.	N.D.	N.D.	0.5
1,1-Dichloroethene	N.D.	N.D.	N.D.	N.D.	0.5
Methylene Chloride	N.D.	N.D.	N.D.	N.D.	0.5
trans-1,2-Dichloroethene	N.D.	N.D.	N.D.	N.D.	0.5
1,1-Dichloroethane	N.D.	N.D.	N.D.	N.D.	0.5
Chloroform	N.D.	N.D.	N.D.	N.D.	0.5
1,1,1-Trichloroethane (TCA)	N.D.	N.D.	N.D.	N.D.	0.5
Carbon Tetrachloride	N.D.	N.D.	N.D.	N.D.	0.5
1,2-Dichloroethane (EDC)	N.D.	N.D.	5.8	N.D.	0.5
Trichloroethene (TCE)	N.D.	N.D.	N.D.	N.D.	0.5
1,2-Dichloropropane	N.D.	N.D.	N.D.	N.D.	0.5
Bromodichloroethane	N.D.	N.D.	N.D.	N.D.	0.5
2-Chloroethylvinyl ether	N.D.	N.D.	N.D.	N.D.	0.5
trans-1,3-Dichloropropene	N.D.	N.D.	N.D.	N.D.	0.5
cis-1,3-Dichloropropene	N.D.	N.D.	N.D.	N.D.	0.5
1,1,2-Trichloroethane	N.D.	N.D.	N.D.	N.D.	0.5
Tetrachloroethene	N.D.	N.D.	N.D.	N.D.	0.5
Dibromochloroethane	N.D.	N.D.	N.D.	N.D.	0.5
Chlorobenzene	N.D.	N.D.	N.D.	N.D.	0.5
Bromoform	N.D.	N.D.	N.D.	N.D.	0.5
1,1,2,2-Tetrachloroethane	N.D.	N.D.	N.D.	N.D.	0.5
1,3-Dichlorobenzene	N.D.	N.D.	N.D.	N.D.	0.5
1,4-Dichlorobenzene	N.D.	N.D.	N.D.	N.D.	0.5
1,2-Dichlorobenzene	N.D.	N.D.	N.D.	N.D.	0.5

QUALITY CONTROL DATA

Surrogate Spike	Percent Recovery			
Bromochloroethane	106 %	105 %	104 %	107 %
1,4-Dichlorobutane	95 %	95 %	102 %	106 %

N.D.: Not Detected

Report Date: 17-Aug-88  
 PACE JOB #: HLA 08144.05-L  
 Analytical Method: EPA 8010  
 MATRIX: SOIL

Extract/Purge Date: 11-Aug-88  
 Completion Date: 11-Aug-88  
 Analyst: ATTIA

LAB #: 8-7223 CLIENT'S ID: B19-25.0

COMPOUND	RESULT (ug/kg)	Detection Limit (ug/kg)
Dichlorodifluoromethane	N.D.	500
Chloromethane	N.D.	500
Vinyl Chloride	N.D.	500
Bromomethane	N.D.	500
Chloroethane	N.D.	500
Trichlorofluoromethane	N.D.	500
1,1-Dichloroethene	N.D.	500
Methylene Chloride	550	500
trans-1,2-Dichloroethene	N.D.	500
1,1-Dichloroethane	N.D.	500
Chloroform	N.D.	500
1,1,1-Trichloroethane (TCA)	N.D.	500
Carbon Tetrachloride	N.D.	500
1,2-Dichloroethane (EDC)	N.D.	500
Trichloroethene (TCE)	N.D.	500
1,2-Dichloropropane	N.D.	500
Bromodichloromethane	N.D.	500
2-Chloroethylvinyl ether	N.D.	500
trans-1,3-Dichloropropene	N.D.	500
cis-1,3-Dichloropropene	N.D.	500
1,1,2-Trichloroethane	N.D.	500
Tetrachloroethene	N.D.	500
Dibromochloromethane	N.D.	500
Chlorobenzene	N.D.	500
Bromoform	N.D.	500
1,1,2,2-Tetrachloroethane	N.D.	500
1,3-Dichlorobenzene	N.D.	500
1,4-Dichlorobenzene	N.D.	500
1,2-Dichlorobenzene	N.D.	500

**QUALITY CONTROL DATA**

Surrogate Spike	Percent Recovery
Bromochloromethane	88 %
1,4-Dichlorobutane	109 %

N.D.: Not Detected

*Attia*  
 Analytical Supervisor

BLANK, SPIKE DUPLICATE AND SPIKE REPORT JOB #  
METHOD : EPA 8010

MLA 08144.05-L

COMPOUND	Blank (ug/l)	Spike Duplicate Z deviation	Spike Z recovery
Dichlorodifluoromethane	N.D.	-	N.S.
Chloromethane	N.D.	-	N.S.
Vinyl Chloride	N.D.	-	N.S.
Bromoethane	N.D.	-	N.S.
Chloroethane	N.D.	-	N.S.
Trichlorofluoroethane	N.D.	-	N.S.
1,1-Dichloroethene	N.D.	-	N.S.
Methylene Chloride	N.D.	-	N.S.
trans-1,2-Dichloroethene	N.D.	-	N.S.
1,1-Dichloroethane (N.S.)	N.D.	3	108
Chloroform	N.D.	-	N.S.
1,1,1-Trichloroethane (TCA)	N.D.	-	N.S.
Carbon Tetrachloride	N.D.	-	N.S.
1,2-Dichloroethane (EDC)	N.D.	-	N.S.
Trichloroethene (TCE) (N.S.)	N.D.	2	101
1,2-Dichloropropane	N.D.	-	N.S.
Bromodichloroethane	N.D.	-	N.S.
2-Chloroethylvinyl ether	N.D.	-	N.S.
trans-1,3-Dichloropropene	N.D.	0	102
cis-1,3-Dichloropropene	N.D.	-	N.S.
1,1,2-Trichloroethane	N.D.	-	N.S.
Tetrachloroethene (N.S.)	N.D.	1	107
Bibromochloroethane	N.D.	-	N.S.
Chlorobenzene	N.D.	-	N.S.
Bromoform	N.D.	-	N.S.
1,1,2,2-Tetrachloroethane	N.D.	-	N.S.
1,3-Dichlorobenzene	N.D.	-	N.S.
1,4-Dichlorobenzene	N.D.	-	N.S.
1,2-Dichlorobenzene	N.D.	-	N.S.

QUALITY CONTROL DATA

Surrogate Spike Z Recovery			
Bromoethane	105 Z	100 Z	105 Z
1,4-Dichlorobutane	102 Z	100 Z	104 Z

N.D.: Not Detected  
N.S.: Not Spiked

  
Analytical Supervisor



Report Date: 17-Aug-88  
PACE JOB #: HLA 08144.05-L  
Analytical Method: EPA 8020  
MATRIX: SOIL

Extract/Purge Date: 02-Aug-88  
Completion Date: 02-Aug-88  
Analyst: ATTIA

LAB #:	8-7219	8-7222	8-7231	
CLIENT'S ID:	B19-10.5	B19-20.5	B3-26.0	
COMPOUND	RESULT (ug/kg)	RESULT (ug/kg)	RESULT (ug/kg)	Detection Limit (ug/kg)
Benzene-----	N.D.	13	7.0	0.2
Toluene-----	N.D.	13	N.D.	0.2
Chlorobenzene-----	N.D.	N.D.	N.D.	0.2
Ethylbenzene-----	N.D.	0.6	2.5	0.2
Xylene-----	N.D.	4.5	4.4	0.2
1,3-Dichlorobenzene-----	N.D.	N.D.	N.D.	0.2
1,4-Dichlorobenzene-----	N.D.	N.D.	N.D.	0.2
1,2-Dichlorobenzene-----	N.D.	N.D.	N.D.	0.2

QUALITY CONTROL DATA

Surrogate Spike                      Percent Recovery  
Fluorobenzene                              98 %                      84 %                      104 %

LAB #:	8-7224	
CLIENT'S ID:	B19.25.5	
COMPOUND	RESULT (ug/kg)	Detection Limit (ug/kg)
Benzene-----	11,000	400
Toluene-----	88,000	400
Chlorobenzene-----	N.D.	400
Ethylbenzene-----	23,000	400
Xylene-----	130,000	400
1,3-Dichlorobenzene-----	N.D.	400
1,4-Dichlorobenzene-----	N.D.	400
1,2-Dichlorobenzene-----	N.D.	400

QUALITY CONTROL DATA

Surrogate Spike                      Percent Recovery  
Fluorobenzene                              84 %

N.D.: Not detected

*Attia*  
-----  
Analytical Supervisor

QUALITY CONTROL DATA  
METHOD: EPA 8020

PACE JOB#: HLA 08144.05-L

COMPOUND	Blank (ug/l)	Spike Duplicate % deviation	Spike % recovery
Benzene-----	N.D.	16	114
Toluene-----	N.D.	9	101
p-Xylene-----	N.D.	6	104


QUALITY CONTROL DATA  
Surrogate Spike % Recovery  
Fluorobenzene

93 %

114 %

112%

N.D.: Not Detected



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Analytical Supervisor

Report Date: 17-Aug-88 Extract/Purge Date: 04-Aug-88  
 PACE JOB #: HLA 08144.05-L Analysis Completion: 04-Aug-88  
 Analytical Method: EPA 7000 SERIES Analyst: WALKER  
 MATRIX: SOIL

LAB #	CLIENT ID	LEAD Pb (mg/kg)
8-7224	B19-25.5	1.26

Detection Limit: 1.00  
 Method #: EPA 7420

QUALITY CONTROL DATA PACE JOB #: HLA 08144.05-L

COMPOUND	Blank (mg/l)	Spike Duplicate % deviation	Spike % recovery
LEAD	N.D.	6	89



-----  
 Analytical Supervisor

Report Date: 17-Aug-88  
 PACE JOB #: HLA 08144.05-L  
 Analytical Method: EPA 8270  
 MATRIX: SOIL

Extract/Purge Date: 05-Aug-88  
 Completion Date: 08-Aug-88  
 Analyst: Siegmund/Moezzi

-----  
 LAB #: 8-7231 CLIENT'S ID: B3-26.0  
 -----

BASE NEUTRALS	RESULT (ug/kg)	Detection Limit (ug/kg)
N-Nitrosodimethylamine	N.D.	n.d.
Aniline	N.D.	n.d.
Bis(2-chloroethyl) ether	N.D.	44
1,3-Dichlorobenzene	N.D.	44
1,4-Dichlorobenzene	N.D.	44
1,2-Dichlorobenzene	N.D.	44
Bis(2-chloroisopropyl)ether	N.D.	44
N-Nitroso-di-N-propylamine	N.D.	44
Hexachloroethane	N.D.	44
Nitrobenzene	N.D.	44
Isophorone	N.D.	44
Bis(2-chloroethoxy)methane	N.D.	44
1,2,4-Trichlorobenzene	N.D.	44
Naphthalene	N.D.	44
Hexachlorobutadiene	N.D.	44
Hexachlorocyclopentadiene	N.D.	44
2-Chloronaphthalene	N.D.	44
Dimethylphthalate	N.D.	44
Acenaphthylene	N.D.	44
2,6-Dinitrotoluene	N.D.	44
Acenaphthene	N.D.	44
Dibenzofuran	N.D.	44
2,4-Dinitrotoluene	N.D.	44
Diethyl phthalate	N.D.	44
Fluorene	N.D.	44
4-Chlorophenylphenyl ether	N.D.	44
N-Nitrosodiphenyl amine	N.D.	n.d.
1,2-Diphenylhydrazine	N.D.	44
4-Bromophenylphenyl ether	N.D.	44
Hexachlorobenzene	N.D.	44
Phenanthrene	N.D.	44
Anthracene	N.D.	44
Di-n-butyl phthalate	N.D.	44
Fluoranthene	N.D.	44
Benzidine	N.D.	n.d.
Pyrene	N.D.	44
Butylbenzyl phthalate	N.D.	44
Benzo(a)anthracene	N.D.	44
3,3'-Dichlorobenzidine	N.D.	87
Chrysene	N.D.	44
Bis(2-ethylhexyl) phthalate	N.D.	44

# REPORT OF LABORATORY ANALYSIS

Offices:  
 Minneapolis, Minnesota  
 Tampa, Florida  
 Coralville, Iowa  
 Novato, California

**pace**  
 laboratories, inc.  
 FORMERLY WESCO LABORATORIES  
 BASE NEUTRALS (cont)

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<b>LAB #:</b> 8-7231	<b>CLIENT'S ID:</b>	B3-26.0
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	RESULT (ug/kg)	Detection Limit (ug/kg)
Di-n-octyl phthalate	N.D.	44
Benzo(b)fluoranthene	N.D.	44
Benzo(k)fluoranthene	N.D.	44
Benzo(a)pyrene	N.D.	44
Indeno(1,2,3-cd)pyrene	N.D.	44
Dibenzo(a,h)anthracene	N.D.	44
Benzo(g,h,i)perylene	N.D.	44

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	Base/Neutral Surrogate Spike Recovery
QUALITY CONTROL DATA	
Nitrobenzene-d5	77 %
2-Fluorobiphenyl	91 %
Terphenyl-d14	82 %

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	RESULT (ug/kg)	Detection Limit (ug/kg)
ACID COMPOUNDS		
Phenol	N.D.	44
2-Chlorophenol	N.D.	44
2-Methylphenol	N.D.	44
4-Methylphenol	N.D.	44
2-Nitrophenol	N.D.	44
2,4-Dimethylphenol	N.D.	44
Benzoic Acid	N.D.	220
2,4-Dichlorophenol	N.D.	44
4-Chloro-3-methylphenol	N.D.	87
2,4,6-Trichlorophenol	N.D.	44
2,4,5-Trichlorophenol	N.D.	44
2,4-Dinitrophenol	N.D.	220
4-Nitrophenol	N.D.	220
2-Methyl-4,6-dinitrophenol	N.D.	220
Pentachlorophenol	N.D.	220

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	Acid Surrogate Spike Recovery
QUALITY CONTROL DATA	
2-Fluorophenol	30 %
Phenol-d5	31 %
2,4,6-Tribromophenol	28 %

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(Pg.2 of 4)

LAB #: 8-7231

CLIENT'S ID:

B3-26.0

1-Naphthylamine	N.D.	n.d.
2-Naphthylamine	N.D.	n.d.
2-Nitroaniline	N.D.	n.d.
3-Nitroaniline	N.D.	n.d.
4-Nitroaniline	N.D.	n.d.
N-Nitrosophenylamine	N.D.	n.d.
N-Nitrosopiperidine	N.D.	n.d.
Pentachlorobenzene	N.D.	n.d.
Pentachloronitrobenzene	N.D.	n.d.
2-Picoline	N.D.	n.d.
Pronamide	N.D.	n.d.
1,2,4,5-Tetrachlorobenzene	N.D.	n.d.
2,3,4,6-Tetrachlorobenzene	N.D.	n.d.
Toxaphene	N.D.	n.d.
Biphenyl	N.D.	n.d.
Diphenylamine	N.D.	n.d.
beta-Naphthylamine	N.D.	n.d.
Dibenzothiophene	N.D.	n.d.

N.D.: Not Detected  
N.A.: Not Applicable

n.d.: not determined

(Pg. 4 of 4)

  
Analytical Supervisor

FORMERLY WESCO LABORATORIES

QUALITY CONTROL DATA  
METHOD EPA 8270

PACE JOB#:

HLA 08144.05-L

COMPOUND	Blank (ug/l)	Spike Duplicate % Deviation	% Spike Recovery
<b>BASE NEUTRAL COMPOUNDS</b>			
N-Nitrosodimethylamine	N.D.	n.s.	n.s.
Aniline	N.D.	n.s.	n.s.
Bis(2-chloroethyl) ether	N.D.	n.s.	n.s.
1,3-Dichlorobenzene	N.D.	n.s.	n.s.
1,4-Dichlorobenzene (MS)	N.D.	8	88
1,2-Dichlorobenzene	N.D.	n.s.	n.s.
Bis(2-chloroisopropyl) ether	N.D.	n.s.	n.s.
N-Nitroso-di-N-propylamine	N.D.	n.s.	n.s.
Hexachloroethane	N.D.	n.s.	n.s.
Nitrobenzene-d5 (SS)	N.A.	5	83
Nitrobenzene	N.D.	n.s.	n.s.
Isophorone	N.D.	n.s.	n.s.
Bis(2-chloroethoxy)methane	N.D.	n.s.	n.s.
1,2,4-Trichlorobenzene	N.D.	n.s.	n.s.
Naphthalene	N.D.	n.s.	n.s.
Hexachlorobutadiene	N.D.	n.s.	n.s.
Hexachlorocyclopentadiene	N.D.	n.s.	n.s.
2-Fluorobiphenyl (SS)	N.A.	12	107
2-Chloronaphthalene	N.D.	n.s.	n.s.
Dimethylphthalate	N.D.	n.s.	n.s.
Acenaphthylene	N.D.	n.s.	n.s.
2,6-Dinitrotoluene	N.D.	n.s.	n.s.
Acenaphthene (MS)	N.D.	13	41
Dibenzofuran	N.D.	n.s.	n.s.
2,4-Dinitrotoluene (MS)	N.D.	11	85
Diethyl phthalate	N.D.	n.s.	n.s.
Fluorene	N.D.	n.s.	n.s.
4-Chlorophenylphenyl ether	N.D.	n.s.	n.s.
N-Nitrosodiphenyl amine	N.D.	n.s.	n.s.
1,2-Diphenylhydrazine	N.D.	n.s.	n.s.
4-Bromophenylphenyl ether	N.D.	n.s.	n.s.
Hexachlorobenzene	N.D.	n.s.	n.s.
Phenanthrene	N.D.	n.s.	n.s.
Anthracene	N.D.	n.s.	n.s.
Di-n-butyl phthalate	N.D.	n.s.	n.s.
Fluoranthene	N.D.	n.s.	n.s.
Benzidine	N.D.	n.s.	n.s.
Pyrene (MS)	N.D.	24	42
Terphenyl-d12 (SS)	N.A.	9	102
Butylbenzyl phthalate	N.D.	n.s.	n.s.
Benzo(a)anthracene	N.D.	n.s.	n.s.

(Pg.1 of 3)



laboratories, inc.

FORMERLY WESCO LABORATORIES

REPORT OF LABORATORY ANALYSIS

Offices:  
 Minneapolis, Minnesota  
 Tampa, Florida  
 Coraiville, Iowa  
 Novato, California

QUALITY CONTROL DATA (cont.)

METHOD: EPA 8270	PACE JOB#:		HLA 08144.05-L
3,3'-Dichlorobenzidine	N.D.	n.s.	n.s.
Chrysene	N.D.	n.s.	n.s.
Bis(2-ethylhexyl) phthalate	N.D.	n.s.	n.s.
Di-n-octyl phthalate	N.D.	n.s.	n.s.
Benzo(b)fluoranthene	N.D.	n.s.	n.s.
Benzo(k)fluoranthene	N.D.	n.s.	n.s.
Benzo(a)pyrene	N.D.	n.s.	n.s.
Indeno(1,2,3-cd)pyrene	N.D.	n.s.	n.s.
Dibenzo(a,h)anthracene	N.D.	n.s.	n.s.
Benzo(g,h,i)perylene	N.D.	n.s.	n.s.
<b>ACID COMPOUNDS</b>			
2-Fluorophenol (SS)	N.A.	6	36
Phenol-d5 (SS)	N.A.	9	36
Phenol (MS)	N.D.	10	62
2-Chlorophenol	N.D.	n.s.	n.s.
2-Methylphenol	N.D.	n.s.	n.s.
4-Methylphenol	N.D.	n.s.	n.s.
2-Nitrophenol	N.D.	n.s.	n.s.
2,4-Dimethylphenol	N.D.	n.s.	n.s.
Benzoic Acid	N.D.	n.s.	n.s.
2,4-Dichlorophenol	N.D.	n.s.	n.s.
4-Chloro-3-methylphenol (MS)	N.D.	11	68
2,4,6-Trichlorophenol	N.D.	n.s.	n.s.
2,4,5-Trichlorophenol	N.D.	n.s.	n.s.
2,4-Dinitrophenol	N.D.	n.s.	n.s.
4-Nitrophenol	N.D.	n.s.	n.s.
2-Methyl-4,6-dinitrophenol	N.D.	n.s.	n.s.
2,4,6-Tribromophenol (SS)	N.A.	10	61
Pentachlorophenol (MS)	N.D.	18	42

(Pg.2 of 3)



QUALITY CONTROL DATA (cont.)

METHOD: EPA 8270

PACE JOB#:

HLA 08144.05-L

PESTICIDES

alpha-BHC	N.D.	n.s.	n.s.
beta-BHC	N.D.	n.s.	n.s.
gamma-BHC	N.D.	n.s.	n.s.
delta-BHC	N.D.	n.s.	n.s.
Heptachlor	N.D.	n.s.	n.s.
Aldrin	N.D.	n.s.	n.s.
Heptachlor epoxide	N.D.	n.s.	n.s.
Endosulfan I	N.D.	n.s.	n.s.
4,4'-DDE	N.D.	n.s.	n.s.
4-Terphenyl-d14 (SS)	N.A.		
Dieldrin	N.D.	n.s.	n.s.
Endrin	N.D.	n.s.	n.s.
Endosulfan II	N.D.	n.s.	n.s.
4,4'-DDD	N.D.	n.s.	n.s.
Endrin Aldehyde	N.D.	n.s.	n.s.
4,4'-DDT	N.D.	n.s.	n.s.
Endosulfan Sulfate	N.D.	n.s.	n.s.

QUALITY CONTROL DATA

Base/Neutral Blank	S. S. Recovery	Acid Blank	S. S. Recovery
Nitrobenzene-d5	116 %	2-Fluorophenol	38 %
2-Fluorobiphenyl	110 %	Phenol-d5	37 %
Terphenyl-d14	85 %	2,4,6-Tribromophenol	28 %

N.D.: Not Detected  
 N.R.: Not Recovered  
 n.s.: not spiked

(SS): Surrogate Spike  
 (MS): Matrix Spike  
 N.A.: Not Applicable



Analytical Supervisor

(Pg.3 of 3)



Harding Lawson Associates  
Environmental Services Division  
200 Rush Landing Road  
Novato, California 94947  
(415) 892-0821

# CHAIN OF CUSTODY FORM

Added by JFE 8/4/88

Project job #: HA 08144.05

Samplers: D. Stolzman

Recorder: Roberta Stolzman  
(Signature Required)

Job Number: 9382.030.02

Name/Location: City of Oakland

Project Manager: David L. Leland

## ANALYSIS REQUESTED

EPA 601/6010	EPA 602/6020	EPA 624/6240	EPA 625/6270	Priority Pestic. Metals	Benzene/Toluene/Xylene	Total Petrol. Hydrocarb.	TPH - 6.1 & Hydrolyzable	Lead
X	X					X		
						X		
X	X					X		
Y						X		
Y						X		
								X

SOURCE CODE	MATRIX				#CONTAINERS & PRESERV.			SAMPLE NUMBER OR LAB NUMBER			DATE				STATION DESCRIPTION/ NOTES	
	Water	Sediment	Soil	Oil	Unpres.	H <sub>2</sub> O <sub>2</sub>	HNO <sub>3</sub>	Yr	Wk	Seq.	Yr	Mo	Dy	Time		
	50		X			1			8	19	-10.5	88	07	29		08
		Y			1									09	15	Hold
		X			1									09	15	Hold
		Y			1									09	40	
		Y			1									10	00	
		Y			1									10	00	
		Y			1									10	40	Hold? #7225
		Y			1									13	05	Hold?
		Y			1									13	25	Hold?
		Y			1									13	40	Hold?

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

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	RECEIVED FOR LAB BY: (Signature) DATE/TIME
Roberta Stolzman	7-29-88 1720	Michelle Coney 7-29 1720
METHOD OF SHIPMENT		

FORM HARDING LAWSON ASSOC. (7/86) 841-00

Report date: August 25, 1988  
 Client: Harding Lawson Associates  
 200 Rush Landing Road  
 Novato, CA 94947  
 Attn.: David Leland

Pace job #: HLA 0814406-L

Date sampled: August 1, 1988  
 Sampled by: Robert Stolzman

Site: City of Oakland

Date received: August 1, 1988  
 Submitted by: R. Stolzman

P.O.: 9382,030.02

Lab #	Client ID	Matrix	Analysis
8- 7283	8831-0001	water	Purg. Halocarbons 601
8- 7283	8831-0001	water	TPH light w/ BTXE
8- 7284	8831-0001	water	Lead 7420
8- 7263	B-2-06.0	soil	
8- 7264	B-2-10.0	soil	
8- 7265	B-2-20.0	soil	
8- 7266	B-2-25.0	soil	
8- 7267	B-2-30.0	soil	Diesel 3550/8015
8- 7267	B-2-30.0	soil	TPH light only 5030/8015
8- 7267	B-2-30.0	soil	Vol Org. Cpds. 8010+8020
8- 7268	B-6-05.0	soil	
8- 7271	B-6-10.0	soil	
8- 7269	B-6-15.5	soil	
8- 7270	B-6-20.0	soil	
8- 7272	B-6-25.5	soil	Diesel 3550/8015
8- 7272	B-6-25.5	soil	TPH light only 5030/8015
8- 7272	B-6-25.5	soil	Vol Org. Cpds. 8010+8020
8- 7273	B-6-30.0	soil	
8- 7274	B-6-35.0	soil	
8- 7275	B-6-40.5	soil	
8- 7276	B-7-05.5	soil	Purg. Halocarbons 8010
8- 7276	B-7-05.5	soil	Diesel 3550/8015
8- 7276	B-7-05.5	soil	TPH light only 5030/8015

Report date: August 25, 1988  
Client: Harding Lawson Associates  
200 Rush Landing Road  
Novato, CA 94947  
Attn.: David Leland

Pace job #: HLA 0814406-L

Date sampled: August 1, 1988  
Sampled by: Robert Stolzman

Site: City of Oakland

Date received: August 1, 1988  
Submitted by: R. Stolzman

P.O.: 9382, 030.02

Lab #	Client ID	Matrix	Analysis
8- 7277	B-7-06.0	soil	Purg. Aromatics 8020
8- 7278	B-7-10.0	soil	Purg. Halocarbons 8010
8- 7278	B-7-10.0	soil	Diesel 3550/8015
8- 7278	B-7-10.0	soil	TPH light only 5030/8015
8- 7279	B-7-10.5	soil	Purg. Aromatics 8020
8- 7280	B-7-15.5	soil	
8- 7281	B-7-16.0	soil	
8- 7282	B-7-20.5	soil	

Dear Client,

No problems were encountered with the analysis of your samples. We will store samples for 30 days after the report date. The samples will be returned to the client after the 30-day period, unless other arrangements are made. If you have any questions, please feel free to call, (415)883-6100.

  
-----  
Sample Controller

Report Date: 25-Aug-88  
 PACE JOB #: HLA 08144.06-L  
 Analytical Method: EPA 8020  
 MATRIX: SOIL

Extract/Purge Date: SEE BELOW  
 Completion Date: SEE BELOW  
 Analyst: LEWIS

LAB #: 8-7267 8-7272  
 CLIENT'S ID: B-2-30.0 B-6-25.5  
 Completion Date: 15-AUG-88 12-AUG-88

COMPOUND	RESULT (ug/kg)	RESULT (ug/kg)	Detection Limit (ug/kg)
Benzene-----	N.D.	N.D.	0.2
Toluene-----	1.5	28	0.2
Chlorobenzene-----	N.D.	N.D.	0.2
Ethylbenzene-----	N.D.	N.D.	0.2
Xylene-----	N.D.	N.D.	0.2
1,3-Dichlorobenzene-----	N.D.	N.D.	0.2
1,4-Dichlorobenzene-----	N.D.	N.D.	0.2
1,2-Dichlorobenzene-----	N.D.	N.D.	0.2

**QUALITY CONTROL DATA**

Surrogate Spike                      Percent Recovery  
 Fluorobenzene                              95 %                      105 %

N.D.: Not Detected

*Atkins*

-----  
 Analytical Supervisor

Report Date: 25-Aug-88  
 PACE JOB #: HLA 08144.06-L  
 Analytical Method: EPA 8020  
 MATRIX: SOIL

Extract/Purge Date: 12-AUG-88  
 Completion Date: 12-AUG-88  
 Analyst: LEWIS

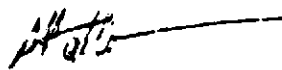
LAB #: 8-7277 8-7279  
 CLIENT'S ID: B-7-06.0 B-7-10.5

COMPOUND	RESULT (ug/kg)	RESULT (ug/kg)	Detection Limit (ug/kg)
Benzene-----	N.D.	N.D.	0.2
Toluene-----	21	1.3	0.2
Chlorobenzene-----	N.D.	N.D.	0.2
Ethylbenzene-----	N.D.	N.D.	0.2
Xylene-----	N.D.	N.D.	0.2
1,3-Dichlorobenzene-----	N.D.	N.D.	0.2
1,4-Dichlorobenzene-----	N.D.	N.D.	0.2
1,2-Dichlorobenzene-----	N.D.	N.D.	0.2

QUALITY CONTROL DATA

Surrogate Spike                      Percent Recovery  
 Fluorobenzene                              99 %                      110 %

N.D.: Not Detected



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 Analytical Supervisor

Report date: 25-Aug-88  
 PACE JOB #: HLA 08144.06-L  
 Analytical Method: 5030/8015  
 MATRIX: SOIL

Extract/Purge Date: 05-AUG-88  
 Completion Date: 05-AUG-88  
 Analyst: LEWIS/ATTIA

LAB #: 8-7267 CLIENT'S ID: B-2-30.0  
 -----  
 COMPOUND RESULT Detection  
 MATRIX: SOIL (ug/kg) Limit(ug/kg)  
 Total Petroleum Hydrocarbons (light)--- N.D. 50.0  
 -----

QUALITY CONTROL DATA Surrogate Spike & Recovery  
 Fluorobenzene 88 %

LAB #: 8-7272 CLIENT'S ID: B-6-25.5  
 -----  
 COMPOUND RESULT Detection  
 MATRIX: SOIL (ug/kg) Limit(ug/kg)  
 Total Petroleum Hydrocarbons (light)--- N.D. 50.0  
 -----

QUALITY CONTROL DATA Surrogate Spike & Recovery  
 Fluorobenzene 99 %

LAB #: 8-7276 CLIENT'S ID: B-7-05.5  
 -----  
 COMPOUND RESULT Detection  
 MATRIX: SOIL (ug/kg) Limit(ug/kg)  
 Total Petroleum Hydrocarbons (light)--- N.D. 50.0  
 -----

QUALITY CONTROL DATA Surrogate Spike & Recovery  
 Fluorobenzene 110 %

N.D.: Not Detected

*Attia*

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 Analytical Supervisor

Report Date: 25-Aug-88  
 PACE JOB #: HLA 08144.06-L  
 Analytical Method: SEE BELOW  
 MATRIX: SEE BELOW

Extract/Purge Date: SEE BELOW  
 Completion Date: SEE BELOW  
 Analyst: LEWIS

Analytical Method: 5030/8015  
 LAB #: 8-7278

DATE COMPLETED: 05-AUG-88  
 CLIENT'S ID: B-7-10.0

COMPOUND	RESULT	Detection
MATRIX: SOIL	(ug/kg)	Limit(ug/kg)
Total Petroleum Hydrocarbons (light)---	N.D.	50.0

QUALITY CONTROL DATA Surrogate Spike % Recovery  
 Fluorobenzene 117 %

Analytical Method: 5030/8015/8020  
 LAB #: 8-7283

DATE COMPLETED: 08-AUG-88  
 CLIENT'S ID: 310001

COMPOUND	RESULT	Detection
MATRIX: WATER	(ug/l)	Limit(ug/l)
Benzene-----	N.D.	0.5
Toluene-----	N.D.	0.5
Ethylbenzene-----	N.D.	0.5
Xylene-----	N.D.	0.5
Total Petroleum Hydrocarbons (light)---	N.D.	50.0

QUALITY CONTROL DATA Surrogate Spike % Recovery  
 Fluorobenzene 91 %

N.D.: Not Detected

*Atto*

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 Analytical Supervisor



QUALITY CONTROL DATA

METHOD: 5030/8015 PACE JOB #: HLA 08144.06-L  
 SAMPLE #: 8-7267, 8-7272, 8-7276, 8-7278

COMPOUND	Blank ug/l	Spike Duplicate % deviation	Spike % recovery
Gasoline-----	N.D.	7	103

QUALITY CONTROL DATA

Surrogate Spike % Recovery  
 Fluorobenzene 96 % 98 % 93 %

QUALITY CONTROL DATA

METHOD: 5030/8015/8020 PACE JOB #: HLA 08144.06-L  
 SAMPLE #: 8-7283

COMPOUND	Blank ug/l	Spike Duplicate % deviation	Spike % recovery
Benzene-----	N.D.	3	94
Toluene-----	N.D.	2	95
Xylene-----	N.D.	4	95
Gasoline-----	N.D.	10	94

QUALITY CONTROL DATA

Surrogate Spike % Recovery  
 Fluorobenzene 88 % 97 % 97 %

N.D.: Not detected

*AH*

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 Analytical Supervisor

Report Date: 25-Aug-88 Extract/Purge Date: 09-AUG-88  
 PACE JOB #: HLA 08144.06-L Analysis Completion: 09-AUG-88  
 Analytical Method: EPA 7000 SERIES Analyst: WALKER  
 MATRIX: WATER

-----  
 LAB # CLIENT ID LEAD  
 Pb  
 (mg/l)  
 -----  
 8-7284 310001 N.D.

DETECTION LIMIT: 0.10  
 METHOD #: EPA 7420

QUALITY CONTROL DATA PACE JOB #: HLA 08144.06-L  
 -----

COMPOUND Blank Spike Duplicate Spike  
 (mg/l) % deviation % recovery  
 -----

LEAD N.D. 1 108

*Attello*

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 Analytical Supervisor



Harding Lawson Associates  
 Environmental Services Division  
 200 Rush Landing Road  
 Novato, California 94947  
 (415) 892-0821

CHAIN OF CUSTODY FORM

Job Number: 9382.030.02  
 Name/Location: City of Oakland  
 Project Manager: David F. Leland

Samplers: R. Stolzman  
 Recorder: Robert A. Stolzman  
(Signature Required)

SOURCE CODE	MATRIX				#CONTAINERS & PRESERV.			SAMPLE NUMBER OR LAB NUMBER			DATE				STATION DESCRIPTION/NOTES
	Water	Sediment	Soil	Oil	Unpres.	H <sub>2</sub> SO <sub>4</sub>	HNO <sub>3</sub>	Yr	Wk	Seq	Yr	Mo	Dy	Time	
W		X			1			B-2	-06.	088	08	09	10	0855	Hold
		X			1			B-2	-10.	0				0910	Hold
		X			1			B-2	-20.	0				0945	Hold
		X			1			B-2	-25.	0				1000	Hold
		X			1			B-2	-30.	0				1020	
		X			1			B-6	-05.	0				1340	Hold
		X			1			B-6	-15.	5				1410	Hold
		X			1			B-6	-20.	0				1430	Hold
		X			1			B-6	-10.	0				1755	Hold
		X			1			B-6	-25.	5				1850	

ANALYSIS REQUESTED										
EPA 601/8010										
EPA 602/8020										
EPA 624/8240										
EPA 625/8270										
Priority Pestic. Metals										
Benzene/Toluene/Xylene										
Total Petrol. Hydrocarb.										
<u>TPH-L-1-Hy by EUS</u>										

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

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	RECEIVED FOR LAB BY: (Signature) DATE/TIME
<u>Robert A. Stolzman</u>	5-1-08 1910	<u>Michelle Cary</u> 8/1/1910
METHOD OF SHIPMENT		



Harding Lawson Associates  
Environmental Services Division  
200 Rush Landing Road  
Novato, California 94947  
(415) 892-0821

# CHAIN OF CUSTODY FORM

Job Number: Q382.030.02  
Name/Location: City of Oakland  
Project Manager: David F. Leland

Samplers: R. Stolzman  
Recorder: Robert A. Stolzman  
(Signature Required)

SOURCE CODE	MATRIX				#CONTAINERS & PRESERV.			SAMPLE NUMBER OR LAB NUMBER			DATE				STATION DESCRIPTION/NOTES
	Water	Sediment	Soil	Oil	Unpres.	H <sub>2</sub> SO <sub>4</sub>	HNO <sub>3</sub>	Yr	Wk	Seq	Yr	Mo	Dy	Time	
SD					1			B-6-30	.0	8	8	8	0	11 51 15	Hold
					1			B-6-35	.0					15 35	Hold
					1			B-6-40	.5					16 00	Hold
					1			B-7-05	.5					17 20	
					1			B-7-06	.0					17 20	
					1			B-7-10	.0					17 20	
					1			B-7-10	.5					17 20	
					1			B-7-15	.5					17 35	Hold
					1			B-7-16	.0					17 35	Hold
					1			B-7-20	.5					17 50	Hold

ANALYSIS REQUESTED						
EPA 601/8010						
EPA 602/8020						
EPA 624/8240						
EPA 625/8270						
Priority Pollut. Metals						
Benzene/Toluene/Xylene						
Total Petrol. Hydrocarb.						
TTH-C-14 by F015						

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

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	RECEIVED FOR LAB BY: (Signature)	DATE/TIME
Robert A. Stolzman	8-1-88 1720	Michelle Carey	8/1 1720
METHOD OF SHIPMENT			



Harding Lawson Associates  
Environmental Services Division  
200 Rush Landing Road  
Novato, California 94947  
(415) 892-0821

# CHAIN OF CUSTODY FORM

HLA 08144.05

PAGE 3 OF 3

Job Number: 9382.030.02  
Name/Location: City of Oakland  
Project Manager: David Leland

Samplers: R. Stolzen  
Recorder: Robert A. Stolzen  
(Signature Required)

SOURCE CODE	MATRIX				#CONTAINERS & PRESERV.			SAMPLE NUMBER OR LAB NUMBER			DATE			
	Water	Sediment	Soil	Oil	Unpres.	H <sub>2</sub> SO <sub>4</sub>	HNO <sub>3</sub>	Yr	Wk	Seq	Yr	Mo	Dy	Time
10	X				3			88	31	000	88	08	01	1220

STATION DESCRIPTION/ NOTES

ANALYSIS REQUESTED										
EPA 601/8010	EPA 602/8020	EPA 624/8240	EPA 625/8270	Priority Pollut. Metals	Benzene/Toluene/Xylene	Total Petrol. Hydrocarb.	TPH - Lt only	BTEX	Lead	
X							X	X	X	

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

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	RECEIVED FOR LAB BY: (Signature) DATE/TIME
Robert A. Stolzen	8-1-88 1220	Michelle Coxy 8/1/17 20
METHOD OF SHIPMENT		

Report date: August 25, 1988  
 Client: Harding Lawson Associates  
 200 Rush Landing Road  
 Novato, CA 94947  
 Attn.: David Leland

Pace job #: HLA 0814407-L

Date sampled: August 2, 1988  
 Sampled by: Robert Stolzman

Site: City of Oakland

Date received: August 2, 1988  
 Submitted by: Robert Stolzman

P.O.: 9382, 030.02

Lab #	Client ID	Matrix	Analysis
8- 7338	310002	water	TPH light w/ BTXE
8- 7339	310002	water	Lead 7420
8- 7330	B1-05.5	soil	
8- 7331	B1-06.0	soil	
8- 7332	B1-10.5	soil	
8- 7333	B1-11.0	soil	
8- 7334	B1-16.5	soil	
8- 7335	B1-17.0	soil	
8- 7336	B1-20.5	soil	
8- 7340	B1-30.0	soil	Purg. Halocarbons 8010
8- 7340	B1-30.0	soil	Diesel 3550/8015
8- 7340	B1-30.0	soil	TPH light only 5030/8015
8- 7337	B1-30.5	soil	Purg. Aromatics 8020
8- 7341	B1-36.5	soil	Diesel 3550/8015
8- 7341	B1-36.5	soil	TPH light only 5030/8015
8- 7341	B1-36.5	soil	Vol Org. Cpds. 8010+8020
8- 7322	B14-05.5	soil	
8- 7323	B14-10.0	soil	Purg. Halocarbons 8010
8- 7323	B14-10.0	soil	GC/MS Extr. Org. ppol. 8270
8- 7324	B14-10.5	soil	Purg. Aromatics 8020
8- 7324	B14-10.5	soil	Diesel 3550/8015
8- 7324	B14-10.5	soil	TPH light only 5030/8015
8- 7325	B14-15.5	soil	

Report date: August 25, 1988  
Client: Harding Lawson Associates  
200 Rush Landing Road  
Novato, CA 94947  
Attn.: David Leland

Pace job #: HLA 0814407-L

Date sampled: August 2, 1988  
Sampled by: Robert Stolzman

Site: City of Oakland

Date received: August 2, 1988  
Submitted by: Robert Stolzman

P.O.: 9382, 030.02

Lab #	Client ID	Matrix	Analysis
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Dear Client,

No problems were encountered with the analysis of your samples. We will store samples for 30 days after the report date. The samples will be returned to the client after the 30-day period, unless other arrangements are made. If you have any questions, please feel free to call, (415)883-6100.

  
-----  
Sample Controller

Report Date: 25-Aug-88  
PACE JOB #: HLA 08144.07-L  
Analytical Method: EPA 8010  
MATRIX: SOIL

Extract/Purge Date: 15-Aug-88  
Completion Date: 15-Aug-88  
Analyst: ATTIA

LAB #:	8-7328	8-7340	8-7341	
CLIENT'S ID:	B14-25.5	B1-30.0	B-1-36.5	
COMPOUND	RESULT (ug/kg)	RESULT (ug/kg)	RESULT (ug/kg)	Detection Limit (ug/kg)
Dichlorodifluoromethane-----	N.D.	N.D.	N.D.	2.0
Chloromethane-----	N.D.	N.D.	N.D.	2.0
Vinyl Chloride-----	N.D.	N.D.	N.D.	2.0
Bromomethane-----	N.D.	N.D.	N.D.	2.0
Chloroethane-----	N.D.	N.D.	N.D.	2.0
Trichlorofluoromethane-----	N.D.	N.D.	N.D.	2.0
1,1-Dichloroethene-----	N.D.	N.D.	N.D.	0.5
Methylene Chloride-----	3.1	1.0	1.1	0.5
trans-1,2-Dichloroethene-----	N.D.	N.D.	N.D.	0.5
1,1-Dichloroethane-----	N.D.	N.D.	N.D.	0.5
Chloroform-----	N.D.	N.D.	N.D.	0.5
1,1,1-Trichloroethane (TCA)-----	N.D.	N.D.	N.D.	0.5
Carbon Tetrachloride-----	N.D.	N.D.	N.D.	0.5
1,2-Dichloroethane (EDC)-----	N.D.	N.D.	0.9	0.5
Trichloroethene (TCE)-----	N.D.	N.D.	N.D.	0.5
1,2-Dichloropropane-----	N.D.	0.9	N.D.	0.5
Bromodichloromethane-----	N.D.	N.D.	N.D.	0.5
2-Chloroethylvinyl ether-----	N.D.	N.D.	N.D.	0.5
trans-1,3-Dichloropropene-----	N.D.	N.D.	N.D.	0.5
cis-1,3-Dichloropropene-----	N.D.	N.D.	N.D.	0.5
1,1,2-Trichloroethane-----	N.D.	N.D.	N.D.	0.5
Tetrachloroethene-----	N.D.	N.D.	N.D.	0.5
Dibromochloromethane-----	N.D.	0.6	N.D.	0.5
Chlorobenzene-----	N.D.	N.D.	N.D.	0.5
Bromoform-----	N.D.	N.D.	N.D.	0.5
1,1,2,2-Tetrachloroethane-----	N.D.	N.D.	N.D.	0.5
1,3-Dichlorobenzene-----	N.D.	N.D.	N.D.	0.5
1,4-Dichlorobenzene-----	N.D.	N.D.	N.D.	0.5
1,2-Dichlorobenzene-----	N.D.	N.D.	N.D.	0.5

QUALITY CONTROL DATA

Surrogate Spike	Percent Recovery		
Bromochloromethane	89%	100%	96%
1,4-Dichlorobutane	102%	91%	92%

N.D.: Not Detected

*Attia*

Analytical Supervisor



Report Date: 25-Aug-88  
PACE JOB #: HLA 08144.07-L  
Analytical Method: EPA 8010  
MATRIX: SOIL

Extract/Purge Date: 15-Aug-88  
Completion Date: 15-Aug-88  
Analyst: ATTIA

LAB #:	8-7319	8-7321	8-7323	
CLIENT'S ID:	B7-30.6	B7-35.5	B-14-10.0	
COMPOUND	RESULT (ug/kg)	RESULT (ug/kg)	RESULT (ug/kg)	Detection Limit (ug/kg)
Dichlorodifluoromethane-----	N.D.	N.D.	N.D.	2.0
Chloromethane-----	N.D.	N.D.	N.D.	2.0
Vinyl Chloride-----	N.D.	N.D.	N.D.	2.0
Bromomethane-----	N.D.	N.D.	N.D.	2.0
Chloroethane-----	N.D.	N.D.	N.D.	2.0
Trichlorofluoromethane-----	N.D.	N.D.	N.D.	2.0
1,1-Dichloroethene-----	N.D.	N.D.	N.D.	0.5
Methylene Chloride-----	0.6	0.5	1.0	0.5
trans-1,2-Dichloroethene-----	N.D.	N.D.	N.D.	0.5
1,1-Dichloroethane-----	N.D.	N.D.	N.D.	0.5
Chloroform-----	N.D.	N.D.	N.D.	0.5
1,1,1-Trichloroethane (TCA)-----	N.D.	N.D.	N.D.	0.5
Carbon Tetrachloride-----	N.D.	N.D.	N.D.	0.5
1,2-Dichloroethane (EDC)-----	N.D.	2.3	N.D.	0.5
Trichloroethene (TCE)-----	N.D.	N.D.	N.D.	0.5
1,2-Dichloropropane-----	N.D.	N.D.	N.D.	0.5
Bromodichloromethane-----	N.D.	N.D.	N.D.	0.5
2-Chloroethylvinyl ether-----	N.D.	N.D.	N.D.	0.5
trans-1,3-Dichloropropene-----	N.D.	N.D.	N.D.	0.5
cis-1,3-Dichloropropene-----	N.D.	N.D.	N.D.	0.5
1,1,2-Trichloroethane-----	N.D.	N.D.	N.D.	0.5
Tetrachloroethene-----	N.D.	N.D.	N.D.	0.5
Dibromochloromethane-----	N.D.	N.D.	N.D.	0.5
Chlorobenzene-----	N.D.	N.D.	N.D.	0.5
Bromoform-----	N.D.	N.D.	N.D.	0.5
1,1,2,2-Tetrachloroethane-----	N.D.	N.D.	N.D.	0.5
1,3-Dichlorobenzene-----	N.D.	N.D.	N.D.	0.5
1,4-Dichlorobenzene-----	N.D.	N.D.	N.D.	0.5
1,2-Dichlorobenzene-----	N.D.	N.D.	N.D.	0.5

QUALITY CONTROL DATA

Surrogate Spike	Percent Recovery		
Bromochloromethane	92%	90%	88%
1,4-Dichlorobutane	100%	103%	100%

N.D.: Not Detected

*Attia*

Analytical Supervisor

BLANK, SPIKE DUPLICATE AND SPIKE REPORT JOB #  
METHOD : EPA 8010

HLA 08144.07-L

COMPOUND	Blank (ug/l)	Spike Duplicate % deviation	Spike % recovery
Dichlorodifluoromethane	N.D.	-	N.S.
Chloromethane	N.D.	-	N.S.
Vinyl Chloride	N.D.	-	N.S.
Bromomethane	N.D.	-	N.S.
Chloroethane	N.D.	-	N.S.
Trichlorofluoromethane	N.D.	-	N.S.
1,1-Dichloroethene	N.D.	-	N.S.
Methylene Chloride	N.D.	-	N.S.
trans-1,2-Dichloroethene	N.D.	-	N.S.
1,1-Dichloroethane (M.S.)	N.D.	8	102
Chloroform	N.D.	-	N.S.
1,1,1-Trichloroethane (TCA)	N.D.	-	N.S.
Carbon Tetrachloride	N.D.	-	N.S.
1,2-Dichloroethane (EDC)	N.D.	-	N.S.
Trichloroethene (TCE) (M.S.)	N.D.	9	99
1,2-Dichloropropane	N.D.	-	N.S.
Bromodichloromethane	N.D.	-	N.S.
2-Chloroethylvinyl ether	N.D.	-	N.S.
trans-1,3-Dichloropropene	N.D.	4	109
cis-1,3-Dichloropropene	N.D.	-	N.S.
1,1,2-Trichloroethane	N.D.	-	N.S.
Tetrachloroethene (M.S.)	N.D.	5	101
Dibromochloromethane	N.D.	-	N.S.
Chlorobenzene	N.D.	-	N.S.
Bromoform	N.D.	-	N.S.
1,1,2,2-Tetrachloroethane	N.D.	-	N.S.
1,3-Dichlorobenzene	N.D.	-	N.S.
1,4-Dichlorobenzene	N.D.	-	N.S.
1,2-Dichlorobenzene	N.D.	-	N.S.

QUALITY CONTROL DATA

Surrogate Spike % Recovery			
Bromochloromethane	95 %	105 %	96 %
1,4-Dichlorobutane	103 %	106 %	104 %

N.D.: Not Detected

N.S.: Not Spiked

*Atello*

Analytical Supervisor

QUALITY CONTROL DATA

METHOD: EPA 5030/8015 PACE JOB #: HLA 08144.07-L  
 SAMPLE #: 8-7319, 8-7321, 8-7324, 8-7328, 8-7338

COMPOUND	Blank ug/l	Spike Duplicate % deviation	Spike % recovery
Gasoline-----	N.D.	3	87

QUALITY CONTROL DATA

Surrogate Spike % Recovery  
 Fluorobenzene 87 % 102 % 91 %

METHOD: EPA 5030/8015 PACE JOB #: HLA 08144.07-L  
 SAMPLE #: 8-7340, 8-7341

COMPOUND	Blank ug/l	Spike Duplicate % deviation	Spike % recovery
Gasoline-----	N.D.	7	103

QUALITY CONTROL DATA

Surrogate Spike % Recovery  
 Fluorobenzene 96 % 98 % 93 %

METHOD: EPA 5030/8015/602 PACE JOB #: HLA 08144.07-L  
 SAMPLE #: 8-7338

COMPOUND	Blank ug/l	Spike Duplicate % deviation	Spike % recovery
Benzene-----	N.D.	10	98
Tolunene-----	N.D.	3	103
Xylene-----	N.D.	3	103
Gasoline-----	N.D.	3	87

QUALITY CONTROL DATA

Surrogate Spike % Recovery  
 Fluorobenzene 87 % 102 % 91 %

N.D.: Not detected

*Atti*  
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 Analytical Supervisor

Report date: 25-Aug-88  
 PACE JOB #: HLA 08144.07-L  
 Analytical Method: EPA 5030/8015  
 MATRIX: SOIL

Extract/Purge Date: 04-Aug-88  
 Completion Date: 04-Aug-88  
 Analyst: LEWIS/ATTIA

LAB #: 8-7319 CLIENT'S ID: B7-30.0  
 -----  
 COMPOUND RESULT Detection  
 (ug/kg) Limit(ug/kg)  
 Total Petroleum Hydrocarbons (light)--- 190 50.0  
 -----  
 QUALITY CONTROL DATA Surrogate Spike % Recovery  
 Fluorobenzene 101 %

LAB #: 8-7321 CLIENT'S ID: B7-35.5  
 -----  
 COMPOUND RESULT Detection  
 (ug/kg) Limit(ug/kg)  
 Total Petroleum Hydrocarbons (light)--- N.D. 50.0  
 -----  
 QUALITY CONTROL DATA Surrogate Spike % Recovery  
 Fluorobenzene 69 %

LAB #: 8-7324 CLIENT'S ID: B14-10.5  
 -----  
 COMPOUND RESULT Detection  
 (ug/kg) Limit(ug/kg)  
 Total Petroleum Hydrocarbons (light)--- N.D. 50.0  
 -----  
 QUALITY CONTROL DATA Surrogate Spike % Recovery  
 Fluorobenzene 90 %

LAB #: 8-7328 CLIENT'S ID: B14-25.5  
 -----  
 COMPOUND RESULT Detection  
 (ug/kg) Limit(ug/kg)  
 Total Petroleum Hydrocarbons (light)--- N.D. 50.0  
 -----  
 QUALITY CONTROL DATA Surrogate Spike % Recovery  
 Fluorobenzene 99 %

N.D.: Not Detected

*Attia*

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 Analytical Supervisor

Report Date: 25-Aug-88  
 PACE JOB #: HLA 08144.07-L  
 Analytical Method: SEE BELOW  
 MATRIX: SEE BELOW

Extract/Purge Date: SEE BELOW  
 Completion Date: SEE BELOW  
 Analyst: LEWIS

Analytical Method: EPA 5030/8015/602  
 LAB #: 8-7338  
 DATE COMPLETED: 04-AUG-88  
 CLIENT'S ID: 310002

COMPOUND MATRIX: WATER	RESULT (ug/l)	Detection Limit(ug/l)
Benzene-----	5,300	50
Toluene-----	11,000	50
Ethylbenzene-----	1,200	50
Xylene-----	6,600	50
Total Petroleum Hydrocarbons (light)---	340,000	5,000

QUALITY CONTROL DATA  
 Fluorobenzene Surrogate Spike & Recovery 106 %

Analytical Method: EPA 5030/8015  
 LAB #: 8-7340  
 DATE COMPLETED: 5-AUG-88  
 CLIENT'S ID: B1-30.0

COMPOUND MATRIX: SOIL	RESULT (ug/kg)	Detection Limit(ug/kg)
Total Petroleum Hydrocarbons (light)---	2,500,000	100,000

QUALITY CONTROL DATA  
 Fluorobenzene Surrogate Spike & Recovery 93 %

Analytical Method: EPA 5030/8015  
 LAB #: 8-7341  
 DATE COMPLETED: 5-AUG-88  
 CLIENT'S ID: B1-36.5

COMPOUND MATRIX: SOIL	RESULT (ug/kg)	Detection Limit(ug/kg)
Total Petroleum Hydrocarbons (light)---	N.D.	50.0

QUALITY CONTROL DATA  
 Fluorobenzene Surrogate Spike & Recovery 99 %

N.D.: Not Detected

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 Analytical Supervisor

Report Date: 25-Aug-88 Extract/Purge Date: 04-Aug-88  
 PACE JOB #: HLA 08144.07-L Completion Date: 05-Aug-88  
 Analytical Method: EPA 3550/8015 Analyst: CLARK  
 MATRIX: SOIL

LAB #	CLIENT ID	Total Petroleum Hydrocarbons (heavy) (mg/kg)	Quantified As	Detection Limit(mg/kg)
8-7319	B7-30.0	N.D.		10
8-7321	B7-35.5	N.D.		10
8-7324	B14-10.5	N.D.		10
8-7328	B14-25.5	N.D.		10
8-7340	B1-30.0	N.D.		10
8-7341	B1-36.5	N.D.		10

QUALITY CONTROL DATA PACE JOB #: HLA 08144.07-L

COMPOUND	Blank (mg/l)	Spike Duplicate % deviation	Spike % recovery
Diesel	N.D.	10	93

N.D.: Not Detected

*Attall*

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 Analytical Supervisor

Report Date: 25-Aug-88  
PACE JOB #: HLA 08144.07-L  
Analytical Method: EPA 8020  
MATRIX: SOIL

Extract/Purge Date: 15-Aug-88  
Completion Date: 15-Aug-88  
Analyst: ATTIA

LAB #: 8-7320 8-7321  
CLIENT'S ID: B7-30.5 B7-35.5

COMPOUND	RESULT (ug/kg)	RESULT (ug/kg)	Detection Limit (ug/kg)
Benzene-----	33	N.D.	0.2
Toluene-----	16	1.6	0.2
Chlorobenzene-----	N.D.	N.D.	0.2
Ethylbenzene-----	1.0	N.D.	0.2
Xylene-----	5.4	0.9	0.2
1,3-Dichlorobenzene-----	N.D.	N.D.	0.2
1,4-Dichlorobenzene-----	N.D.	N.D.	0.2
1,2-Dichlorobenzene-----	N.D.	N.D.	0.2

QUALITY CONTROL DATA

Surrogate Spike Percent Recovery  
Fluorobenzene 97 % 80 %

LAB #: 8-7324 8-7328  
CLIENT'S ID: B14-10.5 B14-25.5

COMPOUND	RESULT (ug/kg)	RESULT (ug/kg)	Detection Limit (ug/kg)
Benzene-----	N.D.	1.8	0.2
Toluene-----	0.7	1.6	0.2
Chlorobenzene-----	N.D.	N.D.	0.2
Ethylbenzene-----	N.D.	N.D.	0.2
Xylene-----	N.D.	N.D.	0.2
1,3-Dichlorobenzene-----	N.D.	N.D.	0.2
1,4-Dichlorobenzene-----	N.D.	N.D.	0.2
1,2-Dichlorobenzene-----	N.D.	N.D.	0.2

QUALITY CONTROL DATA

Surrogate Spike Percent Recovery  
Fluorobenzene 90 % 78 %

N.D.: Not Detected

*Attia*  
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Analytical Supervisor

QUALITY CONTROL DATA  
 METHOD: EPA 8020

PACE JOB#:

HLA 08144.07-L

COMPOUND	Blank (ug/l)	Spike Duplicate % deviation	Spike % recovery
Benzene-----	N.D.	0	93
Toluene-----	N.D.	5	97
p-Xylene-----	N.D.	10	97

QUALITY CONTROL DATA

Surrogate Spike % Recovery

Fluorobenzene	100 %	104 %	99%
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N.D.: Not Detected



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 Analytical Supervisor



PESTICIDE COMPOUNDS	RESULT (ug/kg)	Detection Limit (ug/kg)
alpha-BHC	N.D.	n.d.
beta-BHC	N.D.	n.d.
gamma-BHC	N.D.	n.d.
delta-BHC	N.D.	n.d.
Heptachlor	N.D.	n.d.
Aldrin	N.D.	n.d.
Heptachlor epoxide	N.D.	n.d.
Endosulfan I	N.D.	n.d.
4,4'-DDE	N.D.	n.d.
Dieldrin	N.D.	n.d.
Endrin	N.D.	n.d.
Endosulfan II	N.D.	n.d.
4,4'-DDD	N.D.	n.d.
Endrin Aldehyde	N.D.	n.d.
4,4'-DDT	N.D.	n.d.
Endosulfan Sulfate	N.D.	n.d.

QUALITY CONTROL DATA	Pesticide Surrogate Spike Recovery
Nitrobenzene-d5	77 %
2-Fluorobiphenyl	91 %
Terphenyl-d14	82 %

OTHER EXTRACTABLES	RESULT (ug/kg)	Detection Limit (ug/kg)
Acetophenone	N.D.	n.d.
4-Aminobiphenyl	N.D.	n.d.
Arochlors	N.D.	n.d.
Benzyl Alcohol	N.D.	n.d.
Chlordane	N.D.	n.d.
4-Chloroaniline	N.D.	n.d.
1-Chloronaphthalene	N.D.	n.d.
Dibenz(a,j)acridine	N.D.	n.d.
2,6-Dichlorophenol	N.D.	n.d.
p-Dimethylaminoazobenzene	N.D.	n.d.
7,12-Dimethylbenz(a)-anthracene	N.D.	n.d.
alpha,alpha-Dimethylphenethylamine	N.D.	n.d.
Endrin Ketone	N.D.	n.d.
Ethylmethane sulfonate	N.D.	n.d.
Methoxychlor	N.D.	n.d.
3-Methylchloranthene	N.D.	n.d.
Methylmethane sulfonate	N.D.	n.d.
2-Methylnaphthalene	N.D.	n.d.

Report Date: 25-Aug-88  
 PACE JOB #: HLA 08144.07-L  
 Analytical Method: EPA 8020  
 MATRIX: SOIL

Extract/Purge Date: 15-Aug-88  
 Completion Date: 15-Aug-88  
 Analyst: ATTIA

LAB #:	8-7337		8-7341	
CLIENT'S ID:	B1-30.5		B1-36.5	
COMPOUND	RESULT (ug/kg)	Detection Limit (ug/kg)	RESULT (ug/kg)	Detection Limit (ug/kg)
Benzene-----	3,330	400	0.7	0.2
Toluene-----	35,000	400	6.3	0.2
Chlorobenzene-----	N.D.	400	N.D.	0.2
Ethylbenzene-----	32,000	400	0.6	0.2
Xylene-----	170,000	400	2.3	0.2
1,3-Dichlorobenzene-----	N.D.	400	N.D.	0.2
1,4-Dichlorobenzene-----	N.D.	400	N.D.	0.2
1,2-Dichlorobenzene-----	N.D.	400	N.D.	0.2

QUALITY CONTROL DATA

Surrogate Spike                      Percent Recovery  
 Fluorobenzene                              89 %                              102 %

N.D.: Not Detected

*Attia*

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 Analytical Supervisor

Report Date: 25-Aug-88  
 PACE JOB #: HLA 08144.07-L  
 Analytical Method: EPA 8270  
 MATRIX: SOIL

Extract/Purge Date: 05-Aug-88  
 Completion Date: 08-Aug-88  
 Analyst: Siegmund/Moezzi

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 LAB #: 8-7323 CLIENT'S ID: B14-10.0  
 -----

BASE NEUTRALS	RESULT (ug/kg)	Detection Limit (ug/kg)
N-Nitrosodimethylamine	N.D.	n.d.
Aniline	N.D.	n.d.
Bis(2-chloroethyl) ether	N.D.	44
1,3-Dichlorobenzene	N.D.	44
1,4-Dichlorobenzene	N.D.	44
1,2-Dichlorobenzene	N.D.	44
Bis(2-chloroisopropyl) ether	N.D.	44
N-Nitroso-di-N-propylamine	N.D.	44
Hexachloroethane	N.D.	44
Nitrobenzene	N.D.	44
Isophorone	N.D.	44
Bis(2-chloroethoxy)methane	N.D.	44
1,2,4-Trichlorobenzene	N.D.	44
Naphthalene	N.D.	44
Hexachlorobutadiene	N.D.	44
Hexachlorocyclopentadiene	N.D.	44
2-Chloronaphthalene	N.D.	44
Dimethylphthalate	N.D.	44
Acenaphthylene	N.D.	44
2,6-Dinitrotoluene	N.D.	44
Acenaphthene	N.D.	44
Dibenzofuran	N.D.	44
2,4-Dinitrotoluene	N.D.	44
Diethyl phthalate	N.D.	44
Fluorene	N.D.	44
4-Chlorophenylphenyl ether	N.D.	44
N-Nitrosodiphenyl amine	N.D.	44
1,2-Diphenylhydrazine	N.D.	n.d.
4-Bromophenylphenyl ether	N.D.	44
Hexachlorobenzene	N.D.	44
Phenanthrene	N.D.	44
Anthracene	N.D.	44
Di-n-butyl phthalate	N.D.	44
Fluoranthene	N.D.	44
Benzidine	N.D.	n.d.
Pyrene	N.D.	44
Butylbenzyl phthalate	N.D.	44
Benzo(a)anthracene	N.D.	44
3,3'-Dichlorobenzidine	N.D.	87
Chrysene	N.D.	44
Bis(2-ethylhexyl) phthalate	N.D.	44
Di-n-octyl phthalate	N.D.	44

**BASE NEUTRALS (cont)**

Analytical Method: EPA 8270

PACE JOB #:

HLA 08144.07-L

	RESULT (ug/kg)	Detection (ug/kg)	Limit
Benzo(b)fluoranthene	N.D.	44	
Benzo(k)fluoranthene	N.D.	44	
Benzo(a)pyrene	N.D.	44	
Indeno(1,2,3-cd)pyrene	N.D.	44	
Dibenzo(a,h)anthracene	N.D.	44	
Benzo(g,h,i)perylene	N.D.	44	

**QUALITY CONTROL DATA**

**Base/Neutral Surrogate Spike Recovery**

Nitrobenzene-d5	82 %
2-Fluorobiphenyl	99 %
Terphenyl-d14	81 %

**ACID COMPOUNDS**

RESULT (ug/kg)      Detection (ug/kg)      Limit

Phenol	N.D.	44
2-Chlorophenol	N.D.	44
2-Methylphenol	N.D.	44
4-Methylphenol	N.D.	44
2-Nitrophenol	N.D.	44
2,4-Dimethylphenol	N.D.	44
Benzoic Acid	N.D.	220
2,4-Dichlorophenol	N.D.	44
4-Chloro-3-methylphenol	N.D.	87
2,4,6-Trichlorophenol	N.D.	44
2,4,5-Trichlorophenol	N.D.	44
2,4-Dinitrophenol	N.D.	220
4-Nitrophenol	N.D.	220
2-Methyl-4,6-dinitrophenol	N.D.	220
Pentachlorophenol	N.D.	220

**QUALITY CONTROL DATA**

**Acid Surrogate Spike Recovery**

2-Fluorophenol	33 %
Phenol-d5	32 %
2,4,6-Tribromophenol	29 %

(cont.)

Analytical Method: EPA 8270

PACE JOB #:

HLA 08144.07-L

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PESTICIDE COMPOUNDS	RESULT (ug/kg)	Detection Limit (ug/kg)
alpha-BHC	N.D.	n.d.
beta-BHC	N.D.	n.d.
gamma-BHC	N.D.	n.d.
delta-BHC	N.D.	n.d.
Heptachlor	N.D.	n.d.
Aldrin	N.D.	n.d.
Heptachlor epoxide	N.D.	n.d.
Endosulfan I	N.D.	n.d.
4,4'-DDE	N.D.	n.d.
Dieldrin	N.D.	n.d.
Endrin	N.D.	n.d.
Endosulfan II	N.D.	n.d.
4,4'-DDD	N.D.	n.d.
Endrin Aldehyde	N.D.	n.d.
4,4'-DDT	N.D.	n.d.
Endosulfan Sulfate	N.D.	n.d.

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QUALITY CONTROL DATA

Pesticide Surrogate Spike Recovery

Nitrobenzene-d5	82 %
2-Fluorobiphenyl	99 %
Terphenyl-d14	81 %

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(Pg. 3 of 4)

(cont.)

Analytical Method: EPA 8270

PACE JOB #:

HLA 08144.07-L

**OTHER EXTRACTABLES**

**RESULT**  
(ug/kg)

**Detection Limit**  
(ug/kg)

Acetophenone	N.D.	n.d.
4-Aminobiphenyl	N.D.	n.d.
Arochlors	N.D.	n.d.
Benzyl Alcohol	N.D.	n.d.
Chlordane	N.D.	n.d.
4-Chloroaniline	N.D.	n.d.
1-Chloronaphthalene	N.D.	n.d.
Dibenz(a, j)acridine	N.D.	n.d.
2,6-Dichlorophenol	N.D.	n.d.
p-Dimethylaminoazobenzene	N.D.	n.d.
7,12-Dimethylbenz(a)-anthracene	N.D.	n.d.
alpha, alpha-Dimethylphenethylamine	N.D.	n.d.
Endrin Ketone	N.D.	n.d.
Ethylmethane sulfonate	N.D.	n.d.
Methoxychlor	N.D.	n.d.
3-Methylchloranthene	N.D.	n.d.
Methylmethane sulfonate	N.D.	n.d.
2-Methylnaphthalene	N.D.	n.d.
1-Naphthylamine	N.D.	n.d.
2-Naphthylamine	N.D.	n.d.
2-Nitroaniline	N.D.	n.d.
3-Nitroaniline	N.D.	n.d.
4-Nitroaniline	N.D.	n.d.
N-Nitrosophenylamine	N.D.	n.d.
N-Nitrosopiperidine	N.D.	n.d.
Pentachlorobenzene	N.D.	n.d.
Pentachloronitrobenzene	N.D.	n.d.
2-Picoline	N.D.	n.d.
Pronamide	N.D.	n.d.
1,2,4,5-Tetrachlorobenzene	N.D.	n.d.
2,3,4,6-Tetrachlorobenzene	N.D.	n.d.
Toxaphene	N.D.	n.d.
Biphenyl	N.D.	n.d.
Diphenylamine	N.D.	n.d.
beta-Naphthylamine	N.D.	n.d.
Dibenzothiophene	N.D.	n.d.

N.D.: Not Detected  
N.A.: Not Applicable

n.d.: not determined

*RAH atc*

ANALYTICAL SUPERVISOR

QUALITY CONTROL DATA  
METHOD EPA 8270

PACE JOB#:

HLA 08144.07-L

COMPOUND	Blank (ug/l)	Spike Duplicate & Deviation	% Spike Recovery
<b>BASE NEUTRAL COMPOUNDS</b>			
N-Nitrosodimethylamine	N.D.	n.s.	n.s.
Aniline	N.D.	n.s.	n.s.
Bis(2-chloroethyl) ether	N.D.	n.s.	n.s.
1,3-Dichlorobenzene	N.D.	n.s.	n.s.
1,4-Dichlorobenzene (MS)	N.D.	8	88
1,2-Dichlorobenzene	N.D.	n.s.	n.s.
Bis(2-chloroisopropyl) ether	N.D.	n.s.	n.s.
N-Nitroso-di-N-propylamine	N.D.	n.s.	n.s.
Hexachloroethane	N.D.	n.s.	n.s.
Nitrobenzene-d5 (SS)	N.A.	5	83
Nitrobenzene	N.D.	n.s.	n.s.
Isophorone	N.D.	n.s.	n.s.
Bis(2-chloroethoxy)methane	N.D.	n.s.	n.s.
1,2,4-Trichlorobenzene	N.D.	n.s.	n.s.
Naphthalene	N.D.	n.s.	n.s.
Hexachlorobutadiene	N.D.	n.s.	n.s.
Hexachlorocyclopentadiene	N.D.	n.s.	n.s.
2-Fluorobiphenyl (SS)	N.A.	12	107
2-Chloronaphthalene	N.D.	n.s.	n.s.
Dimethylphthalate	N.D.	n.s.	n.s.
Acenaphthylene	N.D.	n.s.	n.s.
2,6-Dinitrotoluene	N.D.	n.s.	n.s.
Acenaphthene (MS)	N.D.	13	41
Dibenzofuran	N.D.	n.s.	n.s.
2,4-Dinitrotoluene (MS)	N.D.	11	85
Diethyl phthalate	N.D.	n.s.	n.s.
Fluorene	N.D.	n.s.	n.s.
4-Chlorophenylphenyl ether	N.D.	n.s.	n.s.
N-Nitrosodiphenyl amine	N.D.	n.s.	n.s.
1,2-Diphenylhydrazine	N.D.	n.s.	n.s.
4-Bromophenylphenyl ether	N.D.	n.s.	n.s.
Hexachlorobenzene	N.D.	n.s.	n.s.
Phenanthrene	N.D.	n.s.	n.s.
Anthracene	N.D.	n.s.	n.s.
Di-n-butyl phthalate	N.D.	n.s.	n.s.
Fluoranthene	N.D.	n.s.	n.s.
Benzidine	N.D.	n.s.	n.s.
Pyrene (MS)	N.D.	24	42

(Pg.1 of 3)

QUALITY CONTROL DATA (cont.)

METHOD EPA 8270 PACE JOB#: HLA 08144.07-L

COMPOUND	Blank (ug/l)	Spike Duplicate % Deviation	% Spike Recovery
Terphenyl-d12 (SS)	N.A.	9	102
Butylbenzyl phthalate	N.D.	n.s.	n.s.
Benzo(a)anthracene	N.D.	n.s.	n.s.
3,3'-Dichlorobenzidine	N.D.	n.s.	n.s.
Chrysene	N.D.	n.s.	n.s.
Bis(2-ethylhexyl) phthalate	N.D.	n.s.	n.s.
Di-n-octyl phthalate	N.D.	n.s.	n.s.
Benzo(b)fluoranthene	N.D.	n.s.	n.s.
Benzo(k)fluoranthene	N.D.	n.s.	n.s.
Benzo(a)pyrene	N.D.	n.s.	n.s.
Indeno(1,2,3-cd)pyrene	N.D.	n.s.	n.s.
Dibenzo(a,h)anthracene	N.D.	n.s.	n.s.
Benzo(g,h,i)perylene	N.D.	n.s.	n.s.

ACID COMPOUNDS

2-Fluorophenol (SS)	N.A.	6	36
Phenol-d5 (SS)	N.A.	9	36
Phenol (MS)	N.D.	10	62
2-Chlorophenol	N.D.	n.s.	n.s.
2-Methylphenol	N.D.	n.s.	n.s.
4-Methylphenol	N.D.	n.s.	n.s.
2-Nitrophenol	N.D.	n.s.	n.s.
2,4-Dimethylphenol	N.D.	n.s.	n.s.
Benzoic Acid	N.D.	n.s.	n.s.
2,4-Dichlorophenol	N.D.	n.s.	n.s.
4-Chloro-3-methylphenol (MS)	N.D.	11	
2,4,6-Trichlorophenol	N.D.	n.s.	n.s.
2,4,5-Trichlorophenol	N.D.	n.s.	n.s.
2,4-Dinitrophenol	N.D.	n.s.	n.s.
4-Nitrophenol	N.D.	10	61
2-Methyl-4,6-dinitrophenol	N.D.	n.s.	n.s.
2,4,6-Tribromophenol (SS)	N.A.	18	42
Pentachlorophenol (MS)	N.D.	0	86



QUALITY CONTROL DATA (cont.)

METHOD EPA 8270 PACE JOB#: HLA 08144.07-L

PESTICIDES

alpha-BHC	N.D.	n.s.	n.s.
beta-BHC	N.D.	n.s.	n.s.
gamma-BHC	N.D.	n.s.	n.s.
delta-BHC	N.D.	n.s.	n.s.
Heptachlor	N.D.	n.s.	n.s.
Aldrin	N.D.	n.s.	n.s.
Heptachlor epoxide	N.D.	n.s.	n.s.
Endosulfan I	N.D.	n.s.	n.s.
4,4'-DDE	N.D.	n.s.	n.s.
4-Terphenyl-d14 (SS)	N.A.		
Dieldrin	N.D.	n.s.	n.s.
Endrin	N.D.	n.s.	n.s.
Endosulfan II	N.D.	n.s.	n.s.
4,4'-DDD	N.D.	n.s.	n.s.
Endrin Aldehyde	N.D.	n.s.	n.s.
4,4'-DDT	N.D.	n.s.	n.s.
Endosulfan Sulfate	N.D.	n.s.	n.s.

QUALITY CONTROL DATA

Base/Neutral Blank S. S. Recovery	Acid Blank S. S. Recovery	
Nitrobenzene-d5 116 %	2-Fluorophenol	38 %
2-Fluorobiphenyl 110 %	Phenol-d5	37 %
Terphenyl-d14 85 %	2,4,6-Tribromophenol	28 %

N.D.: Not Detected (SS): Surrogate Spike  
 N.R.: Not Recovered (MS): Matrix Spike  
 n.s.: not spiked N.A.: Not Applicable

*Attala*

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 Analytical Supervisor



Working Area to  
 Environmental Services Division  
 200 Rush Landing Road  
 Novato, California 94947  
 (415) 892-0821

CHAIN OF CUSTODY FORM

4/1/01

Job Number: 9382.030.02  
 Name/Location: City of Oakland  
 Project Manager: David F. Leland

Samplers: R. Stolzman

Recorder: Robin A. Stolzman  
 (Signature Required)

SOURCE CODE	MATRIX				#CONTAINERS & PRESERV.			SAMPLE NUMBER OR LAB NUMBER			DATE			
	Water	Sediment	Soil	Oil	Unpres.	H <sub>2</sub> SO <sub>4</sub>	HNO <sub>3</sub>	Yr	Wk	Seq	Yr	Mo	Dy	Time
SD			X		1			8	7	25	08	8	02	0855
			X		1			8	7	25	08	8	02	0855
			X		1			8	7	30	08	8	02	0920
			X		1			8	7	30	08	8	02	0920
			X		1			8	7	35	08	8	02	0940
			X		1			8	14	05	11	1	03	1103
			X		1			8	14	10	11	1	25	1125
			X		1			8	14	10	11	1	25	1125
			X		1			8	14	15	11	1	40	1140
			X		1			8	14	16	11	1	40	1140

STATION DESCRIPTION/NOTES  
 Hold  
 Hold

ANALYSIS REQUESTED	
EPA 601/8010	
EPA 602/8020	
EPA 624/8240	
EPA 625/8270	
Priority Pllnt. Metals	
Benzene/Toluene/Xylene	
Total Petrol. Hydrocarb.	
TPH - Lt Hwy by STD	X
Lead	X

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

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	RECEIVED FOR LAB BY: (Signature) DATE/TIME
Robin A. Stolzman	8-2-88 1940	Michelle Caxy 8/2/88 19:40
METHOD OF SHIPMENT		



Environmental Services Division  
200 Rush Landing Road  
Novato, California 94947  
(415) 892-0821

ENVIRONMENTAL SERVICES DIVISION

Samplers: R. Stolzman

Job Number: 9382.030.02

Name/Location: City of Oakland

Project Manager: David F. Leland

Recorder: Robert A. Stolzman  
(Signature Required)

SOURCE CODE	MATRIX				#CONTAINERS & PRESERV.			SAMPLE NUMBER OR LAB NUMBER			DATE				STATION DESCRIPTION/ NOTES	ANALYSIS REQUESTED										
	Water	Sediment	Soil	Oil	Unpres.	H <sub>2</sub> SO <sub>4</sub>	HNO <sub>3</sub>	Yr	Wk	Seq	Yr	Mo	Dy	Time		EPA 601/8010	EPA 602/8020	EPA 624/8240	EPA 625/8270	Priority Plant. Metals	Benzene/Toluene/Xylene	Total Petrol. Hydrocarb.	TPH-L&H by field			
50			X		1			B14	20	5	88	08	24	1655	Hold											
			X		1			B14	25	5				1225												
			X		1			B14	35	0				1320	Hold											
			X		1			B-1	05	5				1455	Hold											
			X		1			B-1	06	0				1455	Hold											
			X		1			B-1	10	5				1515	Hold											
			X		1			B-1	11	0				1515	Hold											
			X		1			B-1	16	5				1540	Hold											
			X		1			B-1	17	0				1540	Hold											
			X		1			B-1	20	5				1600	Hold											

LAB NUMBER			DEPTH IN FEET	COL MTD CD	QA CODE	MISCELLANEOUS	CHAIN OF CUSTODY RECORD			
Yr	Wk	Seq					RELINQUISHED BY: (Signature)	RECEIVED BY: (Signature)	DATE/TIME	
							DISPATCHED BY: (Signature)	DATE/TIME	RECEIVED FOR LAB BY: (Signature)	DATE/TIME
							Robert A. Stolzman	6-2-88 1920	Michelle Casey	6/2/19.40
METHOD OF SHIPMENT										

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

Report date: 25-Aug-88  
 PACE JOB #: HLA 08144.08-L  
 Analytical Method: EPA 5030/8015  
 MATRIX: SOIL

Extract/Purge Date: SEE BELOW  
 Completion Date: SEE BELOW  
 Analyst: ATTIA

LAB #: 8-7359  
 Completion Date: 11-AUG-88

CLIENT'S ID: B16-15.5

COMPOUND	RESULT (ug/kg)	Detection Limit(ug/kg)
Total Petroleum Hydrocarbons (light)---	150	50.0

QUALITY CONTROL DATA  
 Fluorobenzene Surrogate Spike & Recovery  
 88 %

LAB #: 8-7362  
 Completion Date: 13-AUG-88

CLIENT'S ID: B16-25.0

COMPOUND	RESULT (ug/kg)	Detection Limit(ug/kg)
Total Petroleum Hydrocarbons (light)---	4,000,000	125,000

QUALITY CONTROL DATA  
 Fluorobenzene Surrogate Spike & Recovery  
 179 % M.I.

LAB #: 8-7362 (dup.)  
 Completion Date: 13-AUG-88

CLIENT'S ID: B16-25.0

COMPOUND	RESULT (ug/kg)	Detection Limit(ug/kg)
Total Petroleum Hydrocarbons (light)---	4,800,000	125,000

QUALITY CONTROL DATA  
 Fluorobenzene Surrogate Spike & Recovery  
 87 %

N.D.: Not Detected  
 M.I.: Matrix Interference



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 Analytical Supervisor

Report Date: 27-Sep-88 Extract/Purge Date: SEE BELOW  
 PACE JOB #: HLA 08144.08-L Analysis Completion: SEE BELOW  
 Analytical Method: EPA 7000 SERIES Analyst: WALKER  
 MATRIX: SEE BELOW

LAB #	CLIENT ID	LEAD Pb (mg/kg)	LEAD Pb (mg/l)
DATE COMPLETED:		10-AUG-88	09-AUG-88
MATRIX:		SOIL	WATER
8-7363	B17-26.0	N.D.	
8-7363 (dup.)	B17-26.0	N.D.	-
8-7372	B22-25.0	N.D.	-
8-7372 (dup.)	B22-25.0	N.D.	-
8-7379	310004	-	0.76
DETECTION LIMIT:		2.00	0.05
METHOD #:		EPA 7420	EPA 7420

QUALITY CONTROL DATA PACE JOB #: HLA 08144.08-L

COMPOUND	Blank (mg/l)	Spike Duplicate % deviation	Spike % recovery
LEAD (SOIL)	N.D.	1	115
LEAD (WATER)	N.D.	1	108



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 Analytical Supervisor

QUALITY CONTROL DATA

METHOD: EPA 5030/8015 PACE JOB #: HLA 08144.08-L  
 SAMPLE #: 8-7359, 8-7364, 8-7365, 8-7369

COMPOUND	Blank ug/l	Spike Duplicate % deviation	Spike % recovery
Gasoline-----	N.D.	5	93

QUALITY CONTROL DATA

Surrogate Spike % Recovery  
 Fluorobenzene 100 % 101 % 100 %

QUALITY CONTROL DATA

METHOD: EPA 5030/8015 PACE JOB #: HLA 08144.08-L  
 SAMPLE #: 8-7362, 8-7362 (dup.)

COMPOUND	Blank ug/l	Spike Duplicate % deviation	Spike % recovery
Gasoline-----	N.D.	5	93

QUALITY CONTROL DATA

Surrogate Spike % Recovery  
 Fluorobenzene 100 % 101 % 100 %

N.D.: Not detected



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 Analytical Supervisor

(Pg.1 of 2)

QUALITY CONTROL DATA

METHOD: EPA 5030/8015 PACE JOB #: HLA 08144.08-L  
 SAMPLE #: 8-7372, 8-7372 (dup.), 8-7374

COMPOUND	Blank ug/l	Spike Duplicate % deviation	Spike % recovery
Gasoline-----	N.D.	5	106

QUALITY CONTROL DATA

Surrogate Spike % Recovery  
 Fluorobenzene 100 % 104 % 99 %

QUALITY CONTROL DATA

METHOD: EPA 5030/8015/602 PACE JOB #: HLA 08144.08-L  
 SAMPLE #: 8-7378

COMPOUND	Blank ug/l	Spike Duplicate % deviation	Spike % recovery
Benzene-----	N.D.	3	94
Tolunene-----	N.D.	2	95
Xylene-----	N.D.	4	95
Gasoline-----	N.D.	10	94

QUALITY CONTROL DATA

Surrogate Spike % Recovery  
 Fluorobenzene 88 % 97 % 97 %

N.D.: Not detected



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 Analytical Supervisor (Pg.2 of 2)

Report Date: 25-Aug-88  
 PACE JOB #: HLA 08144.08-L  
 Analytical Method: EPA 5030/8015  
 MATRIX: SOIL

Extract/Purge Date: SEE BELOW  
 Completion Date: SEE BELOW  
 Analyst: LEWIS

LAB #: 8-7372 CLIENT'S ID: B22-25.0  
 Completion Date: 15-AUG-88

COMPOUND	RESULT (ug/kg)	Detection Limit(ug/kg)
Total Petroleum Hydrocarbons (light)---	14,000	2,500

QUALITY CONTROL DATA Surrogate Spike % Recovery  
 Fluorobenzene 102 %

LAB #: 8-7372 (dup.) CLIENT'S ID: B22-25.0  
 Completion Date: 15-AUG-88

COMPOUND	RESULT (ug/kg)	Detection Limit(ug/kg)
Total Petroleum Hydrocarbons (light)---	13,000	2,500

QUALITY CONTROL DATA Surrogate Spike % Recovery  
 Fluorobenzene 104 %

LAB #: 8-7374 CLIENT'S ID: B22-30.5  
 Completion Date: 15-AUG-88

COMPOUND	RESULT (ug/kg)	Detection Limit(ug/kg)
Total Petroleum Hydrocarbons (light)---	180	50.0

QUALITY CONTROL DATA Surrogate Spike % Recovery  
 Fluorobenzene 102 %

N.D.: Not Detected  
 M.I.; Matrix Interference



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 Analytical Supervisor



Report Date: 25-Aug-88  
 PACE JOB #: HLA 08144.08-L  
 Analytical Method: EPA 5030/8015  
 MATRIX: SOIL

Extract/Purge Date: SEE BELOW  
 Completion Date: SEE BELOW  
 Analyst: LEWIS

LAB #: 8-7378  
 Completion Date: 08-AUG-88

CLIENT'S ID: 310004  
 MATRIX: WATER

COMPOUND	RESULT (ug/l)	Detection Limit(ug/l)
Benzene-----	43	2.5
Tolunene-----	11	2.5
Ethylbenzene-----	93	2.5
Xylene-----	570	2.5
Total Petroleum Hydrocarbons (light)---	3,100	250

QUALITY CONTROL DATA  
 Fluorobenzene

Surrogate Spike & Recovery  
 123 % M.I.

N.D.: Not Detected  
 M.I.; Matrix Interference



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 Analytical Supervisor

Report Date: 25-Aug-88  
 PACE JOB #: HLA 08144.08-L  
 Analytical Method: EPA 3550/8015  
 MATRIX: SOIL

Extract/Purge Date: 04-Aug-88  
 Completion Date: 16-Aug-88  
 Analyst: CLARK

LAB #	CLIENT ID	Total Petroleum Hydrocarbons (heavy) (mg/kg)	Quantified As	Detection Limit (mg/kg)
8-7359	B16-15.5	185	MOTOR OIL	10
8-7362	B16-25.0	N.D.		10
8-7364	B16-30.0	N.D.		10
8-7365	B16-35.0	N.D.		10
8-7369	B22-15.5	N.D.		10
8-7372	B22-25.0	N.D.		10
8-7374	B22-30.5	N.D.		10

QUALITY CONTROL DATA

PACE JOB #: HLA 08144.08-L

COMPOUND	Blank (mg/l)	Spike Duplicate % deviation	Spike % recovery
Diesel	N.D.	0	52

N.D.: Not Detected



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 Analytical Supervisor

FORMERLY WESCO LABORATORIES

Report Date: 25-Aug-88  
PACE JOB #: HLA 08144.08-L  
Analytical Method: EPA 8010  
MATRIX: SOIL

Extract/Purge Date: 17-Aug-88  
Completion Date: 17-Aug-88  
Analyst: ATTIA

LAB #: 8-7359 8-7362  
CLIENT'S ID: B16-15.5 B16-25.0

COMPOUND	RESULT (ug/kg)	Detection Limit	RESULT (ug/kg)	Detection Limit (ug/kg)
Dichlorodifluoromethane-----	N.D.	2.0	N.D.	100
Chloromethane-----	N.D.	2.0	N.D.	100
Vinyl Chloride-----	N.D.	2.0	N.D.	100
Bromomethane-----	N.D.	2.0	N.D.	100
Chloroethane-----	N.D.	2.0	N.D.	100
Trichlorofluoromethane-----	N.D.	2.0	N.D.	100
1,1-Dichloroethene-----	N.D.	0.5	N.D.	25
Methylene Chloride-----	1.3	0.5	N.D.	25
trans-1,2-Dichloroethene----	N.D.	0.5	N.D.	25
1,1-Dichloroethane-----	N.D.	0.5	N.D.	25
Chloroform-----	0.9	0.5	N.D.	25
1,1,1-Trichloroethane (TCA)-	N.D.	0.5	N.D.	25
Carbon Tetrachloride-----	N.D.	0.5	N.D.	25
1,2-Dichloroethane (EDC)----	N.D.	0.5	N.D.	25
Trichloroethene (TCE)-----	N.D.	0.5	N.D.	25
1,2-Dichloropropane-----	N.D.	0.5	N.D.	25
Bromodichloromethane-----	N.D.	0.5	N.D.	25
2-Chloroethylvinyl ether----	N.D.	0.5	N.D.	25
trans-1,3-Dichloropropene----	N.D.	0.5	N.D.	25
cis-1,3-Dichloropropene-----	N.D.	0.5	N.D.	25
1,1,2-Trichloroethane-----	N.D.	0.5	N.D.	25
Tetrachloroethene-----	N.D.	0.5	N.D.	25
Dibromochloromethane-----	N.D.	0.5	N.D.	25
Chlorobenzene-----	N.D.	0.5	N.D.	25
Bromoform-----	N.D.	0.5	N.D.	25
1,1,2,2-Tetrachloroethane----	N.D.	0.5	N.D.	25
1,3-Dichlorobenzene-----	N.D.	0.5	N.D.	25
1,4-Dichlorobenzene-----	N.D.	0.5	N.D.	25
1,2-Dichlorobenzene-----	N.D.	0.5	N.D.	25

QUALITY CONTROL DATA

Surrogate Spike	Percent Recovery	
Bromochloromethane	87 %	97%
1,4-Dichlorobutane	110 %	130%

N.D.: Not Detected

*Attia*  
Analytical Supervisor

FORMERLY WESCO LABORATORIES

Report Date: 25-Aug-88  
PACE JOB #: HLA 08144.08-L  
Analytical Method: EPA 8010  
MATRIX: SOIL

Extract/Purge Date: 17-Aug-88  
Completion Date: 17-Aug-88  
Analyst: ATTIA

LAB #: 8-7362 (dup.) 8-7364  
CLIENT'S ID: B16-25.0 B16-30.0

COMPOUND	RESULT (ug/kg)	Detection Limit	RESULT (ug/kg)	Detection Limit (ug/kg)
Dichlorodifluoromethane-----	N.D.	100	N.D.	2.0
Chloromethane-----	N.D.	100	N.D.	2.0
Vinyl Chloride-----	N.D.	100	N.D.	2.0
Bromomethane-----	N.D.	100	N.D.	2.0
Chloroethane-----	N.D.	100	N.D.	2.0
Trichlorofluoromethane-----	N.D.	100	N.D.	2.0
1,1-Dichloroethene-----	N.D.	25	N.D.	0.5
Methylene Chloride-----	N.D.	25	2.2	0.5
trans-1,2-Dichloroethene----	N.D.	25	N.D.	0.5
1,1-Dichloroethane-----	N.D.	25	N.D.	0.5
Chloroform-----	N.D.	25	N.D.	0.5
1,1,1-Trichloroethane (TCA)-	N.D.	25	N.D.	0.5
Carbon Tetrachloride-----	N.D.	25	N.D.	0.5
1,2-Dichloroethane (EDC)----	N.D.	25	18	0.5
Trichloroethene (TCE)-----	N.D.	25	N.D.	0.5
1,2-Dichloropropane-----	N.D.	25	N.D.	0.5
Bromodichloromethane-----	N.D.	25	N.D.	0.5
2-Chloroethylvinyl ether----	N.D.	25	N.D.	0.5
trans-1,3-Dichloropropene---	N.D.	25	N.D.	0.5
cis-1,3-Dichloropropene-----	N.D.	25	N.D.	0.5
1,1,2-Trichloroethane-----	N.D.	25	N.D.	0.5
Tetrachloroethene-----	N.D.	25	N.D.	0.5
Dibromochloromethane-----	N.D.	25	N.D.	0.5
Chlorobenzene-----	N.D.	25	N.D.	0.5
Bromoform-----	N.D.	25	N.D.	0.5
1,1,2,2-Tetrachloroethane---	N.D.	25	N.D.	0.5
1,3-Dichlorobenzene-----	N.D.	25	N.D.	0.5
1,4-Dichlorobenzene-----	N.D.	25	N.D.	0.5
1,2-Dichlorobenzene-----	N.D.	25	N.D.	0.5

QUALITY CONTROL DATA

Surrogate Spike	Percent Recovery	
Bromochloromethane	95%	n.s.
1,4-Dichlorobutane	121%	91%

N.D.: Not Detected  
n.s.: not spiked



Analytical Supervisor

FORMERLY WESCO LABORATORIES

Report Date: 25-Aug-88  
PACE JOB #: HLA 08144.08-L  
Analytical Method: EPA 8010  
MATRIX: SOIL

Extract/Purge Date: 17-Aug-88  
Completion Date: 17-Aug-88  
Analyst: ATTIA

LAB #: 8-7365 8-7369  
CLIENT'S ID: B16-35.0 B22-15.5

COMPOUND	RESULT (ug/kg)	Detection Limit	RESULT (ug/kg)	Detection Limit (ug/kg)
Dichlorodifluoromethane-----	N.D.	2.0	N.D.	2.0
Chloromethane-----	N.D.	2.0	N.D.	2.0
Vinyl Chloride-----	N.D.	2.0	N.D.	2.0
Bromomethane-----	N.D.	2.0	N.D.	2.0
Chloroethane-----	N.D.	2.0	N.D.	2.0
Trichlorofluoromethane-----	N.D.	2.0	N.D.	2.0
1,1-Dichloroethene-----	N.D.	0.5	N.D.	0.5
Methylene Chloride-----	N.D.	0.5	N.D.	0.5
trans-1,2-Dichloroethene----	N.D.	0.5	N.D.	0.5
1,1-Dichloroethane-----	N.D.	0.5	N.D.	0.5
Chloroform-----	1.7	0.5	N.D.	0.5
1,1,1-Trichloroethane (TCA)-	N.D.	0.5	N.D.	0.5
Carbon Tetrachloride-----	N.D.	0.5	N.D.	0.5
1,2-Dichloroethane (EDC)----	N.D.	0.5	N.D.	0.5
Trichloroethene (TCE)-----	N.D.	0.5	N.D.	0.5
1,2-Dichloropropane-----	N.D.	0.5	N.D.	0.5
Bromodichloromethane-----	N.D.	0.5	N.D.	0.5
2-Chloroethylvinyl ether----	N.D.	0.5	N.D.	0.5
trans-1,3-Dichloropropene---	N.D.	0.5	N.D.	0.5
cis-1,3-Dichloropropene-----	N.D.	0.5	N.D.	0.5
1,1,2-Trichloroethane-----	N.D.	0.5	N.D.	0.5
Tetrachloroethene-----	N.D.	0.5	N.D.	0.5
Dibromochloromethane-----	N.D.	0.5	N.D.	0.5
Chlorobenzene-----	N.D.	0.5	N.D.	0.5
Bromoform-----	N.D.	0.5	N.D.	0.5
1,1,2,2-Tetrachloroethane---	N.D.	0.5	N.D.	0.5
1,3-Dichlorobenzene-----	N.D.	0.5	N.D.	0.5
1,4-Dichlorobenzene-----	N.D.	0.5	N.D.	0.5
1,2-Dichlorobenzene-----	N.D.	0.5	N.D.	0.5

QUALITY CONTROL DATA

Surrogate Spike	Percent Recovery	
Bromochloromethane	93%	87%
1,4-Dichlorobutane	111%	113%

N.D.: Not Detected

*[Signature]*  
Analytical Supervisor

FORMERLY WESCO LABORATORIES

Report Date: 25-Aug-88  
PACE JOB #: HLA 08144.08-L  
Analytical Method: EPA 8010  
MATRIX: SOIL

Extract/Purge Date: 17-Aug-88  
Completion Date: 17-Aug-88  
Analyst: ATTIA

LAB #: 8-7372 8-7372 (dup.)  
CLIENT'S ID: B22-25.0 B22-25.0

COMPOUND	RESULT (ug/kg)	Detection Limit	RESULT (ug/kg)	Detection Limit (ug/kg)
Dichlorodifluoromethane-----	N.D.	2.0	N.D.	2.0
Chloromethane-----	N.D.	2.0	N.D.	2.0
Vinyl Chloride-----	N.D.	2.0	N.D.	2.0
Bromomethane-----	N.D.	2.0	N.D.	2.0
Chloroethane-----	N.D.	2.0	N.D.	2.0
Trichlorofluoromethane-----	N.D.	2.0	N.D.	2.0
1,1-Dichloroethene-----	N.D.	0.5	N.D.	0.5
Methylene Chloride-----	N.D.	0.5	N.D.	0.5
trans-1,2-Dichloroethene----	N.D.	0.5	N.D.	0.5
1,1-Dichloroethane-----	N.D.	0.5	N.D.	0.5
Chloroform-----	N.D.	0.5	N.D.	0.5
1,1,1-Trichloroethane (TCA)-	N.D.	0.5	N.D.	0.5
Carbon Tetrachloride-----	N.D.	0.5	N.D.	0.5
1,2-Dichloroethane (EDC)----	N.D.	0.5	N.D.	0.5
Trichloroethene (TCE)-----	N.D.	0.5	N.D.	0.5
1,2-Dichloropropane-----	N.D.	0.5	N.D.	0.5
Bromodichloromethane-----	N.D.	0.5	N.D.	0.5
2-Chloroethylvinyl ether----	N.D.	0.5	N.D.	0.5
trans-1,3-Dichloropropene----	N.D.	0.5	N.D.	0.5
cis-1,3-Dichloropropene-----	N.D.	0.5	N.D.	0.5
1,1,2-Trichloroethane-----	N.D.	0.5	N.D.	0.5
Tetrachloroethene-----	N.D.	0.5	N.D.	0.5
Dibromochloromethane-----	N.D.	0.5	N.D.	0.5
Chlorobenzene-----	N.D.	0.5	N.D.	0.5
Bromoform-----	N.D.	0.5	N.D.	0.5
1,1,2,2-Tetrachloroethane----	N.D.	0.5	N.D.	0.5
1,3-Dichlorobenzene-----	N.D.	0.5	N.D.	0.5
1,4-Dichlorobenzene-----	N.D.	0.5	N.D.	0.5
1,2-Dichlorobenzene-----	N.D.	0.5	N.D.	0.5

QUALITY CONTROL DATA

Surrogate Spike	Percent Recovery	
Bromochloromethane	94%	93%
1,4-Dichlorobutane	112%	113%

N.D.: Not Detected



Analytical Supervisor

FORMERLY WESCO LABORATORIES

Report Date: 25-Aug-88  
PACE JOB #: HLA 08144.08-L  
Analytical Method: EPA 8010  
MATRIX: SEE BELOW

Extract/Purge Date: SEE BELOW  
Completion Date: SEE BELOW  
Analyst: ATTIA

LAB #:	8-7374	8-7378
CLIENT'S ID:	B22-30.5	310004
Completion Date:	17-AUG-88	10-AUG-88
MATRIX: SEE BELOW	SOIL	WATER

COMPOUND	RESULT (ug/kg)	Detection Limit (ug/kg)	RESULT (ug/l)	Detection Limit (ug/l)
Dichlorodifluoromethane-----	N.D.	2.0	10	2.0
Chloromethane-----	N.D.	2.0	N.D.	2.0
Vinyl Chloride-----	N.D.	2.0	N.D.	2.0
Bromomethane-----	N.D.	2.0	N.D.	2.0
Chloroethane-----	N.D.	2.0	N.D.	2.0
Trichlorofluoromethane-----	N.D.	2.0	N.D.	2.0
1,1-Dichloroethene-----	N.D.	0.5	14	0.5
Methylene Chloride-----	0.7	0.5	N.D.	0.5
trans-1,2-Dichloroethene----	N.D.	0.5	N.D.	0.5
1,1-Dichloroethane-----	N.D.	0.5	4.3	0.5
Chloroform-----	N.D.	0.5	N.D.	0.5
1,1,1-Trichloroethane (TCA)-	N.D.	0.5	2.2	0.5
Carbon Tetrachloride-----	N.D.	0.5	N.D.	0.5
1,2-Dichloroethane (EDC)----	N.D.	0.5	3.3	0.5
Trichloroethene (TCE)-----	N.D.	0.5	4.1	0.5
1,2-Dichloropropane-----	N.D.	0.5	0.5	0.5
Bromodichloromethane-----	N.D.	0.5	N.D.	0.5
2-Chloroethylvinyl ether----	N.D.	0.5	N.D.	0.5
trans-1,3-Dichloropropene----	N.D.	0.5	N.D.	0.5
cis-1,3-Dichloropropene-----	N.D.	0.5	N.D.	0.5
1,1,2-Trichloroethane-----	N.D.	0.5	N.D.	0.5
Tetrachloroethene-----	N.D.	0.5	N.D.	0.5
Dibromochloromethane-----	N.D.	0.5	N.D.	0.5
Chlorobenzene-----	N.D.	0.5	N.D.	0.5
Bromoform-----	N.D.	0.5	N.D.	0.5
1,1,2,2-Tetrachloroethane----	N.D.	0.5	N.D.	0.5
1,3-Dichlorobenzene-----	N.D.	0.5	N.D.	0.5
1,4-Dichlorobenzene-----	N.D.	0.5	N.D.	0.5
1,2-Dichlorobenzene-----	N.D.	0.5	N.D.	0.5

QUALITY CONTROL DATA

Surrogate Spike	Percent Recovery	
Bromochloromethane	92%	95%
1,4-Dichlorobutane	105%	87%

N.D.: Not Detected



Analytical Supervisor

FORMERLY WESCO LABORATORIES

BLANK, SPIKE DUPLICATE AND SPIKE REPORT JOB # HLA 08144.08-L  
METHOD : EPA 8010  
SAMPLE #: 8-7359, 8-7362, 8-7362 (dup.), 8-7364, 8-7365,  
8-7362 (dup.), 8-7374

COMPOUND	Blank (ug/l)	Spike Duplicate % deviation	Spike % recovery
Dichlorodifluoromethane	N.D.	-	N.S.
Chloromethane	N.D.	-	N.S.
Vinyl Chloride	N.D.	-	N.S.
Bromomethane	N.D.	-	N.S.
Chloroethane	N.D.	-	N.S.
Trichlorofluoromethane	N.D.	-	N.S.
1,1-Dichloroethene	N.D.	-	N.S.
Methylene Chloride	N.D.	-	N.S.
trans-1,2-Dichloroethene	N.D.	-	N.S.
1,1-Dichloroethane (M.S.)	N.D.	17	101
Chloroform	N.D.	-	N.S.
1,1,1-Trichloroethane (TCA)	N.D.	-	N.S.
Carbon Tetrachloride	N.D.	-	N.S.
1,2-Dichloroethane (EDC)	N.D.	-	N.S.
Trichloroethene (TCE) (M.S.)	N.D.	5	105
1,2-Dichloropropane	N.D.	-	N.S.
Bromodichloromethane	N.D.	-	N.S.
2-Chloroethylvinyl ether	N.D.	-	N.S.
trans-1,3-Dichloropropene	N.D.	6	105
cis-1,3-Dichloropropene	N.D.	-	N.S.
1,1,2-Trichloroethane	N.D.	-	N.S.
Tetrachloroethene (M.S.)	N.D.	3	107
Dibromochloromethane	N.D.	-	N.S.
Chlorobenzene	N.D.	-	N.S.
Bromoform	N.D.	-	N.S.
1,1,2,2-Tetrachloroethane	N.D.	-	N.S.
1,3-Dichlorobenzene	N.D.	-	N.S.
1,4-Dichlorobenzene	N.D.	-	N.S.
1,2-Dichlorobenzene	N.D.	-	N.S.

QUALITY CONTROL DATA

Surrogate Spike % Recovery			
Bromochloromethane	103 %	97 %	99 %
1,4-Dichlorobutane	104 %	103 %	102 %

N.D.: Not Detected  
N.S.: Not Spiked

(Pg.1 of 2)



FORMERLY WESCO LABORATORIES

BLANK, SPIKE DUPLICATE AND SPIKE REPORT JOB #

HLA 08144.08-L

METHOD : EPA 8010

SAMPLE #: 8-7378

COMPOUND	Blank (ug/l)	Spike Duplicate % deviation.	Spike % recovery
Dichlorodifluoromethane	N.D.	-	N.S.
Chloromethane	N.D.	-	N.S.
Vinyl Chloride	N.D.	-	N.S.
Bromomethane	N.D.	-	N.S.
Chloroethane	N.D.	-	N.S.
Trichlorofluoromethane	N.D.	-	N.S.
1,1-Dichloroethene	N.D.	-	N.S.
Methylene Chloride	N.D.	-	N.S.
trans-1,2-Dichloroethene	N.D.	-	N.S.
1,1-Dichloroethane (M.S.)	N.D.	8	103
Chloroform	N.D.	-	N.S.
1,1,1-Trichloroethane (TCA)	N.D.	-	N.S.
Carbon Tetrachloride	N.D.	-	N.S.
1,2-Dichloroethane (EDC)	N.D.	-	N.S.
Trichloroethene (TCE) (M.S.)	N.D.	4	100
1,2-Dichloropropane	N.D.	-	N.S.
Bromodichloromethane	N.D.	-	N.S.
2-Chloroethylvinyl ether	N.D.	-	N.S.
trans-1,3-Dichloropropene	N.D.	1	97
cis-1,3-Dichloropropene	N.D.	-	N.S.
1,1,2-Trichloroethane	N.D.	-	N.S.
Tetrachloroethene (M.S.)	N.D.	5	100
Dibromochloromethane	N.D.	-	N.S.
Chlorobenzene	N.D.	-	N.S.
Bromoform	N.D.	-	N.S.
1,1,2,2-Tetrachloroethane	N.D.	-	N.S.
1,3-Dichlorobenzene	N.D.	-	N.S.
1,4-Dichlorobenzene	N.D.	-	N.S.
1,2-Dichlorobenzene	N.D.	-	N.S.

QUALITY CONTROL DATA

Surrogate Spike % Recovery

Bromochloromethane	88 %	96 %	98 %
1,4-Dichlorobutane	94 %	94 %	94 %

N.D.: Not Detected

N.S.: Not Spiked

Analytical Supervisor

(Pg.2 of 2)

Report Date: 25-Aug-88  
 PACE JOB #: HLA 08144.08-L  
 Analytical Method: EPA 8020  
 MATRIX: SOIL

Extract/Purge Date: SEE BELOW  
 Completion Date: SEE BELOW  
 Analyst: LEWIS


LAB #:	8-7360		8-7363	
CLIENT'S ID:	B16-16.0		B16-25.5	
DATE COMPLETE:	07-Aug-88		16-Aug-88	
COMPOUND	RESULT (ug/kg)	Detection Limit (ug/kg)	RESULT (ug/kg)	Detection Limit (ug/kg)
Benzene-----	93	1.0	15,000	2,000
Toluene-----	19	1.0	280,000	2,000
Chlorobenzene-----	N.D.	1.0	N.D.	2,000
Ethylbenzene-----	8.6	1.0	88,000	2,000
Xylene-----	63	1.0	500,000	2,000
1,3-Dichlorobenzene-----	N.D.	1.0	N.D.	2,000
1,4-Dichlorobenzene-----	N.D.	1.0	N.D.	2,000
1,2-Dichlorobenzene-----	N.D.	1.0	N.D.	2,000

QUALITY CONTROL DATA  
 Surrogate Spike Fluorobenzene      Percent Recovery      92 %      101 %

LAB #:	8-7363 (dup.)		8-7364	
CLIENT'S ID:	B16-25.5		B16-30.0	
DATE COMPLETE:	16-Aug-88		11-Aug-88	
COMPOUND	RESULT (ug/kg)	Detection Limit (ug/kg)	RESULT (ug/kg)	Detection Limit (ug/kg)
Benzene-----	10,000	2,000	1,200	1.0
Toluene-----	220,000	2,000	180	1.0
Chlorobenzene-----	N.D.	2,000	N.D.	1.0
Ethylbenzene-----	81,000	2,000	120	1.0
Xylene-----	470,000	2,000	230	1.0
1,3-Dichlorobenzene-----	N.D.	2,000	N.D.	1.0
1,4-Dichlorobenzene-----	N.D.	2,000	N.D.	1.0
1,2-Dichlorobenzene-----	N.D.	2,000	N.D.	1.0

QUALITY CONTROL DATA  
 Surrogate Spike Fluorobenzene      Percent Recovery      100 %      116 %

N.D.: Not detected

  
 -----  
 Analytical Supervisor

Report Date: 08-Nov-88  
 PACE JOB #: HLA 08144.08-L  
 Analytical Method: EPA 8020  
 MATRIX: SOIL

Extract/Purge Date: SEE BELOW  
 Completion Date: SEE BELOW  
 Analyst: LEWIS

LAB #:	8-7365	8-7373
CLIENT'S ID:	B16-35.0	B22-25.5
DATE COMPLETE:	11-Aug-88	16-Aug-88

COMPOUND	RESULT (ug/kg)	Detection Limit (ug/kg)	RESULT (ug/kg)	Detection Limit (ug/kg)
Benzene-----	3.1	0.2	N.D.	40
Toluene-----	13	0.2	260	40
Chlorobenzene-----	N.D.	0.2	N.D.	40
Ethylbenzene-----	3.0	0.2	18,000	40
Xylene-----	18	0.2	12,000	40
1,3-Dichlorobenzene-----	N.D.	0.2	N.D.	40
1,4-Dichlorobenzene-----	N.D.	0.2	N.D.	40
1,2-Dichlorobenzene-----	N.D.	0.2	N.D.	40

QUALITY CONTROL DATA

Surrogate Spike                      Percent Recovery  
 Fluorobenzene                              100 %                              93 %

LAB #:	8-7373 (dup.)
CLIENT'S ID:	B22-25.5
DATE COMPLETE:	16-Aug-88

COMPOUND	RESULT (ug/kg)	Detection Limit (ug/kg)
Benzene-----	N.D.	40
Toluene-----	240	40
Chlorobenzene-----	N.D.	40
Ethylbenzene-----	17,000	40
Xylene-----	12,000	40
1,3-Dichlorobenzene-----	N.D.	40
1,4-Dichlorobenzene-----	N.D.	40
1,2-Dichlorobenzene-----	N.D.	40

QUALITY CONTROL DATA

Surrogate Spike                      Percent Recovery  
 Fluorobenzene                              93%

N.D.: Not detected  
 M.I.: Matrix Interference

*[Signature]*  
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 Analytical Supervisor

Report Date: 02-Sep-88  
 PACE JOB #: HLA 08144.08-L  
 Analytical Method: EPA 8020  
 MATRIX: SOIL

Extract/Purge Date: 15-Aug-88  
 Completion Date: 15-Aug-88  
 Analyst: ATTIA

LAB #:	8-7370	8-7374	
CLIENT'S ID:	B22-16.0	B22-30.5	
COMPOUND	RESULT (ug/kg)	RESULT (ug/kg)	Detection Limit (ug/kg)
Benzene-----	N.D.	18	0.2
Toluene-----	0.5	3.9	0.2
Chlorobenzene-----	N.D.	N.D.	0.2
Ethylbenzene-----	N.D.	N.D.	0.2
Xylene-----	N.D.	50	0.2
1,3-Dichlorobenzene-----	N.D.	N.D.	0.2
1,4-Dichlorobenzene-----	N.D.	N.D.	0.2
1,2-Dichlorobenzene-----	N.D.	N.D.	0.2

**QUALITY CONTROL DATA**

Surrogate Spike                      Percent Recovery  
 Fluorobenzene                      100 %                      102%

N.D.: Not Detected



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 Analytical Supervisor

QUALITY CONTROL DATA  
 METHOD: EPA 8020

PACE JOB#: HLA 08144.08-L

SAMPLE #: 8-7360

COMPOUND	Blank (ug/l)	Spike Duplicate % deviation	Spike % recovery
Benzene-----	N.D.	1	102
Toluene-----	N.D.	3	100
p-Xylene-----	N.D.	3	100

QUALITY CONTROL DATA

Surrogate Spike % Recovery			
Fluorobenzene	98 %	100 %	98%

SAMPLE #: 8-7363, 8-7363 (dup.), 8-7373, 8-7373 (dup.)

COMPOUND	Blank (ug/l)	Spike Duplicate % deviation	Spike % recovery
Benzene-----	N.D.	1	103
Toluene-----	N.D.	0	105
p-Xylene-----	N.D.	1	104

QUALITY CONTROL DATA

Surrogate Spike % Recovery			
Fluorobenzene	102 %	100 %	100%

QUALITY CONTROL DATA (cont.)

QUALITY CONTROL DATA

METHOD: EPA 8020

PACE JOB#:

HLA 08144.08-L

SAMPLE #: 8-7364, 8-7365

COMPOUND	Blank (ug/l)	Spike Duplicate % deviation	Spike % recovery
Benzene-----	N.D.	2	90
Toluene-----	N.D.	3	90
p-Xylene-----	N.D.	2	90

QUALITY CONTROL DATA

Surrogate Spike % Recovery

Fluorobenzene            100 %                            101 %                            100%

QUALITY CONTROL DATA

METHOD: EPA 8020

PACE JOB#:

HLA 08144.08-L

SAMPLE #: 8-7370, 8-7374

COMPOUND	Blank (ug/l)	Spike Duplicate % deviation	Spike % recovery
Benzene-----	N.D.	0	93
Toluene-----	N.D.	5	97
p-Xylene-----	N.D.	10	97

QUALITY CONTROL DATA

Surrogate Spike % Recovery

Fluorobenzene            100 %                            104 %                            99%

N.D.: Not detected



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 Analytical Supervisor



**Harding Lawson Associates**  
Environmental Services Division  
200 Rush Landing Road  
Novato, California 94947  
(415) 892-0821

**CHAIN OF CUSTODY FORM**

Job Number: 9382.030.02  
Name/Location: City of Oakland  
Project Manager: David F. Leland

Samplers: R. Shizman

Recorder: Robert A. Shizman  
(Signature Required)

ANALYSIS REQUESTED										
EPA 601/8010	EPA 602/8020	EPA 624/8240	EPA 825/8270	Priority Pollut. Metals	Benzene/Toluene/Xylene	Total Petrol. Hydrocarb.	TPH - 41 tpy by SWS	Lead		
X							X			
	X									
X							X			
X								X		
X							X			
X								X		
X								X		
								X		

SOURCE CODE	MATRIX				#CONTAINERS & PRESERV.			SAMPLE NUMBER OR LAB NUMBER				DATE		STATION DESCRIPTION/NOTES		
	Water	Sediment	Soil	Oil	Unpres.	H <sub>2</sub> SO <sub>4</sub>	HNO <sub>3</sub>	Yr	Wk	Seq	Yr	Mo	Dy		Time	
56		X			1			8	8	08	8	08	03	08	10	Hold
		X			1											Hold
		X			1											
		X			1											
		X			1											Hold
		X			1											Split extract + dup
		X			1											Split extract + dup
		X			1											
		X			1											
		X			1											
		X			1											Hold

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

CHAIN OF CUSTODY RECORD			
RELINQUISHED BY: (Signature)	RECEIVED BY: (Signatures)	DATE/TIME	
RELINQUISHED BY: (Signature)	RECEIVED BY: (Signatures)	DATE/TIME	
RELINQUISHED BY: (Signature)	RECEIVED BY: (Signatures)	DATE/TIME	
RELINQUISHED BY: (Signature)	RECEIVED BY: (Signatures)	DATE/TIME	
DISPATCHED BY: (Signature)	DATE/TIME	RECEIVED FOR LAB BY: (Signature)	DATE/TIME
Robert A. Shizman	8-3-88 1725	C. Portney	8/3 5:30 pm
METHOD OF SHIPMENT			

CHAIN OF CUSTODY FORM

Job Number: 9382.030.02  
Name/Location: City of Oakland  
Project Manager: David F. Leland

Samplers: R. Solzman

Recorder: Robert A. Solzman  
*(Signature Required)*

SOURCE CODE	MATRIX				#CONTAINERS & PRESERV.			SAMPLE NUMBER OR LAB NUMBER			DATE				STATION DESCRIPTION/ NOTES
	Water	Sediment	Soil	Oil	Unpres.	H <sub>2</sub> SO <sub>4</sub>	HNO <sub>3</sub>	Yr	Wk	Seq	Yr	Mo	Dy	Time	
10	X				3			88	3	1000	488	08	03	1150	

ANALYSIS REQUESTED										
EPA 801/8010	EPA 802/8020	EPA 824/8240	EPA 825/8270	Priority Pollut. Metals	Benzene/Toluene/Xylene	Total Petrol. Hydrocarb.	TCH - Lt only	BTEX	Lead	
X							X	X	X	

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

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	RECEIVED FOR LAB BY: (Signature)	DATE/TIME
<u>Robert A. Solzman</u>	<u>8-3-88 1725</u>	<u>C. Sontag</u>	<u>8/3 530 PM</u>
METHOD OF SHIPMENT			



Report date: August 25, 1988  
Client: Harding Lawson Associates  
200 Rush Landing Road  
Novato, CA 94947  
Attn.: D. Leland

Pace job #: NLA 0814409-L

Date sampled: August 4, 1988  
Sampled by: R. Stolzman

Site: City of Oakland

Date received: August 5, 1988  
Submitted by: R. Stolzman

P.O.: 9382, 030.02

Lab #	Client ID	Matrix	Analysis
8- 7409	B18-05.5	soil	
8- 7410	B18-11.5	soil	
8- 7411	B18-15.5	soil	
8- 7412	B18-20.5	soil	
8- 7413	B18-21.0	soil	
8- 7414	B18-25.5	soil	Purg. Aromatics 8020
8- 7415	B18-26.0	soil	Purg. Halocarbons 8010
8- 7415	B18-26.0	soil	Lead 7420
8- 7415	B18-26.0	soil	Diesel 3550/8015
8- 7415	B18-26.0	soil	TPH light only 5030/8015
8- 7416	B18-30.5	soil	Diesel 3550/8015
8- 7416	B18-30.5	soil	TPH light only 5030/8015
8- 7416	B18-30.5	soil	Vol Org. Cpds. 8010-8020

Dear Client,

No problems were encountered with the analysis of your samples. We will store samples for 30 days after the report date. The samples will be returned to the client after the 30-day period, unless other arrangements are made. If you have any questions, please feel free to call, (415)883-6100.

  
-----  
Sample Controller

Report Date: 25-Aug-88 Extract/Purge Date: 16-Aug-88  
 PACE JOB #: HLA 08144.09-L Completion Date: 16-Aug-88  
 Analytical Method: EPA 5030/8015 Analyst: ATTIA  
 MATRIX: SOIL

LAB #: 8-7415 CLIENT'S ID: B18-26.0  
 -----  
 COMPOUND RESULT Detection  
 (ug/kg) Limit (ug/kg)  
 Total Petroleum Hydrocarbons (light)--- 100 50.0  
 -----

QUALITY CONTROL DATA  
 Surrogate Spike & Recovery  
 Fluorobenzene 102 %

LAB #: 8-7416 CLIENT'S ID: B18-30.5  
 -----  
 COMPOUND RESULT Detection  
 (ug/kg) Limit (ug/kg)  
 Total Petroleum Hydrocarbons (light)--- 160,000 25,000  
 -----

QUALITY CONTROL DATA  
 Surrogate Spike & Recovery  
 Fluorobenzene 97 %

QUALITY CONTROL DATA  
 METHOD: EPA 5030/8015 PACE JOB #: HLA 08144.09-L  
 -----  
 COMPOUND Blank Spike Duplicate Spike  
 ug/l % deviation % recovery  
 -----  
 Gasoline----- N.D. 0 114  
 -----

QUALITY CONTROL DATA  
 Surrogate Spike & Recovery  
 Fluorobenzene 102 % 100 % 100 %

N.D.: Not Detected

*ATTIA*  
 -----  
 Analytical Supervisor

Report Date: 25-Aug-88 Extract/Purge Date: 08-Aug-88  
 PACE JOB #: HLA 08144.09-L Completion Date: 22-Aug-88  
 Analytical Method: EPA 3550/8015 Analyst: CLARK  
 MATRIX: SOIL

LAB #	CLIENT ID	Total Petroleum Hydrocarbons (heavy) (mg/kg)	Quantified As	Detection Limit(mg/kg)
8-7415	B18-26.0	N.D.		10
8-7416	B18-30.5	N.D.		10

QUALITY CONTROL DATA PACE JOB #: HLA 08144.09-L

COMPOUND	Blank (mg/l)	Spike Duplicate % deviation	Spike % recovery
Diesel	N.D.	34	73

N.D.: Not Detected

*Atkins*  
 -----  
 Analytical Supervisor

Report Date: 25-Aug-88 Extract/Purge Date: 08-AUG-88  
 PACE JOB #: HLA 08144.09-L Analysis Completion : 08-AUG-88  
 Analytical Method: EPA 7000 SERIES Analyst: WALKER  
 MATRIX: SOIL

-----  
 LAB # CLIENT ID LEAD  
 Pb  
 (mg/kg)  
 -----  
 8-7415 B18-26.0 2.55

DETECTION LIMIT: 2.00  
 METHOD #: EPA 7420

QUALITY CONTROL DATA PACE JOB #: HLA 08144.09-L  
 -----  

COMPOUND	Blank (mg/l)	Spike Duplicate % deviation	Spike % recovery
LEAD	N.D.	1	115

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*Atallo*

-----  
 Analytical Supervisor

Report Date: 25-Aug-88  
 PACE JOB #: HLA 08144.09-L  
 Analytical Method: EPA 8020  
 MATRIX: SOIL

Extract/Purge Date: 16-Aug-88  
 Completion Date: 16-Aug-88  
 Analyst: ATTIA

LAB #:	8-7414	8-7416		
CLIENT'S ID:	B18-25.5	B18-30.5		
COMPOUND	RESULT (ug/kg)	Detection Limit (ug/kg)	RESULT (ug/kg)	Detection Limit (ug/kg)
Benzene-----	38	0.2	400	100
Toluene-----	86	0.2	6,800	100
Chlorobenzene-----	N.D.	0.2	N.D.	100
Ethylbenzene-----	12	0.2	4,300	100
Xylene-----	78	0.2	27,000	100
1,3-Dichlorobenzene-----	N.D.	0.2	N.D.	100
1,4-Dichlorobenzene-----	N.D.	0.2	N.D.	100
1,2-Dichlorobenzene-----	N.D.	0.2	N.D.	100

QUALITY CONTROL DATA

Surrogate Spike	Percent Recovery
Fluorobenzene	102 %
	97 %

QUALITY CONTROL DATA  
 METHOD: EPA 8020

PACE JOB#: HLA 08144.09-L

COMPOUND	Blank (ug/l)	Spike Duplicate % deviation	Spike % recovery
Benzene-----	N.D.	7	108
Toluene-----	N.D.	1	102
p-Xylene-----	N.D.	0	102

QUALITY CONTROL DATA

Surrogate Spike % Recovery
Fluorobenzene
103 %
85 %
86%

N.D.: Not Detected

*Attia*

-----  
 Analytical Supervisor

BLANK, SPIKE DUPLICATE AND SPIKE REPORT JOB #  
 METHOD : EPA 8010

HLA 08144.09-L

COMPOUND	Blank (ug/l)	Spike Duplicate % deviation	Spike % recovery
Dichlorodifluoromethane	N.D.	-	N.S.
Chloromethane	N.D.	-	N.S.
Vinyl Chloride	N.D.	-	N.S.
Bromomethane	N.D.	-	N.S.
Chloroethane	N.D.	-	N.S.
Trichlorofluoromethane	N.D.	-	N.S.
1,1-Dichloroethene	N.D.	-	N.S.
Methylene Chloride	N.D.	-	N.S.
trans-1,2-Dichloroethene	N.D.	-	N.S.
1,1-Dichloroethane (M.S.)	N.D.	17	101
Chloroform	N.D.	-	N.S.
1,1,1-Trichloroethane (TCA)	N.D.	-	N.S.
Carbon Tetrachloride	N.D.	-	N.S.
1,2-Dichloroethane (EDC)	N.D.	-	N.S.
Trichloroethene (TCE) (M.S.)	N.D.	5	105
1,2-Dichloropropane	N.D.	-	N.S.
Bromodichloromethane	N.D.	-	N.S.
2-Chloroethylvinyl ether	N.D.	-	N.S.
trans-1,3-Dichloropropene	N.D.	6	105
cis-1,3-Dichloropropene	N.D.	-	N.S.
1,1,2-Trichloroethane	N.D.	-	N.S.
Tetrachloroethene (M.S.)	N.D.	3	104
Dibromochloromethane	N.D.	-	N.S.
Chlorobenzene	N.D.	-	N.S.
Bromoform	N.D.	-	N.S.
1,1,2,2-Tetrachloroethane	N.D.	-	N.S.
1,3-Dichlorobenzene	N.D.	-	N.S.
1,4-Dichlorobenzene	N.D.	-	N.S.
1,2-Dichlorobenzene	N.D.	-	N.S.

QUALITY CONTROL DATA

Surrogate Spike % Recovery			
Bromochloromethane	103 %	97 %	99 %
1,4-Dichlorobutane	104 %	103 %	102 %

N.D.: Not Detected  
 N.S.: Not Spiked

*Handwritten signature*

Analytical Supervisor



Harding Lawson Associates  
Environmental Services Division  
200 Rush Landing Road  
Novato, California 94947  
(415) 892-0821

# CHAIN OF CUSTODY FORM

HLA 08144.09-L

Job Number: 9382.030.02  
Name/Location: City of Oakland  
Project Manager: David F. Loland

Samplers: R. Stolzman

Recorder: Robert A. Stolzman  
(Signature Required)

ANALYSIS REQUESTED											
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
EPA 601/8010	EPA 602/8020	EPA 624/8240	EPA 625/8270	Priority Plitnt. Metals	Benzene/Toluene/Xylene	Total Petrol. Hydrocarb.	<i>TPH-Lt only by fast</i>	<i>Lead</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

SOURCE CODE	MATRIX				#CONTAINERS & PRESERV.			SAMPLE NUMBER OR LAB NUMBER			DATE			
	Water	Sediment	Soil	Oil	Unpres.	H <sub>2</sub> SO <sub>4</sub>	HNO <sub>3</sub>	Yr	Wk	Seq	Yr	Mo	Dy	Time
50		X								88	08	04	12	00
		X											12	25
		X											12	45
		X											13	05
		X											13	05
		X											13	30
		X											13	30
		X											13	55

STATION DESCRIPTION/NOTES
Hold 1410
Hold 1411
Hold 1412
Hold 1413
1414
1415
1416

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

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) <u>Robert A. Stolzman</u>	DATE/TIME <u>8-4-88 1755</u>	RECEIVED FOR LAB BY: (Signature) <u>C. Jontay</u>
METHOD OF SHIPMENT		

FORMERLY WESCO LABORATORIES  
Report Date: September 6, 1988

HARDING LAWSON ASSOC.  
SEP 8 1988

Client: Harding Lawson Associates  
200 Rush Landing Road  
Novato, CA 94947  
Attn.: David Leland

Trace job #: NLA 0814410-L

Date sampled: August 5, 1988 Site: City of Oakland  
Sampled by: R. Stolzman

Date received: August 5, 1988 P.O.: 9382,030.02  
Submitted by: R. Stolzman

Lab #	Client ID	Matrix	Analysis
8- 7451	31-0005	water	Purg. Halocarbons 601
8- 7451	31-0005	water	TPH light w/ BTXE
8- 7452	31-0005	water	Lead 7420
8- 7453	31-0006	water	Purg. Halocarbons 601
8- 7453	31-0006	water	TPH light w/ BTXE
8- 7454	31-0006	water	Lead 7420
8- 7455	31-0007	water	Purg. Halocarbons 601
8- 7455	31-0007	water	TPH light w/ BTXE
8- 7456	31-0007	water	Lead 7420
8- 7457	31-0008	water	Purg. Halocarbons 601
8- 7457	31-0008	water	TPH light w/ BTXE
8- 7458	31-0008	water	Lead 7420
8- 7442	B12-05.5	soil	Purg. Halocarbons 8010
8- 7442	B12-05.5	soil	Diesel 3550/8015
8- 7442	B12-05.5	soil	TPH light only 5030/8015
8- 7443	B12-06.0	soil	Purg. Aromatics 8020
8- 7444	B12-10.5	soil	
8- 7445	B12-15.5	soil	
8- 7446	B12-20.5	soil	
8- 7447	B12-25.0	soil	Purg. Halocarbons 8010
8- 7447	B12-25.0	soil	Diesel 3550/8015
8- 7447	B12-25.0	soil	TPH light only 5030/8015
8- 7448	B12-25.5	soil	Purg. Aromatics 8020
8- 7448	B12-25.5	soil	Lead 7420
8- 7449	B12-30.0	soil	Diesel 3550/8015
8- 7449	B12-30.0	soil	TPH light only 5030/8015
8- 7449	B12-30.0	soil	Vol Org. Cpds. 8010-8020



FORMERLY WESCO LABORATORIES  
Report date: September 6, 1988

Pace job #: HLA 0814410-L

Client: Harding Lavson Associates  
200 Rush Landing Road  
Novato, CA 94947  
Attn.: David LelandDate sampled: August 5, 1988  
Sampled by: R. Stolzman

Site: City of Oakland

Date received: August 5, 1988  
Submitted by: R. Stolzman

P.O.: 9382, 030.02

Lab #	Client ID	Matrix	Analysis
8- 7450	B12-30.5	soil	Diesel 3550/8015
8- 7450	B12-30.5	soil	TPH light only 5030/8015
8- 7450	B12-30.5	soil	Vol Org. Cpds. 8010+8020
8- 7432	B8-05.5	soil	Purg. Halocarbons 8010
8- 7432	B8-05.5	soil	Diesel 3550/8015
8- 7432	B8-05.5	soil	TPH light only 5030/8015
8- 7433	B8-06.0	soil	Purg. Aromatics 8020
8- 7434	B8-10.0	soil	
8- 7435	B8-10.5	soil	
8- 7436	B8-15.5	soil	
8- 7437	B8-20.0	soil	
8- 7438	B8-25.5	soil	Purg. Halocarbons 8010
8- 7438	B8-25.5	soil	Diesel 3550/8015
8- 7438	B8-25.5	soil	TPH light only 5030/8015
8- 7439	B8-26.0	soil	Purg. Aromatics 8020
8- 7439	B8-26.0	soil	Lead 7420
8- 7440	B8-30.0	soil	Diesel 3550/8015
8- 7440	B8-30.0	soil	TPH light only 5030/8015
8- 7440	B8-30.0	soil	Vol Org. Cpds. 8010+8020
8- 7441	B8-35.5	soil	Diesel 3550/8015
8- 7441	B8-35.5	soil	TPH light only 5030/8015
8- 7441	B8-35.5	soil	Vol Org. Cpds. 8010+8020

FORMERLY WESCO LABORATORIES

Report date: September 6, 1988

Pace job #: HLA 0814410-L

Client: Harding Lavson Associates  
200 Rush Landing Road  
Novato, CA 94947

Attn.: David Leland

Date sampled: August 5, 1988  
Sampled by: R. Stolzman

Site: City of Oakland

Date received: August 5, 1988  
Submitted by: R. Stolzman

P.O.: 9382, 030.02

Lab #	Client ID	Matrix	Analysis
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Dear Client,

No problems were encountered with the analysis of your samples. We will store samples for 30 days after the report date. The samples will be returned to the client after the 30-day period, unless other arrangements are made. If you have any questions, please feel free to call, (415)883-6100.

*R. Stolzman*  
Sample Controller

Report Date: 30-Aug-88  
PACE JOB #: HLA 08144.10-L  
Analytical Method: EPA 8020  
MATRIX: SOIL

Extract/Purge Date: SEE BELOW  
Completion Date: SEE BELOW  
Analyst: LEWIS

LAB #:	8-7433	8-7439
CLIENT'S ID:	B8-06.0	B8-26.0
DATE COMPLETE:	19-Aug-88	17-Aug-88

COMPOUND	RESULT (ug/kg)	Detection Limit (ug/kg)	RESULT (ug/kg)	Detection Limit (ug/kg)
Benzene-----	N.D.	0.2	480	25.0
Toluene-----	1.4	0.2	1,000	25.0
Chlorobenzene-----	N.D.	0.2	N.D.	25.0
Ethylbenzene-----	N.D.	0.2	1,100	25.0
Xylene-----	N.D.	0.2	6,300	25.0
1,3-Dichlorobenzene-----	N.D.	0.2	N.D.	25.0
1,4-Dichlorobenzene-----	N.D.	0.2	N.D.	25.0
1,2-Dichlorobenzene-----	N.D.	0.2	N.D.	25.0

QUALITY CONTROL DATA

Surrogate Spike	Percent Recovery	
Fluorobenzene	115 %	111 %

LAB #:	8-7439 (dup.)	8-7440
CLIENT'S ID:	B8-26.0	B8-30.0
DATE COMPLETE:	17-Aug-88	17-Aug-88

COMPOUND	RESULT (ug/kg)	Detection Limit (ug/kg)	RESULT (ug/kg)	Detection Limit (ug/kg)
Benzene-----	540	25.0	29	0.2
Toluene-----	910	25.0	19	0.2
Chlorobenzene-----	N.D.	25.0	N.D.	0.2
Ethylbenzene-----	1,100	25.0	1.3	0.2
Xylene-----	5,800	25.0	12	0.2
1,3-Dichlorobenzene-----	N.D.	25.0	N.D.	0.2
1,4-Dichlorobenzene-----	N.D.	25.0	N.D.	0.2
1,2-Dichlorobenzene-----	N.D.	25.0	N.D.	0.2

QUALITY CONTROL DATA

Surrogate Spike	Percent Recovery	
Fluorobenzene	113 %	99 %

N.D.: Not detected

*P. H. Lewis*  
-----  
Analytical Supervisor

**Appendix D**

**RESULTS OF LABORATORY ANALYSIS OF GROUND-WATER SAMPLES**

HARDING LAWSON ASSOC  
OCT 5 1988

Offices:  
Minneapolis, Minnesota  
Tampa, Florida  
Coralville, Iowa  
Novato, California

Report date: October 3, 1988  
Client: Harding Lawson Associates  
200 Rush Landing Road  
Novato, CA 94947  
Attn.: D. Leland

Pace job #: HLA 083H 93-L

MONITORING WELLS  
9-9-88

Date sampled: September 9, 1988  
Sampled by: D. Evans

Site: City of Oakland

Date received: September 9, 1988  
Submitted by: D. Evans

P.O.: 09382,022.02

Lab #	Client ID	Matrix	Analysis
8- 8278	88360901	MW-5	water TPH (light) only 5030/8015 Vol Org. Cpds. 8010+8020
8- 8278	88360901		
8- 8279	88360902	MW-2	water TPH (light) only 5030/8015 Vol Org. Cpds. 8010+8020
8- 8279	88360902		
8- 8280	88360903	MW-6	water TPH (light) only 5030/8015 Vol Org. Cpds. 8010+8020
8- 8280	88360903		
8- 8281	88360904	MW-10	water TPH (light) only 5030/8015 Vol Org. Cpds. 8010+8020
8- 8281	88360904		
8- 8282	88360905	MW-11	water TPH (light) only 5030/8015 Vol Org. Cpds. 8010+8020
8- 8282	88360905		

Dear Client,

No problems were encountered with the analysis of your samples. We will store samples for 30 days after the report date. The samples will be returned to the client after the 30-day period, unless other arrangements are made. If you have any questions, please feel free to call Lisa Petersen, our Client Services Coordinator at (415)883-6100.

*C. Sontag*  
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Sample Controller

Report Date: 27-Sep-88  
PACE JOB #: HLA 0831.93-L  
Analytical Method: 5030/8015  
MATRIX: WATER

Completion Date: 15-Sep-88  
Reported by: D.Gill  
Analyst: ATTIA

LAB #: 8-8278 CLIENT'S ID: MW-5 360901

COMPOUND	RESULT (ug/l)	Detection Limit (ug/l)
Total Petroleum Hydrocarbons (light)--	N.D.	50.0

QUALITY CONTROL DATA

Surrogate Spike & Recovery  
Fluorobenzene 103 %

LAB #: 8-8279 CLIENT'S ID: MW-Z 360902

COMPOUND	RESULT (ug/l)	Detection Limit (ug/l)
Total Petroleum Hydrocarbons (light)--	790	50.0

QUALITY CONTROL DATA

Surrogate Spike & Recovery  
Fluorobenzene 119 %

LAB #: 8-8280 CLIENT'S ID: MW-6 360903

COMPOUND	RESULT (ug/l)	Detection Limit (ug/l)
Total Petroleum Hydrocarbons (light)--	3,600	500

QUALITY CONTROL DATA

Surrogate Spike & Recovery  
Fluorobenzene 96 %

N.D.: Not Detected



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Analytical Supervisor

Report Date: 27-Sep-88  
PACE JOB #: HLA 0831.93-L  
Analytical Method: EPA 5030/8015  
MATRIX: WATER

Completion Date: 15-Sep-88  
Reported by: D.Gill  
Analyst: ATTIA

LAB #: 8-8281

CLIENT'S ID: MW-10 360904

COMPOUND	RESULT (ug/l)	Detection Limit (ug/l)
Total Petroleum Hydrocarbons (light)--	2,900	500

QUALITY CONTROL DATA

Surrogate Spike & Recovery  
Fluorobenzene 108 %

LAB #: 8-8282

CLIENT'S ID: MW-11 360905

COMPOUND	RESULT (ug/l)	Detection Limit (ug/l)
Total Petroleum Hydrocarbons (light)--	1,200	250

QUALITY CONTROL DATA

Surrogate Spike & Recovery  
Fluorobenzene 111 %

N.D.: Not Detected



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Analytical Supervisor

Report Date: 30-Aug-88  
 PACE JOB #: HLA 08144.10-L  
 Analytical Method: EPA 8020  
 MATRIX: SOIL

Extract/Purge Date: SEE BELOW  
 Completion Date: SEE BELOW  
 Analyst: ATTIA

LAB #:	8-7441	8-7443
CLIENT'S ID:	B8-35.5	B12-25.5
DATE COMPLETE:	17-Aug-88	17-Aug-88

COMPOUND	RESULT (ug/kg)	Detection Limit (ug/kg)	RESULT (ug/kg)	Detection Limit (ug/kg)
Benzene-----	N.D.	0.2	N.D.	0.2
Toluene-----	N.D.	0.2	6.1	0.2
Chlorobenzene-----	N.D.	0.2	N.D.	0.2
Ethylbenzene-----	N.D.	0.2	N.D.	0.2
Xylene-----	N.D.	0.2	N.D.	0.2
1,3-Dichlorobenzene-----	N.D.	0.2	N.D.	0.2
1,4-Dichlorobenzene-----	N.D.	0.2	N.D.	0.2
1,2-Dichlorobenzene-----	N.D.	0.2	N.D.	0.2

QUALITY CONTROL DATA

Surrogate Spike	Percent Recovery	
Fluorobenzene	92 %	84 %

LAB #:	8-7448	8-7449
CLIENT'S ID:	B12-25.5	B12-30.0
DATE COMPLETE:	17-Aug-88	19-Aug-88

COMPOUND	RESULT (ug/kg)	Detection Limit (ug/kg)	RESULT (ug/kg)	Detection Limit (ug/kg)
Benzene-----	10,000	400	780	20
Toluene-----	130,000	400	910	20
Chlorobenzene-----	N.D.	400	N.D.	20
Ethylbenzene-----	38,000	400	130	20
Xylene-----	210,000	400	740	20
1,3-Dichlorobenzene-----	N.D.	400	N.D.	20
1,4-Dichlorobenzene-----	N.D.	400	N.D.	20
1,2-Dichlorobenzene-----	N.D.	400	N.D.	20

QUALITY CONTROL DATA

Surrogate Spike	Percent Recovery	
Fluorobenzene	109 %	102 %

N.D.: Not detected

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 Analytical Supervisor



Report Date: 30-Aug-88  
PACE JOB #: HLA 08144.10-L  
Analytical Method: EPA 8020  
MATRIX: SOIL


Extract/Purge Date: SEE BELOW  
Completion Date: SEE BELOW  
Analyst: ATTIA

LAB #: 8-7450  
CLIENT'S ID: B12-35.5  
DATE COMPLETE: 19-Aug-88

COMPOUND	RESULT (ug/kg)	Detection Limit (ug/kg)
Benzene-----	0.9	0.2
Toluene-----	4.6	0.2
Chlorobenzene-----	N.D.	0.2
Ethylbenzene-----	N.D.	0.2
Xylene-----	2.8	0.2
1,3-Dichlorobenzene-----	N.D.	0.2
1,4-Dichlorobenzene-----	N.D.	0.2
1,2-Dichlorobenzene-----	N.D.	0.2

QUALITY CONTROL DATA  
Surrogate Spike            Percent Recovery  
Fluorobenzene                110 %

N.D.: Not detected

  
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Analytical Supervisor

QUALITY CONTROL DATA

METHOD: EPA 8020

PACE JOB#: HLA 08144.10-L

SAMPLE #: 8-7433, 8-7449, 8-7450

COMPOUND	Blank (ug/l)	Spike Duplicate % deviation	Spike % recovery
Benzene	N.D.	3	120
Toluene	N.D.	4	102
p-Xylene	N.D.	0	101

QUALITY CONTROL DATA

Surrogate Spike % Recovery

Fluorobenzene 107 % 106 % 104%

QUALITY CONTROL DATA

METHOD: EPA 8020

PACE JOB#: HLA 08144.10-L

SAMPLE #: 8-7439, 8-7439 (dup.), 8-7440, 8-7441, 8-7443, 8-7448

COMPOUND	Blank (ug/l)	Spike Duplicate % deviation	Spike % recovery
Benzene	N.D.	2	107
Toluene	N.D.	3	107
p-Xylene	N.D.	3	107

QUALITY CONTROL DATA

Surrogate Spike % Recovery

Fluorobenzene 94 % 120 % 93%

N.D.: Not detected

*Attala*  
 -----  
 Analytical Supervisor

Report date: 30-Aug-88  
 PACE JOB #: HLA 08144.10-L  
 Analytical Method: 3550/8015  
 MATRIX: SOIL

Extract/Purge: 07-AUG-88  
 Completion Date: 07-AUG-88  
 Analyst: CLARK

LAB #	CLIENT ID	Total Petroleum Hydrocarbons (heavy) (mg/kg)	Calibration Standard	Identifiable as	Detection limit (mg/kg)
8-7432	B8-05.5	N.D.	N.A.	N.I.	10
8-7438	B8-25.5	N.D.	N.A.	N.I.	10
8-7440	B8-30.0	N.D.	N.A.	N.I.	10
8-7441	B8-35.5	N.D.	N.A.	N.I.	10
8-7442	B12-05.5	N.D.	N.A.	N.I.	10
8-7447	B12-25.5	N.D.	N.A.	N.I.	10
8-7449	B12-30.0	N.D.	N.A.	N.I.	10
8-7450	B12-35.5	N.D.	N.A.	N.I.	10

PACE JOB #: HLA 08144.10-L

COMPOUND	Blank mg/l	Spike Duplicate % deviation	Spike % recovery
Diesel	N.D.	39	73

N.D.: Not Detected  
 N.A.: Not Analysed  
 N.I.: Not Identified

*[Signature]*  
 -----  
 Analytical Supervisor

Report Date: 30-Aug-88 Extract/Purge Date: 09-Aug-88  
 PACE JOB #: HLA 08144.10-L Completion Date: 09-Aug-88  
 Analytical Method: EPA 5030/8015/8020 Analyst: ATTIA  
 MATRIX: WATER

LAB #: 8-7455 CLIENT'S ID: 31-0007

COMPOUND	RESULT (ug/l)	Detection Limit (ug/l)
Benzene-----	1,400	5
Toluene-----	2,900	5
Ethylbenzene-----	360	5
Xylene-----	1,700	5
Total Petroleum Hydrocarbons (light)---	10,000	500

**QUALITY CONTROL DATA**

Surrogate Spike & Recovery  
 Fluorobenzene 101 %BFB

LAB #: 8-7457 CLIENT'S ID: 31-0008

COMPOUND	RESULT (ug/l)	Detection Limit (ug/l)
Benzene-----	1,300	10
Toluene-----	2,600	10
Ethylbenzene-----	310	10
Xylene-----	1,500	10
Total Petroleum Hydrocarbons (light)---	9,100	1,000

**QUALITY CONTROL DATA**

Surrogate Spike & Recovery  
 Fluorobenzene 89 %BFB

N.D.: Not Detected  
 BFB: Matrix interference with Bromofluorobenzene



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 Analytical Supervisor

Report Date: 30-Aug-88 Extract/Purge Date: SEE BELOW  
 PACE JOB #: HLA 08144.10-L Completion Date: SEE BELOW  
 Analytical Method: EPA 5030/8015/8020 Analyst: ATTIA  
 MATRIX: WATER

LAB #: 8-7451 CLIENT'S ID: 31-0005  
 Completion Date: 08-AUG-88

COMPOUND	RESULT (ug/l)	Detection Limit (ug/l)
Benzene-----	370	10
Toluene-----	780	10
Ethylbenzene-----	150	10
Xylene-----	880	10
Total Petroleum Hydrocarbons (light)---	3,800	1,000

QUALITY CONTROL DATA

Surrogate Spike & Recovery  
 Fluorobenzene 106 %

LAB #: 8-7453 CLIENT'S ID: 31-0006  
 Completion Date: 09-AUG-88

COMPOUND	RESULT (ug/l)	Detection Limit (ug/l)
Benzene-----	390	10
Toluene-----	650	10
Ethylbenzene-----	130	10
Xylene-----	670	10
Total Petroleum Hydrocarbons (light)---	3,100	1,000

QUALITY CONTROL DATA

Surrogate Spike & Recovery  
 Fluorobenzene 107 %BFB

N.D.: Not Detected

BFB: Matrix interference with Bromofluorobenzene

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 Analytical Supervisor

QUALITY CONTROL DATA

METHOD: EPA 5030/8015/8020  
 SAMPLE #: 8-7451

PACE JOB #:

HLA 08144.10-L

COMPOUND	Blank ug/l	Spike Duplicate % deviation	Spike % recovery
Benzene-----	N.D.	3	94
Toluene-----	N.D.	2	95
p-Xylene-----	N.D.	4	95
Gasoline-----	N.D.	10	94

QUALITY CONTROL DATA

Surrogate Spike % Recovery  
 Fluorobenzene

88 %

97 %

97 %

QUALITY CONTROL DATA

METHOD: EPA 5030/8015/8020  
 SAMPLE #: 8-7453, 8-7455, 8-7457

PACE JOB #:

HLA 08144.10-L

COMPOUND	Blank ug/l	Spike Duplicate % deviation	Spike % recovery
Benzene-----	N.D.	13	100
Toluene-----	N.D.	7	102
p-Xylene-----	N.D.	1	103
Gasoline-----	N.D.	9	97

QUALITY CONTROL DATA

Surrogate Spike % Recovery  
 Fluorobenzene

98 %

109 %

110 %

N.D.: Not Detected



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 Analytical Supervisor

Report date: 30-Aug-88  
 PACE JOB #: HLA 08144.10-L  
 Analytical Method: EPA 5030/8015  
 MATRIX: SOIL

Extract/Purge Date: 19-Aug-88  
 Completion Date: 19-Aug-88  
 Analyst: ATTIA

LAB #: 8-7432 CLIENT'S ID: B8-05.5  
 -----  
 COMPOUND RESULT Detection  
 (ug/kg) Limit(ug/kg)  
 Total Petroleum Hydrocarbons (light)--- N.D. 50.0

QUALITY CONTROL DATA Surrogate Spike & Recovery  
 Fluorobenzene 85 %

LAB #: 8-7438 CLIENT'S ID: B8-25.5  
 -----  
 COMPOUND RESULT Detection  
 (ug/kg) Limit(ug/kg)  
 Total Petroleum Hydrocarbons (light)--- 14,000 2,000

QUALITY CONTROL DATA Surrogate Spike & Recovery  
 Fluorobenzene 108 %

LAB #: 8-7438 (duplicate) CLIENT'S ID: B8-25.5  
 -----  
 COMPOUND RESULT Detection  
 (ug/kg) Limit(ug/kg)  
 Total Petroleum Hydrocarbons (light)--- 17,000 2,000

QUALITY CONTROL DATA Surrogate Spike & Recovery  
 Fluorobenzene 88 %

N.D.: Not Detected

*Attia*

-----  
 Analytical Supervisor

Report Date: 30-Aug-88  
 PACE JOB #: HLA 08144.10-L  
 Analytical Method: EPA 5030/8015  
 MATRIX: SOIL

Extract/Purge Date: SEE BELOW  
 Completion Date: SEE BELOW  
 Analyst: ATTIA

LAB #: 8-7440  
 DATE COMPLETED: 17-AUG-88  
 CLIENT'S ID: B8-30.0

COMPOUND	RESULT (ug/kg)	Detection Limit(ug/kg)
Total Petroleum Hydrocarbons (light)---	89	50.0

QUALITY CONTROL DATA Surrogate Spike & Recovery  
 Fluorobenzene 99 %

LAB #: 8-7441  
 DATE COMPLETED: 17-AUG-88  
 CLIENT'S ID: B8-35.5

COMPOUND	RESULT (ug/kg)	Detection Limit(ug/kg)
Total Petroleum Hydrocarbons (light)---	N.D.	50.0

QUALITY CONTROL DATA Surrogate Spike & Recovery  
 Fluorobenzene 92 %

LAB #: 8-7442  
 DATE COMPLETED: 19-AUG-88  
 CLIENT'S ID: B12-05.5

COMPOUND	RESULT (ug/kg)	Detection Limit(ug/kg)
Total Petroleum Hydrocarbons (light)---	N.D.	50.0

QUALITY CONTROL DATA Surrogate Spike & Recovery  
 Fluorobenzene 80 %

N.D.: Not Detected

*Attia*  
 -----  
 Analytical Supervisor



Report Date: 30-Aug-88  
 PACE JOB #: HLA 08144.10-L  
 Analytical Method: EPA 5030/8015  
 MATRIX: SOIL

Extract/Purge Date: SEE BELOW  
 Completion Date: SEE BELOW  
 Analyst: ATTIA

LAB #: 8-7447  
 DATE COMPLETED: 12-AUG-88  
 CLIENT'S ID: B12-25.0

COMPOUND	RESULT (ug/kg)	Detection Limit(ug/kg)
Total Petroleum Hydrocarbons (light)---	3,000,000	125,000

QUALITY CONTROL DATA  
 Fluorobenzene Surrogate Spike & Recovery  
 91 % BFB

LAB #: 8-7449  
 DATE COMPLETED: 12-AUG-88  
 CLIENT'S ID: B12-30.0

COMPOUND	RESULT (ug/kg)	Detection Limit(ug/kg)
Total Petroleum Hydrocarbons (light)---	7,700	2,500

QUALITY CONTROL DATA  
 Fluorobenzene Surrogate Spike & Recovery  
 101 %

LAB #: 8-7450  
 DATE COMPLETED: 19-AUG-88  
 CLIENT'S ID: B12-35.5

COMPOUND	RESULT (ug/kg)	Detection Limit(ug/kg)
Total Petroleum Hydrocarbons (light)---	N.D.	50.0

QUALITY CONTROL DATA  
 Fluorobenzene Surrogate Spike & Recovery  
 110 %

N.D.: Not Detected  
 BFB: Bromofluorobenzene

*Attia*  
 -----  
 Analytical Supervisor

QUALITY CONTROL DATA

METHOD: EPA 5030/8015 PACE JOB #: HLA 08144.10-L  
 SAMPLE #: 8-7432, 8-7438, 8-7438 (dup.), 8-7442, 8-7450

COMPOUND	Blank ug/l	Spike Duplicate % deviation	Spike % recovery
Gasoline-----	N.D.	12	107

QUALITY CONTROL DATA

Surrogate Spike % Recovery  
 Fluorobenzene 107 % 106 % 104 %

QUALITY CONTROL DATA

METHOD: EPA 5030/8015 PACE JOB #: HLA 08144.10-L  
 SAMPLE #: 8-7440, 8-7441

COMPOUND	Blank ug/l	Spike Duplicate % deviation	Spike % recovery
Gasoline-----	N.D.	1	121

QUALITY CONTROL DATA

Surrogate Spike % Recovery  
 Fluorobenzene 94 % 120 % 93 %

QUALITY CONTROL DATA

METHOD: EPA 5030/8015 PACE JOB #: HLA 08144.10-L  
 SAMPLE #: 8-7447, 8-7449

COMPOUND	Blank ug/l	Spike Duplicate % deviation	Spike % recovery
Gasoline-----	N.D.	1	96

QUALITY CONTROL DATA

Surrogate Spike % Recovery  
 Fluorobenzene 93 % 114 % 112 %

N.D.: Not detected

*[Signature]*  
 -----  
 Analytical Supervisor

Report Date: 30-Aug-88 Extract/Purge Date: SEE BELOW  
 PACE JOB #: HLA 08144.10-L Analysis Completion: SEE BELOW  
 Analytical Method: EPA 7000 SERIES Analyst: WALKER  
 MATRIX: SEE BELOW

MATRIX:		SOIL	WATER
LAB #	CLIENT ID	LEAD	LEAD
		Pb	Pb
		(mg/kg)	(mg/l)
DATE COMPLETED:			
8-7439	B8-26.0	N.D.	-
8-7439	(dup.)	N.D.	-
8-7448	B12-25.5	N.D.	-
8-7452	31-0005	-	N.D.
8-7454	31-0006	-	N.D.
8-7456	31-0007	-	N.D.
8-7458	31-0008	-	N.D.

DETECTION LIMIT: 2.00 0.010  
 METHOD: EPA 7420 EPA 7421

QUALITY CONTROL DATA PACE JOB #: HLA 08144.10-L

COMPOUND	Blank (mg/l)	Spike Duplicate % deviation	Spike % recovery
Pb (soil)	N.D.	0.1	104
Pb (water)	N.D.	0.7	83

N.D.: Not Detected

  
 -----  
 Analytical Supervisor

Report Date: 01-Sep-88  
 PACE JOB #: HLA 08144.10-L  
 Analytical Method: EPA 8010  
 MATRIX: SOIL

Extract/Purge Date: 22-Aug-88  
 Completion Date: 22-Aug-88  
 Analyst: LEWIS/ATTIA

LAB #: 8-7447 8-7450  
 CLIENT'S ID: B12-25.0 B12-35.5

COMPOUND	RESULT (ug/kg)	Detecti Limit (ug/kg)	RESULT (ug/kg)	Detection Limit (ug/kg)
Dichlorodifluoromethane	N.D.	10	N.D.	2.0
Chloromethane	N.D.	10	N.D.	2.0
Vinyl Chloride	N.D.	10	N.D.	2.0
Bromomethane	N.D.	10	N.D.	2.0
Chloroethane	N.D.	10	N.D.	2.0
Trichlorofluoromethane	N.D.	10	N.D.	2.0
1,1-Dichloroethene	N.D.	10	N.D.	0.5
Methylene Chloride	N.D.	10	1.2	0.5
trans-1,2-Dichloroethene	N.D.	10	N.D.	0.5
1,1-Dichloroethane	N.D.	10	N.D.	0.5
Chloroform	N.D.	10	N.D.	0.5
1,1,1-Trichloroethane (TCA)	N.D.	10	N.D.	0.5
Carbon Tetrachloride	N.D.	10	N.D.	0.5
1,2-Dichloroethane (EDC)	0.8	10	N.D.	0.5
Trichloroethene (TCE)	N.D.	10	N.D.	0.5
1,2-Dichloropropane	N.D.	10	N.D.	0.5
Bromodichloromethane	N.D.	10	N.D.	0.5
2-Chloroethylvinyl ether	N.D.	10	N.D.	0.5
trans-1,3-Dichloropropene	N.D.	10	N.D.	0.5
cis-1,3-Dichloropropene	N.D.	10	N.D.	0.5
1,1,2-Trichloroethane	N.D.	10	N.D.	0.5
Tetrachloroethene	N.D.	10	N.D.	0.5
Dibromochloromethane	N.D.	10	N.D.	0.5
Chlorobenzene	N.D.	10	N.D.	0.5
Bromoform	N.D.	10	N.D.	0.5
1,1,2,2-Tetrachloroethane	N.D.	10	N.D.	0.5
1,3-Dichlorobenzene	N.D.	10	N.D.	0.5
1,4-Dichlorobenzene	N.D.	10	N.D.	0.5
1,2-Dichlorobenzene	N.D.	10	N.D.	0.5

QUALITY CONTROL DATA

Surrogate Spike	Percent Recovery	
Bromochloromethane	98 %	94 %
1,4-Dichlorobutane	88 %	95 %

N.D.: Not Detected

*Attia*  
 Analytical Supervisor

Report Date: 30-Aug-88  
PACE JOB #: HLA 08144.10-L  
Analytical Method: EPA 8010  
MATRIX: SOIL

Extract/Purge Date: 22-Aug-88  
Completion Date: 22-Aug-88  
Analyst: LEWIS/ATTIA

LAB #: 8-7438 8-7441  
CLIENT'S ID: B8-25.5 B8-35.5

COMPOUND	RESULT (ug/kg)	RESULT (ug/kg)	Detection Limit (ug/kg)
Dichlorodifluoromethane	N.D.	N.D.	2.0
Chloromethane	N.D.	N.D.	2.0
Vinyl Chloride	N.D.	N.D.	2.0
Bromomethane	N.D.	N.D.	2.0
Chloroethane	N.D.	N.D.	2.0
Trichlorofluoromethane	N.D.	N.D.	2.0
1,1-Dichloroethene	N.D.	N.D.	0.5
Methylene Chloride	1.7	1.2	0.5
trans-1,2-Dichloroethene	N.D.	N.D.	0.5
1,1-Dichloroethane	N.D.	N.D.	0.5
Chloroform	1.7	N.D.	0.5
1,1,1-Trichloroethane (TCA)	N.D.	N.D.	0.5
Carbon Tetrachloride	N.D.	N.D.	0.5
1,2-Dichloroethane (EDC)	N.D.	N.D.	0.5
Trichloroethene (TCE)	N.D.	N.D.	0.5
1,2-Dichloropropane	N.D.	N.D.	0.5
Bromodichloromethane	N.D.	N.D.	0.5
2-Chloroethylvinyl ether	N.D.	N.D.	0.5
trans-1,3-Dichloropropene	N.D.	N.D.	0.5
cis-1,3-Dichloropropene	N.D.	N.D.	0.5
1,1,2-Trichloroethane	N.D.	N.D.	0.5
Tetrachloroethene	N.D.	N.D.	0.5
Dibromochloromethane	N.D.	N.D.	0.5
Chlorobenzene	N.D.	N.D.	0.5
Bromoform	N.D.	N.D.	0.5
1,1,2,2-Tetrachloroethane	N.D.	N.D.	0.5
1,3-Dichlorobenzene	N.D.	N.D.	0.5
1,4-Dichlorobenzene	N.D.	N.D.	0.5
1,2-Dichlorobenzene	N.D.	N.D.	0.5

QUALITY CONTROL DATA

Surrogate Spike	Percent Recovery	
Bromochloromethane	96%	100%
1,4-Dichlorobutane	107%	111%

N.D.: Not Detected

  
Analytical Supervisor

BLANK, SPIKE DUPLICATE AND SPIKE REPORT JOB #  
METHOD : EPA 8010

HLA 08144.10-L

COMPOUND	Blank (ug/l)	Spike Duplicate % deviation	Spike % recovery
Dichlorodifluoromethane	N.D.	-	N.S.
Chloromethane	N.D.	-	N.S.
Vinyl Chloride	N.D.	-	N.S.
Bromomethane	N.D.	-	N.S.
Chloroethane	N.D.	-	N.S.
Trichlorofluoromethane	N.D.	-	N.S.
1,1-Dichloroethene	N.D.	-	N.S.
Methylene Chloride	N.D.	-	N.S.
trans-1,2-Dichloroethene	N.D.	-	N.S.
1,1-Dichloroethane (M.S.)	N.D.	0	107
Chloroform	N.D.	-	N.S.
1,1,1-Trichloroethane (TCA)	N.D.	-	N.S.
Carbon Tetrachloride	N.D.	-	N.S.
1,2-Dichloroethane (EDC)	N.D.	-	N.S.
Trichloroethene (TCE) (M.S.)	N.D.	1	103
1,2-Dichloropropane	N.D.	-	N.S.
Bromodichloromethane	N.D.	-	N.S.
2-Chloroethylvinyl ether	N.D.	-	N.S.
trans-1,3-Dichloropropene	N.D.	4	103
cis-1,3-Dichloropropene	N.D.	-	N.S.
1,1,2-Trichloroethane	N.D.	-	N.S.
Tetrachloroethene (M.S.)	N.D.	4	104
Dibromochloromethane	N.D.	-	N.S.
Chlorobenzene	N.D.	-	N.S.
Bromoform	N.D.	-	N.S.
1,1,2,2-Tetrachloroethane	N.D.	-	N.S.
1,3-Dichlorobenzene	N.D.	-	N.S.
1,4-Dichlorobenzene	N.D.	-	N.S.
1,2-Dichlorobenzene	N.D.	-	N.S.

QUALITY CONTROL DATA

Surrogate Spike % Recovery

Bromochloromethane	94 %	105 %	102 %
1,4-Dichlorobutane	93 %	109 %	108 %

N.D.: Not Detected

N.S.: Not Spiked

*[Signature]*  
Analytical Supervisor

**CHAIN OF CUSTODY FORM**

HLA 08144.1D-L

Job Number: 9382,030.02  
Name/Location: City of Oakland  
Project Manager: David F. Leland

Samplers: R. Stolzman

Recorder: Roberta Stolzman  
(Signature Required)

ANALYSIS REQUESTED

EPA 601/8010	EPA 602/8020	EPA 624/8240	EPA 625/8270	Priority Pestic. Metals	Benzene/Toluene/Xylene	Total Petrol. Hydrocarb.	TPH - <i>letting by EPA</i>	Lead
X	X	X	X	X	X	X	X	X

SOURCE CODE	MATRIX				#CONTAINERS & PRESERV.			SAMPLE NUMBER OR LAB NUMBER			DATE				STATION DESCRIPTION/ NOTES
	Water	Sediment	Soil	Oil	Unpres.	H <sub>2</sub> SO <sub>4</sub>	HNO <sub>3</sub>	Yr	Wk	Seq	Yr	Mo	Dy	Time	
510			X		1			8	8	05	588	08	25	0840	
			X		1			8	8	06	0			0845	
			X		1			8	8	10	0			0855	Hold
			X		1			8	8	10	5			0855	Hold
			X		1			8	8	15	5			0910	Hold
			X		1			8	8	20	5			0925	Hold
			X		1			8	8	25	5			0940	Split extract + dup
			X		1			8	8	26	0			0940	Split extract + dup
			X		1			8	8	30	0			1005	
			X		1			8	8	35	5			1030	

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

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	RECEIVED FOR LAB BY: (Signature)
Roberta Stolzman	8-5-88 1005	L. Fontana 8/5/88
METHOD OF SHIPMENT		

**CHAIN OF CUSTODY FORM**

HLA 08144.10-L

Job Number: 9382,030.02  
 Name/Location: City of Oakland  
 Project Manager: David F. Leland

Samplers: R. Stolzman

Recorder: Robert A. Stolzman  
 (Signature Required)

SOURCE CODE	MATRIX				#CONTAINERS & PRESERV.				SAMPLE NUMBER OR LAB NUMBER			DATE				STATION DESCRIPTION/ NOTES	
	Water	Sediment	Soil	Oil	Unpres.	H <sub>2</sub> SO <sub>4</sub>	HNO <sub>3</sub>			Yr	Wk	Seq	Yr	Mo	Dy		Time
50			X		1					8	2	-05.5	88	08	05	1155	
			X		1							-06.0				1155	
			X		1							-10.5				1210	Hold
			X		1							-15.5				1230	Hold
			X		1							-20.5				1250	Hold
			X		1							-25.0				1305	
			X		1							-25.5				1305	
			X		1							-30.0				1335	
			X		1							-35.5				1400	
10	X				3							8831	00	05		1100	

ANALYSIS REQUESTED										
EPA 501/5010	EPA 502/5020	EPA 524/5240	EPA 525/5270	Priority Pestic. Metals	Benzene/Toluene/Xylene	Total Petrol. Hydrocarb.	TPH-Catting by GUS	TPH-Cat only	Lead	PTEX
X	X	X	X			X	X			
	X									
	X					X				
	X							X		
X	X					X				
X	X					X				
X							X	X	X	

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

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	RECEIVED FOR LAB BY: (Signature) DATE/TIME
Robert A. Stolzman	8-5-88 1205	L. Santay 8/5/88
METHOD OF SHIPMENT		





National Environmental Services Division  
 Environmental Services Division  
 200 Rush Landing Road  
 Novato, California 94947  
 (415) 892-0821

## CHAIN OF CUSTODY FORM

HLA 08144.10-L

Job Number: 9382, 030.02  
 Name/Location: City of Oakland  
 Project Manager: David F. Leland

Samplers: R. Stoljman

Recorder: Robert A. Stoljman  
*(Signature Required)*

SOURCE CODE	MATRIX				#CONTAINERS & PRESERV.			SAMPLE NUMBER OR LAB NUMBER			DATE			
	Water	Sediment	Soil	Oil	Unpres.	H <sub>2</sub> SO <sub>4</sub>	HNO <sub>3</sub>	Yr	Wk	Seq	Yr	Mo	Dy	Time
10	X				3			88	31	0006	88	08	05	1100
10	X				3			88	31	0007	88	09	09	1500
10	X				3			88	31	0008	88	09	09	1515

STATION DESCRIPTION/ NOTES
7450 ...
...
...

ANALYSIS REQUESTED									
EPA 601/8010	EPA 602/8020	EPA 624/8240	EPA 625/8270	Priority Pflnt. Metals	Benzene/Toluene/Xylene	Total Petrol. Hydrocarb.	MPH-LA only	BTX	Lead
X	X						X	X	X
X	X						X	X	X
X	X						X	X	X

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

CHAIN OF CUSTODY RECORD		
RELINQUISHED BY: <i>(Signature)</i>	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
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		

QUALITY CONTROL DATA  
METHOD: 5030/8015

PACE JOB #: HLA 0831.93-L

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COMPOUND	Blank ug/l	Spike Duplicate % deviation	Spike % recovery
Gasoline-----	N.D.	3	103

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QUALITY CONTROL DATA

Surrogate Spike % Recovery

Fluorobenzene	106 %	103 %	103 %
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N.D.: Not Detected



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Analytical Supervisor

Report Date: 28-Sep-88  
PACE JOB #: HLA 0831.93-L  
Analytical Method: EPA 8010  
MATRIX: WATER

Completion Date:  
Reported by:  
Analyst: ATTIA

SEE BELOW  
D.Gill

	MW-5	MW-2	MW-6	MW-10	MW-11
LAB #:	8-8278	8-8279	8-8280	8-8281	8-8282
CLIENT'S ID:	360901	360902	360903	360904	360905

COMPOUND	RESULT (ug/l)	RESULT (ug/l)	RESULT (ug/l)	RESULT (ug/l)	RESULT (ug/l)	Detection Limit (ug/l)
Dichlorodifluoromethane-----	N.D.	N.D.	N.D.	1.7	N.D.	2.0
Chloromethane-----	N.D.	N.D.	N.D.	N.D.	N.D.	2.0
Vinyl Chloride-----	N.D.	N.D.	N.D.	N.D.	N.D.	2.0
Bromomethane-----	N.D.	N.D.	N.D.	N.D.	0.3	2.0
Chloroethane-----	N.D.	N.D.	N.D.	N.D.	N.D.	2.0
Trichlorofluoromethane-----	N.D.	N.D.	N.D.	N.D.	N.D.	2.0
1,1-Dichloroethene-----	16	N.D.	N.D.	16	2.6	0.5
Methylene Chloride-----	0.7	0.6	0.5	N.D.	N.D.	0.5
trans-1,2-Dichloroethene-----	N.D.	0.8	1.7	N.D.	N.D.	0.5
1,1-Dichloroethane-----	8.8	N.D.	N.D.	4.1	2.7	0.5
Chloroform-----	6.4	5.5	19	N.D.	N.D.	0.5
1,1,1-Trichloroethane (TCA)-----	1.3	N.D.	N.D.	N.D.	1.4	0.5
Carbon Tetrachloride-----	N.D.	N.D.	N.D.	N.D.	N.D.	0.5
1,2-Dichloroethane (EDC)-----	1.4	1.0	2.1	17	28	0.5
Trichloroethene (TCE)-----	N.D.	3,800*	940**	62	5.6	0.5
1,2-Dichloropropane-----	N.D.	N.D.	N.D.	N.D.	N.D.	0.5
Bromodichloromethane-----	N.D.	N.D.	N.D.	N.D.	N.D.	0.5
2-Chloroethylvinyl ether-----	N.D.	N.D.	N.D.	N.D.	N.D.	0.5
trans-1,3-Dichloropropene-----	N.D.	N.D.	N.D.	N.D.	N.D.	0.5
cis-1,3-Dichloropropene-----	N.D.	N.D.	N.D.	N.D.	N.D.	0.5
1,1,2-Trichloroethane-----	N.D.	N.D.	N.D.	N.D.	N.D.	0.5
Tetrachloroethene-----	N.D.	5.9	13	N.D.	N.D.	0.5
Dibromochloromethane-----	N.D.	N.D.	N.D.	N.D.	N.D.	0.5
Chlorobenzene-----	N.D.	N.D.	N.D.	N.D.	N.D.	0.5
Bromoform-----	N.D.	N.D.	N.D.	N.D.	N.D.	0.5
1,1,2,2-Tetrachloroethane-----	N.D.	N.D.	N.D.	N.D.	N.D.	0.5
1,3-Dichlorobenzene-----	N.D.	N.D.	N.D.	N.D.	N.D.	0.5
1,4-Dichlorobenzene-----	N.D.	N.D.	N.D.	N.D.	N.D.	0.5
1,2-Dichlorobenzene-----	N.D.	N.D.	N.D.	N.D.	N.D.	0.5

QUALITY CONTROL DATA

Surrogate Spike	Percent Recovery				
Bromochloromethane	107 %	98 %	104 %	95 %	89 %
1,4-Dichlorobutane	103 %	91 %	83 %	103 %	96 %

N.D.: Not Detected

\*: TCE quantified at 50 times dilution

\*\* : TCE quantified at 100 times dilution

  
Analytical Supervisor

BLANK, SPIKE DUPLICATE AND SPIKE REPORT JOB # HLA 0831.93-L  
METHOD : EPA 8010  
SAMPLE #: 8-8278, 8-8279, 8-8280

COMPOUND	Blank (ug/l)	Spike Duplicate % deviation	Spike % recovery
Dichlorodifluoromethane	N.D.	-	N.S.
Chloromethane	N.D.	-	N.S.
Vinyl Chloride	N.D.	-	N.S.
Bromomethane	N.D.	-	N.S.
Chloroethane	N.D.	-	N.S.
Trichlorofluoromethane	N.D.	-	N.S.
1,1-Dichloroethene	N.D.	-	N.S.
Methylene Chloride	1.2	-	N.S.
trans-1,2-Dichloroethene	N.D.	-	N.S.
1,1-Dichloroethane (M.S.)	N.D.	14	94
Chloroform	N.D.	-	N.S.
1,1,1-Trichloroethane (TCA)	N.D.	-	N.S.
Carbon Tetrachloride	N.D.	-	N.S.
1,2-Dichloroethane (EDC)	N.D.	-	N.S.
Trichloroethene (TCE) (M.S.)	N.D.	7	91
1,2-Dichloropropane	N.D.	-	N.S.
Bromodichloromethane	N.D.	-	N.S.
2-Chloroethylvinyl ether	N.D.	-	N.S.
trans-1,3-Dichloropropene	N.D.	1	99
cis-1,3-Dichloropropene	N.D.	-	N.S.
1,1,2-Trichloroethane	N.D.	-	N.S.
Tetrachloroethene (M.S.)	N.D.	5	102
Dibromochloromethane	N.D.	-	N.S.
Chlorobenzene	N.D.	-	N.S.
Bromoform	N.D.	-	N.S.
1,1,2,2-Tetrachloroethane	N.D.	-	N.S.
1,3-Dichlorobenzene	N.D.	-	N.S.
1,4-Dichlorobenzene	N.D.	-	N.S.
1,2-Dichlorobenzene	N.D.	-	N.S.

QUALITY CONTROL DATA

Surrogate Spike % Recovery

Bromochloromethane	99 %	103 %	99% %
1,4-Dichlorobutane	111 %	101 %	97% %

N.D.: Not Detected

N.S.: Not Spiked



-----  
Analytical Supervisor

BLANK, SPIKE DUPLICATE AND SPIKE REPORT JOB # HLA 0831.95-L  
METHOD : EPA 8010  
SAMPLE #: 8-8281, 8-8282

COMPOUND	Blank (ug/l)	Spike Duplicate % deviation	Spike % recovery
Dichlorodifluoromethane	N.D.	-	N.S.
Chloromethane	N.D.	-	N.S.
Vinyl Chloride	N.D.	-	N.S.
Bromomethane	N.D.	-	N.S.
Chloroethane	N.D.	-	N.S.
Trichlorofluoromethane	N.D.	-	N.S.
1,1-Dichloroethene	N.D.	-	N.S.
Methylene Chloride	N.D.	-	N.S.
trans-1,2-Dichloroethene	N.D.	-	N.S.
1,1-Dichloroethane (M.S.)	N.D.	2	104
Chloroform	N.D.	-	N.S.
1,1,1-Trichloroethane (TCA)	N.D.	-	N.S.
Carbon Tetrachloride	N.D.	-	N.S.
1,2-Dichloroethane (EDC)	N.D.	-	N.S.
Trichloroethene (TCE) (M.S.)	N.D.	3	97
1,2-Dichloropropane	N.D.	-	N.S.
Bromodichloromethane	N.D.	-	N.S.
2-Chloroethylvinyl ether	N.D.	-	N.S.
trans-1,3-Dichloropropene	N.D.	4	102
cis-1,3-Dichloropropene	N.D.	-	N.S.
1,1,2-Trichloroethane	N.D.	-	N.S.
Tetrachloroethene (M.S.)	N.D.	8	92
Dibromochloromethane	N.D.	-	N.S.
Chlorobenzene	N.D.	-	N.S.
Bromoform	N.D.	-	N.S.
1,1,2,2-Tetrachloroethane	N.D.	-	N.S.
1,3-Dichlorobenzene	N.D.	-	N.S.
1,4-Dichlorobenzene	N.D.	-	N.S.
1,2-Dichlorobenzene	N.D.	-	N.S.

QUALITY CONTROL DATA

Surrogate Spike % Recovery			
Bromochloromethane	91 %	100 %	106XX
1,4-Dichlorobutane	107 %	106 %	105XX

N.D.: Not Detected

N.S.: Not Spiked

Report Date: 27-Sep-88  
 PACE JOB #: HLA 0831.93-L  
 Analytical Method: EPA 8020  
 MATRIX: WATER

Completion Date: 26-Jul-88  
 Reported by: D.Gill  
 Analyst: ATTIA

	MW-5	MW-2	MW-6
LAB #:	8-8278	8-8279	8-8280
CLIENT'S ID:	360901	360902	360903
COMPLETION DATE:	15-SEP-88	15-SEP-88	15-SEP-88

COMPOUND	RESULT (ug/l)	RESULT (ug/l)	RESULT (ug/l)	Detection Limit (ug/l)
Benzene-----	N.D.	8.4	29	0.2
Toluene-----	N.D.	1.6	77	0.2
Chlorobenzene-----	N.D.	N.D.	N.D.	0.2
Ethylbenzene-----	N.D.	0.9	250	0.2
Xylene-----	N.D.	3.1	490	0.2
1,3-Dichlorobenzene-----	N.D.	N.D.	N.D.	0.2
1,4-Dichlorobenzene-----	N.D.	N.D.	N.D.	0.2
1,2-Dichlorobenzene-----	N.D.	N.D.	N.D.	0.2

**QUALITY CONTROL DATA**

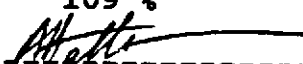
Surrogate Spike                      Percent Recovery  
 Fluorobenzene                              100 %                      119 %                      105 %

	MW-10	MW-11
LAB #:	8-8281	8-8282
CLIENT'S ID:	360904	360905
COMPLETION DATE:	16-SEP-88	16-SEP-88

COMPOUND	RESULT (ug/l)	Detection Limit (ug/l)	RESULT (ug/l)	Detection Limit (ug/l)
Benzene-----	910	4.0	520	2.0
Toluene-----	690	4.0	670	2.0
Chlorobenzene-----	N.D.	4.0	N.D.	2.0
Ethylbenzene-----	42	4.0	13	2.0
Xylene-----	270	4.0	180	2.0
1,3-Dichlorobenzene-----	N.D.	4.0	N.D.	2.0
1,4-Dichlorobenzene-----	N.D.	4.0	N.D.	2.0
1,2-Dichlorobenzene-----	N.D.	4.0	N.D.	2.0

**QUALITY CONTROL DATA**

Surrogate Spike                      Percent Recovery  
 Fluorobenzene                              104 %

109 %  
  
 -----  
 Analytical Supervisor

QUALITY CONTROL DATA

METHOD: EPA 8020

SAMPLE #: 8-8278, 8-8279, 8-8280

PACE JOB#:

HLA 0831.93-L

COMPOUND	Blank (ug/l)	Spike Duplicate % deviation	Spike % recovery
Benzene-----	N.D.	4	95
Toluene-----	N.D.	7	94
p-Xylene-----	N.D.	6	94

QUALITY CONTROL DATA

Surrogate Spike % Recovery

Fluorobenzene 99 % 99 % 99%

SAMPLE #: 8-8281, 8-8282

COMPOUND	Blank (ug/l)	Spike Duplicate % deviation	Spike % recovery
Benzene-----	N.D.	8	102
Toluene-----	N.D.	7	101
p-Xylene-----	N.D.	8	102

QUALITY CONTROL DATA

Surrogate Spike % Recovery

Fluorobenzene 98 % 98 % 10%

N.D.: Not Detected



-----  
Analytical Supervisor



Harding Lawson Associates  
 Environmental Services Division  
 200 Rush Landing Road  
 Novato, California 94947  
 (415) 892-0821

# CHAIN OF CUSTODY FORM

HLA 0831.93

Job Number: 093821082102  
 Name/Location: City of Oakland  
 Project Manager: Dave Leland

Samplers: David M Evans  
Pete A Crispell

Recorder: David M Evans  
 (Signature Required)

SOURCE CODE	MATRIX				#CONTAINERS & PRESERV.			SAMPLE NUMBER OR LAB NUMBER			DATE			
	Water	Sediment	Soil	Oil	Unpres.	H <sub>2</sub> SO <sub>4</sub>	HNO <sub>3</sub>	Yr	Wk	Seq	Yr	Mo	Dy	Time
23	X				X			88	36	0901	88	09	09	1135
23	X				X			88	36	0902	88	09	09	1215
23	X				X			88	36	0903	88	09	09	1250
23	X				X			88	36	0904	88	09	09	1548
23	X				X			88	36	0905	88	09	09	1659

ANALYSIS REQUESTED										
EPA 601/8010										
EPA 602/8020	X	X								
EPA 624/8240	X	X								
EPA 625/8270	X	X								
Priority Piltnt. Metals										
Benzene/Toluene/Xylene										
Total Petrol. Hydrocarb.										
EPA 8015 L	X	X	X	X	X	X	X	X	X	X

LAB NUMBER			DEPTH IN FEET	COL MTD CD	QA CODE	MISCELLANEOUS
Yr	Wk	Seq				
						Regular Turnaround

*Pace* CHAIN OF CUSTODY RECORD

RELINQUISHED BY: (Signature) <u>David M Evans</u>	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) <u>David M Evans</u>	DATE/TIME 9-9-88	RECEIVED FOR LAB BY: (Signature) <u>C. Jontag</u>
METHOD OF SHIPMENT <u>Hand delivered in cooler w/ice</u>		



HARDING LAWSON ASSOC.  
OCT 26 1988

Report date: October 21, 1988  
Client: Harding Lawson Associates  
P.O Box 578  
Novato, CA 94947  
Attn.: David Leland

Pace job #: HLA 0831.98-L

MONITORING WELLS  
9-29-88

Date sampled: September 29, 1988  
Sampled by: T. Walker

Site: City of Oakland

Date received: September 29, 1988  
Submitted by: T. Walker

P.O.: 09382,022.02

Lab #	Client ID		Matrix	Analysis
8- 9435	392901	MW-9	water	Purg. Halocarbons 601/8010
8- 9435	392901		water	TPH with 8020
8- 9436	392902	MW-10	water	Purg. Halocarbons 601/8010
8- 9436	392902		water	TPH with 8020
8- 9437	392903	MW-11	water	Purg. Halocarbons 601/8010
8- 9437	392903		water	TPH with 8020

Dear Client,

No problems were encountered with the analysis of your samples. We will store samples for 30 days after the report date. The samples will be returned to the client after the 30-day period, unless other arrangements are made. If you have any questions, please feel free to call Lisa Petersen, our Client Services Coordinator at 415-883-6100.

C. Sontag  
Sample Controller

Report Date: 17-Oct-88  
PACE JOB #: HLA 0831.98-L  
Analytical Method: 5030/8015  
MATRIX: WATER

Completion Date: 06-Oct-88  
Analyst: ATTIA  
Reported by: HLA 0831.98-L

LAB #: 8-9435      *MW-9*      CLIENT'S ID: 392901

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COMPOUND	RESULT (ug/l)	Detection Limit (ug/l)
Total Petroleum Hydrocarbons (light)--	140	50.0
QUALITY CONTROL DATA		
Surrogate Spike % Recovery		
Fluorobenzene	116 %	

LAB #: 8-9436      *MW-10*      CLIENT'S ID: 392902

---

COMPOUND	RESULT (ug/l)	Detection Limit (ug/l)
Total Petroleum Hydrocarbons (light)--	1,700	200.0
QUALITY CONTROL DATA		
Surrogate Spike % Recovery		
Fluorobenzene	112 %	

LAB #: 8-9437      *MW-11*      CLIENT'S ID: 392903

---

COMPOUND	RESULT (ug/l)	Detection Limit (ug/l)
Total Petroleum Hydrocarbons (light)--	1,700	100.0
QUALITY CONTROL DATA		
Surrogate Spike % Recovery		
Fluorobenzene	105 %	

N.D.: Not Detected

*Douglas Crum*  
Analytical Supervisor

QUALITY CONTROL DATA

METHOD: 5030/8015

PACE JOB #: HLA 0831.98-L

COMPOUND	Blank ug/l	Spike Duplicate % deviation	Spike % recovery
Gasoline-----	N.D.	3	103

QUALITY CONTROL DATA

Surrogate Spike % Recovery

Fluorobenzene	96 %	104 %	99 %
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N.D.: Not Detected

*Douglas Orans*  
-----  
Analytical Supervisor

Report Date: 20-Oct-88  
PACE JOB #: HLA 0831.98-L  
Analytical Method: EPA 8010  
Matrix: WATER

Completion Date: 06-Oct-88  
Reported by: Harwood  
Analyst: Powell

	MW-9	MW-10	MW-11	
LAB #:	8-9435	8-9436	8-9437	
CLIENT ID	392901	392902	392903	
COMPOUND	RESULT (ug/l)	RESULT (ug/l)	RESULT (ug/l)	Detection Limit (ug/l)
Dichlorodifluoromethane-----	42	1.1	N.D.	2.0
Chloromethane-----	N.D.	N.D.	N.D.	2.0
Vinyl Chloride-----	N.D.	N.D.	1.1	2.0
Bromomethane-----	N.D.	N.D.	N.D.	2.0
Chloroethane-----	N.D.	N.D.	N.D.	2.0
Trichlorofluoromethane-----	N.D.	N.D.	N.D.	2.0
1,1-Dichloroethene-----	1.6	9.1	0.6	0.5
Methylene Chloride-----	N.D.	N.D.	N.D.	0.5
trans-1,2-Dichloroethene-----	N.D.	N.D.	N.D.	0.5
1,1-Dichloroethane-----	0.8	2.5	0.6	0.5
Chloroform-----	4.8	N.D.	3.3	0.5
1,1,1-Trichloroethane (TCA)-----	N.D.	N.D.	N.D.	0.5
Carbon Tetrachloride-----	N.D.	N.D.	N.D.	0.5
1,2-Dichloroethane (EDC)-----	1.8	40	130	0.5
Trichloroethene (TCE)-----	N.D.	73	4.4	0.5
1,2-Dichloropropane-----	N.D.	N.D.	N.D.	0.5
Bromodichloromethane-----	N.D.	N.D.	N.D.	0.5
2-Chloroethylvinyl ether-----	N.D.	N.D.	N.D.	0.5
trans-1,3-Dichloropropene-----	N.D.	N.D.	N.D.	0.5
cis-1,3-Dichloropropene-----	N.D.	N.D.	N.D.	0.5
1,1,2-Trichloroethane-----	N.D.	N.D.	N.D.	0.5
Tetrachloroethene-----	N.D.	N.D.	N.D.	0.5
Dibromochloromethane-----	N.D.	N.D.	N.D.	0.5
Chlorobenzene-----	N.D.	N.D.	N.D.	0.5
Bromoform-----	N.D.	N.D.	N.D.	0.5
1,1,2,2-Tetrachloroethane-----	N.D.	N.D.	N.D.	0.5
1,3-Dichlorobenzene-----	N.D.	N.D.	N.D.	0.5
1,4-Dichlorobenzene-----	N.D.	N.D.	N.D.	0.5
1,2-Dichlorobenzene-----	N.D.	N.D.	N.D.	0.5

QUALITY CONTROL DATA

Surrogate Spike % Percent Recovery

Bromochloromethane	85%	81%	83%
1,4-Dichlorobutane	93%	95%	93%

N.D.: Not Detected

*Douglas Green*  
Analytical Supervisor

BLANK, SPIKE DUPLICATE AND SPIKE REPORT JOB # HLA 0831.98-L  
METHOD: EPA 8010

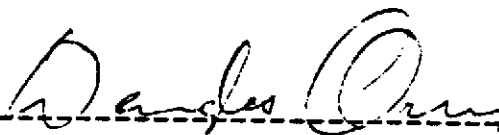
COMPOUND	Blank (ug/l)	Spike Duplicate % deviation	Spike % recovery
Dichlorodifluoromethane	N.D.	-	N.S.
Chloromethane	N.D.	-	N.S.
Vinyl Chloride	N.D.	-	N.S.
Bromomethane	N.D.	-	N.S.
Chloroethane	N.D.	-	N.S.
Trichlorofluoromethane	N.D.	-	N.S.
1,1-Dichloroethene	N.D.	-	N.S.
Methylene Chloride	N.D.	-	N.S.
trans-1,2-Dichloroethene	N.D.	-	N.S.
1,1-Dichloroethane	N.D.	-	N.S.
Chloroform	N.D.	-	N.S.
1,1,1-Trichloroethane (TCA)	N.D.	9	97
Carbon Tetrachloride	N.D.	-	N.S.
1,2-Dichloroethane (EDC)	N.D.	-	N.S.
Trichloroethene (TCE)	N.D.	6	100
1,2-Dichloropropane	N.D.	-	N.S.
Bromodichloromethane	N.D.	-	N.S.
2-Chloroethylvinyl ether	N.D.	-	N.S.
trans-1,3-Dichloropropene	N.D.	4	103
cis-1,3-Dichloropropene	N.D.	-	N.S.
1,1,2-Trichloroethane	N.D.	-	N.S.
Tetrachloroethene	N.D.	2	105
Dibromochloromethane	N.D.	-	N.S.
Chlorobenzene	N.D.	-	N.S.
Bromoform	N.D.	-	N.S.
1,1,2,2-Tetrachloroethane	N.D.	-	N.S.
1,3-Dichlorobenzene	N.D.	-	N.S.
1,4-Dichlorobenzene	N.D.	-	N.S.
1,2-Dichlorobenzene	N.D.	-	N.S.

QUALITY CONTROL DATA

Surrogate Spike % Recovery

Bromochloromethane	105 %	102 %	95 %
1,4-Dichlorobutane	104 %	103 %	103 %

N.D.: Not Detected  
N.S.: Not Spiked

  
Analytical Supervisor

Report Date: 18-Oct-88  
PACE JOB #: HLA 0831.98-L  
Analytical Method: EPA 8020  
MATRIX: WATER

Extract/Purge Date: 06-Oct-88  
Reported by: D.Gill  
Analyst: POWELL

	MW-9	MW-10	MW-11	
LAB #:	8-9435	8-9436	8-9437	
CLIENT'S ID:	392901	392902	392903	
COMPOUND	RESULT (ug/l)	RESULT (ug/l)	RESULT (ug/l)	Detection Limit (ug/l)
Benzene-----	75	140	3.6	0.2
Toluene-----	13	16	1.2	0.2
Chlorobenzene-----	N.D.	N.D.	N.D.	0.2
Ethylbenzene-----	N.D.	N.D.	N.D.	0.2
Xylene-----	53	230	250	0.2
1,3-Dichlorobenzene-----	N.D.	N.D.	N.D.	0.2
1,4-Dichlorobenzene-----	N.D.	N.D.	N.D.	0.2
1,2-Dichlorobenzene-----	N.D.	N.D.	N.D.	0.2

QUALITY CONTROL DATA

Surrogate Spike                      Percent Recovery  
Fluorobenzene                              101 %                      89 %                      81 %

QUALITY CONTROL DATA

METHOD: EPA 8020

PACE JOB#: HLA 0831.98-L

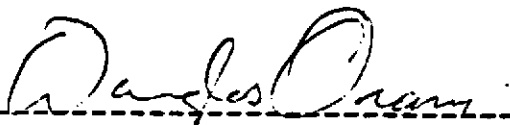
COMPOUND	Blank (ug/l)	Spike Duplicate % deviation	Spike % recovery
Benzene-----	N.D.	3	100
Toluene-----	N.D.	2	101
p-Xylene-----	N.D.	2	103

QUALITY CONTROL DATA

Surrogate Spike % Recovery

Fluorobenzene                      103 %                      101 %                      98

N.D.: Not Detected

  
Analytical Supervisor



200 Rush Landing Road  
P.O. Box 6107  
Novato, California 94948  
415/892-0821  
Teletype: 415/892-1588

# CHAIN OF CUSTODY FORM

Lab: TRACE

Samplers: WALKER TJ

Recorder: J. J. Hall  
(Signature Required)

Job Number: 9382 022 02

Name/Location: CITY OF OAK

Project Manager: D. DELAND

SOURCE CODE	MATRIX				#CONTAINERS & PRESERV.			SAMPLE NUMBER OR LAB NUMBER			DATE				STATION DESCRIPTION/NOTES
	Water	Sediment	Soil	Oil	Unpres.	H <sub>2</sub> SO <sub>4</sub>	HNO <sub>3</sub>	Yr	Wk	Seq	Yr	Mo	Dy	Time	
23	X				X			8839	29	01	8809	29	1	540	
23	X				X			8839	29	02	8809	29	1	635	
23	X				X			8839	29	02	8809	29	1	745	

ANALYSIS REQUESTED										
EPA 601/8010	EPA 602/8020	EPA 624/8240	EPA 625/8270	Priority Pflnt. Metals	Benzene/Toluene/Xylene	Total Petrol. Hydrocarb. (L)				
X	X	X	X	X	X	X				

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

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	RECEIVED FOR LAB BY: (Signature)
METHOD OF SHIPMENT		

*J. J. Hall* 09/29/1910      *L. Santag* 7/29/710

Report date: November 29, 1988  
Client: Harding Lawson Associates  
200 Rush Landing Road  
Novato, CA 94947  
Attn.: D. Leland

Pace job #: HLA 0831104-L

MONITORING WELLS  
11-1-88

Date sampled: November 1, 1988  
Sampled by: T.J. Walker

Site: City of Oakland

Date received: November 1, 1988  
Submitted by: T.J. Walker

P.O.: 09382 022 02

Lab #	Client ID	Matrix	Analysis
8- 1442	88450101	water	TPH (light) only 5030/8015
8- 1442	88450101	water	Vol Org. Cpds. 8010 + 8020
8- 1451	88450101	water	Priority Pollutant Metals (wat)
8- 1442	88450101	water	EDB EPA 504
8- 1444	88450102	water	TPH (light) only 5030/8015
8- 1444	88450102	water	Vol Org. Cpds. 8010 + 8020
8- 1452	88450102	water	Priority Pollutant Metals (wat)
8- 1444	88450102	water	EDB EPA 504
8- 1446	88450103	water	TPH (light) only 5030/8015
8- 1446	88450103	water	Vol Org. Cpds. 8010 + 8020
8- 1453	88450103	water	Priority Pollutant Metals (wat)
8- 1446	88450103	water	EDB EPA 504

Dear Client,

No problems were encountered with the analysis of your samples. We will store samples for 30 days after the report date. The samples will be returned to the client after the 30-day period, unless other arrangements are made. If you have any questions, please feel free to call Lisa Petersen, our Client Services Coordinator at 415-883-6100.

*C. Sontag*  
Sample Controller



Report Date: 29-Nov-88  
PACE JOB #: HLA 0831.104-L  
Analytical Method: EPA 8010  
Matrix: WATER

Completion Date: 15-Nov-88  
Reported by: J.HARWOOD  
Analyst: CHROMALAB

	MW-9	MW-10	MW-11
LAB #:	8-1442	8-1444	8-1446
CLIENT ID	450101	450102	450103

COMPOUND	RESULT (ug/l)	RESULT (ug/l)	RESULT (ug/l)	Detection Limit(ug/l)
Dichlorodifluoromethane-----	N.D.	N.D.	N.D.	1.0
Chloromethane-----	N.D.	N.D.	N.D.	1.0
Vinyl Chloride-----	N.D.	N.D.	N.D.	1.0
Bromomethane-----	N.D.	N.D.	N.D.	1.0
Chloroethane-----	N.D.	N.D.	N.D.	1.0
Trichlorofluoromethane-----	N.D.	N.D.	N.D.	1.0
1,1-Dichloroethene-----	N.D.	10.7	N.D.	1.0
Methylene Chloride-----	16.0	13.7	15.9	1.0
trans-1,2-Dichloroethene-----	N.D.	N.D.	N.D.	1.0
1,1-Dichloroethane-----	1.0	3.0	N.D.	1.0
Chloroform-----	5.1	N.D.	N.D.	1.0
1,1,1-Trichloroethane (TCA)-----	N.D.	N.D.	3.5	1.0
Carbon Tetrachloride-----	N.D.	N.D.	N.D.	1.0
1,2-Dichloroethane (EDC)-----	N.D.	7.5	27.0	1.0
Trichloroethene (TCE)-----	N.D.	55.0	N.D.	1.0
1,2-Dichloropropane-----	N.D.	N.D.	N.D.	1.0
Bromodichloromethane-----	N.D.	N.D.	N.D.	1.0
2-Chloroethylvinyl ether-----	N.D.	N.D.	N.D.	1.0
trans-1,3-Dichloropropene-----	N.D.	N.D.	N.D.	1.0
cis-1,3-Dichloropropene-----	N.D.	N.D.	N.D.	1.0
1,1,2-Trichloroethane-----	N.D.	N.D.	N.D.	1.0
Tetrachloroethene-----	N.D.	N.D.	N.D.	1.0
Dibromochloromethane-----	N.D.	N.D.	N.D.	1.0
Chlorobenzene-----	N.D.	N.D.	N.D.	1.0
Bromoform-----	N.D.	N.D.	N.D.	1.0
1,1,2,2-Tetrachloroethane-----	N.D.	N.D.	N.D.	1.0
1,3-Dichlorobenzene-----	N.D.	N.D.	N.D.	1.0
1,4-Dichlorobenzene-----	N.D.	N.D.	N.D.	1.0
1,2-Dichlorobenzene-----	N.D.	N.D.	N.D.	1.0

N.D.: Not Detected

NOTE: Report was sent out to Chromalab, no Q.C available.

*Douglas Gray*  
-----  
Analytical Supervisor

Report Date: 28-Nov-88 Extraction Date: 01-Nov-88  
 PACE JOB #: HLA 0831.104-L Completion Date: 14-Nov-88  
 Analytical Method: EPA 504 Reported By: J.HARWOOD  
 MATRIX: WATER Analyst: CLARK  
 Instrument I.D.: 3700 BETA

	MW-9	MW-10	MW-11	
LAB #:	8-1442	8-1444	8-1446	
CLIENT'S ID:	450101	450102	450103	
COMPOUND	RESULT (ug/l)	RESULT (ug/l)	RESULT (ug/l)	Detection Limit (ug/l)
Ethylene Dibromide	0.15	0.03	0.16	0.01

BLANK, SPIKE DUPLICATE AND SPIKE REPORT  
 METHOD: EPA 504 PACE JOB #: HLA 0831.104-L

COMPOUND	Blank ug/l	Spike Duplicate % deviation	Spike % recovery
QUALITY CONTROL DATA			
Surrogate Spike % Recovery			
Ethylene Dibromide	N.D. %	10 %	103%

N.D.: Not Detected

*Douglas Oray*  
 Analytical Supervisor

Report Date: 15-Nov-88  
PACE JOB #: HLA 0831.104-L  
Analytical Method: EPA 8020  
MATRIX: WATER

Completion Date: SEE BELOW  
Reported by: J. Harwood  
Analyst: Attia

	MW-9		MW-10	
LAB #:	8-1442		8-1444	
CLIENT'S ID:	450101		450102	
DATE:	07-Nov-88		07-Nov-88	
COMPOUND	RESULT (ug/l)	Detection Limit (ug/l)	RESULT (ug/l)	Detection Limit (ug/l)
Benzene-----	140	0.2	200	0.5
Toluene-----	63	0.2	55	0.5
Chlorobenzene-----	N.D.	0.2	N.D.	0.5
Ethylbenzene-----	N.D.	0.2	N.D.	0.5
Xylene-----	40	0.2	250	0.5
1,3-Dichlorobenzene-----	N.D.	0.2	N.D.	0.5
1,4-Dichlorobenzene-----	N.D.	0.2	N.D.	0.5
1,2-Dichlorobenzene-----	N.D.	0.2	N.D.	0.5

QUALITY CONTROL DATA

Surrogate Spike                      Percent Recovery  
Fluorobenzene                              120 %\*                              113 %

LAB #:    MW-11  
CLIENT'S ID:                                      8-1446  
DATE:    450103  
    09-Nov-88

COMPOUND	RESULT (ug/l)	Detection Limit (ug/l)
Benzene-----	1,300	5.0
Toluene-----	1,900	5.0
Chlorobenzene-----	N.D.	5.0
Ethylbenzene-----	91	5.0
Xylene-----	820	5.0
1,3-Dichlorobenzene-----	N.D.	5.0
1,4-Dichlorobenzene-----	N.D.	5.0
1,2-Dichlorobenzene-----	N.D.	5.0

QUALITY CONTROL DATA

Surrogate Spike                      Percent Recovery  
Fluorobenzene                              104 %

N.D.: Not Detected  
\*: Matrix Interference



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Analytical Supervisor

Report Date: 14-Nov-88  
PACE JOB #: HLA 0831.104-L  
Analytical Method: SEE BELOW

Completion Date: SEE BELOW  
Reported by: J. Harwood  
Analyst: Kibbler/Nackord/  
Walker

MATRIX: WATER

LAB #	CLIENT ID	Antimony (Sb) (mg/l)	Arsenic (As) (mg/l)	Barium (Ba) (mg/l)	Beryllium (Be) (mg/l)	Cadmium (Cd) (mg/l)	Chromium (Cr) (mg/l)
DATE:		06-Nov-88	04-Nov-88	06-Nov-88	06-Nov-88	06-Nov-88	06-Nov-88
8-1451	450101 MW-9	N.D.	N.D.	0.15	N.D.	N.D.	0.01
8-1452	450102 MW-10	N.D.	N.D.	0.11	N.D.	N.D.	N.D.
8-1453	450103 MW-11	N.D.	N.D.	0.078	N.D.	N.D.	N.D.
Detection limit		0.2	0.003	0.01	0.01	0.01	0.01
Method number		EPA 200.7	EPA 7060	EPA 200.7	EPA 200.7	EPA 200.7	EPA 200.7

LAB #	CLIENT ID	Cobalt (Co) (mg/l)	Copper (Cu) (mg/l)	Lead (Pb) (mg/l)	Mercury (Hg) (mg/l)	Molybdenum (Mo) (mg/l)	Nickel (Ni) (mg/l)
DATE:		06-Nov-88	06-Nov-88	06-Nov-88	03-Nov-88	06-Nov-88	06-Nov-88
8-1451	450101 MW-9	0.01	N.D.	N.D.	N.D.	N.D.	0.01
8-1452	450102 MW-10	0.01	N.D.	N.D.	N.D.	N.D.	0.01
8-1453	450103 MW-11	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
Detection limit		0.01	0.01	0.05	<0.001	0.02	0.01
Method number		EPA 200.7	EPA 200.7	EPA 200.7	EPA 7470	EPA 200.7	EPA 200.7

LAB #	CLIENT ID	Selenium (Se) (mg/l)	Silver (Ag) (mg/l)	Thallium (Tl) (mg/l)	Vanadium (V) (mg/l)	Zinc (Zn) (mg/l)
DATE:		04-Nov-88	06-Nov-88	06-Nov-88	06-Nov-88	06-Nov-88
8-1451	450101 MW-9	N.D.	N.D.	N.D.	N.D.	0.077
8-1452	450102 MW-10	N.D.	N.D.	N.D.	N.D.	0.093
8-1453	450103 MW-11	N.D.	N.D.	N.D.	N.D.	0.066
Detection limit		0.005	0.01	0.2	0.01	0.01
Method number		EPA 7740	EPA 200.7	EPA 200.7	EPA 200.7	EPA 200.7

*[Handwritten Signature]*

Analytical Supervisor

QUALITY CONTROL DATA

IPACE JOB #: HLA 0831.104-L

COMPOUND	Blank (mg/l)	Spike Duplicate % deviation	Spike % recovery
Antimony	N.D.	6.1	90
Arsenic	N.D.	4	62*
Barium	N.D.	3.6	100
Beryllium	N.D.	1.0	92
Cadmium	N.D.	3.3	87.0
Chromium	N.D.	1.8	101
Cobalt	N.D.	3.2	90
Copper	N.D.	1.8	94
Lead	N.D.	0.61	96.4
Mercury	N.D.	4.6	108
Molybdenum	N.D.	4.2	103
Nickel	N.D.	3.1	95.8
Selenium	N.D.	3	100
Silver	N.D.	2.4	88
Thallium	N.D.	17.4	73.4
Vanadium	N.D.	11.8	83
Zinc	N.D.	3.9	98.9

N.D.: Not Detected  
 \*: Matrix Interference

  
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 Analytical Supervisor

Report Date: 02-Dec-88 Completion Date: 08-Nov-88  
 PACE JOB #: HLA 0831.104-L Reported by: J. Harwood  
 Analytical Method: EPA 8270 Analyst: Siegmund  
 MATRIX: WATER

	MW-9	MW-10	MW-11
LAB #:	8-1448	8-1449	8-1450
CLIENT'S ID:	450101	450102	450103

BASE NEUTRALS	RESULT (ug/l)	RESULT (ug/l)	RESULT (ug/l)	Detection Limit (ug/l)
N-Nitrosodimethylamine	N.D.	N.D.	N.D.	n.d.
Aniline	N.D.	N.D.	N.D.	n.d.
Bis(2-chloroethyl) ether	N.D.	N.D.	N.D.	7
1,3-Dichlorobenzene	N.D.	N.D.	N.D.	2
1,4-Dichlorobenzene	N.D.	N.D.	N.D.	4
1,2-Dichlorobenzene	N.D.	N.D.	N.D.	2
Bis(2-chloroisopropyl) ether	N.D.	N.D.	N.D.	6
N-Nitroso-di-N-propylamine	N.D.	N.D.	N.D.	n.d.
Hexachloroethane	N.D.	N.D.	N.D.	2
Nitrobenzene	N.D.	N.D.	N.D.	2
Isophorone	N.D.	N.D.	N.D.	n.d.
Bis(2-chloroethoxy)methane	N.D.	N.D.	N.D.	5
1,2,4-Trichlorobenzene	N.D.	N.D.	N.D.	2
Naphthalene	N.D.	N.D.	N.D.	2
Hexachlorobutadiene	N.D.	N.D.	N.D.	1
Hexachlorocyclopentadiene	N.D.	N.D.	N.D.	n.d.
2-Chloronaphthalene	N.D.	N.D.	N.D.	2
Dimethylphthalate	N.D.	N.D.	N.D.	2
Acenaphthylene	N.D.	N.D.	N.D.	4
2,6-Dinitrotoluene	N.D.	N.D.	N.D.	2
Acenaphthene	N.D.	N.D.	N.D.	2
Dibenzofuran	N.D.	N.D.	N.D.	n.d.
2,4-Dinitrotoluene	N.D.	N.D.	N.D.	6
Diethyl phthalate	2.1	N.D.	10	2
Fluorene	N.D.	N.D.	N.D.	2
4-Chlorophenylphenyl ether	N.D.	N.D.	N.D.	4
N-Nitrosodiphenyl amine	N.D.	N.D.	N.D.	2
1,2-Diphenylhydrazine	N.D.	N.D.	N.D.	n.d.
4-Bromophenylphenyl ether	N.D.	N.D.	N.D.	2
Hexachlorobenzene	N.D.	N.D.	N.D.	2
Phenanthrene	N.D.	N.D.	N.D.	6
Anthracene	N.D.	N.D.	N.D.	2
Di-n-butyl phthalate	N.D.	N.D.	N.D.	3
Fluoranthene	N.D.	N.D.	N.D.	2
Benzidine	N.D.	N.D.	N.D.	n.d.
Pyrene	N.D.	N.D.	N.D.	2
Butylbenzyl phthalate	N.D.	N.D.	N.D.	3

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FORMERLY WESCO LABORATORIES

REPORT OF LABORATORY ANALYSIS

Offices:  
Minneapolis, Minnesota  
Tampa, Florida  
Coralville, Iowa  
Novato, California

PESTICIDE COMPOUNDS

JOB #: HLA 0831.104-L

MW-9 MW-10 MW-11

Analytical Method: EPA 8270

LAB #: 8-1448 8-1449 8-1450  
CLIENT'S ID: 450101 450102 450103

	RESULT (ug/l)	RESULT (ug/l)	RESULT (ug/l)	Detection (ug/l)
alpha-BHC	N.D.	N.D.	N.D.	n.d.
beta-BHC	N.D.	N.D.	N.D.	n.d.
gamma-BHC	N.D.	N.D.	N.D.	n.d.
delta-BHC	N.D.	N.D.	N.D.	n.d.
Heptachlor	N.D.	N.D.	N.D.	n.d.
Aldrin	N.D.	N.D.	N.D.	n.d.
Heptachlor epoxide	N.D.	N.D.	N.D.	n.d.
Endosulfan I	N.D.	N.D.	N.D.	n.d.
4,4'-DDE	N.D.	N.D.	N.D.	n.d.
Dieldrin	N.D.	N.D.	N.D.	n.d.
Endrin	N.D.	N.D.	N.D.	n.d.
Endosulfan II	N.D.	N.D.	N.D.	n.d.
4,4'-DDD	N.D.	N.D.	N.D.	n.d.
Endrin Aldehyde	N.D.	N.D.	N.D.	n.d.
4,4'-DDT	N.D.	N.D.	N.D.	n.d.
Endosulfan Sulfate	N.D.	N.D.	N.D.	n.d.

QUALITY CONTROL DATA

Pesticide Surrogate Spike Recovery

Nitrobenzene-d5	53%	63%	48%
2-Fluorobiphenyl	49%	53%	48%
Terphenyl-d14	83%	75%	89%

OTHER EXTRACTABLES

	RESULT (ug/l)	RESULT (ug/l)	RESULT (ug/l)	Detection (ug/l)
Acetophenone	N.D.	N.D.	N.D.	n.d.
4-Aminobiphenyl	N.D.	N.D.	N.D.	n.d.
Arochlors	N.D.	N.D.	N.D.	n.d.
Benzyl Alcohol	N.D.	N.D.	N.D.	n.d.
Chlordane	N.D.	N.D.	N.D.	n.d.
4-Chloroaniline	N.D.	N.D.	N.D.	n.d.
1-Chloronaphthalene	N.D.	N.D.	N.D.	n.d.
Dibenz(a,j)acridine	N.D.	N.D.	N.D.	n.d.
2,6-Dichlorophenol	N.D.	N.D.	N.D.	n.d.
p-Dimethylaminoazobenzene	N.D.	N.D.	N.D.	n.d.
7,12-Dimethylbenz(a)-anthracene	N.D.	N.D.	N.D.	n.d.
alpha,alpha-Dimethylphenethylamine	N.D.	N.D.	N.D.	n.d.
Endrin Ketone	N.D.	N.D.	N.D.	n.d.
Ethylmethane sulfonate	N.D.	N.D.	N.D.	n.d.
Methoxychlor	N.D.	N.D.	N.D.	n.d.

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OTHER EXTRACTABLES (cont)

JOB #: HLA 0831.104-L

MW-9 MW-10 MW-11

Analytical Method: EPA 8270

LAB #: 8-1448 8-1449 8-1450  
CLIENT'S ID: 450101 450102 450103

	RESULT (ug/l)	RESULT (ug/l)	RESULT (ug/l)	Detection (ug/l)
3-Methylchloranthene	N.D.	N.D.	N.D.	n.d.
Methylmethane sulfonate	N.D.	N.D.	N.D.	n.d.
2-Methylnaphthalene	N.D.	N.D.	N.D.	n.d.
1-Naphthylamine	N.D.	N.D.	N.D.	n.d.
2-Naphthylamine	N.D.	N.D.	N.D.	n.d.
2-Nitroaniline	N.D.	N.D.	N.D.	n.d.
3-Nitroaniline	N.D.	N.D.	N.D.	n.d.
4-Nitroaniline	N.D.	N.D.	N.D.	n.d.
N-Nitrosophenylamine	N.D.	N.D.	N.D.	n.d.
N-Nitrosopiperidine	N.D.	N.D.	N.D.	n.d.
Pentachlorobenzene	N.D.	N.D.	N.D.	n.d.
Pentachloronitrobenzene	N.D.	N.D.	N.D.	n.d.
2-Picoline	N.D.	N.D.	N.D.	n.d.
Pronamide	N.D.	N.D.	N.D.	n.d.
1,2,4,5-Tetrachlorobenzene	N.D.	N.D.	N.D.	n.d.
2,3,4,6-Tetrachlorobenzene	N.D.	N.D.	N.D.	n.d.
Toxaphene	N.D.	N.D.	N.D.	n.d.
Biphenyl	N.D.	N.D.	N.D.	n.d.
Diphenylamine	N.D.	N.D.	N.D.	n.d.
beta-Naphthylamine	N.D.	N.D.	N.D.	n.d.
Dibenzothiophene	N.D.	N.D.	N.D.	n.d.

N.D.: Not Detected  
N.A.: Not Applicable  
n.d.: not determined  
M.I.: Matrix Interference

*[Handwritten Signature]*

Analytical Supervisor  
(Pg.4 of 4)





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FORMERLY WESCO LABORATORIES

REPORT OF LABORATORY ANALYSIS

Offices:  
 Minneapolis, Minnesota  
 Tampa, Florida  
 Coralville, Iowa  
 Novato, California

QUALITY CONTROL DATA

METHOD EPA 8270

PACE JOB#:

HLA 0831.104-L

COMPOUND	Blank (ug/l)	Spike Duplicate % Deviation	% Spike Recovery
<b>BASE NEUTRAL COMPOUNDS</b>			
N-Nitrosodimethylamine	N.D.	n.s.	n.s.
Aniline	N.D.	n.s.	n.s.
Bis(2-chloroethyl) ether	N.D.	n.s.	n.s.
1,3-Dichlorobenzene	N.D.	n.s.	n.s.
1,4-Dichlorobenzene (MS)	N.D.	29	28
1,2-Dichlorobenzene	N.D.	n.s.	n.s.
Bis(2-chloroisopropyl) ether	N.D.	n.s.	n.s.
N-Nitroso-di-N-propylamine	N.D.	n.s.	n.s.
Hexachloroethane	N.D.	n.s.	n.s.
Nitrobenzene-d5 (SS)	N.A.	36	53
Nitrobenzene	N.D.	n.s.	n.s.
Isophorone	N.D.	n.s.	n.s.
Bis(2-chloroethoxy)methane	N.D.	n.s.	n.s.
1,2,4-Trichlorobenzene	N.D.	n.s.	n.s.
Naphthalene	N.D.	n.s.	n.s.
Hexachlorobutadiene	N.D.	n.s.	n.s.
Hexachlorocyclopentadiene	N.D.	n.s.	n.s.
2-Fluorobiphenyl (SS)	N.A.	0	24
2-Chloronaphthalene	N.D.	n.s.	n.s.
Dimethylphthalate	N.D.	n.s.	n.s.
Acenaphthylene	N.D.	n.s.	n.s.
2,6-Dinitrotoluene	N.D.	n.s.	n.s.
Acenaphthene (MS)	N.D.	10	57
Dibenzofuran	N.D.	n.s.	n.s.
2,4-Dinitrotoluene (MS)	N.D.	5	21
Diethyl phthalate	N.D.	n.s.	n.s.
Fluorene	N.D.	n.s.	n.s.
4-Chlorophenylphenyl ether	N.D.	n.s.	n.s.
N-Nitrosodiphenyl amine	N.D.	n.s.	n.s.
1,2-Diphenylhydrazine	N.D.	n.s.	n.s.
4-Bromophenylphenyl ether	N.D.	n.s.	n.s.
Hexachlorobenzene	N.D.	n.s.	n.s.
Phenanthrene	N.D.	n.s.	n.s.
Anthracene	N.D.	n.s.	n.s.
Di-n-butyl phthalate	N.D.	n.s.	n.s.
Fluoranthene	N.D.	n.s.	n.s.
Benzidine	N.D.	n.s.	n.s.
Pyrene (MS)	N.D.	10	89
Terphenyl-d12 (SS)	N.A.	15	76
Butylbenzyl phthalate	N.D.	n.s.	n.s.
Benzo(a)anthracene	N.D.	n.s.	n.s.
3,3'-Dichlorobenzidine	N.D.	n.s.	n.s.

(Page 1 of 3)

QUALITY CONTROL DATA (cont)

METHOD: EPA 8270

PACE JOB #:HLA 0831.104-L

COMPOUND	Blank (ug/l)	Spike Duplicate % Deviation	% Spike Recovery
<b>BASE NEUTRAL COMPOUNDS</b>			
Chrysene	N.D.	n.s.	n.s.
Bis(2-ethylhexyl) phthalate	N.D.	n.s.	n.s.
Di-n-octyl phthalate	N.D.	n.s.	n.s.
Benzo(b) fluoranthene	N.D.	n.s.	n.s.
Benzo(k) fluoranthene	N.D.	n.s.	n.s.
Benzo(a) pyrene	N.D.	n.s.	n.s.
Indeno(1,2,3-cd) pyrene	N.D.	n.s.	n.s.
Dibenzo(a,h) anthracene	N.D.	n.s.	n.s.
Benzo(g,h,i) perylene	N.D.	n.s.	n.s.

**ACID COMPOUNDS**

2-Fluorophenol (SS)	N.A.	39	27
Phenol-d5 (SS)	N.A.	14	41
Phenol (MS)	N.D.	12	8
2-Chlorophenol	N.D.	n.s.	n.s.
2-Methylphenol	N.D.	n.s.	n.s.
4-Methylphenol	N.D.	n.s.	n.s.
2-Nitrophenol	N.D.	n.s.	n.s.
2,4-Dimethylphenol	N.D.	n.s.	n.s.
Benzoic Acid	N.D.	n.s.	n.s.
2,4-Dichlorophenol	N.D.	n.s.	n.s.
4-Chloro-3-methylphenol (MS)	N.D.	9	34
2,4,6-Trichlorophenol	N.D.	n.s.	n.s.
2,4,5-Trichlorophenol	N.D.	n.s.	n.s.
2,4-Dinitrophenol	N.D.	n.s.	n.s.
4-Nitrophenol	N.D.	N.R.	n.s.
2-Methyl-4,6-dinitrophenol	N.D.	n.s.	n.s.
2,4,6-Tribromophenol (SS)	N.A.	12	90
Pentachlorophenol (MS)	N.D.	19	66

**PESTICIDES**

alpha-BHC	N.D.	n.s.	n.s.
beta-BHC	N.D.	n.s.	n.s.
gamma-BHC	N.D.	n.s.	n.s.
delta-BHC	N.D.	n.s.	n.s.
Heptachlor	N.D.	n.s.	n.s.
Aldrin	N.D.	n.s.	n.s.
Heptachlor epoxide	N.D.	n.s.	n.s.

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QUALITY CONTROL DATA (cont)

METHOD: EPA 8270

PACE JOB #: HLA 0831.104-L

COMPOUND	Blank (ug/l)	Spike Duplicate % Deviation	% Spike Recovery
Dieldrin	N.D.	n.s.	n.s.
Endosulfan I	N.D.	n.s.	n.s.
4,4'-DDE	N.D.	n.s.	n.s.
4-Terphenyl-d14 (SS)	N.A.	n.s.	n.s.
Dieldrin	N.D.	n.s.	n.s.
Endrin	N.D.	n.s.	n.s.
Endosulfan II	N.D.	n.s.	n.s.
4,4'-DDD	N.D.	n.s.	n.s.
Endrin Aldehyde	N.D.	n.s.	n.s.
4,4'-DDT	N.D.	n.s.	n.s.
Endosulfan Sulfate	N.D.	n.s.	n.s.

QUALITY CONTROL DATA

Base/Neutral	Blank S. S. Recovery	Acid Blank S. S. Recovery	
Nitrobenzene-d5	64 %	2-Fluorophenol	28 %
2-Fluorobiphenyl	48 %	Phenol-d5	31 %
Terphenyl-d14	83 %	2,4,6-Tribromophenol	78 %

N.D.: Not Detected (SS): Surrogate Spike  
 N.R.: Not Recovered (MS): Matrix Spike  
 n.s.: not spiked N.A.: Not Applicable



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 Analytical Supervisor  
 (Page 3 of 3)

Report Date: 12-Nov-88 Completion Date: 03-Nov-88  
 PACE JOB #: HLA 0831.104-L Reported by: Petersen  
 Analytical Method: EPA 8240 Analyst: MOEZZI  
 MATRIX: WATER MW-9 MW-10 MW-11  
 LAB #: 8-1443 8-1445 8-1447  
 CLIENT ID: 450101 450102 450103

COMPOUND	RESULT (ug/l)	RESULT (ug/l)	RESULT (ug/l)	Detection Limit (ug/l)
Dichlorodifluoromethane	N.D.	N.D.	N.D.	0.5
Chloromethane	N.D.	N.D.	N.D.	0.5
Vinyl Chloride	N.D.	N.D.	N.D.	0.5
Bromomethane	N.D.	N.D.	N.D.	0.5
Chloroethane	N.D.	N.D.	5.5	0.5
Trichlorofluoromethane	N.D.	N.D.	N.D.	0.5
2-Butanone (MEK)	N.D.	N.D.	N.D.	0.5
Iodomethane	N.D.	N.D.	N.D.	0.5
1,1-Dichloroethene	2.1	7.8	N.D.	0.5
Carbon Disulfide	N.D.	N.D.	N.D.	0.5
Acrylonitrile	N.D.	N.D.	N.D.	0.5
Methylene Chloride	0.6	0.7	0.7	0.5
trans-1,2-Dichloroethene	N.D.	N.D.	N.D.	0.5
1,1-Dichloroethane	1.9	3.0	0.7	0.5
Chloroform	4.4	N.D.	N.D.	0.5
1,1,1-Trichloroethane	N.D.	N.D.	N.D.	0.5
1,2-Dichloroethane	2.0	17	54	0.5
Carbon Tetrachloride	N.D.	N.D.	N.D.	0.5
Benzene	135*	205*	1300*	0.5
1,2-Dichloropropane	N.D.	N.D.	N.D.	0.5
Trichloroethene	0.5	66	5.7	0.5
Dibromomethane	N.D.	N.D.	N.D.	0.5
Bromodichloromethane	N.D.	N.D.	N.D.	0.5
trans-1,3-Dichloropropene	N.D.	N.D.	N.D.	0.5
3-Methyl-2-pentanone (MIBK)	N.D.	N.D.	N.D.	0.5

QUALITY CONTROL DATA (cont.)

METHOD: EPA 8240

PACE JOB #:HLA 0831.104-L

Toluene (M.S.)	N.D.	24	95
cis-1,3-Dichloropropene	N.D.	-	N.S.
1,1,2-Trichloroethane	N.D.	-	N.S.
2-Chloroethylvinyl ether	N.D.	-	N.S.
Ethylmethacrylate	N.D.	-	N.S.
Dibromochloromethane	N.D.	-	N.S.
Tetrachloroethene	N.D.	-	N.S.
Chlorobenzene (M.S.)	N.D.	17	100
Ethylbenzene	N.D.	-	N.S.
Bromoform	N.D.	-	N.S.
Xylene	N.D.	-	N.S.
1,1,2,2,-Tetrachloroethane	N.D.	-	N.S.
1,2,3-Trichloropropane	N.D.	-	N.S.
1,4-Dichloro-2-butene	N.D.	-	N.S.

QUALITY CONTROL DATA

Surrogate Spike % Recovery

1,2-Dichloroethane-d4	92%	93 %	119%
Toluene-d8	128%	95 %	96%
4-Bromofluorobenzene	95%	92 %	84%

N.D.: Not Detected

M.S.: Matrix Spike

N.S.: Not Spiked

  
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(Pg. 2 of 2)

Report Date: 14-Nov-88  
 PACE JOB #: HLA 0831.104-L  
 Analytical Method: 5030/8015  
 MATRIX: WATER

Completion Date: SEE BELOW  
 Reported by: J.HARWOOD  
 Analyst: ATTIA

MW-9

LAB #: 8-1442  
 DATE: 07-Nov-88

CLIENT'S ID: 450101

COMPOUND	RESULT (ug/l)	Detection Limit (ug/l)
Total Petroleum Hydrocarbons (light)--	480	50.0

QUALITY CONTROL DATA  
 Surrogate Spike % Recovery  
 Fluorobenzene

120 %\*

MW-10

LAB #: 8-1444  
 DATE: 07-Nov-88

CLIENT'S ID: 450102

COMPOUND	RESULT (ug/l)	Detection Limit (ug/l)
Total Petroleum Hydrocarbons (light)--	1,380	125

QUALITY CONTROL DATA  
 Surrogate Spike % Recovery  
 Fluorobenzene

113 %

MW-11

LAB #: 8-1446  
 DATE: 09-Nov-88

CLIENT'S ID: 450103

COMPOUND	RESULT (ug/l)	Detection Limit (ug/l)
Total Petroleum Hydrocarbons (light)--	6,500	1,250

QUALITY CONTROL DATA  
 Surrogate Spike % Recovery  
 Fluorobenzene

104 %

N.D.: Not Detected  
 \*: Matrix Interference



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 Analytical Supervisor

QUALITY CONTROL DATA  
METHOD: 5030/8015  
LAB #: 8-1442, 8-1444

PACE JOB #: HLA 0831.104-L

COMPOUND	Blank ug/l	Spike Duplicate % deviation	Spike % recovery
Gasoline-----	N.D.	2%	103%

QUALITY CONTROL DATA  
Surrogate Spike % Recovery  
Fluorobenzene 96 % 98 % 111 %

QUALITY CONTROL DATA  
METHOD: 5030/8015  
LAB #: 8-1446  
PACE JOB #: HLA 0831.104-L

COMPOUND	Blank ug/l	Spike Duplicate % deviation	Spike % recovery
Gasoline-----	N.D.	11%	102%

QUALITY CONTROL DATA  
Surrogate Spike % Recovery  
Fluorobenzene 93 % 105 % 100 %

N.D.: Not Detected



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Analytical Supervisor

QUALITY CONTROL DATA

METHOD: EPA 8020

PACE JOB#:

HLA 0831.104-L

LAB #: 8-1442, 8-1444

COMPOUND	Blank (ug/l)	Spike Duplicate % deviation	Spike % recovery
Benzene	N.D.	10	109
Toluene	N.D.	1	107
p-Xylene	N.D.	3	107

QUALITY CONTROL DATA

Surrogate Spike % Recovery

Fluorobenzene 96 % 98 % 111%

QUALITY CONTROL DATA

METHOD: EPA 8020

PACE JOB#:

HLA 0831.104-L

LAB #: 8-1446

COMPOUND	Blank (ug/l)	Spike Duplicate % deviation	Spike % recovery
Benzene	N.D.	4	104
Toluene	N.D.	3	100
p-Xylene	N.D.	3	101

QUALITY CONTROL DATA

Surrogate Spike % Recovery

Fluorobenzene 93 % 105 % 100%

N.D.: Not Detected



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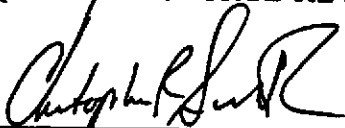
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DFL/CRS/rmc/E6377-R

QUALITY CONTROL REVIEWER



Christopher R. Smith  
Senior Associate Hydrogeologist