WORKPLAN

CLOSURE WORKPLAN FOR THE FORMER CELIS ALLIANCE FUEL STATION
4000 SAN PABLO AVENUE EMERYVILLE, CALIFORNIA

Prepared for

City of Emeryville Redevelopment Agency
2200 Powell Street, 12th Floor
Emeryville, CA 94608-4356

September 26, 1996

Woodward-Clyde

Woodward-Clyde Consultants
500 12th Street, Suite 100
Oakland, CA 94607-4014
(510) 893-3600
Project #941114NA

CITY OF EMERYVILLE
REDEVELOPMENT AGENCY
2200 POWELL STREET, SUITE 1200
EMERYVILLE, CALIFORNIA 94608
(510) 596-4350

October 10, 1996

CERTIFICATION

Document Title: Closure Workplan for the Former Celis Alliance Fuel Station at 4000 San Pablo Avenue, Emeryville, September 26, 1996 prepared by Woodward-Clyde Consultants

I, representing the City of Emeryville Redevelopment Agency, have read the above referenced document and agree with the conclusions and recommendations contained in the document. To the best of my knowledge, the contents of the document are accurate and the document has been prepared following the Tri-Regional Board of Staff Recommendations for Preliminary Evaluation and Investigation of Underground Tank Sites (August 10, 1990) and Appendix A - Reports (August 30, 1991) and the San Francisco Bay Regional Water Quality Control Board Interim Guidance on Required Cleanup at Low Risk Fuel Sites (January 5, 1996).

Ignacio Dayrit
Project Coordinator
City of Emeryville Redevelopment Agency

Document Distribution:

Alameda County Department of Environmental Health
Regional Water Quality control Board, San Francisco Bay Region

ALAMEDA COUNTY
HEALTH CARE SERVICES
AGENCY
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December 12, 1996
STID # 567

Mr. Ignacio Dayrit
City of Emeryville, Redevelopment Agency
2200 Powell Street, 12th Floor
Emeryville, CA 94608

RE: Closure Work Plan for the Former Celis Alliance Fuel Station
4000 San Pablo Avenue, Emeryville California 94608

Dear Mr. Dayrit:

This agency has completed review of the "Closure Work Plan" dated September 26, 1996 and prepared by Woodward Clyde Consultants for the above referenced site. The work plan includes the following elements: installation of one groundwater extraction / monitoring well; free product removal if present; groundwater monitoring program for one year and RBCA risk evaluation.

The work plan is acceptable to this agency provided the items listed below are addressed:

1) Methyl tertiary butyl ether, lead and TPH as motor oil must be included as target analytes in soil and groundwater samples in addition to TPH gasoline, TPH diesel and BTEX. If TPH diesel is detected, the sample should be analyzed for polynuclear aromatic hydrocarbons (PAH's). If lead is not present during the initial sampling , it can be dropped from the monitoring program.

2) Free product up to 0.52 feet was present in the downgradient well (LF-1) near the property boundary along San Pablo Avenue. LF-1 was decommissioned during the excavation/ construction / demolition activities at the site. The presence of preferential pathways (i. e. utilities) acting as a conduit for the hydrocarbon plume to migrate along San Pablo Avenue should be evaluated.

3) An existing off - site downgradient monitoring well LF-4 and the proposed new well (EW-1) should be sampled quarterly for one year and existing off - site well MW-2 will be used to establish groundwater flow direction for the site. Additional sampling points (i. e. groundwater monitoring wells, borings /grab water sample) may be required in the future to adequately characterize the extent of the petroleum hydrocarbon plume.

4) Please provide our office at least 72 hours advance notice of any field activity at the site.

If you have any questions concerning this letter or the subject site, please call me at (510) 567-6780.

Sincerely,

Susan L. Hugo

Susan L. Hugo
Senior Hazardous Materials Specialist

c: Mee Ling Tung, Director, Environmental Health
Gordon Coleman, Acting Chief, Environmental Protection Division
Kevin Graves, San Francisco Bay RWQCB
Xinggang Tong, WCC, 500 12th Street, Suite 100, Oakland, CA 94607
SH / files

Woodward-Clyde

Engineering & sciences applied to the earth & its environment

September 26, 1996
941114NA

Ms. Susan Hugo
Division of Environmental Protection
Department of Environmental Health
Alameda County Health Agency
1131 Harbor Bay Parkway, 2nd Floor
Alameda, California 94502

Subject: Transmittal of Closure Workplan for the
Former Celis Alliance Fuel Station UST Site
Emeryville, California

Dear Ms. Hugo:

On behalf of the City of Emeryville Redevelopment Agency, transmitted herewith is the subject site closure workplan for your review and approval. This workplan has been prepared following the Tri-Regional Water Quality Control Board (RWQCB) of Staff Recommendations for Preliminary Evaluation and Investigation of Underground Tank Site (August 10, 1990) and Appendix A - Reports (August 30, 1991), State Water Resources Control Board's (SWRCB) Interim Guidance on Required Cleanup at Low Risk Fuel Sites (December 8, 1995), and the San Francisco Bay RWQCB's Supplemental Instructions to the SWRCB's Interim Guidance (January 5, 1996).

The status of the former Celis Alliance Fuel Station, located at 4000 San Pablo Avenue, can be summarized below:

- All underground storage tanks and associated piping were removed in 1994;
- The site has been extensively characterized. Soil and groundwater samples collected at various times from both on-site and off-site locations were analyzed for TPH as gasoline, diesel, motor oil, oil and grease, BTEX, organic lead, PCBs, Creosote, PNAs, halogenated VOCs, and metals (Cd, Cr, Pb, Ni, Zn, and WET CAM 17 metals). Results from these investigations indicate that only petroleum hydrocarbons (TPHg, TPHd, and BTEX) appear to be constituents of concern;
- Three on-site groundwater monitoring wells were installed in 1993 and one downgradient off-site groundwater monitoring well was installed in 1994. Free product was measured in one of the on-site monitoring wells, but not in others;
- On-site soil from surface to groundwater table was removed and disposed of off-site in 1994. The three on-site monitoring wells were destroyed. Soil samples collected from

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the side walls and the bottom of the excavation pit showed benzene concentrations up to 3.8 mg/kg and TPHg up to 1,000 mg/kg. TPHd was detected up to 18,000 mg/kg in the area where free product was measured in the monitoring well LF-1. Clean soil was imported to fill the site;

- The site was redeveloped in 1995 into part of the 40th Street Right-of-Way and was paved with asphalt-concrete mixture. Properties next to the site are either streets or parking lots also having asphalt-concrete surface.
- TPH contamination is a regional problem. Several TPH-affected parcels exist in the area.

Based on the regulatory requirements and the site information summarized above, the following additional work is identified and is presented in this workplan in details:

- Install one 4-inch diameter groundwater extraction/monitoring well near the location of the former monitoring well LF-1, where free product was detected in 1993. Perform weekly groundwater extraction from the well for three months to remove free product, if it still exists beneath the site;
- Perform one-year groundwater monitoring for plume stability analysis;
- Conduct RBCA risk evaluation.

The City of Emeryville should be able to apply for site closure after the free product is removed, the plume is indicated as not migrating, and no significant risk to both human health and the environment can be documented.

Please do not hesitate to call me at (510) 874-3060 or Mr. Ignacio Dayrit at (510) 596-4356 for questions or comments.

Sincerely,

Xinggang Tong, P.E., Ph.D.
Project Manager

Enclosure.

Woodward-Clyde

Engineering & sciences applied to the earth & its environment

CERTIFICATION

CLOSURE WORKPLAN FOR THE FORMER CELIS ALLIANCE FUEL STATION AT 4000 SAN PABLO AVENUE EMERYVILLE, CALIFORNIA

September 26, 1996
941114NA

This report has been prepared by the staff of Woodward-Clyde Consultants and has been reviewed and approved by the professional whose signature appears below.

The findings, recommendations, specifications, or professional opinions are presented within the limits prescribed by the client and in accordance with generally accepted environmental engineering practice in Northern California at the time this work plan was prepared. No other warranty is either expressed or implied.

WOODWARD-CLYDE CONSULTANTS

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The City of Emeryville Redevelopment Agency (the City) retained Woodward-Clyde Consultants (WCC) to prepare a workplan for additional environmental activities which may lead to site closure for the former Celis Alliance Fuel Station (site) located at 4000 San Pablo Avenue in Emeryville, California (Figure 1). The workplan has been prepared following the completion of a series of recent investigation, remediation, and improvement activities at the site. The scope of work presented in this workplan follows the Interim Guidance on Required Cleanup at Low Risk Fuel Sites issued by State Water Resources Control Board (SWRCB) on December 8, 1995 and the Supplemental Instructions by Regional Water Quality Control Board (RWQCB) - San Francisco Bay Region on January 5, 1996.

1.1 PURPOSE AND SCOPE OF WORK

The purpose of this workplan is to present criteria and procedures for additional environmental work activities which may lead to site closure. The scope of work includes:

- review available site investigation and remediation results;
- present an overall project plan based on the SWRCB Interim Guidance (December 8, 1995) and the RWQCB Supplemental Instructions (January 5, 1996) for low risk fuel sites;
- describe additional work activities that are necessary prior to applying for site closure, which are:
  - install one groundwater monitoring / product recovery well on site;
  - recover free product, if any;
  - conduct one-year groundwater monitoring;
  - perform risk evaluation based on ASTM Risk-Based Corrective Action (RBCA) approach.

1.2 SITE CONTACTS

Woodward-Clyde is providing environmental consulting services for the project to the City. Table 1 presents the names and addresses of other important entities involved with the project, including the regulatory agencies who oversee the site investigation and will receive copies of report and correspondence regarding the closure activities proposed in this workplan.

1.3 SITE DESCRIPTION

The former Celis Alliance Fuel Station (site) is located at 4000 San Pablo Avenue in Emeryville, California (Figure 1), which is now part of the 40th Street Right-of-Way between San Pablo Avenue and Adeline Street. The site has an area of approximately 100 feet by 100 feet, is located in a commercial area in Emeryville, and is bounded by San Pablo Avenue to the west, a former two-story concrete warehouse to the east, and parking lots to both the north and south (Figure 2).

In June 1993, Levine-Fricke (1993a) conducted a Phase I environmental site assessment (ESA) on the subject site. The Phase I ESA revealed that a commercial fueling and auto service station (fuel station) had been operated at the site since 1936 (it ceased operation in April 1994). The fuel station contained a service garage with an attached office and canopy, and one fuel dispenser island, as shown on Figure 2.

Geologically, the Phase I ESA investigation found that the site is underlain by Holocene alluvial deposits, primarily unconsolidated, fine sand, silt, and clayey silt with occasional thin beds of coarse sand. The site is located approximately 1 mile east of the San Francisco Bay and is essentially level, with an approximate elevation of 40 feet above mean sea level.

Following the Phase I ESA, several additional investigations and remediations were performed, which are summarized in Section 2.0.

2.1 INITIAL INVESTIGATIONS, JUNE THROUGH AUGUST 1993

In June 1993, Catellus Development Corporation (Catellus) of San Francisco, California, retained Levine-Fricke of Emeryville, California, to conduct a Phase I environmental site assessment for a planned 40th Street Right-of-Way extension to run between San Pablo Avenue and Adeline Street (Levine-Fricke 1993a). The Celis Alliance Fuel Station (Site) is located within the extension area. The Phase I assessment revealed the existence of a fuel station on the Celis site since at least 1936 and reported the following six underground storage tanks (USTs):

- One 7,000-gallon diesel UST;
- One 6,000-gallon regular gasoline UST;
- One 4,000-gallon unleaded gasoline UST;
- One 2,000-gallon unleaded gasoline UST;
- One 3,500-gallon super unleaded gasoline UST;
- One 550-gallon waste oil UST.

Heavy oil stains were observed in many areas of the site. On the basis of the Phase I findings, Levine-Fricke performed a Phase II investigation for the 40th St. Right-of-Way in August 1993 (Levine-Fricke 1993b), which included:

- Site inspection and geophysical survey;
- Drilling of 22 soil borings and collection of soil samples for lithologic description and chemical analysis. Of the 22 soil borings, 14 were from the Celis site;
- Conversion of 3 soil borings to groundwater monitoring wells on the Celis site;
- Collection of groundwater samples from the monitoring wells for chemical analysis.

The locations of soil borings and monitoring wells are shown on Figure 2. Selected soil samples were analyzed for total petroleum hydrocarbons (TPH) as gasoline (TPHg) using EPA Method 8015/5030; benzene, toluene, ethylbenzene, and xylenes (BTEX) using EPA Method 8020; TPH as diesel (TPHd) using EPA Method 8015/3510; TPH as motor oil (TPHmo) using EPA Method 8015/3510; total recoverable petroleum hydrocarbons as oil and grease (TRPH) using Standard Method 5520EF; and polychlorinated biphenyls (PCBs) using EPA Method 8080.

The soil analytical results are summarized in Table 2. Soil samples were generally collected at depths of 7, 9.5, and 14.5 feet below ground surface (bgs). The analytical results indicate that soil at the Celis site contains significant concentrations of petroleum hydrocarbons. TPHg was reported in 19 of the 32 soil samples analyzed, with concentrations ranging from 1 milligram per kilogram (mg/kg) to 2,800 mg/kg. Benzene was detected in all but four samples, at concentrations ranging from 0.005 to 22 mg/kg. The highest concentrations of petroleum hydrocarbons were generally reported for samples collected from 7 and 9.5 feet bgs. Four soil samples collected from soil borings SB-2 and SB-3, which were near the waste oil tank, were also analyzed for PCBs. PCB concentrations in these borings were below laboratory detection limits.

The soil encountered in the borings mainly consists of clayey silt (ML), silty clay (CL), and silty sand (SM). Some silty clay of low plasticity was also encountered.

The three groundwater monitoring wells installed on the Celis site were all 2 inches in diameter, 20 feet bgs, screened from 5 to 20 feet bgs, and constructed with polyvinyl chloride. Shallow groundwater elevations varied from approximately 8 to 9.5 feet bgs during the month of August 1993. Groundwater flow direction beneath the site is generally toward the west under a hydraulic gradient of approximately 0.03 ft/ft.

Free-phase fuel product was measured in monitoring well LF-1 at a thickness of 6.24 inches on August 20, 1993. LF-1 is located downgradient from the pump island and the diesel tank. Free-phase product has not been detected in the other two monitoring wells.

The three monitoring wells were sampled on August 7, 1993 for the analysis of TPHg, TPHd, TPHmo, BTEX, and TRPH. The results are summarized in Table 3. The results indicate that shallow groundwater beneath the Celis site has been significantly affected by petroleum hydrocarbons.

2.2 ADDITIONAL INVESTIGATIONS, JANUARY 1994

At the request of Alameda County Department of Environmental Health (ACDEH), Levine-Fricke conducted additional investigations to further assess the lateral extent of petroleum hydrocarbons in groundwater downgradient (west) from the Celis site (Levine-Fricke 1994a). Two soil borings were drilled, one of which was converted to a groundwater monitoring well (LF-4). Their locations are shown on Figure 2. This new monitoring well is also 2 inches in diameter, 20 feet bgs, and screened from 5 to 20 feet bgs.

Soil samples were analyzed for TPHg, TPHd, TPHmo, BTEX, and TRPH. The results are included in Table 2. Groundwater samples were analyzed for the same constituents as soil samples and their results are given in Table 3.

Monitoring well LF-4 is located approximately 160 feet west (downgradient) of well LF-1. The soil sample at 10 feet bgs from this well showed TPHg (220 mg/kg), TPHd (19 mg/kg), and BTEX. Groundwater samples from this well also reported TPHg, TPHd, TPHmo, and BTEX. Soil boring EB-1 is approximately 150 feet west of well LF-4 (310 feet downgradient of well LF-1). Soil samples from this boring were below detection limits for TPHg, TPHd, TRPH and BTEX, but had low levels of TPHmo (17 mg/kg at 5 ft bgs and 49 mg/kg at 10 ft bgs). A grab groundwater sample (GWEB1) was also obtained from this boring and showed very low levels of TPHd (0.081 mg/l), toluene (0.00057 mg/l) and xylenes (0.0026 mg/l). These low levels of petroleum hydrocarbons in boring EB-1 may not necessarily originate from the Celis site because TPHg, which was reported at concentrations of approximately 10 times the TPHd concentration in well LF-4, was not detected in boring EB-1. TPHg is more mobile than TPHd in groundwater and usually appears downgradient before TPHd. Thus, the downgradient edge of the hydrocarbon plume was probably between LF-4 and EB-1 in January 1994.

2.3 BUILDING DEMOLITION, MAY 1994

Between May 2 and 13, 1994, a contractor retained by Catellus removed the fuel station building, the fuel dispenser island and the surface pavement of entire site. Two hydraulic lifts and associated piping and hydraulic fluid storage tank(s) in the service garage may have also been removed during that time. However, a report documenting the field activities was not available to WCC for review.

2.4 UNDERGROUND TANK REMOVAL, MAY 1994

Levine-Fricke removed the six underground storage tanks (UST) and associated piping during the week of May 16, 1994 (Levine-Fricke 1994b). All six USTs were made of welded steel and single-walled. Holes were noted in the 2,000-gallon unleaded gasoline tank and the 550-gallon waste oil tank, but not in the other four tanks. Holes were also noted in a previously abandoned product piping that appeared to have been connected to the 6,000-gallon regular gasoline tank, in the portion of the piping just north of the super unleaded gasoline tank.

A total of eight soil samples were collected from the UST excavations after the tanks were removed: five from native soils in the sidewalls of the gasoline UST excavation, two from native soils in the sidewalls of the diesel UST excavation, and one from native soil about 1 foot below the bottom of the waste oil UST excavation. Sampling locations and analytical results of TPH and BTEX are shown on Figure 3. The soil sample D1-9 in the diesel tank excavation near the monitoring well LF-1 showed a diesel concentration of 1,300 mg/kg. Free-phase product was measured previously in LF-1. Soil samples from the north side of the gasoline UST excavation showed much higher TPHg concentrations than the samples from the south side of the same excavation. No petroleum oil (TPHo) was measured above the laboratory detection limit (5 mg/kg) in the soil sample collected beneath the waste oil UST.

The soil sample (G3-9.5) taken near the regular gasoline UST was also analyzed for organic lead, and the result was below laboratory detection limit (0.5 ppm). The soil sample taken beneath the waste oil UST was also analyzed for organic lead (result below detection limit, 0.5 ppm), five LUFT metals (results were Cd < 0.1 mg/kg, Cr (total) = 27 mg/kg, Pb (total) = 2 mg/kg, Ni = 26 mg/kg, and Zn = 47 mg/kg), PCBs (result below detection limit, 0.05 mg/kg), Creosote (result below detection limit, 5 mg/kg), PNAs (polynuclear aromatics, result below detection limit, 0.2 mg/kg), and HVOCs (halogenated volatile organic compounds, results below detection limit, 0.005 mg/kg). These results indicate that the site may have only been impacted by petroleum hydrocarbons.

2.5 SOIL REMEDIATION, JUNE THROUGH OCTOBER 1994

Following the tank removal, the City retained Woodward-Clyde Consultants (WCC) in June 1994 to conduct soil remediation at the Celis Fuel Station Site. WCC prepared a workplan for the soil remediation (WCC 1994), which was approved by the ACDEH in a letter to the City dated August 24,1994. Soil excavation started in June 1994 following verbal approval of the workplan by the ACDEH (WCC 1995).

Before excavation began, the three on-site shallow groundwater monitoring wells (LF-1 through LF-3), installed previously by Levine-Fricke, were closed in-place by pressure grouting in

accordance with permit instructions from the Alameda County Flood Control and Water Conservation District, Zone 7.

Soil was excavated to the groundwater table vertically (approximately 9.5 feet below grade), and to the site boundary horizontally except the 1:1 slope on three sides of the excavation pit. The slope was needed to maintain the stability of the sidewalls and the safe work environment. The side along San Pablo Avenue was shored with sheet piling and excavated vertically. Excavated soil was temporarily stockpiled on the adjacent parking lot for further sampling and analyses. Soil from the waste oil tank area (a total of 17 cubic yards) was stockpiled separately and was analyzed for WET CAM 17 metals and petroleum oil and grease (<50 mg/kg). Soil from the diesel tank area (a total of 17 cubic yards) was also stockpiled separately and was analyzed for TPH as diesel (3,100 mg/kg). These two stockpiles of soil were disposed of at Forward Landfill, a Class II landfill, in Stockton, California. Soils from the rest of the site (a total of 3,204 loose cubic yards) were analyzed for TPH as gasoline and BTEX and were disposed of at Alta/B&J Landfill, a Class III landfill, in Vacaville, California. TPHg concentrations ranged from 2.4 to 140 mg/kg and benzene from less than 0.005 to 0.78 mg/kg. Analytical results are summarized in Table 4.

Oily-looking soils were observed on the bottom of the excavation pit near the former waste oil tank, the diesel tank, and the gasoline tank areas. A total of 22 soil samples were collected on the sidewalls (6 inches above the bottom) and the bottom of the excavation pit and were analyzed for BTEX, TPHg, TPHd, TRPH, and five metals (cadmium, chromium, lead, nickel, and zinc). Figure 4 shows sampling locations. Elevated concentrations of BTEX and gasoline were found remaining on sidewalls and the bottom, with benzene concentrations up to 3.8 mg/kg and TPHg up to 1,000 mg/kg. Only one soil sample, obtained near the southwest corner of the excavation pit, had concentrations of BTEX and gasoline below detection limits. Diesel concentrations up to 18,000 mg/kg were also detected in the former diesel tank area. Free-phase product has been reported in the diesel tank area previously by Levine-Fricke (1993b). Analytical results are summarized in Table 5.

Petroleum oil and grease (reported as TRPH, total recoverable petroleum hydrocarbons) was not detected in samples from the former waste oil tank area, but was found in one soil sample at 120 mg/kg from the former gasoline tank cluster area. The TRPH reported probably represents the heavier fraction of the diesel. Concentrations of the five metals do not appear to be at hazardous waste levels as measured by either TTLC or STLC in Title 22 of the California Code of Regulations for the definition of characteristics of toxicity.

Clean soil for backfilling was imported from the stockpile near the south terminus of Shellmound Street and owned by the City of Emeryville. Chemical and geotechnical tests were not conducted on the soil for this project, but were done previously for other projects by others. The imported soil was compacted to a minimum of 90 percent relative compaction in 8-inch lifts. The site was backfilled from the bottom of the excavation to approximately 3 feet below the original grade. The City graded the top 3 feet for road construction as discussed below.

2.6 CONSTRUCTION OF 40TH STREET RIGHT-OF-WAY, 1995

The construction of 40th Street Right-of-Way extension between San Pablo Avenue and Adeline Street was completed in about October 1995. The road is constructed of 2.2 ft thick aggregate

base and 0.55 ft asphalt-concrete surface. Figure 5 illustrates the completed 40th street between San Pablo Avenue and Adeline Street.

This section presents an overall project plan and describes criteria and procedures for additional environmental work activities which will lead to closure of the site.

3.1 SUMMARY OF SITE STATUS

Site status can be summarized below:

- All underground storage tanks and associated piping were removed in 1994;
- The site has been extensively characterized. Soil and groundwater samples collected at various times from both on- and off-site locations were analyzed for TPH as gasoline, diesel, motor oil, oil and grease, BTEX, organic lead, PCBs, Creosote, PNAs, halogenated VOCs, and metals (Cd, Cr, Pb, Ni, Zn, and WET CAM 17 metals). Results from these investigations indicate that only petroleum hydrocarbons (TPHg, TPHd, and BTEX) appear to be constituents of concern;
- Three on-site groundwater monitoring wells were installed in 1993 and one downgradient off-site groundwater monitoring well was installed in 1994. Free product was measured in one of the on-site monitoring wells, but not in others;
- On-site soil from surface to groundwater table was removed and disposed of off-site in 1994. The three on-site monitoring wells were destroyed. Soil samples collected from the side walls and the bottom of the excavation pit showed benzene concentrations up to 3.8 mg/kg, TPHg up to 1,000 mg/kg, and TPHd up to 18,000 mg/kg in the area where free product was measured in the monitoring well. Clean soil was imported to fill the site;
- The site was redeveloped in 1995 into part of the 40th Street Right-of-Way and was paved with asphalt-concrete mixture. Properties next to the site are either streets or parking lots also having asphalt-concrete surface.
- TPH contamination is a regional problem. Several TPH-affected parcels exist in the area.

3.2 REGULATORY REQUIREMENT

The primary guidance for conducting UST investigations in Emeryville used to be the RWQCB Tri-Regional Board Staff Recommendations for Preliminary Investigation and Evaluation of Underground Tank Sites (August 1990) and associated Appendix A (August 1991). However, an interim guidance from the SWRCB (December 1995) and supplemental instructions from the RWQCB-San Francisco Bay Region (January 1996) have substantially changed the requirement for UST site investigation and remediation. The new requirement and its background information are summarized below.

In October 1995, Lawrence Livermore National Laboratory (LLNL) presented to the State Water Resources Control Board (SWRCB) a final report titled "Recommendations to Improve the Cleanup Process for California's Underground Fuel Tanks". This report is based on LLNL's review of investigation and remediation results of California's historical LUFT cases. In summary, the report found that:

- Most LUFT plumes are predictable and plume lengths rarely exceed about 250 ft;

- Natural (passive) biodegradation is a very important factor controlling the plume size and mass;
- Usually, only shallow groundwater is impacted at LUFT sites, which is typically not a drinking water source in California.

Based on the LLNL's report, SWRCB issued an Interim Guidance on December 8, 1995, on required cleanup at low risk fuel sites. On January 5, 1996, RWQCB - San Francisco Bay Region, issued Supplemental Instructions to the SWRCB's Interim Guidance. The new requirements outlined in the Interim Guidance and the Supplemental Instructions are summarized below.

- Delineating fuel hydrocarbon plumes to non-detect levels is not required at all sites;
- Sources should be removed. This includes the removal of leaking tanks and associated piping, free product, and soil containing sufficient mobile constituents;
- After source removal, monitoring and passive bioremediation should be the preferred remedial alternative;
- It is recommended to perform a risk evaluation based on the American Society of Testing and Materials' (ASTM) Standard for Risk Based Corrective Action (RBCA, ASTM E-1739-95);
- For sites with low risk soil contamination only and having been characterized reasonably well, they should be closed;
- For sites with low risk groundwater contamination and having been characterized reasonably well, one year of groundwater monitoring is usually enough, and passive bioremediation should be the preferred remedial alternative. RWQCB listed 6 criteria (definition) for low risk groundwater case in its Supplemental Instructions. A comparison of the 6 criteria to the current site condition is presented in Table 6.

Based on the new regulatory requirements and the site information summarized above, the following additional work is identified:

- Remove free product, if it still exists;
- Perform one-year groundwater monitoring for plume stability analysis;
- Conduct RBCA risk evaluation.

The City of Emeryville should be able to apply for site closure after the free product is removed, the plume is indicated as not migrating, and no significant risk to both human health and the environment can be documented. The remaining of this section presents procedures for the additional work identified above.

3.3 PRODUCT RECOVERY

3.3.1 Installation of a Product Recovery Well

One 4"-diameter well, designated as EW-1 on Figure 5, is proposed in the area near the former monitoring well LF-1 location. Levine-Fricke reported up to 6" free product in the well LF-1 in August 1993. However, since the former well LF-1 is located right in the middle of the 40th

Street Right-of-Way as the site has been developed to, it is difficult to place the new well EW-1 in the exact same location as the former well LF-1 for the following reasons: a) traffic would have to be at least partially blocked during well installation, monitoring and pumping activities; b) well head could be damaged by heavy trucks; and c) it would pose significant safety hazards to technicians who perform groundwater sampling and measurement activities. For these reasons, the proposed location for the new well EW-1 is on the pedestrian sidewalk (Figure 5), approximately 25 feet north of the former well LF-1. Since the groundwater flow direction beneath the site was reported toward the west by Levine-Fricke in 1993, the proposed location for well EW-1 would be at downgradient of the site and at approximately the same groundwater elevation as the former well LF-1 did.

The boring will be advanced to a depth of 20 feet below ground surface (bgs), the same depth as the former well LF-1, using 10-inch hollow-stem augers on a truck-mounted drill rig. Soil samples will be collected at 5-foot intervals beginning at 5 feet bgs. An attempt will be made to collect a soil sample from just above the water table, which was reported at about 9 feet below grade by Levine-Fricke in 1993. Soil samples will be collected using a 2.5-inch-diameter modified California split-spoon sampler lined with clean brass or stainless steel lines. The sampler will be decontaminated between uses. The sampler will be driven a maximum of 18 inches using a 140-pound hammer with a 30-inch drop. The number of blows required to drive the sampler each 6-inch interval (blow count) will be recorded on a boring log. The soil samples will be retained in the lines within the sampler. The middle liner of soil will be retained for laboratory analysis, which will be sealed with aluminum foil or Teflon sheeting, plastic end caps, labeled, placed in a plastic bag, and stored in an ice chest cooled with ice. The remaining soil in the lines will be examined by a qualified engineer or geologist to describe the soil according to the Unified Soil Classification System (USCS).

Three soil samples from 5' bgs, just above water table or 10' bgs, and 15' bgs will be submitted to a California Department of Toxic Substance Control certified environmental laboratory under chain-of-custody for the analysis of TPH as gasoline and diesel and BTEX.

The 20'-deep soil boring will be completed as a groundwater monitoring and free product recovery well. The well will be constructed of 4-inch diameter schedule 40 polyvinyl chloride (PVC) casing with flush-threaded ends. PVC screen with 0.02-inch slot size will be placed between 5' to 20' bgs. The bottom of the well will be capped with a threaded end cap.

Sand pack around the well casing will be placed by a tremie method as the augers are removed. A conservatively small size such as Lone Star No. 2/12 will be placed to reduce the amount of sediment that may enter the well. The sand pack thickness will be measured continuously to ensure a solid pack with no bridging. The sand pack will extend approximately one foot above the top of the well screen. Two feet of bentonite pellets will be placed on top of the sand pack and will be hydrated with tap water to seal the sand pack. Neat cement grout will then be placed from the top of the bentonite seal to the ground surface. The well head will be completed at grade with a watertight locking well cap and placed in a traffic-rated utility box. Figure 6 illustrates typical well construction details.

The well will be allowed to set 24 hours or more after construction prior to well development. It will be developed by a combination of bailing, surging, and pumping until the discharge water is relatively free of settleable solids or a maximum of 10 well casing volumes has been pumped from

the well. Water quality parameters such as pH and specific conductance will be measured and recorded during well development. Following development, the well will be allowed to stabilize for at least 72 hours prior to groundwater sampling and water level measurement.

The elevation of the top of the well casing will be surveyed by a licensed land surveyor to a precision of 0.01 foot, relative to a referenced and established benchmark.

Underground Services Alert will be contacted at least 48 hours, but not more than 14 days, prior to the drilling. In addition, a private utility locator will also be retained to provide underground utility clearance. If any underground utilities or surface obstructions prevent soil boring at the proposed location, the boring will be relocated to a clear location nearby.

3.3.2 Procedures for Product Recovery

Free-phase product was only observed in the former well LF-1. No free product was ever observed in the former well LF-2 which is located about 90 feet upgradient (east) from LF-1, nor in the former well LF-3 which is about 50 feet south of LF-1, nor in existing well LF-4 which is about 160 feet downgradient (west) of LF-1. Thus, it appears that free product, if it still exists beneath the site, is limited to the area immediately surrounding the former well LF-1.

To capture the limited amount of free product, it is unnecessary to install a continuous groundwater extraction system, which would require costly on-site treatment, discharge and monitoring. Plus, there is no room on site to install treatment equipment. Instead, we propose to extract groundwater from well EW-1 on a schedule of 4-hour per week for three months. A technician will be on site weekly using a portable jet pump to extract the groundwater. The extraction will allow the free product, if it still exists, to flow in to the extraction well and to be removed. Measurement of evidence for floating product will be made each week prior to pumping, and will be recorded in the field notes. If there is no free product in the well EW-1 after three months of weekly pumping, no further groundwater extraction will be taken. The well will then be monitored quarterly as described in Section 3.4. We believe that weekly groundwater extraction for three months will be adequate to capture the limited amount of free product, if any. However, in the unlikely event that minor free product, such as a sheen layer, still exists after three months of pumping, the pumping will continue monthly 4-hour per month for additional three months. After that the well will be monitored quarterly as described in Section 3.4. The volume of extracted water will be recorded in the field notes.

The extracted groundwater will be stored temporarily in a 5,000-gallon tank on a nearby fenced parking lot. The groundwater will be sampled and analyzed for TPHg, TPHd, and BTEX, and will be transported upon acceptance to an off-site recycling facility for treatment and disposal.

Soil beneath the site mainly consists of fine grained materials, such as clayey silt (ML), silty clay (CL), and limited silty sand (SM). Shallow wells in the area typically produce less than 5 gallons per minute (gpm). Assuming that a sustained yield of 2 gpm can be achieved from the proposed extraction well EW-1, the volume of groundwater that may be extracted in four hours each week would be:

2 gpm x 60 min/hr x 4 hr extraction per week = 480 gallons per week

The total volume of groundwater that may be extracted in three months (13 weeks) would be:

480 gallons / wk x 13 wks = 6,240 gallons.

3.4 GROUNDWATER MONITORING

The existing downgradient monitoring well LF-4 and the proposed new well EW-1 will be sampled quarterly for one year and will be analyzed for TPHg, TPHd, and BTEX. Water levels will be measured to the nearest 0.01 foot, prior to any purging activities to avoid disturbance of the static water table. An oil-water interface probe will be used to measure the thickness of any floating product, if present. For the determination of groundwater flow direction in the area, water level will be measured in a third well, MW-2, which is located approximately 200 feet south of LF-4 (Figure 2). MW-2 was installed by Levine-Fricke for the investigation of contamination not related to this site.

Prior to collecting groundwater samples, each well will be purged three to five well casing volumes to allow groundwater representative of the saturated soil to enter the well. Water quality parameters including pH, temperature, and specific conductance will be recorded during well purging. Samples will be collected when these parameters have stabilized and the water level has returned to at least 80 percent of its static level. Stabilization of these parameters suggests that the water within the well is representative of the groundwater in the saturated soil. Purge water will also be inspected in the field for the presence of odor or sheen. Groundwater samples will be collected using fresh disposable bailers. Water samples will be decanted into containers provided by the analytical laboratory for a specific analysis. Sample containers will be labeled with identifying information, stored in an ice chest cooled with ice, and transported under standard chain-of-custody procedures to an analytical laboratory certified by the State of California EPA for the required analyses.

The proposed new well EW-1 is a replacement of the former monitoring well LF-1. The other two on-site monitoring wells (LF-2 and LF-3) that were destroyed in June 1994 during soil excavation will not be replaced because a) the area of the site is small (only approximately 100 ft by 100 ft) and one on-site well is sufficient for the monitoring of groundwater quality within the site; b) all on-site unsaturated soil has been removed and filled with clean, imported soil; c) both LF-2 and LF-3 are upgradient wells relative to LF-1 and no free product was measured before; and d) the site has been redeveloped into the 40th Street Right-of-Way and it is difficult to install wells and perform well monitoring activities on the street.

The off-site, downgradient well LF-4 will provide information for plume stability and off-site migration potential. In a January 1994 groundwater sample from this well, TPHg was detected at 21 mg/l, TPHd at 2.2 mg/l, and benzene at 1.1 mg/l. In a June 1994 Workplan prepared by WCC, a second off-site monitoring well (WCC-1) was proposed approximately 20 feet West (downgradient) of Levine-Fricke's soil boring EB-1, or about 170 feet further downgradient of LF-4. The objective of the well was to define the plume to non-detect boundary according to the RWQCB Tri-Regional Guidelines for UST investigations (August 1990 and August 1991). The well (WCC-1) was never installed due to the site development in the proposed well area. However, based on the new guidelines as discussed in Section 3.2, this proposed well is unnecessary, and thus will not be installed. LF-4 will be the only off-site, downgradient well for the TPH plume monitoring.

3.5 RBCA EVALUATION

Following the San Francisco Bay Area RWQCB's Interim Guidance on Required Cleanup at Low Risk Fuel Sites as discussed in section 3.2, a Risk-Based Corrective Action (RBCA) evaluation is proposed based on ASTM Standard E-1739-95. The purpose of this RBCA evaluation is to classify the site and to develop screening and target levels for TPH and BTEX that may be left in-place with acceptable risk. Under this task, the following work scope is proposed:

- Review existing site contamination information to determine the nature and extent of contamination for the entire section of 40th Street Right-of-Way between San Pablo Avenue and Adeline Street. This section consists of four parcels, and the Celis Gas Station site is one of them. All the four parcels have the same TPH problem and the same site usage, and thus may be grouped as one site for RBCA evaluation;
- Prepare a RBCA workplan that presents site-specific information and approach to the RBCA evaluation. The workplan will be submitted to the ACDEH for approval;
- Perform RBCA Tier 1 and, if necessary, Tier 2 evaluation following the approval of the RBCA workplan. Site-specific risk-based screening levels may be developed and compared with concentrations of chemicals detected in groundwater and soil at the site. Target levels may be developed to support decision making;
- Prepare a report presenting the RBCA evaluation results.

4.1 DECONTAMINATION PROCEDURES

Down-hole drilling equipment such as augers and well development equipment will be decontaminated using a pressure steam cleaner with potable water before beginning drilling, between each drilling/sampling location, and before leaving the site. Split-spoon samplers, brass tube lines, oil-water interface probe/water level indicators and bailers will be decontaminated before use by washing/scrubbing in an Alconox solution and rinsing with potable water followed by rinsing with deionized water. A decontamination pad will be set to contain the runoff from steam cleaning. The decontamination water will be handled according to Section 4.2.

4.2 WASTE DISPOSAL

Purged groundwater, equipment decontamination water, and soil cuttings will be collected in separate DOT-approved drums and left on site pending characterization, acceptance and transportation to an appropriate recycling or disposal facility. To provide for proper handling, treatment and/or disposal, the drums will be labeled with the following information: date of collection, site address, waste material, well identification, and the name and phone number of a contact person to whom questions may be addressed.

Following the approval of this workplan from ACDEH, a well construction permit for EW-1 will be applied to the Alameda County Zone 7 Water Agency within one week. Drilling work will be scheduled within one week after receipt of well construction permit and should be completed within one day. A well construction report will be filed with the Zone 7 Water Agency within one week following the completion of well construction.

Weekly free product recovery will start within two weeks following the completion of the well construction. A report will be submitted following the completion of the three month groundwater extraction. The report will present the results of free product measurement, volumes of groundwater extracted, analytical results, and disposal records.

Quarterly groundwater monitoring is scheduled for the calendar year of 1997. A quarterly groundwater monitoring report will be submitted within 30 days following the end of each quarter. The report will summarize field activities and tabulated results of chemical analyses including historical analytical results. Laboratory analytical reports will be included. Discussion of changes in groundwater elevations and chemical concentrations will also be presented.

A RBCA workplan will be submitted within 30 days following the approval of this workplan from ACDEH. The RBCA workplan will presents site-specific information and approach to the RBCA evaluation. Following the approval of the RBCA workplan, RBCA Tier 1 and, if necessary, Tier 2 evaluation will be conducted to develop site-specific risk-based screening and target levels which will be compared with concentrations of chemicals detected in groundwater and soil at the site. A RBCA report presenting the evaluation results will be submitted within 30 days following the approval of the workplan.

A project schedule is illustrated in Figure 7.

California State Water Resource Control Board, December 8, 1995. Interim Guidance on Required Cleanup at Low Risk Fuel Sites.

Levine-Fricke, June 1993a. Phase I Environmental Site Assessment, 40th Street Right-of-Way, Emeryville, California.

Levine-Fricke, September 1993b. Phase II Investigation Results, Proposed 40th Street Right-of-Way, Emeryville, California.

Levine-Fricke, March 1994a. Further Soil and Ground-water Investigation, Fuel Station, 40th Street Right-of-Way, Emeryville, California.

Levine-Fricke, July 1994b. Report on Removal of Six Underground Fuel Storage Tanks and Associated Piping, Celis Alliance Fueling Station, 4000 San Pablo Avenue, Emeryville, California.

Regional Water Quality Control Board - North Coast, San Francisco Bay, and Central Valley Regions, August, 1990. Tri-Regional Board Staff Recommendation for Preliminary Evaluation and Investigation of Underground Tank Sites. Appendix A- Reports, August 1991.

Regional Water Quality Control Board - San Francisco Bay Region, January 1996. Supplemental Instructions to State Water Board December 8, 1995, Interim Guidance on Required Cleanup at Low Risk Fuel Sites.

Woodward-Clyde Consultants, June 1994. Workplan for Additional Site Investigation and Limited Soil Excavation, Celis Alliance Fuel Station, 4000 San Pablo Avenue, Emeryville, California.

Woodward-Clyde Consultants, January 1995. Report on Soil Remediation at the Former Celis Alliance Fuel Station, , 4000 San Pablo Avenue, Emeryville, California.

TABLE 1

LIST OF CONTACTS
THE FORMER CELIS ALLIANCE FULE STATION AT 4000 SAN PABLO AVENUE
EMERYVILLE, CALIFORNIA

Owner's Representatives:

Celis Alliance Gas Station
4000 San Pablo Avenue
Emeryville, California
Constantino and Remedios Celis
c/o City of Emeryville

City of Emeryville:

City of Emeryville Redevelopment Agency
2200 Powell Street, 12th Floor, Suite 1200
Emeryville, California 94608-4356
Ignacio Dayrit (510) 596-4356

Site Developer:

Catellus Development Corporation
201 Mission Street, Suite 250
San Francisco, California 94105
Kimberly Brandt (415) 974-3705

Environmental Consultant:

Woodward-Clyde Consultants
500 12th Street, Suite 100
Oakland, California 94607-4014
Xinggang Tong (510) 874-3060

Lead Implementing Agency:

Alameda County Health Care Services Agency
Department of Environmental Health
Division of Hazardous Materials
80 Swan Way, Room 350
Oakland, California 94621
Susan Hugo (510) 271-4530

Regional Water Quality Control Board:

Regional Water Quality Control Board -
San Francisco Bay Region
2101 Webster Street, Suite 500
Oakland, California 94612
Lester Feldman (510) 286-1255

TABLE 2

ANALYTICAL RESULTS FOR SOIL SAMPLES COLLECTED FROM THE FUEL STATION
40TH STREET RIGHT-OF-WAY, EMERYVILLE, CALIFORNIA
(concentrations in milligrams per kilogram [mg/kg])

Sample Name	Depth (ft)	Sample Date	TPHg	TPHd	TPHmo	Benzene	Toluene	Ethyl-benzene	Total Xylenes	TRPH	PCBs
LF-1-4.5	4.5	07-Aug-93	550	220	16	0.84	1.2	5.6	2.7	77	NA
LF-1-9.5	9.5	07-Aug-93	470	18	<10	0.97	<0.005	6.6	8.9	<30	NA
LF-1-14.5	14.5	07-Aug-93	8.4	16	<10	0.14	0.17	0.081	0.37	60	NA
LF-2-9.5	9.5	07-Aug-93	740	14	<10	4.7	35	13	68	30	NA
LF-2-14.5	14.5	07-Aug-93	<0.5	<10	<10	0.009	0.012	<0.005	0.015	<30	NA
LF-3-9.5	9.5	07-Aug-93	75	<10	<10	0.062	0.28	1.1	1.1	37	NA
LF-3-14.5	14.5	07-Aug-93	<0.5	<10	<10	0.014	<0.005	0.01	0.007	<30	NA
LF-4-5.0	5	28-Jan-94	0.8	<10	<10	0.083	<0.005	<0.005	0.034	NA	NA
LF-4-10.0	10	28-Jan-94	220	19	<10	1.7	6.7	4.5	24	NA	NA
SB-1-7	7	08-Aug-93	850	240	27	5.4	<0.005	25	42	290	NA
SB-1-9.5	9.5	08-Aug-93	180	220	<50	0.89	1.1	4.3	18	130	NA
SB-1-14.5	14.5	08-Aug-93	7.4	<10	<10	0.44	0.44	0.14	0.61	60	NA
SB-2-7	7	08-Aug-93	780	790	57	8	<0.005	31	140	160	ND
SB-2-9.5	9.5	08-Aug-93	720	200	<50	2.4	5.2	14	59	210	NA
SB-2-14.5	14.5	08-Aug-93	1	<10	12	0.2	0.21	0.021	0.12	43	ND
SB-3-9.5	9.5	07-Aug-93	580	11	<10	9.7	50	15	90	37	ND
SB-3-14.5	14.5	07-Aug-93	0.9	<10	<10	0.092	0.16	0.031	0.17	37	ND
SB-4-7	7	08-Aug-93	380	13	<10	3	5.2	8.2	18	70	NA
SB-4-14.5	14.5	08-Aug-93	<0.5	<10	<10	0.026	0.005	0.019	0.023	210	NA
SB-5-7	7	08-Aug-93	410	15	<10	2.4	0.6	16	6.3	37	NA
SB-5-14.5	14.5	08-Aug-93	<0.5	<10	<10	0.011	<0.005	0.008	0.008	93	NA
SB-6-9.5	9.5	08-Aug-93	490	51	<10	2.7	<0.005	15	15	67	NA
SB-6-14.5	14.5	08-Aug-93	<0.5	<10	<10	<0.005	<0.005	<0.005	<0.005	<30	NA
SB-7-9.5	9.5	07-Aug-93	750	52	66	2.5	8.5	22	93	170	NA
SB-7-14.5	14.5	07-Aug-93	2.8	<10	<10	<0.005	<0.005	0.029	0.03	<30	NA
SB-8-9.5	9.5	08-Aug-93	2,800	110	<50	22	9.5	82	290	130	NA
SB-8-14.5	14.5	08-Aug-93	<0.5	<10	11	0.009	<0.005	<0.005	<0.005	37	NA
SB-9-7	7	07-Aug-93	210	14	<10	2.8	13	5.1	29	<30	NA
SB-9-9.5	9.5	07-Aug-93	1,200	NA	NA	14	81	26	140	NA	NA
SB-9-14.5	14.5	07-Aug-93	<0.5	<10	<10	0.079	0.059	0.011	0.041	77	NA
SB-10-7	7	07-Aug-93	73	NA	NA	2.6	4.5	1.6	7.7	NA	NA
SB-10-9.5	9.5	07-Aug-93	1,100	<10	<10	<0.005	7.8	<0.005	22	40	NA
SB-10-14.5	14.5	07-Aug-93	8.6	<10	<10	0.48	0.29	0.1	0.48	<30	NA
SB-11-14.5	14.5	09-Aug-93	<0.5	<10	11	<0.005	<0.005	<0.005	<0.005	40	NA
EB-1-5.0	5	28-Jan-94	<0.5	<10	17	<0.005	<0.005	<0.005	<0.005	NA	NA
EB-1-10.0	10	28-Jan-94	<0.5	<20	49	<0.005	<0.005	<0.005	<0.005	NA	NA

Data extracted from Levine-Fricke's Reports of September 1993 and March 1994
NA = not available; ND = not detected.
TPHg = total petroleum hydrocarbons as gasoline
TPHd = total petroleum hydrocarbons as diesel
TPHmo = total petroleum hydrocarbons as motor oil
TRPH = total recoverable petroleum hydrocarbons
PCBs = polychlorinated biphenyls

TABLE 3

ANALYTICAL RESULTS FOR GROUNDWATER SAMPLES
40th Street Right-of-Way, Emeryville, California
(concentrations in milligrams per liter [mg/l])

Sample Name	Sample Date	TPHg	TPHd	TPHmo	Benzene	Toluene	Ethyl-benzene	Total Xylenes	TRPH
LF-1AG	7-Aug-93	100	41	<2.5	13	9.4	3.1	14	11
LF-2AG	7-Aug-93	13	0.095	<0.50	2.4	2.9	0.5	2	<5
LF-3AG	7-Aug-93	11	0.78	<0.25	1.5	0.17	2.9	5.1	<5
GWEB1 *	28-Jan-94	<0.05	0.081	<0.05	<0.0005	0.00057	<0.0005	0.0026	NA
LF-4	28-Jan-94	18	1.4	0.16	1	1.9	0.88	4.7	NA
LF-4dup	28-Jan-94	21	2.2	0.21	1.1	2	0.80	4.2	NA

Data extracted from Levine-Fricke's Reports of September 1993 and March 1994.
NA = not available; ND = not detected.
TPHg = total petroleum hydrocarbons as gasoline.
TPHd = total petroleum hydrocarbons as diesel.
TPHmo = total petroleum hydrocarbons as motor oil.
TRPH = total recoverable petroleum hydrocarbons
GWEB1 * is a grab groundwater sample collected from soil boring EB-1.

TABLE 4

ANALYTICAL RESULTS FOR SOIL SAMPLES COLLECTED FROM EXCAVATED SOIL STOCKPILES
CELIS ALLIANCE FUEL STATION, EMERYVILLE, CALIFORNIA

Soil Stockpile	Sample ID	Benzene	Toluene	Ethyl benzene	Xylenes	TPHg	TPHd	TRPH (1)	WET CAM 17 metals (2)
		mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/l
0 to 5 feet	S-0-5ft-1-A,B,C,D	0.15	1.1	1.2	9	110	NA	NA	NA
below grade	S-0-5ft-2-A,B,C,D	0.06	0.45	0.57	4.3	59	NA	NA	NA
	S-0-5ft-3-A,B,C,D	0.04	0.42	0.74	5.9	83	NA	NA	NA
	S-0-5ft-4-A,B,C,D	0.14	1.1	1.5	10	140	NA	NA	NA
	S-0-5ft-5-A,B,C,D	0.12	0.66	0.83	5.8	77	NA	NA	NA
	S-0-5ft-6-A,B,C,D	0.05	0.13	0.22	3.2	55	NA	NA	NA
	S-0-5ft-7-A,B,C,D	0.13	0.4	0.49	4.5	56	NA	NA	NA
	S-0-5ft-8-A,B,C,D	0.05	0.16	0.18	3.1	48	NA	NA	NA
	S-0-5ft-9-A,B,C,D	0.2	1	0.4	3.2	130	NA	NA	NA
	S-0-5ft-10-A,B,C,D	ND(0.05)	ND(0.05)	ND(0.05)	0.09	48	NA	NA	NA
	S-0-5ft-11-A,B,C,D	0.03	0.03	0.05	0.19	28	NA	NA	NA
	S-0-5ft-12-A,B,C,D	0.12	0.13	0.05	0.78	49	NA	NA	NA
	S-0-5ft-13-A,B,C,D	0.05	0.04	0.02	0.12	27	NA	NA	NA
	S-0-5ft-14-A,B,C,D	0.14	0.14	0.1	0.29	42	NA	NA	NA
	S-0-5ft-15-A,B,C,D	0.04	0.07	0.1	0.59	24	NA	NA	NA
	S-0-5ft-16-A,B,C,D	ND(0.1)	0.6	0.8	6.1	73	NA	NA	NA
	S-0-5ft-17-A,B,C,D	0.05	0.22	0.22	1.7	20	NA	NA	NA
	S-0-5ft-18-A,B,C,D	0.019	0.064	0.096	0.8	12	NA	NA	NA
Gas hot spots	S-G-A,B,C,D	0.1	1.1	1	6	52	NA	NA	NA
Site east,	S-5-9.5ft-1-A,B,C,D	0.014	0.064	0.18	1.4	25	NA	NA	NA
5 to 9.5 feet	S-5-9.5ft-2-A,B,C,D	0.78	1.5	1.5	7.9	140	NA	NA	NA
blow grade	S-5-9.5ft-3-A,B,C,D	D(0.005)	ND(0.005)	ND(0.005)	0.04	2.4	NA	NA	NA
	S-5-9.5ft-4-A,B,C,D	0.056	0.44	0.67	4.2	92	NA	NA	NA
	S-5-9.5ft-5-A,B,C,D	0.064	0.88	0.82	5.1	8.4	NA	NA	NA
	S-5-9.5ft-6-A,B,C,D	0.026	0.16	0.14	1.1	22	NA	NA	NA
	S-5-9.5ft-7-A,B,C,D	0.017	0.13	0.17	1.3	23	NA	NA	NA
Diesel hot spot	S-D-A,B,C,D	NA	NA	NA	NA	NA	3100	NA	NA
Waste oil tank	S-O&G-A,B,C,D	NA	NA	NA	NA	NA	NA	ND(50)	Sb=ND (0.05)
	"	NA	NA	NA	NA	NA	NA	NA	As=0.08
	"	NA	NA	NA	NA	NA	NA	NA	Ba=8.7
	"	NA	NA	NA	NA	NA	NA	NA	Be=ND(0.05)
	"	NA	NA	NA	NA	NA	NA	NA	Cd=ND(0.05)
	"	NA	NA	NA	NA	NA	NA	NA	Cr=0.07
	"	NA	NA	NA	NA	NA	NA	NA	Co=0.16
	"	NA	NA	NA	NA	NA	NA	NA	Cu=0.07
	"	NA	NA	NA	NA	NA	NA	NA	Pb=ND(0.1)
	"	NA	NA	NA	NA	NA	NA	NA	Hg=ND(0.0002)
	"	NA	NA	NA	NA	NA	NA	NA	Mo=ND(0.05)
	"	NA	NA	NA	NA	NA	NA	NA	Ni=0.34
	"	NA	NA	NA	NA	NA	NA	NA	Se=ND(0.05)
	"	NA	NA	NA	NA	NA	NA	NA	Ag=ND(0.01)
	"	NA	NA	NA	NA	NA	NA	NA	Tl=ND(0.5)
	"	NA	NA	NA	NA	NA	NA	NA	V =0.34
	"	NA	NA	NA	NA	NA	NA	NA	Zn=0.2

NOTES:

NA = not available; ND = not detected above the quantification limit given in parenthesis following the ND.

1 TRPH = total recoverable petroleum hydrocarbons by Standard Method 5520D&F

2 Sb = Antimony, As = Arsenic, Ba = Barium, Be = Beryllium, Cd = Cadmium, Cr = Chromium
Co = Cobalt, Cu = Copper, Pb = Lead, Hg = Mercury, Mo = Molybdenum, Ni = Nickel
Se = Selenium, Ag = Silver, Tl = Thallium, V = Vanadium, Zn = Zinc.

TABLE 5

ANALYTICAL RESULTS FOR SOIL SAMPLES COLLECTED FROM SIDE WALLS AND BOTTOM OF THE EXCAVATION PIT
CELIS ALLIANCE FUEL STATION, EMERYVILLE, CALIFORNIA

Sample ID	Benzene	Toluene	Ethyl benzene	Xylenes	TPHg	TPHd	TRPH (1)	Cadmium	Chromium (total)	Lead	Nickel	Zinc
	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
E-1	0.33	3.5	3.4	16	240	NA	NA	NA	NA	NA	NA	NA
E-2	0.81	3.4	1.8	8.9	170	2	ND(50)	1.4	18	4.3	34	26
E-3	2.9	18	9.2	46	660	NA	NA	NA	NA	NA	NA	NA
E-4	2.6	12	4.9	24	380	5.2	ND(50)	1.4	16	5.6	17	30
N-1	2.6	21	11	57	920	21	ND(50)	2.1	26	6.1	37	40
N-2	0.097	0.83	2.5	11	250	10	ND(50)	1.4	16	2.8	26	23
N-3	0.38	3	3.6	17	390	96	ND(50)	2.6	20	7.3	25	40
N-4	0.16	ND(0.1)	1	1.3	85	310	160	2.1	28	5	25	29
S-1	1.7	6	9.9	41	800	NA	NA	NA	NA	NA	NA	NA
S-2	0.4	0.2	4	12	430	60	ND(50)	2.3	28	7	39	43
S-3	1.4	ND(0.13)	11	1.7	730	NA	NA	NA	NA	NA	NA	NA
S-4	ND(0.5)	ND(0.5)	5.6	13	560	25	ND(50)	1.9	26	8.3	23	30
W-1	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(1.0)	ND(1.0)	ND(50)	2.2	27	8	34	45
W-2	0.34	0.61	2.3	6.9	230	34	ND(50)	2.3	29	5.5	26	42
W-3	0.012	ND(0.01)	0.029	0.043	20	180	ND(50)	1.4	19	5.6	21	27
W-4	ND(0.05)	0.073	0.26	0.99	80	500	150	2	28	6.2	36	38
B-C-1	0.081	0.11	2	8.4	260	68	ND(50)	2.3	31	6.7	29	37
B-C-2	2.4	10	11	49	1000	75	ND(50)	1.3	18	4	19	25
B-C-3	2.2	15	7.3	39	690	29	ND(50)	1.8	27	5.2	25	33
B-O&G-1	2.4	9.9	6.3	27	490	160	ND(50)	2.7	35	8.3	41	39
B-D-1	3.8	1.7	8.1	17	650	18000	15000	1.9	27	7	25	27
B-G-1	0.64	ND(0.5)	6.5	12	540	ND(10)	120	2.9	25	54	21	200

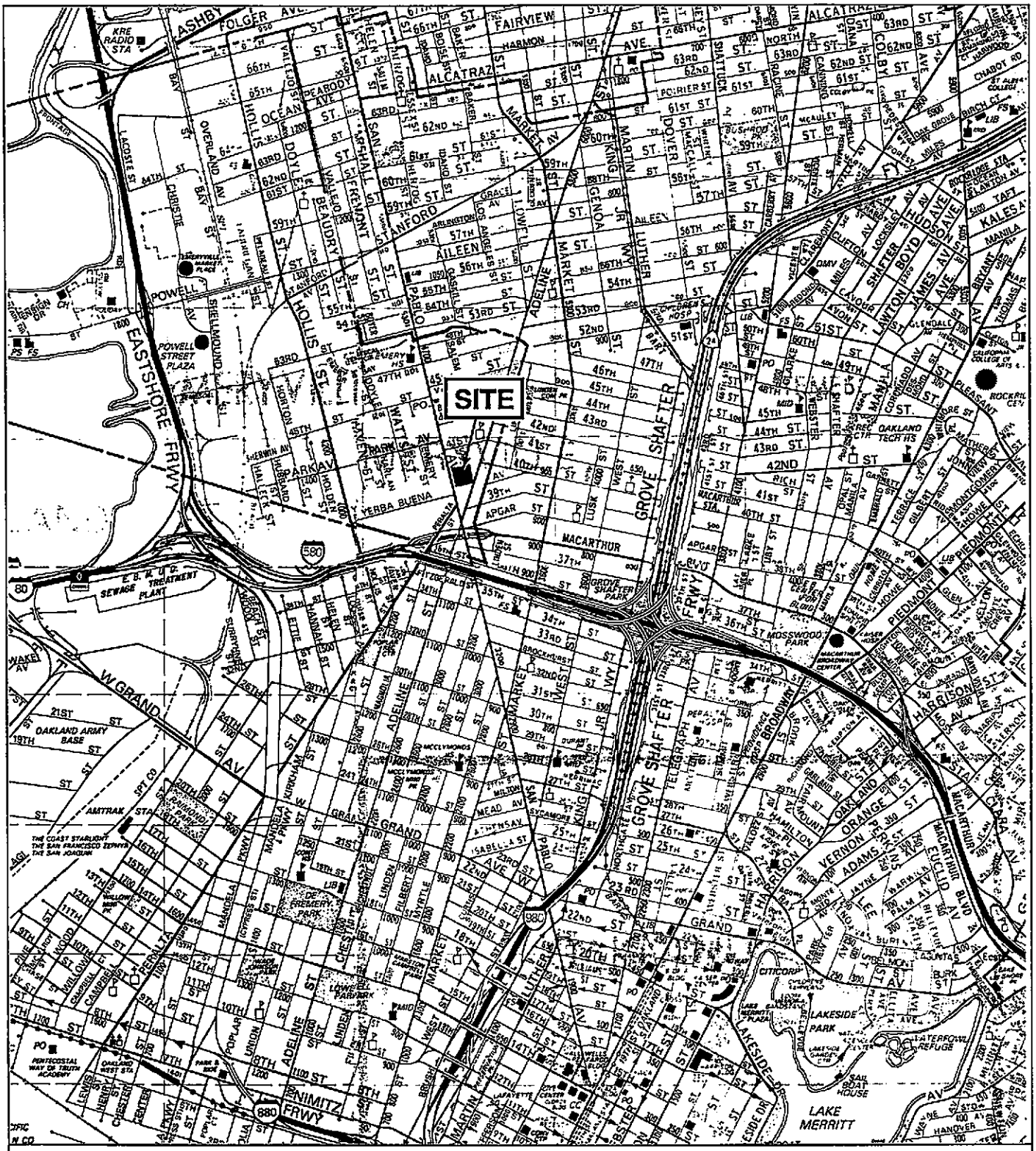
NOTES (1) TRPH = total recoverable petroleum hydrocarbons as determined by Standard Method 5520 E&F

(2) NA = not available; ND = not detected above the quantification limit given in parenthesis following the ND.

TABLE 6.

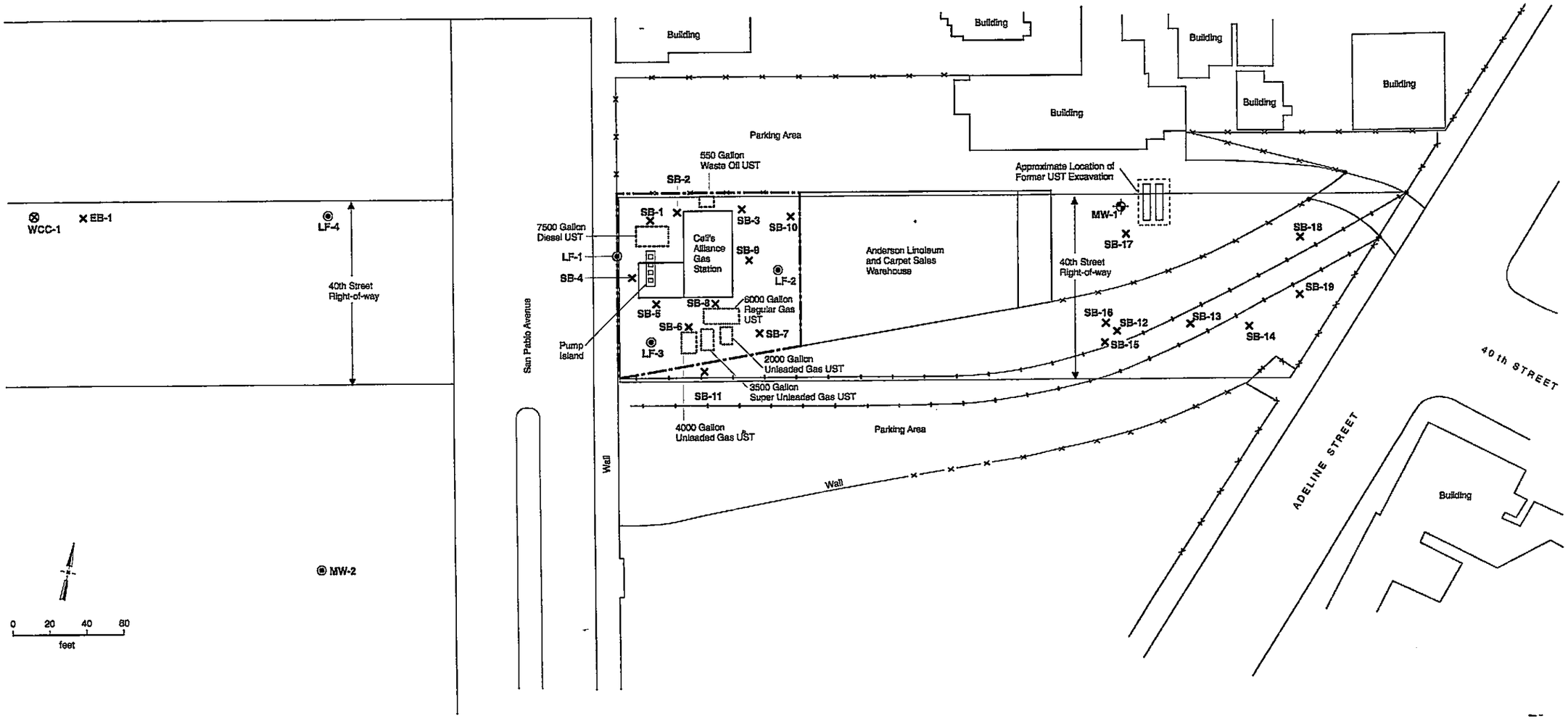
RWQCB's Definition of Low Risk Groundwater Case
and its Application to the Celis Fuel Station Site.

	RWQCB's definition of low risk groundwater case	Celis Fuel Station at 40th St. Right-of-Way
1	The leak has been stopped and ongoing sources, including free product, have been removed or remediated.	Removed all USTs and associated piping in 1994. Removed soil down to groundwater level. But Levine-Fricke reported 6-in free product in monitor well LF-1 in 1993. Action: to install one 4" well in the former LF-1 area to remove free product.
2	The site has been adequately characterized.	Both soil and groundwater have been adequately characterized.
3	The dissolved hydrocarbon plume is not migrating.	Not enough groundwater monitoirng data are available. Action: to perform one year groundwater monitoring.
4	No water wells, deeper drinking water aquifers, surface water, or other sensitive receptors are likely to be impacted.	This statement can probably be applided to this site. No action would be necessary at this time until evidence indicates otherwise.
5	The site presents no significant risk to human health.	Action: to perform RBCA Tier 1 and Tier 2 (if necessary) risk evaluation.
6	The site presents no significant risk to the environment.	The site does not appear to present any significant risk to the environment, but will be further addressed in combination with the RBCA risk evaluation above under definition #5.



Project No. 941114NA	40th Street UST	SITE LOCATION MAP CELI'S ALLIANCE GAS STATION SITE	Figure 1
Woodward-Clyde Consultants			

941114NA-1000/060994



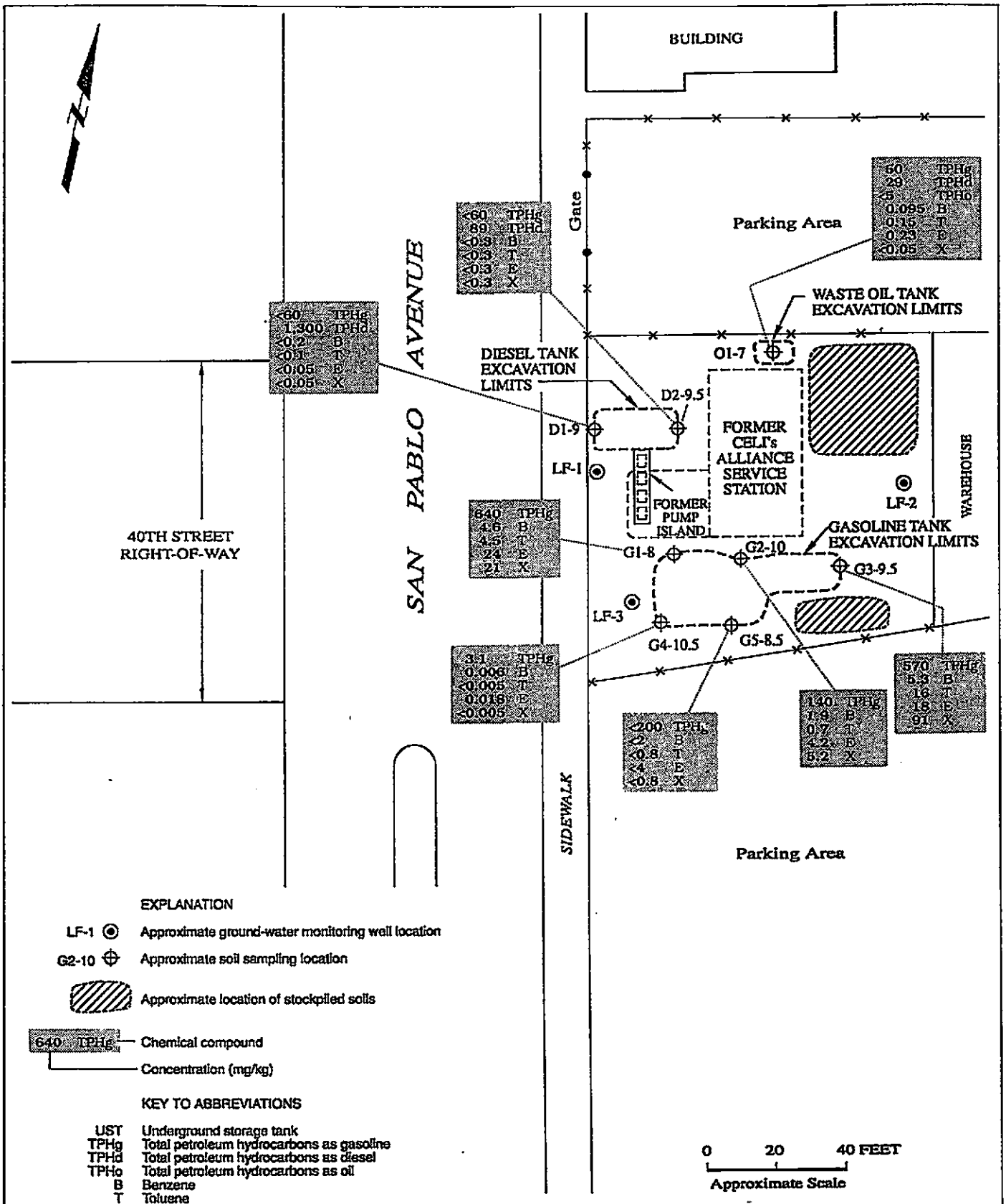
EXPLANATION

- Approximate Location of Former Railroad Tracks
- × Soil Borings by Levine-Fricke
- ◉ Monitoring Well by Levine-Fricke (LF-1, LF-2, & LF-3 destroyed)
- ⌖ Monitoring Well by SECOR (destroyed)
- ⊗ Proposed Monitoring Well by WCC in 1994 (not installed)

Source: Levine-Fricke (1992) and Woodward-Clyde Consultants (1994)

Project No. 941114NA	40th Street UST	SOIL BORING AND MONITORING WELL LOCATIONS 40TH STREET RIGHT-OF-WAY EMERYVILLE, CALIFORNIA	Figure 2
Woodward-Clyde Consultants			

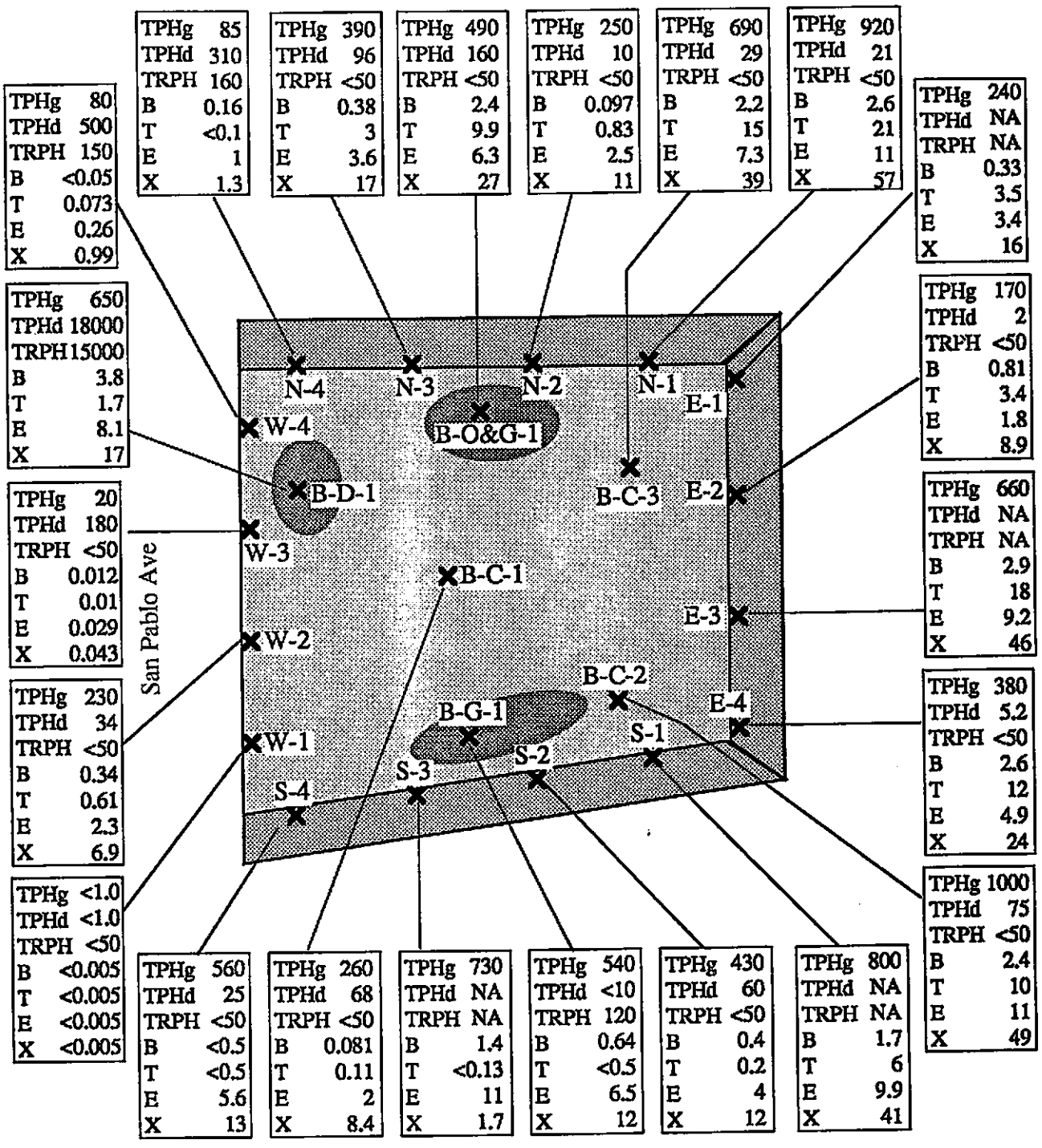
941114NA-9620/05/2/96



Source: Reference 7 (Levine-Fricke Report)

Project No. 941114NA	40th Street UST	SITE PLAN SHOWING UST EXCAVATIONS, SAMPLEING LOCATIONS AND TPH AND BTEX CONCENTRATIONS	Figure 3
Woodward-Clyde Consultants			

941114NA-1000/110794



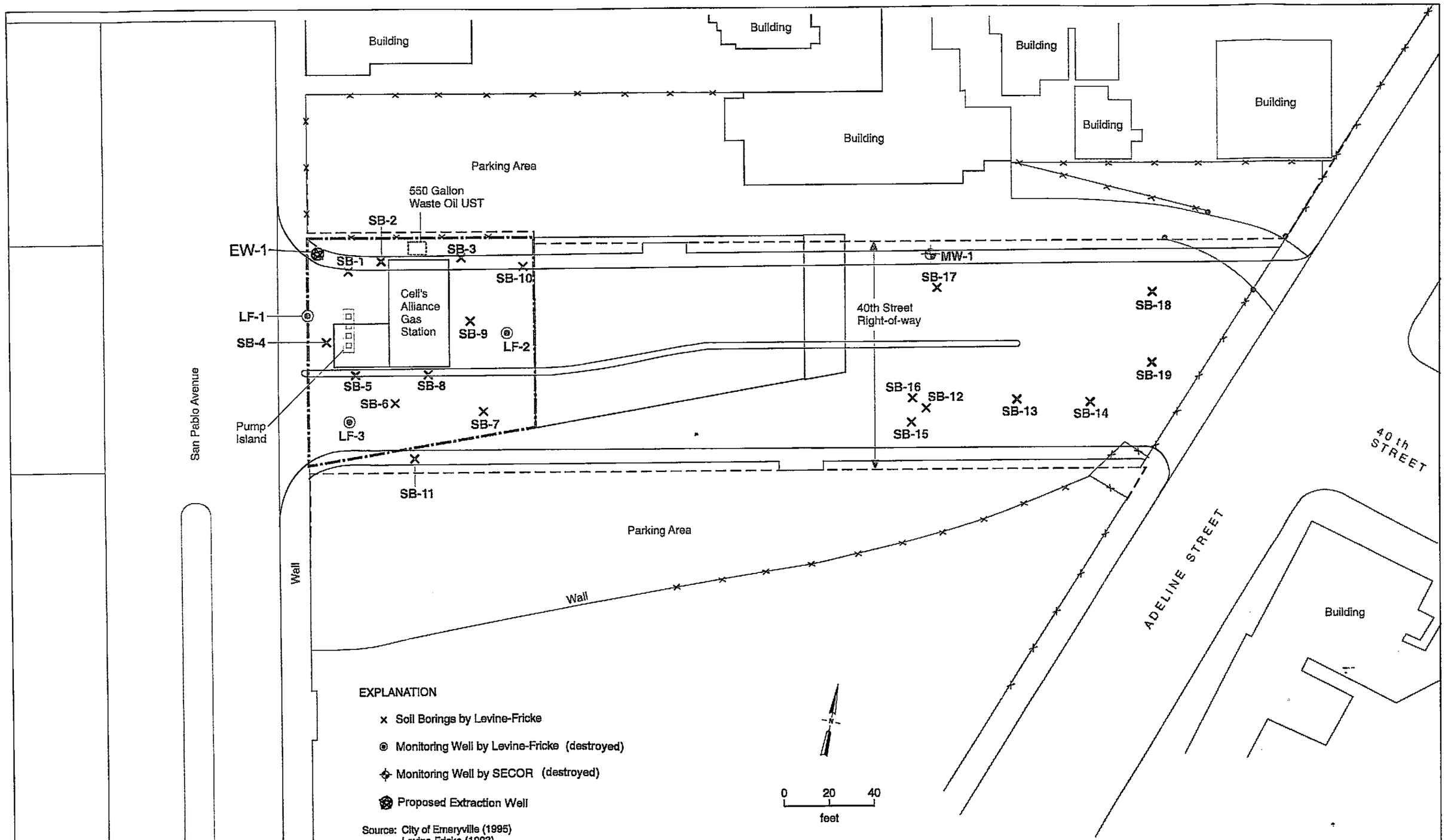
TPHg = total petroleum hydrocarbons as gasoline
TPHd = total petroleum hydrocarbons as diesel
TRPH = total recoverable petroleum hydrocarbons

B = benzene
T = toluene
E = ethyl benzene
X = xylenes

Soil samples on side walls were collected 6-in above the bottom floor

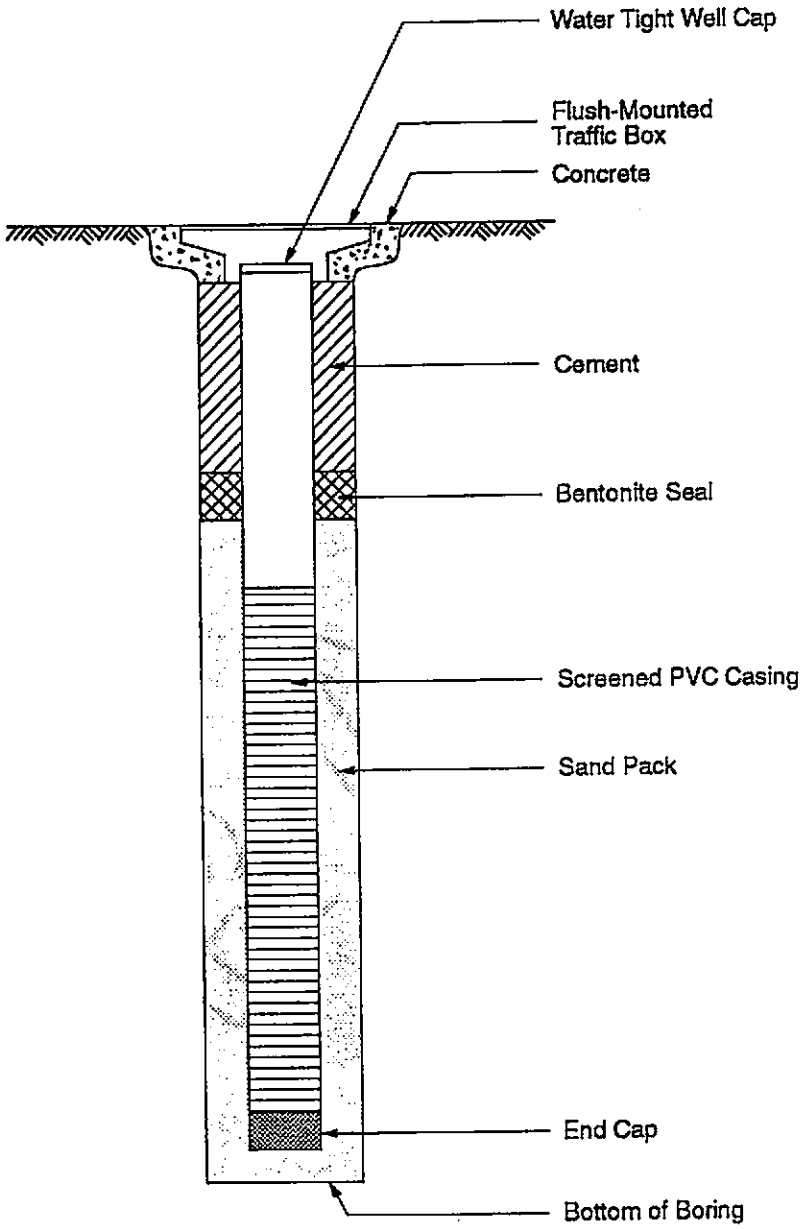
Unit of Concentration: mg/kg

Project No. 941114NA	CITY OF EMERYVILLE REDEVELOPMENT AGENCY	SOIL SAMPLING LOCATIONS & ANALYTE CONCENTRATIONS	Figure 4
Woodward-Clyde Consultants		40th Street UST at 4000 San Pablo Avenue	



Project No. 941114NA	40th Street UST	40TH STREET RIGHT-OF-WAY EMERYVILLE, CALIFORNIA	Figure 5
Woodward-Clyde Consultants			

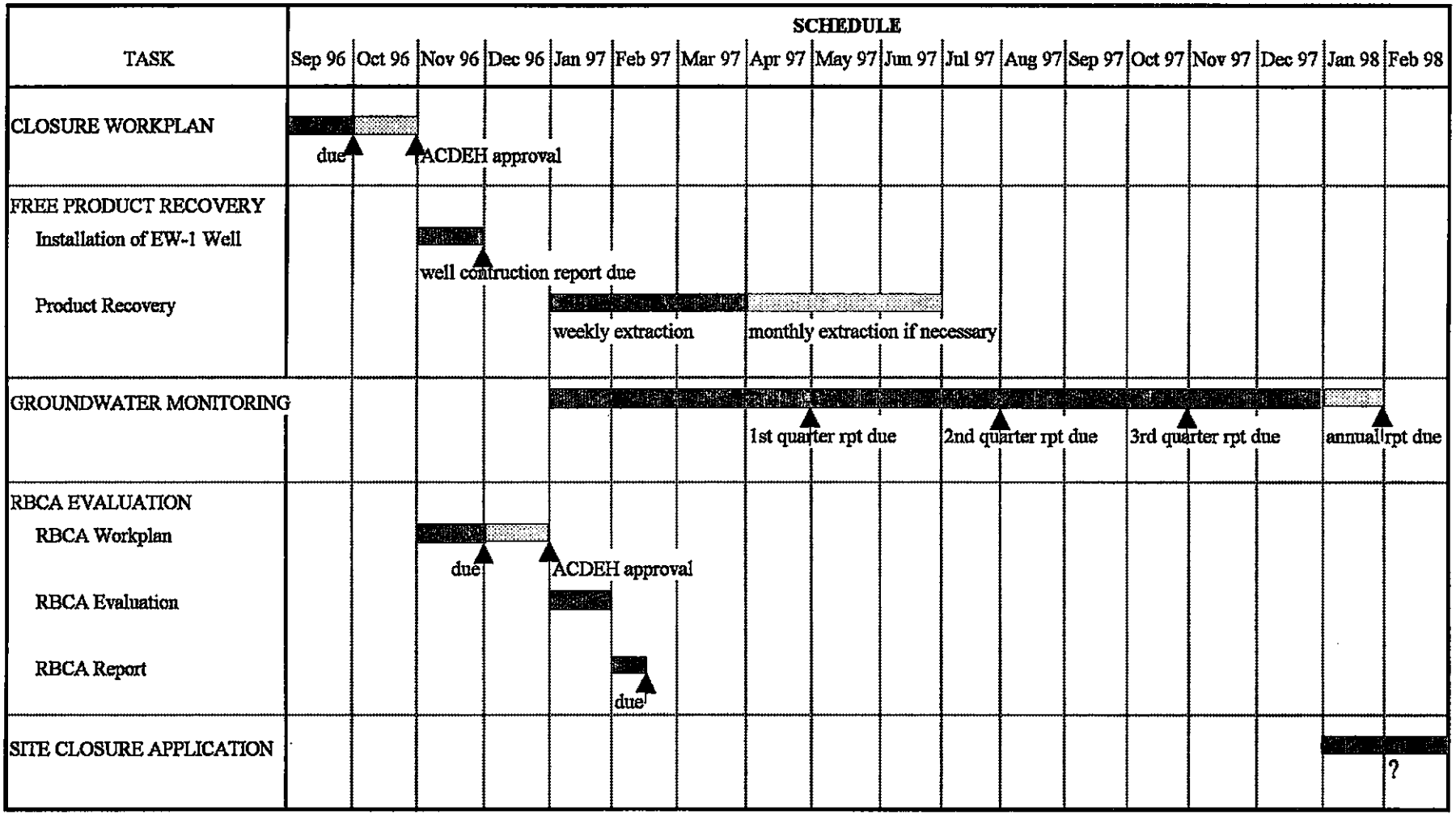
941114NA-9620/05/2/96



Woodward-Clyde Consultants		PROPOSED MONITORING WELL CONSTRUCTION	Figure 6

92C0644A-0200/050694

FIGURE 7. PROJECT SCHEDULE



APPENDIX A SITE HEALTH AND SAFETY PLAN

FORM HS-507
SITE SAFETY PLAN
FIELD INVESTIGATION OF UNDERGROUND FUEL SPILLS

ADMINISTRATIVE INFORMATION

Project Number 941114NA **Project Name** 40th St. UST

Project Manager Xinggang Tong **Operating Unit** Oakland WMG

Site Safety Officer Xinggang Tong **Health & Safety Officer** Tanya Rice

Date of Issue 9/26/96 **Effective Dates** 9/26/96 - 3/31/98

SITE INFORMATION (attach map of site)

Location: 40th St between San Pablo Ave and Adeline St, Emeryville, CA

Pertinent History: Gas station. All USTs have been removed

Material(s) Spilled: gasoline and diesel

FIELD ACTIVITIES

monitoring well installation, groundwater extraction, sampling

EMERGENCY TELEPHONE NUMBERS

Fire Department	911
Ambulance	911
Hospital	(510) 204-4444
Project Manager	(510) 874-3060
Health & Safety Officer	(510) 874-3146
Hospital	

FORM HS-507
SITE SAFETY PLAN
FIELD INVESTIGATION OF UNDERGROUND FUEL SPILLS, CONCLUDED

HOSPITAL INFORMATION

Name: Alta Bates Hospital

Address: 2450 Ashby Ave.

Route: from the site, take San Pablo Ave. south to Ashby, turn left, hospital is on, see attached map

AUTHORIZED FIELD PERSONNEL

Clifford Chan

Carrie Austin

Xinggang Tong

Dave Wallenstain

NAME OF SUBCONTRACTORS (field work)

Name: _____ **Telephone Number:** _____

Address: _____

Authorized Representatives: _____

Name: _____ **Telephone Number:** _____

Address: _____

Authorized Representative: _____

APPROVALS

Xinggang Tong — **Project Manager**

9/26/96 — **Date**

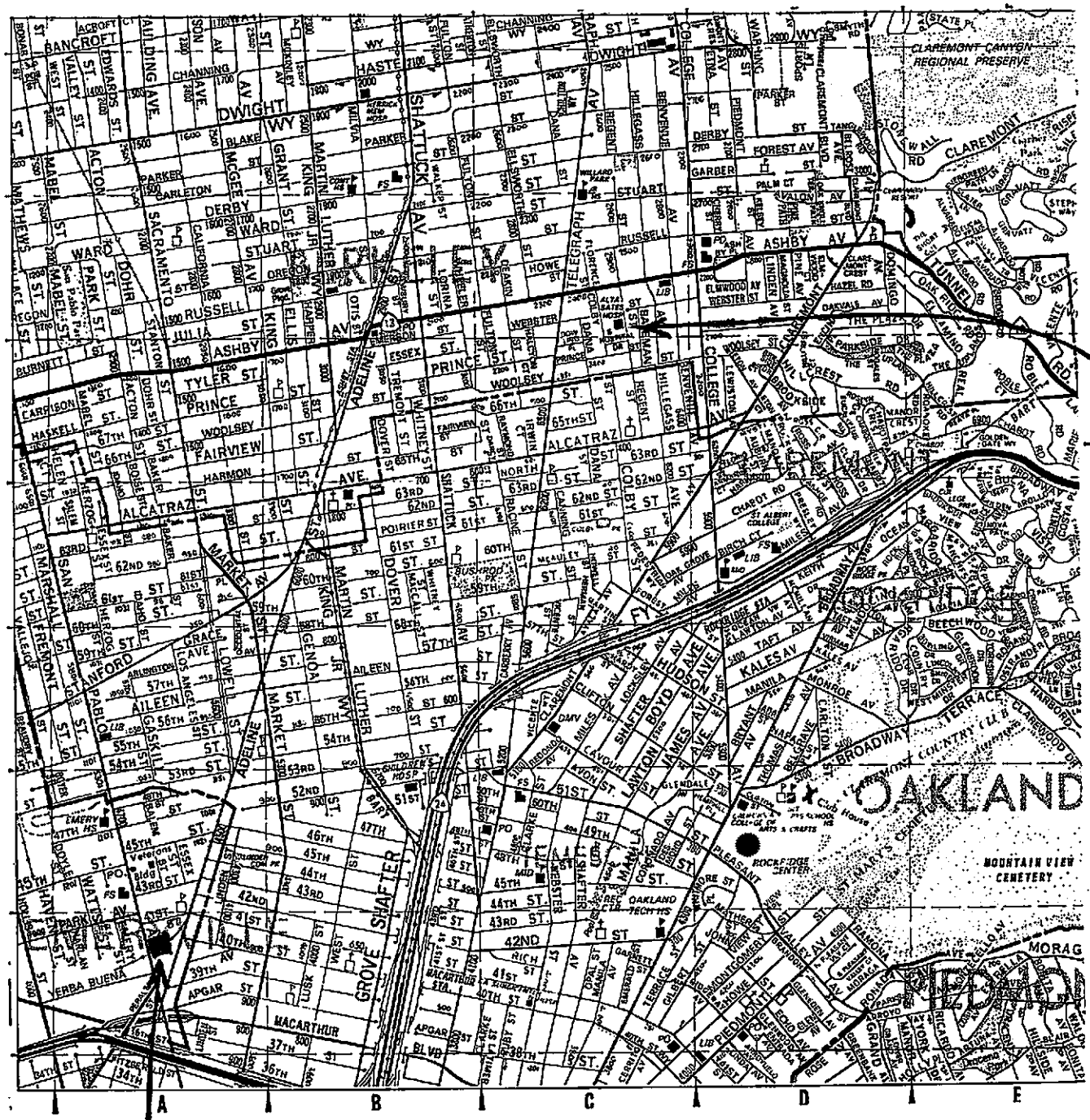
_____ **Health & Safety Officer**

_____ **Date**

_____ **Corporate Health & Safety Officer***

_____ **Date**

*Signature required only for modified plans.


Hospital
Site . the former Celis Gas Station @ 4000 San Pablo Ave.
Hospital Route

OPERATING PROCEDURE NO. HS-507

507.0 PROCEDURES FOR FIELD INVESTIGATIONS OF UNDERGROUND SPILLS OF GASOLINE AND OTHER PETROLEUM DISTILLATE FUELS

507.1 PURPOSE

The purpose of this procedure is to establish sound and uniform health and safety procedures and guidelines for field operations associated with investigations of leakage of petroleum hydrocarbon fuels from underground storage tanks and pipes.

507.2 SCOPE

This procedure identifies the types of fuels and field activities to which it applies, assesses the hazards of fuels, and describes risk control measures.

507.3 APPLICABILITY

This procedure applies to: (1) collection of samples of surface and subsurface soil, (2) construction, completion, testing, and abandonment of groundwater monitoring wells, (3) collection of water samples from new and existing wells, and observing removal of underground fuel pipes and storage tanks at facilities that currently dispense or store:

(1) leaded gasoline
(2) unleaded gasoline,
(3) gasohol,
(4) Numbers 1, 1D (diesel), 2, 2D (diesel), 4, 5, or 6 fuel oils,
(5) jet A, jet A-1, jet B, JP-1, JP-3, JP-4, and JP-5 jet fuels,
(6) crankcase oil,
(7) methanol (when used as a motor fuel), and/or
(8) stoddard solvent.

This procedure shall not be used for confined space entry or for installing or operating pilot and full-scale fuel recovery systems. This plan may be used for the installation of vapor extraction systems only by appropriate modification and proper health and safety approvals. This plan may not be used for the start-up or operation of vapor extraction systems. It is also not applicable to field work performed at refineries, sites where spills of chemicals other than the substances listed above have occurred, sites of unusual hazard, and any other site or activity for which the use of this plan is identified as inappropriate by the operating unit HSO.

This plan is applicable to work involving the removal of underground fuel pipes and storage tanks only when used with and attached to the American Petroleum Institute API Recommended Practice 1604, Second Ed. 1987 as revised March 6, 1989, Removal and Disposal of Used Underground Petroleum Storage Tanks.

This plan is applicable to work involving boring with power equipment only when used with and attached to Woodward-Clyde Operating Procedure HS-509, Safety Guidelines For Drilling Into Soil and Rocks.

This plan is applicable to work involving entry into excavations by Woodward-Clyde or Woodward-Clyde subcontractor personnel only when used with and attached to Woodward-Clyde Operating Procedure HS-510, Safety Procedures for Trench Construction and Other Excavating Operations.

507.4 RESPONSIBILITY AND AUTHORITY

The Project Manager has overall responsibility for safe conduct of all field work, including ensuring full implementation of this procedure by the site manager, project staff and subcontractors assisting with field work. The PM shall assign (with the concurrence of the operating unit HSO or HSC) a Site Safety Officer (SSO) to attend to day-to-day health and safety matters in the field. The PM may elect, if qualified, to serve as SSO. The SSO must be on-site whenever work by employees of WC or its subcontractors is being performed at the site.

Both the PM and SSO are authorized to suspend work when working conditions become too hazardous and are authorized to remove from the site any WC and subcontractor employee whose conduct endangers the health and safety of the employee or of others.

507.5 HAZARD EVALUATION

Petroleum distillate fuels are mixtures of aliphatic and aromatic hydrocarbons, the constituent concentrations of which can vary significantly dependent upon the crude feedstock, refining process, and seasonal variations. The predominant types of compounds in fuels are paraffins (e.g., pentane, hexane), naphthenes (e.g., cyclohexane) and aromatics (e.g., benzene, toluene, polynuclear aromatics). Gasoline contains about 80 percent paraffins, 6 percent naphthenes, and 14 percent aromatics. JP-1 and 4 contain up to 48 percent paraffin, 38 percent naphthenes, and 20 percent aromatics. Fuel oils and certain jet fuels (JP-3 and 5) contain about 10 percent paraffin, up to 23 percent naphthenes, and up to 78 percent non-volatile aromatic hydrocarbons. Gasohol is gasoline containing 10 to 40 percent ethyl alcohol. Methanol as it is used as a motor fuel typically contains up to 20% gasoline to improve cold starting characteristics as a safety factor to provide a visible flame. To improve their burning properties, compounds such as tetraethyl-lead, methyl tertbutyl ether (MTBE) and ethylene dibromide (EDB) are often added to automotive and aviation fuels.

Petroleum distillate fuels exhibit relatively low acute inhalation and dermal toxicity. Concentrations of 160 to 270 ppm gasoline vapor have been reported to cause eye, nose, and throat irritation in people after several hours of exposure. Levels of 500 to 900 ppm have been reported to cause irritation and dizziness in one hour and 2,000 ppm has been reported to cause mild anesthesia in 30 minutes. Gasoline, kerosene, and some jet fuels will cause severe eye irritation on contact with the eye and low to moderate skin irritation on contact with the skin. Methanol can be toxic by either skin or inhalation exposure, and is unique in that it attacks the optic nerve. Methanol blindness can be irreversible.

Ingestion of 10 to 15 grams (2 to 3 teaspoons) of gasoline has caused death in children. In adults, ingestion of 20 to 50 grams may produce severe symptoms of poisoning. The most dangerous aspect of ingestion of these motor fuels is the development of chemical pneumonia from the aspiration of gasoline or other fuels are aspirated into the lungs.

Aspiration of very small quantities of these motor fuels into the lungs is often fatal. Some gasoline additives, such as ethylene dichloride, ethylene dibromide, and tetraethyl- and tetramethyl-lead are highly toxic materials; however, their concentrations in gasoline are so low that their contribution to the overall toxicity of gasoline is negligible in most instances.

Petroleum distillate fuels are flammable. Under certain conditions, this property presents a greater risk than toxicity. Six of the fuels covered by this procedure are classified by the Federal Department of Transportation as flammable liquids as all six typically have flash points of 100 degrees F or less. These fuels are gasoline, gasohol, Jet B, JP-1, JP-4, and No. 1 fuel oil. Lower explosive limits of the fuels range from 0.6 to 1.4 percent (6,000 to 14,000 ppm).

507.6 HEALTH AND SAFETY CLEARANCE

WC employees as well as subcontractor employees assigned to perform field activities covered by this procedure must be currently approved for hazardous waste field work, including:

Current medical clearance to conduct hazardous waste field work and to wear a respirator;

Successful completion of a respirator fit test within the last 12 months for the make and model of the respirator assigned to that individual for use at that site;

Completion of training as required by 29 CFR 1910.120(e), including either:

40 hours of hazardous waste worker basic instruction within the last 12 months, or,

8 hours of hazardous waste worker refresher training within the last 12 months, subsequent to completion of 40 hours of basic hazardous waste worker training.

507.7 HEALTH AND SAFETY BRIEFING

Before field work begins, all field personnel, including subcontractor employees, must be briefed on their work assignments and the provisions of this procedure, and each person briefed must be given a copy of this document and each must acknowledge receipt and willingness to comply by submitting a signed safety compliance agreement to the WC Project Manager. Individuals refusing to sign the agreement will be prohibited from working at the site.

507.8 PERSONAL PROTECTIVE EQUIPMENT

Equipment listed below must be available on-site in appropriate sizes for use when needed.

1. NIOSH approved full- or half-face respirator with organic vapor cartridges. Respirators must be worn when airborne hydrocarbon action levels are reached or exceeded.

2. Saranex or polyethylene coated Tyvek coveralls. Coated coveralls must be worn when product quantities of fuel are encountered and when fuel-saturated soil is handled.

3. Safety goggles or glasses. Must be worn when working within 10 feet of operating heavy equipment (e.g., drill rig, backhoe). Must be splash-proof when handling concentrated fuel product.

4. Nitrile or neoprene gloves for all fuels except methanol. Workers handling methanol must wear butyl gloves. Gloves must be worn when handling contaminated soil or water or drilling or digging into contaminated soil. Confirm with your HSO the applicability of model and brand of gloves!

5. Neoprene or butyl rubber safety boots, calf-length. Must be worn when walking on obviously contaminated soil and when working within 10 feet of operating heavy equipment.

6. Hardhat. Must be worn when working within 10 feet of operating heavy equipment.

507.9 ORGANIC VAPOR MONITORING

507.9.1 Monitoring Instruments

Two instruments are required for this work:

1) Combustible Gas/Oxygen indicator (CGI/O_2) with readout in %LEL and $\%O_2$.

2) Photoionization (PID) field survey instrument (HNU, ThermoEnvironmental 580A, Photovac Microtip, or equivalent)*, or, Flame-ionization (FID) field survey instrument (Foxboro OVA or equivalent).

*PID instruments cannot readily detect methanol, and therefore may NOT be used on sites where methanol is or may be encountered.

507.9.2 Toxicity Action Levels

The toxicity action levels given below are set to comply with OSHA Permissible Exposure Levels and ACGIH Threshold Limit Values. Some of the more volatile motor fuels also contain some concentration of benzene. Gasoline averages approximately 1% benzene. Therefore, for motor fuels which may contain benzene, the action levels specified below are also set to comply with the proposed TLV of 0.1 ppm. These action levels are also adjusted for the relative response of common PID or FID instruments to motor fuel vapors.

Respirators must be worn when meter readings averaged over 10 minutes equal or exceed the action level for upgrade to Level C PPE. Workers must be evacuated from the area when organic vapor concentrations exceeding respiratory protective equipment protection factors are encountered.

507.9.2.1 Toxicity Action Levels for Gasoline and Jet B

TOXICITY ACTION LEVELS
GASOLINE AND JET B
(in PPM indicated)

Instrument	Calibration Gas	Action Upgrade to Level C	Evacuate
Photoionization meter# (10.0 to 10.2 eV lamp)	H.Nu calibration gas* or Benzene	2	60** 300***
Photoionization meter (10.0 to 10.2 eV lamp)	Isobutylene	3.3	100** 500***
Flame-ionization meter (OVA-128)	Methane	10	300** 1500***

Photoionization instruments do not work and shall not be used for work in high (<90%) humidity or rainy weather, or sites where methanol is or may be present.

* Although the calibration gas purchased from HNU is isobutylene, the concentration identified on the cylinder for calibration of an HNU with 10.2 eV lamps is a benzene equivalent.

** for workers wearing 1/2 face respirators.

*** for workers wearing full face respirators.

507.9.2.2 Toxicity Action Levels for Fuels other than Gasoline and Jet B

TOXICITY ACTION LEVELS
FUELS OTHER THAN GASOLINE, METHANOL AND JET B
(in PPM indicated)

Instrument	Calibration Gas	Action Upgrade to Level C	Evacuate
Photoionization meter# (10.0 to 10.2 eV lamp)	H.Nu calibration gas* or Benzene	20	60** 300***
Photoionization meter (10.0 to 10.2 eV lamp)	Isobutylene	33	100** 500***
Flame-ionization meter (OVA-128)	Methane	99	300** 1500***

Photoionization instruments do not work and shall not be used for work in high (<90%) humidity or rainy weather.

* Although the calibration gas purchased from H.Nu is isobutylene, the concentration identified on the cylinder for calibration of H.Nu's with 10.2 eV lamps is a benzene equivalent.

** for workers wearing 1/2 face respirators.

*** for workers wearing full face respirators.

All instruments shall be calibrated both immediately prior to commencing the day's field work and after work ceases for the day. Calibration and monitoring records shall be kept in the project file and provided to the operating unit HSO. Records shall include:

Worker's name,
Date,
Time,
Location,
Temperature and humidity, and
Calibration gas identity and concentration.
Exposure data (time, location, and concentration)

507.9.3 Explosion Hazard Action Levels

The explosivity action levels below are set to prevent the creation of flammable or explosive atmospheres. Measurements should be taken at all locations where personnel are present or power/hand tools are in use.

EXPLOSIVITY ACTION LEVELS
(% of the LEL)

Instrument	Calibration Gas	Action Level (Evacuate)
Combustible Gas Indicator	hexane	20%
Combustible Gas Indicator	methane	20%

The CGI alarm must be set to sound at the action level. For this work it is highly recommended that hexane be used as the calibration gas.

When measurements with a combustible gas indicator (CGI) indicate the presence of combustible gas levels equal to or exceeding the explosivity action level in the work area, the following action must be taken:

1. Extinguish all possible ignition sources in the work area and shut down all powered equipment.

2. Move personnel at least 100 feet away from work area.

3. Contact Health and Safety Officer (HSO).

4. At the instruction of the HSO and after waiting 5 minutes for organic vapors to dissipate, the SSO or PM may use the CGI to cautiously and with prudence approach the worksite to determine the extent and concentration of organic emissions. The SSO or PM shall not enter any area where CGI readings exceed the explosivity action level, nor shall the SSO or PM make any approach if there is possibility of fire or explosion.

5. Personnel may reenter the work area only by clearance of the HSO after the cause of the emission has been determined and the source abated.

6. Prepare incident report and submit to HSO.

507.9.4 Monitoring Guidelines

Personnel exposure monitoring should be performed as often as necessary and wherever necessary to protect field personnel from hazardous concentrations of organic vapors. Monitoring must be performed by individuals trained in the calibration, use and care of the required instruments.

Toxicity action levels are considerably lower then explosivity action levels. Therefore initial and periodic monitoring should be conducted with the PID or FID. Monitoring shall be conducted in the worker's breathing zone, which is a 1 foot diameter sphere surrounding the worker's head. The alarm on this instrument should be set to sound at the action level. If vapors are measured continuously and the instrument must be unattended, the detector inlet should be located as close to the worker's breathing zone as possible. Decisions regarding respirator use should be based on breathing zone vapor concentrations of personnel expected to have the greatest exposures. Particular effort should be made to monitor personnel exposures while trenching, boring or tank inerting is progressing.

Explosivity monitoring should be continuous, with the detector set at a location near and downwind of the source of emission. Additional monitoring with the CGI should be

performed when organic vapor concentrations exceed the ppm range of the PID or FID instrument. If the alarm sounds while continuously monitoring with a CGI, initiate shut-down and evacuation procedures immediately.

507.10 AREA CONTROL

Access to hazardous and potentially hazardous areas of spill sites must be controlled to reduce the probability of occurrence of physical injury and chemical exposure of field personnel, visitors, and the public. A hazardous or potentially hazardous area includes any area where (1) field personnel are required to wear respirators, (2) borings are being drilled with powered augers, or (3) excavating operations with heavy equipment are being performed.

The boundaries of hazardous and potentially hazardous areas must be identified by cordons, barricades, or emergency traffic cones or posts, depending on conditions. If such areas are left unattended, signs warning of the danger and forbidding entry must be placed around the perimeter if the areas are accessible to the public. Trenches and other large holes must be guarded with wooden or metal barricades spaced no further than 20 feet apart and connected with yellow or yellow and black nylon tape not less than 3/4-inches wide. The barricades must be placed no less than two feet from the edge of the excavation or hole.

Entry of hazardous areas shall be limited to individuals who must work in those areas. Unofficial visitors must not be permitted to enter hazardous areas while work in those areas is in progress. Official visitors should be discouraged from entering hazardous areas, but may be allowed to enter only if they agree to abide by the provisions of this document, follow orders issued by the site safety officer, and are informed of the potential dangers that could be encountered in the areas.

507.11 DECONTAMINATION

Field decontamination of personnel and equipment is not required except when contamination is obvious (visually or by odor). Recommended decontamination procedures follow.

507.11.1 Personnel Decontamination

Gasoline, kerosene, jet fuel, and gasohol should be removed from skin using a mild detergent and water. Hot water is more effective than cold. Liquid dishwashing detergent is more effective than hand soap.

507.11.2 Equipment Decontamination

Gloves, respirators, hardhats, boots and goggles should be cleaned as described under personnel; however, if boots do not become clean after washing with detergent and water, wash them with a strong solution of trisodium phosphate and hot water.

Sampling equipment, augers, vehicle undercarriages, and tires should be steam or high pressure washer cleaned. The steam cleaner is a convenient source of hot water for personnel and protective equipment cleaning.

507.12 SMOKING

Smoking and open flames are strictly prohibited at sites under investigation.

507.13 INERTING OF TANKS

Whenever WC personnel must be present during removal or transport of fuel storage tanks, the SSO or designee must determine whether or not the procedures to be used by the firm responsible for tank removal/transport agree with API Recommended Practice 1604, Second Ed. 1987 as revised March 6, 1989, Removal and Disposal of Used Underground Petroleum Storage Tanks. If the firm's procedures, especially those addressing removal/inactivation of flammable vapors, disagree substantially with API's procedures, the PM and HSO must be notified immediately (by telephone, if possible). In turn, the PM shall inform the client that WC personnel will not report to the site during tank/removal operations unless proper procedures are used. If the firm responsible for tank removal/transport is under subcontract to WC, the WC project manager shall require the subcontractor to follow API procedures.

OPERATING PROCEDURE NO. HS-203

203.0 SAFETY GUIDELINES FOR DRILLING INTO SOIL AND ROCKS

203.1 PURPOSE

The purpose of this Operating Procedure (OP) is to provide an overview for working safely around drilling operations with truck-mounted and other engine-powered drill rigs. The procedure addresses off-road movement of drill rigs, overhead and buried utilities, use of augers, rotary and core drilling, and other drilling operations and activities.

203.2 APPLICATION

The guidelines shall be applied in Woodward-Clyde (W-C) projects in which truck-mounted, or other engine-powered, drill rigs are used. The guidelines are applicable to W-C employees and W-C owned rigs. For drill rigs operated by contractors, the primary responsibility for drilling safety is with the drilling contractor.

203.3 RESPONSIBILITY AND AUTHORITY

Drill rig safety and maintenance is the responsibility of the drill rig operator. W-C employees are responsible for their own safety including recognizing and avoiding drill rig hazards. W-C employees that observe a drill rig condition believed to be unsafe, shall advise the drill rig operator of the unsafe condition.

203.4 SAFETY GUIDELINES

203.4.1 Movement of Drill Rigs

Before moving a rig, the operator must do the following:

1. To the extent practical, walk the planned route of travel and inspect it for depressions, gullies, ruts, and other obstacles.

2. Check the brakes of the truck/carrier, especially if the terrain along the route of travel is rough or sloped.

3. Discharge all passengers before moving on rough or steep terrain.

4. Engage the front axle (on 4x4, 6x6, etc. vehicles) before traversing rough or steep terrain.

Driving drill rigs along the sides of hills or embankments should be avoided; however, if side-hill travel becomes necessary, the operator must conservatively evaluate the ability of the rig to remain upright while on the hill or embankment. The possibility must be considered that the presence of drilling tools on the rig may reduce the ability of the rig to remain upright (raises the center of mass of the rig).

Logs, ditches, road curbs, and other long and horizontal obstacles should be normally approached and driven over squarely, not at an angle.

When close lateral or overhead clearance is encountered, the driver of the rig should be guided by another person on the ground.

Loads on the drill rig and truck must be properly stored while the truck is moving, and the mast must be in the fully lowered position.

After the rig has been positioned to begin drilling, all brakes and/or locks must be set before drilling begins. If the rig is positioned on a steep grade and leveling of the ground is impossible or impractical, the wheel of the transport vehicle should be blocked and other means of preventing the rig from moving or topping over employed.

203.5 BURIED AND OVERHEAD UTILITIES

The location of overhead and buried utility lines must be determined before drilling begins, and the locations should be noted on boring plans or assignment sheets.

When overhead power lines are close by, the drill rig mast should not be raised unless the distance between the rig and the nearest power line is at least 20 feet or other distance as required by local ordinances, whichever is greater. The drill rig operator or assistant should walk completely around the rig to make sure that proper distance exists.

When the drill rig is positioned near an overhead line, the rig operator should be aware that hoist lines and power lines can be moved towards each other by wind. When necessary and approved by the Project Manager (PM) and the utility and/or powerlines may be shielded, shut down, or moved by the appropriate personnel.

203.6 CLEARING THE WORK AREA

Before a drill rig is positioned to drill, the area on which the rig is to be positioned should be cleared of removable obstacles and the rig should be leveled if sloped. The cleared/leveled area should be large enough to accommodate the rig and supplies.

203.7 SAFE USE OF AUGERS

Never place hands or fingers under the bottom of an auger flight or drill rods when hoisting the augers or rods over the top of another auger or rod in the ground or other hard surfaces, such as the drill rig platform.

Never allow feet to get under the auger or drill rod while they are being hoisted.

When the drill is rotating, stay clear of the drill string and other rotating components of the drill rig. Never reach behind or around a rotating auger for any reason.

Move auger cuttings away from the auger with a long-handled shovel or spade; never use hands or feet.

Never clean an auger attached to the drill rig unless the transmission is in neutral or the engine is off, and the auger has stopped rotating.

203.8 SAFE USE OF HAND TOOLS

OSHA regulations regarding hand tools should be observed in addition to the guidelines provided below:

1. Each tool should be used only to perform tasks for which it was originally designed.

2. Damaged tools should be repaired before use or discarded.

3. Safety goggles or glasses should be worn when using a hammer or chisel. Nearby co-workers and by-standers should be required to wear safety goggles or glasses also, or move away.

4. Tools should be kept cleaned and stored in an orderly manner when not in use.

203.9 SAFE USE OF WIRE LINE HOISTS, WIRE ROPE, AND HOISTING HARDWARE

Safety rules described in Title 29 Code of Federal Regulations (CFR) 1926.552 and guidelines contained in the Wire RPE User's Manual published by the American Iron and Steel Institute shall be used whenever wire line hoists, wire rope, or hoisting hardware are used.

203.10 PROTECTIVE GEAR

203.10.1 Minimum Protective Gear

Items listed below should be worn by all members of the drilling team while engaged in drilling activities.

- Hard Hat;
- Safety Shoes (shoes or boots with steel toes and shanks); and
- Gloves.

203.10.2 Other Gear

Items listed below should be worn when conditions warrant their use. Some of the conditions are listed after each item.

1. **Safety Goggles or Glasses:** Use when working within 25 feet of a drill rig or when using hand tools or chemicals that may create eye hazards.

2. **Safety Belts and Lifelines:** Safety belts and lifelines should be worn by all persons working on top of an elevated derrick beam. The lifeline should be secured at a position that will allow a person to fall no more than eight feet.

3. **Life Vests:** Use for work over water.

203.11 TRAFFIC SAFETY

Drilling in streets, parking lots or other areas of vehicular traffic requires definition of the work zones with cones, warning tape, etc. and compliance with local police requirements.

203.12 FIRE SAFETY

1. Fire extinguishers shall be kept on or near drill rigs for fighting small fires.

2. If methane is suspected in the area, a combustible gas instrument (CGI) shall be used to monitor the air near the borehole with all work to stop at 20 percent of the Lower Explosive Limit.

3. Work shall stop during lighting storms.

OPERATING PROCEDURE NO. HS-204

204.0 SAFETY PROCEDURES FOR TRENCH CONSTRUCTION AND OTHER EXCAVATING OPERATIONS

204.1 PURPOSE

This procedure contains an overview of the safety requirements for excavating and trenching operations. The requirements are consistent with standards established by the Occupational Safety and Health Administration (OSHA) and described in Title 29 Code of Federal Regulations (CFR) 1926.650. The detailed OSHA standard was effective in January 1990 and should be consulted before design of a shoring system, with questions regarding sloping options, or before working as a "competent person" on an excavation site.

204.2 RESPONSIBILITY

The responsibility and authority for excavating and trenching safety must be well defined prior to project start-up. In general, the contractor will assume responsibility for excavation safety and Woodward-Clyde (W-C) will maintain safety responsibility and authority only for W-C and W-C subcontractor employees. W-C employees will not serve in the OSHA defined role of "competent person" unless specifically defined in the project scope of work and approved by the Project Manager (PM) and Management Oversight Reviewer (MOR). The PM shall ensure that the W-C field staff clearly understands the limitation of their excavation safety responsibilities and authorities.

W-C employees are responsible for understanding the general excavation safety requirements and for not entering improper trenches or excavations.

204.3 APPLICABILITY

This procedure is applicable to all W-C projects in which trenching or other excavating operations, exclusive of borings, are entered by W-C personnel or personnel employed by firms under contract to W-C. It is also applicable to W-C projects requiring W-C personnel

or personnel of firms under contract to W-C to enter trenches and other types of excavations.

The best approach for avoiding the detailed trenching requirements is to perform sampling and other procedures without entry into excavations. Use of a backhoe to bring up samples, use of long-handled sampling devices, and similar techniques are recommended.

204.4 REQUIREMENTS

204.4.1 Preliminary Requirements

Certain government agencies (e.g. California) require a permit to perform excavation operations.

Before digging, determine or have the client determine if underground installations, such as sewer, water, fuel, or electrical lines are to be encountered, and if so, determine the exact locations of the lines. Information can be obtained by contacting Underground Service Alert (consult local telephone directory for toll-free number), local utility companies, and the owner of the property on which excavating operations are planned.

Trees, boulders, and other surface encumbrances, located so as to pose a potential hazard to employees must be removed or made safe before the operation begins.

204.4.2 Placement of Excavated Materials

Excavated materials must be placed at least two feet back from the edge of the excavation and precautions must be taken to prevent the materials from falling into the excavation.

204.4.3 Working in Excavations

Shoring and Sloping

Except for solid rock, trenches in which personnel are required to work must be shored or sloped if the depth of the excavation is five (5) feet or more. When a shoring system is used, it shall consist of hydraulic shores or the equivalent, with sheathing or sheet piling as needed. Trench boxes are also permitted. OSHA uses a soil classification system to determine the allowable slopes for trenches. The shoring system must be properly designed and installed to sustain all existing and expected loads. For details on shoring and sloping requirements, consult Title 29 CFR, Subpart P, Sections 1926.650 to 1926.653 (attached).

Access

When work is to be performed in any excavation, safe access to the excavation must be provided by means of ladders, stairs, or ramps. Trenches four or more feet deep must have ladders spaced no less than 25 feet apart, and the ladders must extend at least three feet above grade.

Hazardous Atmospheres

At sites where oxygen deficiency or hazardous concentrations of flammable or toxic vapors or gases may be encountered in excavations, the atmosphere in the excavations must be tested by the site safety officer or other qualified person before work in an excavation begins and at appropriate intervals afterward. Trenches may be classified as confined spaces and require an entry permit as covered in HS-205, Confined Space Entry.

204.4.4 Inspection of Excavation

Excavations must be observed daily by the "competent person". If evidence for potential cave-ins or slides is apparent, all work in the excavation must be suspended until necessary steps have been taken to safeguard employees.

204.4.5 Operations of Vehicles Near Excavations

When vehicles or heavy equipment must operate near an excavation, the sides of the excavation must be shored or braced as necessary to withstand forces exerted by the superimposed load and the earth pressure. Stop logs or other types of secure barriers must be installed at the edges of the excavations.

204.4.6 Bell-Bottom Pier Holes

Employees entering drilled pier holes must be protected by a casing proportioned to sustain the maximum stresses imposed by earth and water or slurry that extends the full depth of the shaft and to the bottom of the bell. A safety cage or a shoulder harness secured to a full-time tended lifeline shall be required for entry and exit. Air monitoring and related requirements of HS-205, Confined Space entry, shall be followed.

204.4.7 Bridges and Walkways

Walkways or bridges with standard guardrails must be provided where employees or equipment are required or permitted to cross over excavations. Pedestrian walkways shall be of sufficient strength to permit a vertical deflection of no more than 0.5 inch when a 250-pound weight is applied to the center of the walkway. All bridges intended for vehicular traffic must be constructed to withstand twice the load of the heaviest vehicle expected.

204.4.8 Barricades and Fences

Excavated areas must be completely guarded on all sides with barricades or fences, as appropriate. If barricades are used, they must be spaced no more than 20 feet apart and

shall not be less than 35 inches high when erected. A yellow or yellow and black tape, at least 0.75 inches wide, shall be stretched between the barricades.

204.4.9 Backfilling

Excavated areas must be backfilled in accordance with the work plan as soon as practical after work is completed, and all associated equipment must be removed from the area.

204.5 EXCAVATIONS NEXT TO EXISTING STRUCTURES

A registered engineer will review all plans for excavations next to existing structures to avoid undermining the structures and possible collapse.

SAFETY AND HEALTH PROTECTION ON THE JOB

Cal/OSHA

State of California
Department of Industrial Relations

The California Occupational Safety and Health Act of 1973 provides job safety and health protection for workers. The Department of Industrial Relations has primary responsibility for administering the Cal/OSHA program. Job safety and health standards are promulgated by the Occupational Safety and Health Standards Board. Employers and employees are required to comply with these standards. Enforcement is carried out by the Division of Occupational Safety and Health within the Department of Industrial Relations.

EMPLOYERS AND EMPLOYEES

California law requires every employer to provide employment and a place of employment which are safe and healthful for the employees therein. Employers and employees are required to comply with the occupational safety and health standards contained in Title 8 of the California Code of Regulations and all rules, regulations and orders pursuant to Division 5 of the California Labor Code which are applicable to their employment and actions on the job.

COMPLIANCE WITH JOB SAFETY AND HEALTH REQUIREMENTS

To ensure compliance with State job safety and health requirements, the Division of Occupational Safety and Health conducts periodic jobsite inspections. The inspections are made by trained safety engineers and industrial hygienists.

The law provides that an authorized representative of the employer and a representative of the employees be given an opportunity to accompany the safety engineer/industrial hygienist for the purpose of aiding the inspection. Where there is no authorized employee representative, the safety engineer/industrial hygienist talks with a reasonable number of employees about the safety and health conditions in the workplace.

Every employee has the right to bring unsafe or unhealthful conditions to the attention of the safety engineer/industrial hygienist making the inspection. In addition, any employee who believes unsafe or unhealthful conditions exist at the worksite has the right to notify the Division of Occupational Safety and Health. The Division upon request will withhold the names of employees who submit or make statements during an inspection or investigation.

If the Division of Occupational Safety and Health believes that an employer has violated a safety and health standard or order, it issues a citation to the employer. Each citation specifies a date by which the alleged violation must be corrected. The law provides for mandatory penalties against employers of up to $2,000 for each serious violation and for optional penalties of up to $1,000 for each general violation. Penalties of up to $2,000 per day may be proposed for failure to correct serious violations and up to $1,000 per day may be proposed for failure to correct general violations by the abatement date. Also any employer who willfully or repeatedly violates any occupational safety and health standard or order may be assessed civil penalties of not more than $20,000 for serious violations and $10,000 for general violations.

A willful violation that causes death or permanent impairment of the body of any employee results, upon conviction, in a fine of not more than $10,000 or imprisonment of not more than six months, or both. A second conviction, after a first conviction, doubles these maximum penalties.

While governmental entities may be cited on the same basis as other employers, and abatement dates set, civil penalties will not be assessed.

An employer who receives a citation, Order to Take Special Action or Special Order must post it prominently at or near the place of the violation for three working days, or until the unsafe condition is corrected, whichever is longer, to warn employees of danger that may exist there. Any employee may protest the time allowed for correction of the violation.

COMPLAINTS

Employees or their representatives who believe unsafe or unhealthful conditions exist in their workplace have the right to file a complaint with any office of the Division of Occupational Safety and Health and thereby to request an inspection. The Division keeps confidential the names of complainants unless they request otherwise.

An employee may not be fired or punished in any way for filing a complaint about unsafe or unhealthful working conditions or using any other right given to employees by the Cal/OSHA law. An employee of a private employer who believes that he/she has been fired or punished for exercising such rights may file a complaint about this discrimination with the nearest office of the Department of Industrial Relations - Division of Labor Standards Enforcement (State Labor Commissioner) or with the San Francisco office of the U.S. Department of Labor, Occupational Safety and Health Administration. Employees of state or local government agencies may file discrimination complaints only with the State Labor Commissioner. Consult your local telephone directory for the office nearest you.

OTHER EMPLOYEE RIGHTS

Any employee has the right to refuse to perform work which would violate the Cal/OSHA Act or any occupational safety or health standard or order where such violation would create a real and apparent hazard to the employee or other employees.

Employers who use any substance listed as a hazardous substance in Section 339 of Title 8 of the California Code of Regulations or subject to the Federal Hazard Communication Standard (29 CFRS 1910.1200) must provide employees with information on the contents of material safety data sheets (MSDS) or equivalent information about the substance which trains employees to use the substance safely.

Employers shall make available on a timely and reasonable basis a material safety data sheet on each hazardous substance in the workplace upon request of an employee collective bargaining representative, or an employee's physician.

Employees have the right to see and copy their medical records and accurate records of employee exposure to potentially toxic materials or harmful physical agents.

Any employee has the right to observe monitoring or measuring of employee exposure to hazards conducted pursuant to Cal/OSHA standards. Employers must tell their employees when they are being, or have been, exposed to concentrations of harmful substances higher than the exposure limits allowed by Cal/OSHA standards, and the corrective action being taken.

For information and assistance, contact the nearest office of the Division of Occupational Safety and Health. See addresses below.

The law requires each employer in California to post this poster conspicuously in each workplace.

CONSULTATION SERVICE

In order to encourage voluntary compliance, Cal/OSHA provides free, upon request, a full range of occupational safety and health consulting services. The Cal/OSHA Consultation Service is separate from Cal/OSHA enforcement activities.

OFFICES OF THE DIVISION OF OCCUPATIONAL SAFETY AND HEALTH

HEADQUARTERS: 395 Oyster Point Blvd. So. San Francisco 94080

Regional Offices

Anaheim	2100 E. Katella Ave., Room 125, 92806	(714) 939-8611
Los Angeles*	6150 Van Nuys Blvd., Ste. 310, Van Nuys, 91401	(818) 901-5421
Sacramento*	2422 Arden Way, Suite B-53, 95825	(916) 920-6127
San Francisco	455 Golden Gate Ave., Room 1171, 94102	(415) 557-8640

District Offices

Anaheim	2100 E. Katella Ave., Room 140, 92806	(714) 939-0145
Bakersfield	4800 Stockdale Highway, Suite 212, 93309	(805) 395-2718
Concord	1465 Enea Circle, Bldg. E, Suite 900, 94520	(415) 676-5333
Covina	1123 So. Parkview, Suite 100, 91724	(818) 966-1166
Fresno	2550 Mariposa St., Room 4000, 93721	(209) 445-5302
Long Beach	401 E. Ocean Blvd., Room, 400, 90802	(213) 590-5035
Los Angeles	3550 West Sixth St., Room 431, 90020	(213) 736-3041
Modesto	1209 Woodrow Ave., Suite C-4, 95350	(209) 576-6260
Oakland	7700 Edgewater Dr., Suite 125, 94621	(415) 568-8502
Redding	381 Hemsted Drive, 96002	(916) 224-4743
Sacramento*	2422 Arden Way, Suite B-55, 95825	(916) 920-6123
San Bernardino	303 West Third St., Room 640, 92401	(714) 383-4321
San Diego	7607 Convoy Court, Suite 140, 92111	(619) 237-7325
San Francisco	455 Golden Gate Ave., Room 1193, 94102	(415) 557-1677
San Jose*	100 Paseo De San Antonio, Suite 101, 95113	(408) 277-1260
San Mateo	1900 So. Norfolk St., Suite 215, 94403	(415) 573-3812
Santa Fe Spgs*	11980 Telegraph Rd., Suite 102, 90670	(213) 944-7676
Santa Rosa	50 "D" St., Suite 430, 95404	(707) 576-2388
Van Nuys	6150 Van Nuys Blvd., Suite 405, 91401	(818) 901-5403
Ventura	1655 Mesa Verde, 93003	(805) 654-4581
Vernon*	11980 Telegraph Rd., Ste. 102,Santa Fe Spgs. 90670	(213) 944-7676

Field Offices

Chico	555 Rio Lindo, Suite A, 95926	(916) 895-4761
Eureka	619 Second St., Room 109, 95501	(707) 445-6611
Salinas	1164 Monroe St., Suite 1, 93906	(408) 443-3050
Stockton	31 E. Channel St., Room 418, 95202	(209) 948-7762
Ukiah	620 Kings Court, Suite 5, 95482	(707) 463-4753

* Denotes temporary location.

CAL/OSHA CONSULTATION SERVICE

Headquarters: 395 Oyster Pt. Blvd., 3rd Fl., So.San Francisco, 94080 (415) 737-2843

Area Offices

Downey	8535 E. Florence Ave., Suite 200, 90240	(213) 861-9993
Fresno	1901 N. Gateway, Suite 102, 93727	(209) 454-1295
Sacramento*	2424 Arden Way, Suite D-90, 95825	(916) 920-6131
San Diego*	7807 Convoy Court, Suite 140, 92111	(619) 279-3771
San Mateo	3 Waters Park Drive, Suite 230, 94403	(415) 557-1715

Persons wishing to register a complaint alleging inadequacy in the administration of the California Occupational Safety and Health Plan may do so by contacting the San Francisco Regional Office of the Occupational Safety and Health Administration (OSHA), U.S. Department of Labor (Tel 415/744-6670). OSHA monitors the operation of State plans to assure that continued approval is merited.

TO ALL EMPLOYERS OF CALIFORNIA EMPLOYEES: Section 6408(a) of the California Labor Code requires that information shall be posted regarding protections and obligations of employers under the occupational safety and health laws. This poster meets that requirement and must be prominently posted in all places of employment in the state of California. Section 6431 of the California Labor Code provides that any employer who violates any of the posting requirements of Section 6408 of the California Labor Code shall be assessed a civil penalty of up to one thousand dollars ($1,000) for each violation.

DECEMBER 1989

JOB SAFETY & HEALTH PROTECTION

The Occupational Safety and Health Act of 1970 provides job safety and health protection for workers by promoting safe and healthful working conditions throughout the Nation. Requirements of the Act include the following:

Employers

All employers must furnish to employees employment and a place of employment free from recognized hazards that are causing or are likely to cause death or serious harm to employees. Employers must comply with occupational safety and health standards issued under the Act.

Employees

Employees must comply with all occupational safety and health standards, rules, regulations and orders issued under the Act that apply to their own actions and conduct on the job.

The Occupational Safety and Health Administration (OSHA) of the U.S. Department of Labor has the primary responsibility for administering the Act. OSHA issues occupational safety and health standards, and its Compliance Safety and Health Officers conduct jobsite inspections to help ensure compliance with the Act.

Inspection

The Act requires that a representative of the employer and a representative authorized by the employees be given an opportunity to accompany the OSHA inspector for the purpose of aiding the inspection.

Where there is no authorized employee representative, the OSHA Compliance Officer must consult with a reasonable number of employees concerning safety and health conditions in the workplace.

Complaint

Employees or their representatives have the right to file a complaint with the nearest OSHA office requesting an inspection if they believe unsafe or unhealthful conditions exist in their workplace. OSHA will withhold, on request, names of employees complaining.

The Act provides that employees may not be discharged or discriminated against in any way for filing safety and health complaints or for otherwise exercising their rights under the Act.

Employees who believe they have been discriminated against may file a complaint with their nearest OSHA office within 30 days of the alleged discrimination.

Citation

If upon inspection OSHA believes an employer has violated the Act, a citation alleging such violations will be issued to the employer. Each citation will specify a time period within which the alleged violation must be corrected.

The OSHA citation must be prominently displayed at or near the place of alleged violation for three days, or until it is corrected, whichever is later, to warn employees of dangers that may exist there.

Proposed Penalty

The Act provides for mandatory penalties against employers of up to $1,000 for each serious violation and for optional penalties of up to $1,000 for each nonserious violation. Penalties of up to $1,000 per day may be proposed for failure to correct violations within the proposed time period. Also, any employer who willfully or repeatedly violates the Act may be assessed penalties of up to $10,000 for each such violation.

Criminal penalties are also provided for in the Act. Any willful violation resulting in death of an employee, upon conviction, is punishable by a fine of not more than $10,000, or by imprisonment for not more than six months, or by both. Conviction of an employer after a first conviction doubles these maximum penalties.

Voluntary Activity

While providing penalties for violations, the Act also encourages efforts by labor and management, before an OSHA inspection, to reduce workplace hazards voluntarily and to develop and improve safety and health programs in all workplaces and industries. OSHA's Voluntary Protection Programs recognize outstanding efforts of this nature.

Such voluntary action should initially focus on the identification and elimination of hazards that could cause death, injury, or illness to employees and supervisors. There are many public and private organizations that can provide information and assistance in this effort, if requested. Also, your local OSHA office can provide considerable help and advice on solving safety and health problems or can refer you to other sources for help such as training.

Consultation

Free consultative assistance, without citation or penalty, is available to employers, on request, through OSHA supported programs in most State departments of labor or health.

More Information

Additional information and copies of the Act, specific OSHA safety and health standards, and other applicable regulations may be obtained from your employer or from the nearest OSHA Regional Office in the following locations:

Atlanta, Georgia
Boston, Massachusetts
Chicago, Illinois
Dallas, Texas
Denver, Colorado
Kansas City, Missouri
New York, New York
Philadelphia, Pennsylvania
San Francisco, California
Seattle, Washington

Telephone numbers for these offices, and additional area office locations, are listed in the telephone directory under the United States Department of Labor in the United States Government listing.

Washington, D.C.
1985
OSHA 2203

William E. Brock, Secretary of Labor

U.S. Department of Labor
Occupational Safety and Health Administration

Under provisions of Title 29, Code of Federal Regulations, Part 1903.2(a)(1) employers must post this notice (or a facsimile) in a conspicuous place where notices to employees are customarily posted.

WARNING

THE CALIFORNIA STATE SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT (PROPOSITION 65) REQUIRES PUBLIC NOTIFICATION OF THE PRESENCE OF CHEMICALS KNOWN BY THE STATE OF CALIFORNIA TO CAUSE CANCER OR REPRODUCTIVE TOXICITY. COMPOUNDS LISTED BY THE GOVERNOR MAY BE PRESENT DURING THIS OPERATION.

Woodward-Clyde Consultants

AIR MONITORING DATA SHEET

Site or Project Name _____ Project No. _____ Date: _____

Person(s) Collecting Data _____

General Operation and Location at Site _____

Instrument Type, Make, Model _____

Instrument Serial or ID No. _____ Battery Check Results _____

Date of Last Calibration or Check _____ Date of Last Service _____

Contaminant(s) Suspected _____

	Specific Location	Specific Operation or Work Phase	Employee Name If Breathing Zone Monitored	Time	Reading	Comments (e.g., duration, causation of reading)
1.						
2.						
3.						
4.						
5.						
6.						
7.						
8.						
9.						
10.						

General Comments: _____

Signature of Person Responsible for Data: _____ Date Signed _____

FORM HS-102

W-C HEALTH AND SAFETY INCIDENT REPORT

Project Name: _____

Project Number: _____

Date of Incident: _____

Time of Incident: _____

Location: _____

_____

TYPE OF INCIDENT (Check all applicable items)

☐ Illness ☐ Fire, explosion, flash

☐ Injury ☐ Unexpected exposure

☐ Property Damage ☐ Vehicular Accident

☐ Health & Safety Infraction

☐ Other (describe) _____

DESCRIPTION OF INCIDENT (Describe what happened and possible cause. Identify individual involved, witnesses, and their affiliations; and describe emergency or corrective action taken. Attach additional sheets, drawings, or photographs as needed.)

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

Reporter: _____ _____ _____

Print Name Signature Date

Reporter must deliver this report to the Operating Unit Health & Safety Officer within 24 hours of the reported incident for medical treatment cases and within five days for other incidents.

Reviewed by: _____ _____

Operating Unit Health & Safety Officer Date

Distribution by HSO:

- WCGI Corporate Health and Safety Manager
- Corporate Health and Safety Officer
- Project Manager
- Personnel Office (medical treatment cases only)