Woodward-Clyde Consultants

ENVIRONMENTAL SITE ASSESSMENT AND FILL CHARACTERIZATION REPORT CITY CENTER PARCELS T5 AND T6 OAKLAND, CALIFORNIA

Prepared for

Redevelopment Agency of the City of Oakland

June 1993

Prepared by

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Woodward-Clyde Consultants

Engineering & sciences applied to the earth & its environment

June 7, 1993
Project Numbers 90C0039A and 90C0039C

Mr. Donnell Choy
Oakland City Attorney's Office
505 14th Street, 12th Floor
Oakland, California 94612

Subject: Environmental Site Assessment and Fill Characterization Reports
Parcels T5 and T6
City Center
Oakland, California

Dear Mr. Choy:

We are pleased to submit this final report which combines the Environmental Site Assessment and the Fill Characterization Report for the City Center Parcels T5 and T6 in Oakland, California.

The Environmental Site Assessment was performed to provide the Redevelopment Agency of the City of Oakland with information about the presence of hazardous materials which may be in the vicinity of the site resulting from previous or current site use. This assessment includes a review of site history and published regulatory listings and a discussion of the results of an environmental field investigation.

The Fill Characterization Report describes the work completed to investigate soil conditions at the site and to chemically characterize surficial fill occurring locally on the site. The report also presents a brief discussion of remedial alternatives with cost estimates for the fill on the parcel.

It has been a pleasure working with you on this project. If you have any questions, please do not hesitate to call.

Yours truly,
WOODWARD-CLYDE CONSULTANTS

William B. Copeland
Assistant Project Geologist

Albert P. Ridley, C.E.G.
Associate

cc: Ms. Lois Parr, Office of Economic Development and Employment, City of Oakland

Enclosure

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1.0
INTRODUCTION

Woodward-Clyde Consultants (WCC) has performed an environmental assessment of Parcels T5 and T6 located on the east side of Clay Street between 11th and 12th Streets in Oakland, California (Figure 1).

The environmental assessment was performed in accordance with the January 19, 1990 Contract for Professional Services between WCC and the Office of Economic Development and Employment of the City of Oakland (Agency) and consisted of four tasks: 1) information on site history was collected from the Sanborn Map, City of Oakland records, and historic aerial photographs; 2) Federal, State, and local regulatory agency listings of nearby sites with toxic problems which could impact the site were consulted; 3) twelve soil borings, three of which were converted to groundwater monitoring wells were completed on the site; samples of the soil and groundwater were chemically analyzed to characterize the environmental field work were integrated and evaluated in relation to the historic and regulatory review. The results are presented in this report.

2.0
SITE DESCRIPTION

The two parcels are approximately equal in size with combined dimensions of approximately 200 feet by 300 feet. Approximately 40 percent of Parcels T5 and T6 are presently occupied by paved driveways entering the site from both 11th and Clay streets. The driveways provide access to the City Center garage structure and the loading bays for the City Center, the Clorox Company, 1111 Broadway and Hyatt Regency buildings. Most of the remaining area is landscaped with lawn, plantings, trees, and various pieces of sculpture. A rectangular area occupying about the southeastern 20 percent of Parcel T5 has been recently backfilled in association with construction of the adjacent 1111 Broadway Building. The site grade varies from street level (approximately elevation 37 feet, City of Oakland Datum (C.O.O.D)) down to approximate elevation 15 feet C.O.O.D. Slope inclinations within the landscaped areas range from approximately 8 (horizontal):1 (vertical) to 2:1 and in the paved areas from approximately level to 5:1. The flatter portions of the landscaped areas are concentrated near the margins of the site adjacent to Clay and 11th streets.

Parcels T5 and T6 have been completely reworked by excavation and/or backfilling since construction of the City Center project. Review of historical data indicates these parcels originally had ground surface elevations of approximately 35 to 38 feet C.O.O.D.

3.0
SITE HISTORY

This evaluation of environmental site history focuses on previous site uses requiring underground tanks or involving: 1) manufacturing and machine shops, 2) painters and paint companies, 3) auto repair and service stations, 4) photo processing laboratories, 5) printers and publishers, and/or 6) dry cleaning establishments. Underground fuel storage tanks are a potential source of various petroleum hydrocarbons. Similarly, service station waste oil tanks are a potential source of waste oil, fuel hydrocarbons, and solvents. Manufacturing processes may have used a variety of chemicals, especially lubricating oils and solvents. Paint products contain high concentrations of lead and petroleum-based solvents. Ink and other fluids used in printing contain elevated concentrations of various heavy metals. Dry cleaners are a potential source of trichloroethane (TCA), tetrachloroethene (PCE), carbon tetrachloride, and other chlorinated solvents. Until recently, the use and disposal of many of these substances was largely unregulated.

A review of selected available records was performed in order to collect information on historic business uses of parcels T5 and T6 and the surrounding area within one block of the site. Information was obtained from various historic maps, the Oakland Library, Oakland City Business Tax records, and historic aerial photographs.

His[redacted]0s. Historic business occupations of all types on the subject parcels are listed in Table 1. Some of the source records for this list are incomplete and some addresses listed are therefore uncertain. The locations of noteworthy business occupation at parcels T5 and T6 are indicated in Figure 1. A[redacted] Work recently completed in the City Center project area by WCC and others suggested that there is a high likelihood that petroleum hydrocarbons may be present in the soil and/or groundwater at this location.

Noteworthy historic business occupations within one block of Parcels T5 and T6, with approximate dates of occupation included in parentheses, are listed below:

- A multi-story garage structure at the northeast corner of 11th and Jefferson streets (pre-1926 to at least 1950), which may have also contained underground fuel storage tanks;

- a machine shop at or adjacent to 597 12th Street (circa 1950);

- an auto body shop at 512 12th Street (1922 to pre-1926);

- various parking lots located between 11th and 13th streets and Clay and Jefferson streets (1926 to present);

- a "waste dump" at 565 11th Street (1959), about which no additional information is available at this time;

- a dry cleaners on the east side of Clay Street between 10th and 11th streets (circa 1920), a dry cleaners at 562 12th Street (1926 to 1932), two hat cleaners located at 567 and 595 12th Street (1940s to 1950s), and a laundry, which may have provided dry cleaning services, at 597 12th Street (1930s to at least 1950s);

- six printing shops located at 1160 Jefferson Street (post-1950), 587 11th Street (circa 1956), 555 12th Street (circa 1950), 566 12th Street (circa 1935), 571 12th Street (pre-1939 to at least 1950), and 597 12th Street (pre-1926). Four publishing businesses, which may have also contained printing machinery, were located at 531 11th Street (circa 1937), 1008 Clay Street (circa 1929), 566 12th Street (circa 1935), and 562 11th Street (circa 1935);

- apparently two photo labs located at 482 12th Street (circa 1935) and 530 12th Street (circa 1945); and

- a paint store at 534 12th Street (circa 1941), and sign painters at 544 12th Street (circa 1955), 573 11th Street (circa 1934), and 1014 Clay Street (circa 1962).

3.1 UNDERGROUND STORAGE TANK ACTIVITY

The primary records source for review of underground storage tank activity was the City of Oakland Fire Marshal's records of Applications to Install, Remove, or Repair Tanks for the period from 1973 to 1989 (Table 2). Records for periods before 1973 were not retained by the City of Oakland.

A [redacted] Water Quality Control Board (RWQCB) reports this as a "type BE" leak, meaning that the soil has been impacted, but impact to the water is unknown. Based on observations made by WCC at the site, it is believed that no significant diesel contamination presently exists in either the soil or the groundwater at this location.

Available records do not indicate the occurrence of an underground tank removal at the former site of the service station on Parcel T6 at the intersection of 11th and Clay streets.

The State of California, Office of Planning and Research, Hazardous Waste and Substance List indicates a tank leak at 1160 Jefferson Street. This property belonged to the Blue Print Service Company at the time the leak was reported. No other information regarding this reported leak is available at this time.

A permit was issued by the Oakland Fire Department for the removal of two 500-gallon tanks within one-half block of Parcel T6 at 1215 Clay Street on April 11, 1977. This address is located at the site of the proposed Oakland Federal Building. Although a tank leak apparently associated with this address is shown on the State of California Hazardous Waste and Substances Site List, we have not been able to associate soil or groundwater contamination with these tanks.

3.2 REGULATORY RECORDS REVIEWED

The following lists were examined to assess if regulatory agencies are aware of any discharges of hazardous substances within one block of Parcels T5 and T6:

1) United States Environmental Protection Agency (EPA) "National Priority List, Final and Proposed Sites," June 1988;

2) EPA, Office of External Affairs, "Comprehensive Environmental Response, Compensation and Liability Information System" (CERCLIS);

3) EPA, Office of External Affairs, "Hazardous Waste Data Management System" (HWDMS), regulated under the Resource Conservation and Recovery Act of 1976, February 1989;

4) California Department of Health Services (DHS) "Expenditure Plan for Hazardous Substances Cleanup Bond Act of 1984," Revision 4, 1989;

5) State Office of Planning and Research, "Hazardous Waste and Substances Site List";

6) RWQCB, San Francisco Bay Region, North Bay Toxic Case List;

7) RWQCB, San Francisco Bay Region, "Fuel Leak Case List," February 1989;

8) RWQCB, San Francisco Bay Region, "General Waste Discharger List, October 1988; and

9) City of Oakland, Fire Marshal's records of "Application for Permit to Install, Remove, or Repair Tanks," 1973 through October 1988.

With the exception of underground tank leaks and tank activity previously described, these lists did not report releases that are judged likely to impact the site.

4.0
SOIL AND GROUNDWATER SAMPLING

Soil borings were drilled [redacted] using hollow-stem auger drilling techniques. Monitoring wells were subsequently installed in three of the borings. Locations of these soil borings/monitoring wells are shown on Figure 2. The borings were drilled and the monitoring wells constructed by Sierra Pacific Exploration of Concord, California at the direction of WCC's field representative, Ms. Lois Gruenberg.

The rationale for locating borings was based on the results of the historical review and hydrologic considerations, and is summarized below:

Boring	Location Rationale
W-1	Located at the extreme upgradient end of Parcel T5 to determine if gasoline contaminated groundwater has migrated to the parcels.
W-2, -3, and B-2	Located at the former site of a service station at 11th and Clay streets. They were located near sidewalks where underground gasoline storage tanks were likely located.
B-1	Located near the center of the combined T5 and T6 site to provide general coverage.

Soil samples for chemical analyses were obtained at selected intervals within each boring using a 2-inch inside-diameter drive sampler. Logs of the borings showing the depth of soil samples are included in Appendix A. Soil samples for chemical analysis were retained in brass sample liners capped with Teflon sheets and plastic end caps. The soil sampler was cleaned between each sample and between borings by washing in an Alconox detergent and deionized water solution, followed by deionized water rinses. Following drilling, the borings were backfilled to the ground surface using a cement grout, in accordance with requirements of Zone 7 of the Alameda County Flood Control and Water Conservation District. Soil cuttings were placed in drums for storage and later disposal. Soil samples were immediately placed in cooled ice chests for transport to the analytical laboratory under chain-of-custody control.

Monitoring wells (W-1, W-2, and W-3) were constructed using 2-inch-diameter PVC well casing and machine-slotted, 0.020-inch aperture well screen. The boring annulus surrounding the screened casing was backfilled with Lonestar No. 3 sand. The screened and/or sand-packed interval of these wells extends from approximately 22 feet to 35 feet below ground surface. The screened and sand-packed intervals of the wells are sealed from the surface by a 2-foot-thick bentonite seal and cement grout extending to the ground surface in accordance with the Zone 7 permit requirements. The well collars include a locking cap located beneath a flush-mounted steel cover. A schematic drawing of the construction of these wells is shown with the boring logs in Appendix A.

The wells were developed using a truck-mounted Smeal well development rig operated by Sierra Pacific Exploration. Development and purging was performed by alternate surging and bailing until the discharged water became substantially less turbid. Approximately 20 gallons (equivalent to approximately 17 wetted casing volumes) of water was discharged prior to groundwater sampling and placed in drums and stored at a depot in the site vicinity maintained by WCC. No hydrocarbon sheen or floating product was noted on the groundwater in any of the monitoring wells.

The groundwater samples were obtained with a Teflon bailer and placed immediately in prepared sample bottles. The bottles were placed in a cooled ice chest and transported to the laboratory under chain-of-custody control.

Groundwater levels were recorded at the time of drilling, during groundwater sampling, and at a later time for the express purpose of determining site groundwater gradient and flow direction. Elevations of the tops of the well casing were recorded by a survey conducted on March 1, 1990 by Harris Consulting Group, Inc. of Oakland. On March 13 the depths to groundwater varied from 26.77 to 28.70 feet (top of casing) in the monitoring wells. These wate[redacted] and a[redacted] as shown on Figure 2.

5.0
LABORATORY TESTING

In accordance with the January 19, 1990 Contract for Professional Services, soil and groundwater samples from all borings and monitoring wells were analyzed by Eureka Laboratories, Inc. of Sacramento. [redacted]

Groundwater samples obtained from Monitoring Wells W-1 and W-2 were analyzed for volatile organic compounds (EPA Method 624) and Title 22 metals (total). Groundwater samples obtained from Monitoring Well W-3 were analyzed for volatile organic compounds, semi-volatile organic compounds (EPA Method 625), EPA Priority Pollutant metals, and cyanide.

The analytical program was designed to screen for compounds that might have been introduced to the site by previous activities at or near the site. This analytical program was based on the contract requirements of the Agency.

The results of the laboratory testing of soil and groundwater samples are tabulated in Tables 3 through 6. Copies of the laboratory analytical reports are included in Appendix B.

The results of the soil analyses are summarized as follows:

- The EPA Method 8240 volatile organic compounds (VOCs) ethylbenzene and xylene (total) were identified at concentrations of 0.835 mg/kg (equivalent to parts-per-million) and 0.763 mg/kg, respectively, in the composite soil sample from Boring W-2. No other volatile organic compounds were identified at concentrations exceeding detection limits in this or any other soil samples.

- The EPA Method 8270 semi-volatile organic compounds phenol, naphthalene, and 2-methylnaphthalene, were identified at concentrations of 0.300 mg/kg, 0.400 mg/kg, and 0.300 mg/kg, respectively, in the composite soil sample from Boring W-2. No other semi-volatile compounds were identified at concentrations exceeding detection limits in this sample.

- EPA Priority Pollutant metals concentrations identified in the composite soil sample from Boring W-2 were well below California Title 22-specified Total Threshold Limit Concentrations (TTLCs). [redacted]

- The cyanide concentration of the composite soil sample from Boring W-2 was below the detection limit.

Test results for soil samples are summarized in Tables 3 through 5.

The results of the analysis of groundwater samples from Monitoring Wells W-1, W-2, and W-3 are summarized as follows:

- The EPA Method 624 volatile organic compounds toluene and xylene (total) were identified at concentrations of 0.026 mg/L and 3.819 mg/L, respectively, in the groundwater sample from Monitoring Well W-2. Toluene and xylene (total) were identified at concentrations of 0.034 mg/L and 0.703 mg/L, respectively, in the groundwater sample from Monitoring Well W-3. No other volatile organic compounds were identified at concentrations exceeding their respective detection limits in groundwater samples from these two wells. No EPA Method 624 volatile organic compounds were identified at concentrations exceeding their respective detection limits in the groundwater sample from Monitoring Well W-1.

- The EPA Method 625 semi-volatile organic compounds naphthalene and 2-methylnaphthalene were identified at concentrations of 0.045 mg/L and 0.017 mg/L, respectively, in the groundwater sample from Monitoring Well W-3. No

other semi-volatile compounds were identified at concentrations exceeding the detection limits in this sample.

- Metals concentrations in samples submitted for EPA Priority Pollutant metals or California Title 22 metals (total) analyses were generally below applicable drinking water standards (for those compounds for which standards have been set), with the exception of total chromium, nickel, thallium, aluminum, iron, and manganese. Chromium (nondifferentiated species) levels exceeded the maximum contaminant level (MCL) for soluble chromium VI (a conservative standard for comparison) in the groundwater sample from monitoring wells W-1 by 0.12 mg/L. The chromium level in the groundwater sample from monitoring well W-2 equaled this MCL of 0.05 mg/L. Nickel levels exceeded the MCL by 0.15 mg/L in the groundwater sample from Monitoring Well W-1. The thallium concentration of 0.2 mg/L identified in the same sample exceeded the EPA National Ambient Water Quality Criteria level of 0.013 mg/L by a factor of about 15. The groundwater sample from Monitoring Well W-3 exceeded the MCLs for aluminum, iron, and manganese by 3.4 mg/L, 7.4 mg/L, and 1.85 mg/L, respectively.

Test results for groundwater samples are summarized in Tables 3, 4, and 6.

6.0
DISCUSSION

Chemical analyses performed for this project indicate that components of gasoline occur in soil and groundwater in the southwest corner of Parcel T6. The detected compounds include phenol, naphthalene, 2-methylnaphthalene, and BTEX. The concentrations of these compounds are summarized on Tables 3 and 4 along with selected regulatory standards for the organic compounds that have been regulated.

While the analytical laboratory reported the metals chromium, nickel, thallium, aluminum, iron, and manganese at concentrations exceeding their respective applicable (or potentially applicable in the case of chromium) drinking water standards, experiences with similar sites in the immediate area demonstrate that these levels are typical of those found elsewhere and are very probably not due to industrial contamination but reflect naturally occurring "background" levels. Furthermore, while the metals concentrations reported in the groundwater sample present total concentrations (i.e., both soluble and insoluble components), the drinking water standards applicable to these elements are based on soluble concentrations. Additionally, the same body of experience indicates that the more toxic species of chromium, chromium VI, is probably a nonexistent or minor component of the total chromium detected and therefore the drinking water standard for soluble chromium VI is probably not exceeded.

The concentrations of gasoline components detected in the composite soil sample from boring W-2 are low enough that cleanup action might not be required. [redacted] This inference is consistent with the analytical results for the groundwater samples from monitoring wells W-2 and W-3, which show xylene concentrations of about 3.819 and 0.703 mg/L, respectively. Assuming that there is a typical 10- to 100-fold attenuation of concentrations from soil to adjacent groundwater, the xylene data for the groundwater suggest that soil containing concentrations of xylenes of at least 7 mg/kg (10 times the 0.7 mg/L xylene concentration in the W-3 sample) and possibly much higher occur nearby.

Or 10 x 3.8 = 38 mg/kg in W2

The lack of occurrence of benzene in the soil and groundwater samples suggests that the gasoline has been in the soil and groundwater for a relatively long time, and that the benzene has volatized.

Possible Sources of Contamination - The pattern of occurrence of gasoline components in the soil and groundwater in the southwest corner of Parcel T6 is consistent with a leak from underground tanks or pipes at the automotive service station formerly located on the corner. Pres[illegible] s[illegible]. Recent experience with similar sites in the City Center Project area suggests that it is likely that the tanks would have been located near or beneath the sidewalks bordering the property.

The occurrence of gasoline components in the soil and groundwater samples from Monitoring Well W-2 suggests that gasoline in soil and groundwater known to occur immediately upgradient of the site (see Figure 1) may trespass the parcels. — more likely from onsite release

Although the soil and groundwater data from Parcel T6 do not permit precise definition of the extent of contamination, the lack of occurrence of gasoline components in soil and groundwater samples from monitoring well T6-W1 located on Parcel [illegible], immediately downgradient from the former service station site, suggests that the plume of hydrocarbons may be confined to a relatively small area. where is this?

Because no floating petroleum product was observed in the purged groundwater and groundwater samples taken from Monitoring Wells W-2 and W-3, it also seems unlikely that large quantities of free product occur in the groundwater at the site. It is more likely that the petroleum hydrocarbons occur as dissolved constituents in the groundwater and in a layer of contaminated soil located in the zone of groundwater fluctuation.

Regulatory Considerations - Cleanup requirements for soil and groundwater contamination by fuels are established on a case-by-case basis by the Alameda County Department of Environmental Health (DEH), and/or the San Francisco Bay regional office of the RWQCB, with participation by the California Department of Health Services (DHS) in some cases. Generally, the DEH uses guidelines that have been established by the RWQCB. The scope of the cleanup typically depends on (1) the concentration and extent of soil and groundwater

contamination; (2) the threat posed to public health and/or beneficial uses of the groundwater; (3) the local geologic/hydraulic regime; and (4) whether the plume is still migrating.

As a general rule, the agencies will require remediation of soil contamination in excess of 1000 ppm of total petroleum hydrocarbons (TPH). Petroleum hydrocarbon concentrations in soil between 100 and 1000 ppm fall into a "gray area" where remediation may be required in sensitive cases but not in others. Based on previous experience in the area, regulatory agencies would undoubtedly require additional characterization of the site before rendering a decision regarding the requirement for cleanup. Remediation of soil contamination in similar cases has consisted of removing any tanks still located on the parcel, excavating and aerating the soil on site until TPH concentrations decrease to acceptable levels, then disposing of the aerated soil at a commercial Class III landfill. In cases where the contamination is relatively deep and/or has spread over a wide area, excavation and aeration may be impractical. In these cases, cleanup may sometimes be accomplished using vapor extraction or in situ bioremediation methods which do not require large excavations.

Based on recent experience, it is unlikely that an agency-mandated soil remediation program would be required if the 0.8 mg/kg xylenes concentration observed to date is representative of maximum concentrations in soil in other parts of the southwest corner of the site. However, th[redacted] that the [redacted] concentrations [redacted].

We understand that development plans for Parcels T5 and T6 include a multistory office structure with two underground parking levels, requiring an excavation [redacted] deep. This excavation would encompass the portion of the site where soil and groundwater contamination by petroleum hydrocarbons have been identified. In this case, the most practical method of soil remediation may be excavation and on-site aeration of soil followed by off-site disposal. The excavation may be left open (with proper shoring and/or other safety precautions) and later incorporated into the foundation excavation for the structure. This work may be done in advance of the start of construction, or concurrently with the foundation excavation. The excavation and removal process may be significantly complicated by the need to preserve driveway access through the site to the City Center parking garage and loading dock areas.

Cleanup of groundwater in fuel leak cases is typically governed by regulatory action levels for components of gasoline or other fuels in cases where the contaminated groundwater is or may be used as a source of potable water. Because it is unlikely that the affected groundwater at the site is used as a source of domestic supply, it is unlikely that the agencies would require cleanup of the local groundwater to a DHS (or other agency) drinking water standard. However, because the xylene concentrations of 3800 µg/L identified in the groundwater sample from W-2 exceeds the DHS xylene Maximum Contaminant Level of 1750 µg/L by a factor of 2, some groundwater cleanup could be required. The requirement for a cleanup (if any) would depend upon the extent and concentration of the plume, whether it is still migrating and whether natural biodegradation and adsorption in the soil are reducing petroleum concentrations in the groundwater.

If a groundwater cleanup is required, the steps involved include (1) defining the local groundwater flow direction and limits of the plume of contamination; (2) negotiating a cleanup standard with the regulatory agencies; (3) designing and installing a groundwater extraction and treatment system; and (4) pumping and treating the groundwater for a period of months (or years) until the cleanup standard is substantially achieved. In most cases, groundwater cleanup may be performed without a major effect on the development of the property into a multistory parking structure.

Hazard to Public Health - Based on the assumption (presently unconfirmed) that the local shallow groundwater is not used as a domestic water supply, it appears that the soil and groundwater contamination identified at the site do not pose an immediate threat to public health and safety. Excavation and removal of soil for remediation or to construct the proposed office building and parking garage would most likely expose some contaminated soil to the air, increasing the risk of exposure of construction personnel and the nearby public to petroleum vapors. However, use of relatively simple precautions that are routinely employed on similar projects would serve to limit these exposures and reduce health hazards to acceptably low levels.

7.0
CONCLUSIONS AND RECOMMENDATIONS

Based on the historical use review and soil and groundwater sampling and analysis performed for this study, we may conclude the following:

- Components of as gasoline occur in the soil and groundwater in the southwestern part of the site.

- The source of the gasoline components are believed to be a tank or tanks located on the former service station property on the southwest corner of the block.

- The present data do not permit quantification of the concentration and extent of soil and groundwater contamination, but the data do suggest that groundwater remediation could be required. The extent of effort required may only be established by negotiation with DEH and/or RWQCB after the soil and groundwater contamination has been more fully characterized.

- The lack of elevated priority pollutant metals levels in the tested soil indicates it is unlikely the site has been contaminated by materials containing toxic levels of heavy metals.

Based on these conclusions, WCC recommends additional soil and groundwater sampling and analysis to more fully characterize the vertical and lateral extent and concentration of gasoline and/or gasoline components in the soil and groundwater. A typical characterization program for this site could consist of at least six additional soil borings and one or more additional monitoring wells. Any additional work should be closely coordinated with the DEH and/or RWQCB.

8.0
LIMITATIONS

This report was prepared in general accordance with the accepted standard of practice which exists in northern California at the time the investigation was performed. Judgments leading to conclusions and recommendations are generally made with an incomplete knowledge of the subsurface conditions present. More extensive studies including additional subsurface investigation can tend to reduce the inherent uncertainties associated with inferring subsurface conditions.

9.0
REFERENCES

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TABLE 1

BUSINESSES ON PARCELS T5 AND T6

Data taken from Curry (1950), Wachs Bros (1926), Wachs Co. (1932), Map of Downtown Oakland (Source Unknown, 1928), Oakland Chamber of Commerce (1948), Sanborn (1902, 1912, 1935, 1950), and City of Oakland Business Tax Records. Dates in brackets are known records of business license applications.

Location	1926	1928	1932	1948	1950
500 Block of 12th Street:					
537 12th Street					
Men's Clothing Store	X	X	X	X	X
Furniture Store [1928]	X	X	X	X	X
1100 Block of Clay Street:					
1116 Clay Street					
Moose Club [1929, 1950]	X	X	X	X	--
Stage Depot	X	X	X	--	--
Parking Lot [1951, 1971]	--	--	--	X	X
1100 Clay Street					
Candy Vendor [1928]	--	--	--	--	--
Shoe Shine [1933]	--	--	--	--	--
500 Block of 11th Street: (11th Street between Washington and Clay)					
11th and Clay Streets					
Shell Service Station	X	X	X	X	X
520 11th St.					
Furniture Store	X	X	X	--	--
Woolworth's	--	--	--	X	X
516 11th St.					
Rooms	X	X	X	X	X
514 11th St.					
Noodle Factory	X	X	X	--	--
Woolworth's	--	--	--	X	X
510 11th St.					
Trading Stamps	X	X	--	--	--
S&K Premiums	--	--	X	--	--
Woolworths	--	--	--	--	X

TABLE 1 (Continued)

BUSINESSES ON PARCELS T5 AND T6

Data taken from Curry (1950), Wachs Bros (1926), Wachs Co. (1932), Map of Downtown Oakland (Source Unknown, 1928), Oakland Chamber of Commerce (1948), Sanborn (1902, 1912, 1935, 1950), and City of Oakland Business Tax Records. Dates in brackets are known records of business license applications.

Location	1926	1928	1932	1948	1950
500 Block of 12th Street:					
537 12th Street					
Men's Clothing Store	X	X	X	X	X
Furniture Store [1928]	X	X	X	X	X
1100 Block of Clay Street:					
1116 Clay Street					
Moose Club [1929, 1950]	X	X	X	X	--
Stage Depot	X	X	X	--	--
Parking Lot [1951, 1971]	--	--	--	X	X
1100 Clay Street					
Candy Vendor [1928]	--	--	--	--	--
Shoe Shine [1933]	--	--	--	--	--
500 Block of 11th Street: (11th Street between Washington and Clay)					
11th and Clay Streets					
Shell Service Station	X	X	X	X	X
520 11th St.					
Furniture Store	X	X	X	--	--
Woolworth's	--	--	--	X	X
516 11th St.					
Rooms	X	X	X	X	X
514 11th St.					
Noodle Factory	X	X	X	--	--
Woolworth's	--	--	--	X	X
510 11th St.					
Trading Stamps	X	X	--	--	--
S&K Premiums	--	--	X	--	--
Woolworths	--	--	--	--	X

TABLE 1 (Continued)

BUSINESSES ON PARCELS T5 and T6

Location	1926	1928	1932	1948	1950
500 Block of 11th Street (cont.):					
516 11th Street					
Rooms	X	X	X	X	X
514 11th Street					
Noodle Factory	X	X	X	--	--
Woolworth's	--	--	--	X	X
510 11th Street					
Trading Stamps	X	X	--	--	--
S&K Premiums	--	--	X	--	--
Woolworth's	--	--	--	--	X
1000 Block of Washington Street: (Washington between 11th and 12th Streets)					
1051-1055 Washington					
Women's Clothing	X	--	--	--	--
National Dollar Store	--	X	X	X	X
1057 Washington					
Women's Clothing	X	X	X	X	--
Oakland Toggery	--	--	--	--	X
1059-1071 Washington					
Woolworth's	X	X	X	X	X

TABLE 2

FIRE MARSHAL'S PERMIT APPLICATIONS

Date	Permit Number	Address	Description
10/11/74	7965	1215 Clay St. DG	Install vapor lines (4,000-gal tank)
4/11/77	8198	1215 Clay St.	Remove two 500-gal tanks
5/12/77	8208	1229 Grove St.	Remove two 5,000-gal tanks
8/23/79	8385	650-644 12th St. DG	Remove two 5,000-gal tanks
8/23/79	8386	589-599 12th St. DG	Remove two 5,000-gal tanks
1/25/82	8542	11th & Broadway	Install two 2,000-gal tanks ?
7/6/82	8570	550 10th St.	Install one 1,000-gal tank
3/3/87	8865	1221 Broadway	Remove one 500-gal tank

TABLE 3

CITY CENTER ENVIRONMENTAL SITE ASSESSMENT, PARCELS T5 AND T6
SUMMARY OF ANALYTICAL RESULTS[1]
VOLATILE ORGANIC COMPOUNDS (EPA METHODS 8240, 624)

Sample #	Matrix[2] Type	Benzene	Toluene	Ethylbenzene	Xylenes	Other
T6-W1	Soil	ND	ND	ND	ND	ND
T6-W2	Soil	ND	ND	0.835	0.763	ND
T6-W3	Soil	ND	ND	ND	ND	ND
T6-B1	Soil	ND	ND	ND	ND	ND
T6-B2	Soil	ND	ND	ND	ND	ND
T5 ~~T6~~-MW1	Water	ND	ND	ND	ND	ND
T6-MW2	Water	ND	0.026	ND	3.819	ND
T6-MW3	Water	ND	0.034	ND	0.703	ND
Drinking Water[3]		0.001	0.1	0.68	0.62	

[1] All results reported as mg/kg (soil) or mg/L (water) (parts-per-million).

[2] All soil samples are composited. what depths ?

[3] California State Department of Health Services (DHS) Maximum Contaminant Levels (MCLs).

ND = Not Detected

TABLE 4

CITY CENTER ENVIRONMENTAL SITE ASSESSMENT, PARCELS T5 AND T6
SUMMARY OF ANALYTICAL RESULTS,
SEMI-VOLATILE ORGANIC COMPOUNDS (EPA METHODS 8270, 625),
CYANIDE (EPA METHOD 9010)

Sample #	Matrix* Type	Semi-Volatile Compounds Concentration (mg/kg)	Cyanide
T6-W2	Soil	0.3[a] 0.4[b] 0.3[c]	ND
T6-MW3	Water	0.045[b] 0.017[c]	ND

* All soil samples are composites.

[a] Phenol
[b] Naphthalene
[c] 2-Methylnapthalene

ND = Not Detected

TABLE 5

CITY CENTER ENVIRONMENTAL SITE ASSESSMENT, PARCELS T5 AND T6
SUMMARY OF ANALYTICAL RESULTS,
METAL CONCENTRATIONS[1] IN SOIL

	Detection Limit Soil	T6-W2 Composite Soil	Limit Concentrations STLC[2]	Limit Concentrations TTLC[3]
Silver	0.5	0.6	5	500
Arsenic	0.2	1.4	5	500
Barium	0.1	310		
Beryllium	0.5	ND	0.75	75
Cadmium	1.0	ND	1	100
Cobalt	1.0	6.0		
Chromium	0.5	34.0	560	2500
Copper	0.5	7.6	25	2500
Mercury	0.05	ND	0.2	20
Molybdenum	1.0	ND		
Nickel	1.0	32.2	20	2000
Lead	3.0	5.4	5	1000
Antimony	3.0	ND	15	500
Selenium	0.15	ND	1	100
Thallium	1.0	16.7	7	700
Vanadium	0.5	21.7		
Zinc	0.5	20.0	250	5000
Aluminum	2.5	4710		
Calcium	5.0	886		
Magnesium	10.0	1900		
Iron	5.0	8330		
Sodium	10.0	131		
Manganese	0.5	94.4		
Potassium	150	223		
Boron	10.0	9.8		

1 All concentrations are reported in mg/kg (parts-per-million)
2 STLC = Soluble Threshold Limit Concentration
3 TTLC = Total Threshold Limit Concentration

TABLE 6

CITY CENTER ENVIRONMENTAL SITE ASSESSMENT, PARCELS T5 AND T6, SUMMARY OF ANALYTICAL RESULTS, METAL CONCENTRATION (mg/L) IN GROUNDWATER

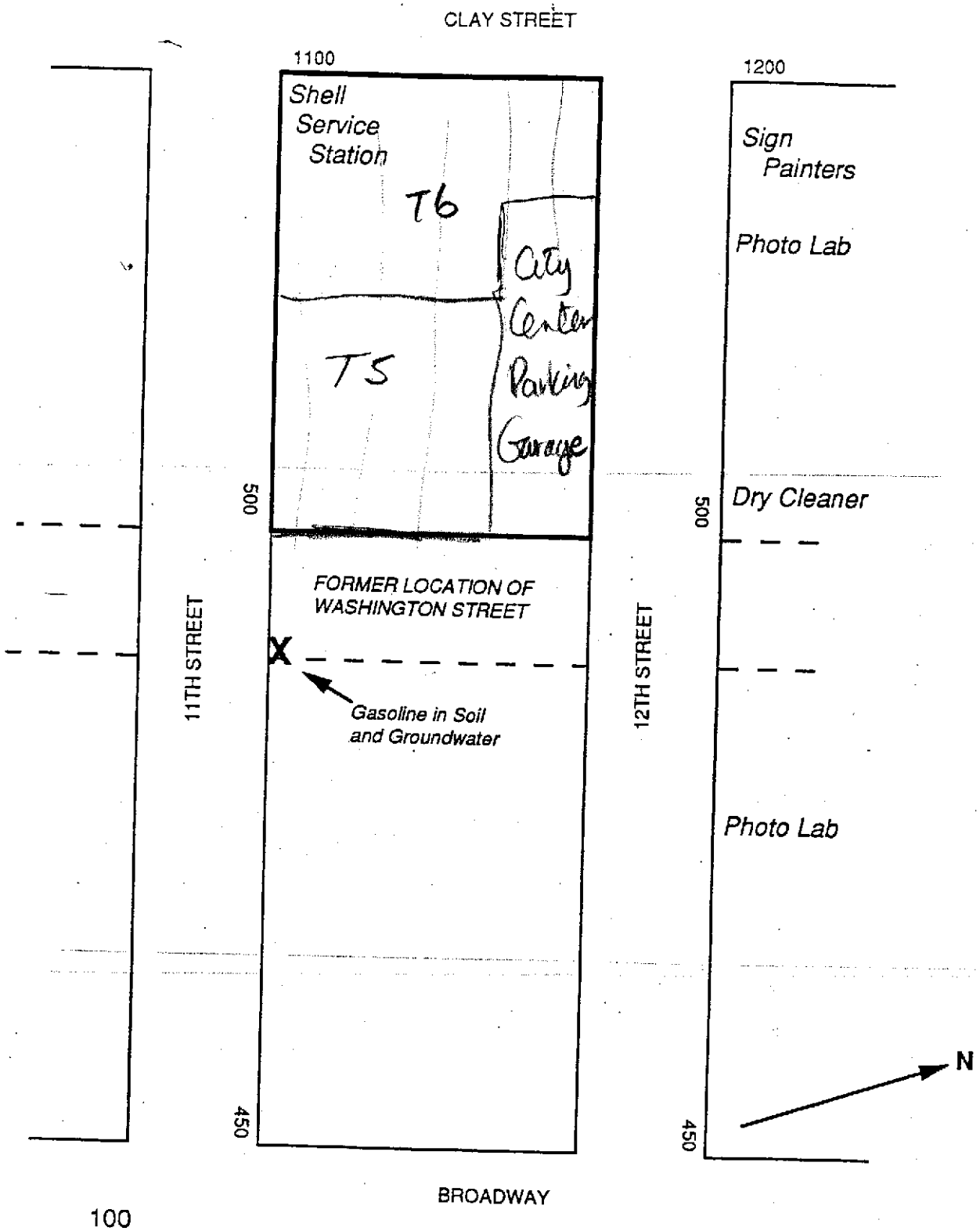
	Detection Limit Water	T5 ~~T6-MW1~~ Water	T6-MW2 Water	T6-MW3 Water	DHS/EPA Health & Human Welfare[1] Regulatory Standards
Silver	0.01	ND	ND	ND	0.050 DHS Primary MCL[3]
Arsenic	0.004	0.005	0.01	0.004	0.05 DHS Primary MCL
Barium	0.02	0.50	0.25	0.15	
Beryllium	0.01	ND	ND	ND	---
Cadmium	0.02	ND	ND	ND	0.010 DHS Primary MCL
Cobalt	0.02	0.07	ND	ND	
Chromium	0.02	0.17	0.05	0.03	0.050 DHS Primary MCL (CrVI)
Copper	0.01	0.04	0.02	0.02	1.0 DHS Secondary MCL
Mercury	0.001	ND	ND	ND	0.002 DHS Primary MCL
Molybdenum	0.02	ND	ND	ND	
Nickel	0.1	0.3	ND	ND	0.15 EPA SNARL[4]
Lead	0.05	ND	ND	ND	0.05 DHS Primary MCL
Antimony	0.05	ND	ND	ND	0.146 EPA NAWQC
Selenium	0.003	ND	ND	ND	0.010 DHS Primary[2] MCL
Thallium	0.1	0.2	ND	0.1	0.013 EPA NAWQC[2]
Vanadium	0.01	0.14	0.04	0.03	
Zinc	0.01	0.21	0.09	0.10	5.0 DHS Secondary MCL
Aluminum	0.05			3.40	1.0 DHS Primary MCL
Calcium	0.1			43.7	
Magnesium	0.2			48.2	
Iron	0.1			7.7	0.3 DHS Secondary MCL
Sodium	0.2			118	
Manganese	0.01			1.9	0.05 DHS Secondary MCL
Potassium	3.0			3.0	
Boron	0.2			0.8	

1 Source: Marshack, J.B., 1989, A Compilation of Water Quality Goals; staff report of the CRWQCB, Central Valley Region

2 NAWQC: National Ambient Water Quality Criteria, based on Public Health Effects

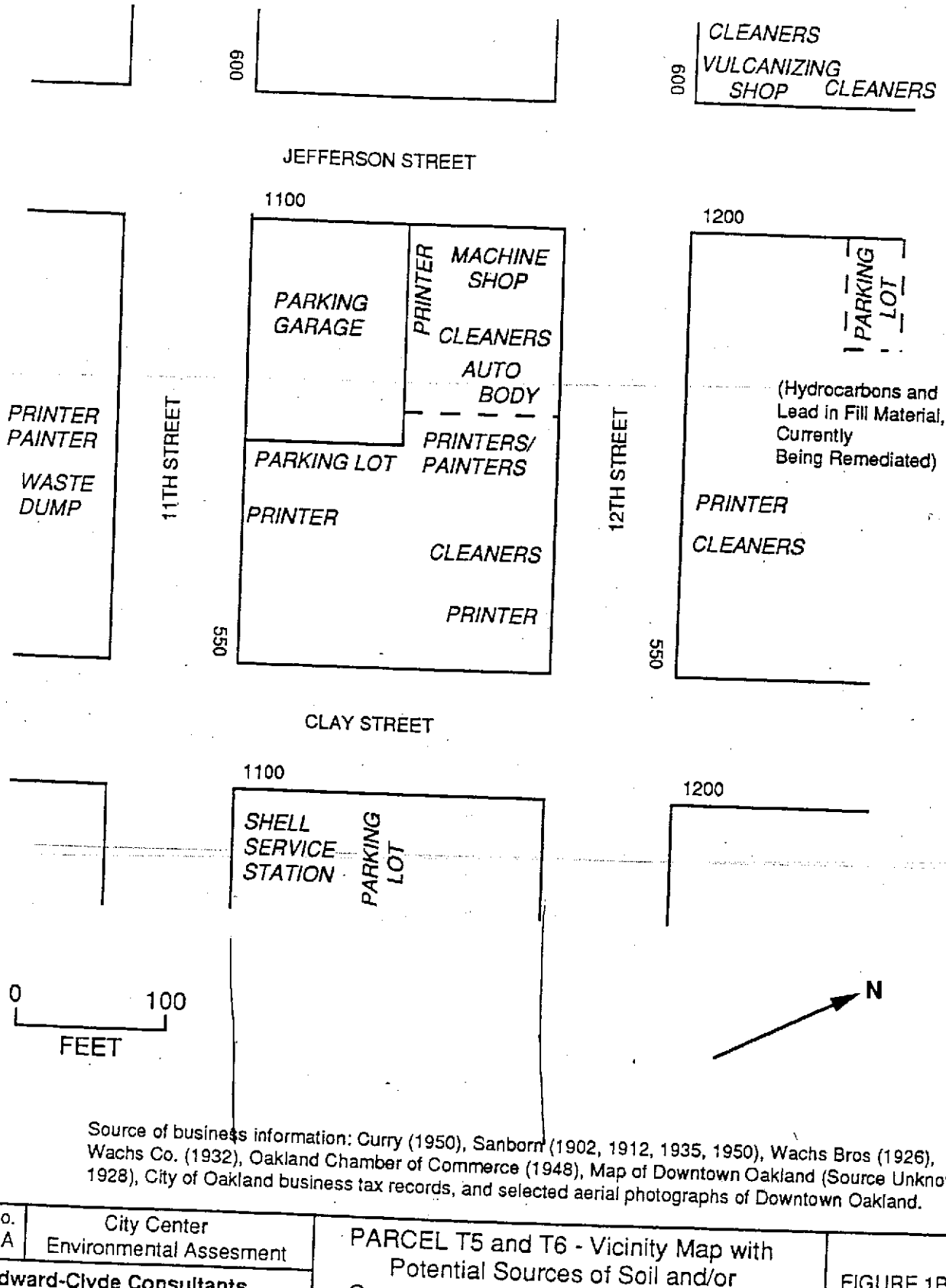
3 MCL: Maximum Contaminant Level

4 SNARL: EPA Suggested No Adverse Response Levels



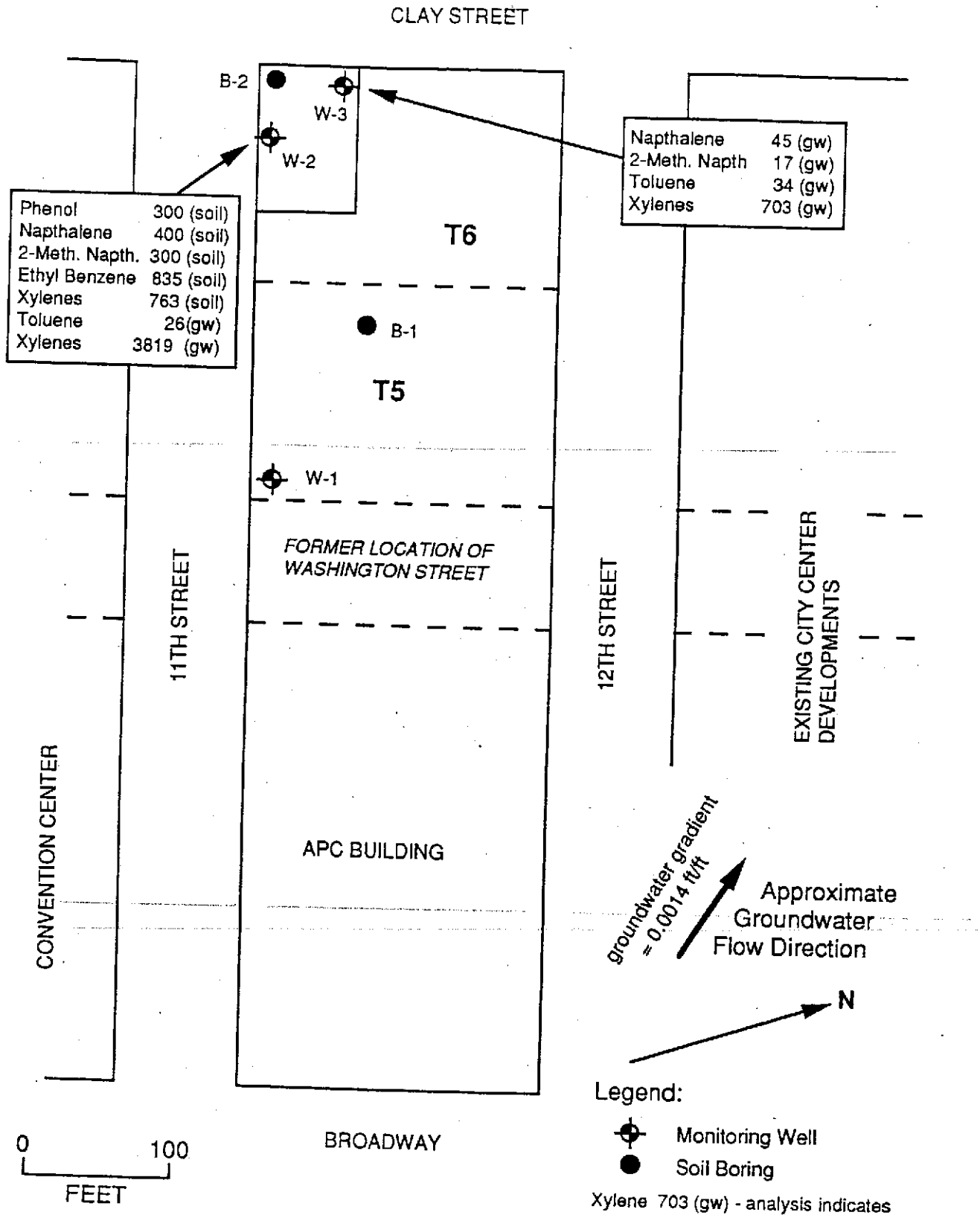
Source of business information: Curry (1950), Sanborn (1902, 1912, 1935, 1950), Wachs Bros (1926), Wachs Co. (1932), Oakland Chamber of Commerce (1948), Map of Downtown Oakland (Source Unknown, 1928), City of Oakland business tax records, and selected aerial photographs of Downtown Oakland.

Project No. 90C0039A	City Center Environmental Assesment	PARCELS T5 AND T6 - Vicinity Map with Potential Sources of Soil and/or Groundwater Contamination	FIGURE 1A
Woodward-Clyde Consultants			



Source of business information: Curry (1950), Sanborn (1902, 1912, 1935, 1950), Wachs Bros (1926), Wachs Co. (1932), Oakland Chamber of Commerce (1948), Map of Downtown Oakland (Source Unknown, 1928), City of Oakland business tax records, and selected aerial photographs of Downtown Oakland.

Project No. 90C0039A	City Center Environmental Assesment	PARCEL T5 and T6 - Vicinity Map with Potential Sources of Soil and/or Groundwater Contamination (Continued)	FIGURE 1B
Woodward-Clyde Consultants			



Project No. 90C0039A	City Center Environmental Assesment	PARCELS T5 AND T6 - BORING AND MONITORING WELL LOCATIONS	FIGURE 2
Woodward-Clyde Consultants			

1990

APPENDIX A

LOGS OF SOIL BORINGS AND GROUNDWATER MONITORING WELLS

Woodward-Clyde Consultants	90C0039A City Center ESA	LOG OF BORING T-6 B-1

LOCATION Parcel T-6, 12th & Clay Sts., Oakland, California			ELEVATION AND DATUM
AGENCY Sierra Pacific	DRILLER Derald/Aaron		DATE STARTED 2/16/90
EQUIPMENT Mobil Drill B-53			DATE COMPLETED 2/16/90
METHOD 8"-diam Hollow Stem Auger	DRILL BIT		COMPLETION DEPTH 16-1/2'
CASING			SAMPLERS Modified California 2-in.-diam.
PERFORATIONS	FROM TO		NO. OF SAMPLES DIST. UNDIST. 3
PACK	FROM TO		WATER LEVEL ATD 15' COMPL 24 HR
TYPE OF SEALS	FROM TO		LOGGED BY Lois Gruenberg
Sand cement grout	FROM 0' TO 16-1/2'		CHECKED BY Michael McGuire

DEPTH (FT)	DESCRIPTION	DEPTH (FT)	SAMPLES	Blow Counts	Recovery	REMARKS (Strength, moisture content, etc.)
	Grass turf surface.					
5	SILTY SAND (SM) - mottled gray and brown with orange stain - fine to medium sand - trace clay - dense - damp	5		8 27 38		
10		10		18 25 38		
15		15				No recovery.
	Bottom of Boring at 16.5 feet					
20		20				
25		25				

Woodward-Clyde Consultants	90C0039A City Center ESA	LOG OF BORING T-6 B-2

LOCATION Parcel T-6, 12th & Clay Sts., Oakland, California			ELEVATION AND DATUM
AGENCY Sierra Pacific	DRILLER Derald/Aaron		DATE STARTED 2/15/90
EQUIPMENT Mobil Drill B-53			DATE COMPLETED 2/15/90
METHOD 8"-diam Hollow Stem Auger	DRILL BIT		COMPLETION DEPTH 26.5'
CASING			SAMPLERS Modified California 2-in.-diam.
PERFORATIONS	FROM TO		NO. OF SAMPLES DIST. UNDIST. 3
PACK	FROM TO		WATER LEVEL ATD 26.5' COMPL 24 HR
TYPE OF SEALS	FROM TO		LOGGED BY Lois Gruenberg
Sand cement grout	FROM 0' TO 26.5'		CHECKED BY Michael McGuire

DEPTH (FT)	DESCRIPTION	DEPTH (FT)	SAMPLES	Blow Counts	Recovery	REMARKS (Strength, moisture content, etc.)
	Grass turf surface.					
5	SILTY SAND (SM) - mottled gray and brown with orange stain - fine to medium sand - trace clay - dense - damp	5	1	2 2 2		
10	becomes brown with orange staining	10	2	10 25 32		
15		15	3	20 23 30		
20		20	4	15 21 28		
25	▽ ATD	25	5	28 39 42		
30	Bottom of Boring at 26.5 feet	30				

Woodward-Clyde Consultants

90C0039A
City Center ESA

LOG OF MONITORING WELL
T-5 W-1

LOCATION	Parcel T-6, 12th & Clay Streets, Oakland, California	ELEVATION AND DATUM	36.98 feet (C.O.O.D.)
AGENCY	Sierra Pacific	DRILLER Derald/Aaron	DATE STARTED 2/15/90
EQUIPMENT	Mobile Drill B-53		DATE COMPLETED 2/15/90
METHOD	8"-diam Hollow Stem Auger	DRILL BIT	COMPLETION DEPTH 37-1/2'
CASING	2 in.-diameter Schedule 40 PVC		SAMPLERS Modified California 2-in.-diam.
PERFORATIONS	0.020 in. slot	FROM 25' TO 35'	NO. OF SAMPLES DIST. UNDIST. 6
PACK	#3 Monterey sand	FROM 23' TO 37-1/2'	WATER LEVEL ATD 27' COMPL 24 HR
TYPE OF SEALS	Activated 3/8" bentonite pellets	FROM 20' TO 23'	LOGGED BY Lois Gruenberg
	Sand cement grout	FROM 0' TO 20'	CHECKED BY Michael McGuire

DEPTH (FT)	DESCRIPTION	PIEZOMETER INSTALLTION	DEPTH (FT)	SAMPLES	Blow Counts	Recovery	REMARKS (Strength, moisture content, etc.)
5	SILTY SAND (SM) - brown with orange stain - fine to medium grain - trace clay - medium dense - moist		5	1	6 8 10		
10	becomes gray, dense.		10	2	20 25 45		
15	becomes brown with orange staining		15	3	10 14 21		
20			20	4	18 24 35		
25			25				

Continued on next page.

Woodward-Clyde Consultants

90C0039A
City Center ESA

LOG OF MONITORING WELL
T-5 W-1

DEPTH (FT)	DESCRIPTION	PIEZOMETER INSTALLTION	DEPTH (FT)	SAMPLES	Blow Counts	Recovery	REMARKS (Strength, moisture content, etc.)
25	becomes brown.		25	5	20 34 48		
	▽ ATD						
	▽ 3/13/90			6	29 39 42		
30			30				
35			35				
	Bottom of Boring at 37.5 feet						
40			40				
45			45				
50			50				
55			55				

Woodward-Clyde Consultants	90C0039A City Center ESA	LOG OF MONITORING WELL **T-6 W-2**

LOCATION Parcel T-6, 12th & Clay Streets, Oakland, California			ELEVATION AND DATUM 34.61 feet (C.O.O.D.)
AGENCY Sierra Pacific	DRILLER Derald/Aaron		DATE STARTED 2/14/90
EQUIPMENT Mobile Drill B-53			DATE COMPLETED 2/14/90
METHOD 8"-diam Hollow Stem Auger	DRILL BIT		COMPLETION DEPTH 37-1/2'
CASING 2 in.-diameter Schedule 40 PVC			SAMPLERS Modified California 2-in.-diam.
PERFORATIONS 0.020 in. slot	FROM 25' TO 35'	NO. OF SAMPLES	DIST. UNDIST. 6
PACK #3 Monterey sand	FROM 23' TO 37-1/2'	WATER LEVEL	ATD 27' COMPL 24 HR
TYPE OF SEALS: Activated 3/8" bentonite pellets	FROM 20' TO 23'	LOGGED BY Lois Gruenberg	CHECKED BY Michael McGuire
TYPE OF SEALS: Sand cement grout	FROM 0' TO 20'		

DEPTH (FT)	DESCRIPTION	PIEZOMETER INSTALLTION	DEPTH (FT)	SAMPLES	Blow Counts	Recovery	REMARKS (Strength, moisture content, etc.)
5	SILTY SAND (SM) - brown with orange stain - fine to medium grain - trace clay - medium dense - damp		5	1	6 12 15		
10	becomes dense.		10	2	16 35 38		
15			15	3	11 24 28		Strong gasoline odor.
20	becomes gray.		20	4	20 40 45		
25			25				Continued on next page.

Woodward-Clyde Consultants

90C0039A
City Center ESA

LOG OF MONITORING WELL
T-6 W-2

DEPTH (FT)	DESCRIPTION	PIEZOMETER INSTALLTION	DEPTH (FT)	SAMPLES	Blow Counts	Recovery	REMARKS (Strength, moisture content, etc.)
25	SILTY SAND (SM) Continued		25	5	20 39 45		Strong gasoline odor.
	ATD			6	20 48 50/5		
	3/13/90						
30			30				
35			35				
	Bottom of Boring at 37.5 feet						
40			40				
45			45				
50			50				
55			55				

Woodward-Clyde Consultants	90C0039A City Center ESA	LOG OF MONITORING WELL T-6 W-3

LOCATION	Parcel T-6, 12th & Clay Streets, Oakland, California	ELEVATION AND DATUM	35.16 feet (C.O.O.D.)
AGENCY	Sierra Pacific	DRILLER Derald/Aaron	DATE STARTED 2/14/90
EQUIPMENT	Mobile Drill B-53		DATE COMPLETED 2/14/90
METHOD	8"-diam Hollow Stem Auger	DRILL BIT	COMPLETION DEPTH 37-1/2'
CASING	2 in.-diameter Schedule 40 PVC		SAMPLERS Modified California 2-in.-diam.
PERFORATIONS	0.020 in. slot	FROM 25' TO 35'	NO. OF SAMPLES / DIST. / UNDIST. 6
PACK	#3 Monterey sand	FROM 23' TO 37-1/2'	WATER LEVEL / ATD 27' / COMPL / 24 HR
TYPE OF SEALS	Activated 3/8" bentonite pellets	FROM 20' TO 23'	LOGGED BY Lois Gruenberg
	Sand cement grout	FROM 0' TO 20'	CHECKED BY Michael McGuire

DEPTH (FT)	DESCRIPTION	PIEZOMETER INSTALLTION	DEPTH (FT)	SAMPLES	Blow Counts	Recovery	REMARKS (Strength, moisture content, etc.)
5	SILTY SAND (SM) - brown with orange stain - fine to medium grain - trace clay - medium dense - damp		5	1	8 10 15		
10	becomes brown with slight orange stain, dense.		10	2	9 27 40		
15			15	3	9 21 28		Very strong gasoline odor.
20			20	4	19 28 39		
25			25				Continued on next page.

Woodward-Clyde Consultants

90C0039A
City Center ESA

LOG OF MONITORING WELL
T-6 W-3

DEPTH (FT)	DESCRIPTION	PIEZOMETER INSTALLTION	DEPTH (FT)	SAMPLES	Blow Counts	Recovery	REMARKS (Strength, moisture content, etc.)
25	increasing silt, becomes light tan, moist.		25	5	16 35 41		strong gasoline odor
	▽ ATD						
	▽ 3/13/90			6	16 29 35		
30			30				
35			35				
	Bottom of Boring at 37.5 feet						
40			40				
45			45				
50			50				
55			55				

APPENDIX B

RESULTS OF LABORATORY TESTING, CHAIN-OF-CUSTODY FORMS, AND SAMPLING RECORDS

ORGANIC ANALYSIS REPORT
Volatile Compound, EPA Method 8240

EUREKA LABORATORIES, INC.
6790 Florin-Perkins Road
Sacramento, CA 95828
(916) 381-7953

Order No: 90-02-161
Hazardous Waste Testing
Certification: 108

CLIENT: WOODWARD-CLYDE
PROJECT: 90C0039A
SAMPLE ID: T6-B1-1D,2D

DATE RECEIVED: 02/22/1990
DATE EXTRACTED: 02/26/1990
DATE COMPLETED: 03/05/1990

COMP. No.	COMPOUND	ug/Kg	DETECTION LIMIT ug/Kg (ppb)
V1	Chloromethane	<500	500
V2	Bromomethane	<500	500
V3	Vinyl chloride	<500	500
V4	Chloroethane	<500	500
V5	Methylene chloride	<500	500
V6	Trichlorofluoromethane	<100	100
V7	1,1-Dichloroethene	<100	100
V8	1,1-Dichloroethane	<100	100
V9	trans-1,2-Dichloroethene	<100	100
V10	Chloroform	<100	100
V11	1,2-Dichloroethane	<100	100
V12	1,1,1,-Trichloroethane	<100	100
V13	Carbon tetrachloride	<100	100
V14	Bromodichloromethane	<100	100
V15	1,2-Dichloropropane	<100	100
V16	trans-1,3-Dichloropropene	<100	100
V17	Trichloroethene	<100	100
V18	Benzene	<100	100
V19	Dibromochloromethane	<100	100
V20	1,1,2-Trichloroethane	<100	100
V21	cis-1,3-Dichloropropene	<100	100
V22	2-Chloroethylvinyl ether	<200	200
V23	Bromoform	<100	100
V24	1,1,2,2-Tetrachloroethane	<100	100
V25	Tetrachloroethene	<100	100
V26	Toluene	<100	100
V27	Chlorobenzene	<100	100
V28	Ethylbenzene	<100	100
V29	Total Xylenes	<100	100

Harlan Loui
Chemist

March 9, 1990
Date

ORGANIC ANALYSIS REPORT
Volatile Compound, EPA Method 8240

EUREKA LABORATORIES, INC.
6790 Florin-Perkins Road
Sacramento, CA 95828
(916) 381-7953

Order No: 90-02-125
Hazardous Waste Testing
Certification: 108

CLIENT: WOODWARD-CLYDE
PROJECT: 90C0039A
SAMPLE ID: T6-B2-1D,2D,3D,4D,5D

DATE RECEIVED: 02/16/1990
DATE EXTRACTED: 02/22/1990
DATE COMPLETED: 03/01/1990

COMP. No.	COMPOUND	ug/Kg	DETECTION LIMIT ug/Kg (ppb)
V1	Chloromethane	<500	500
V2	Bromomethane	<500	500
V3	Vinyl chloride	<500	500
V4	Chloroethane	<500	500
V5	Methylene chloride	<500	500
V6	Trichlorofluoromethane	<100	100
V7	1,1-Dichloroethene	<100	100
V8	1,1-Dichloroethane	<100	100
V9	trans-1,2-Dichloroethene	<100	100
V10	Chloroform	<100	100
V11	1,2-Dichloroethane	<100	100
V12	1,1,1,-Trichloroethane	<100	100
V13	Carbon tetrachloride	<100	100
V14	Bromodichloromethane	<100	100
V15	1,2-Dichloropropane	<100	100
V16	trans-1,3-Dichloropropene	<100	100
V17	Trichloroethene	<100	100
V18	Benzene	<100	100
V19	Dibromochloromethane	<100	100
V20	1,1,2-Trichloroethane	<100	100
V21	cis-1,3-Dichloropropene	<100	100
V22	2-Chloroethylvinyl ether	<200	200
V23	Bromoform	<100	100
V24	1,1,2,2-Tetrachloroethane	<100	100
V25	Tetrachloroethene	<100	100
V26	Toluene	<100	100
V27	Chlorobenzene	<100	100
V28	Ethylbenzene	<100	100
V29	Total Xylenes	<100	100

Chung P Li, Ph.D.
Chemist

March 5, 1990
Date

ORGANIC ANALYSIS REPORT
Volatile Compound, EPA Method 8240

EUREKA LABORATORIES, INC.
6790 Florin-Perkins Road
Sacramento, CA 95828
(916) 381-7953

Order No: 90-02-125
Hazardous Waste Testing
Certification: 108

CLIENT: WOODWARD-CLYDE
PROJECT: 90C0039A
SAMPLE ID: T6-W1-1D,2D,3D,4D,5D,6D

DATE RECEIVED: 02/16/1990
DATE EXTRACTED: 02/22/1990
DATE COMPLETED: 03/01/1990

COMP. No.	COMPOUND	ug/Kg	DETECTION LIMIT ug/Kg (ppb)
V1	Chloromethane	<500	500
V2	Bromomethane	<500	500
V3	Vinyl chloride	<500	500
V4	Chloroethane	<500	500
V5	Methylene chloride	<500	500
V6	Trichlorofluoromethane	<100	100
V7	1,1-Dichloroethene	<100	100
V8	1,1-Dichloroethane	<100	100
V9	trans-1,2-Dichloroethene	<100	100
V10	Chloroform	<100	100
V11	1,2-Dichloroethane	<100	100
V12	1,1,1,-Trichloroethane	<100	100
V13	Carbon tetrachloride	<100	100
V14	Bromodichloromethane	<100	100
V15	1,2-Dichloropropane	<100	100
V16	trans-1,3-Dichloropropene	<100	100
V17	Trichloroethene	<100	100
V18	Benzene	<100	100
V19	Dibromochloromethane	<100	100
V20	1,1,2-Trichloroethane	<100	100
V21	cis-1,3-Dichloropropene	<100	100
V22	2-Chloroethylvinyl ether	<200	200
V23	Bromoform	<100	100
V24	1,1,2,2-Tetrachloroethane	<100	100
V25	Tetrachloroethene	<100	100
V26	Toluene	<100	100
V27	Chlorobenzene	<100	100
V28	Ethylbenzene	<100	100
V29	Total Xylenes	<100	100

Chung P Li

Chung P Li, Ph.D.
Chemist

March 5, 1990
Date

ORGANIC ANALYSIS REPORT
Volatile Compound, EPA Method 8240

EUREKA LABORATORIES, INC.
6790 Florin-Perkins Road
Sacramento, CA 95828
(916) 381-7953

Order No: 90-02-125
Hazardous Waste Testing
Certification: 108

CLIENT: WOODWARD-CLYDE
PROJECT: 90C0039A
SAMPLE ID: T6-W2-1D,2D,3D,4D,5D,6D

DATE RECEIVED: 02/16/1990
DATE EXTRACTED: 02/22/1990
DATE COMPLETED: 03/01/1990

COMP. No.	COMPOUND	ug/Kg	DETECTION LIMIT ug/Kg (ppb)
V1	Chloromethane	<500	500
V2	Bromomethane	<500	500
V3	Vinyl chloride	<500	500
V4	Chloroethane	<500	500
V5	Methylene chloride	<500	500
V6	Trichlorofluoromethane	<100	100
V7	1,1-Dichloroethene	<100	100
V8	1,1-Dichloroethane	<100	100
V9	trans-1,2-Dichloroethene	<100	100
V10	Chloroform	<100	100
V11	1,2-Dichloroethane	<100	100
V12	1,1,1,-Trichloroethane	<100	100
V13	Carbon tetrachloride	<100	100
V14	Bromodichloromethane	<100	100
V15	1,2-Dichloropropane	<100	100
V16	trans-1,3-Dichloropropene	<100	100
V17	Trichloroethene	<100	100
V18	Benzene	<100	100
V19	Dibromochloromethane	<100	100
V20	1,1,2-Trichloroethane	<100	100
V21	cis-1,3-Dichloropropene	<100	100
V22	2-Chloroethylvinyl ether	<200	200
V23	Bromoform	<100	100
V24	1,1,2,2-Tetrachloroethane	<100	100
V25	Tetrachloroethene	<100	100
V26	Toluene	<100	100
V27	Chlorobenzene	<100	100
V28	Ethylbenzene	835	100
V29	Total Xylenes	763	100

Chung P. Li
Chung P. Li, Ph.D.
Chemist

March 5, 1990
Date

ORGANIC ANALYSIS REPORT
Volatile Compound, EPA Method 8240

EUREKA LABORATORIES, INC.
6790 Florin-Perkins Road
Sacramento, CA 95828
(916) 381-7953

Order No: 90-02-125
Hazardous Waste Testing
Certification: 108

CLIENT: WOODWARD-CLYDE
PROJECT: 90C0039A
SAMPLE ID: T6-W3-1D,2D,3D,4D,5D,6D

DATE RECEIVED: 02/16/1990
DATE EXTRACTED: 02/22/1990
DATE COMPLETED: 03/01/1990

COMP. No.	COMPOUND	ug/Kg	DETECTION LIMIT ug/Kg (ppb)
V1	Chloromethane	<500	500
V2	Bromomethane	<500	500
V3	Vinyl chloride	<500	500
V4	Chloroethane	<500	500
V5	Methylene chloride	<500	500
V6	Trichlorofluoromethane	<100	100
V7	1,1-Dichloroethene	<100	100
V8	1,1-Dichloroethane	<100	100
V9	trans-1,2-Dichloroethene	<100	100
V10	Chloroform	<100	100
V11	1,2-Dichloroethane	<100	100
V12	1,1,1,-Trichloroethane	<100	100
V13	Carbon tetrachloride	<100	100
V14	Bromodichloromethane	<100	100
V15	1,2-Dichloropropane	<100	100
V16	trans-1,3-Dichloropropene	<100	100
V17	Trichloroethene	<100	100
V18	Benzene	<100	100
V19	Dibromochloromethane	<100	100
V20	1,1,2-Trichloroethane	<100	100
V21	cis-1,3-Dichloropropene	<100	100
V22	2-Chloroethylvinyl ether	<200	200
V23	Bromoform	<100	100
V24	1,1,2,2-Tetrachloroethane	<100	100
V25	Tetrachloroethene	<100	100
V26	Toluene	<100	100
V27	Chlorobenzene	<100	100
V28	Ethylbenzene	<100	100
V29	Total Xylenes	<100	100

Chung P. Li

Chung P. Li, Ph.D.
Chemist

March 5, 1990
Date

ORGANIC ANALYSIS REPORT

Semi-Volatile Compound, EPA Method 8270

EUREKA LABORATORIES, INC.
6790 Florin-Perkins Road
Sacramento, CA 95828
(916) 381-7953

Order No: 90-02-125
Hazardous Waste Testing
Certification: 108

CLIENT: WOODWARD-CLYDE
PROJECT: 90C0039A
SAMPLE ID: T6-W2-1D,2D,3D,5D,6D

DATE RECEIVED: 02/16/1990
DATE EXTRACTED: 02/20/1990
DATE COMPLETED: 03/01/1990

COMP No.	COMPOUND	ug/Kg	DETECTION LIMIT ug/Kg (ppb)
I. PRIORITY POLLUTANT ACID COMPOUNDS			
A1	Phenol	300	150
A2	2-Chlorophenol	<150	150
A3	2-Nitrophenol	<150	150
A4	2,4-Dimethylphenol	<150	150
A5	2,4-Dichlorophenol	<150	150
A6	4-Chloro-3-methylphenol	<150	150
A7	2,4,6-Trichlorophenol	<150	150
A8	2,4-Dinitrophenol	<800	800
A9	4-Nitrophenol	<800	800
A10	2-Methyl-4,6-Dinitrophenol	<800	800
A11	Pentachlorophenol	<150	150
II. PRIORITY POLLUTANT BASE/NEUTRAL COMPOUNDS			
B1	N-Nitrosodimethylamine	<150	150
B2	Bis(2-Chloroethyl)ether	<150	150
B3	1,3-Dichlorobenzene	<150	150
B4	1,2-Dichlorobenzene	<150	150
B5	1,4-Dichlorobenzene	<150	150
B6	Bis(2-Chloroisopropyl)ether	<150	150
B7	Hexachloroethane	<150	150
B8	N-Nitrosodi-n-propylamine	<150	150
B9	Nitrobenzene	<150	150
B10	Di-n-octyl phthalate	<150	150
B11	1,2,4-Trichlorobenzene	<150	150
B12	Naphthalene	400	150
B13	Hexachlorobutadiene	<150	150
B14	2-Methylnaphthalene	300	150
B15	Hexachlorocyclopentadiene	<150	150
B16	2-Chloronaphthalene	<150	150
B17	Dimethyl phthalate	<150	150
B18	Acenaphthylene	<150	150
B19	Acenaphthene	<150	150
B20	2,4-Dinitrotoluene	<300	300
B21	2,6-Dinitrotoluene	<300	300
B22	Fluorene	<150	150
B23	Diethyl phthalate	<150	150
B24	4-Chlorophenyl phenyl ether	<150	150
B25	1,2-Diphenylhydrazine	<300	300
B26	4-Bromophenyl phenyl ether	<150	150
B27	Hexachlorobenzene	<150	150
B28	Phenanthrene	<150	150
B29	Anthracene	<150	150
B30	Di-n-butyl phthalate	<150	150
B31	Fluoranthene	<150	150

Semi-Volatile Compound, EPA Method 8270

CLIENT: WOODWARD-CLYDE

SAMPLE ID: T6-W2-1D,2D,3D,4D,5D,6D

COMP No.	COMPOUND	ug/Kg	DETECTION LIMIT ug/Kg (ppb)
II. PRIORITY POLLUTANT BASE/NEUTRAL COMPOUNDS			
B32	Benzidine	<1200	1200
B33	Bis(2-Chloroethoxy)methane	<300	300
B34	Pyrene	<150	150
B35	Butyl benzyl phthalate	<150	150
B36	3,3-Dichlorobenzidine	<300	300
B37	Chrysene	<150	150
B38	Benzo[a]anthracene	<150	150
B39	Bis(2-Ethylehexyl)phthalate	2000	500
B40	Benzo[k]fluoranthene	<150	150
B41	Benzo[b]fluoranthene	<150	150
B42	Benzo[a]pyrene	<150	150
B43	Indeno[1,2,3-cd]pyrene	<150	150
B44	Dibenzo[a,h]anthracene	<150	150
B45	Benzo[g,h,i]perylene	<150	150
B46	Isophrone	<150	150
III. PESTICIDES			
P1	a-BHC	<500	500
P2	g-BHC	<500	500
P3	B-BHC	<500	500
P4	d-BHC	<500	500
P5	Heptachlor	<500	500
P6	Aldrin	<500	500
P7	Heptachlor epoxide	<500	500
P8	Dieldrin	<500	500
P9	4,4'-DDE	<500	500
P10	Endosulfan	<1000	1000
P11	Endrin	<1000	1000
P12	4,4'-DDD	<500	500
P13	4,4'-DDT	<500	500
P14	Endosulfan sulfate	<1000	1000
P15	Chlordane	<5000	5000
P16	Toxaphene	<10000	10000
P17	PCB	<10000	10000

Paul Poon
Chemist

March 5, 1990
Date

PRIORITY POLLUTANT METALS, EPA Method 6010 ARSENIC, EPA 7060, MERCURY, EPA 7470, AND SELENIUM, EPA 7740

EUREKA LABORATORIES, INC.
6790 Florin-Perkins Road
Sacramento, CA 95828
(916) 381-7953

Order No: 90-02-125
Hazardous Waste Testing
Certification: 108

CLIENT: WOODWARD-CLYDE
PROJECT: 90C0039A
SAMPLE ID: T6-W2-1D,2D,3D,4D,5D,6D

DATE RECEIVED: 02/16/1990
DATE EXTRACTED: 02/26/1990
DATE COMPLETED: 03/01/1990

	CONCENTRATION [mg/Kg (ppm)]	DETECTION LIMIT [mg/Kg (ppm)]
Silver	0.6	0.5
Arsenic	1.4	0.2
Barium	310	0.1
Beryllium	<0.5	0.5
Cadmium	<1.0	1.0
Cobalt	6.0	1.0
Chromium	34.0	0.5
Copper	7.6	0.5
Mercury	<0.05	0.05
Molybdenum	<1.0	1.0
Nickel	32.2	1.0
Lead	5.4	3.0
Antimony	<3.0	3.0
Selenium	<0.15	0.15
Thallium	16.7	1.0
Vanadium	21.7	0.5
Zinc	20.0	0.5
Aluminum	4710	2.5
Calcium	886	5.0
Magnesium	1900	10.0
Iron	8330	5.0
Sodium	1310	10.0
Manganese	94.4	0.5
Potassium	223	150
Boron	9.8	10.0

This detection limit for soil is based on the dilution factor of 50.

Josie Quiambao
Josie Quiambao
Chemist

March 5, 1990
Date

CYANIDE
EPA Method 9010

EUREKA LABORATORIES, INC.
6790 Florin-Perkins Road
Sacramento, CA 95828
(916) 381-7953

Order No: 90-02-125
Hazardous Waste Testing
Certification: 108

CLIENT: WOODWARD-CLYDE
PROJECT: 90C0039A

DATE RECEIVED: 02/16/1990
DATE EXTRACTED: 02/23/1990
DATE COMPLETED: 02/26/1990

SAMPLE ID.	CYANIDE [mg/Kg (ppm)]
T6-W2-1D,2D,3D,4D,5D,6D	<0.05
T9-B2-1D,2D,3D,4D,5D	<0.05
METHOD BLANK	<0.05

REAGENT SPIKE RECOVERY - 107%
REAGENT SPIKE RECOVERY DUP. - 104%

DETECTION LIMIT: 0.05 [mg/Kg (ppm)]

Hung Nguyen
Chemist

March 5, 1990
Date

ORGANIC ANALYSIS REPORT
Volatile Compound, EPA Method 624

EUREKA LABORATORIES, INC.
6790 Florin-Perkins Road
Sacramento, CA 95828
(916) 381-7953

Order No: 90-02-161
Hazardous Waste Testing
Certification: 108

CLIENT: WOODWARD-CLYDE
PROJECT :90C0039A
SAMPLE ID: T6-MW1-1

DATE RECEIVED : 02/22/1990
DATE ANALYZED : 03/01/1990
DATE COMPLETED: 03/05/1990

COMP. No.	COMPOUND	ug/L (ppb)	DETECTION LIMIT ug/L (ppb)
V1	Chloromethane	<10	10
V2	Bromomethane	<10	10
V3	Vinyl chloride	<10	10
V4	Chloroethane	<10	10
V5	Methylene chloride	<50	50
V6	Trichlorofluoromethene	<5	5
V7	1,1-Dichloroethene	<5	5
V8	1,1-Dichloroethane	<5	5
V9	trans-1,2-Dichloroethene	<5	5
V10	Chloroform	<5	5
V11	1,2-Dichloroethane	<5	5
V12	1,1,1,-Trichloroethane	<5	5
V13	Carbon tetrachloride	<5	5
V14	Bromodichloromethane	<5	5
V15	1,2-Dichloropropane	<5	5
V16	trans-1,3-Dichloropropene	<5	5
V17	Trichloroethene	<5	5
V18	Benzene	<5	5
V19	Dibromochloromethane	<10	10
V20	1,1,2-Trichloroethane	<5	5
V21	cis-1,3-Dichloropropene	<5	5
V22	2-Chloroethylvinyl ether	<10	10
V23	Bromoform	<5	5
V24	1,1,2,2-Tetrachloroethane	<5	5
V25	Tetrachloroethene	<5	5
V26	Toluene	<5	5
V27	Chlorobenzene	<5	5
V28	Ethylbenzene	<5	5
V29	Total Xylenes	<5	5

Harlan Loui
Chemist

March 9, 1990
Date

ORGANIC ANALYSIS REPORT
Volatile Compound, EPA Method 624

EUREKA LABORATORIES, INC.
6790 Florin-Perkins Road
Sacramento, CA 95828
(916) 381-7953

Order No: 90-02-161
Hazardous Waste Testing
Certification: 108

CLIENT: WOODWARD-CLYDE
PROJECT :90C0039A
SAMPLE ID: T6-MW2-1

DATE RECEIVED : 02/22/1990
DATE ANALYZED : 03/01/1990
DATE COMPLETED: 03/05/1990

COMP. No.	COMPOUND	ug/L (ppb)	DETECTION LIMIT ug/L (ppb)
V1	Chloromethane	<50	50
V2	Bromomethane	<50	50
V3	Vinyl chloride	<50	50
V4	Chloroethane	<50	50
V5	Methylene chloride	<250	250
V6	Trichlorofluoromethene	<25	25
V7	1,1-Dichloroethene	<25	25
V8	1,1-Dichloroethane	<25	25
V9	trans-1,2-Dichloroethene	<25	25
V10	Chloroform	<25	25
V11	1,2-Dichloroethane	<25	25
V12	1,1,1,-Trichloroethane	<25	25
V13	Carbon tetrachloride	<25	25
V14	Bromodichloromethane	<25	25
V15	1,2-Dichloropropane	<25	25
V16	trans-1,3-Dichloropropene	<25	25
V17	Trichloroethene	<25	25
V18	Benzene	<25	25
V19	Dibromochloromethane	<50	50
V20	1,1,2-Trichloroethane	<25	25
V21	cis-1,3-Dichloropropene	<25	25
V22	2-Chloroethylvinyl ether	<50	50
V23	Bromoform	<25	25
V24	1,1,2,2-Tetrachloroethane	<25	25
V25	Tetrachloroethene	<25	25
V26	Toluene	26	25
V27	Chlorobenzene	<25	25
V28	Ethylbenzene	<25	25
V29	Total Xylenes	3819	25

Harlan Loui
Chemist

March 9, 1990
Date

ORGANIC ANALYSIS REPORT
Volatile Compound, EPA Method 624

EUREKA LABORATORIES, INC.
6790 Florin-Perkins Road
Sacramento, CA 95828
(916) 381-7953

Order No: 90-02-161
Hazardous Waste Testing
Certification: 108

CLIENT: WOODWARD-CLYDE
PROJECT :90C0039A
SAMPLE ID: T6-MW3-1

DATE RECEIVED : 02/22/1990
DATE ANALYZED : 03/01/1990
DATE COMPLETED: 03/05/1990

COMP. No.	COMPOUND	ug/L (ppb)	DETECTION LIMIT ug/L (ppb)
V1	Chloromethane	<10	10
V2	Bromomethane	<10	10
V3	Vinyl chloride	<10	10
V4	Chloroethane	<10	10
V5	Methylene chloride	<50	50
V6	Trichlorofluoromethene	<5	5
V7	1,1-Dichloroethene	<5	5
V8	1,1-Dichloroethane	<5	5
V9	trans-1,2-Dichloroethene	<5	5
V10	Chloroform	<5	5
V11	1,2-Dichloroethane	<5	5
V12	1,1,1,-Trichloroethane	<5	5
V13	Carbon tetrachloride	<5	5
V14	Bromodichloromethane	<5	5
V15	1,2-Dichloropropane	<5	5
V16	trans-1,3-Dichloropropene	<5	5
V17	Trichloroethene	<5	5
V18	Benzene	<5	5
V19	Dibromochloromethane	<10	10
V20	1,1,2-Trichloroethane	<5	5
V21	cis-1,3-Dichloropropene	<5	5
V22	2-Chloroethylvinyl ether	<10	10
V23	Bromoform	<5	5
V24	1,1,2,2-Tetrachloroethane	<5	5
V25	Tetrachloroethene	<5	5
V26	Toluene	34	5
V27	Chlorobenzene	<5	5
V28	Ethylbenzene	<5	5
V29	Total Xylenes	703	5

Harlan Loui
Chemist

March 9, 1990
Date

ORGANIC ANALYSIS REPORT
Volatile Compound, EPA Method 624

EUREKA LABORATORIES, INC.
6790 Florin-Perkins Road
Sacramento, CA 95828
(916) 381-7953

Order No: 90-02-161
Hazardous Waste Testing
Certification: 108

CLIENT: WOODWARD-CLYDE
PROJECT :90C0039A
SAMPLE ID: T6-MW3-1 MATRIX SPIKE RECOVERY

DATE RECEIVED : 02/22/1990
DATE ANALYZED : 03/01/1990
DATE COMPLETED: 03/05/1990

COMP No.	COMPOUND	SPIKE RECOVERY
V7	1,1-Dichloroethene	91%
V17	Trichloroethene	95%
V18	Benzene	104%
V26	Toluene	97%
V27	Chlorobenzene	104%

Harlan Loui
Chemist

March 9, 1990
Date

ORGANIC ANALYSIS REPORT
Volatile Compound, EPA Method 624

EUREKA LABORATORIES, INC.
6790 Florin-Perkins Road
Sacramento, CA 95828
(916) 381-7953

Order No: 90-02-161
Hazardous Waste Testing
Certification: 108

CLIENT: WOODWARD-CLYDE
PROJECT :90C0039A
SAMPLE ID: T6-MW3-1 MATRIX SPIKE
RECOVERY DUPLICATE

DATE RECEIVED : 02/22/1990
DATE ANALYZED : 03/01/1990
DATE COMPLETED: 03/05/1990

COMP No.	COMPOUND	SPIKE RECOVERY
V7	1,1-Dichloroethene	83%
V17	Trichloroethene	91%
V18	Benzene	96%
V26	Toluene	100%
V27	Chlorobenzene	112%

Harlan Loui
Chemist

March 9, 1990
Date

ORGANIC ANALYSIS REPORT

Semi-Volatile Compound, EPA Method 625

EUREKA LABORATORIES, INC.
6790 Florin Perkins Road
Sacramento, CA 95828
(916) 381-7953

Order No: 90-02-161
Hazardous Waste Testing
Certification: 108

CLIENT: WOODWARD-CLYDE
PROJECT :90C0039A
SAMPLE ID: T6-MW3-1

DATE RECEIVED : 02/22/1990
DATE EXTRACTD : 02/27/1990
DATE COMPLETED: 03/08/1990

COMP No.	COMPOUND	ug/L (ppb)	DETECTION LIMIT ug/L (ppb)
I. PRIORITY POLLUTANT ACID COMPOUNDS			
A1	Phenol	<10	10
A2	2-Chlorophenol	<10	10
A3	2-Nitrophenol	<10	10
A4	2,4-Dimethylphenol	<10	10
A5	2,4-Dichlorophenol	<10	10
A6	4-Chloro-3-methylphenol	<10	10
A7	2,4,6-Trichlorophenol	<10	10
A8	2,4-Dinitrophenol	<50	50
A9	4-Nitrophenol	<50	50
A10	2-Methyl-4,6-Dinitrophenol	<50	50
A11	Pentachlorophenol	<10	10
II. PRIORITY POLLUTANT BASE/NEUTRAL COMPOUNDS			
B1	N-Nitrosodimethylamine	<10	10
B2	Bis(2-Chloroethyl)ether	<10	10
B3	1,3-Dichlorobenzene	<10	10
B4	1,2-Dichlorobenzene	<10	10
B5	1,4-Dichlorobenzene	<10	10
B6	Bis(2-Chloroisopropyl)ether	<10	10
B7	Hexachloroethane	<10	10
B8	N-Nitrosodi-n-propylamine	<10	10
B9	Nitrobenzene	<10	10
B10	Di-n-octyl phthalate	<10	10
B11	1,2,4-Trichlorobenzene	<10	10
B12	Naphthalene	15	10
B13	Hexachlorobutadiene	<10	10
B14	2-Methylnaphthalene	17	10
B15	Hexachlorocyclopentadiene	<10	10
B16	2-Chloronaphthalene	<10	10
B10	Dimethyl phthalate	<10	10
B18	Acenaphthylene	<10	10
B19	Acenaphthene	<10	10
B20	2,4-Dinitrotoluene	<20	20
B21	2,6-Dinitrotoluene	<20	20
B22	Fluorene	<10	10
B23	Diethyl phthalate	<10	10
B24	4-Chlorophenyl phenyl ether	<10	10
B25	1,2-Diphenylhydrazine	<20	20
B26	4-Bromophenyl phenyl ether	<10	10
B27	Hexachlorobenzene	<10	10
B28	Phenanthrene	<10	10
B29	Anthracene	<10	10
B30	Di-n-butyl phthalate	<10	10

ORGANIC ANALYSIS REPORT

Semi-Volatile Compound, EPA Method 625

CLIENT: WOODWARD-CLYDE

SAMPLE ID.: T6-MW3-1

COMP No.	COMPOUND	ug/L (ppb)	DETECTION LIMIT ug/L (ppb)
II. PRIORITY POLLUTANT BASE/NEUTRAL COMPOUNDS			
B31	Fluoranthene	<10	10
B32	Benzidine	<80	80
B33	Bis(2-Chloroethoxy)methane	<20	20
B34	Pyrene	<10	10
B35	Butyl benzyl phthalate	<10	10
B36	3,3-Dichlorobenzidine	<20	20
B37	Chrysene	<10	10
B38	Benzo[a]anthracene	<10	10
B39	Bis(2-Ethylehexyl)phthalate	43	10
B40	Benzo[k]fluoranthene	<10	10
B41	Benzo[b]fluoranthene	<10	10
B42	Benzo[a]pyrene	<10	10
B43	Indeno[1,2,3-cd]pyrene	<10	10
B44	Dibenzo[a,h]anthracene	<10	10
B45	Benzo[g,h,i]perylene	<10	10
B46	Isophrone	<10	10
III. PESTICIDES			
P1	a-BHC	<10	10
P2	g-BHC	<10	10
P3	B-BHC	<10	10
P4	d-BHC	<10	10
P5	Heptachlor	<10	10
P6	Aldrin	<10	10
P7	Heptachlor epoxide	<10	10
P8	Dieldrin	<10	10
P9	4,4'-DDE	<10	10
P10	Endosulfan	<20	20
P11	Endrin	<20	20
P12	4,4'-DDD	<10	10
P13	4,4'-DDT	<10	10
P14	Endosulfan sulfate	<20	20
P15	Chlordane	<100	100
P16	Toxaphene	<500	500
P10	PCB	<100	100

Paul Poon
Chemist

March 9, 1990
Date

TTLC/CAM Metals, EPA Method 6010
ARSENIC, EPA Method 7060, MERCURY, EPA Method 7470
SELENIUM, EPA Method 7740

EUREKA LABORATORIES, INC.
6790 Florin-Perkins Road
Sacramento, CA 95828
(916) 381-7953

Order No: 90-02-161
Hazardous Waste Testing
Certification: 108

CLIENT: WOODWARD-CLYDE
PROJECT: 90C0039A
SAMPLE ID: T6-MW1-1

DATE RECEIVED: 02/22/1990
DATE EXTRACTED: 02/26/1990
DATE COMPLETED: 03/01/1990

	CONCENTRATION [mg/L (ppm)]	DETECTION LIMIT [mg/L (ppm)]
Silver	<0.01	0.01
Arsenic	0.005	0.004
Barium	0.50	0.02
Beryllium	<0.01	0.01
Cadmium	<0.02	0.02
Cobalt	0.07	0.02
Chromium	0.17	0.02
Copper	0.04	0.01
Mercury	<0.001	0.001
Molybdenum	<0.02	0.02
Nickel	0.3	0.1
Lead	<0.1	0.1
Antimony	<0.05	0.05
Selenium	<0.003	0.003
Thallium	0.2	0.1
Vanadium	0.14	0.01
Zinc	0.21	0.01

Josie Quiambao
Chemist

March 9, 1990
Date

TTLC/CAM Metals, EPA Method 6010
ARSENIC, EPA Method 7060, MERCURY, EPA Method 7470
SELENIUM, EPA Method 7740

EUREKA LABORATORIES, INC.
6790 Florin-Perkins Road
Sacramento, CA 95828
(916) 381-7953

Order No: 90-02-161
Hazardous Waste Testing
Certification: 108

CLIENT: WOODWARD-CLYDE
PROJECT: 90C0039A
SAMPLE ID: T6-MW2-1

DATE RECEIVED: 02/22/1990
DATE EXTRACTED: 02/26/1990
DATE COMPLETED: 03/01/1990

	CONCENTRATION [mg/L (ppm)]	DETECTION LIMIT [mg/L (ppm)]
Silver	<0.01	0.01
Arsenic	0.010	0.004
Barium	0.25	0.02
Beryllium	<0.01	0.01
Cadmium	<0.02	0.02
Cobalt	<0.02	0.02
Chromium	0.05	0.02
Copper	0.02	0.01
Mercury	<0.001	0.001
Molybdenum	<0.02	0.02
Nickel	<0.1	0.1
Lead	<0.1	0.1
Antimony	<0.05	0.05
Selenium	<0.003	0.003
Thallium	<0.1	0.1
Vanadium	0.04	0.01
Zinc	0.09	0.01

Josie Quiambao
Chemist

March 9, 1990
Date

PRIORITY POLLUTANT METALS, EPA Method 6010 ARSENIC, EPA 7060, MERCURY, EPA 7470, AND SELENIUM, EPA 7740

EUREKA LABORATORIES, INC.
6790 Florin-Perkins Road
Sacramento, CA 95828
(916) 381-7953

Order No: 90-02-161
Hazardous Waste Testing
Certification: 108

CLIENT: WOODWARD-CLYDE
PROJECT: 90C0039A
SAMPLE ID: T6-MW3-1

DATE RECEIVED: 02/22/1990
DATE EXTRACTED: 02/26/1990
DATE COMPLETED: 03/01/1990

	CONCENTRATION [mg/L (ppm)]	DETECTION LIMIT [mg/L (ppm)]
Silver	<0.01	0.01
Arsenic	0.004	0.004
Barium	0.15	0.02
Beryllium	<0.01	0.01
Cadmium	<0.02	0.02
Cobalt	<0.02	0.02
Chromium	0.03	0.02
Copper	0.02	0.01
Mercury	<0.001	0.001
Molybdenum	<0.02	0.02
Nickel	<0.1	0.1
Lead	<0.05	0.05
Antimony	<0.05	0.05
Selenium	<0.003	0.003
Thallium	0.1	0.1
Vanadium	0.03	0.01
Zinc	0.10	0.01
Aluminum	3.40	0.05
Calcium	43.7	0.1
Magnesium	48.2	0.2
Iron	7.7	0.1
Sodium	118	0.2
Manganese	1.9	0.01
Potassium	3.0	3.0
Boron	0.8	0.2

Josie Quiambao
Chemist

March 9, 1990
Date

CYANIDE
EPA Method 9010

EUREKA LABORATORIES, INC.
6790 Florin-Perkins Road
Sacramento, CA 95828
(916) 381-7953

Order No: 90-02-161
Hazardous Waste Testing
Certification: 108

CLIENT: WOODWARD-CLYDE
PROJECT: 90C0039A

DATE RECEIVED: 02/22/1990
DATE EXTRACTED: 03/02/1990
DATE COMPLETED: 03/02/1990

SAMPLE ID.	LOCATION	CYANIDE [mg/L (ppm)]
T9-MW3-1	-	<0.01
T6-MW3-1	-	<0.01
T12-MW3-1	-	<0.01
METHOD BLANK		<0.01

REAGENT SPIKE RECOVERY - 104%
REAGENT SPIKE RECOVERY DUP. - 102%

DETECTION LIMIT: 0.01 [mg/L (ppm)]

Hung Nguyen
Chemist

March 9, 1990
Date

Woodward-Clyde Consultants

500 12th Street, Suite 100, Oakland, CA 94607-4041
(415) 893-3600

Chain of Custody Record

PROJECT NO. 90C0039A

SAMPLERS: (Signature) Lois Gruenberg

DATE	TIME	SAMPLE NUMBER	Sample Matrix (S)oil, (W)ater, (A)ir	ANALYSES: EPA Method 8240	EPA Method	EPA Method	EPA Method	Number of Containers	REMARKS (Sample preservation, handling procedures, etc.)
2/15	1490	Tb-W1-1-D	S					1	Results to Mike McGuire @ (415) 874-3268
		Tb-W1-2-D						1	
		Tb-W1-3-D						1	
		Tb-W1-4-D						1	
		Tb-W1-5-D						1	
		Tb-W1-6-D						1	
		Tb-W1-1-C					HOLD	1	* Composite into one (1) sample and analyze for EPA Method 8240
		Tb-W1-2-C					HOLD	1	
		Tb-W1-3-C					HOLD	1	
		Tb-W1-4-C					HOLD	1	
		Tb-W1-5-C					HOLD	1	
		Tb-W1-6-C					HOLD	1	
		Tb-B2-1-D						1	Eureka Lab 6790 FLORIN PERKINS RD Sacramento, CA (916) 381-7953
		Tb-B2-2-D						1	
		Tb-B2-3-D						1	
		Tb-B2-4-D						1	
		Tb-B2-5-D						1	
		Tb-B2-1-C					HOLD	1	
		Tb-B2-2-C					HOLD	1	
		Tb-B2-3-C					HOLD	1	
		Tb-B2-4-C					HOLD	1	
		Tb-B2-5-C					HOLD	1	
							TOTAL NUMBER OF CONTAINERS	22	

RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)	RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)
Lois Gruenberg	2/15/1990 4:30 PM			2/15 4:35	

METHOD OF SHIPMENT:	SHIPPED BY: (Signature)	COURIER: (Signature)	RECEIVED FOR LAB BY: (Signature)	DATE/TIME
ICE CHEST				

Woodward-Clyde Consultants

500 12th Street, Suite 100, Oakland, CA 94607-4041
(415) 893-3600

Chain of Custody Record

PROJECT NO. 90C00394A

SAMPLERS: (Signature) Lori S Gruenberg

DATE	TIME	SAMPLE NUMBER	Sample Matrix (S)oil, (W)ater, (A)ir	EPA Method 8240	EPA Method 8270	EPA Method 200.7	EPA Method 335.3	Number of Containers	REMARKS (Sample preservation, handling procedures, etc.)
7/14/1990		T6-W3-1-D	S					1	Results to Mike McGuire (415) 874-3288
		T6-W3-2-D						1	
		T6-W3-3-D						1	
		T6-W3-4-D						1	
		T6-W3-5-D						1	
		T6-W3-6-D						1	
								0	
		T6-W3-1-C					HOLD	1	
		T6-W3-2-C					HOLD	1	
		T6-W3-3-C					HOLD	1	
		T6-W3-4-C					HOLD	1	
		T6-W3-5-C					HOLD	1	
		T6-W3-6-C					HOLD	1	
		T6-W2-1-D						1	* Composite into 1 (one) sample and analyze for EPA Method 8240, etc or as marked
		T6-W2-2-D						1	
		T6-W2-3-D						1	
		T6-W2-4-D						1	
		T6-W2-5-D						1	
		T6-W2-6-D						1	
		T6-W2-1-C					HOLD	1	
		T6-W2-2-C					HOLD	1	
		T6-W2-3-C					HOLD	1	
		T6-W2-4-C					HOLD	1	
		T6-W2-5-C					HOLD	1	
		T6-W2-6-C					HOLD	1	
							TOTAL NUMBER OF CONTAINERS	24	

Eureka Lab. 6790 FLORIN PERKINS RD. Sacramento, CA (916) 381-7953

RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)	RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)
Lori S Gruenberg	7/15/1990 1430			7/15 1:35	

METHOD OF SHIPMENT:	SHIPPED BY: (Signature)	COURIER: (Signature)	RECEIVED FOR LAB BY: (Signature)	DATE/TIME
ICE CHEST				7/16/90 10

Woodward-Clyde Consultants

500 12th Street, Suite 100, Oakland, CA 94607-4041
(415) 893-3600

Chain of Custody Record

PROJECT NO. 90C0039A

SAMPLERS: (Signature) Lori S. Greenberg

DATE	TIME	SAMPLE NUMBER	General Mineral	Priority Pollutant Metals	EPA Method 624	EPA Method 625	EPA Method 608	EPA 8240	Number of Containers	REMARKS (Sample preservation, handling procedures, etc.)
4/6		T9-B4-1-C						HOLD	1	Results to Mike McGinn (415) 874-3288
1990		T9-B4-2-C						HOLD	1	
		T9-B4-3-C						HOLD	1	
		T9-B4-4-C						HOLD	1	
		T9-B4-5-C						HOLD	1	
		T6-B1-1-D							1	* Composite into one sample and analyze EPA 8248
		T6-B1-2-D							1	
		T6-B1-3-D							0	
		T6-B1-4-D							0	
		T6-B1-5-D							0	
		T6-B1-1-C						HOLD	1	Eureka Labs 6790 FLORIN PERKINS RD. Sacramento, CA 95828 (916) 381-7953
		T6-B1-2-C						HOLD	1	
		T6-B1-3-C						HOLD	0	
		T6-B1-4-C						HOLD	0	
		T6-B1-5-C						HOLD	0	

TOTAL NUMBER OF CONTAINERS: 15

RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)	RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)
	4/1 5:00				

METHOD OF SHIPMENT:	SHIPPED BY: (Signature)	COURIER: (Signature)	RECEIVED FOR LAB BY: (Signature)	DATE/TIME
				4/2/90 10:40

Woodward-Clyde Consultants

500 12th Street, Suite 100, Oakland, CA 94607-4041
(415) 893-3600

Chain of Custody Record

PROJECT NO. 90C0039A

SAMPLERS: (Signature) Michael McGuire

DATE	TIME	SAMPLE NUMBER	General Mineral Matrix	Priority Pollutant Metals	EPA Method 624 8240	EPA Method 625	EPA Method 608	6010 - Title 22 Metals	Cyanide					Number of Containers	REMARKS (Sample preservation, handling procedures, etc.)
2/20/90		T6-MW1-1-Z	W					X						1	Results to
		T6-MW1-1-Y			X									2	Mike McGuire
		—													(415) 874-3288
		T6-MW2-1-Z						X						1	
		T6-MW2-1-Y			X									2	
		T6-MW3-1-Z		X		~~X~~								1	Eureka Labs
		T6-MW3-1-Y							X					1	6790 FLORIN
		T6-MW3-1-X				X								0	PERKINS RD.,
		T6-MW3-1-W			X									0	Sacramento CA
														0	
		T12-MW2-1-Z						X						1	95828
		T12-MW2-1-Y			X									2	
															(916) 381-7953
		T12-MW3-1-Z				X								0	
		T12-MW3-1-Y		X										0	
		T12-MW3-1-X							X					0	
		T12-MW3-1-W			X									2	

TOTAL NUMBER OF CONTAINERS: 19

RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)	RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)
M McGuire	2/21 5:00	[signature]	[signature]		

METHOD OF SHIPMENT:	SHIPPED BY: (Signature)	COURIER: (Signature)	RECEIVED FOR LAB BY: (Signature)	DATE/TIME
			[signature]	2/[illegible]/90 10:40

T6-MW-1

WATER SAMPLE LOG

Sample No. ~~EB-W1-1~~

Project No.: 9CC0039A Date: 2/20/90

Project Name: City Center ESA

Sample Location: T6-W1

Well Description: 2" PVC, screen 25-35'

Weather Conditions: cloudy, cold.

Observations / Comments:

Quality Assurance

Sampling Method: teflon bailer

Method to Measure Water Level: power sounder

Pump Lines: New / Cleaned Bailer Lines: (New) / Cleaned

Method of cleaning Pump / Bailer: Alconox / DI rinse

pH Meter No.: Calibrated daily

Specific Conductance Meter No.: Calibrated daily

Comments: well developed by surging/bailing w/ Smeal rig.

Sampling Measurements

Water Level (below MP) at Start: 30.3' End:

Measuring Point (MP): TOC.

Time	Discharge (gallons)	pH	Temp. (°C)	Specific Conductance (µmhos / cm)	Turbidity	Color	Odor	Comments
1300	20	6.70	18	100 x 10 µmhos	CR			
	21	6.75	18	1000 µmhos.				

Total Discharge: ~~X~~ 21 gals Casing Volumes Removed: 26

Method of disposal of discharged water: barrel on site

Number and size of sample containers filled: 1-1L; 2-40ml VOA.

& T6-MW1-1-Z, Y

Collected by: McGuire / Hesse

Woodward-Clyde Consultants
500 12th Street, Suite 100 Oakland, CA 94607-4014
(415) 893-3600

WATER SAMPLE LOG

Sample No. TG-MW-2

Project No.: 90C0039A Date: 2/20/90

Project Name: City Center ESA

Sample Location: TG-W2

Well Description: 2" PVC, Screen 25-35'

Weather Conditions: Cloudy, cold.

Observations / Comments:

Quality Assurance

Sampling Method: Teflon bailer

Method to Measure Water Level: Power sounder

Pump Lines: New / Cleaned Bailer Lines: (New) / Cleaned

Method of cleaning Pump / Bailer: Alconox w/DI rinse

pH Meter No.: Calibrated daily

Specific Conductance Meter No.: Calibrated daily

Comments: well developed by surging/bailing with Smeal rig.

Sampling Measurements

Water Level (below MP) at Start: 30.0' End:

Measuring Point (MP): TOC

Time	Discharge (gallons)	pH	Temp. (°C)	Specific Conductance (µmhos / cm)	Turbidity	Color	Odor	Comments
1415	20	7.50	17	850 µmhos				
1440	20	7.90	16.5	800 µmhos				
1455	21	7.90	17	800 µmhos MOD		(1)	(2)	(1) slightly green (2) odor of gasoline

Total Discharge: 21 gals Casing Volumes Removed: 2.5

Method of disposal of discharged water: on site drum

Number and size of sample containers filled: 2-40 ml VOA; 1-1L pl. bottle

6 samples TG-MW2-1-Z, Y

Collected by: McGuire/Hesse

Woodward-Clyde Consultants
500 12th Street, Suite 100 Oakland, CA 94607-4014
(415) 893-3600

WATER SAMPLE LOG

Sample No. TG-MW-3-1

Project No.: 90C0039A

Date: 2/20/90

Project Name: City Center ESA

Sample Location: TG-W3

Well Description: 2" PVC, screen 25-35'

Weather Conditions: cloudy, cold.

Observations / Comments:

Quality Assurance

Sampling Method: teflon bailer

Method to Measure Water Level: Power Sounder

Pump Lines: New / Cleaned

Bailer Lines: (New) / Cleaned

Method of cleaning Pump / Bailer: Alconox w/ DI rinse

pH Meter No.: Calibrated daily

Specific Conductance Meter No.: Calibrated daily

Comments: well developed by surging/bailing using Smeal rig

Sampling Measurements

Water Level (below MP) at Start: 28.3 End:

Measuring Point (MP): TOC.

Time	Discharge (gallons)	pH	Temp. (°C)	Specific Conductance (µmhos / cm)	Turbidity	Color	Odor	Comments
4:45	20	7.58	17	800 µmhos				1: moderate
					(1)	(2)	(3)	2: sl. green
								3: gasoline odor

Total Discharge: 20 gals

Casing Volumes Removed: 1 8

Method of disposal of discharged water: on site drum

Number and size of sample containers filled: 2-40 ml VOAs, 1-1L glass bottle, 2-1L plastic bottles

Samples TG-MW3-1-E, Y, W

Collected by: McGuire/Hegge

Woodward-Clyde Consultants
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