PHASE II HYDROGEOLOGIC ASSESSMENT OF THE MASKELL OIL PROPERTY SAN LEANDRO, CALIFORNIA

November 5, 1990
LF 1596

14500 E. 14th St, San Leandro 94578

Prepared for:

Maskell Oil
14500 East 14th Street
San Leandro, California

LEVINE·FRICKE

LEVINE·FRICKE
CONSULTING ENGINEERS AND HYDROGEOLOGISTS

November 7, 1990 LF 1596

Mr. Ariu Levi
Alameda County Health Agency
Department of Environmental Health
470 27th Street, Room 332
Oakland, California 94612

Subject: Report on Phase II Hydrogeologic Assessment of Maskell Oil Property, San Leandro, California

Dear Mr. Levi:

Enclosed is the report: Phase II Hydrogeologic Assessment of the Maskell Oil Property, San Leandro, California, dated November 5, 1990, prepared by Levine•Fricke. The subject report is being submitted on behalf of Ms. Coramarie Allenbaugh and Ms. Theadate Phillips, owners of the property.

Please give me or Tom Johnson, R.G. (415-652-4500) a call if you have any questions concerning this matter.

Sincerely,

Gregson W. Taylor, R.G.
Senior Project Hydrogeologist

Enclosure

cc: Ms. Coramarie Allenbaugh without enclosure
Mr. John Lyons, Landels, Ripley & Diamond without enclosure
Mr. Steve R. Ritchie, Regional Water Quality Control Board
Mr. Howard Hatayama, Department of Health Services

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CONTENTS

CONTENTS
(continued)

LIST OF TABLES

LIST OF FIGURES

November 5, 1990 LF 1596

PHASE II HYDROGEOLOGIC ASSESSMENT OF THE MASKELL OIL PROPERTY SAN LEANDRO, CALIFORNIA

1.0 INTRODUCTION

1.1 Background

The Maskell Oil Property ("the Property") is located at 14500 East 14th Street in San Leandro, California, approximately one-half mile southwest of Interstate 580 (Figure 1). A facility for the storage and distribution of petroleum fuels has occupied the Property for approximately the last fifty years. Operation of this facility ceased in October 1988. Results of a limited investigation performed by Hageman-Schank, Inc., during December 1988 revealed that shallow soils and ground water were affected by various petroleum hydrocarbons, mainly diesel fuel. At the request of the owners, Levine•Fricke developed a proposal (August 30, 1989) to complete an initial hydrogeologic assessment of the Property.

The results of Levine•Fricke's Phase I hydrogeologic assessment were presented in a report entitled "Soil and Ground-Water Investigation for Property at 14500 East 14th Street San Leandro, California," dated September 14, 1989. That investigation included the following tasks:

- a background and record review of pertinent regulatory files concerning the Property and reported contamination cases within a one-half-mile radius of the Property
- a field inspection of the Property, including interviews with employees and renters at the Site
- completion of seven shallow soil borings
- drilling and installation of five ground-water monitoring wells
- developing and sampling of the new monitoring wells
- laboratory analysis of selected soil and ground-water samples

- measurement of ground-water elevations and product thickness, if present, in the monitoring wells.

The review of regulatory files conducted in conjunction with the Phase I investigation revealed a number of sites located within a one-half-mile radius of the Property where investigations of possible ground-water contamination are being conducted, primarily on the periphery of the investigated area. The identified sites are located mainly in the industrial area southwest (downgradient with respect to regional ground-water flow direction) of the Property. No known sites of potential environmental hazards were identified in the residential areas located east and southeast (upgradient with respect to ground-water flow direction) of the Property.

Based on Levine•Fricke's field inspection and information received from persons familiar with activities at the Property, various portions of the Property were identified for surface soil sampling (depths less than 3 feet), sampling of deeper soils (at depths between 4 feet and 23 feet) from the soil borings and the borings for the monitoring wells, and sampling of shallow ground water from the monitoring wells. Analytical results for samples collected throughout the Property revealed the following:

- Elevated concentrations (ranging from 200 to 39,000 parts per million [ppm]) of total petroleum hydrocarbons (TPH) as oil and grease and TPH as diesel (ranging from 62 to 24,000 ppm) were detected in surface (depths to 3 feet) soil samples collected in the northeastern, eastern and western portions of the Property, primarily near the Property boundaries (Figure 7 of the September 14, 1989 Report).

- Elevated concentrations (up to 18,000 ppm at 23 feet) of TPH as diesel were detected in deeper soil samples collected from the borings for wells LF-3, located in the central portion of the Property, and wells LF-4 and LF-5, located near the western boundary of the Property (Figure 7 of the September 14, 1989 Report).

- Elevated concentrations of TPH as gasoline (2,600 ppm), ethylbenzene (80 ppm), and xylenes (260 ppm) were detected in deeper soil samples collected from the boring for well LF-2, located near the southern boundary of the Property (Figure 7 of the September 14, 1989 Report).

- Low concentrations of lead (up to 9 ppm at 23 feet) were reported in deeper soil samples collected from the borings for wells LF-1 and LF-2, located along the southern boundary of the Property, and LF-5, located near the western boundary of the Property (Figure 9 of the September 14, 1989 Report).

- Low concentrations of polychlorinated biphenyls (PCBs), (up to 1.3 ppm) were reported in two surface soil samples collected in the northeastern portion of the Property (Figure 8 of the September 14, 1989 Report).

- Analytical results for ground-water samples collected from the monitoring wells on April 6, 1989 revealed the following:

- Elevated concentrations of benzene (up to 1.6 ppm), ethylbenzene (up to 1.1 ppm), xylenes (up to 0.47 ppm), and TPH as diesel (up to 340 ppm) were reported in samples collected from monitoring wells located near the southern and western boundaries of the Property.

- Toluene, TPH as gasoline, TPH as waste oil and lead were not detected in the ground-water samples.

Ground-water level measurements and measurements of floating petroleum hydrocarbon (product) thicknesses, if present, indicated the following:

- The general direction of shallow ground-water flow in the Property vicinity is towards the west.

- Floating petroleum hydrocarbons (product) were encountered in well LF-5 (1.58 feet) and well LF-4 (1.10 feet) on July 5, 1989.

Based on the results of Levine•Fricke's Phase I investigation, additional hydrogeologic investigations were proposed (August 30, 1989) to further assess the lateral extent of petroleum hydrocarbons in the immediate vicinity of the Property. Additionally, the Phase II investigation was proposed to provide more data needed to complete an evaluation of possible soil and/or ground-water remedial action alternatives for the Property.

1.1 Scope of Work

The Scope of Work for the Phase II investigation proposed by Levine•Fricke (August 30, 1989) was developed to provide data to assess the lateral extent of petroleum hydrocarbons in the immediate vicinity of the Property. The proposed Scope of Work included the following tasks:

1) reviewing aerial photographs and performing a well canvass
2) additional sampling of shallow soil
3) drilling and installing four additional ground-water monitoring wells
4) developing and sampling new monitoring wells
5) analyzing selected soil and ground-water samples
6) measuring ground-water elevations and product thickness, where present, in the monitoring wells
7) preparing a report to include property figures and present results and offer recommendations based on these field investigations.

2.0 AERIAL PHOTOGRAPH REVIEW AND WELL CANVASS

Aerial photographs and available records of existing wells were reviewed to provide information on past uses of the Property and properties surrounding the Property. Aerial photographs were obtained from Pacific Aerial Surveys of Oakland, California. Information regarding wells within a one-half-mile radius of the Property were obtained from the County of Alameda Public Works Agency.

2.1 Aerial Photograph Review

Aerial photographs of the property vicinity taken in the years 1947, 1953 and 1973 were reviewed to determine the past extent, uses and outstanding features of the Property, and to note the past uses of neighboring properties.

Review of the aerial photographs indicated that in 1947 the Property extended across what is now Bancroft Avenue (Figure 3). Additionally, there appears to have been ten above-ground fuel storage tanks on the Property at that time. Four of the ten tanks remain on the Property today; the other six tanks, which have since been removed, were located in the area northeast of the easternmost tank present at the Property today. The property southeast of the Property appeared to contain individual residences and the property immediately

northwest of the Property appeared to be an orchard with two farmhouses located in the southwest corner of the property.

The 1953 aerial photograph of the property vicinity indicated that six of the ten above-ground fuel tanks had been removed, and
the orchard on the property northwest of the Property was approximately one-half of its 1947 size.

The 1973 aerial photograph depicts the Property much as it appears today. The northeastern border terminated at Bancroft Avenue. The property to the northwest previously occupied by the orchard had been developed and included the four apartment buildings currently existing on that property. The property to the southeast, which had been residential, also was developed and included the apartment complex existing there today.

2.2 Well Canvass

A survey of wells located within a one-half-mile radius of the Property was conducted using data provided by the County of Alameda Public Works Agency (Figure 2). Additionally, Levine•Fricke personnel conducted a drive-by survey of the investigated area to assess the present use of the properties where the wells are located. The results of this canvass revealed that there are presently 52 documented water wells within a one-half-mile radius of the Property (Figure 2). Table 1 summarizes available information regarding the wells.

3.0 GEOLOGY AND CROSS SECTIONS

Four additional shallow ground-water monitoring wells (less than 35 feet deep) were drilled and installed during November 1989 to further assess the extent of petroleum hydrocarbons in the vicinity of the Property. Newly installed monitoring wells LF-6, LF-7 and LF-8 were drilled northwest of the Property, and monitoring well LF-9 was drilled in the western corner of the Property (Figure 3). The four wells are located in the downgradient ground-water flow direction from the previously installed monitoring wells. A discussion of drilling procedures used to drill and install the wells is presented in Appendix A. Lithologic and well construction logs for each monitoring well are included in Appendix B.

Geologic cross section locations A-A′ and B-B′ are shown on Figure 4; cross sections are included as Figures 5 and 6, respectively. These cross sections illustrate near-surface

geologic conditions (to depths of less than 40 feet) beneath the Property. Cross section A-A′ depicts near-surface conditions from the southern portion of the Property (well LF-2) to northwest of the Property (well LF-6). Cross section B-B′ extends from west of the Property (well LF-8) to the eastern portion of the Property (well LF-3).

Sediments underlying the Property consist of unconsolidated interbedded clay, silt, sand and gravel. Silty clay and clayey silt are the predominant sediments encountered in the near-surface depths. These finer-grained sediments are present from the surface to depths ranging from 9 feet below the surface in the borings for wells LF-4 and LF-8 to 12 feet in the borings for wells LF-2, LF-3 and LF-5. Below these depths, silty sands, silty gravels, sandy gravels and gravelly sands were encountered. Thicknesses of the layers of these coarser-grained sediments vary from 3 feet in the borings for wells LF-3 and LF-9 to approximately 16.5 feet in the boring for well LF-8. These coarser-grained sediments typically extend to depths of 9 to 25 feet below the surface and appear to thin out towards the north and thicken to the west. Below these depths, finer-grained clayey silt underlain by silty clay was generally encountered to the total depths of the wells (33 to 38 feet). An 8-foot-thick interval of sand was encountered below a depth of approximately 19 feet in the boring for well LF-6. This coarser-grained layer appears to be somewhat continuous with a thin (approximately 2-foot thick) sand layer encountered in wells south of well LF-6.

4.0 GROUND-WATER ELEVATION AND FLOW DIRECTION

Ground-water elevations and floating petroleum hydrocarbon (product) thicknesses (where present) were measured in all wells on December 4 and 15, 1989 (Table 2). Depth to ground water on December 4, 1989 varied between 25.83 (well LF-6) and 28.77 (well LF-4) feet below the top of the well casing; corresponding ground-water elevations ranged from 22.44 feet above mean sea level (msl) in the eastern portion of the Property (well LF-5) to 22.05 feet above msl in the northwestern portion of the Property (well LF-7).

Ground-water elevations measured on December 4, 1989 are shown graphically in Figure 7. Ground-water elevations and product thicknesses measured on December 4, 1989 also are shown on cross sections A-A′ and B-B′ (Figures 5 and 6).

Ground-water elevations in monitoring wells that had measurable floating product (free-phase hydrocarbons) were

corrected to account for the thickness of the floating product. Based on odor and the results of chemical analyses on soil and ground-water samples, this correction involved: 1) assuming that the product was diesel and that the specific gravity of diesel is 0.84; 2) multiplying the measured thickness of floating product by the assumed specific gravity; 3) subtracting the product of this multiplication from the measured depth to ground water; and 4) subtracting the corrected depth to ground water from the well elevation.

Ground-water elevations measured on December 4, 1989 indicate that shallow ground water (depth less than about 30 feet) beneath the Property flows toward the northwest and west. The calculated horizontal hydraulic gradient measured on December 4, 1989 ranged from 0.002 ft/ft (a decrease of 0.002 vertical feet per 1 horizontal foot) in a westerly direction to approximately 0.001 ft/ft in a northwesterly direction.

Floating product was encountered in three wells on December 4, 1989 (Table 2). Measured thicknesses of floating product ranged from 0.01 feet in well LF-2, 1.04 feet in well LF-4 and 1.47 feet in well LF-5. The distribution of measured floating product is depicted on cross sections A-A′ and B-B′ (Figures 5 and 6).

5.0 SOIL QUALITY RESULTS

Soil samples were collected for chemical analysis on November 17, 27 and 28, 1989. Details of sample collection protocol are provided in Appendix A. Analytical results are summarized in Table 3. Soil samples B-1, B-2, B-3, B-4, B-5 and B-6 were analyzed for undifferentiated TPH using EPA Method 503E and polychlorinated biphenyls (PCBs) using EPA Method 8080. Selected soil samples collected from the borings for wells LF-6, LF-7, LF-8 and LF-9 were analyzed for TPH as gasoline and diesel using EPA Method 8015 and benzene, toluene, ethylbenzene and xylenes (BTEX) using EPA Method 8020. Laboratory data sheets for soil samples collected and analyzed during this investigation are included in Appendix C.

Soil samples analyzed for undifferentiated TPH were collected at a depth of 1 foot below the ground surface at six locations in the northeastern portion of the Property. These locations were chosen based on surface soil staining and the local drainage pattern in this area. The analytical results revealed the following TPH concentrations: B-6 (11,000 ppm); B-1 (9,300 ppm); B-5 (8,700 ppm); B-3 (1,800 ppm); B-2 (1,400 ppm); and B-4 (290 ppm) (Figure 8). None of these samples

revealed concentrations of PCBs above their analytical detection limits (0.050 ppm).

Soil samples collected from the borings for the monitoring wells and analyzed for TPH as gasoline and diesel did not reveal these compounds above their analytical detection limits, except for the sample collected from the boring for well LF-6 (Figure 8). This sample was collected at a depth of 25 feet below the ground surface and revealed a concentration of TPH as diesel at 1,600 ppm.

Toluene was the only BTEX compound detected at concentrations above analytical detection limits. Toluene was revealed in the soil samples from the borings for LF-7 (0.100 ppm), collected
at a depth of 23 feet, LF-9 (0.031 ppm), collected from a depth of 24 feet, and LF-8 (0.003 ppm), collected from a depth of 24.5 feet.

6.0 GROUND WATER

6.1 Ground-Water Quality

One round of ground-water samples was collected on December 4 and 5, 1989 from newly installed monitoring wells LF-6, LF-7, LF-8 and LF-9. Ground-water samples collected from each well were analyzed for TPH as gasoline, diesel, and waste oil using EPA Method 8015 and for BTEX using EPA Method 602. Laboratory data sheets for water samples collected and analyzed during this investigation are included in Appendix C. Table 4 summarizes analytical data for ground-water samples collected during this investigation. Table 5 presents ground-water sampling data for each of the wells sampled. Details of sample collection protocol are presented in Appendix A.

6.2 Ground-Water Quality Results

Analytical data for ground-water samples collected from the newly-installed monitoring wells revealed concentrations of TPH as gasoline (19 ppm) and TPH as diesel (18 ppm) in the sample collected from off-site well LF-7 and TPH as diesel (120 ppm) in the sample collected from off-site well LF-6 (Figure 9). Wells LF-6 and LF-7 are located downgradient of well LF-5. Ground-water samples collected from wells LF-8 and LF-9, located downgradient of previously existing wells LF-1, LF-2 and LF-4, did not reveal TPH as gasoline or diesel above their analytical detection limits. TPH as waste oil and BTEX

compounds were not present above their analytical detection limits in the ground-water samples analyzed.

7.0 INTERPRETATION

The following sections provide discussions and interpretations for the soil and ground-water quality results presented above.

7.1 Soil Quality

Soil samples collected and analyzed during the Phase I & II investigations have revealed areas of the Property where soil contains elevated concentrations of petroleum hydrocarbons.

- Elevated concentrations of TPH (up to 11,000 ppm) were reported in samples from the upper 1 foot of soil in the northeastern portion of the Property (Figure 8). The occurrence of elevated TPH concentrations in shallow soils may be due to the use of this portion of the Property as a parking and maintenance area for trucks which leaked various motor fuels and lubricants onto the ground. Drainage patterns in this portion of the Property indicate that the petroleum hydrocarbons drain toward the fence.

- Elevated concentrations of TPH as gasoline (2.600 ppm), ethylbenzene (80 ppm) and xylenes (260 ppm) were detected in soil samples collected from a depth of 23 feet in the boring for well LF-2, located southwest of the above-ground fuel storage tanks. Observations made in the vicinity of the above-ground tanks and fuel pumping shed revealed the presence of petroleum-stained soils. It appears that the petroleum hydrocarbons detected in samples collected at depths down to 27 feet in the boring for LF-2 may be attributed to leaks/spills in the vicinity of the above-ground tanks and fuel pumping shed.

- TPH as diesel was revealed at an elevated concentration (1,600 ppm at a depth of 25 feet) in the sample from the boring for well LF-6 located northwest of the Property. This location is approximately 70 feet west of well LF-5. During the previous Phase I investigation, TPH as diesel was detected in samples collected from the boring for well LF-5 (depth of 23 feet) at a concentration of 18,000 ppm. The presence of diesel at a depth of 23 feet in the vicinity of wells LF-6 and LF-5 suggests that the remote pump island and the associated piping may be possible sources for this TPH as diesel.

- An examination of surface soils along the western boundary of the Property suggested that TPH has affected soils in the vicinity of monitoring well LF-6. Observation of a one-foot thick "cut-away" of the ground surface along the western boundary of the Property revealed that the soil in the upper 1 foot exhibited discoloration and a strong petroleum odor. During the Phase I investigation, a surface soil sample collected within 30 feet of the western boundary of the Property revealed elevated concentrations of TPH as diesel and oil and grease (700 ppm and 1,200 ppm, respectively). Sources for these compounds may include a number of storage drums in the area containing various petroleum hydrocarbons, and parked trucks leaking various fuels and lubricants onto the ground in this portion of the Property.

- Observations revealed discoloration of and a strong petroleum odor in surface soils in the vicinity of the eastern boundary of the Property. During the Phase I investigation, a surface soil sample collected approximately 15 feet from the eastern boundary of the Property revealed elevated concentrations of TPH as diesel and oil and grease (24,000 ppm and 39,000 ppm, respectively). The source for these compounds may include parking and maintenance of trucks which leak various fuels and lubricants onto the ground in this portion of the Property.

- Low concentrations (up to 1.3 ppm) of PCBs were detected in two surface soil samples collected in the northeastern portion of the Property. However, PCBs were not present above the analytical detection limit of 0.05 ppm in subsequent soil samples collected from surface-water drainage areas located in the northeastern portion of the Property. These data suggest that PCBs have not significantly impacted soils at the Property.

7.2 Ground-Water Quality

Ground-water samples collected during the Phase I and Phase II investigations have revealed that shallow ground water beneath the Property and in the near vicinity to the west, (on-site wells LF-1, LF-2, LF-3, LF-4, and LF-5, and off-site wells LF-6 and LF-7, respectively; Figure 9) has been affected by petroleum hydrocarbons.

- TPH as diesel was detected in ground-water samples collected from wells LF-6 (120 ppm) and LF-7 (18 ppm).

Additionally, TPH as gasoline was revealed in the sample collected from well LF-7 (19 ppm). Monitoring wells LF-6 and LF-7 are located downgradient from monitoring wells LF-4 and LF-5. During the Phase I investigation, TPH as diesel was detected in samples collected from wells LF-4 (340 ppm) and LF-5 (59 ppm). The presence of dissolved petroleum compounds in shallow ground water in the vicinity of these wells suggests that the remote pump island and the piping connecting the island to the four large above-ground storage tanks in the south are possible sources.

- BTEX compounds were not found in any of the ground-water samples collected from the newly-installed wells. During the Phase I investigation, elevated concentrations of benzene, ethylbenzene and xylenes (up to 1.6 ppm) were detected in upgradient wells located in the western and southern portions of the Property. Possible sources for these petroleum hydrocarbons include the four large above-ground tanks in the southern portion of the Property and the piping leading from the above-ground tanks to the remote pump island.

7.3 Floating Petroleum Hydrocarbons

On December 4, 1989, floating petroleum hydrocarbons (product) were measured in wells LF-5 (1.47 feet), LF-4 (1.04 feet) and LF-2 (0.01 feet). On December 15, 1989 product thickness decreased in wells LF-5 (1.25 feet) and LF-2 (trace amounts - less than 0.01 foot), and increased in well LF-4 (1.32 feet). During the Phase I investigation, floating product was measured in well LF-5 (1.58 feet on May 9, 1989), approximately one month after installation of the well. It was assumed that the floating product was diesel fuel based on analytical results of soil and ground water.

Available data suggest that the pump island is the probable source of the floating product in wells LF-4 and LF-5. Data suggests that the large above-ground tanks located in the southwestern portion of the Property may be sources of the floating product detected in well LF-2.

The results of the Phase II investigation have revealed that petroleum hydrocarbons have affected surface soils primarily in the northeastern portion of the Property adjacent to the fence bordering Bancroft Avenue. Only the soil samples collected at a depth of 25 feet from the boring for well LF-6 revealed concentrations of total petroleum hydrocarbons (1,600

ppm as TPH as diesel) in areas northwest of the Property. This investigation also has revealed that petroleum hydrocarbons have affected ground water in the downgradient ground-water flow direction to the west of the Property (off-site wells LF-6 and LF-7).

8.0 CONCLUSIONS

8.1 Discussion of Results

Analytical results for soil and ground-water samples collected during the Phase I and Phase II investigations have revealed that petroleum hydrocarbons have affected a number of portions of the Property and adjacent areas west of the Property. Specifically, these results revealed:

- concentrations (up to 39,000 ppm) of TPH as diesel and TPH as oil and grease in shallow soils (less than 3 feet in depth) in the northeastern, eastern and western portions of the Property

- concentrations (up to 18,000 ppm) of TPH as diesel in deeper (depths of 18 to 23 feet) soil samples from borings for wells LF-3, LF-5 and LF-6

- concentrations of TPH as gasoline (2,600 ppm), ethylbenzene (80 ppm) and xylenes (200 ppm) in the deeper (depth of 23 feet) soil sample collected from the boring for well LF-2

- concentrations (up to 330 ppm) of TPH as diesel in ground-water samples collected from shallow wells LF-1, LF-2, LF-4, LF-5, LF-6 and LF-7 and TPH as gasoline (18 ppm) in samples collected from well LF-7

- concentrations (up to 1.6 ppm) of benzene, ethylbenzene and xylenes in ground-water samples collected from shallow wells located in the southern and western portions of the Property

- the presence of floating product, assumed to be diesel fuel, (greater than 1 foot in thickness) in wells LF-4 and LF-5.

8.2 Need for Remedial Action

It appears, based on information collected during Levine•Fricke's Phase I and Phase II investigations and based on previous regulatory experience at similar sites, that remedial action will be required at the Property. It is likely that remedial actions will include the mitigation of: petroleum hydrocarbons found in soils at the Property; the floating product encountered in wells LF-4 and LF-5; and possibly petroleum-affected ground water beneath the western and northwestern portions of the Property. Remedial action alternatives were evaluated to address each of these areas and are presented in section 9.0

9.0 EVALUATION OF REMEDIAL ACTION ALTERNATIVES FOR THE PROPERTY

Remediation of floating product in the vicinity of the remote fuel dispensing pumps and associated piping in the northwestern portion of the Property (Figures 3 and 10) will likely be required, along with excavation and removal of petroleum-affected soils at concentrations greater than 1,000 ppm, if excavation is feasible (i.e., not under a building). It is not likely that dissolved hydrocarbons in ground water will require remediation at this time, but periodic monitoring of ground-water quality will likely be necessary.

9.1 Remedial Action Alternatives

Based on our experience at other sites, remedial action alternatives for the Maskell Oil Facility would include:

- implementation of floating product removal and periodic sampling and analysis to monitor concentrations of fuel compounds in ground water at the Property and downgradient of the Property

- analysis of the petroleum hydrocarbon-affected soils according to Article 11 of Title 22 of the California Administrative Code and determining the applicable hazardous waste concentration

- removal of existing fuel storage tanks, dispensing pumps and associated piping, and excavation and removal of shallow soil containing concentrations of petroleum hydrocarbons greater than the determined hazardous waste concentration

- modification of the surface-water drainage system in the northeast portion of the Property to eliminate the potential for off-site discharge of petroleum hydrocarbons.

Additional measures that are recommended for implementation at the Property include improving (or eliminating): tenant maintenance of vehicles; and tenant storage and disposal of waste oil and other petroleum products.

9.2 Alternative 1: Product Extraction and Ground-Water Extraction, Treatment and Monitoring

Extraction wells to remove free product are a feasible alternative for on-site remedial action. Product recovery wells could be installed in the vicinity of wells LF-4 and LF-5 to remove product. Prior to installing the extraction wells, hydraulic tests are recommended on existing wells at the Property to assist in evaluating the predicted effectiveness of existing wells and the need for possible additional wells. To enhance the flow of product into the extraction wells, ground water would also be extracted to depress the ground-water surface. The product would then be removed using a "skimmer-type" system, designed to extract the fuel product floating on the water surface in the well. Options for disposal of ground water removed during this process and found to be affected by fuel compounds include treatment using an air stripper, carbon and/or direct discharge to the sanitary sewer.

Product collected from the water surface could be stored in 55-gallon drums for disposal. The total volume of product and ground water extracted could be recorded and evaluated along with other pertinent data, including product thickness and water-level measurements.

Ground-water monitoring at the Property will most likely be required to assess the effectiveness of the remediation and monitor ground-water quality beneath the Property. Monitoring wells already present at the Property can be used for monitoring purposes. Typically, State and local agencies require quarterly monitoring for at least one year after completion of remediation (removal of floating product) to establish that stable or decreasing chemical concentration conditions exist at the Property. Once these conditions have been established, monitoring frequency may be reduced.

9.3 Alternative 2: Testing of Soils to Determine Hazardous Waste Concentration

The Department of Health Services (DHS) has not set specific criteria for classifying petroleum hydrocarbon-affected soil as hazardous waste. In the past, a typical guideline used by the DHS and other agencies for classifying petroleum hydrocarbon-affected soil as hazardous waste has been a TPH concentration of 1,000 ppm. This concentration was based on the ignitability characteristics of fresh gasoline in sandy soil. In accordance with Article 11 of Title 22 of the California Administrative Code, the DHS has required that contaminated soils be tested according to the applicable criteria to evaluate whether the subject soils are hazardous waste.

This alternative would involve the collection of representative samples from various locations at the Property and analysis of the samples in accordance with Article 11 of Title 22. Additionally, interfacing with the regulatory agencies will be required during completion of this alternative.

9.4 Alternative 3: Removal of Fuel Storage and Dispensing Facilities and Excavation and Removal of Petroleum Hydrocarbon-Affected Soils

Although existing fuel storage and dispensing facilities (with the exception of the waste oil tank) are no longer in use at the Property, removal of those facilities would serve as additional source abatement measures. Removal of the fuel storage and dispensing facilities would include removal of: (1) the four above-ground fuel storage tanks; (2) the underground vapor recovery tank; (3) the underground waste oil tank; (4) the remote pump island and pump island adjacent to the above-ground tanks; (5) the fuel pump shed and pump adjacent to the above-ground tanks; and (6) associated above ground and underground piping (Figure 10).

Removal of the fuel-affected soils is a possible alternative for soils remediation and would be effective in removing the existing source(s) of petroleum hydrocarbons to ground water. Excavation and removal of hydrocarbon-affected soils would be completed using a backhoe. Due to the presence of buildings and other structures at the Property and the depth to which affected soils were encountered, it may not be feasible to remove all the affected soil. Additionally, problems may arise if the fuel-affected soils extend beneath the apartment buildings located northwest of the Property. Excavation of

the soils without prior removal of the floating fuel hydrocarbons could be difficult and may be of concern for health and safety during the excavation activities. The benefits to human health and the environment to be achieved are the reduction of further degradation of the ground water and the potential for off-site migration due to the removal of a large portion of the fuel-affected soils.

Disposal of the excavated soil would involve transporting the soils to a Class I facility for disposal, or on-site biotreatment and transportation to a Class III facility for disposal.

9.5 Alternative 4: Modification of Surface-Water Drainage System

Modification of the surface-water drainage system in the northeast portion of the Property would involve removing the existing drain and installing a new drain system, or modifying the existing drain system to eliminate the potential for off-site discharge of petroleum hydrocarbons. Modification could involve collection of run-off water and discharge to the sanitary sewer, or, if Alternative 1 is implemented, piping the run-off water to the ground-water treatment system.

10.0 RECOMMENDED PROPERTY REMEDIATION MEASURES

Based on the evaluation of remedial action alternatives discussed above, the following remedial action measures are proposed for the Maskell Oil facility. The proposed remedial action measures have been divided into four phases based on relative priority for implementation. Considerations that have been utilized for selecting the proposed measures have included technical feasibility, expected effectiveness (e.g., reducing migration of petroleum hydrocarbons and eliminating source areas[s]), and compliance with current regulatory guidelines. The four proposed phases and estimated costs are presented in this section. A summary of the schedule and estimated costs is presented in Table 6 below.

TABLE 6:

SCHEDULE AND ESTIMATED COSTS FOR REMEDIAL ACTION MEASURES
Maskell Oil Facility • San Leandro, California

Remedial Measure	Years 1	2	3	4	5	6	7
Ground-Water Monitoring (Estimated Cost)	$40,000	$44,000	$48,000	$53,000	$59,000	$65,000	$71,000
Modification of Surface Water Drainage System (Estimated Cost)	$10,000						
Removal of Fuel Storage Tanks & Distribution Facilities (Estimated Cost)	$90,000						
Ground-Water/Floating Product Extraction & Treatment * (Estimated Cost)	$73,000	$87,000	$55,000	$60,000	$67,000	$73,000	
Soil Testing to determine Applicable Hazardous Waste Concentration (Estimated Cost)		$8,000					
Pilot Study for Biotreatment of Petroleum-Affected Soils (Estimated Cost)		$7,000					
Excavation & Biotreatment of Petroleum-Affected Soils (Estimated Cost)		$180,000	$650,000				
Capping of Site with Low Permeability Material (Estimated Cost)		$85,000					
Estimated Annual Total Cost	$213,000	$411,000	$753,000	$113,000	$126,000	$138,000	$71,000

*Assumes Discharge to Sanitary Sewer; Estimated Costs Assume 10% Annual Rate Increases

ESTIMATED PROJECT TOTAL $ 1,825,000

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PHASE 1: costs to begin to be incurred within 6 to 8 months

Measure 1: Ground-Water Monitoring (assumes duration of 7 years)

- quarterly sampling of monitoring wells
- quarterly laboratory analysis of collected ground-water samples
- quarterly measuring of ground-water elevations and product thickness
- data evaluation and preparation of quarterly ground-water monitoring report for submittal to agencies
- project management

Estimated Quarterly Cost	$ 10,000
Estimated Annual Cost	$ 40,000
Estimated 7 Year Cost (includes 10% annual rate increases)	$ 380,000

Measure 2: Modification of Surface-Water Drainage System

- removal of existing system and installation of new system or modification of existing system to eliminate off-site discharge of petroleum hydrocarbons
- permitting discharge of surface water to sanitary sewer

Estimated Cost	$ 8,000 to 10,000

Measure 3: Removal of Fuel Storage Tanks and Distribution Facilities (dispensing pumps and associated piping)

- disassembly, excavation, removal and disposal of four above-ground fuel storage tanks, fuel dispensing pumps and associated piping, fuel pumping shed, underground waste oil tanks and underground vapor recovery tank (does not include excavation of petroleum-affected soils)

Estimated Cost	$ 70,000 to 90,000

ESTIMATED PHASE 1 TOTAL

1 YEAR	**$ 118,000 to 140,000**
7 YEARS	**$ 458,000 to 480,000**

PHASE 2: costs to begin to be incurred within 8 to 14 Months

Measure 4a: Ground-Water/Floating Product Extraction and Treatment (assumes discharge to sanitary sewer)

- hydraulic testing of sediments
- drilling and installation of two ground-water extraction wells
- installation of extraction and treatment system
- permitting for operation of treatment system
- maintenance of extraction and treatment system
- sampling and report preparation in accordance with permit requirements
- monitoring and reporting of system's operation and effectiveness

Estimated Capital Costs	$ 90,000 to 110,000
Estimated Annual Operation and Maintenance Costs	$ 40,000 to 50,000
Estimated 5 Year Cost (assumes 10% annual rate increase)	$ 245,000 to 305,000

Measure 4b: Ground-Water Floating Product Extraction and Treatment (assumes discharge under NPDES permit)

- hydraulic testing of sediments
- drilling and installation of two ground-water extraction wells
- installation of extraction and treatment system
- permitting for operation of treatment system
- maintenance of extraction and treatment system
- sampling and report preparation in accordance with permit requirements
- monitoring and reporting of system's operation and effectiveness

Estimated Capital Costs	$ 190,000 to 220,000
Estimated Annual Operation and Maintenance Costs	$ 90,000 to 110,000
Estimated 5 Year Cost (assumes 10% annual rate increase)	$ 550,000 to 670,000

Measure 5: Soil Testing To Determine Applicable Hazardous Waste Concentration

- collection and chemical analysis of representative soil samples
- discussions with regulatory agencies

Estimated Cost	$ 5,000 to 8,000

ESTIMATED PHASE 2 TOTAL

Assuming Measure 4a	
1 YEAR	**$ 135,000 to 168,000**
5 YEARS	**$ 340,000 to 423,000**
Assuming Measure 4b	
1 YEAR	**$ 285,000 to 338,000**
5 YEARS	**$ 745,000 to 898,000**

PHASE 3: costs to begin to be incurred within 14 to 20 Months

Measure 6: Pilot Study for Biotreatment of Petroleum-Affected Soils

- collection of representative soil samples
- completion of biotreatment pilot study
- discussions with regulatory agencies

Estimated Cost $ 5,000 to 7,000

Measure 7: Excavation and Biotreatment of Petroleum-Affected Soils (assumes 6,000 cubic yards)

- excavation of petroleum-affected soils with concentrations of petroleum hydrocarbons above determined hazardous waste concentration
- on-site biotreatment of soils (costs for off-site disposal of treated soils not included)

Estimated Excavation, Backfill and Stockpiling Cost $ 160,000 to 180,000

Estimated Biotreatment and Disposal Cost $ 450,000 to 650,000
(actual costs contingent upon results of pilot study and regulatory requirements)

ESTIMATED PHASE 3 TOTAL

1 YEAR $ 615,000 to 837,000

PHASE 4: costs to begin to be incurred within 20 to 24 Months

Measure 8: Capping of Property with Low Permeability Material

- grading and preparation of property
- capping of property with asphalt

Estimated Cost	$ 75,000 to 85,000
ESTIMATED PHASE 4 TOTAL	
1 YEAR	**$ 75,000 to 85,000**

TABLE 1

SUMMARY OF AVAILABLE WELL DATA FOR WELLS WITHIN A ONE-HALF MILE
RADIUS OF THE MASKELL OIL PROPERTY

LF I.D. NO.	WELL NUMBER	OWNER	LOCATION	LOG	DATE INSTALLED	TOTAL WELL DEPTH (FT)	PRESENT PROPERTY USE	WELL USE
1	2S/2W 31M 2	HOWARD GREEN	14753 CRAFT AV	Y	7/77	35	RESIDENCE	IRR
2	2S/2W 31N	IVAN CORNELIUS	14822 E. 14TH ST	Y	7/86	30	BALCOURT APTS.	BOR
3	2S/2W 31N	ENTERPRISE LEASING	14182 E. 14TH ST	Y	12/87	20	?	BOR
4	2S/2W 31P 1	DELFINA FARIAS	1725 HALSEY AV	N	?	40	RESIDENCE	IRR
5	2S/2W 31P 2	JOHN DEBURN	1614 HALSEY AV	N	5/77	?	RESIDENCE	IRR
6	2S/3W 36J	SAN LEANDRO SCHOOL DIST.	14311 LARK ST	Y	5/89	51	THOMAS JEFFERSON SCHOOL	BOR
7	2S/3W 36J 1	DOROTHY GIACOMETTI	14390 E. 14TH ST	N	?/24	94	?	DOM
8	2S/3W 36K 1	U.S. COAST GUARD TRAINING	WAKEFIELD DR	Y	?	147	?	IRR
9	2S/3W 36K 2	SHIMODA NURSERY	13908 E. 14TH ST	Y	4/51	432	?	IRR
10	2S/3W 36K 3	BROWN'S NURSERY	14101 E. 14TH ST	N	?/44	84	THE COURTYARDS APTS.	DOM
11	2S/3W 36K 5	EDWIN MENZIE	14245 ROSE DR	Y	9/77	43	RESIDENCE	IRR
12	2S/3W 36K 6	BILL MCMAHON	1124 139TH AV	Y	4/77	80	CUSTOM CHROME PLATING	IND
17	2S/3W 36Q	NAKASHIMA NURSERY (OLD)	906 143RD	Y	11/85	?	PARKSIDE COMMONS	?
18	2S/3W 36Q	NAKASHIMA NURSERY (OLD)	906 143RD	Y	11/85	?	PARKSIDE COMMONS	?
19	2S/3W 36Q	NAKASHIMA NURSERY (OLD)	906 143RD	Y	11/85	?	PARKSIDE COMMONS	?
20	2S/3W 36Q 1	NAKASHIMA NURSERY	906 143RD	Y	7/29	372	PARKSIDE COMMONS	?
21	2S/3W 36Q 2	NAKASHIMA NURSERY	143RD AV	N	?	289	PARKSIDE COMMONS	IRR
22	2S/3W 36Q 3	FERRIS GRIFFIN	13221 IVY CT	N	?/54	62	RESIDENCE	DOM
23	2S/3W 36Q 4	C.L. SMITH	14252 ORCHID DR	Y	6/77	35	RESIDENCE	IRR
24	2S/3W 36Q 5	MRS. WILLIAMS	14201 ORCHID DR	Y	9/77	72	RESIDENCE	IRR
25	2S/3W 36Q 6	?	14221 ORCHID DR	Y	10/77	60	RESIDENCE	IRR
26	2S/3W 36Q 7	NAKASHIMA NURSERY	906 143RD AV	Y	5/82	152	PARKSIDE COMMONS	IRR
27	2S/3W 36Q 8	HUNT PROPERTIES	906 143RD AV	Y	11/85	30	PARKSIDE COMMONS	MON
28	2S/3W 36Q 9	HUNT PROPERTIES	906 143RD AV	Y	11/85	30	PARKSIDE COMMONS	MON
31	2S/3W 36R 1	K. NAKASHIMA NURSERY	906 143RD AV	Y	12/51	601	PARKSIDE COMMONS	?
32	2S/3W 36R 2	?	1315 147 AV	Y	6/77	53	?	IRR
33	2S/3W 36R 3	MERCHORA LAMAS	1200 144TH AV	Y	5/77	58	?	IRR
34	2S/3W 36R 4	ROBERT MATTHEWS	1245 145TH AV	Y	6/77	61	?	IRR
35	2S/3W 36R 5	CORAMARIE ALLENBAUGH	14500 E. 14TH ST	Y	4/89	33	MASKELL OIL	MON
36	2S/3W 36R 6	CORAMARIE ALLENBAUGH	14500 E. 14TH ST	Y	4/89	38	MASKELL OIL	MON
37	2S/3W 36R 7	CORAMARIE ALLENBAUGH	14500 E. 14TH ST	Y	4/89	33	MASKELL OIL	MON
38	2S/3W 36R 8	CORAMARIE ALLENBAUGH	14500 E. 14TH ST	Y	4/89	33	MASKELL OIL	MON
39	2S/3W 36R 9	CORAMARIE ALLENBAUGH	14500 E. 14TH ST	Y	4/89	34	MASKELL OIL	MON
40	3S/2W 6C 1	STANLEY	1524 150TH AV	N	?	30	UNKNOWN BUILDING	IRR
42	3S/2W 6C 3	C & H DEVELOPMENT CO	150TH AV & E. 14TH ST	Y	3/88	19	MALL	MON
43	3S/2W 6C 7	CHEVRON U.S.A. INC.	15002 HESPERIAN BLVD	Y	5/88	23	GAS STATION	MON
44	3S/2W 6C 8	CHEVRON U.S.A. INC.	15002 HESPERIAN BLVD	Y	5/88	22	GAS STATION	MON
45	3S/2W 6C 9	CHEVRON U.S.A. INC.	15002 HESPERIAN BLVD	Y	5/88	21	GAS STATION	MON

TABLE 1

SUMMARY OF AVAILABLE WELL DATA FOR WELLS WITHIN A ONE-HALF MILE RADIUS OF THE MASKELL OIL SITE

LF I.D. NO.	WELL NUMBER	OWNER	LOCATION	LOG	DATE INSTALLED	TOTAL WELL DEPTH (FT)	PRESENT PROPERTY USE	WELL USE
46	3S/2W 6D	RALPH GOODELL	15051 HESPERIAN BLVD	Y	10/86	?	FAMILY HEALTH CENTER	?
47	3S/2W 6D 1	ROBERTS	1252 DOROTHY AV	N	?	24	RESIDENCE	IRR
48	3S/2W 6D 2	M.F. NUNES	14830 E. 14TH ST	N	?/20	100	?	IRR
49	3S/2W 6D 3	FRANK MIQUEL	1268 BETTY AV	N	5/77	32	RESIDENCE	IRR
50	3S/2W 6D 4	CHEVRON STATION #92013	15002 HESPERIAN BLVD	Y	5/88	23	GAS STATION	MON
51	3S/2W 6D 5	CHEVRON STATION #92013	15002 HESPERIAN BLVD	Y	5/88	18	GAS STATION	MON
52	3S/2W 6D 6	CHEVRON STATION #92013	15002 HESPERIAN BLVD	Y	5/88	17	GAS STATION	MON
53	3S/3W 1A 1	JUSTINO	1211 147TH AV	N	?	65	?	IRR
54	3S/3W 1A 2	JOHN TENENTE	1227 148TH AV	N	8/58	61	?	IRR
55	3S/3W 1A 3	FRANK FREITAS	1264 MARGERY AV	Y	5/77	49	RESIDENCE	IRR
56	3S/3W 1A 4	AARON GEISER	1268 MARGERY ST	Y	5/77	48	RESIDENCE	IRR
57	3S/3W 1A 5	WM. MCCABE	1261 MARGERY ST	Y	5/77	45	RESIDENCE	IRR
58	3S/3W 1A 6	EDMUND BOTELITO	14982 WESTERN AV	N	1/78	30	RESIDENCE	IRR
60	3S/3W 1B 2	H. MELLO	501 143RD AV	N	?/20	64	?	IRR

IRR - a water well used to supply water only for irrigation or other agricultural purposes.
BOR - a geotechnical boring.
DOM - a domestic water well which is used to supply water for the domestic needs of an individual residence of an individual residence or systems of four or less service connections.
IND - a water well used to supply an industry on an individual basis.
MON - wells constructed for the purpose of monitoring ground-water conditions.

Reference - County of Alameda Public Works Agency.

TABLE 2

GROUND-WATER ELEVATION AND PRODUCT THICKNESS MEASUREMENTS
DECEMBER 1989

Well No.	Well Elevations Top of Casing (feet - MSL)	December 4, 1989 Product Thickness (feet)	December 4, 1989 Ground-Water Elevations (feet - MSL)	December 15, 1989 Product Thickness (feet)	December 15, 1989 Ground-Water Elevations (feet - MSL)
LF-1	49.27	0	22.26	0	22.25
LF-2	49.48	0.01**	22.21*	trace	22.23
LF-3	49.23	0	22.44	0	22.41
LF-4	50.10	1.04**	22.20*	1.32**	22.15*
LF-5	49.27	1.47**	22.40*	1.25**	22.34*
LF-6	48.08	0	22.25	0	22.28
LF-7	49.39	0	22.05	0	22.01
LF-8	49.92	0	22.08	0	22.08
LF-9	49.49	0	22.17	0	22.23

MSL = mean sea level

* = Ground-water elevation corrected for floating petroleum hydrocarbons assuming specific gravity of 0.84

** = Product assumed to be diesel

TABLE 3

CONCENTRATIONS OF TOTAL PETROLEUM HYDROCARBONS AS GASOLINE, DIESEL AND MOTOR OIL,
AND BENZENE, TOLUENE, ETHYLBENZENE, XYLENES AND POLYCHLORINATED BIPHENYLS IN SOIL SAMPLES
(concentrations expressed in parts per million, ppm)

Sample No.	Sample Depth (feet)	Sample Date	Lab	EPA Method	Benzene	Toluene	Ethyl-benzene	Xylenes	TPH as Gasoline	TPH as Diesel	TPH as Waste Oil	TPH (undifferen-tiated)	PCBs
B-1/1	1	17-Nov-89	M-T	503E	NA	NA	NA	NA	NA	NA	NA	9300	<0.050
B-2/1	1	17-Nov-89	M-T	503E	NA	NA	NA	NA	NA	NA	NA	1400	<0.050
B-3/1	1	17-Nov-89	M-T	503E	NA	NA	NA	NA	NA	NA	NA	1800	<0.050
B-4/1	1	17-Nov-89	M-T	503E	NA	NA	NA	NA	NA	NA	NA	290	<0.050
B-5/1	1	17-Nov-89	M-T	503E	NA	NA	NA	NA	NA	NA	NA	8700	<0.050
B-6/1	1	17-Nov-89	M-T	503E	NA	NA	NA	NA	NA	NA	NA	11,000	<0.050
LF-6/25	25	28-Nov-89	M-T	8015/8020	<0.001	<0.001	<0.001	<0.003	<300	1600	<20	NA	NA
LF-7/23	23	28-Nov-89	M-T	8015/8020	<0.001	0.100	<0.001	<0.003	<0.2	<10	<20	NA	NA
LF-8/24.5	24.5	27-Nov-89	M-T	8015/8020	<0.001	0.003	<0.001	<0.003	<0.2	<10	<20	NA	NA
LF-9/24	24	27-Nov-89	M-T	8015/8020	<0.001	0.031	<0.001	<0.003	<0.2	<10	<20	NA	NA

M-T = Med Tox Associates of Pleasant Hill, California.

NA = not analyzed

TABLE 4

CONCENTRATIONS OF AROMATIC ORGANIC COMPOUNDS AND TPH
DETECTED IN GROUND-WATER SAMPLES COLLECTED
ON DECEMBER 4 AND 5, 1989
(All concentrations expressed in parts per million, ppm)

Sample No.	Date Sampled	Lab	Benzene	Toluene	Ethyl-benzene	Xylenes	Total Petroleum Hydrocarbons		
							Gasoline	Diesel	Waste Oil
LF-6	4-Dec-89	M-T	<0.1	<0.1	<0.1	<0.3	<1.0	120	<0.5
duplicate	4-Dec-89	M-T	<0.1	<0.1	<0.1	<0.3	<1.0	77	<0.5
LF-7	4-Dec-89	M-T	<0.005	<0.005	<0.005	<0.02	19	18	<0.5
LF-8	4-Dec-89	M-T	<0.0005	<0.0005	<0.0005	<0.002	<0.1	<0.3	<0.5
LF-9	5-Dec-89	M-T	<0.0005	<0.0005	<0.0005	<0.002	<0.1	<0.3	<0.5
Blanks									
LF-8FB	4-Dec-89	M-T	<0.0005	<0.0005	<0.0005	<0.002	<0.1	<0.3	<0.5

M-T = Med-Tox Associates of Pleasant Hill, California.

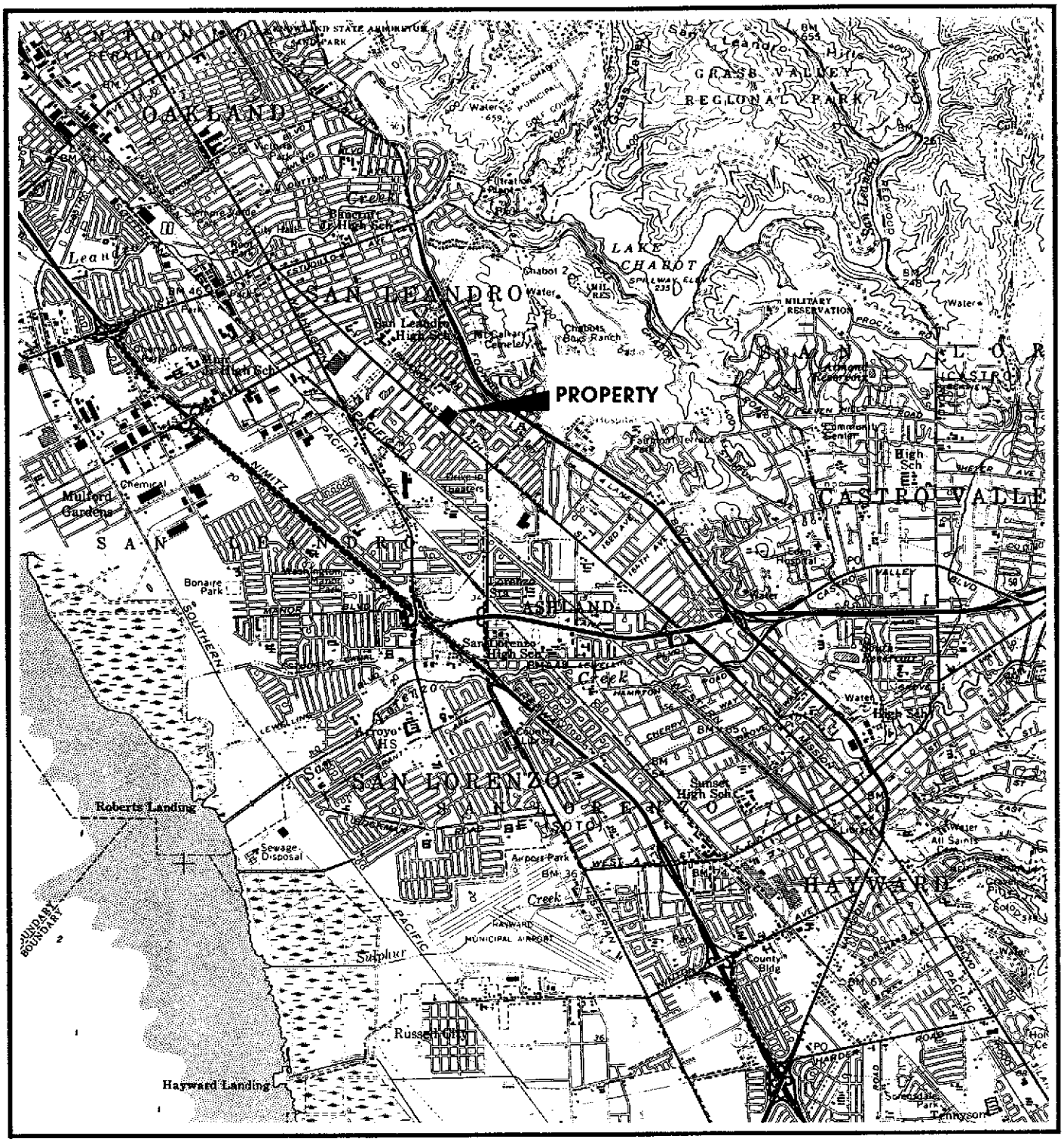
Analytical methods for each sample include EPA Method 8015 and EPA Method 602.

TABLE 5

GROUND-WATER SAMPLING DATA
DECEMBER 4 AND 5, 1989

Well No.	Date Sampled	Well Volume (gallons)	Gallons Extracted	pH	Specific Conductance (micromhos/cm)	Temperature (deg C)	Water Clarity
LF-6	4-Dec-89	1.47	14	6.62	1900	NM	Cloudy
LF-7	4-Dec-89	1.25	12	6.63	2350	NM	Very cloudy
LF-8	4-Dec-89	1.24	9	6.79	1700	NM	Slightly cloudy
LF-9	5-Dec-89	1.16	10	6.63	1277	17.5	Muddy

NM = not measured



MAP SOURCE:
U.S.G.S. Hayward, California
15 Minute Series

Figure 1: PROPERTY VICINITY

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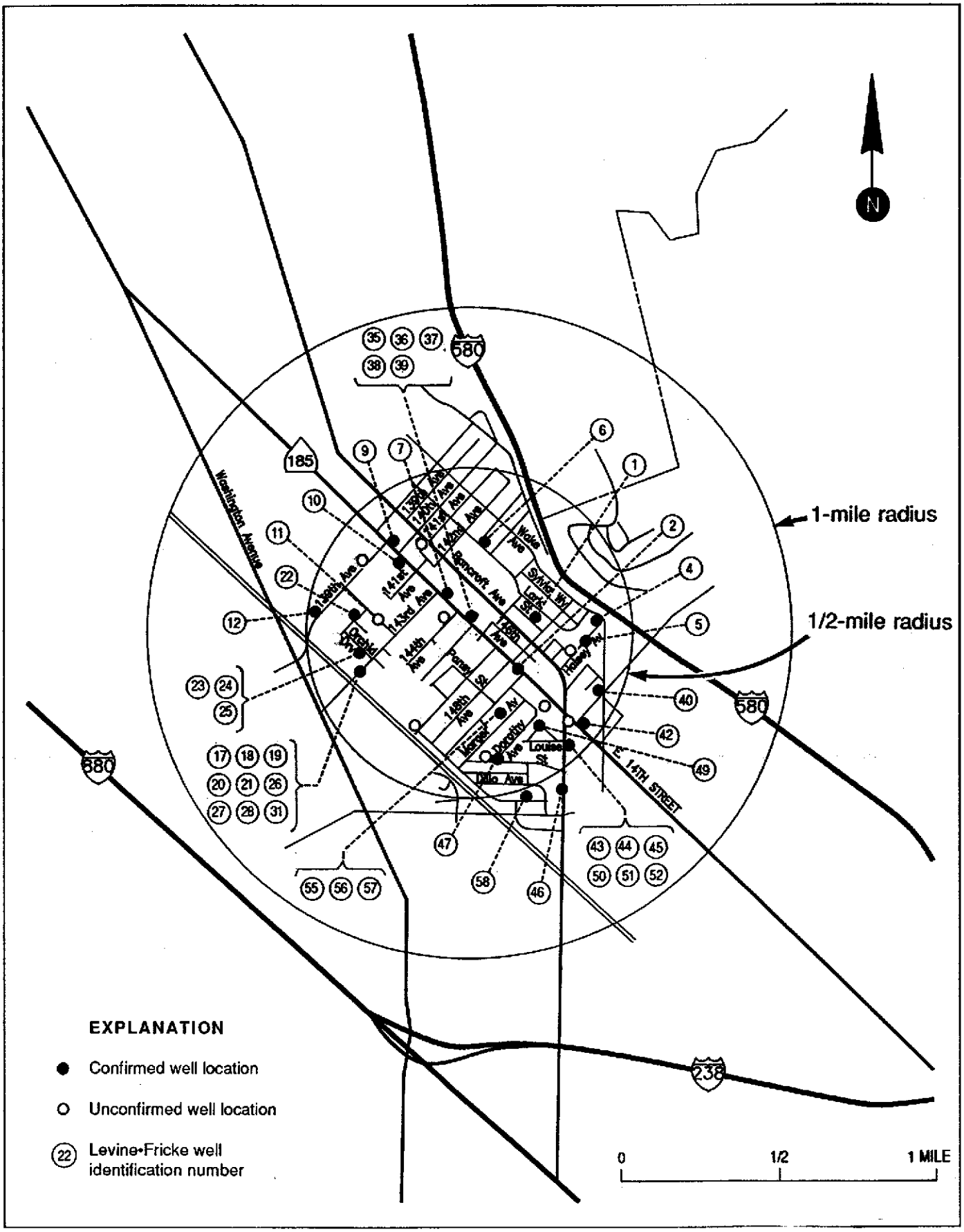


Figure 2: WELL LOCATIONS WITHIN A 1/2-MILE RADIUS OF PROPERTY

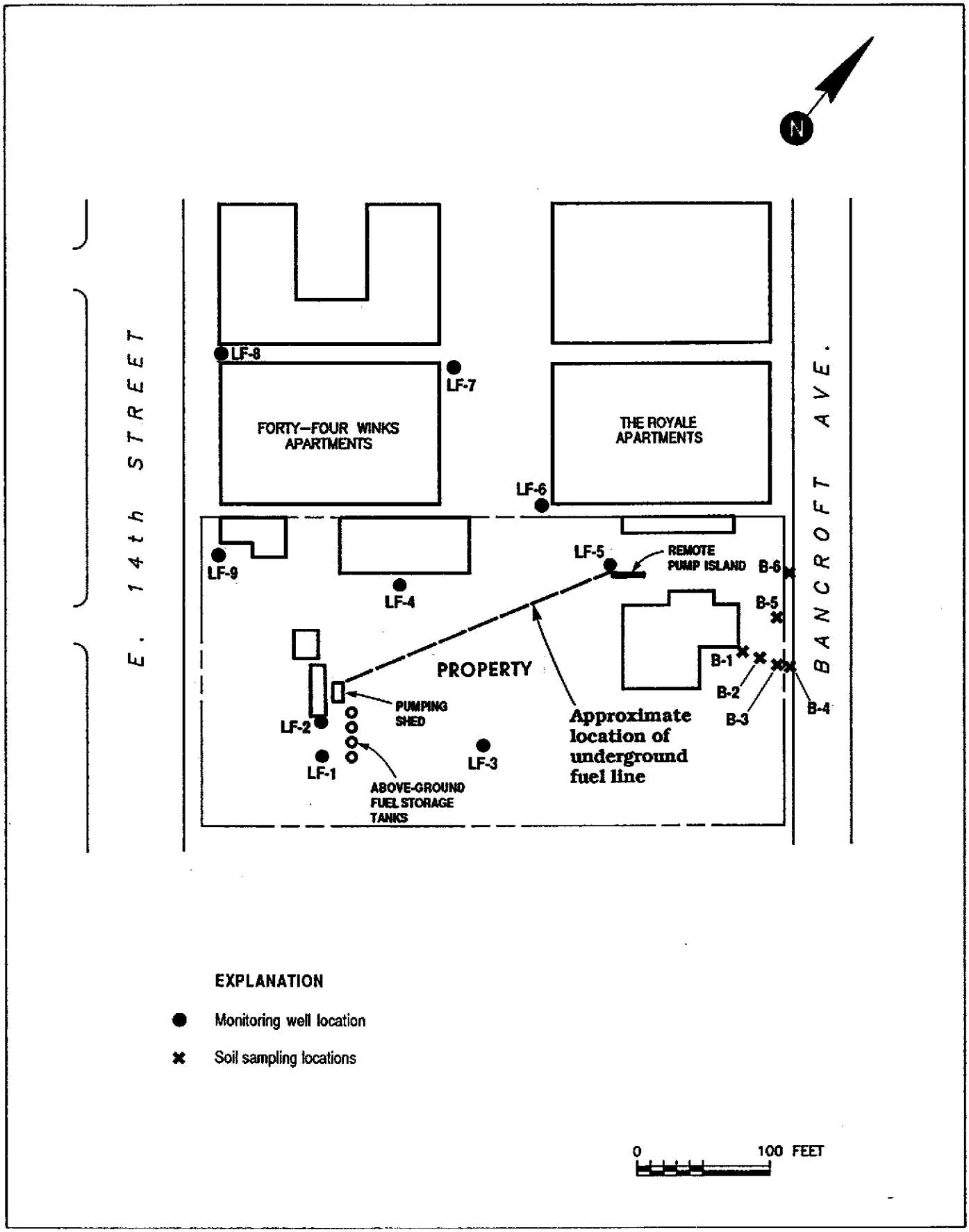


Figure 3: PROPERTY MAP SHOWING MONITORING WELL AND SOIL SAMPLING LOCATIONS

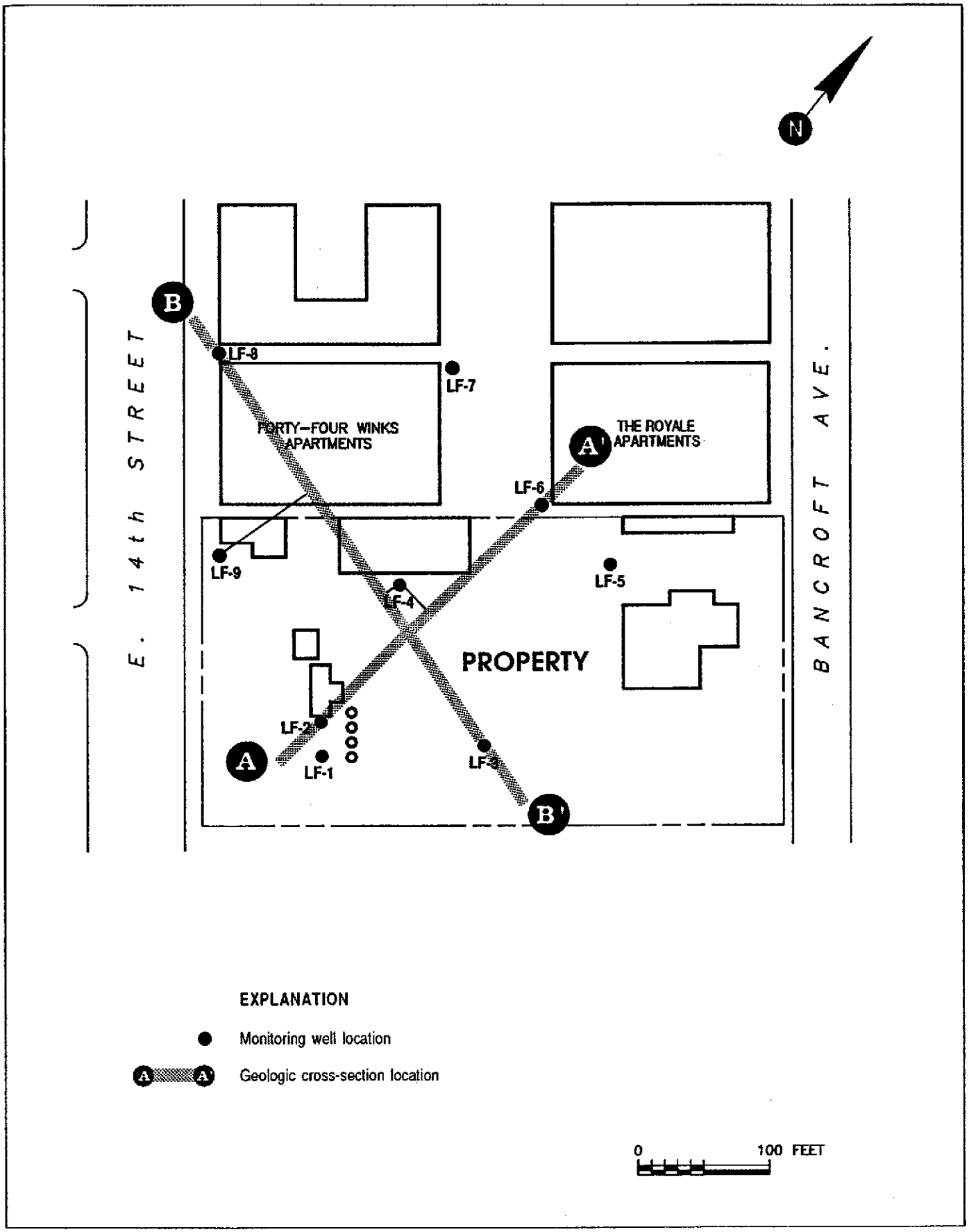
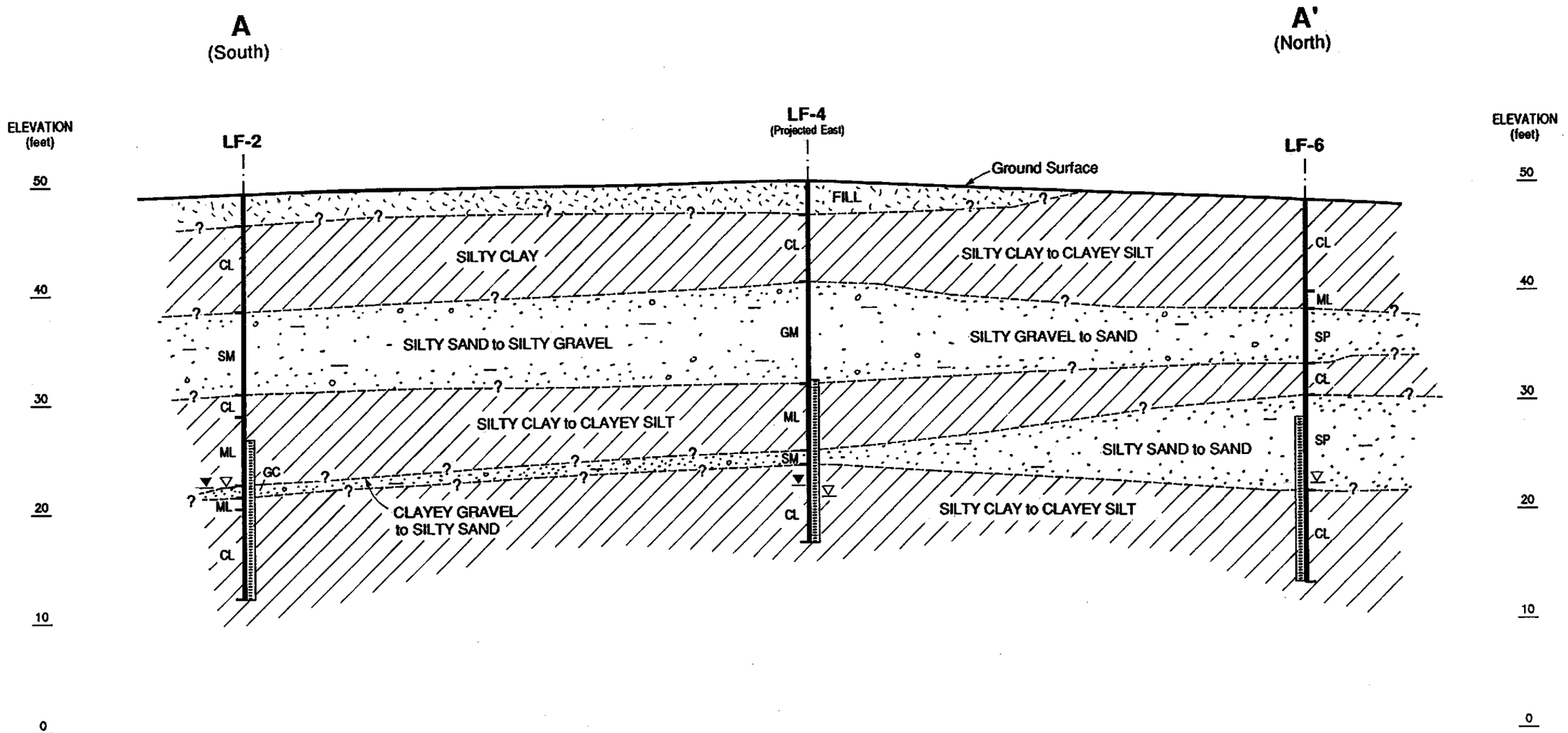
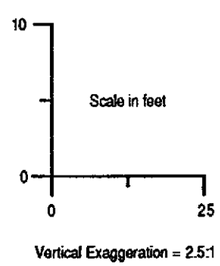


Figure 4 : GEOLOGIC CROSS-SECTION LOCATIONS



EXPLANATION

- Product level measured on December 4, 1989
- Ground-water elevation measured on December 4, 1989
- Perforated interval of well



Vertical Exaggeration = 2.5:1

Figure 5 :

SOUTH - NORTH
GEOLOGIC CROSS SECTION A-A'

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B
(West)

B'
(East)

ELEVATION (feet)

50
40
30
20
10
0

LF-8 | LF-9 (Projected North) | LF-4 (Projected South) | LF-3

Ground Surface

CL — SILTY CLAY

SW — GRAVELLY SAND to SAND

SM/SP — SAND to SILTY GRAVEL

ML — SILTY CLAY to CLAYEY SILT

SW — SAND to SILTY SAND

FILL

GM — SILTY GRAVEL to SILTY SAND

SM

EXPLANATION

▼ Product level measured on December 4, 1989

▽ Ground-water elevation measured on December 4, 1989

Perforated interval of well

10
Scale in feet
0
0 25

Vertical Exaggeration = 2.5:1

Figure 6 :

WEST - EAST
GEOLOGIC CROSS SECTION B-B'

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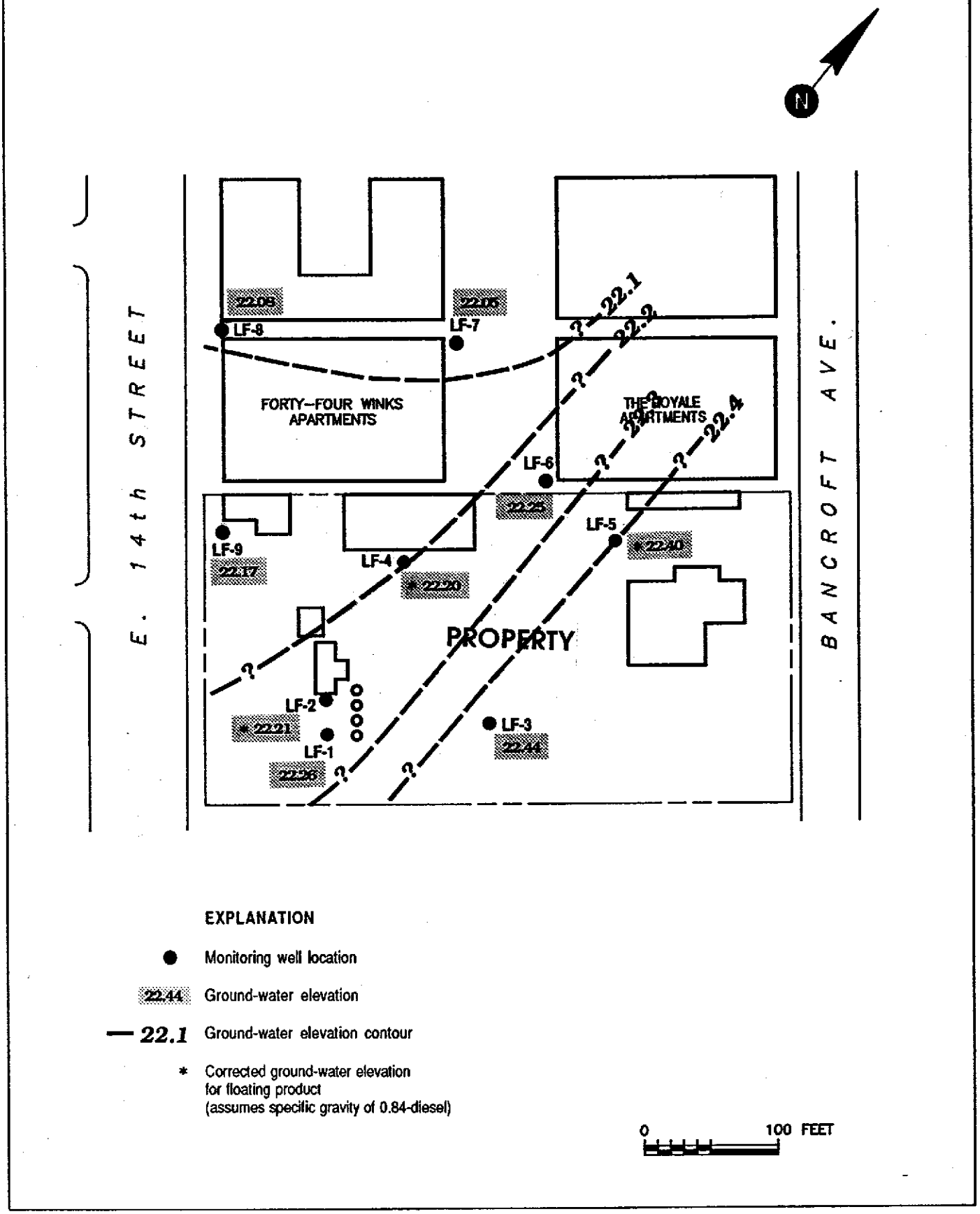

Figure 7 : GROUND-WATER ELEVATIONS MEASURED ON DECEMBER 4, 1989

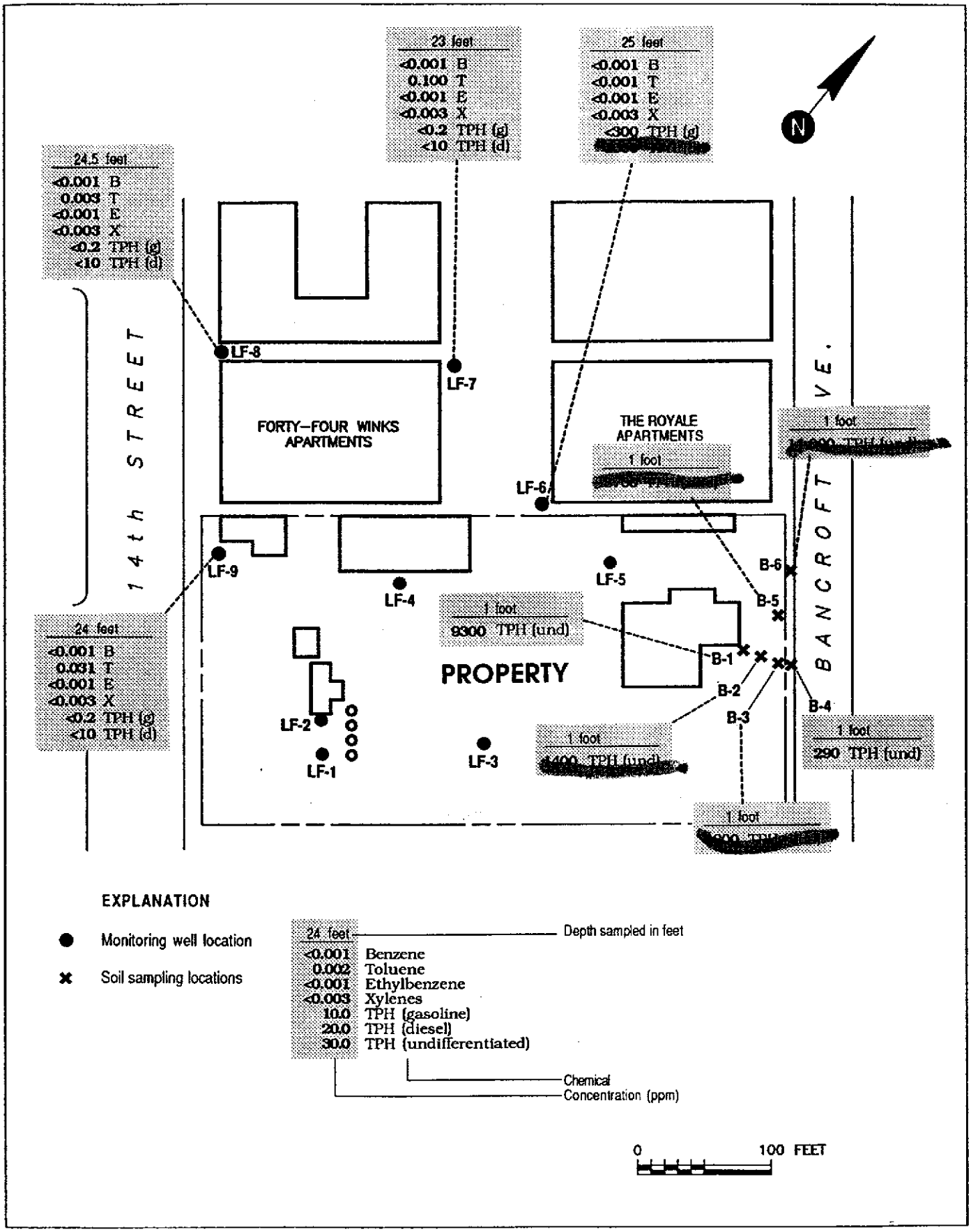

Figure 8: CONCENTRATIONS OF BENZENE, TOLUENE, ETHYLBENZENE, XYLENES, AND TOTAL PETROLEUM HYDROCARBONS DETECTED IN SOIL

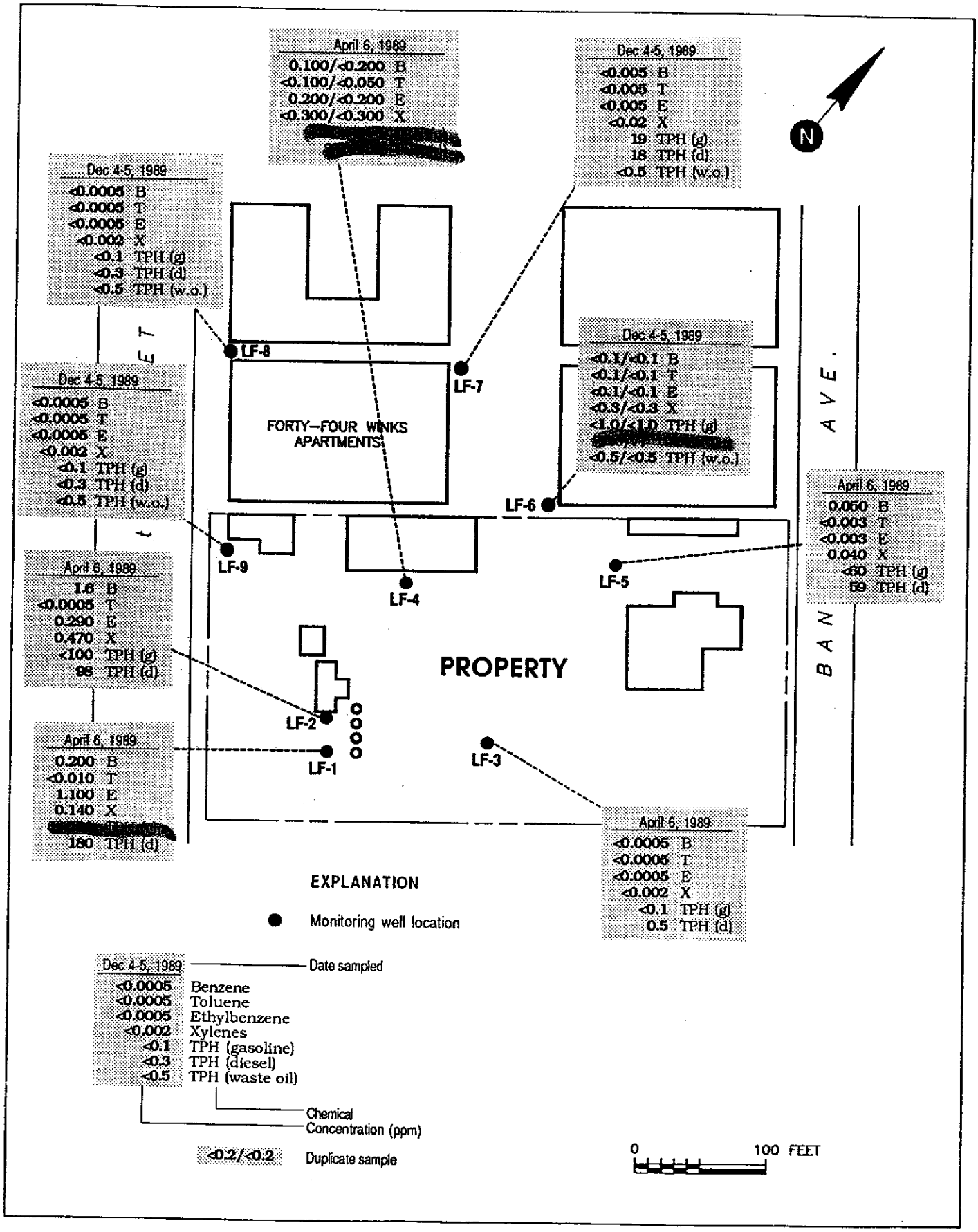

Figure 9: CONCENTRATIONS OF BENZENE, TOLUENE, ETHYLBENZENE, XYLENES, AND TOTAL PETROLEUM HYDROCARBONS DETECTED IN GROUND WATER

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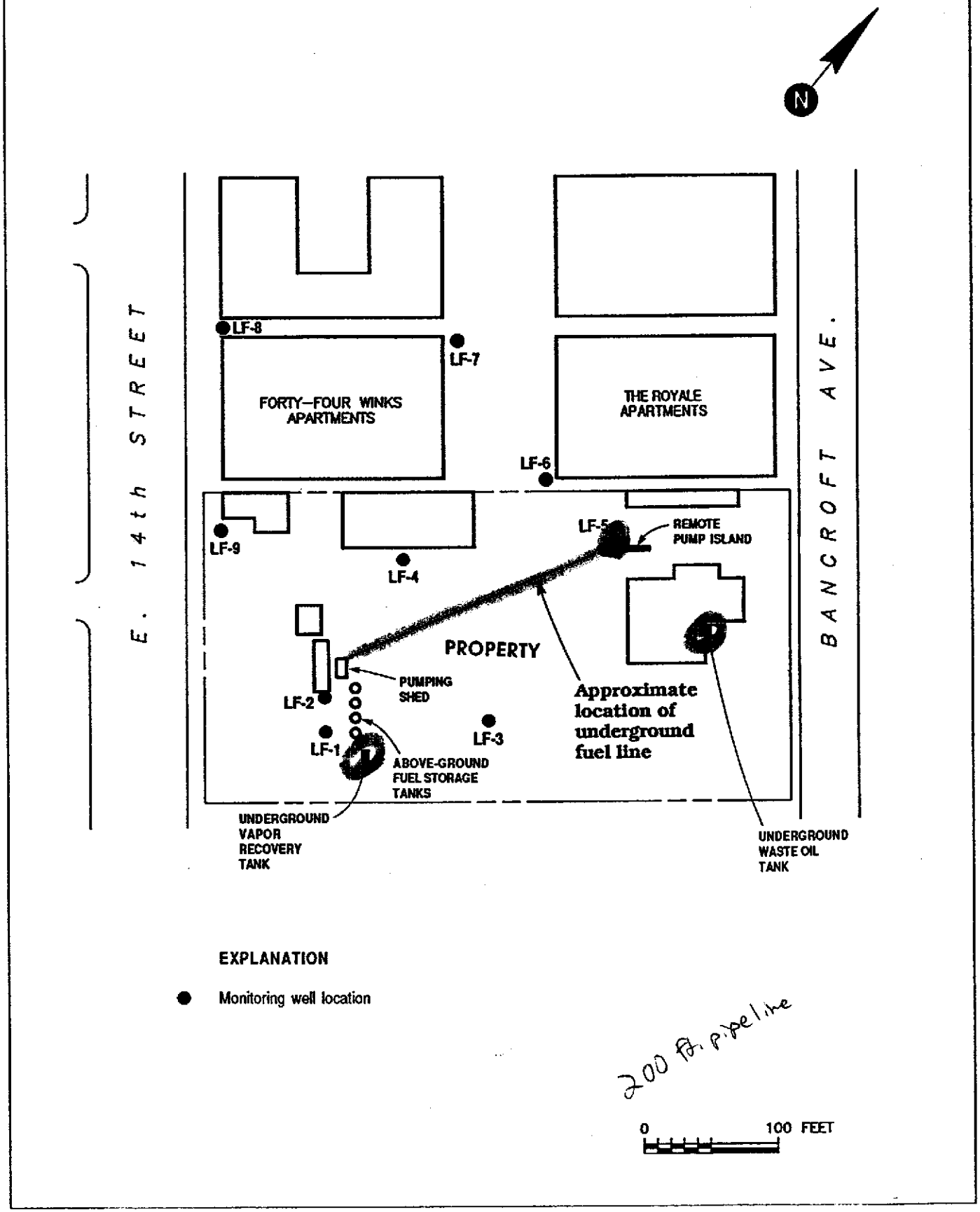


Figure 10: PROPERTY MAP SHOWING LOCATIONS OF UNDERGROUND STORAGE TANKS

APPENDIX A

FIELD PROCEDURES

FIELD PROCEDURES

Well Drilling and Installation

Four shallow wells (35 to 36 feet deep) were drilled and installed on November 27 and 28, 1989 by Hew Drilling Company, Inc., of Palo Alto, California, using the hollow-stem auger drilling method. All field activities during drilling, including well construction, well development, and sampling were performed under the direct supervision of a Levine•Fricke Registered Geologist.

The hollow-stem auger method, with 8-inch outside diameter augers, was used to complete drilling of the borings to the desired total depth. Soil samples were collected, described, and lithologically logged during the drilling of each boring using the continuous-core sampling method. Soil samples also were collected from selected borings for possible chemical analysis. These samples were collected in laboratory-supplied glass jars directly from the continuous-core sampler. After collection, a lid was fastened to the jar and the lid was wrapped with electrical tape to obtain a tight seal. The jar was then placed in a chilled cooler for transport by Levine•Fricke personnel to Med-Tox Associates of Pleasant Hill, California.

Shallow soil samples were collected on November 17, 1989 using a stainless steel hand trowel. The hand trowel was cleaned with Alconox, a laboratory-grade detergent, and rinsed with distilled water between each use.

Well Construction

Each newly installed well was constructed by installing 2-inch-diameter, schedule-40 polyvinyl chloride (PVC) casing; the perforated interval of each well consists of 0.020-inch machine slotted perforations. The screened interval of each well was selected based on lithologic data obtained during soil sampling and the depth to ground water. A sand pack of number 3 Monterey sand was then placed above the screened interval, extending approximately two feet above the perforations. Approximately two feet of bentonite pellets were placed above this sand pack as a seal. Levels of sand and bentonite in the well annulus were confirmed during well construction by sounding with a weighted tape. The remaining annular space above the bentonite seal was grouted with a cement-bentonite slurry. All equipment was steam-cleaned before use in each boring. The well casings also were steam-

cleaned prior to installation.

Well Development and Sampling

Four wells, numbered LF-6 through LF-9 were developed and sampled for chemical analysis on December 4 and 5, 1989. Each well was developed in order to clear silt and sand from the well and to establish better hydraulic communication between the well and the surrounding sediments. Wells were developed by purging at least ten well volumes of water from the well and until the parameters being monitored (pH, specific conductance and temperature) had stabilized. All water evacuated during development was placed in on-site 55-gallon drums which were sealed.

The four wells were sampled for TPH as gasoline and BTEX, and these samples were placed in 40 ml vials; two vials from each well. Each well also was sampled for TPH as diesel and waste oil, and these samples were placed in one-liter amber bottles. All samples were collected using a Teflon bailer. Before each use the Teflon bailers were washed with Alconox, steam-cleaned and fitted with new polypropylene rope.

One bailer blank was collected as a quality control check of sampling procedures. The blank sample was prepared by pouring distilled water into a clean Teflon bailer and then into a sample bottle.

Samples were stored in a chilled cooler during sampling. Samples were then transported by Levine•Fricke personnel to Med-Tox Associates of Pleasant Hill, California for analysis.

Product Thickness and Ground-Water Elevation Measurements

Product thickness, where present, and ground-water elevation measurements were taken in each well using an electric oil/water interface probe graduated in 0.01-foot increments. Additionally, a clear, acrylic product bailer was used to visually inspect product thickness in each well. Well elevations were surveyed by Nolte and Associates of San Jose, California, to the nearest 0.01-foot and tied to benchmarks located near the Maskell Oil Facility.

APPENDIX B

LITHOLOGIC AND WELL CONSTRUCTION LOGS

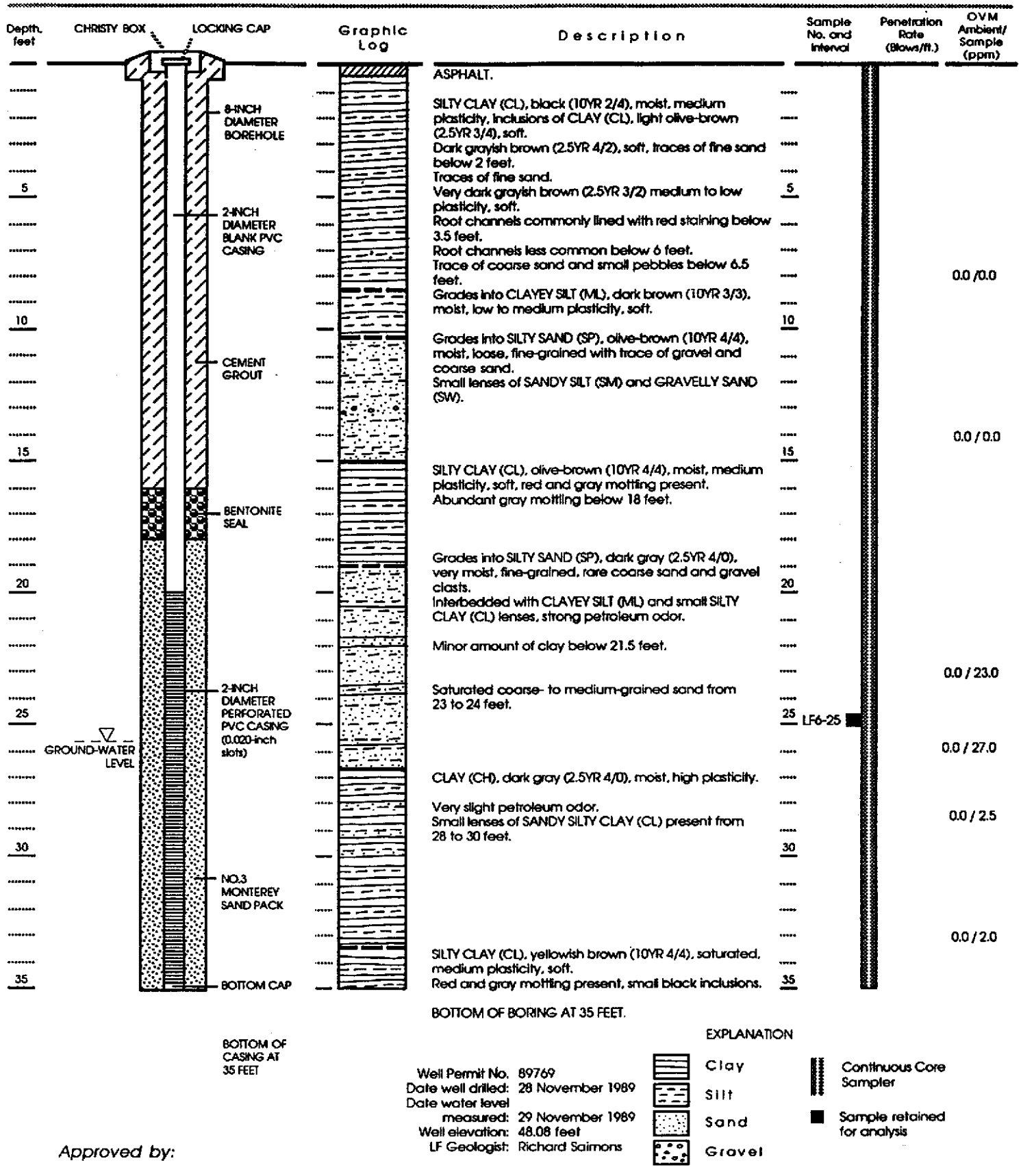


Figure B-1 : WELL CONSTRUCTION AND LITHOLOGY FOR WELL LF-6

Project No. 1596

LEVINE•FRICKE
CONSULTING ENGINEERS AND HYDROGEOLOGISTS

O-P10JAN90jc

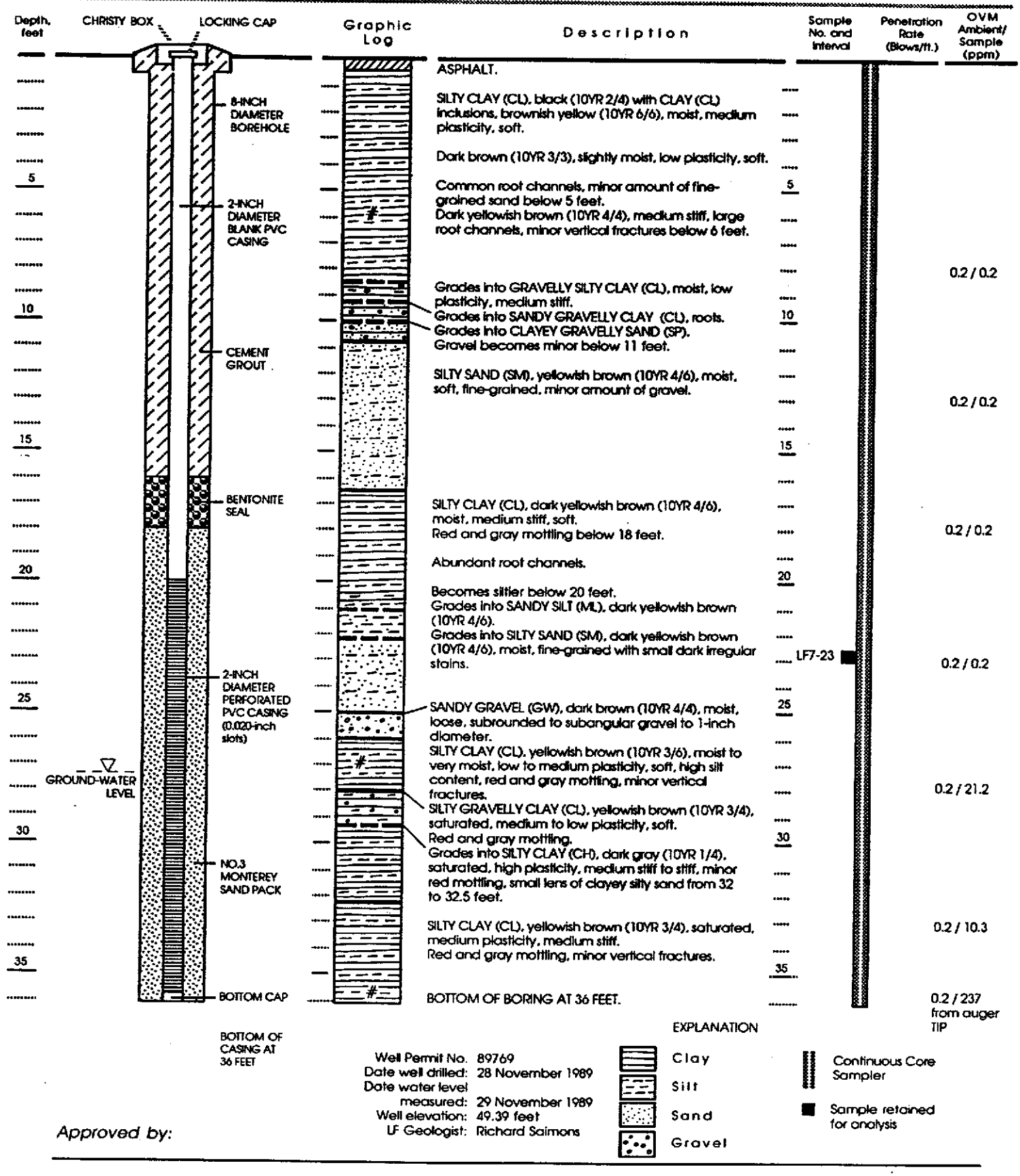


Figure B-2 : WELL CONSTRUCTION AND LITHOLOGY FOR WELL LF-7

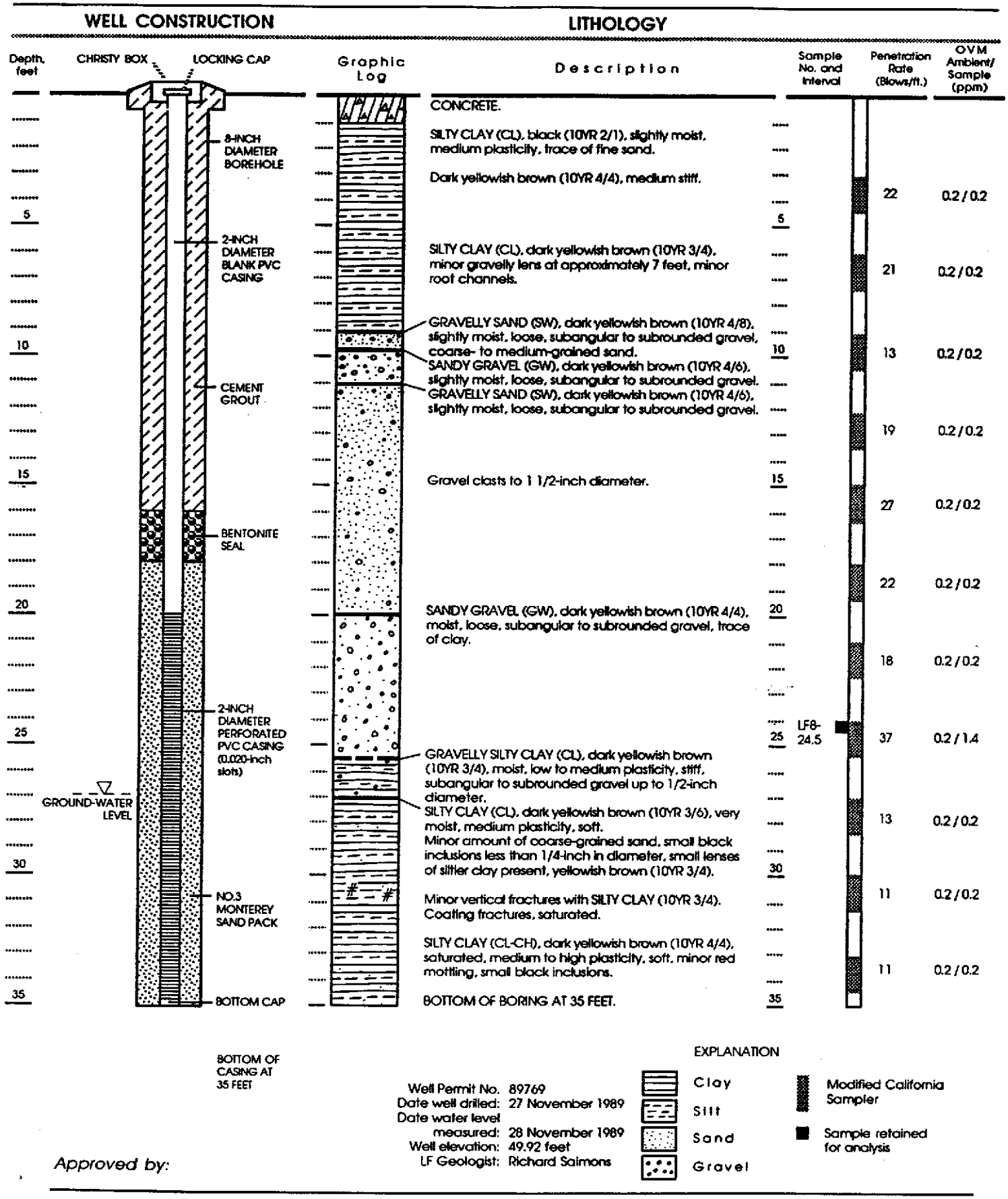
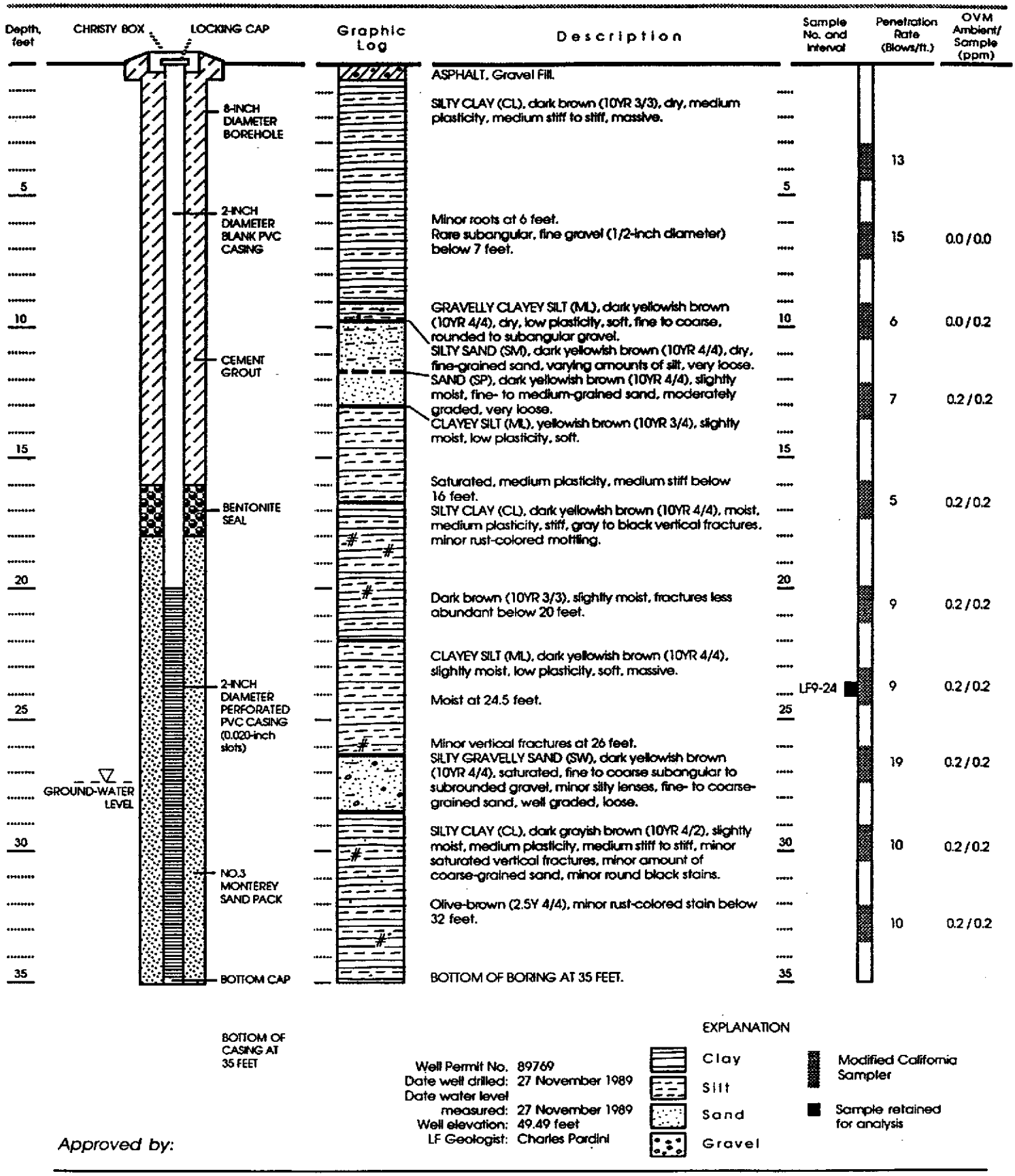


Figure B-3 : WELL CONSTRUCTION AND LITHOLOGY FOR WELL LF-8



Well Permit No. 89769
Date well drilled: 27 November 1989
Date water level measured: 27 November 1989
Well elevation: 49.49 feet
LF Geologist: Charles Pardini

Approved by:

Figure B-4 : WELL CONSTRUCTION AND LITHOLOGY FOR WELL LF-9

APPENDIX C

LABORATORY CERTIFICATES

MED-TOX ASSOCIATES, INC.

ENVIRONMENTAL & OCCUPATIONAL HEALTH SERVICES

3440 Vincent Road Pleasant Hill, CA 94523 • (415) 930-9090 • FAX# (415) 930-0256

LABORATORY ANALYSIS REPORT

LEVINE-FRICKE
1900 POWELL ST., 12TH FL.
EMERYVILLE, CA 94608

ATTN: CHUCK PARDINI

CLIENT PROJECT NO: 1596

REPORT DATE: 12/14/89

DATE SAMPLED: 11/17/89
DATE RECEIVED: 11/17/89
DATE EXTRACTED: 12/01/89
DATE ANALYZED: 12/04/89

MED-TOX JOB NO: 8911120

ANALYSIS OF: SIX SOIL SAMPLES FOR HYDROCARBONS, ORGANOCHLORINE PESTICIDES AND PCBs

METHOD: 503E

INSTRUMENT: IR

Sample Identification Client Id.	Lab No.	Hydrocarbons (mg/kg)
B-1/1	01A	9,300
B-2/1	02A	1,400
B-3/1	03A	1,800
B-4/1	04A	290
B-5/1	05A	8,700
B-6/1	06A	11,000
Detection Limit		20

Michael Lynch, Manager
Organic Laboratory

Results FAXed to Chuck Pardini 12/11/89

RECEIVED
DEC 15
LEVINE-FRICKE

MED-TOX ASSOCIATES, INC.

LEVINE-FRICKE

CLIENT ID: B-1/1
CLIENT JOB NO: 1596
DATE SAMPLED: 11/17/89
DATE RECEIVED: 11/17/89
REPORT DATE: 12/14/89

MED-TOX LAB NO: 8911120-01A
MED-TOX JOB NO: 8911120
DATE EXTRACTED: 11/29/89
DATE ANALYZED: 12/04-07/89
INSTRUMENT: #2

EPA METHOD 8080
ORGANOCHLORINE PESTICIDES AND PCBs

COMPOUND	CAS #	CONCENTRATION (ug/kg)	DETECTION LIMIT (ug/kg)
Aldrin	309-00-2	ND	5
alpha-BHC	319-84-6	ND	5
beta-BHC	319-85-7	ND	5
delta-BHC	319-86-8	ND	5
gamma-BHC (Lindane)	58-89-9	ND	5
Chlordane	57-74-9	ND	50
4,4'-DDD	72-54-8	ND	10
2,4'-DDD	53-19-0	ND	10
4,4'-DDE	72-55-9	ND	10
2,4'-DDE	3424-82-6	ND	10
4,4'-DDT	50-29-3	ND	10
2,4'-DDT	789-02-6	ND	10
Dieldrin	60-57-1	ND	10
Endosulfan I	959-98-8	ND	5
Endosulfan II	33212-65-9	ND	10
Endosulfan sulfate	1031-07-8	ND	10
Endrin	72-20-8	ND	10
Endrin aldehyde	7421-93-4	ND	10
Heptachlor	76-44-8	ND	5
Heptachlor epoxide	1024-57-3	ND	5
Methoxychlor	72-43-5	ND	10
Toxaphene	8001-35-2	ND	50
PCB-1016	12674-11-2	ND	50
PCB-1221	11104-28-2	ND	50
PCB-1232	11141-16-5	ND	50
PCB-1242	53469-21-9	ND	50
PCB-1248	12672-29-6	ND	50
PCB-1254	11097-69-1	ND	50
PCB-1260	11096-82-5	ND	50

ND = Not Detected

MED-TOX ASSOCIATES, INC.

LEVINE-FRICKE

CLIENT ID: B-2/1
CLIENT JOB NO: 1596
DATE SAMPLED: 11/17/89
DATE RECEIVED: 11/17/89
REPORT DATE: 12/14/89

MED-TOX LAB NO: 8911120-02A
MED-TOX JOB NO: 8911120
DATE EXTRACTED: 11/29/89
DATE ANALYZED: 12/04/89
INSTRUMENT: #2

EPA METHOD 8080
ORGANOCHLORINE PESTICIDES AND PCBs

COMPOUND	CAS #	CONCENTRATION (ug/kg)	DETECTION LIMIT (ug/kg)
Aldrin	309-00-2	ND	5
alpha-BHC	319-84-6	ND	5
beta-BHC	319-85-7	ND	5
delta-BHC	319-86-8	ND	5
gamma-BHC (Lindane)	58-89-9	ND	5
Chlordane	57-74-9	ND	50
4,4'-DDD	72-54-8	ND	10
2,4'-DDD	53-19-0	ND	10
4,4'-DDE	72-55-9	ND	10
2,4'-DDE	3424-82-6	ND	10
4,4'-DDT	50-29-3	ND	10
2,4'-DDT	789-02-6	ND	10
Dieldrin	60-57-1	ND	10
Endosulfan I	959-98-8	ND	5
Endosulfan II	33212-65-9	ND	10
Endosulfan sulfate	1031-07-8	ND	10
Endrin	72-20-8	ND	10
Endrin aldehyde	7421-93-4	ND	10
Heptachlor	76-44-8	ND	5
Heptachlor epoxide	1024-57-3	ND	5
Methoxychlor	72-43-5	ND	10
Toxaphene	8001-35-2	ND	50
PCB-1016	12674-11-2	ND	50
PCB-1221	11104-28-2	ND	50
PCB-1232	11141-16-5	ND	50
PCB-1242	53469-21-9	ND	50
PCB-1248	12672-29-6	ND	50
PCB-1254	11097-69-1	ND	50
PCB-1260	11096-82-5	ND	50

ND = Not Detected

MED-TOX ASSOCIATES, INC

LEVINE-FRICKE

CLIENT ID: B-3/1
CLIENT JOB NO: 1596
DATE SAMPLED: 11/17/89
DATE RECEIVED: 11/17/89
REPORT DATE: 12/14/89

MED-TOX LAB NO: 8911120-03A
MED-TOX JOB NO: 8911120
DATE EXTRACTED: 11/29/89
DATE ANALYZED: 12/04/89
INSTRUMENT: #2

EPA METHOD 8080
ORGANOCHLORINE PESTICIDES AND PCBs

COMPOUND	CAS #	CONCENTRATION (ug/kg)	DETECTION LIMIT (ug/kg)
Aldrin	309-00-2	ND	5
alpha-BHC	319-84-6	ND	5
beta-BHC	319-85-7	ND	5
delta-BHC	319-86-8	ND	5
gamma-BHC (Lindane)	58-89-9	ND	5
Chlordane	57-74-9	ND	50
4,4'-DDD	72-54-8	ND	10
2,4'-DDD	53-19-0	ND	10
4,4'-DDE	72-55-9	ND	10
2,4'-DDE	3424-82-6	ND	10
4,4'-DDT	50-29-3	ND	10
2,4'-DDT	789-02-6	ND	10
Dieldrin	60-57-1	ND	10
Endosulfan I	959-98-8	ND	5
Endosulfan II	33212-65-9	ND	10
Endosulfan sulfate	1031-07-8	ND	10
Endrin	72-20-8	ND	10
Endrin aldehyde	7421-93-4	ND	10
Heptachlor	76-44-8	ND	5
Heptachlor epoxide	1024-57-3	ND	5
Methoxychlor	72-43-5	ND	10
Toxaphene	8001-35-2	ND	50
PCB-1016	12674-11-2	ND	50
PCB-1221	11104-28-2	ND	50
PCB-1232	11141-16-5	ND	50
PCB-1242	53469-21-9	ND	50
PCB-1248	12672-29-6	ND	50
PCB-1254	11097-69-1	ND	50
PCB-1260	11096-82-5	ND	50

ND = Not Detected

MED-TOX ASSOCIATES, INC.

LEVINE-FRICKE

CLIENT ID: B-4/1
CLIENT JOB NO: 1596
DATE SAMPLED: 11/17/89
DATE RECEIVED: 11/17/89
REPORT DATE: 12/14/89

MED-TOX LAB NO: 8911120-04A
MED-TOX JOB NO: 8911120
DATE EXTRACTED: 11/29/89
DATE ANALYZED: 12/04/89
INSTRUMENT: #2

EPA METHOD 8080
ORGANOCHLORINE PESTICIDES AND PCBs

COMPOUND	CAS #	CONCENTRATION (ug/kg)	DETECTION LIMIT (ug/kg)
Aldrin	309-00-2	ND	5
alpha-BHC	319-84-6	ND	5
beta-BHC	319-85-7	ND	5
delta-BHC	319-86-8	ND	5
gamma-BHC (Lindane)	58-89-9	ND	5
Chlordane	57-74-9	ND	50
4,4'-DDD	72-54-8	ND	10
2,4'-DDD	53-19-0	ND	10
4,4'-DDE	72-55-9	ND	10
2,4'-DDE	3424-82-6	ND	10
4,4'-DDT	50-29-3	ND	10
2,4'-DDT	789-02-6	ND	10
Dieldrin	60-57-1	ND	10
Endosulfan I	959-98-8	ND	5
Endosulfan II	33212-65-9	ND	10
Endosulfan sulfate	1031-07-8	ND	10
Endrin	72-20-8	ND	10
Endrin aldehyde	7421-93-4	ND	10
Heptachlor	76-44-8	ND	5
Heptachlor epoxide	1024-57-3	ND	5
Methoxychlor	72-43-5	ND	10
Toxaphene	8001-35-2	ND	50
PCB-1016	12674-11-2	ND	50
PCB-1221	11104-28-2	ND	50
PCB-1232	11141-16-5	ND	50
PCB-1242	53469-21-9	ND	50
PCB-1248	12672-29-6	ND	50
PCB-1254	11097-69-1	ND	50
PCB-1260	11096-82-5	ND	50

ND = Not Detected

MED-TOX ASSOCIATES, INC.

LEVINE-FRICKE

CLIENT ID: B-5/1
CLIENT JOB NO: 1596
DATE SAMPLED: 11/17/89
DATE RECEIVED: 11/17/89
REPORT DATE: 12/14/89

MED-TOX LAB NO: 8911120 05A
MED-TOX JOB NO: 8911120
DATE EXTRACTED: 11/29/89
DATE ANALYZED: 12/04-07/89
INSTRUMENT: #2

EPA METHOD 8080
ORGANOCHLORINE PESTICIDES AND PCBs

COMPOUND	CAS #	CONCENTRATION (ug/kg)	DETECTION LIMIT (ug/kg)
Aldrin	309-00-2	ND	5
alpha-BHC	319-84-6	ND	5
beta-BHC	319-85-7	ND	5
delta-BHC	319-86-8	ND	5
gamma-BHC (Lindane)	58-89-9	ND	5
Chlordane	57-74-9	ND	50
4,4'-DDD	72-54-8	20	10
2,4'-DDD	53-19-0	ND	10
4,4'-DDE	72-55-9	ND	10
2,4'-DDE	3424-82-6	ND	10
4,4'-DDT	50-29-3	ND	10
2,4'-DDT	789-02-6	ND	10
Dieldrin	60-57-1	ND	10
Endosulfan I	959-98-8	ND	5
Endosulfan II	33212-65-9	ND	10
Endosulfan sulfate	1031-07-8	ND	10
Endrin	72-20-8	ND	10
Endrin aldehyde	7421-93-4	ND	10
Heptachlor	76-44-8	ND	5
Heptachlor epoxide	1024-57-3	ND	5
Methoxychlor	72-43-5	ND	10
Toxaphene	8001-35-2	ND	50
PCB-1016	12674-11-2	ND	50
PCB-1221	11104-28-2	ND	50
PCB-1232	11141-16-5	ND	50
PCB-1242	53469-21-9	ND	50
PCB-1248	12672-29-6	ND	50
PCB-1254	11097-69-1	ND	50
PCB-1260	11096-82-5	ND	50

ND = Not Detected

MED-TOX ASSOCIATES, INC.

LEVINE-FRICKE

CLIENT ID: B-6/1
CLIENT JOB NO: 1596
DATE SAMPLED: 11/17/89
DATE RECEIVED: 11/17/89
REPORT DATE: 12/14/89

MED-TOX LAB NO: 8911120-06A
MED-TOX JOB NO: 8911120
DATE EXTRACTED: 11/29/89
DATE ANALYZED: 12/04/89
INSTRUMENT: #2

EPA METHOD 8080
ORGANOCHLORINE PESTICIDES AND PCBs

COMPOUND	CAS #	CONCENTRATION (ug/kg)	DETECTION LIMIT (ug/kg)
Aldrin	309-00-2	ND	5
alpha-BHC	319-84-6	ND	5
beta-BHC	319-85-7	ND	5
delta-BHC	319-86-8	ND	5
gamma-BHC (Lindane)	58-89-9	ND	5
Chlordane	57-74-9	ND	50
4,4'-DDD	72-54-8	ND	10
2,4'-DDD	53-19-0	ND	10
4,4'-DDE	72-55-9	ND	10
2,4'-DDE	3424-82-6	ND	10
4,4'-DDT	50-29-3	ND	10
2,4'-DDT	789-02-6	ND	10
Dieldrin	60-57-1	ND	10
Endosulfan I	959-98-8	ND	5
Endosulfan II	33212-65-9	ND	10
Endosulfan sulfate	1031-07-8	ND	10
Endrin	72-20-8	ND	10
Endrin aldehyde	7421-93-4	ND	10
Heptachlor	76-44-8	ND	5
Heptachlor epoxide	1024-57-3	ND	5
Methoxychlor	72-43-5	ND	10
Toxaphene	8001-35-2	ND	50
PCB-1016	12674-11-2	ND	50
PCB-1221	11104-28-2	ND	50
PCB-1232	11141-16-5	ND	50
PCB-1242	53469-21-9	ND	50
PCB-1248	12672-29-6	ND	50
PCB-1254	11097-69-1	ND	50
PCB-1260	11096-82-5	ND	50

ND = Not Detected

CHAIN OF CUSTODY / ANALYSES REQUEST FORM

8/11/90

Project No.: 1524 | Field Logbook No.: | Date: 11/17/89 | Serial No.: NO 4524

Project Name: Mobil Oil | Project Location: San Leandro

Sampler (Signature): [signature] | Samplers: CMP

SAMPLES						ANALYSES							REMARKS
SAMPLE NO.	DATE	TIME	LAB SAMPLE NO.	NO. OF CONTAINERS	SAMPLE TYPE	EPA 601	EPA 624	EPA 5030 EPA 8015	EPA 8020		HOLD	RUSH	
[illegible]	11/17	1040	1A	2	S			X	X				EPA 5030 - TPH
[illegible]	"	1055	2A										EPA 8080 - PCBs
[illegible]	"	1105	3A										
[illegible]	"	1125	4A										Normal TAT
[illegible]	"	1115	5A										Contact Cindy Fenton with results
[illegible]	↓	1130	6A	↓	↓			↓	↓				Per Greg Taylor on 11/20/89

RELINQUISHED BY: (Signature) [signature]	DATE 11/17/89	TIME 12:15	RECEIVED BY: (Signature) [signature]	DATE 11/17/89	TIME 12:15
RELINQUISHED BY: (Signature)	DATE	TIME	RECEIVED BY: (Signature)	DATE	TIME
RELINQUISHED BY: (Signature)	DATE	TIME	RECEIVED BY: (Signature)	DATE	TIME
METHOD OF SHIPMENT: Hand delivered	DATE	TIME	LAB COMMENTS:		

Sample Collector:
LEVINE-FRICKE
1900 Powell Street, 12th Floor
Emeryville, Ca 94608
(415) 652-4500

Analytical Laboratory:
Med-Tox Associates

Shipping · (White) Lab Copy (Green) File Copy (Yellow) d Copy (Pink) FORM I 86/COC/ARF

415 652 4623 PAGE.009

NOV 5 '90 12:33

MED-TOX ASSOCIATES, INC.

ENVIRONMENTAL & OCCUPATIONAL HEALTH SERVICES
3440 Vincent Road Pleasant Hill, CA 94523 • (415) 930-9090 • FAX# (415) 930-0256

LABORATORY ANALYSIS REPORT

LEVINE-FRICKE
1900 POWELL ST., 12TH FL.
EMERYVILLE, CA 94608

ATTN: CHUCK PARDINI

CLIENT PROJECT NO: 1596

REPORT DATE: 12/15/89

DATE SAMPLED: 11/27-28/89

DATE RECEIVED: 11/30/89

MED-TOX JOB NO: 8911174

ANALYSIS OF: FOUR SOIL SAMPLES FOR BTXE, PURGEABLE AND EXTRACTABLE HYDROCARBONS

See attached for results

RECEIVED
DEC 18 1989

Michael Lynch, Manager
Organic Laboratory

Results FAXed to Chuck Pardini 12/13/89

MED-TOX ASSOCIATES, INC.

LEVINE-FRICKE

CLIENT ID: LF-9/24
CLIENT JOB NO: 1596
DATE SAMPLED: 11/27/89
DATE RECEIVED: 11/30/89

REPORT DATE: 12/15/89

MED-TOX LAB NO: 8911174-01A
MED-TOX JOB NO: 8911174
DATE EXTRACTED: 12/08/89
DATE ANALYZED: 12/06,10/89
INSTRUMENT: #5, 9

BTXE AND HYDROCARBONS

METHOD: EPA 8020, 8015 (PURGE & TRAP AND EXTRACTION)

	CONCENTRATION (ug/kg)	DETECTION LIMIT (ug/kg)
Benzene	ND	1
Toluene	31	1
Ethylbenzene	ND	1
Xylenes	ND	3
PURGEABLE HYDROCARBONS AS:		
Gasoline	ND mg/kg	0.2 mg/kg
EXTRACTABLE HYDROCARBONS AS:		
Diesel	ND mg/kg	10 mg/kg
Waste oil	ND mg/kg	20 mg/kg

ND = Not Detected

MED-TOX ASSOCIATES, INC.

LEVINE-FRICKE

CLIENT ID: LF-8/24.5
CLIENT JOB NO: 1596
DATE SAMPLED: 11/27/89
DATE RECEIVED: 11/30/89

REPORT DATE: 12/15/89

MED-TOX LAB NO: 8911174-02A
MED-TOX JOB NO: 8911174
DATE EXTRACTED: 12/08/89
DATE ANALYZED: 12/06,10/89
INSTRUMENT: #9, 5

BTXE AND HYDROCARBONS

METHOD: EPA 8020, 8015 (PURGE & TRAP AND EXTRACTION)

	CONCENTRATION (ug/kg)	DETECTION LIMIT (ug/kg)
Benzene	ND	1
Toluene	3	1
Ethylbenzene	ND	1
Xylenes	ND	3
PURGEABLE HYDROCARBONS AS:		
Gasoline	ND mg/kg	0.2 mg/kg
EXTRACTABLE HYDROCARBONS AS:		
Diesel	ND mg/kg	10 mg/kg
Waste oil	ND mg/kg	20 mg/kg

ND = Not Detected

MED-TOX ASSOCIATES, INC.

LEVINE-FRICKE

CLIENT ID: LF-7/23
CLIENT JOB NO: 1596
DATE SAMPLED: 11/28/89
DATE RECEIVED: 11/30/89

REPORT DATE: 12/15/89

MED-TOX LAB NO: 8911174-03A
MED-TOX JOB NO: 8911174
DATE EXTRACTED: 12/08/89
DATE ANALYZED: 12/06,10/89
INSTRUMENT: #9, 5

BTXE AND HYDROCARBONS

METHOD: EPA 8020, 8015 (PURGE & TRAP AND EXTRACTION)

	CONCENTRATION (ug/kg)	DETECTION LIMIT (ug/kg)
Benzene	ND	1
Toluene	100	1
Ethylbenzene	ND	1
Xylenes	ND	3
PURGEABLE HYDROCARBONS AS:		
Gasoline	ND mg/kg	0.2 mg/kg
EXTRACTABLE HYDROCARBONS AS:		
Diesel	ND mg/kg	10 mg/kg
Waste oil	ND mg/kg	20 mg/kg

ND = Not Detected

MED-TOX ASSOCIATES, INC.

LEVINE-FRICKE

CLIENT ID: LF-6/25
CLIENT JOB NO: 1596
DATE SAMPLED: 11/28/89
DATE RECEIVED: 11/30/89

REPORT DATE: 12/15/89

MED-TOX LAB NO: 8911174-04A
MED-TOX JOB NO: 8911174
DATE EXTRACTED: 12/08/89
DATE ANALYZED: 12/06-11/89
INSTRUMENT: #9, 5

BTXE AND HYDROCARBONS

METHOD: EPA 8020, 8015 (PURGE & TRAP AND EXTRACTION)

	CONCENTRATION (ug/kg)	DETECTION LIMIT (ug/kg)
Benzene	ND	10
Toluene	ND	10
Ethylbenzene	ND	10
Xylenes	ND	30
PURGEABLE HYDROCARBONS AS:		
Gasoline	ND mg/kg	300 mg/kg
EXTRACTABLE HYDROCARBONS AS:		
Diesel	1,600 mg/kg	10 mg/kg
Waste oil	ND mg/kg	20 mg/kg

ND = Not Detected

CHAIN OF CUSTODY / ANALYSES REQUEST FORM

R-H, S-C 941128

Project No.: 1596	Field Logbook No.:	Date: 11/29/89	Serial No.: № 5697
Project Name: Maskell Oil	Project Location: San Leandro		
Sampler (Signature): [illegible]			Samplers: CHP/RHS

SAMPLES / ANALYSES

SAMPLE NO.	DATE	TIME	LAB SAMPLE NO.	NO. OF CONTAINERS	SAMPLE TYPE	EPA 601	EPA 624	TPH as gasoline/diesel	BTEX			HOLD	RUSH	REMARKS
LF-9/14	11/27	1000	01A	2 soil jars	Soil			X						TPH as gasoline + diesel with BTEX
LF-9/[illegible]	↓		02A	↓	↓			↓	↓					
LF-7/23	11/29		03A	↓	↓			↓	↓					Normal TAT
LF-6/75	↓		04A	↓	↓			↓	↓					Contact [illegible] with results
														[illegible]

RELINQUISHED BY: (Signature)	DATE	TIME	RECEIVED BY: (Signature)	DATE	TIME
[illegible]	11/30/89	9:50	[illegible]	[illegible]	[illegible]
[illegible]	11/30/89	11:00	[illegible]	[illegible]	
[illegible]	11/30/89	4 -	[illegible]	[illegible]	
METHOD OF SHIPMENT: Hand-delivered	DATE	TIME	LAB COMMENTS:		

Sample Collector:	Analytical Laboratory:
LEVINE-FRICKE 1900 Powell Street, 12th Floor Emeryville, Ca 94608 (415) 652-4500	Med Tox [illegible]

Shipping Copy (White) Lab Copy (Green) File Copy (Yellow) Field Copy (Pink) FORM NO. 86/COC/ARF

11/05/90 13:29 LEVINE FRICKE 015

MED-TOX ASSOCIATES, INC.

ENVIRONMENTAL & OCCUPATIONAL HEALTH SERVICES

3440 Vincent Road Pleasant Hill, CA 94523 • (415) 930-9090 • FAX# (415) 930-0256

LABORATORY ANALYSIS REPORT

LEVINE-FRICKE
1900 POWELL ST., 12TH FL.
EMERYVILLE, CA 94608

ATTN: CHUCK PARDINI

CLIENT PROJECT NO: 1596

REPORT DATE: 12/22/89

DATE SAMPLED: 12/04-05/89

DATE RECEIVED: 12/04-05/89

MED-TOX JOB NO: 8912014

ANALYSIS OF: ONE WATER SAMPLE FOR BTXE AND PURGEABLE HYDROCARBONS; FIVE WATER SAMPLES FOR BTXE, PURGEABLE AND EXTRACTABLE HYDROCARBONS

See attached for results

Michael Lynch
Michael Lynch, Manager
Organic Laboratory

Results FAXed to Chuck Pardini 12/19/89

RECEIVED
DEC 29 1989
LEVINE-FRICKE

MED-TOX ASSOCIATES, INC.

LEVINE-FRICKE

CLIENT ID: LF-8-FB
CLIENT JOB NO: 1596
DATE SAMPLED: 12/04/89
DATE RECEIVED: 12/04/89
REPORT DATE: 12/22/89

MED-TOX LAB NO: 8912014-01A
MED-TOX JOB NO: 8912014

DATE ANALYZED: 12/08/89
INSTRUMENT: 9

BTXE AND HYDROCARBONS

METHOD: EPA 8020, 8015 (PURGE & TRAP)

	CONCENTRATION (ug/L)	DETECTION LIMIT (ug/L)
Benzene	ND	1
Toluene	ND	1
Ethylbenzene.	ND	0.5
Xylenes	ND	2
PURGEABLE HYDROCARBONS AS:		
Gasoline	ND mg/L	0.1 mg/L

ND = Not Detected

MED-TOX ASSOCIATES, INC.

LEVINE-FRICKE

CLIENT ID: LF-7-1Q
CLIENT JOB NO: 1596
DATE SAMPLED: 12/04/89
DATE RECEIVED: 12/04/89

REPORT DATE: 12/22/89

MED-TOX LAB NO: 8912014-02A
MED-TOX JOB NO: 8912014
DATE EXTRACTED: 12/11/89

DATE ANALYZED: 12/08-12/89
INSTRUMENT: 9,5

BTXE AND HYDROCARBONS

METHOD: EPA 8020, 8015 (PURGE & TRAP AND EXTRACTION)

	CONCENTRATION (ug/L)	DETECTION LIMIT (ug/L)
Benzene	ND	5
Toluene	ND	5
Ethylbenzene.	ND	5
Xylenes	ND	20
PURGEABLE HYDROCARBONS AS:		
Gasoline*	19 mg/L	0.5 mg/L
EXTRACTABLE HYDROCARBONS AS:		
Lab No: 02C		
Diesel*	18 mg/L	0.3 mg/L
Waste Oil	ND mg/L	0.5 mg/L

ND = Not Detected

* This sample appears to contain a mixture of gasoline and diesel. The results above were determined separately using the respective hydrocarbon calibration.

MED-TOX ASSOCIATES, INC.

LEVINE-FRICKE

CLIENT ID: LF-8-1Q
CLIENT JOB NO: 1596
DATE SAMPLED: 12/04/89
DATE RECEIVED: 12/04/89

REPORT DATE: 12/22/89

MED-TOX LAB NO: 8912014-03A
MED-TOX JOB NO: 8912014
DATE EXTRACTED: 12/11/89

DATE ANALYZED: 12/08-12/89
INSTRUMENT: 9,5

BTXE AND HYDROCARBONS

METHOD: EPA 8020, 8015 (PURGE & TRAP AND EXTRACTION)

	CONCENTRATION (ug/L)	DETECTION LIMIT (ug/L)
Benzene	ND	0.5
Toluene	ND	0.5
Ethylbenzene.	ND	0.5
Xylenes	ND	2
PURGEABLE HYDROCARBONS AS:		
Gasoline	ND mg/L	0.1 mg/L
EXTRACTABLE HYDROCARBONS AS:		
Lab No: 03C		
Diesel	ND mg/L	0.3 mg/L
Waste Oil	ND mg/L	0.5 mg/L

ND = Not Detected

MED-TOX ASSOCIATES, INC.

LEVINE-FRICKE

CLIENT ID: LF-6-1Q
CLIENT JOB NO: 1596
DATE SAMPLED: 12/04/89
DATE RECEIVED: 12/04/89

REPORT DATE: 12/22/89

MED-TOX LAB NO: 8912014-04A
MED-TOX JOB NO: 8912014
DATE EXTRACTED: 12/11/89

DATE ANALYZED: 12/08-12/89
INSTRUMENT: 9,5

BTXE AND HYDROCARBONS

METHOD: EPA 8020, 8015 (PURGE & TRAP AND EXTRACTION)

	CONCENTRATION (ug/L)	DETECTION LIMIT (ug/L)
Benzene	ND	100
Toluene	ND	100
Ethylbenzene.	ND	100
Xylenes	ND	300
PURGEABLE HYDROCARBONS AS:		
Gasoline	ND mg/L	1 mg/L
EXTRACTABLE HYDROCARBONS AS:		
Lab No: 04C		
Diesel	120 mg/L	0.3 mg/L
Waste Oil	ND mg/L	0.5 mg/L

ND = Not Detected

Footnote: Elevated detection limits due to presence of hydrocarbons heavier than those found in gasoline.

MED-TOX ASSOCIATES, INC.

LEVINE-FRICKE

CLIENT ID: LF-6D-1Q
CLIENT JOB NO: 1596
DATE SAMPLED: 12/04/89
DATE RECEIVED: 12/04/89

REPORT DATE: 12/22/89

MED-TOX LAB NO: 8912014-05A
MED-TOX JOB NO: 8912014
DATE EXTRACTED: 12/15/89

DATE ANALYZED: 12/08-17/89
INSTRUMENT: 9,5

BTXE AND HYDROCARBONS

METHOD: EPA 8020, 8015 (PURGE & TRAP AND EXTRACTION)

	CONCENTRATION (ug/L)	DETECTION LIMIT (ug/L)
Benzene	ND	100
Toluene	ND	100
Ethylbenzene.	ND	100
Xylenes	ND	300
PURGEABLE HYDROCARBONS AS:		
Gasoline*	ND mg/L	1 mg/L
EXTRACTABLE HYDROCARBONS AS:		
Lab No: 05C		
Diesel	77 mg/L	0.3 mg/L
Waste Oil	ND mg/L	0.5 mg/L

ND = Not Detected

Footnote: Elevated detection limits due to presence of hydrocarbons heavier than those found in gasoline.

MED-TOX ASSOCIATES, INC.

LEVINE-FRICKE

CLIENT ID: LF-9-1Q
CLIENT JOB NO: 1596
DATE SAMPLED: 12/05/89
DATE RECEIVED: 12/05/89

REPORT DATE: 12/22/89

MED-TOX LAB NO: 8912014-06A
MED-TOX JOB NO: 8912014
DATE EXTRACTED: 12/15/89

DATE ANALYZED: 12/08-17/89
INSTRUMENT: 9,5

BTXE AND HYDROCARBONS

METHOD: EPA 8020, 8015 (PURGE & TRAP AND EXTRACTION)

	CONCENTRATION (ug/L)	DETECTION LIMIT (ug/L)
Benzene	ND	0.5
Toluene	ND	0.5
Ethylbenzene.	ND	0.5
Xylenes	ND	2
PURGEABLE HYDROCARBONS AS:		
Gasoline	ND mg/L	0.1 mg/L
EXTRACTABLE HYDROCARBONS AS:		
Lab No: 06C		
Diesel	ND mg/L	0.3 mg/L
Waste Oil	ND mg/L	0.5 mg/L

ND = Not Detected

8912014

CHAIN OF CUSTODY / ANALYSES REQUEST FORM

Project No.: 1596	Field Logbook No.:	Date: 12/4/89	Serial No.: № 4552
Project Name: [illegible]	Project Location: San Leandro		
Sampler (Signature): [signature]			Samplers: CHIP, NPD

SAMPLES / ANALYSES

SAMPLE NO.	DATE	TIME	LAB SAMPLE NO.	NO. OF CONTAINERS	SAMPLE TYPE	EPA 601	EPA 624	TPH as gas & diesel	TPH as diesel			HOLD	RUSH	REMARKS
[illegible]	12/4	[illegible]	01A,B	2 VOA	H_2O			X						TPH as gas & diesel w/BTEX by Purge & Trap
[illegible]	↓	12[illegible]	02A,B,C,D	4	↓			↓	X					
[illegible]	↓	125[illegible]	03A,B,C,D	↓	↓			↓	↓					TPH as diesel by extraction
[illegible]	↓	1350	04A,B,C,D	↓	↓			↓	↓					
[illegible]	↓	1255	05A,B,C,D	↓	↓			↓	↓					Normal TAT.
														Contact Chuck Pardini with results

	DATE	TIME		DATE	TIME
RELINQUISHED BY: (Signature) [signature]	12/4/89	1350	RECEIVED BY: (Signature) [signature]	12/4/89	1350
RELINQUISHED BY: (Signature) [signature]	12/4/89	1630	RECEIVED BY: (Signature)		
RELINQUISHED BY: (Signature)	12/4/89		RECEIVED BY: (Signature) Denise Harrington	12/4/89	1630
METHOD OF SHIPMENT: Courier			LAB COMMENTS:		

Sample Collector: LEVINE-FRICKE, 1900 Powell Street, 12th Floor, Emeryville, Ca 94608, (415) 652-4500	Analytical Laboratory: Med-Tox & Assoc.

Shipping Copy (White) Lab Copy (Green) File Copy (Yellow) Field Copy (Pink) FORM NO. 86/COC/ARF

CHAIN OF CUSTODY / ANALYSES REQUEST FORM

8910014

Project No.: 1596	Field Logbook No.:	Date: 12/5/89	Serial No.: No 5824
Project Name: Marshall Oil	Project Location: San Leandro		
Sampler (Signature): C Purchase			

SAMPLES						ANALYSES									Samplers: CAP
SAMPLE NO.	DATE	TIME	LAB SAMPLE NO.	NO. OF CONTAINERS	SAMPLE TYPE	EPA 601	EPA 624	TPH as gasoline	TPH as gasoline			HOLD	RUSH	REMARKS
LF-3-100	12/5	1330	06A,B,C,D	4	H2O			X	X					TPH as gasoline / BTEX by Purge & Trap
														TPH diesel by extraction
														Normal TAT
														Contact Chuck Gordon with results

RELINQUISHED BY: (Signature) C Purchase	DATE 12/6/89	TIME 905	RECEIVED BY: (Signature)	DATE	TIME
RELINQUISHED BY: (Signature)	DATE	TIME	RECEIVED BY: (Signature)	DATE	TIME
RELINQUISHED BY: (Signature)	DATE	TIME	RECEIVED BY: (Signature) Denise Harrington	DATE 12/5/89	TIME 0905
METHOD OF SHIPMENT: Hand delivered	DATE	TIME	LAB COMMENTS:		

Sample Collector:
LEVINE-FRICKE
1900 Powell Street, 12th Floor
Emeryville, Ca 94608
(415) 652-4500

Analytical Laboratory:
Med. Tox & Assoc.

Shipping Copy (White) Lab Copy (Green) File Copy (Yellow) Field Copy (Pink) FORM NO. 86/COC/ARF