URS Greiner Woodward Clyde
A Division of URS Corporation

ENVIRONMENTAL PROTECTION
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September 16, 1999

Mr. Larry Seto
Alameda County Environmental Health Services
1131 Harbor Bay Parkway
Alameda, CA 94502

Subject: Parcel T12 between Martin Luther King Jr. Way and Jefferson Street and 11th and 12th Streets, Oakland
Project No. 510996706002

Dear Mr. Seto:

Please find enclosed a summary report (actually contains two separate reports) describing the soil and groundwater conditions at the subject property in Oakland. Historical records cited in these reports do not indicate that an underground storage tank containing fuels was present at the site.

We respectfully request that you review these reports in anticipation of plans to excavate soil as part of redevelopment of the site.

Thank you for your attention to this subject matter.

Sincerely,

Jay B. Clare
Project Manager

Enclosures

cc: Nicholas Loukianoff, Shorenstein

Woodward-Clyde Consultants

Engineering & sciences applied to the earth & its environment

June 7, 1993
Project Numbers 90C0039A and 90C0039D

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 T12
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 Parcel T12 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

Woodward-Clyde Consultants

ENVIRONMENTAL SITE ASSESSMENT AND FILL CHARACTERIZATION REPORT CITY CENTER PARCELS T12 OAKLAND, CALIFORNIA

Prepared for

Redevelopment Agency of the City of Oakland

June 1993

Prepared by

Woodward-Clyde Consultants
500 12th Street, Suite 100
Oakland, CA 94607-4014

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDIXES

1.0
INTRODUCTION

Woodward-Clyde Consultants (WCC) has performed an environmental assessment of parcel T12 located on the east side of Martin Luther King, Jr. Way between 12th and 11th 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 fire insurance maps, 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) A series of four soil borings, three of which were converted to groundwater monitoring wells were constructed on-site; samples of the soil and groundwater were chemically analyzed; and 4) The results of the environmental field work were integrated with data from the historic and regulatory review, evaluated, and the results presented in this report.

2.0
SITE DESCRIPTION

The parcel presently consists of a level asphalt concrete parking lot, approximately 200 feet by 300 feet, surrounded by a chain link fence. The ground surface elevation is between 35 and 38 feet City of Oakland Datum (C.O.O.D.). No visible evidence of prior occupation remains on the parcel.

3.0
SITE HISTORY

This environmental assessment 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 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 quantities 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 historical uses of parcel T12 and the surrounding area within one block of the site. Information was obtained from various historic maps, the Oakland Library and Oakland City Business Tax records and historic aerial photographs. Some of the source records for this list are incomplete and some addresses listed are therefore uncertain.

Parcel T12 was formerly occupied by the old Oakland High School, a possible source for heating oil and/or asbestos in the near-surface fill. The high school was constructed in the late 1800s, and existed on-site through the late 1930s or 1940s. By 1950, the school had been demolished and replaced by a parking lot.

Noteworthy historic business occupation within one block of parcel T12, with approximate dates of occupation included in parentheses, is listed below:

- two service stations located at the intersection of Martin Luther King, Jr. Way (formally Grove Street) and 12th Street: at 568 12th Street (circa 1958) and 1125 Grove Street (1940 to 1962).

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

- various parking lots at various times located between Martin Luther King, Jr. Way and Clay Streets and between 12th and 13th Streets (1926 to present) and at various areas of the block on the north side of 11th Street between Jefferson and Clay Streets (1926 to present);

- two auto body repair shops at 1229 Grove Street (circa 1950) and 581 12th Street (circa 1922);

- a machine shop located at 597 12th Street (circa 1950);

- two hat cleaning establishments located at 567 12th Street and 595 12th Street (1940s to 1950); three dry cleaning establishments at 1209 Jefferson Street (1933 to 1960), 562 12th Street (1926 to 1932) and 604 12th Street (circa 1935); a laundry, which may have provided dry cleaning services at 597 12th Street (1930s to at least 1950s);

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

- four paint shops at 573 11th Street (circa 1934), 534 12th Street (circa 1941), 544 12th Street (circa 1955), and 1201 Grove Street (1945);

- a "vulcanizing" shop (possibly engaged in retreading of rubber tires) at 602 12th Street (circa 1935);

- a "waste dump" at 565 11th Street (1959), about which no more is known at this time; and

- a photo lab at 1101 Grove Street (1959 to 1969).

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 1). Records for periods before 1973 were not retained by the City of Oakland.

A permit was issued by the Oakland Fire Department for the removal of two 500-gallon tanks 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.

Removal of two 5,000-gallon tanks from a former auto body and paint shop at 1229 Grove Street was permitted on May 12, 1977. This location is currently occupied by Preservation Park on Martin Luther King Jr. Way. Possible contamination from these tanks or paint from the body shop are not likely to impact parcel T12 because it is believed to be located across- or upgradient from the 1229 Grove Street address.

Two 5,000-gallon tanks, presumably located adjacent to the gas station on the northeast corner of 12th and Grove Streets (Martin Luther King Jr. Way) were removed on August 23, 1979. The tanks are believed to have been located under the sidewalk of Martin Luther King Jr. Way. This site is located down- or across-gradient from the parcel T12.

3.2 REGULATORY RECORDS REVIEWED

The following lists were examined to determine if regulatory agencies were aware of any discharges of hazardous substances within one block of Parcel T12:

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) Regional Water Quality Control Board (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"; 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 at four locations on the site between February 9 and 16, 1990, using 8-inch outside-diameter hollow-stem augers. 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 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, -2, and -3	Distributed to provide reasonable areal coverage for the collection of soil samples and to determine if groundwater contaminant plumes are entering or exiting the site. Monitoring Well W-1 is located at the up-gradient end of the parcel, while Monitoring Wells W-2 and W-3 are located at the downgradient end.
B-1	Located roughly 10 to 30 feet north of the center of the parcel at the likely site of oil-fired boilers than may have serviced the high school building formally occupying the site. This boring was also located near the center of the parcel to complete the general coverage for the collection of soil samples from a site without clearly defined potential sources of contamination.

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 analyses 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 local regulatory requirements. 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, -2 and -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 to 35 feet below ground surface. The screened and sand-packed interval 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 permit requirements of Zone 7 of the Alameda County Flood Control and Water Conservation District. 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 become 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 an 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 27.35 to 28.45 feet (from top of casing) in the monitoring wells. These water levels were used to calculate the groundwater gradient across the site of 0.0036 ft/ft and a groundwater flow direction of N38W, as shown on Figure 2.

5.0
LABORATORY TESTING

In accordance with the January 19, 1990 Contract of Professional Services, soil and groundwater samples from all borings and monitoring wells were analyzed by Eureka Laboratories, Inc. of Sacramento. Vertical composite soil samples made from the discrete samples in individual borings were analyzed for purgeable volatile organic compounds (EPA Method 8240). One composite sample, from Boring B-1 near the center of the site, was additionally analyzed for extractable semi-volatile organic compounds (EPA Method 8270), EPA Priority Pollutant metals, cyanide, and bulk asbestos content.

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. This analytical program was based upon the contract requirements of the Agency.

The results of the laboratory testing of soil and groundwater samples are tabulated in Tables 2 through 5. Laboratory results are included in Appendix B.

The results of the soil analyses are summarized as follows:

- No EPA Method 8240 volatile organic compounds (VOCs) were identified at concentrations exceeding detection limits in any of the composite soil samples.

- No EPA Method 8270 semi-volatile organic compounds were identified at concentrations exceeding detection limits in the composite soil sample from soil boring B-1.

- EPA Priority Pollutant metals concentrations identified in the composite soil sample from Boring B-1 were all below California Title 22-specified Total Threshold Limit Concentrations (TTLCs). Nickel, lead and thallium occurred at concentrations slightly above their respective Soluble Threshold Limit Concentration (STLC) values of 20 ppm, 5 ppm, and 7 ppm, respectively.

- The cyanide concentration of the composite soil sample from Boring B-1 was below detection limits.

- No asbestos was identified in the composite soil sample from Boring B-1.

Test results for soil samples are summarized in Tables 2 through 4.

The results of the analyses of groundwater samples from monitoring wells W-1, -2 and -3 are summarized as follows:

- The EPA Method 624 VOC parameter chloroform was identified at a concentration of 0.005 ppm in the groundwater from monitoring well W-3. No other EPA Method 624 VOCs were identified at concentrations exceeding detection limits in any of the groundwater samples from monitoring wells W-1 or W-2.

- No EPA Method 625 semi-volatile organic compounds were identified at concentrations exceeding detection limits in the groundwater sample from monitoring well W-3.

- EPA Priority Pollutant and California Title 22 metal concentrations were generally below applicable drinking water standards (for the compounds for which drinking water standards have been set), with the exception of total chromium, lead, alluminum, iron, magnanese, and thallium. Chromium (non-differentiated species) and lead exceeded their respective maximum contaminant levels (MCL) by 0.01 ppm in the groundwater sample from monitoring well W-3. In the case of chromium, the MCL used was for soluble chromium VI, a very conservative standard for comparison. The thallium concentrations of 0.1 ppm identified in the sample from W-3 exceeded the EPA National Ambient Water Quality Criteria level

of 0.013 ppm by a factor of about 8. The groundwater sample from monitoring well W-3 exceeded the MCLs for aluminum, iron and manganese by 5.35 ppm, 14.6 ppm and 0.28 ppm, respectively.

Test results for groundwater samples are summarized in Tables 2, 3 and 5.

6.0
DISCUSSION

Presently, it is not known conclusively whether the chloroform identified at 0.005 ppm (the threshold of detection is 0.005 ppm) in the groundwater sample from monitoring well W-3 represents actual groundwater contamination or laboratory imprecision or artifacts. Based on the lack of occurrence of any other EPA Method 624 VOCs in other soil and groundwater samples from the site, it seems highly unlikely that the chloroform results from widespread contamination of the site groundwater by VOCs. In any event, the detected concentration of 0.005 ppm is well below the DHS MCL of 0.1 ppm for chloroform.

While the chemical analyses detected 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, experience with similar sites in the immediate area demonstrates 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 groundwater sample metals concentrations reported 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.

7.0
CONCLUSIONS AND RECOMMENDATIONS

The soil and groundwater sampling and chemical analyses performed on parcel T12 for this project have not disclosed conditions which would require cleanup or special handling or disposal of soil and groundwater. No conditions were identified which would be expected to pose an acute threat to public health during development of the parcel.

In the event that the planned development of parcel T12 will require deep foundation excavations and heavy construction dewatering, it is possible that contaminated groundwater may be drawn into the site from nearby areas. If deep excavations will be required, it would be prudent to plan to install a backup groundwater treatment system at or near the site in the event that contaminated water is actually drawn into the site. Such a system would allow construction to proceed with minimal delays.

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

Curry, 1950, New Map of Oakland, Calif. Business District.

Oakland Chamber of Commerce, 1948, Map of Downtown Oakland.

Pacific Aerial Surveys, 1950 and 1975, Selected Aerial Photographs of Downtown Oakland.

Sanborn, 1902, Fire Insurance Rating Map, Downtown Oakland.

Sanborn, 1912, Fire Insurance Rating Map, Downtown Oakland.

Sanborn, 1950, Fire Insurance Rating Map, Downtown Oakland.

Unknown, 1928, Map of Downtown Oakland.

Wachs Bros., 1926, Map of Oakland's Fast Growing Business District, 1926-27

Wachs Co, 1932, Business District Map of Oakland, California: Scale = 1:1800.

WCC, 1987, Final Report, Underground Fuel Oil Tank Removal, 12th Street Improvements, Oakland, California: Report Prepared for Bramalea Pacific, 3p.

WCC, 1989a, Environmental Site Assessment, City Center Garage II Parcel, Jefferson and 13th Streets, Oakland, California: Report Prepared for the Oakland Redevelopment Agency.

WCC, 1989b, Proposed Remedial Alternatives for the Oakland Federal Building Project, Oakland, California: Report Prepared for the City of Oakland, Office of Development and Employment.

TABLE 1

PROJECT NO. 90C0039A
FIRE MARSHALL'S PERMIT APPLICATION

Date	Permit Number	Address	Description
10/11/74	7965	1215 Clay St.	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.	Remove two 5,000 gal tanks
8/23/79	8386	589-599 12th St.	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 2

CITY CENTER ENVIRONMENTAL SITE ASSESSMENT, PARCEL T12
SUMMARY OF ANALYTICAL RESULTS[1]
VOLATILE ORGANIC COMPOUNDS (EPA METHOD 8240, 624)

Sample #	Matrix[2] Type	Benzene	Toluene	Ethylbenzene	Xylenes	Other
T12-W1	Soil	ND	ND	ND	ND	ND
T12-W2	Soil	ND	ND	ND	ND	ND
T12-W3	Soil	ND	ND	ND	ND	ND
T12-B1	Soil	ND	ND	ND	ND	ND
T12-MW1	Water	ND	ND	ND	ND	ND
T12-MW2	Water	ND	ND	ND	ND	ND
T12-MW3	Water	ND	ND	ND	ND	0.005[4]
Drinking Water[3]		0.001	0.01	0.68	0.62	0.1[4]

[1] All results reported as parts-per-million (ppm).
[2] All soil samples are composited.
[3] California State Department of Health Services (DHS) Maximum Contaminant Levels (MCLs).
[4] Chloroform.
ND = Not Detected

TABLE 3

CITY CENTER ENVIRONMENTAL SITE ASSESSMENT, PARCEL T12 SUMMARY OF ANALYTICAL RESULTS, SEMI-VOLATILE ORGANIC COMPOUNDS (EPA METHOD 8270, 625), CYANIDE (EPA METHOD 9010), ASBESTOS

Sample #	Matrix* Type	Semi-Volatile Compounds Concentration (ppm)	Cyanide	Asbestos
T12-B1	Soil	ND	ND	ND
T12-MW3	Water	ND	ND	NT

*All soil samples are composites.
ND = Not Detected
NT = Not Tested

TABLE 4

CITY CENTER ENVIRONMENTAL SITE ASSESSMENT PARCEL T12
SUMMARY OF ANALYTICAL RESULTS,
METAL CONCENTRATION[1] IN SOIL

	Detection Limit	T12-B1	Limit Concentrations	
	Soil	Composite Soil	STLC[2]	TTLC[3]
Silver	0.5	0.6	5	500
Arsenic	0.2	1.3	5	500
Barium	0.1	27.8		
Beryllium	0.5	ND	0.75	75
Cadmium	1.0	ND	1	100
Cobalt	1.0	5.4		
Chromium	0.5	33.1	560	2500
Copper	0.5	7.3	25	2500
Mercury	0.05	ND	0.2	20
Molybdenum	1.0	1.1		
Nickel	1.0	28.9	20	2000
Lead	3.0	5.9	5	1000
Antimony	3.0	ND	15	500
Selenium	0.15	ND	1	100
Thallium	1.0	15.8	7	700
Vanadium	0.5	22.6		
Zinc	0.5	18.5	250	5000
Aluminum	2.5	3880		
Calcium	5.0	870		
Magnesium	10.0	1650		
Iron	5.0	8050		
Sodium	10.0	246		
Manganese	0.5	105		
Potassium	150	179		
Boron	10.0	10.6		

[1] All concentrations are reported in parts-per-million (ppm)
[2] STLC = Soluble Threshold Limit Concentration
[3] TTLC = Total Threshold Limit Concentration

TABLE 5

CITY CENTER ENVIRONMENTAL SITE ASSESSMENT PARCEL T12, SUMMARY OF ANALYTICAL RESULTS, METAL CONCENTRATION (ppm) IN GROUNDWATER

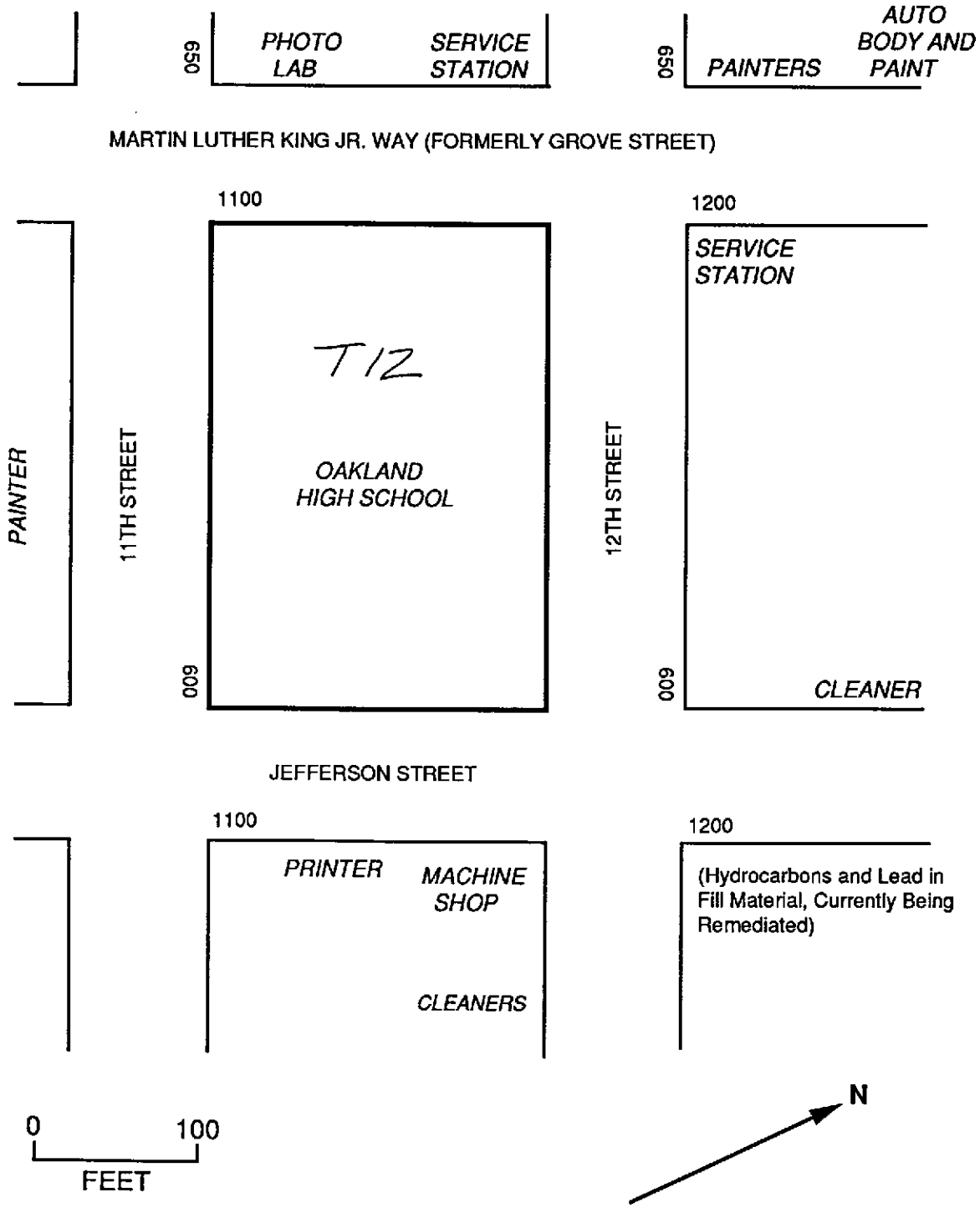
	Detection Limit Water	T12-MW1 Water	T12-MW2 Water	T12-MW3 Water	DHS/EPA Health & Human Welfare[1] Regulatory Standards
Silver	0.01	ND	ND	ND	0.050 DHS Primary MCL[3]
Arsenic	0.004	0.024	ND	ND	0.05 DHS Primary MCL
Barium	0.02	0.66	0.08	0.12	
Beryllium	0.01	ND	ND	ND	---
Cadmium	0.02	ND	ND	ND	0.010 DHS Primary MCL
Cobalt	0.02	0.12	ND	0.02	
Chromium	0.02	0.27	ND	0.06	0.050 DHS Primary MCL (CrVI)
Copper	0.01	0.08	ND	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	0.6	ND	ND	0.15 EPA SNARL[4]
Lead	0.05	ND	ND	0.06	O.05 DHS Primary MCL
Antimony	0.05	ND	ND	ND	0.146 EPA NAWQC
Selenium	0.003	ND	ND	ND	0.010 DHS Primary MCL
Thallium	0.1	0.2	ND	0.1	0.013 EPA NAWQC[2]
Vanadium	0.01	0.19	ND	0.04	
Zinc	0.01	0.33	0.05	0.05	5.0 DHS Secondary MCL
Aluminum	0.05			6.35	1.0 DHS Primary MCL
Calcium	0.1			21.0	
Magnesium	0.2			22.0	
Iron	0.1			14.9	0.3 DHS Secondary MCL
Sodium	0.2			76.4	
Manganese	0.01			0.38	0.05 DHS Secondary MCL
Potassium	3.0			ND	
Boron	0.2			0.3	

[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

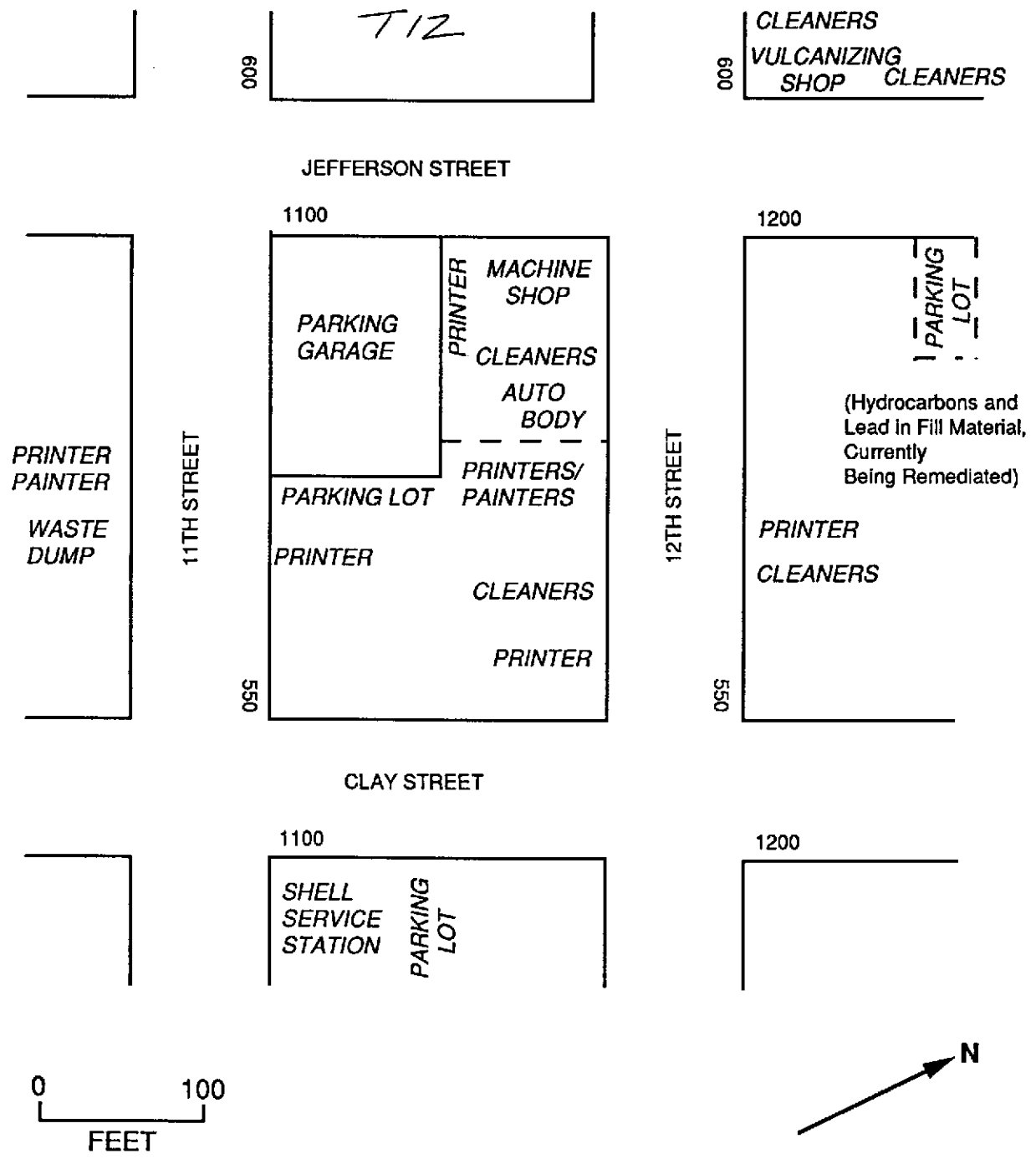
[3] MCL: Maximum Contaminant Level

[4] SNARL: EPA Suggested No Adverse Response Levels



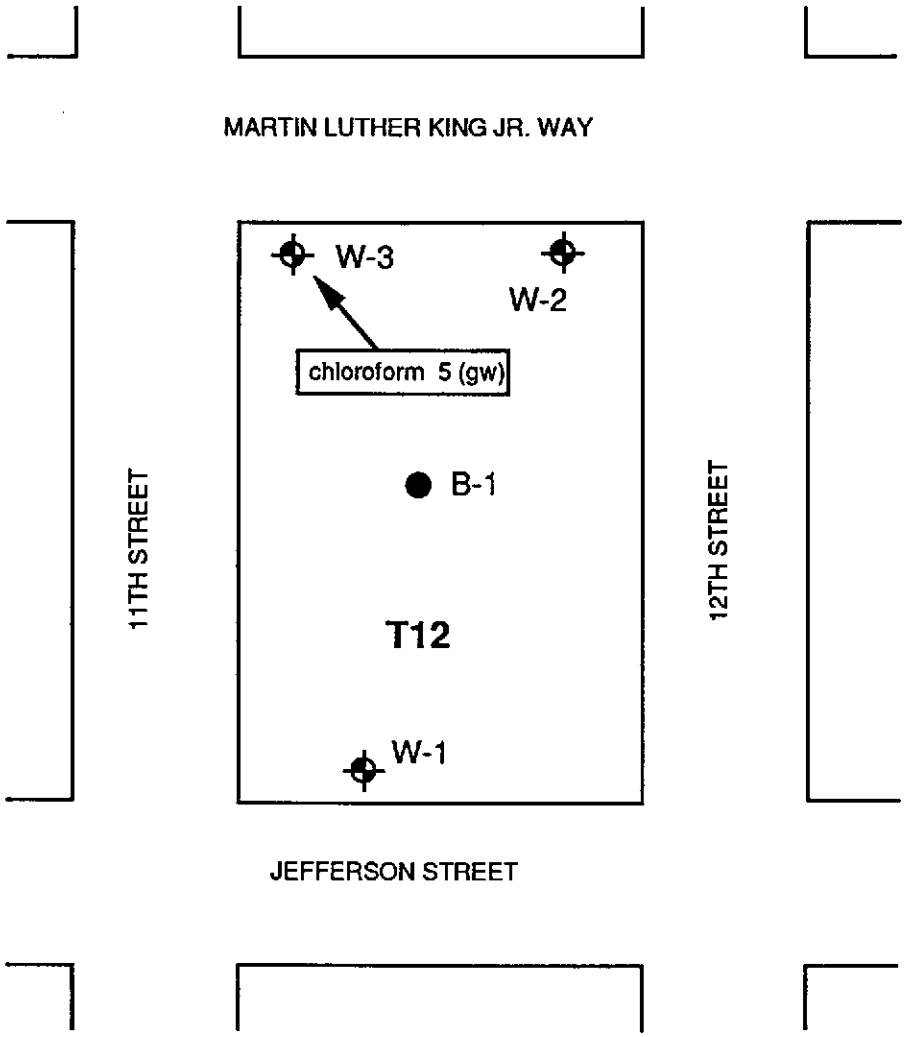
Source of business information: Curry (1950), Sanborn (1902, 1912, 1935, 1950), Wachs Bros (1926), Wachs Co. (1932), Oakland Chamber of Commerce (1948), Map of Downtown Oakland (Source Unknown, 1928), City of Oakland business tax records, and selected aerial photographs of Downtown Oakland.

Project No. 90C0039A	City Center Environmental Assesment	PARCEL T12 - 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 T12 - Vicinity Map with Potential Sources of Soil and/or Groundwater Contamination (Continued)	FIGURE 1B
Woodward-Clyde Consultants			



0 100
FEET

groundwater gradient = 0.0036 ft/ft

Approximate Groundwater Flow Direction

N

Legend:

- Monitoring Well
- Soil Boring

chloroform 5 (gw) - analysis indicates compound in groundwater (gw) or soil (soil), concentration expressed as ppb

Project No. 90C0039A	City Center Environmental Assesment	PARCEL T12 - BORING AND MONITORING WELL LOCATIONS	FIGURE 2
Woodward-Clyde Consultants			

APPENDIX A

LOGS OF SOIL BORINGS AND GROUNDWATER MONITORING WELLS

Woodward-Clyde Consultants	90C0039A City Center ESA	LOG OF BORING T-12 B-1

LOCATION Parcel T-9, 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 26-1/2'
CASING			SAMPLERS Modified California 2-in.-diam.
PERFORATIONS	FROM TO		NO. OF SAMPLES DIST. UNDIST. 5
PACK	FROM TO		WATER LEVEL ATD COMPL 24 HR
TYPE OF SEALS	FROM TO		LOGGED BY Lois Gruenberg
Sand cement grout	FROM 0' TO 26-1/2'		CHECKED BY Michael McGuire

DEPTH (FT)	DESCRIPTION	DEPTH (FT)	SAMPLES	Blow Counts	Recovery	REMARKS (Strength, moisture content, etc.)
	Asphalt surface approximately 6".					
	FILL - contains brick fragments and gravel	5	1			No recovery.
10	SILTY SAND (SM) - brown with orange stain - fine to medium sand - medium dense - damp	10	2	21 25 28		
15		15	3	17 19 25		
20		20	4	21 31 38		
25		25	5	28 24 38		
30	Bottom of Boring at 26.5 feet	30				

Woodward-Clyde Consultants	90C0039A City Center ESA	LOG OF MONITORING WELL T-12 W-1

LOCATION	Parcel T-12, 12th & Clay Streets, Oakland, California			ELEVATION AND DATUM	33.81 feet (C.O.O.D.)
AGENCY	Sierra Pacific	DRILLER	Derald/Aaron	DATE STARTED	2/9/90
EQUIPMENT	Mobile Drill B-53			DATE COMPLETED	2/9/90
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.	6 / UNDIST.
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.)
	Asphalt surface approximately 6".						
	FILL - SILTY SAND (SM)- light and dark brown, fine to medium grained, some silt, damp						
5	SILTY SAND (SM) - brown with orange stain - fine to medium sand - clay lenses - medium dense - damp		5	1	5 6 16		
10	becomes brown, very dense		10	2	16 36 46		
15	increasing clay, becomes gray brown, moist.		15	3	21 /6"		
20	little clay, brown, medium dense.		20	4	10 10 18		
25			25				Continued on next page.

Woodward-Clyde Consultants	90C0039A City Center ESA	LOG OF MONITORING WELL **T-12 W-1**

DEPTH (FT)	DESCRIPTION	PIEZOMETER INSTALLTION	DEPTH (FT)	SAMPLES	Blow Counts	Recovery	REMARKS (Strength, moisture content, etc.)
25	SILTY SAND (SM) Continued		25	5	10 16 21		
	▽ ATD ▽ 3/13/90			6	10 19 27		
30	becomes gray brown.		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-12 W-2

LOCATION	Parcel T-12, 12th & Clay Streets, Oakland, California	ELEVATION AND DATUM	33.15 feet (C.O.O. D.)
AGENCY	Sierra Pacific	DRILLER Derald/Aaron	DATE STARTED 2/12/90
EQUIPMENT	Mobile Drill B-53		DATE COMPLETED 2/12/90
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.)
	Asphalt surface to approximately 6".						
5	SILTY SAND (SM) - brown with orange stain - fine to medium sand - medium dense - damp		5	1	4 6 16		
10			10	2	10 12 16		
15	increasing clay, moist.		15	3	5 10 14		
20			20	4	10 14 18		
25			25				Continued on next page.

Woodward-Clyde Consultants	90C0039A City Center ESA	LOG OF MONITORING WELL **T-12 W-2**

DEPTH (FT)	DESCRIPTION	PIEZOMETER INSTALLTION	DEPTH (FT)	SAMPLES	Blow Counts	Recovery	REMARKS (Strength, moisture content, etc.)
25	SILTY SAND (SM) Continues becomes brown gray, moist. ▽ ATD ▽ 3/13/90		25	5	15 21 26		
				6	12 24 38		
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-12 W-3

LOCATION	Parcel T-12, 12th & Clay Streets, Oakland, California			ELEVATION AND DATUM	32.34 feet (C.O.O. D.)		
AGENCY	Sierra Pacific	DRILLER	Derald/Aaron	DATE STARTED	2/12/90		
EQUIPMENT	Mobile Drill B-53			DATE COMPLETED	2/12/90		
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
	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 and blue-gray veins - fine to medium grain - some clay - medium dense - damp		5	1	6 9 20		
10	becomes brown.		10	2	9 12 18		
15	increasing clay, becomes moist		15	3			
20			20	4			
25			25				Continued on next page.

Continued on next page.

Woodward-Clyde Consultants	90C0039A City Center ESA	LOG OF MONITORING WELL T-12 W-3

DEPTH (FT)	DESCRIPTION	PIEZOMETER INSTALLTION	DEPTH (FT)	SAMPLES	Blow Counts	Recovery	REMARKS (Strength, moisture content, etc.)
25	SILTY SAND (SM) Continued ▽ ATD ▽ 3/13/90		25	5 6			
30			30				
35			35				
40	Bottom of Boring at 37.5 feet		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: T12-B1-2D,3D,4D,5D

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: 90-02-088
Hazardous Waste Testing
Certification: 108

CLIENT: WOODWARD-CLYDE
PROJECT NO: 90C0039A
SAMPLE ID: T12-W1-1D,2D,3D,4D,5D,6D

DATE RECEIVED: 02/13/1990
DATE EXTRACTED: 02/16/1990
DATE COMPLETED: 02/23/1990

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

February 27, 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: 90-02-088
Hazardous Waste Testing
Certification: 108

CLIENT: WOODWARD-CLYDE
PROJECT NO: 90C0039A
SAMPLE ID: T12-W2-1D,2D,3D,4D,5D,6D

DATE RECEIVED: 02/13/1990
DATE EXTRACTED: 02/16/1990
DATE COMPLETED: 02/23/1990

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

February 27, 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: 90-02-088
Hazardous Waste Testing
Certification: 108

CLIENT: WOODWARD-CLYDE
PROJECT NO: 90C0039A
SAMPLE ID: T12-W3-1D,2D,3D,4D,5D,6D

DATE RECEIVED: 02/13/1990
DATE EXTRACTED: 02/16/1990
DATE COMPLETED: 02/23/1990

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

February 27, 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: 90-02-088
Hazardous Waste Testing
Certification: 108

CLIENT: WOODWARD-CLYDE
PROJECT NO: 90C0039A
SAMPLE ID: T12-W3-1D,2D,3D,4D,5D,6D
MATRIX SPIKE RECOVERY

DATE RECEIVED: 02/13/1990
DATE EXTRACTED: 02/16/1990
DATE COMPLETED: 02/23/1990

COMP No.	COMPOUND	SPIKE RECOVERY
V7	1,1-Dichloroethene	100%
V17	Trichloroethene	91%
V18	Benzene	103%
V26	Toluene	94%
V27	Chlorobenzene	104%

Chung P. Li

Chung P. Li, Ph.D.
Chemist

February 27, 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: 90-02-088
Hazardous Waste Testing
Certification: 108

CLIENT: WOODWARD-CLYDE
PROJECT NO: 90C0039A
SAMPLE ID: T12-W3-1D,2D,3D,4D,5D,6D
MATRIX SPIKE RECOVERY DUP.

DATE RECEIVED: 02/13/1990
DATE EXTRACTED: 02/16/1990
DATE COMPLETED: 02/23/1990

COMP No.	COMPOUND	SPIKE RECOVERY
V7	1,1-Dichloroethene	104%
V17	Trichloroethene	94%
V18	Benzene	103%
V26	Toluene	100%
V27	Chlorobenzene	103%

Chung P. Li

Chung P. Li, Ph.D.
Chemist

February 27, 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: 90-02-161
Hazardous Waste Testing
Certification: 108

CLIENT: WOODWARD-CLYDE
PROJECT: 90C0039A
SAMPLE ID: T12-B1-2D,3D,4D,5D

DATE RECEIVED: 02/22/1990
DATE EXTRACTED: 02/27/1990
DATE COMPLETED: 03/07/1990

COMP No.	COMPOUND	ug/Kg	DETECTION LIMIT ug/Kg (ppb)
I. PRIORITY POLLUTANT ACID COMPOUNDS			
A1	Phenol	<150	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	<150	150
B13	Hexachlorobutadiene	<150	150
B14	2-Methylnaphthalene	<150	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

ORGANIC ANALYSIS REPORT

Semi-Volatile Compound, EPA Method 8270

CLIENT: WOODWARD-CLYDE SAMPLE ID: T12-B1-2D,3D,4D,5D

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	780	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 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: T12-B1-2D,3D,4D,5D

DATE RECEIVED: 02/22/1990
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	1.3	0.2
Barium	27.8	0.1
Beryllium	<0.5	0.5
Cadmium	<1.0	1.0
Cobalt	5.4	1.0
Chromium	33.1	0.5
Copper	7.3	0.5
Mercury	<0.05	0.05
Molybdenum	1.1	1.0
Nickel	28.9	1.0
Lead	5.9	3.0
Antimony	<3.0	3.0
Selenium	<0.15	0.15
Thallium	15.8	1.0
Vanadium	22.6	0.5
Zinc	18.5	0.5
Aluminum	3880	2.5
Calcium	870	5.0
Magnesium	1650	10.0
Iron	8050	5.0
Sodium	246	10.0
Manganese	105	0.5
Potassium	179	150
Boron	10.6	10.0

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

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/Kg (ppm)]
T12-B1-2D,3D,4D,5D		<0.05
METHOD BLANK		<0.05

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

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

Hung Nguyen
Chemist

March 9, 1990
Date

ASBESTOS
EPA PUBLICATION 600/M4-82-020

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: N/A
DATE COMPLETED: 03/05/1990

SAMPLE ID.	ASBESTOS VOL %	NON-ASBESTOS MATERIALS VOL %
T12-B1-2D,3D,4D,5D	0%	Quartz Sand - 80% Opaque Pebbles - 10% Metal Flakes - 5% Mineral Wool Fibers - 5%

THIS IS NOT AN ASBESTOS CONTAINING MATERIAL.

Shao-Pi Yu for
Joe McNeal
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: T12-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: TI2-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	<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: T12-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	<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

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: T12-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	<10	10
B13	Hexachlorobutadiene	<10	10
B14	2-Methylnaphthalene	<10	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.: T12-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	56	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

March 9, 1990

Paul Poon
Chemist

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: T12-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	0.024	0.004
Barium	0.66	0.02
Beryllium	<0.01	0.01
Cadmium	<0.02	0.02
Cobalt	0.12	0.02
Chromium	0.27	0.02
Copper	0.08	0.01
Mercury	<0.001	0.001
Molybdenum	<0.02	0.02
Nickel	0.6	0.1
Lead	<0.1	0.1
Antimony	<0.05	0.05
Selenium	<0.003	0.003
Thallium	0.2	0.1
Vanadium	0.19	0.01
Zinc	0.33	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: T12-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	<0.004	0.004
Barium	0.08	0.02
Beryllium	<0.01	0.01
Cadmium	<0.02	0.02
Cobalt	<0.02	0.02
Chromium	<0.02	0.02
Copper	<0.01	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	<0.01	0.01
Zinc	0.05	0.01

Josie Quiambao
Chemist

March 9, 1990
Date

TTLC/CAM Metals, EPA Method 6010
Arsenic, EPA Method 7060, Mercury, EPA Method 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: T12-MW2-1 MATRIX SPIKE RECOVERY

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

	SPIKE RECOVERY
Silver	98%
Arsenic	80%
Barium	95%
Beryllium	96%
Cadmium	94%
Cobalt	95%
Chromium	92%
Copper	95%
Mercury	106%
Molybdenum	97%
Nickel	94%
Lead	92%
Antimony	98%
Selenium	92%
Thallium	96%
Vanadium	95%
Zinc	91%

Josie Quiambao
Chemist

March 9, 1990
Date

TTLC/CAM Metals, EPA Method 6010
Arsenic, EPA Method 7060, Mercury, EPA Method 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: T12-MW2-1 MATRIX SPIKE RECOVERY DUP.

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

SPIKE RECOVERY

Silver	99%
Arsenic	81%
Barium	95%
Beryllium	99%
Cadmium	95%
Cobalt	96%
Chromium	97%
Copper	95%
Mercury	106%
Molybdenum	98%
Nickel	97%
Lead	93%
Antimony	98%
Selenium	92%
Thallium	99%
Vanadium	96%
Zinc	92%

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: T12-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	0.12	0.02
Beryllium	<0.01	0.01
Cadmium	<0.02	0.02
Cobalt	0.02	0.02
Chromium	0.06	0.02
Copper	0.02	0.01
Mercury	<0.001	0.001
Molybdenum	<0.02	0.02
Nickel	<0.1	0.1
Lead	0.06	0.05
Antimony	<0.05	0.05
Selenium	<0.003	0.003
Thallium	0.1	0.1
Vanadium	0.04	0.01
Zinc	0.05	0.01
Aluminum	6.35	0.05
Calcium	21.0	0.1
Magnesium	22.0	0.2
Iron	14.9	0.1
Sodium	76.4	0.2
Manganese	0.38	0.01
Potassium	<3.0	3.0
Boron	0.3	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 II

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.)
2/12		T12-W2-1-D	S	X				1	Results to Mike McGuire (415) 874-3288
1990		T12-W2-2-D		X				1	
		T12W2-3-D *		X				1	
		T12W2-4D *		X				1	
		T12W2-5-D		X				1	
		T12W2-6-D		X				1	
		T12-W2-1-C				Hold		1	* Composite into one (1) sample and evaluate EPA Method 8240
		T12-W2-2-C				Hold		1	
		T12-W2-3-C				HOLD		1	
		T12-W2-4-C				HOLD		1	
		T12-W2-5-C				HOLD		1	
		T12-W2-6-C				HOLD		1	
									Eureka Laboratories 6790 FLORIN PERKINS RD. SACREMENTO CA (916) 381-7953
		T12-W1-1-D		X				1	
		T12-W1-2-D		X				1	
		T12-W1-3-D *		X				1	
		T12-W1-4-D *		X				1	
		T12-W1-5-D		X				1	
		T12-W1-6-D		X				1	
		T12-W1-1-C				HOLD		1	
		T12-W1-2-C				HOLD		1	
		T12-W1-3-C				HOLD		1	
		T12-W1-4-C				HOLD		1	
		T12-W1-5-C				HOLD		1	
		T12-W1-6-C				HOLD		1	

TOTAL NUMBER OF CONTAINERS: 24

RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)	RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)
Lois Gruenberg	2/12/1990 4:45 P				

METHOD OF SHIPMENT:	SHIPPED BY: (Signature)	COURIER: (Signature)	RECEIVED FOR LAB BY: (Signature)	DATE/TIME
ICE CHEST			ELI	10:55

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
2/12		T12-W3-1-D	S					1
1990		T12-W3-2-D						1
		T12-W3-3-D						1
		T12-W3-4-D *						1
		T12-W3-5-D						1
		T12-W3-6-D						1
		T12-W3-1-C				HOLD		1
		T12-W3-2-C				HOLD		1
		T12-W3-3-C				HOLD		1
		T12-W3-4-C				HOLD		1
		T12-W3-5-C				HOLD		1
		T12-W3-6-C				HOLD		1
		T9-W1-1-D				HOLD		1
		T9-W1-1-C				HOLD		1
		T9-W1-31-D				HOLD		1
		T9-W1-31-C				HOLD		1
		T9-W1-2-C				HOLD		1

REMARKS (Sample preservation, handling procedures, etc.)

Results to Mike McGuire (415) 874-3288

* Composite into one (1) sample and analyze for EPA Method 8240

Eureka Laboratories

6

TOTAL NUMBER OF CONTAINERS: 17

RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)	RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)
Lois Gruenberg	445 P 2/12/1990				

METHOD OF SHIPMENT:	SHIPPED BY: (Signature)	COURIER: (Signature)	RECEIVED FOR LAB BY: (Signature)	DATE/TIME
ICE CHEST				2/13/90 10:55

Woodward-Clyde Consultants

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

Chain of Custody Record

PROJECT NO.

SAMPLERS: (Signature)

DATE	TIME	SAMPLE NUMBER	General Mineral Matrix	Priority Pollutant Metals	EPA Method 624	EPA Method 625	EPA Method 608	6010 - Title 22 Metals	Cyanide					Number of Containers	REMARKS (Sample preservation, handling procedures, etc.)
2/21/90	1400	T12-MW1-1-Z						X						1	
		T12-MW1-1-Y			X									2	
	1430	T9-MW2-1-Z						X						1	
		T9-MW2-1-Y			X									2	
	1500	T9-MW3-1-Z		X										1	
		T9-MW3-1-Y							X					1	
		T9-MW3-1-X				X								0	
		T9-MW2-1-W			X									0	
														0	
	1600	T9-MW1-1-E						X						1	
		T9-MW1-1-Y			X									2	
														0	
														0	
														0	

TOTAL NUMBER OF CONTAINERS: 14

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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 Greenberg

DATE	TIME	SAMPLE NUMBER	General Mineral / MATRIX	Priority Pollutant Metals	EPA Method 624 8240	EPA Method 625	EPA Method 608	8270	Cu	Asbestos			Number of Containers	REMARKS (Sample preservation, handling procedures, etc.)
2/16		T12-B1-2-D	S		X			X	X	X			1	Results to
1990		T12-B1-3-D *			X			X	X	X			1	Mike McGuire
		T12-B1-4-D			X			X	X	X			1	(415) 874-3288
		T12-B1-5-D			X			X	X	X			1	
		T12-B1-3-C				HOLD							1	
		T12-B1-4-C				HOLD							1	* Composite
		T12-B1-5-C				HOLD							1	into one (1)
		T9-B3-1-D			X								1	sample and
		T9-B3-2-D			X								1	analyze
		T9-B3-3-D *			X								1	EPA 8240
		T9-B3-4-D			X								1	
		T9-B3-5-D			X								1	
		T9-B3-1-C				HOLD							1	Eureka Lab
		T9-B3-2-C				HOLD							1	6790 FLORIN
		T9-B3-3-C				HOLD							1	PERKINS RD.
		T9-B3-4-C				HOLD							1	Sacramento,
		T9-B3-5-C				HOLD							1	CA
		T9-B4-1-D			X								1	95828
		T9-B4-2-D			X								1	
		T9-B4-3-D *			X								1	(916) 381-7953
		T9-B4-4-D			X								1	
		T9-B4-5-D			X								1	

TOTAL NUMBER OF CONTAINERS: 22

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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 M'Guire
		—													(415) 874-3288
		T6-MW2-1-Z						X						1	
		T6-MW2-1-Y			X									2	
															Eureka Labs
		T6-MW3-1-Z		X		~~X~~								1	
		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	95828
		T12-MW2-1-Z						X						1	
		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

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M McGuire	2/21 1500	[signature]	[signature]		

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WATER SAMPLE LOG

Sample No. T12-MW1-1

Project No.: 90C0039A Date: 2/21/90

Project Name: City Center BA

Sample Location: T12-W1

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

Weather Conditions: sunny, warm

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: 28.1 End:

Measuring Point (MP): TOC

Time	Discharge (gallons)	pH	Temp. (°C)	Specific Conductance (µmhos / cm)	Turbidity	Color	Odor	Comments
14:05	~20	6.67	21°C	1100 µmho				
					mod	brn		

Total Discharge: 20 gals Casing Volumes Removed: 17

Method of disposal of discharged water: drum on site

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

So T12-MW1-1-2,4

Collected by: McGuire / Hesse.

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WATER SAMPLE LOG

Sample No. T12-MW2

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

Project Name: City Center ESA

Sample Location: T12-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 using Smeal rig.

Sampling Measurements

Water Level (below MP) at Start: 28.5' End:

Measuring Point (MP): TOC

Time	Discharge (gallons)	pH	Temp. (°C)	Specific Conductance (µmhos / cm)	Turbidity	Color	Odor	Comments
1720	20	7.08	17	700 µmhos				
					Mod.	brn		

Total Discharge: 20 gals Casing Volumes Removed: 18

Method of disposal of discharged water: drum on site

Number and size of sample containers filled: 2-40 mil VOA, 1-1L plastic bottle

∴ T12-MW2-1-Z, Y

Collected by: M'Guire/Hesse.

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(415) 893-3600

WATER SAMPLE LOG

Sample No. T12-MW3

Project No.: 9RC0039A Date: 2/20/90

Project Name: City Center EBA

Sample Location: T12-W3

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

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: 27.5' End:

Measuring Point (MP): TOC.

Time	Discharge (gallons)	pH	Temp. (°C)	Specific Conductance (µmhos / cm)	Turbidity	Color	Odor	Comments
1740	20	7.49	18°	950 µmhos				
					-	Mod	brn	

Total Discharge: 20 gals. Casing Volumes Removed: 16

Method of disposal of discharged water: drum on site

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

: T12-MW3-1-Z, Y, X, W

Collected by: McGuire/Hasse.

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDIXES

1.0
INTRODUCTION

1.1 AUTHORIZATION AND SCOPE

This report presents the results of studies performed by Woodward-Clyde Consultants (WCC) to characterize soil conditions at City Center Parcel T12. This parcel is located on the block bounded by 11th Street, 12th Street, Jefferson Street and Martin Luther King, Jr. Way. This study was performed in accordance with the Contract for Professional Services between WCC and the Redevelopment Agency of the City of Oakland (Agency), dated January 19, 1990, and amended June 25, 1990, November 15, 1990, January 18, 1991 and January 18, 1992.

The purpose of this study is to chemically characterize the surficial fill material on the T12 Parcel to evaluate appropriate treatment and/or off-site disposal options for the fill. The work completed for this study included the following:

- Drilling and logging 18 soil borings ranging in depth from 4 to 16 feet;
- Laboratory analysis of 54 soil samples for total petroleum hydrocarbons (TPH) as gasoline, diesel, and motor oil, oil and grease, total lead, polychlorinated biphenyls (PCB's), CAM 17 metals, and semi-volatile organic compounds; and
- Evaluation of the chemical analytical data and preparation of this report. This report includes discussions of the work performed, the chemical analytical results and disposal alternatives and estimated costs for the fill material.

1.2 LIMITATIONS

This report was prepared in general accordance with the accepted standard of practice which exists in the San Francisco Bay Area at the time this investigation was performed. No other warranties are expressed or implied. The scope of this investigation is limited by time constraints, expense, and practicality. A limited number of samples were taken at locations at the site and a limited number of laboratory chemical analyses were performed for those

samples. Professional opinions concerning the presence of hazardous substances were developed based on the resulting data. It would be prohibitively expensive and time consuming to sample all locations at the site and analyze the samples for all substances which are now, or in the future might be, considered hazardous. Therefore, WCC cannot be held responsible should the investigation fail to detect the presence or quantity of all hazardous substances at all locations of the site. Also, project costs, remediation plans and the availability of various off-site disposal options may change due to the following: 1) additional analytical data; 2) changes in soil disposal market conditions; and 3) changes in regulatory requirements.

2.0
FILL CHARACTERIZATION

2.1 SOIL BORINGS

The soil borings were drilled on Parcel T12 under Groundwater Protection Ordinance Permit Number 90469 issued by the Alameda County Flood Control and Water Conservation District (Zone 7) to WCC on August 3, 1990.

WCC drilled soil borings at 18 locations on the site on August 13 and 14, 1990, using a truck-mounted hydraulic drill rig equipped with 6-inch diameter solid-stem augers. Approximate locations of these soil borings are shown on Figure 1. Boring numbers F1 through F16 were located on a 4 X 4 grid pattern across the site for the purpose of evaluating the depth and physical and chemical nature of the surficial fill material. Borings F17 and F18 were located in an area found to contain a thicker layer of fill. The locations were chosen to explore the lateral boundaries of the thicker layer. The depth of the borings varied from approximately 4 feet to approximately 16 feet. Drilling was generally terminated at or just below the base of the fill layer.

Soil samples were collected in each boring at approximately 2-foot intervals. The depth of sample collection alternated from even-numbered depths to odd-numbered depths so that all levels of the fill would be relatively equally sampled. The number of samples per boring varied depending on the thickness of the fill at that location. Logs of the borings describing the materials encountered and the depth of soil samples are included in Appendix A.

The soil samples were obtained using a 2-inch inside-diameter drive sampler. The samples were retained in 2-inch-diameter by 4-inch-long brass tubes with plastic end caps. The soil sampler was cleaned between each sample and between borings by washing in an Alconox detergent and tap water solution, followed by water rinses. Following drilling, the borings were backfilled to the ground surface using drill cuttings. Soil samples were immediately placed in an ice chest cooled with "blue ice" for transport under chain-of-custody control to Eureka Laboratories, Inc., a State-certified analytical laboratory in Sacramento, California.

2.2 CHEMICAL ANALYTICAL RESULTS

Fifty-six soil samples of the fill and native soil beneath the fill were analyzed for total lead using EPA Method 6010, total oil and grease using EPA Method 413.2 and the petroleum fraction of the total oil and grease using EPA Method 418.1. Five soil samples were analyzed for TPH quantified as gasoline, diesel, and motor oil using EPA Method 8015 (modified). One discrete sample and three composite samples were analyzed for PCBs using EPA Method 8080, CAM 17 metals using EPA Method 6010, and semi-volatile organic compounds using EPA Method 8270.

The results of the laboratory analyses of the samples, shown in Tables 1 and 2 and Appendix B, are summarized as follows:

- The reported concentration of total lead in the fill samples ranges from 2.1 ppm to 758 ppm with an average concentration of 89.3 ppm;

- The reported concentration of the hydrocarbon fraction of oil and grease in the fill samples ranges from below the detection limit of 50 ppm to 2520 ppm with an average concentration of 426 ppm. This average assumes a concentration of 25 ppm oil and grease in the samples in which oil and grease was not detected. This minimum concentration value was chosen because soil samples for which oil and grease was reported to be below the limit of detection may contain oil and grease at concentrations below the higher detection limit of 50 ppm;

- Five samples were analyzed for gasoline, diesel, and motor oil. Gasoline was not reported at a concentration exceeding the detection limit of 5 ppm in any sample. Diesel was reported in two of the five samples with concentrations of 63 ppm and 103 ppm. The detection limit for diesel is 10 ppm. Motor oil was reported in four of the five samples with a maximum concentration of 674 ppm and an average concentration of 332 ppm. The detection limit for motor oil in these samples was 25 ppm;

- No PCBs were reported at concentrations exceeding the detection limit of 0.1 ppm in the one discrete sample and three composite samples which were analyzed;

- Eight samples of native soil collected beneath the fill were analyzed. The average of the reported concentrations of lead in these samples is 3.5 ppm. No oil and grease was reported in the native soil samples;

- The reported total metal concentrations do not exceed the Total Threshold Limit Concentrations (TTLC) of the respective metals. The concentrations of seven metals, including arsenic, chromium, copper, mercury, nickel, lead, and thallium, exceed the Soluble Threshold Limit Concentration (STLC) in one or more samples. However, only lead exceeds the STLC by a factor greater than 10 in one sample. The analytical results for metals are shown in Table 2; and

- Four soil samples were analyzed for semi-volatile organic compounds by EPA Method 8270. Three of these samples were composite soil samples. No semi-volatile organic compounds were reported exceeding their respective detection limits in two of the four analyzed samples. Concentrations of some semi-volatile compounds were reported in two of the three composite samples which were analyzed. In one composite sample, F18-1,2, a total Polynuclear Aromatic Hydrocarbon (PAH) concentration of about 36 ppm was reported. The specific results are shown in Table 1 and Appendix B.

2.3 DISCUSSION

The thickness of the fill, as shown on Figure 1, was estimated at each boring location based on visual and textural characteristics of the drill cuttings and soil samples and the results of chemical analysis of the soil samples. The estimated fill thicknesses, at various locations, are as follows: 1) approximately 4 to 5 feet thick in most of the area on the T12 parcel; 2) approximately 8 feet thick along most of the west side of the parcel; 3) approximately 11 feet thick near boring F15 on the north side of the parcel; and 4) approximately 10 to 12 feet thick in the northeast corner of the parcel. Based on the fill thickness, the total volume of fill on the site is estimated to be approximately 14,800 bank (in-place) cubic yards.

The parcel has been informally divided into two areas based on the concentration of lead and oil and grease in the surficial fill as shown in Figure 2. Area 1 has relatively low concentrations of lead and oil and grease (averages less than 100 ppm). Area 2 has higher

concentrations of lead and oil and grease (averages greater than 100 ppm and 600 ppm, respectively).

Based on this classification, approximately 8,300 bank cubic yards of fill (equivalent to approximately 13,300 bulk cubic yards) in Area 1 shown on Figure 2, contains average concentrations of oil and grease and total lead of approximately 72 ppm and 38 ppm, respectively.

The remaining approximately 6,300 bank cubic yards of fill (equivalent to approximately 10,100 bulk cubic yards) in Area 2 shown on Figure 1 contains an average concentration of 823 ppm oil and grease and 146 ppm total lead. In addition, one sample from Area 2 contained elevated concentrations of PAHs.

3.0
FILL DISPOSAL ALTERNATIVES

WCC expects that the commercial development of Parcel T12 will require the removal and off-site disposal of large quantities of both fill and native soil in order to create space for high-rise building foundations and, perhaps, underground parking. Based on the results of this study, WCC estimates that approximately 14,800 bank cubic yards of fill on the T12 parcel contain elevated concentrations of lead and oil and grease that would restrict the available options for off-site disposal.

Seven conceptual disposal alternatives for this fill are discussed below along with order-of-magnitude estimated costs for implementation. The alternatives include the best case and worst case scenarios. The alternatives are presented in descending order of liklihood of selection, beginning with the most likely to be selected and progressing to less likely alternatives based on current disposal criteria and the chemical analytical data of this study. The disposal alternative actually used will depend on disposal costs and disposal criteria at the time of remediation, the chemical character of the fill based on additional sampling and analysis, and the required excavation schedule. Also, combinations of the various options, other than those discussed here, may be required to achieve final cleanup of the parcel. Disposal of the fill will require a greater sampling frequency and number of chemical analyses. These additional analyses may disclose chemical conditions not found by the more limited number of analyses presented in this study.

WCC has developed these alternatives based on previous experience with cleanup projects on nearby sites in the City Center area. These projects, performed on behalf of the City of Oakland, include the Oakland Federal Building, City Center Garage II, and 1155 Clay Street. Cleanup of these sites also involved the off-site treatment and/or disposal of surficial fill material containing elevated concentrations of lead and petroleum hydrocarbons.

3.1 GENERAL DISPOSAL CRITERIA

In general, the available disposal options depend on the chemical characteristics of the soil to be disposed. As regards the T12 Parcel, the concentrations of petroleum hydrocarbons,

extractable lead and PAHs in the soil are most likely to govern the selection of an off-site disposal option. Soil with an average concentration of oil and grease greater than 1000 ppm may require direct disposal in a Class I landfill or treatment, such as bioremediation, to reduce the concentration of petroleum hydrocarbons and achieve disposal in a less-expensive Class II/III landfill.

Soil with an average concentration of extractable lead greater than about 0.5 ppm (as measured by the Waste Extraction Test (WET) using an acidic extracting solution) cannot usually be disposed in a Class II/III landfill. Soil with an average concentration of extractable lead between 0.5 ppm and 5 ppm may be disposed at an incineration facility. However, Forward, Inc. Class II landfill in Stockton, California, may accept soil with WET average results of up to 0.5 ppm extractable lead as measured by the WET method using deionized water as the extracting solution. This concentration of 0.5 ppm extractable lead correlates with a total lead concentration of about 50 ppm or more. Therefore, soil with an average concentration of total lead less than about 50+ ppm may possibly be directly disposed in a Class II landfill. Soil with an average concentration of total lead greater than about 50+ ppm may require disposal in a Class I landfill or treatment of the soil to reduce the solubility of the lead.

PAH compounds are associated with waste or spent petroleum hydrocarbons such as waste motor oil. These toxic compounds are regulated in soil and may limit disposal alternatives. The significance of the occurrance of PAH compounds is difficult to assess at this time because of the limited number of samples and because acceptance criteria for soil containing PAH compounds varies between disposal sites.

Based on the above disposal criteria and the results of this study, WCC estimates that approximately 6,300 bank cubic yards of fill (approximately 10,100 bulk cubic yards) in Area 2, shown on Figure 2, may require disposal at a Class I landfill or incineration. These more costly disposal alternatives may be necessary if the concentration of PAHs reported in one sample from Area 2 is representative of the entire volume. Disposal in a Class II or Class III landfill may be possible, especially if the fill material undergoes one, or both, of the following treatments as necessary; bioremediation to reduce the concentration of oil and grease and/or chemical fixation to reduce the concentration of extractable lead.

Soil with both an average concentration of oil and grease and extractable lead less than 1000 ppm and 0.5 ppm, respectively, may possibly be directly disposed in a Class II or Class III landfill. WCC estimates that the remaining approximately 8,300 bank cubic yards of fill (approximately 13,300 bulk cubic yards) in Area 1 shown on Figure 2 may meet these criteria for Class II or Class III landfill disposal.

3.2 BASIC REMEDIATION APPROACH

All the cleanup alternatives for the T12 Parcel discussed below fundamentally consist of a process of excavation, segregation and stockpiling of the fill on the site. The T12 fill would be segregated on the basis of relative petroleum hydrocarbon concentrations with the intent of developing a stockpile containing low concentrations of petroleum hydrocarbons, possibly suitable for direct disposal in a landfill, and one or more stockpiles with higher petroleum hydrocarbon concentrations. Based on previous site cleanup experience in the City Center area, WCC believes that a segregation operation would be feasible because the high concentrations of oil and grease, which have also been associated with high concentrations of lead, appear to impart a distinctive color and textural quality to the soil. Therefore, the fill may often be segregated on the basis of the color and texture. The resulting stockpiles would be sampled for additional analyses to characterize the fill for more accurate assessment of off-site disposal alternatives and to comply with application requirements of potential disposal sites.

3.3 BASIS FOR COST ESTIMATES

The cost estimates presented in this section are necessarily based on a number of assuptions: 1) the fill volumes and chemical characteristics as discussed in this report are representative of the fill on the T12 Parcel; and 2) no additional contaminants are encountered. Additional assumptions used in developing these cost estimates are shown on Table 3.

Contractor, engineering and consulting costs, including fill characterization and project oversight, are estimated to be in the range of $350,000 to $450,000 for each alternative. A more detailed breakdown of the estimated costs, along with estimated excavation and disposal costs, is presented in Table 3.

3.4 ALTERNATIVE 1 - INCINERATION AND CLASS III DISPOSAL

Incineration of the Area 2 fill and disposal of the Area 1 fill in a Class III landfill may be the most likely and least expensive available disposal option. WCC considers this the most likely option because the Area 2 fill probably contains concentrations of extractable lead which are too high for disposal at a Class II or III landfill. If that is the case, the next least-expensive, available disposal option after direct landfill disposal may be incineration of the Area 2 fill at a facility such as Port Costa Materials, Inc. (PCM). PCM's current acceptance criteria for extractable lead as measure by the WET method is 5.0 ppm, ten times the current WET lead limit of Forward, Inc.

This disposal alternative involves the excavation of all fill on the T12 parcel and segregation of the Area 1 and Area 2 fill material into two or more stockpiles based on the relative concentrations of oil and grease. This process may be useful in forming stockpiles of relatively higher and lower concentrations of lead because elevated concentrations of oil and grease have previously been associated with elevated concentrations of total lead elsewhere in the City Center area. The Area 1 and Area 2 stockpiles would be sampled and analyzed in accordance with disposal application requirements at a Class III landfill and at PCM, respectively. If the fill is accepted for disposal, the Area 2 fill would be incinerated at PCM and the Area 1 fill would be disposed at a Class III landfill such as the BFI/Vasco Road landfill in Livermore, California.

This alternative appears to be the most likely selection for the following reasons:

- The concentration of extractable lead in the Area 2 fill may preclude direct disposal in a Class II or Class III landfill. PCM's acceptance criteria for extractable lead is 5 ppm whereas the acceptance criteria at the Class II Forward, Inc. landfill is 0.5 ppm;

- Use of an on-site chemical treatment to reduce the solubility of the lead in the Area 2 fill to achieve disposal at a Class II or Class III landfill may be more expensive and time-consuming than incineration; and

- Disposal of the Area 2 fill at a Class I landfill would be more expensive than this alternative.

The excavation, hauling, incineration and disposal costs as shown on Table 3 are estimated to be approximately $1,635,000 or about $70/bulk cubic yard. The total project cost for this alternative, including a 50% contingency, is estimated to be about $3,050,000.

3.5 ALTERNATIVE 2 - BIOREMEDIATION AND CLASS II AND CLASS III DISPOSAL

If extractable lead concentrations in the Area 2 fill are within the acceptance criteria of a Class II landfill (which WCC considers to be unlikely based on the limited analyses completed so far), then this alternative, involving bioremediation and direct Class II disposal of the Area 2 fill, would be a feasible alternative and less expensive than incineration discussed in Alternative 1. The Area 2 fill would probably require a treatment such as bioremediation to reduce the concentrations of petroleum hydrocarbons to within a range acceptable for direct disposal in a Class II landfill. The bioremediation process may be performed in various ways, including landfarming, biological reactors or in-situ bioremediation.

As before, the Area 1 and Area 2 fill material would be excavated and segregated into two or more stockpiles based on the relative concentrations of oil and grease. The Area 1 and Area 2 stockpiles would be sampled and analyzed in accordance with disposal application requirements at a Class III landfill and a Class II landfill, respectively. The Area 1 fill would most likely be directly disposed in a Class III landfill. If the Area 2 fill exceeds the oil and grease acceptance criteria but is otherwise acceptable for Class II disposal, WCC would recommend a treatment such as bioremediation to reduce the petroleum hydrocarbon concentrations.

Based on our previous experience working in the City Center area, the relatively shallow depth of the fill, space limitations in the area and cost considerations, we believe that the most efficient way to achieve reductions in petroleum hydrocarbon concentrations would be to bioremediate the soil using a simple landfarming program. The fill could be hauled to

Forward, Inc. for treatment by bioremediation prior to disposal. The Area 1 fill may be disposed in a Class III landfill such as the BFI/Vasco Road landfill.

This alternative may be feasible if the following conditions apply:

- The average concentration of oil and grease in the Area 2 fill exceeds the limiting disposal criteria for oil and grease at a Class II landfill;
- Bioremediation is a feasible process for reducing the average concentration of oil and grease in the fill to a concentration below the limiting disposal criteria for oil and grease at a Class II landfill;
- The concentration of extractable lead in the treated fill is below the limiting disposal criteria for extractable lead at a Class II landfill and the fill is otherwise suitable for direct disposal at a Class II landfill; and
- The Area 1 fill is suitable for disposal in a Class III landfill.

If these more restrictive conditions apply, this alternative may be slightly more preferable to incineration (discussed as Alternative 1) due to lower estimated cost. The excavation, hauling, biremedial treatment and disposal costs are estimated to be approximately $1,540,000 or about $66/cubic yard. The total project cost for this alternative, including a 50% contingency, is estimated to be about $2,900,000.

3.6 ALTERNATIVE 3 - DIRECT CLASS II AND CLASS III DISPOSAL

This alternative, involving direct disposal of the Area 1 and Area 2 fills in Class III and Class II landfills, respectively, would be the simplest and least expensive option and, therefore, the most desirable. Successful performance of this alternative depends on the Area 2 fill meeting the acceptance criteria for lead and petroleum hydrocarbons at a Class II landfill. However, due to the relatively high concentrations of lead and oil and grease reported in Area 2 samples analyzed for this study, WCC considers the possibility of direct Class II disposal of the Area 2 fill to be unlikely without treatment of the fill to reduce petroleum hydrocarbon concentrations.

This disposal alternative involves the excavation of all fill on the T12 Parcel and segregation of the fill in Areas 1 and 2. The Area 1 stockpile would be disposed in a Class III landfill if the average concentrations of oil and grease and extractable lead do not exceed the limiting disposal criteria at a Class III landfill. Similarly, the Area 2 fill would be directly disposed in a Class II landfill if the average concentrations of oil and grease and extractable lead do not exceed the limiting disposal criteria at a Class II landfill.

This alternative appears to be the least expensive alternative, but would be feasible only if the following conditions apply:

- The average concentration of oil and grease in the Area 2 stockpile is below 100 ppm or the current limiting disposal criteria at the time of site remediation. Forward, Inc., a Class II landfill, expects that the regulatory agencies may permit Forward to begin accepting soil containing up to 700 ppm to 1000 ppm petroleum hydrocarbons beginning in the Spring of 1992;

- The concentration of extractable lead in the two stockpiles is below the limiting disposal criteria for extractable lead. Based on the available data, the concentration of total lead in the fill appears to be well below the limiting disposal criteria for total lead; and

- The fill is otherwise suitable for disposal in Class II and Class III landfills (e. g., not ignitable, corrosive or reactive).

However, the relatively high concentration of total lead in Area 2 suggest that the concentration of extractable lead will probably exceed the limiting disposal criteria at a Class II landfill. Also, the high concentration of PAHs in the one analyzed sample suggest that the fill may not be acceptable for Class II disposal on that basis.

The excavation, hauling and disposal costs are estimated to be approximately $1,130,000 or about $48/cubic yard assuming disposal at the Forward, Inc. landfill. The total project cost for this alternative, including a 50% contingency, is estimated to be about $2,290,000. If the BFI, Inc. Pittsburg landfill is available for disposal of Class II material at the time the work

is performed, some reduction in cost may be possible due to lower transport and disposal costs.

3.7 ALTERNATIVE 4 - ON-SITE LEAD FIXING, BIOREMEDIATION AND CLASS II AND CLASS III DISPOSAL

If it is found that the Area 2 stockpiled fill contains concentrations of extractable lead which exceed the acceptance criteria of non-hazardous incinerator facilities, and oil and grease concentrations which exceed the acceptance criteria at a Class II landfill, then treatment of the fill to fix the lead and reduce the oil and grease concentrations (bioremediation) may be the next least expensive disposal alternative. Lead fixation is a treatment of the fill which uses a chemical process to reduce the solubility of the lead. The goal of the lead fixation and bioremedial treatments of the fill would be to render the fill acceptable for disposal in a Class II landfill.

In order to perform on-site chemical treatment of the soil to reduce the solubility of lead, permits are required from various state and local agencies. At least several months would be required to apply for the relevant permits, selection of a treatment contractor, and preparation of the site. A significant uncertainty of this alternative is that there is no guarantee that permits for the on-site treatment of waste would be granted by the State of California, Alameda County, and/or the Regional Water Quality Control Board. Also, in other cases, it has been difficult to persued Class II/III landfills to accept the treated soil for disposal.

This disposal alternative involves the excavation of all fill on the T12 parcel and segregation of the Area 1 and Area 2 fill. If the necessary permits are acquired, the Area 2 fill would be treated on-site by the lead lead fixation process and treated off-site by bioremediation to reduce oil and grease concentrations. Following the treatments, the Area 2 fill would then be disposed in a Class II landfill. The Area 1 fill would be directly disposed in a Class III landfill.

This alternative would be feasible if the following conditions apply:

- The concentrations of extractable lead and oil and grease in the Area 2 fill exceed the limiting disposal criteria for extractable lead and oil and grease at an incinerator facility and a Class II landfill;

- A lead fixation process and bioremediation will reduce the concentrations of extractable lead and oil and grease, respectively, to concentrations below the limiting disposal criteria for extractable lead and oil and grease at a Class II landfill;

- The Area 2 treated fill is otherwise suitable for direct disposal at a Class II landfill; and

- The Area 1 fill is suitable for direct disposal in a Class III landfill.

The excavation, hauling, treatment and disposal costs are estimated to be approximately $2,330,000 or about $100/cubic yard. The total project cost for this alternative, including a 50% contingency, is estimated to be about $4,090,000.

3.8 ALTERNATIVE 5 - ON-SITE LEAD FIXING AND CLASS II AND CLASS III DISPOSAL

This alternative may be feasible if it is found that: 1) the Area 2 stockpiled fill contains average concentrations of extractable lead which exceed the acceptance criteria at an incineration facility, and; 2) concentrations of oil and grease and which do not exceed the acceptance criteria at a Class II landfill. If that is the case, treatment of the fill to fix the lead may be sufficient to achieve Class II disposal of the Area 2 fill. Bioremediation of the fill, discussed above in Alternative 4, would not be necessary.

This disposal alternative involves the excavation of all fill on the T12 parcel and segregation of the Area 1 and Area 2 fill. If the necessary permits for the on-site lead-fixation process are granted by the regulatory agencies (see Alternative 4), the Area 2 fill would be chemically

treated to reduce the solubility of the lead in the fill, and disposed in a Class II landfill. The Area 1 fill would be directly disposed in a Class III landfill.

This alternative would be feasible if the following conditions apply:

- The concentration of extractable lead in the Area 2 fill exceeds the disposal criteria for extractable lead at an incineration facility;
- A lead fixation process will reduce the concentration of extractable lead to a concentration which does not exceed the disposal criteria for extractable lead at a Class II landfill;
- The treated fill is otherwise suitable for direct disposal at a Class II landfill; and
- The Area 1 fill is suitable for disposal in a Class III landfill.

The excavation, hauling, treatment and disposal costs are estimated to be approximately $1,920,000 or about $82/cubic yard. The total project cost for this alternative, including a 50% contingency, is estimated to be about $3,480,000. If the Area 2 fill could be treated to meet Class III disposal criteria, the total project cost may be about $3,210,000.

3.9 ALTERNATIVE 6 - SEGREGATION AND CLASS I AND CLASS III DISPOSAL

Direct class I disposal of the Area 2 fill may be the only available option if: 1) the concentration of extractable lead exceeds the acceptance criteria at an incineration facility, and; 2) a lead fixing process is either insufficient to qualify the fill for Class II landfill disposal or is not permitted by regulatory agencies. Assuming other contaminants, such as PAHs, are not present at concentrations requiring Class I disposal, the necessity of this option appears unlikely because lower-cost treatments of the fill in Area 2 appear feasible based on the analytical results of this study.

This disposal alternative involves the excavation of all fill on the T12 parcel and segregation of the Area 1 and Area 2 fill. The Area 2 stockpile would be disposed at a Class I landfill.

The Area 1 stockpile of fill, with a lower average concentration of lead, would be disposed at a Class III landfill.

This alternative would be feasible if the following conditions apply:

- The fill in Area 2 contains concentrations of extractable lead or other contaminants exceeding the limiting disposal criteria for a Class II landfill or incineration facility;

- Soil treatment processes such as lead fixation and bioremediation to reduce the concentrations of lead and oil and grease, respectively, for the fill in Area 2 cannot render the fill acceptable for Class II landfill disposal or incineration; and

- The fill in Area 1 is suitable for Class III disposal.

The excavation, hauling and disposal costs are estimated to be approximately $2,360,000 or about $101/cubic yard. The total project cost for this alternative, including a 50% contingency, is estimated to be about $4,140,000.

3.10 ALTERNATIVE 7 - DIRECT CLASS I DISPOSAL

This alternative would be the most expensive alternative and is considered a worst-case, end-member scenario which would be unlikely to be necessary unless other currently unknown contaminants are identified. While there is a possibility that the Area 2 fill may require Class I landfill disposal, we believe that other disposal options discussed above would be available for the Area 1 fill.

This disposal alternative involves the excavation of all fill on the T12 Parcel and direct disposal in a Class I landfill such as Kettleman Hills Landfill.

This alternative appears to be the most expensive alternative but necessary if the following conditions apply:

- The concentration of extractable lead in both the Area 1 and Area 2 fill exceeds the disposal criteria for extractable lead at an incineration facility; and

- A lead fixation process will not reduce the concentration of soluble lead in the Area 1 and 2 fill to a concentration below the disposal criteria for extractable lead at a Class II landfill; or

- Despite any treatments, the treated fill is not suitable for direct disposal at a Class II landfill due to the concentration of some other contaminant unknown at this time.

The excavation, hauling and disposal costs are estimated to be approximately $4,200,000 or about $180/cubic yard. The total project cost for this alternative, including a 50% contingency, is estimated to be about $6,890,000.

3.11 UNCERTAINTY IN COST ESTIMATES

The cost estimates provided for each of the remediation alternatives have been developed using currently available information, the limited analytical results of this study, and assumptions which are believed to be reasonable and conservative. Although the estimated costs must be considered approximate, we believe they correctly show the relative cost ranking for each alternative. The actual fill excavation and disposal costs will depend on a host of variables, including: 1) the quantity of soil moved, 2) the chemical characteristics of the soil encountered, 3) contracting and disposal market conditions at the time the remediation is performed, 4) the need, if any, to accelerate the work schedule; and 5) various contingencies which may arise during the course of the project.

4.0
CONCLUSIONS AND RECOMMENDATIONS

Commercial development of Parcel T12 may require the excavation, removal and off-site disposal of large quantities of surficial fill and native soil. The analytical results of this study suggest that disposal options for the approximately 14,800 bank cubic yards of surficial fill may be limited due to elevated concentrations of oil and grease and lead in the fill. The chemical analytical data suggest that, for purposes of fill removal and disposal, the fill material may be subdivided into two areas, Area 1 and Area 2 as shown on Figure 2, containing lower and higher average concentrations of oil and grease and lead, respectively.

The lowest cost alternative for disposal of the fill currently available may involve Alternative 1 discussed above, the incineration of the fill in Area 2 and direct disposal of the remaining fill in Area 1 at a Class III landfill. This option appears to be the most likely for selection because the elevated concentration of total lead in the Area 2 fill may preclude direct disposal at a Class II or III landfill. In addition, incineration appears less expensive than treatment by lead fixation to achieve Class II/III disposal.

If the Area 2 fill meets a limiting Class II/III landfill disposal criteria for extractable lead, treatment by bioremediation may be necessary to reduce concentrations of oil and grease (Alternative 2). However, if the disposal criteria for oil and grease are raised at a Class II landfill, e. g., Forward, Inc., prior to commencement of the remediation project, Alternative 3, the lowest cost alternative involving direct disposal at Class II and Class III landfills, may become feasible.

If the concentration of extractable lead in Area 2 exceeds the acceptance criteria at incineration facilities, the more expensive alternatives, Alternatives 4 through 7 involving lead fixation or Class I disposal, may become necessary to achieve off-site disposal of the T12 fill material.

Table 1. Summary of Selected Chemical Analyses of Fill Material*,
City Center Parcel T12, Oakland, California

FILL SAMPLES

SAMPLE NUMBER	DEPTH (feet)	TOTAL LEAD	TOTAL PETROLEUM HYDROCARBONS				PCB	SEMI-VOLATILE COMPOUNDS
			OIL AND GREASE	GASOLINE	DIESEL	MOTOR OIL		
F1-1	1	49.2	ND	ND	ND	124	ND	--
F1-2	3	2.8	ND	--	--	--	--	--
F1-3	5	7.7	766	--	--	--	--	--
F1-1,2	--	--	--	--	--	--	--	note 1
F2-1	1	31.7	ND	--	--	--	--	--
F3-1	1	60.6	ND	--	--	--	--	--
F3-2	3	2.9	ND	--	--	--	--	--
F4-1	1	--	--	ND	ND	ND	ND	ND
F4-2	4	2.1	ND	--	--	--	--	--
F5-1	2	187.0	1230	--	--	--	--	--
F5-2	3	--	--	ND	63	476		
F5-3	4	208.0	1650	--	--	--	--	--
F6-1	3	7.6	ND	--	--	--	--	--
F6-2	5	2.5	ND	--	--	--	--	--
F7-1	1	53.0	ND	--	--	--	--	--
F7-2	3	2.7	ND	--	--	--	--	--
F8-1	2	94.2	55	--	--	--	--	--
F8-2	5	61.5	ND	--	--	--	--	--
F8-3	7	71.9	--	--	--	--	--	--
F9-1	2	23.0	ND	--	--	--	--	--
F9-3	7	103.0	ND	--	--	--	--	--
F10-1	3	63.9	98	--	--	--	--	--
F11-1	2	758.0	ND	--	--	--	--	--
F11-2	4	25.0	ND	--	--	--	--	--
F12-1	1	33.1	72	--	--	--	--	--
F12-2	3	--	1030	--	--	--	--	--
F12-3	5	231.0	--	--	--	--	--	--
F12-5	11	142.0	1880	--	--	--	--	--
F13-1	2	167.0	2520	--	--	--	--	--
F13-2	5	8.7	1150	--	--	--	--	--
F13-3	7	96.6	1240	--	--	--	--	--
F14-1	2	27.6	ND	--	--	--	--	--
F14-2	4	297.0	62	--	--	--	--	--
F15-1	1	29.4	68	ND	ND	54	ND	--
F15-2	3	--	--	--	--	--	--	--
F15-4	7	--	--	--	--	--	--	--
F15-5	9	8.2	ND	--	--	--	--	--
F15-1,2,4,5	--	--	--	--	--	--	--	ND
F16-1	2	24.3	ND	--	--	--	--	--
F16-2	5	92.0	ND	--	--	--	--	--
F17-1	5	220.0	740	--	--	--	--	--
F17-2	7	219.0	610	--	--	--	--	--
F17-3	10	10.1	ND	--	--	--	--	--
F17-4	13	4.9	ND	--	--	--	--	--
F18-1	4	35.6	905	--	--	--	ND	--
F18-2	8	66.3	1560	ND	103	674	--	--

Table 1. Summary of Selected Chemical Analyses of Fill Material*, Parcel T12
City Center, Oakland, California (Continued)

SAMPLE NUMBER	DEPTH (feet)	TOTAL LEAD	TOTAL PETROLEUM HYDROCARBONS				PCB	SEMI-VOLATILE COMPOUNDS
			OIL AND GREASE	GASOLINE	DIESEL	MOTOR OIL		
F18-3	11	39.2	862	--	--	--	--	--
F18-1,2	--	--	--	--	--	--	--	note 2
Average		89.3	426	--	--	--	--	--
NATIVE SOIL SAMPLES								
F2-2	4	2.9	ND	--	--	--	--	--
F3-3	4	2.6	ND	--	--	--	--	--
F3-4	7	3.1	ND	--	--	--	--	--
F5-4	10	3.9	ND	--	--	--	--	--
F5-5	15	--	--	--	--	--	--	--
F7-3	5	--	--	--	--	--	--	--
F10-2	6	5.9	ND	--	--	--	--	--
F11-3	6	3.8	ND	--	--	--	--	--
F12-6	13	2.4	ND	--	--	--	--	--
F12-7	16	3.3	ND	--	--	--	--	--
F15-6	11	3.4	ND	--	--	--	--	--
Average		3.5	ND	--	--	--	--	--
Detection Limit		3.0	50	5	10	25	0.1	varies
Analytical Method:								
EPA Method		6010	418.1	8015 (Modified)			8080	8270

* all results reported as mg/kg (parts per million), ND = not detected, dashed where no analysis performed

note 1: phenanthrene = 0.400 ppm
fluoranthene = 0.637 ppm
pyrene = 0.911 ppm
chrysene = 0.390 ppm
benzo(a) anthracene = 0.264 ppm
benzo(k)fluoranthene = 0.245 ppm
benzo(b)fluoranthene = 0.259 ppm
benzo(a)pyrene = 0.240 ppm

note 2: naphthalene = 0.267 ppm
acenaphthylene = 0.506 ppm
phenanthrene = 3.320 ppm
anthracene = 0.370
fluoranthene = 5.690 ppm
pyrene = 8.150 ppm
chrysene = 2.610 ppm
benzo(a) anthracene = 2.140 ppm
benzo(k)fluoranthene = 2.410 ppm
benzo(b)fluoranthene = 2.340 ppm
benzo(a)pyrene = 3.500 ppm
indeno(1,2,3-cd)pyrene = 1.940 ppm
dibenzo(g,h,i)perylene = 2.770

Table 2. Summary of Chemical Analytical Results for Metals in Fill Material*,
City Center Parcel T12, Oakland, California.

METAL	DETECTION LIMIT	F1-1,2 composite	F4-1	F15-1,2,3,4,5 composite	F18-1,2 composite	TTLC	STLC
Silver	0.5	ND	ND	ND	ND	500	5
Arsenic	1.0	9.9	9.5	12.6	11.8	500	5
Barium	0.1	75.3	52.2	88.5	56.9	10,000	100
Beryllium	0.5	ND	ND	ND	ND	75	0.75
Cadmium	1.0	ND	ND	ND	ND	100	1
Cobalt	1.0	4.9	3.7	5.5	5.2	8,000	80
Chromium	0.5	25.5	20.1	21.0	17.2	2,500	5
Copper	0.5	13.4	20.0	15.7	36.3	2,500	25
Mercury	1.0	1.0	ND	1.4	1.8	20	0.2
Molybdenum	1.0	ND	ND	1.1	3.2	3,500	350
Nickel	1.0	26.5	15.5	25.0	26.2	2,000	20
Lead	3.0	44.2	87.8	47.4	105	1,000	5
Antimony	3.0	ND	ND	3.3	4.0	500	15
Selenium	3.0	ND	ND	ND	3.8	100	1
Thallium	1.0	36.2	35.1	37.2	44.7	700	7
Vanadium	0.5	20	16.2	21.1	23.1	2,400	24
Zinc	0.5	78.7	49.2	54.8	162	5,000	250

* all results reported as mg/kg (parts per million), ND = not detected
TTLC = Total Threshold Limit Concentration
STLC = Soluble Threshold Limit Concentration

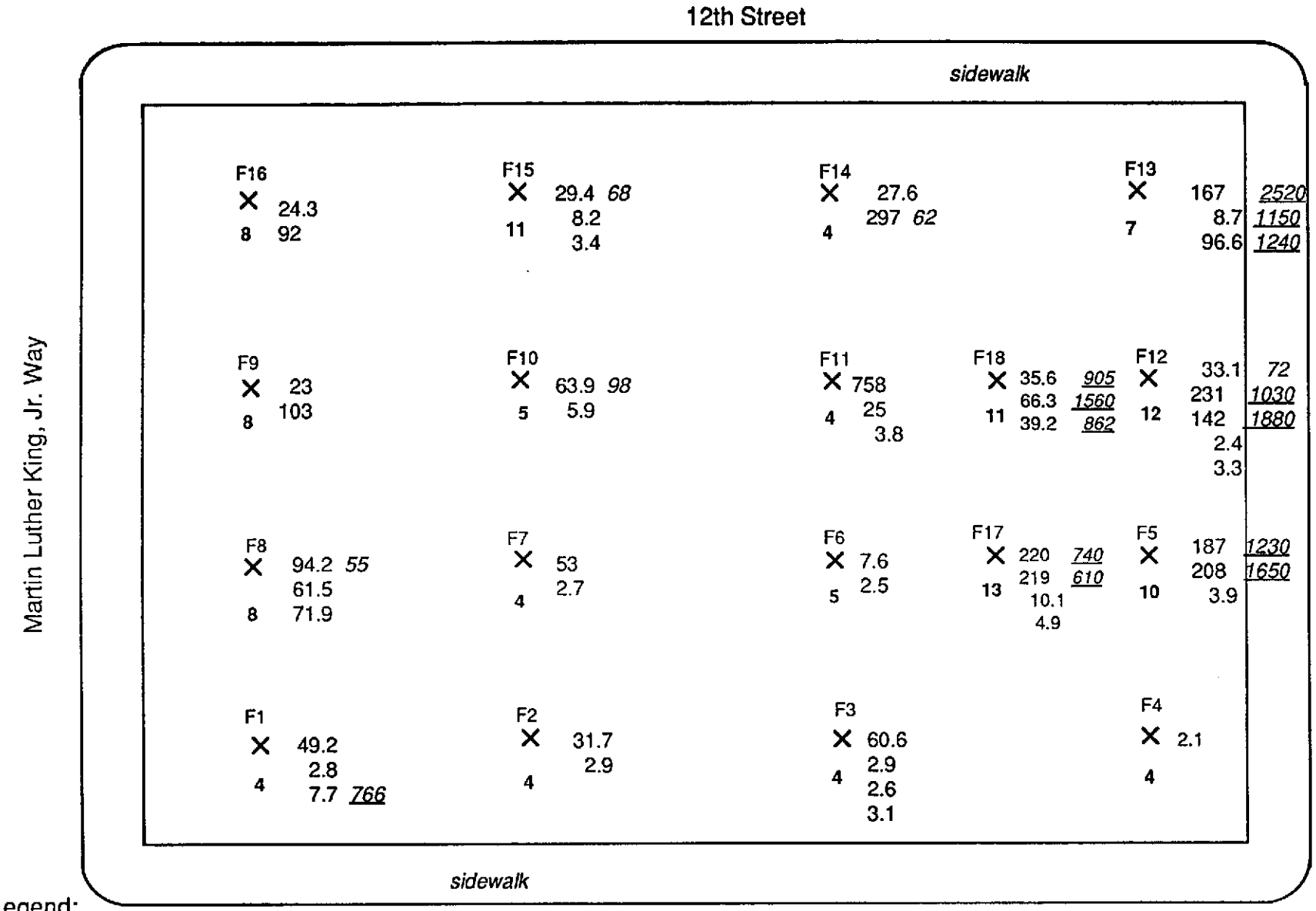
Table 3. Cost Estimate for Fill Disposal Alternatives, City Center Parcel T12

ALTERNATIVE -	1	2	3	4	5	6	7
	Incinerate + Class III Disposal	Bioremediate, Class II & Class III Disposal	Class II and Class III Disposal	Lead Fixation, Bioremediate, Class II & Class III Disposal	Lead Fixation, Class II & Class III Disposal	Class I and Class III Disposal	Class I Direct Disp.
Excavation and Disposal							
Excavate and Haul	422,400	513,600	513,600	513,600	513,600	848,000	1,400,000
Incineration	912,000						
Bioremediation		202,000		202,000			
Bioremediation Space Rental		202,000		202,000			
Lead Fixing Process				790,400	790,400		
Disposal	300,000	619,200	619,200	619,200	619,200	1,516,000	2,800,000
EXC. AND DISP. SUBTOTAL	$1,634,400	$1,536,800	$1,132,800	$2,327,200	$1,923,200	$2,364,000	$4,200,000
Contractor							
Mobe/Demobe	6,000	6,000	6,000	6,000	6,000	6,000	6,000
Site Preparation	45,000	45,000	45,000	45,000	45,000	45,000	45,000
Traffic Control	20,000	20,000	20,000	20,000	20,000	20,000	20,000
Truck Scale	20,000	20,000	20,000	20,000	20,000	20,000	20,000
Health and Safety	2,500	2,500	2,500	2,500	2,500	2,500	2,500
Erosion Control	2,000	2,000	2,000	2,000	2,000	2,000	2,000
CONTRACTOR SUBTOTAL	$95,500	$95,500	$95,500	$95,500	$95,500	$95,500	$95,500
WCC - Engineering and Consulting							
Contractor Selection	16,000	16,000	16,000	16,000	16,000	16,000	16,000
Soil Characterization	80,000	80,000	80,000	80,000	80,000	80,000	80,000
Project Management	60,000	60,000	60,000	60,000	60,000	60,000	60,000
Field Monitoring	80,000	80,000	80,000	80,000	80,000	80,000	80,000
Landfill and Reg. Corresp.	25,000	25,000	25,000	25,000	25,000	25,000	25,000
Closure	20,000	20,000	20,000	20,000	20,000	20,000	20,000
Reporting	20,000	20,000	20,000	20,000	20,000	20,000	20,000
WCC SUBTOTAL	$301,000	$301,000	$301,000	$301,000	$301,000	$301,000	$301,000
50% Contingency	$1,015,450	$966,650	$764,650	$1,361,850	$1,159,850	$1,380,250	$2,298,250
ESTIMATED PROJECT TOTAL COST	$3,046,350	$2,899,950	$2,293,950	$4,085,550	$3,479,550	$4,140,750	$6,894,750

Table 3. Cost Estimate for Fill Disposal Alternatives, City Center Parcel T12 (concluded)

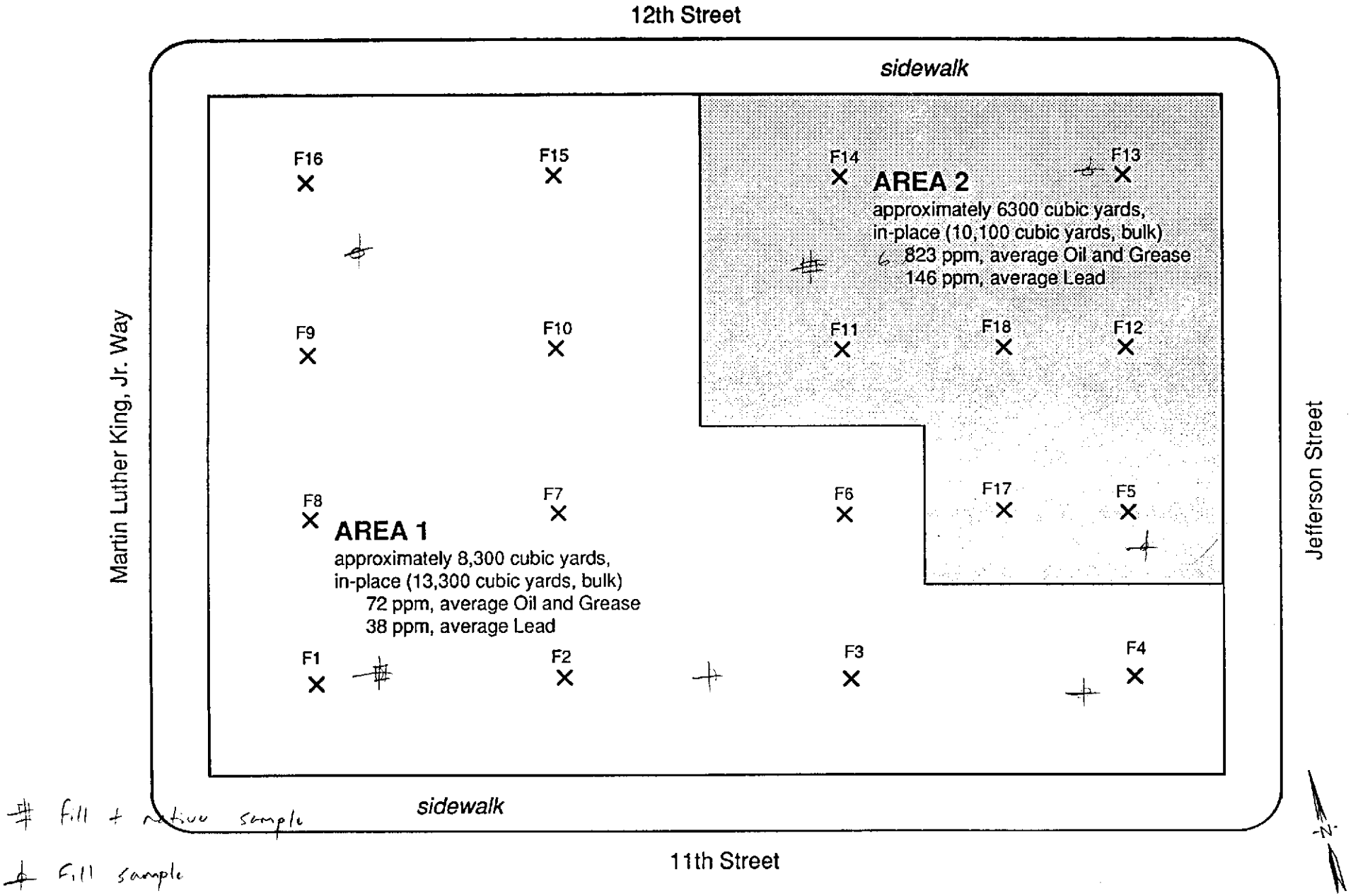
ASSUMPTIONS:

1) No additional contamination is encountered.
2) The landfill acceptance criteria do not change substantially from those currently in effect.
3) On-site segregation of soil can be accomplished effectively.
4) Estimated 8,300 cubic yard volume of in-place, contaminated fill (Area 1) is expected to yield 13,300 bulk yards of material to be disposed weighing approximately 20,000 tons.
5) Estimated 6,300 cubic yard volume of in-place, contaminated fill (Area 2) is expected to yield 10,100 bulk yards of material to be disposed weighing approximately 15,200 tons.
6) The disposal and haul rates are based on 1991 rates and are not adjusted for inflation.



Note: Where no Oil and Grease analysis shown, result is < 50 ppm.

Project No. 90C0039A	City Center ESA	Parcel T12 Boring Locations	Figure 1
Woodward-Clyde Consultants			



Project No. 90C0039A	City Center ESA	Parcel T12 Fill Characteristics	Figure 2
Woodward-Clyde Consultants			

APPENDIX A

SOIL BORING LOGS

Woodward-Clyde Consultants PROJECT NAME CITY CENTER T12 No. 90C0039D

BORING NUMBER F1		DATE STARTED / DATE FINISHED	AUGUST 13, 1990
DRILLING AGENCY HEW Drilling	DRILLER	ELEVATION AND DATUM	NA
DRILLING EQUIPMENT		COMPLETION DEPTH 5-1/2 Ft.	SAMPLER 2" Modified Calif. Type
DRILLING METHOD 6" Solid Auger	DRILL BIT NA		
SIZE AND TYPE OF CASING NA		NO. OF SAMPLES 3	DIST. 0 / UNDIST. 3
TYPE OF PERFORATION NA	FROM TO Ft.		
SIZE AND TYPE OF PACK NA	FROM TO Ft.	WATER LEVEL NA	FIRST COMPL. 24 HRS.
TYPE OF SEAL NO. 1 NA	FROM TO Ft.	LOGGED BY T. Kolbe	CHECKED BY
NO. 2 NA	FROM TO Ft.		

DEPTH (feet)	DESCRIPTION	DEPTH (feet)	SAMPLES drive no.	sample no.	recov. (ft)	blow counts	REMARKS (Drill rate, Fluid Loss, Odor, etc.)
	Asphaltic concrete						
	GRAVEL (GM) red to red brown, little sand, clay		1	F1-1		14 15	
	SAND (SP-SM) dark brown, very fine, minor silt		2	F1-2		3 4	
5	SAND (SW-SC) light brown to red, little clay (native soil)	5	3	F1-3		5 9	
	Bottom of Boring at 5-1/2 ft.						
10		10					
15		15					
20		20					
25		25					
30		30					
35		35					

Woodward-Clyde Consultants PROJECT NAME CITY CENTER T12 No. 90C0039D

BORING NUMBER F2		DATE STARTED / DATE FINISHED	AUGUST 13, 1990
DRILLING AGENCY HEW Drilling	DRILLER	ELEVATION AND DATUM	NA
DRILLING EQUIPMENT		COMPLETION DEPTH 4 Ft.	SAMPLER 2" Modified Calif. Type
DRILLING METHOD 6" Solid Auger	DRILL BIT NA		
SIZE AND TYPE OF CASING NA		NO. OF SAMPLES 2 DIST. 0	UNDIST. 2
TYPE OF PERFORATION NA	FROM TO Ft.		
SIZE AND TYPE OF PACK NA	FROM TO Ft.	WATER LEVEL NA FIRST	COMPL. 24 HRS.
TYPE OF SEAL NO. 1 NA	FROM TO Ft.	LOGGED BY T. Kolbe	CHECKED BY
NO. 2 NA	FROM TO Ft.		

DEPTH (feet)	DESCRIPTION	DEPTH (feet)	SAMPLES drive no.	sample no.	recov. (ft)	blow counts	REMARKS (Drill rate, Fluid Loss, Odor, etc.)
	Asphaltic concrete						
	GRAVEL with SAND (GM) dark brown, little clay		1	F2-1		7 8	
	SAND with GRAVEL (SP-SC) dark brown, little clay		2	F2-2		3 3	
5	SAND (SP) light brown to red, fine-grained, well sorted (native soil)	5					
	Bottom of Boring at 4 ft.						
10		10					
15		15					
20		20					
25		25					
30		30					
35		35					

Woodward-Clyde Consultants

PROJECT NAME CITY CENTER T12 No. 90C0039D

BORING NUMBER F3	DATE STARTED / DATE FINISHED AUGUST 13, 1990
DRILLING AGENCY HEW Drilling / DRILLER	ELEVATION AND DATUM NA
DRILLING EQUIPMENT	COMPLETION DEPTH 7-1/2 Ft. / SAMPLER 2" Modified Calif. Type
DRILLING METHOD 6" Solid Auger / DRILL BIT NA	NO. OF SAMPLES 4 / DIST. 0 / UNDIST. 4
SIZE AND TYPE OF CASING NA	
TYPE OF PERFORATION NA / FROM / TO / Ft.	WATER LEVEL NA / FIRST / COMPL. / 24 HRS.
SIZE AND TYPE OF PACK NA / FROM / TO / Ft.	LOGGED BY T. Kolbe / CHECKED BY
TYPE OF SEAL NO. 1 NA / FROM / TO / Ft.	
NO. 2 NA / FROM / TO / Ft.	

DEPTH (feet)	DESCRIPTION
	Asphaltic concrete
	GRAVEL (GP) light brown to red, with little clay and silt
	SAND (SP-SM) dark brown, with little gravel, very fine-grained
5	SAND (SM) dark brown, very fine-grained (native soil)
	SAND (SP-SC) light brown to red, with little clay (native soil)
	Bottom of Boring at 7-1/2 ft.
10	
15	
20	
25	
30	
35	

DEPTH (feet)	SAMPLES: drive no.	sample no.	recov. (ft)	blow counts	REMARKS (Drill rate, Fluid Loss, Odor, etc.)
	1	F3-1		13 10	
	2	F3-2		5 5	
5	3	F3-3		3 4	
	4	F3-4		12 27	
10					
15					
20					
25					
30					
35					

Woodward-Clyde Consultants

PROJECT NAME CITY CENTER T12 No. 90C0039D

BORING NUMBER F4		DATE STARTED / DATE FINISHED	AUGUST 13, 1990
DRILLING AGENCY HEW Drilling	DRILLER	ELEVATION AND DATUM	NA
DRILLING EQUIPMENT		COMPLETION DEPTH 4 Ft.	SAMPLER 2" Modified Calif. Type
DRILLING METHOD 6" Solid Auger	DRILL BIT NA	NO. OF SAMPLES 2	DIST. 0 / UNDIST. 2
SIZE AND TYPE OF CASING NA			
TYPE OF PERFORATION NA	FROM TO Ft.	WATER LEVEL NA	FIRST COMPL. 24 HRS.
SIZE AND TYPE OF PACK NA	FROM TO Ft.	LOGGED BY T. Kolbe	CHECKED BY
TYPE OF SEAL NO. 1 NA	FROM TO Ft.		
NO. 2 NA	FROM TO Ft.		

DEPTH (feet)	DESCRIPTION
0	Asphaltic concrete
	SAND (SP) dark brown, very fine-grained
	becomes light brown
	SAND (SM)
5	light brown to red, very fine-grained (native soil)
	Bottom of Boring at 4 ft.
10	
15	
20	
25	
30	
35	

DEPTH (feet)	SAMPLES drive no.	sample no.	recov. (ft)	blow counts	REMARKS (Drill rate, Fluid Loss, Odor, etc.)
0	1	F4-1		19 14	
	2	F4-2		3 3	
5					
10					
15					
20					
25					
30					
35					

Woodward-Clyde Consultants PROJECT NAME CITY CENTER T12 No. 90C0039D

BORING NUMBER F5		DATE STARTED / DATE FINISHED	AUGUST 13, 1990
DRILLING AGENCY HEW Drilling	DRILLER	ELEVATION AND DATUM	NA
DRILLING EQUIPMENT		COMPLETION DEPTH 15-1/2 Ft.	SAMPLER 2" Modified Calif. Type
DRILLING METHOD 6" Solid Auger	DRILL BIT NA		
SIZE AND TYPE OF CASING NA		NO. OF SAMPLES 5 DIST. 0	UNDIST. 5
TYPE OF PERFORATION NA	FROM TO Ft.		
SIZE AND TYPE OF PACK NA	FROM TO Ft.	WATER LEVEL NA FIRST	COMPL. 24 HRS.
TYPE OF SEAL NO. 1 NA	FROM TO Ft.	LOGGED BY T. Kolbe	CHECKED BY
NO. 2 NA	FROM TO Ft.		

DEPTH (feet)	DESCRIPTION	DEPTH (feet)	SAMPLES drive no.	sample no.	recov. (ft)	blow counts	REMARKS (Drill rate, Fluid Loss, Odor, etc.)
	Asphaltic concrete						
	CLAYEY GRAVEL with SAND (GC) dark gray to black		1	F5-1		8	
			2	F5-2		7 5	
			3	F5-3		6 5 5	
5	grades to	5					odor of oil
	CLAYEY SAND with GRAVEL (SC)						
	SAND (SP) light green to olive gray, very fine-grained		4	F5-4		15 21	
10	becomes light brown to olive gray and clayey, wet, mottled with iron staining, very fine-grained	10					
15	Bottom of Boring at 15-1/2 ft.	15	5	F5-5		10 12	
20		20					
25		25					
30		30					
35		35					

Woodward-Clyde Consultants PROJECT NAME CITY CENTER T12 No. 90C0039D

BORING NUMBER F6		DATE STARTED / DATE FINISHED	AUGUST 13, 1990
DRILLING AGENCY HEW Drilling	DRILLER	ELEVATION AND DATUM	NA
DRILLING EQUIPMENT		COMPLETION DEPTH 5 Ft.	SAMPLER 2" Modified Calif. Type
DRILLING METHOD 6" Solid Auger	DRILL BIT NA		
SIZE AND TYPE OF CASING NA		NO. OF SAMPLES 2	DIST. 0 / UNDIST. 2
TYPE OF PERFORATION NA	FROM TO Ft.		
SIZE AND TYPE OF PACK NA	FROM TO Ft.	WATER LEVEL NA	FIRST COMPL. 24 HRS.
TYPE OF SEAL NO. 1 NA	FROM TO Ft.	LOGGED BY T. Kolbe	CHECKED BY
NO. 2 NA	FROM TO Ft.		

DEPTH (feet)	DESCRIPTION	DEPTH (feet)	SAMPLES drive no.	sample no.	recov. (ft)	blow counts	REMARKS (Drill rate, Fluid Loss, Odor, etc.)
	Asphaltic concrete						
	GRAVEL (GP) light brown to red, (base rock)		1	F6-1		10 12	
	SAND (SP) light brown to red, fine-grained becomes clayey		2	F6-2		4 4	
5	Bottom of Boring at 5 ft.	5					
10		10					
15		15					
20		20					
25		25					
30		30					
35		35					

Woodward-Clyde Consultants PROJECT NAME CITY CENTER T12 No. 90C0039D

BORING NUMBER F7		DATE STARTED / DATE FINISHED	AUGUST 13, 1990
DRILLING AGENCY HEW Drilling	DRILLER	ELEVATION AND DATUM	NA
DRILLING EQUIPMENT		COMPLETION DEPTH 5-1/2 Ft.	SAMPLER 2" Modified Calif. Type
DRILLING METHOD 6" Solid Auger	DRILL BIT NA		
SIZE AND TYPE OF CASING NA		NO. OF SAMPLES 3	DIST. 0 / UNDIST. 3
TYPE OF PERFORATION NA	FROM TO Ft.		
SIZE AND TYPE OF PACK NA	FROM TO Ft.	WATER LEVEL NA	FIRST COMPL. 24 HRS.
TYPE OF SEAL NO. 1 NA	FROM TO Ft.	LOGGED BY T. Kolbe	CHECKED BY
NO. 2 NA	FROM TO Ft.		

DEPTH (feet)	DESCRIPTION
	Asphaltic concrete
	GRAVEL (GP) (base rock)
	CLAYEY GRAVEL with SAND (GC) light brown, few brick fragments, grades to sand (fill)
5	SAND (SP) mottled with iron staining (native soil)
	Bottom of Boring at 5-1/2 ft.
10	
15	
20	
25	
30	
35	

DEPTH (feet)	SAMPLES drive no.	sample no.	recov. (ft)	blow counts	REMARKS (Drill rate, Fluid Loss, Odor, etc.)
	1	F7-1		13 8	
	2	F7-2		3 3	
5	3	F7-3		4 2	
10					
15					
20					
25					
30					
35					

Woodward-Clyde Consultants PROJECT NAME CITY CENTER T12 No. 90C0039D

BORING NUMBER F8	DATE STARTED / DATE FINISHED AUGUST 13, 1990
DRILLING AGENCY HEW Drilling / DRILLER	ELEVATION AND DATUM NA
DRILLING EQUIPMENT	COMPLETION DEPTH 9 Ft. / SAMPLER 2" Modified Calif. Type
DRILLING METHOD 6" Solid Auger / DRILL BIT NA	NO. OF SAMPLES 3 / DIST. 0 / UNDIST. 3
SIZE AND TYPE OF CASING NA	
TYPE OF PERFORATION NA / FROM TO Ft.	WATER LEVEL NA / FIRST / COMPL. 24 HRS.
SIZE AND TYPE OF PACK NA / FROM TO Ft.	LOGGED BY T. Kolbe / CHECKED BY
TYPE OF SEAL NO. 1 NA / FROM TO Ft.	
NO. 2 NA / FROM TO Ft.	

DEPTH (feet)	DESCRIPTION
0	Asphaltic concrete
	GRAVEL (GP) light brown to red, with sand (base rock)
	GRAVEL with SAND (GP) dark brown, CONTAINS brick and concrete fragments (fill)
5	becomes less sandy and gravelly with more brick and concrete fragments (fill)
	CLAYEY SAND (SC) light brown to red (native soil)
10	Bottom of Boring at 9 ft.
15	
20	
25	
30	
35	

DEPTH (feet)	SAMPLES drive no.	sample no.	recov. (ft)	blow counts	REMARKS (Drill rate, Fluid Loss, Odor, etc.)
0					
	1	F8-1		9 15	
5	2	F8-2		2 7	
	3	F8-3		4 3	
10					
15					
20					
25					
30					
35					

Woodward-Clyde Consultants PROJECT NAME CITY CENTER T12 No. 90C0039D

BORING NUMBER F9		DATE STARTED / DATE FINISHED	AUGUST 13, 1990
DRILLING AGENCY HEW Drilling	DRILLER	ELEVATION AND DATUM	NA
DRILLING EQUIPMENT		COMPLETION DEPTH 9 Ft.	SAMPLER 2" Modified Calif. Type
DRILLING METHOD 6" Solid Auger	DRILL BIT NA		
SIZE AND TYPE OF CASING NA		NO. OF SAMPLES 3 DIST. 0 UNDIST. 3	
TYPE OF PERFORATION NA	FROM TO Ft.		
SIZE AND TYPE OF PACK NA	FROM TO Ft.	WATER LEVEL NA FIRST COMPL. 24 HRS.	
TYPE OF SEAL NO. 1 NA	FROM TO Ft.	LOGGED BY T. Kolbe	CHECKED BY
NO. 2 NA	FROM TO Ft.		

DEPTH (feet)	DESCRIPTION
	Asphaltic concrete
	GRAVEL with SAND and SILT (GP-GM) dark brown, trace clay
	CONCRETE dark brown and light gray, highly decomposed, trace silt and clay (fill)
5	becomes silty and clayey with brick fragments (fill)
	CLAYEY SAND (SC) light brown to red (native soil)
10	Bottom of Boring at 9 ft.
15	
20	
25	
30	
35	

DEPTH (feet)	SAMPLES drive no.	sample no.	recov. (ft)	blow counts	REMARKS (Drill rate, Fluid Loss, Odor, etc.)
5	1	F9-1		3 4	
	2	F9-2		2 2	
10	3	F9-3		4 5	
15					
20					
25					
30					
35					

Woodward-Clyde Consultants PROJECT NAME CITY CENTER T12 No. 90C0039D

BORING NUMBER F10		DATE STARTED / DATE FINISHED	AUGUST 13, 1990
DRILLING AGENCY HEW Drilling	DRILLER	ELEVATION AND DATUM	NA
DRILLING EQUIPMENT		COMPLETION DEPTH 6 Ft.	SAMPLER 2" Modified Calif. Type
DRILLING METHOD 6" Solid Auger	DRILL BIT NA		
SIZE AND TYPE OF CASING NA		NO. OF SAMPLES 2 DIST. 0	UNDIST. 2
TYPE OF PERFORATION NA	FROM TO Ft.		
SIZE AND TYPE OF PACK NA	FROM TO Ft.	WATER LEVEL NA FIRST	COMPL. 24 HRS.
TYPE OF SEAL NO. 1 NA	FROM TO Ft.	LOGGED BY T. Kolbe	CHECKED BY
NO. 2 NA	FROM TO Ft.		

DEPTH (feet)	DESCRIPTION
	Asphaltic concrete
	GRAVEL with CLAY and SAND (GP-GC) dark gray to black (base rock)
5	SAND with CLAY (SP-SC) dark brown, contains brick and concrete fragments (fill)
	SAND with SILT (SP-SM) mottled light brown to dark brown (native soil)
	Bottom of Boring at 6 ft.
10	
15	
20	
25	
30	
35	

DEPTH (feet)	SAMPLES drive no.	sample no.	recov. (ft)	blow counts	REMARKS (Drill rate, Fluid Loss, Odor, etc.)
5	1	F10-1		4 6	
	2	F10-2		2 3	
10					
15					
20					
25					
30					
35					

Woodward-Clyde Consultants PROJECT NAME CITY CENTER T12 No. 90C0039D

BORING NUMBER F11		DATE STARTED / DATE FINISHED	AUGUST 13, 1990
DRILLING AGENCY HEW Drilling	DRILLER	ELEVATION AND DATUM	NA
DRILLING EQUIPMENT		COMPLETION DEPTH 6 Ft.	SAMPLER 2" Modified Calif. Type
DRILLING METHOD 6" Solid Auger	DRILL BIT NA	NO. OF SAMPLES 3	DIST. 0 / UNDIST. 3
SIZE AND TYPE OF CASING NA			
TYPE OF PERFORATION NA	FROM TO Ft.	WATER LEVEL NA	FIRST COMPL. 24 HRS.
SIZE AND TYPE OF PACK NA	FROM TO Ft.	LOGGED BY T. Kolbe	CHECKED BY
TYPE OF SEAL NO. 1 NA	FROM TO Ft.		
NO. 2 NA	FROM TO Ft.		

DEPTH (feet)	DESCRIPTION
0	Asphaltic concrete
	GRAVEL with SAND and CLAY (GP-GC) (base rock)
	SAND with SILT (SP-SM) dark gray to black, sand with brick and concrete fragments,
5	SAND with SILT (SP-SM) mottled light brown to dark brown, trace clay (native soil) becomes light brown to red, less clayey
	Bottom of Boring at 6 ft.
10	
15	
20	
25	
30	
35	

DEPTH (feet)	SAMPLES drive no.	sample no.	recov. (ft)	blow counts	REMARKS (Drill rate, Fluid Loss, Odor, etc.)
0	1	F11-1		6 6	
	2	F11-2		3 2	
5	3	F11-3		3 4	
10					
15					
20					
25					
30					
35					

Woodward-Clyde Consultants PROJECT NAME CITY CENTER T12 No. 90C0039D

BORING NUMBER F12		DATE STARTED / DATE FINISHED	AUGUST 13, 1990
DRILLING AGENCY HEW Drilling	DRILLER	ELEVATION AND DATUM	NA
DRILLING EQUIPMENT		COMPLETION DEPTH 16 Ft.	SAMPLER 2" Modified Calif. Type
DRILLING METHOD 6" Solid Auger	DRILL BIT NA		
SIZE AND TYPE OF CASING NA		NO. OF SAMPLES 7 DIST. 0	UNDIST. 7
TYPE OF PERFORATION NA	FROM TO Ft.		
SIZE AND TYPE OF PACK NA	FROM TO Ft.	WATER LEVEL NA FIRST	COMPL. 24 HRS.
TYPE OF SEAL NO. 1 NA	FROM TO Ft.	LOGGED BY T. Kolbe	CHECKED BY
NO. 2 NA	FROM TO Ft.		

DEPTH (feet)	DESCRIPTION	DEPTH (feet)	SAMPLES drive no.	sample no.	recov. (ft)	blow counts	REMARKS (Drill rate, Fluid Loss, Odor, etc.)
	Asphaltic concrete		1	F12-1		20 2	odor of oil
	GRAVEL with CLAY and SAND (GP-GC) light brown to red (base rock)						
	GRAVELLY CLAY (CL) dark greenish gray		2	F12-2		4 5	odor of oil
5	becomes dark gray to black and sandy, silty	5	3	F12-3		4 5	odor of oil
	contains fragments of wood, brick, and glass		4	F12-4		4 8	odor of oil
	SANDY GRAVEL (GP) dark gray to black, trace clay contains leaves, fragments of wood, brick, and glass (fill)						
10	SILTY CLAY (CL) dark gray to black, wet, contains wood and leaves (fill)	10	5	F12-5		1 2	odor of oil
			6	F12-6		18 15	
	SAND (SP) light greenish gray to olive green, moist, mottled with iron staining						
15	SILTY CLAYEY SAND (SM-SC) mottled light brown to brown, moist (native soil)	15	7	F12-7		7 9	
	Bottom of Boring at 16 ft.						
20		20					
25		25					
30		30					
35		35					

Woodward-Clyde Consultants PROJECT NAME CITY CENTER T12 No. 90C0039D

BORING NUMBER F13		DATE STARTED / DATE FINISHED	AUGUST 13, 1990
DRILLING AGENCY HEW Drilling	DRILLER	ELEVATION AND DATUM	NA
DRILLING EQUIPMENT		COMPLETION DEPTH 7 Ft.	SAMPLER 2" Modified Calif. Type
DRILLING METHOD 6" Solid Auger	DRILL BIT NA		
SIZE AND TYPE OF CASING NA		NO. OF SAMPLES 3	DIST. 0 / UNDIST. 3
TYPE OF PERFORATION NA	FROM TO Ft.		
SIZE AND TYPE OF PACK NA	FROM TO Ft.	WATER LEVEL NA	FIRST COMPL. 24 HRS.
TYPE OF SEAL NO. 1 NA	FROM TO Ft.	LOGGED BY T. Kolbe	CHECKED BY
NO. 2 NA	FROM TO Ft.		

DEPTH (feet)	DESCRIPTION	DEPTH (feet)	SAMPLES drive no.	sample no.	recov. (ft)	blow counts	REMARKS (Drill rate, Fluid Loss, Odor, etc.)
	Asphaltic concrete						
	GRAVEL (GP) light brown to red, trace sand, silt and clay (base rock)		1	F13-1		10 4	
	SILTY GRAVEL (GM) dark brown, trace concrete fragments (fill)		2	F13-2		6 2	
5	GRAVELLY CLAY (CL) light greenish gray to olive green	5	3	F13-3		4 5	odor of oil
	becomes mottled dark greenish gray to dark gray						
	Bottom of Boring at 7 ft.						
10		10					
15		15					
20		20					
25		25					
30		30					
35		35					

Woodward-Clyde Consultants PROJECT NAME CITY CENTER T12 No. 90C0039D

BORING NUMBER F14		DATE STARTED / DATE FINISHED	AUGUST 13, 1990
DRILLING AGENCY HEW Drilling	DRILLER	ELEVATION AND DATUM	NA
DRILLING EQUIPMENT		COMPLETION DEPTH 4Ft.	SAMPLER 2" Modified Calif. Type
DRILLING METHOD 6" Solid Auger	DRILL BIT NA		
SIZE AND TYPE OF CASING NA		NO. OF SAMPLES 2 DIST. 0	UNDIST. 2
TYPE OF PERFORATION NA	FROM TO Ft.		
SIZE AND TYPE OF PACK NA	FROM TO Ft.	WATER LEVEL NA FIRST COMPL. 24 HRS.	
TYPE OF SEAL NO. 1 NA	FROM TO Ft.	LOGGED BY T. Kolbe	CHECKED BY
NO. 2 NA	FROM TO Ft.		

DEPTH (feet)	DESCRIPTION
	Asphaltic concrete
	GRAVELLY CLAY (CL) light brown to brown, concrete fragments (fill)
	becomes dark brown, sandy with little clay and gravel
5	Bottom of Boring at 4 ft.
10	
15	
20	
25	
30	
35	

DEPTH (feet)	SAMPLES drive no.	sample no.	recov. (ft)	blow counts	REMARKS (Drill rate, Fluid Loss, Odor, etc.)
	1	F14 -1		4 4	encountered concrete foundation and moved 10 ft. west to drill to F14-2
	2	F14 -2		3 3	
5					
10					
15					
20					
25					
30					
35					

Woodward-Clyde Consultants PROJECT NAME CITY CENTER T12 No. 90C0039D

BORING NUMBER F15		DATE STARTED / DATE FINISHED	AUGUST 14, 1990
DRILLING AGENCY HEW Drilling	DRILLER	ELEVATION AND DATUM	NA
DRILLING EQUIPMENT		COMPLETION DEPTH 11 Ft.	SAMPLER 2" Modified Calif. Type
DRILLING METHOD 6" Solid Auger	DRILL BIT NA		
SIZE AND TYPE OF CASING NA		NO. OF SAMPLES 6 DIST. 0	UNDIST. 6
TYPE OF PERFORATION NA	FROM TO Ft.		
SIZE AND TYPE OF PACK NA	FROM TO Ft.	WATER LEVEL NA FIRST	COMPL. 24 HRS.
TYPE OF SEAL NO. 1 NA	FROM TO Ft.	LOGGED BY T. Kolbe	CHECKED BY
NO. 2 NA	FROM TO Ft.		

DEPTH (feet)	DESCRIPTION	DEPTH (feet)	SAMPLES drive no.	sample no.	recov. (ft)	blow counts	REMARKS (Drill rate, Fluid Loss, Odor, etc.)
	Asphaltic concrete		1	F15-1		6 6	
	GRAVEL (GP) light brown to red, trace sand, silt and clay (base rock)						
	CLAY (CL) brown to dark brown, trace silt, sand and concrete (fill)		2	F15-2		5 6	
5	becomes sandy with gravel, few brick fragments	5	3	F15-3		3 5	
	becomes clayey, mottled dark brown, decomposed concrete and brick fragments (fill)		4	F15-4		4 2	odor of oil
			5	F15-5		2 5	
10	SAND with SILT and CLAY (SP-SM) mottled light brown to brown (native soil)	10	6	F15-6		7 21	
	Bottom of Boring at 11 ft.						
15		15					
20		20					
25		25					
30		30					
35		35					

Woodward-Clyde Consultants PROJECT NAME CITY CENTER T12 No. 90C0039D

BORING NUMBER F16		DATE STARTED / DATE FINISHED	AUGUST 14, 1990
DRILLING AGENCY HEW Drilling	DRILLER	ELEVATION AND DATUM	NA
DRILLING EQUIPMENT		COMPLETION DEPTH 9 Ft.	SAMPLER 2" Modified Calif. Type
DRILLING METHOD 6" Solid Auger	DRILL BIT NA		
SIZE AND TYPE OF CASING NA		NO. OF SAMPLES 2	DIST. 0 / UNDIST. 2
TYPE OF PERFORATION NA	FROM TO Ft.		
SIZE AND TYPE OF PACK NA	FROM TO Ft.	WATER LEVEL NA	FIRST COMPL. 24 HRS.
TYPE OF SEAL NO. 1 NA	FROM TO Ft.	LOGGED BY T. Kolbe	CHECKED BY
NO. 2 NA	FROM TO Ft.		

DEPTH (feet)	DESCRIPTION	DEPTH (feet)	SAMPLES drive no.	sample no.	recov. (ft)	blow counts	REMARKS (Drill rate, Fluid Loss, Odor, etc.)
	Asphaltic concrete						
	GRAVEL (GP) dark brown, with trace sand and silt (base rock)		1	F16 -1		7 6	
	CLAY (CL) dark brown		2	F16 -2		9 5	
5	SAND (SP) dark brown with brick and concrete fragments (fill)	5					
	(native soil ?)						
10	Bottom of Boring at 9 ft.	10					
15		15					
20		20					
25		25					
30		30					
35		35					

Woodward-Clyde Consultants PROJECT NAME CITY CENTER T12 No. 90C0039D

BORING NUMBER F17		DATE STARTED / DATE FINISHED	AUGUST 14, 1990
DRILLING AGENCY HEW Drilling	DRILLER	ELEVATION AND DATUM	NA
DRILLING EQUIPMENT		COMPLETION DEPTH 13 Ft.	SAMPLER 2" Modified Calif. Type
DRILLING METHOD 6" Solid Auger	DRILL BIT NA		
SIZE AND TYPE OF CASING NA		NO. OF SAMPLES 4 DIST. 0	UNDIST. 4
TYPE OF PERFORATION NA	FROM TO Ft.		
SIZE AND TYPE OF PACK NA	FROM TO Ft.	WATER LEVEL NA FIRST	COMPL. 24 HRS.
TYPE OF SEAL NO. 1 NA	FROM TO Ft.	LOGGED BY T. Kolbe	CHECKED BY
NO. 2 NA	FROM TO Ft.		

DEPTH (feet)	DESCRIPTION	SAMPLES: drive no.	sample no.	recov. (ft)	blow counts	REMARKS (Drill rate, Fluid Loss, Odor, etc.)
0	Asphaltic concrete					
	GRAVEL (GP-GM) dark brown, trace sand and silt					odor of oil
	GRAVEL (GP) black, trace silt and clay	1	F17 -1		9 2	odor of oil
5	contains wood chips	2	F17 -2		2 3	odor of oil
		3	F17 -3		3 2	
10	SAND (SP) olive green, trace gravel and wood chips (fill)	4	F17 -4		15 11	
	Bottom of Boring at 13 ft.					
15						
20						
25						
30						
35						

Woodward-Clyde Consultants PROJECT NAME CITY CENTER T12 No. 90C0039D

BORING NUMBER F18		DATE STARTED / DATE FINISHED	AUGUST 14, 1990
DRILLING AGENCY HEW Drilling	DRILLER	ELEVATION AND DATUM	NA
DRILLING EQUIPMENT		COMPLETION DEPTH 11 Ft.	SAMPLER 2" Modified Calif. Type
DRILLING METHOD 6" Solid Auger	DRILL BIT NA		
SIZE AND TYPE OF CASING NA		NO. OF SAMPLES 3	DIST. 0 / UNDIST. 3
TYPE OF PERFORATION NA	FROM TO Ft.		
SIZE AND TYPE OF PACK NA	FROM TO Ft.	WATER LEVEL NA	FIRST COMPL. 24 HRS.
TYPE OF SEAL NO. 1 NA	FROM TO Ft.	LOGGED BY T. Kolbe	CHECKED BY
NO. 2 NA	FROM TO Ft.		

DEPTH (feet)	DESCRIPTION	DEPTH (feet)	SAMPLES drive no.	sample no.	recov. (ft)	blow counts	REMARKS (Drill rate, Fluid Loss, Odor, etc.)
	GRAVEL (GP) black, trace clay, some twigs (fill)						odor of oil
			1	F18-1		2 3	odor of oil
5	SAND (SP) black, trace of clay and silt	5					odor of oil
			2	F18-2		3 9	
10	GRAVELLY SAND (SP) olive green, trace clay	10	3	F18-3			odor of oil
	Bottom of Boring at 11 ft.						
15		15					
20		20					
25		25					
30		30					
35		35					

Woodward-Clyde Consultants PROJECT NAME CITY CENTER T12 No. 90C0039D

BORING NUMBER F19		DATE STARTED / DATE FINISHED	AUGUST 14, 1990
DRILLING AGENCY HEW Drilling	DRILLER	ELEVATION AND DATUM	NA
DRILLING EQUIPMENT		COMPLETION DEPTH 1 Ft.	SAMPLER 2" Modified Calif. Type
DRILLING METHOD 6" Solid Auger	DRILL BIT NA		
SIZE AND TYPE OF CASING NA		NO. OF SAMPLES 0 DIST.	UNDIST.
TYPE OF PERFORATION NA	FROM TO Ft.		
SIZE AND TYPE OF PACK NA	FROM TO Ft.	WATER LEVEL NA FIRST	COMPL. 24 HRS.
TYPE OF SEAL NO. 1 NA	FROM TO Ft.	LOGGED BY T. Kolbe	CHECKED BY
NO. 2 NA	FROM TO Ft.		

DEPTH (feet)	DESCRIPTION	DEPTH (feet)	SAMPLES: drive no.	sample no.	recov. (ft)	blow counts	REMARKS (Drill rate, Fluid Loss, Odor, etc.)
	Asphaltic Concrete						
	GRAVEL (GP) (base rock)						
	Bottom of Boring at 1 ft. at concrete foundation						
5		5					
10		10					
15		15					
20		20					
25		25					
30		30					
35		35					

APPENDIX B

CHEMICAL ANALYTICAL RESULTS

EUREKA LABORATORIES, INC.

Corporate Office:
6790 FLORIN PERKINS ROAD
SACRAMENTO, CA 95828
TEL: (916) 381-7953
FAX: (916) 381-4013

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12121 NORTHUP WAY, SUITE 212
BELLEVUE, WA 98005
TEL: (206) 885-0284
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Air Pollution
Chemical Analysis,
Research & Testing
Environmental Studies
Robotics
Toxicology

September 6, 1990

Mr. Bill Copeland
WOODWARD-CLYDE CONSULTANTS
500 12th Street, Suite 100
Oakland, CA 94607

Reference: ELI No: 90-08-149
Project #: 90C0039D

Dear Mr. Copeland:

Eureka Laboratories, Inc. is pleased to submit a revised laboratory report for the subject project. This report presents analytical results fifty-four (54) soil samples for the following analyses:

ANALYSIS	METHOD	SAMPLE ID.
Total Lead	EPA 6010	F1-1 thru F1-3, F2-1, F2-2, F3-1 thru F3-4, F4-2, F5-1, F5-3, F5-4, F6-1, F6-2, F7-1, F7-2, F8-1 thru F8-3, F9-1, F9-3, F10-1, F10-2 F11-1 thru F11-3, F12-1, F12-3, F12-5, F12-6, F12-7, F13-1 thru F13-3, F14-1, F14-2, F15-1, F15-5, F15-6, F16-1, F16-2, F17-1 thru F17-4, F18-1 thru F18-3
Total Recoverable Hydrocarbons	EPA 418.1	F1-1 thru F1-3, F2-1, F2-2, F3-1 thru F3-4, F4-2, F5-1, F5-3, F5-4, F6-1, F6-2, F7-1, F7-2, F8-1 thru F8-3, F9-1, F9-3, F10-1, F10-2 F11-1 thru F11-3, F12-1, F12-3, F12-5, F12-6, F12-7, F13-1 thru F13-3, F14-1, F14-2, F15-1, F15-5, F15-6, F16-1, F16-2, F17-1 thru F17-4, F18-1 thru F18-3, F4-1 *
Oil and Grease	EPA 413.2	same as above
Total Petroleum Hydrocarbons	EPA 8015 (Modified)	F1-1, F4-1, F15-1, F5-2, F18-2

Polychlorinated Biphenyls (PCB)	EPA 8080	F4-1, F15-1, F15-2, F15-3, F15-4, F15-5 COMPOSITE, F18-1, F18-2 COMPOSITE, F1-1, F1-2 COMPOSITE
TTLC/CAM Metals	EPA 6010	same as above
Semi-Volatile Compound	EPA 8270	same as above

* Insufficient sample

Sincerely,
EUREKA LABORATORIES, INC.

By: Shao-Pin Yo, Ph.D.
Laboratory Director

SPY/pj

Attachment

TOTAL LEAD
EPA 6010

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

Order No: 90-08-149
Hazardous Waste Testing
Certification: E765

CLIENT: WOODWARD-CLYDE
PROJECT #: 90C0039D

DATE RECEIVED: 08/16/1990
DATE EXTRACTED: 08/20/1990
DATE COMPLETED: 08/31/1990

SAMPLE ID.	DATE SAMPLED	LEAD [mg/Kg(ppm)]
F1-1	8/13/90	49.2
F1-2	8/13/90	2.8
F1-3	8/13/90	7.7
F2-1	8/13/90	31.7
F2-2	8/13/90	2.9
F3-1	8/13/90	60.6
F3-2	8/13/90	2.9
F3-3	8/13/90	2.6
F3-4	8/13/90	3.1
F4-2	8/13/90	2.1
F5-1	8/13/90	187
F5-3	8/13/90	208
F5-4	8/13/90	3.9
F6-1	8/13/90	7.6
F6-2	8/13/90	2.5
F7-1	8/13/90	53.0
F7-2	8/13/90	2.7
F8-1	8/13/90	94.2
F8-2	8/13/90	61.5
F8-3	8/13/90	71.9
F9-1	8/13/90	23.0
F9-3	8/13/90	103
F10-1	8/13/90	63.9
F11-1	8/13/90	758
F11-2	8/13/90	25.0
F11-3	8/13/90	3.8
F12-1	8/13/90	33.1
F12-3	8/13/90	231
F12-5	8/13/90	142
F12-6	8/13/90	2.4
F12-7	8/13/90	3.3
F13-1	8/13/90	167
F13-2	8/13/90	8.7
F13-3	8/13/90	96.6
F14-1	8/13/90	27.6

F14-2	8/13/90	297
F15-1	8/14/90	29.4
F15-5	8/14/90	8.2
F15-6	8/14/90	3.4
F16-1	8/14/90	24.3
F16-2	8/14/90	92.0
F17-1	8/14/90	220
F17-2	8/14/90	219
F17-3	8/14/90	10.1
F17-4	8/14/90	4.9
F18-1	8/14/90	35.6
F18-2	8/14/90	66.3
F18-3	8/14/90	39.2
F10-2	8/13/90	5.9
BLANK		<3.0

F8-2 MATRIX SPIKE RECOVERY - 88%
F8-2 MATRIX SPIKE RECOVERY DUP. - 86%

F15-6 MATRIX SPIKE RECOVERY - 85%
F15-6 MATRIX SPIKE RECOVERY DUP. - 88%

REAGENT SPIKE RECOVERY - 95%
REAGENT SPIKE RECOVERY DUP. - 95%

F10-2 MATRIX SPIKE RECOVERY - 85%
F10-2 MATRIX SPIKE RECOVERY DUP. - 93%

DETECTION LIMIT: 3.0 [mg/Kg(ppm)]

Josie Quiambao — September 6, 1990
Josie Quiambao — Date
Chemist

TOTAL RECOVERABLE HYDROCARBONS
EPA METHOD 418.1

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

Order No: 90-08-149
Hazardous Waste Testing
Certification: E765

CLIENT: WOODWARD-CLYDE
PROJECT #: 90C0039D

DATE RECEIVED: 08/16/1990
DATE EXTRACTED: 08/22/1990
DATE COMPLETED: 08/30/1990

SAMPLE ID.	DATE SAMPLED	CONCENTRATION [mg/Kg(ppm)]	DETECTION LIMIT [mg/Kg(ppm)]
F1-1	8/13/90	<50	50
F1-2	8/13/90	<50	50
F1-3	8/13/90	766	50
F2-1	8/13/90	<50	50
F2-2	8/13/90	<50	50
F3-1	8/13/90	<50	50
F3-2	8/13/90	<50	50
F3-3	8/13/90	<50	50
F3-4	8/13/90	<50	50
F4-1	8/13/90	INSUFFICIENT SAMPLE	50
F4-2	8/13/90	<50	50
F5-1	8/13/90	1230	50
F5-3	8/13/90	1650	50
F5-4	8/13/90	<50	50
F6-1	8/13/90	<50	50
F6-2	8/13/90	<50	50
F7-1	8/13/90	<50	50
F7-2	8/13/90	<50	50
F8-1	8/13/90	55	50
F8-2	8/13/90	<50	50
F8-3	8/13/90	<50	50
F9-1	8/13/90	<50	50
F9-3	8/13/90	<50	50
F10-1	8/13/90	98	50
F11-1	8/13/90	<50	50
F11-2	8/13/90	<50	50
F11-3	8/13/90	<50	50
F12-1	8/13/90	72	50
F12-3	8/13/90	1030	50
F12-5	8/13/90	1880	50
F12-6	8/13/90	<50	50
F12-7	8/13/90	<50	50
F13-1	8/13/90	2520	50
F13-2	8/13/90	1150	50
F13-3	8/13/90	1240	50

F14-1	8/13/90	<50	50
F14-2	8/13/90	62	50
F15-1	8/14/90	68	50
F15-5	8/14/90	<50	50
F15-6	8/14/90	<50	50
F16-1	8/14/90	<50	50
F16-2	8/14/90	<50	50
F17-1	8/14/90	740	50
F17-2	8/14/90	610	50
F17-3	8/14/90	<50	50
F17-4	8/14/90	<50	50
F18-1	8/14/90	905	50
F18-2	8/14/90	1560	50
F18-3	8/14/90	862	50
F10-2	8/13/90	<50	50
METHOD BLANK		<50	50
METHOD BLANK		<50	50
METHOD BLANK		<50	50

F1-2 MATRIX SPIKE RECOVERY - 80%
F1-2 MATRIX SPIKE RECOVERY DUP. - 84%

F2-2 MATRIX SPIKE RECOVERY - 87%
F2-2 MATRIX SPIKE RECOVERY DUP. - 100%

F11-2 MATRIX SPIKE RECOVERY - 90%
F11-2 MATRIX SPIKE RECOVERY DUP. - 100%

Bruce G. Trotter
Chemist

September 6, 1990
Date

OIL AND GREASE
EPA METHOD 413.2

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

Order No: 90-08-149
Hazardous Waste Testing
Certification: E765

CLIENT: WOODWARD-CLYDE
PROJECT #: 90C0039D

DATE RECEIVED: 08/16/1990
DATE EXTRACTED: 08/22/1990
DATE COMPLETED: 08/30/1990

SAMPLE ID.	DATE SAMPLED	CONCENTRATION [mg/Kg (ppm)]	D/L
BLANK-1		<50	50
BLANK-2		<50	50
BLANK-3		<50	50
F1-1	08/13/1990	51	50
F1-2	08/13/1990	<50	50
F1-3	08/13/1990	872	50
F2-1	08/13/1990	53	50
F2-2	08/13/1990	<50	50
F3-1	08/13/1990	<50	50
F3-2	08/13/1990	<50	50
F3-3	08/13/1990	<50	50
F3-4	08/13/1990	<50	50
F4-1	08/13/1990	INSUFFICIENT SAMPLE	50
F4-2	08/13/1990	<50	50
F5-1	08/13/1990	1270	50
F5-3	08/13/1990	1660	50
F5-4	08/13/1990	<50	50
F6-1	08/13/1990	<50	50
F6-2	08/13/1990	<50	50
F7-1	08/13/1990	<50	50
F7-2	08/13/1990	<50	50
F8-1	08/13/1990	73	50
F8-2	08/13/1990	<50	50
F8-3	08/13/1990	<50	50
F9-1	08/13/1990	<50	50
F9-3	08/13/1990	<50	50
F10-1	08/13/1990	133	50
F11-1	08/13/1990	<50	50
F11-2	08/13/1990	<50	50
F11-3	08/13/1990	<50	50
F12-1	08/13/1990	91	50
F12-3	08/13/1990	1200	50
F12-5	08/13/1990	2130	50
F12-6	08/13/1990	<50	50
F12-7	08/13/1990	<50	50
F13-1	08/13/1990	3340	50

SAMPLE ID.	DATE SAMPLED	CONCENTRATION [mg/Kg (ppm)]	D/L
F13-2	08/13/1990	1410	50
F13-3	08/13/1990	1390	50
F14-1	08/13/1990	<50	50
F14-2	08/13/1990	96	50
F15-1	08/14/1990	98	50
F15-5	08/14/1990	<50	50
F15-6	08/14/1990	<50	50
F16-1	08/14/1990	<50	50
F16-2	08/14/1990	<50	50
F17-1	08/14/1990	837	50
F17-2	08/14/1990	638	50
F17-3	08/14/1990	<50	50
F17-4	08/14/1990	<50	50
F18-1	08/14/1990	1040	50
F18-2	08/14/1990	1990	50
F18-3	08/14/1990	1000	50
F10-2	08/14/1990	<50	50

F1-2 MATRIX SPIKE RECOVERY - 87%
F1-2 MATRIX SPIKE RECOVERY DUP. - 90%

F2-2 MATRIX SPIKE RECOVERY - 91%
F2-2 MATRIX SPIKE RECOVERY DUP. - 102%

F11-2 MATRIX SPIKE RECOVERY - 90%
F11-2 MATRIX SPIKE RECOVERY DUP. - 99%

Bruce Trotter
Chemist

September 6, 1990
Date

TOTAL PETROLEUM HYDROCARBONS
MODIFIED EPA METHOD 8015 (Modified)

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

Order No: 90-08-149
Hazardous Waste Testing
Certification: E765

CLIENT: WOODWARD-CLYDE
PROJECT #: 90C0039D
SAMPLE ID: BLANK

DATE RECEIVED: 08/16/1990
DATE EXTRACTED: 08/21/1990
DATE COMPLETED: 08/22/1990

PETROLEUM HYDROCARBONS	CONCENTRATION [mg/Kg(ppm)]	DETECTION LIMIT [mg/Kg(ppm)]
Gasoline Range	<5	5
Diesel Range	<10	10
Motor Oil Range	<25	25
Total Petroleum Hydrocarbons	-	-
CARBON NO. RANGE		
Gasoline Range	-	-
Diesel Range	-	-
Motor Oil Range	-	-
PEAK CARBON NO		
Gasoline Range	-	-
Diesel Range	-	-
Motor Oil Range	-	-

Abdou Mekebri
Chemist

September 6, 1990
Date

TOTAL PETROLEUM HYDROCARBONS
MODIFIED EPA METHOD 8015 (Modified)

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

Order No: 90-08-149
Hazardous Waste Testing
Certification: E765

CLIENT: WOODWARD-CLYDE
PROJECT #: 90C0039D
SAMPLE ID: F1-1 *

DATE RECEIVED: 08/16/1990
DATE EXTRACTED: 08/21/1990
DATE COMPLETED: 08/22/1990
DATE SAMPLED: 08/13/1990

PETROLEUM HYDROCARBONS	CONCENTRATION [mg/Kg(ppm)]	DETECTION LIMIT [mg/Kg(ppm)]
Gasoline Range	<5	5
Diesel Range	<10	10
Motor Oil Range	124	25
Total Petroleum Hydrocarbons	124	-
CARBON NO. RANGE		
Gasoline Range	-	-
Diesel Range	-	-
Motor Oil Range	C18-C28	-
PEAK CARBON NO		
Gasoline Range	-	-
Diesel Range	-	-
Motor Oil Range	C24	-

* Unknown peaks have been observed in this sample.

Abdou Mekebri
Chemist

September 6, 1990
Date

TOTAL PETROLEUM HYDROCARBONS
MODIFIED EPA METHOD 8015 (Modified)

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

Order No: 90-08-149
Hazardous Waste Testing
Certification: E765

CLIENT: WOODWARD-CLYDE
PROJECT #: 90C0039D
SAMPLE ID: F4-1

DATE RECEIVED: 08/16/1990
DATE EXTRACTED: 08/21/1990
DATE COMPLETED: 08/22/1990
DATE SAMPLED: 08/13/1990

PETROLEUM HYDROCARBONS	CONCENTRATION [mg/Kg(ppm)]	DETECTION LIMIT [mg/Kg(ppm)]
Gasoline Range	<5	5
Diesel Range	<10	10
Motor Oil Range	<25	25
Total Petroleum Hydrocarbons	-	-
CARBON NO. RANGE		
Gasoline Range	-	-
Diesel Range	-	-
Motor Oil Range	-	-
PEAK CARBON NO		
Gasoline Range	-	-
Diesel Range	-	-
Motor Oil Range	-	-

Abdou Mekebri
Chemist

September 6, 1990
Date

TOTAL PETROLEUM HYDROCARBONS
MODIFIED EPA METHOD 8015 (Modified)

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

Order No: 90-08-149
Hazardous Waste Testing
Certification: E765

CLIENT: WOODWARD-CLYDE
PROJECT #: 90C0039D
SAMPLE ID: F15-1

DATE RECEIVED: 08/16/1990
DATE EXTRACTED: 08/21/1990
DATE COMPLETED: 08/22/1990
DATE SAMPLED: 08/14/1990

PETROLEUM HYDROCARBONS	CONCENTRATION [mg/Kg(ppm)]	DETECTION LIMIT [mg/Kg(ppm)]
Gasoline Range	<5	5
Diesel Range	<10	10
Motor Oil Range	54	25
Total Petroleum Hydrocarbons	54	-
CARBON NO. RANGE		
Gasoline Range	-	-
Diesel Range	-	-
Motor Oil Range	C18-C28	-
PEAK CARBON NO		
Gasoline Range	-	-
Diesel Range	-	-
Motor Oil Range	C24	-

* Unknown peaks have been observed in this sample.

Abdou Mekebri
Chemist

September 6, 1990
Date

TOTAL PETROLEUM HYDROCARBONS
MODIFIED EPA METHOD 8015 (Modified)

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

Order No: 90-08-149
Hazardous Waste Testing
Certification: E765

CLIENT: WOODWARD-CLYDE
PROJECT #: 90C0039D
SAMPLE ID: F18-2

DATE RECEIVED: 08/16/1990
DATE EXTRACTED: 08/21/1990
DATE COMPLETED: 08/22/1990
DATE SAMPLED: 08/14/1990

PETROLEUM HYDROCARBONS	CONCENTRATION [mg/Kg(ppm)]	DETECTION LIMIT [mg/Kg(ppm)]
Gasoline Range	<5	5
Diesel Range	103	10
Motor Oil Range	674	25
Total Petroleum Hydrocarbons	777	-
CARBON NO. RANGE		
Gasoline Range	-	-
Diesel Range	C11-C18	-
Motor Oil Range	C18-C30	-
PEAK CARBON NO		
Gasoline Range	-	-
Diesel Range	C16	-
Motor Oil Range	C24	-

Abdou Mekebri
Chemist

September 6, 1990
Date

TOTAL PETROLEUM HYDROCARBONS
MODIFIED EPA METHOD 8015 (Modified)

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

Order No: 90-08-149
Hazardous Waste Testing
Certification: E765

CLIENT: WOODWARD-CLYDE
PROJECT #: 90C0039D
SAMPLE ID: F5-2

DATE RECEIVED: 08/16/1990
DATE EXTRACTED: 08/21/1990
DATE COMPLETED: 08/22/1990
DATE SAMPLED: 08/13/1990

PETROLEUM HYDROCARBONS	CONCENTRATION [mg/Kg(ppm)]	DETECTION LIMIT [mg/Kg(ppm)]
Gasoline Range	<5	5
Diesel Range	63	10
Motor Oil Range	476	25
Total Petroleum Hydrocarbons	539	-
CARBON NO. RANGE		
Gasoline Range	-	-
Diesel Range	C11-C18	-
Motor Oil Range	C18-C30	-
PEAK CARBON NO		
Gasoline Range	-	-
Diesel Range	C16	-
Motor Oil Range	C24	-

Abdou Mekebri
Chemist

September 6, 1990
Date

TOTAL PETROLEUM HYDROCARBONS
MODIFIED EPA METHOD 8015 (Modified)

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

Order No: 90-08-149
Hazardous Waste Testing
Certification: E765

CLIENT: WOODWARD-CLYDE
PROJECT #: 90C0039D
SAMPLE ID: F4-1 MATRIX SPIKE RECOVERY

DATE RECEIVED: 08/16/1990
DATE EXTRACTED: 08/21/1990
DATE COMPLETED: 08/22/1990

PETROLEUM HYDROCARBONS	SPIKE RECOVERY
Gasoline Range	83%
Diesel Range	-
Motor Oil Range	88%
Total Petroleum Hydrocarbons	
CARBON NO. RANGE	
Gasoline Range	-
Diesel Range	-
Motor Oil Range	-
PEAK CARBON NO	
Gasoline Range	-
Diesel Range	-
Motor Oil Range	-

Abdou Mekebri
Chemist

September 6, 1990
Date

TOTAL PETROLEUM HYDROCARBONS
MODIFIED EPA METHOD 8015 (Modified)

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

Order No: 90-08-149
Hazardous Waste Testing
Certification: E765

CLIENT: WOODWARD-CLYDE
PROJECT #: 90C0039D
SAMPLE ID: F4-1 MATRIX SPIKE RECOVERY DUPLICATE

DATE RECEIVED: 08/16/1990
DATE EXTRACTED: 08/21/1990
DATE COMPLETED: 08/22/1990

PETROLEUM HYDROCARBONS	SPIKE RECOVERY
Gasoline Range	87%
Diesel Range	-
Motor Oil Range	99%
Total Petroleum Hydrocarbons	
CARBON NO. RANGE	
Gasoline Range	-
Diesel Range	-
Motor Oil Range	-
PEAK CARBON NO	
Gasoline Range	-
Diesel Range	-
Motor Oil Range	-

Abdou Mekebri
Chemist

September 6, 1990
Date

POLYCHLORINATED BIPHENYLS (PCB)
EPA METHOD 8080

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

Order No: 90-08-149
Hazardous Waste Testing
Certification: E765

CLIENT: WOODWARD-CLYDE
PROJECT #: 90C0039D
DATE SAMPLED: 08/13-14/1990

DATE RECEIVED: 08/16/1990
DATE EXTRACTED: 08/21/1990
DATE COMPLETED: 08/23/1990

SAMPLE ID.	PCB CONTENT	AROCHLOR TYPE	D/L [mg/Kg (ppm)]	
F4-1	<0.1		0.1	
F15-1-15-5 COMP.	<0.1		0.1	
F18-1,18-2 COMP.	<0.2		0.2	*
F1-1,1-2 COMP.	<0.1		0.1	
METHOD BLANK	<0.1		0.1	

F4-1 MATRIX SPIKE RECOVERY - 91% DDT **
F4-1 MATRIX SPIKE RECOVERY DUP. - 87% DDT **

* Higher detection limit is due to matrix interference.

** DDT was chosen because PCB was not requested at first. However, this DDT spike was run with this same batch and both DDT and PCB are the target compounds at 8080.

Jeannette Chen
Jeannette Chen
Chemist

September 6, 1990
Date

TTLC/CAM Metals, EPA Method 6010

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

Order No: 90-08-149
Hazardous Waste Testing
Certification: E765

CLIENT: WOODWARD-CLYDE
PROJECT #: 90C0039D
SAMPLE ID: BLANK

DATE RECEIVED: 08/16/1990
DATE EXTRACTED: 08/20/1990
DATE COMPLETED: 08/31/1990

	CONCENTRATION [mg/Kg (ppm)]	DETECTION LIMIT [mg/Kg (ppm)]
Silver	<0.5	0.5
Arsenic	<1.0	1.0
Barium	<0.1	0.1
Beryllium	<0.5	0.5
Cadmium	<1.0	1.0
Cobalt	<1.0	1.0
Chromium	<0.5	0.5
Copper	<0.5	0.5
Mercury	<1.0	1.0
Molybdemum	<1.0	1.0
Nickel	<1.0	1.0
Lead	<3.0	3.0
Antimony	<3.0	3.0
Selenium	<3.0	3.0
Thallium	<1.0	1.0
Vanadium	<0.5	0.5
Zinc	<0.5	0.5

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

The determinations of Mercury, Arsenic, and Selenium by methods 6010 or 200.7 are subjected to many interferences. For more accurate determinations for the above three metals, Atomic Absorption Spectrometric methods are recommended. ICP may be used for scanning or for reference purposes for the three metals only.

Josie Quiambao
Josie Quiambao
Chemist

September 6, 1990
Date

TTLC/CAM Metals, EPA Method 6010

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

Order No: 90-08-149
Hazardous Waste Testing
Certification: E765

CLIENT: WOODWARD-CLYDE
PROJECT #: 90C0039D
SAMPLE ID: F4-1

DATE RECEIVED: 08/16/1990
DATE EXTRACTED: 08/20/1990
DATE COMPLETED: 08/31/1990
DATE SAMPLED: 08/13/1990

	CONCENTRATION [mg/Kg (ppm)]	DETECTION LIMIT [mg/Kg (ppm)]
Silver	<0.5	0.5
Arsenic	9.5	1.0
Barium	52.2	0.1
Beryllium	<0.5	0.5
Cadmium	<1.0	1.0
Cobalt	3.7	1.0
Chromium	20.1	0.5
Copper	20.0	0.5
Mercury	<1.0	1.0
Molybdemum	<1.0	1.0
Nickel	15.5	1.0
Lead	87.8	3.0
Antimony	<3.0	3.0
Selenium	<3.0	3.0
Thallium	35.1	1.0
Vanadium	16.2	0.5
Zinc	49.2	0.5

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

The determinations of Mercury, Arsenic, and Selenium by methods 6010 or 200.7 are subjected to many interferences. For more accurate determinations for the above three metals, Atomic Absorption Spectrometric methods are recommended. ICP may be used for scanning or for reference purposes for the three metals only.

Josie Quiambao
Josie Quiambao
Chemist

September 6, 1990
Date

TTLC/CAM Metals, EPA Method 6010

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

Order No: 90-08-149
Hazardous Waste Testing
Certification: E765

CLIENT: WOODWARD-CLYDE
PROJECT #: 90C0039D
SAMPLE ID: F15-1,F15-2,F15-3,F15-4, F15-5 COMPOSITE

DATE RECEIVED: 08/16/1990
DATE EXTRACTED: 08/20/1990
DATE COMPLETED: 08/31/1990
DATE SAMPLED: 08/14/1990

	CONCENTRATION [mg/Kg (ppm)]	DETECTION LIMIT [mg/Kg (ppm)]
Silver	<0.5	0.5
Arsenic	12.6	1.0
Barium	88.5	0.1
Beryllium	<0.5	0.5
Cadmium	<1.0	1.0
Cobalt	5.5	1.0
Chromium	21.0	0.5
Copper	15.7	0.5
Mercury	1.4	1.0
Molybdemum	1.1	1.0
Nickel	25.0	1.0
Lead	47.4	3.0
Antimony	3.3	3.0
Selenium	<3.0	3.0
Thallium	37.2	1.0
Vanadium	21.1	0.5
Zinc	54.8	0.5

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

The determinations of Mercury, Arsenic, and Selenium by methods 6010 or 200.7 are subjected to many interferences. For more accurate determinations for the above three metals, Atomic Absorption Spectrometric methods are recommended. ICP may be used for scanning or for reference purposes for the three metals only.

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September 6, 1990
Date

TTLC/CAM Metals, EPA Method 6010

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

Order No: 90-08-149
Hazardous Waste Testing
Certification: E765

CLIENT: WOODWARD-CLYDE
PROJECT #: 90C0039D
SAMPLE ID: F18-1,F18-2 COMPOSITE

DATE RECEIVED: 08/16/1990
DATE EXTRACTED: 08/20/1990
DATE COMPLETED: 08/31/1990
DATE SAMPLED: 08/14/1990

	CONCENTRATION [mg/Kg (ppm)]	DETECTION LIMIT [mg/Kg (ppm)]
Silver	<0.5	0.5
Arsenic	11.8	1.0
Barium	56.9	0.1
Beryllium	<0.5	0.5
Cadmium	<1.0	1.0
Cobalt	5.2	1.0
Chromium	17.2	0.5
Copper	36.3	0.5
Mercury	1.8	1.0
Molybdemum	3.2	1.0
Nickel	26.2	1.0
Lead	105	3.0
Antimony	4.0	3.0
Selenium	3.8	3.0
Thallium	44.7	1.0
Vanadium	23.1	0.5
Zinc	162	0.5

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

The determinations of Mercury, Arsenic, and Selenium by methods 6010 or 200.7 are subjected to many interferences. For more accurate determinations for the above three metals, Atomic Absorption Spectrometric methods are recommended. ICP may be used for scanning or for reference purposes for the three metals only.

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TTLC/CAM Metals, EPA Method 6010

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6790 Florin-Perkins Road
Sacramento, CA 95828
(916) 381-7953

Order No: 90-08-149
Hazardous Waste Testing
Certification: E765

CLIENT: WOODWARD-CLYDE
PROJECT #: 90C0039D
SAMPLE ID: F1-1,F1-2 COMPOSITE

DATE RECEIVED: 08/16/1990
DATE EXTRACTED: 08/20/1990
DATE COMPLETED: 08/31/1990
DATE SAMPLED: 08/13/1990

	CONCENTRATION [mg/Kg (ppm)]	DETECTION LIMIT [mg/Kg (ppm)]
Silver	<0.5	0.5
Arsenic	9.9	1.0
Barium	75.3	0.1
Beryllium	<0.5	0.5
Cadmium	<1.0	1.0
Cobalt	4.9	1.0
Chromium	25.5	0.5
Copper	13.4	0.5
Mercury	1.0	1.0
Molybdemum	<1.0	1.0
Nickel	26.5	1.0
Lead	44.2	3.0
Antimony	<3.0	3.0
Selenium	<3.0	3.0
Thallium	36.2	1.0
Vanadium	20	0.5
Zinc	78.7	0.5

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

The determinations of Mercury, Arsenic, and Selenium by methods 6010 or 200.7 are subjected to many interferences. For more accurate determinations for the above three metals, Atomic Absorption Spectrometric methods are recommended. ICP may be used for scanning or for reference purposes for the three metals only.

Josie Quiambao
Chemist

September 6, 1990
Date

TTLC/CAM Metals, EPA Method 6010

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

Order No: 90-08-149
Hazardous Waste Testing
Certification: E765

CLIENT: WOODWARD-CLYDE
PROJECT #: 90C0039D
SAMPLE ID: F4-1 MATRIX SPIKE RECOVERY

DATE RECEIVED: 08/16/1990
DATE EXTRACTED: 08/20/1990
DATE COMPLETED: 08/31/1990

	SPIKE RECOVERY
Silver	88%
Arsenic	86%
Barium	92%
Beryllium	101%
Cadium	82%
Cobalt	84%
Chromium	86%
Copper	92%
Mercury	82%
Molybdenum	87%
Nickel	94%
Lead	77%
Antimony	63%
Selenium	91%
Thallium	97%
Vanadium	89%
Zinc	84%

Josie Quiambao
Chemist

September 6, 1990
Date

TTLC/CAM Metals, EPA Method 6010

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

Order No: 90-08-149
Hazardous Waste Testing
Certification: E765

CLIENT: WOODWARD-CLYDE
PROJECT #: 90C0039D
SAMPLE ID: F4-1 MATRIX SPIKE RECOVERY DUPLICATE

DATE RECEIVED: 08/16/1990
DATE EXTRACTED: 08/20/1990
DATE COMPLETED: 08/31/1990

SPIKE RECOVERY

Silver	89%
Arsenic	91%
Barium	98%
Beryllium	97%
Cadium	88%
Cobalt	90%
Chromium	91%
Copper	98%
Mercury	79%
Molybdenum	93%
Nickel	90%
Lead	82%
Antimony	83%
Selenium	97%
Thallium	93%
Vanadium	87%
Zinc	90%

Josie Quiambao
Chemist

September 6, 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.: 90-08-149
Hazardous Waste Testing
Certification No.: E765

CLIENT: WOODWARD-CLYDE CONSULTANTS
SAMPLE ID: F4-1
REPORT UNIT: ppb (ug/Kg)
SAMPLE LOCATION:

DATE SAMPLED: 08/13/90
DATE RECEIVED: 08/16/90
DATE EXTRACTED: 08/22/90
DATE COMPLETED: 08/24/90
DILUTION FACTOR: 1.00

CAS#	COMPOUND	RESULT	DET.LIMIT
I. PRIORITY POLLUTANT ACID COMPOUNDS			
108-95-2	Phenol	ND	150
95-57-8	2-Chlorophenol	ND	150
88-75-5	2-Nitrophenol	ND	150
105-67-9	2,4-Dimethylphenol	ND	150
120-83-2	2,4-Dichlorophenol	ND	150
59-50-7	4-Choro-3-methylphenol	ND	150
88-06-2	2,4,6-Trichlorophenol	ND	150
51-28-5	2,4-Dinitrophenol	ND	800
100-02-7	4-Nitrophenol	ND	800
534-52-1	2-Methyl-4,6-Dinitrophenol	ND	800
87-86-5	Pentachlorophenol	ND	150
II. PRIORITY POLLUTANT BASE/NEUTRAL COMPOUNDS			
62-75-9	N-Nitrosodimethylamine	ND	150
111-44-4	Bis(2-Chloroethyl)ether	ND	150
541-73-1	1,3-Dichlorobenzene	ND	150
95-50-1	1,2-Dichlorobenzene	ND	150
106-46-7	1,4-Dichlorobenzene	ND	150
118-74-1	Hexachlorobenzene	ND	150
67-72-1	Hexachloroethane	ND	150
621-64-7	N-Nitrosodi-n-propylamine	ND	150
98-95-3	Nitrobenzene	ND	150
117-84-0	Di-n-octyl phthalate	ND	150
120-82-1	1,2,4-Trichlorobenzene	ND	150
91-20-3	Naphthalene	ND	150
87-68-3	Hexachlorobutadiene	ND	150
91-57-6	2-Methylnaphthalene	ND	150
77-47-4	Hexachlorocyclopentadiene	ND	150
91-58-7	2-Chloronaphthalene	ND	150
131-11-3	Dimethyl phthalate	ND	150
208-96-8	Acenaphthylene	ND	150
83-32-9	Acenaphthene	ND	150
121-14-2	2,4-Dinitrotoluene	ND	300
606-20-2	2,6-Dinitrotoluene	ND	300
86-73-7	Fluorene	ND	150
84-66-2	Diethyl phthalate	ND	150
7005-72-3	4-Chlorophenyl phenyl ether	ND	150
86-30-6	N-Nitrosodiphenylamine	ND	300
101-55-3	4-Bromophenyl phenyl ether	ND	150

ORGANIC ANALYSIS REPORT
Semi-Volatile Compound, EPA Method 8270

CLIENT: WOODWARD-CLYDE CONSULTANTS Order No.: 90-08-149
SAMPLE ID: F4-1

39638-32-9	Bis(2-Chloroisopropyl)ether	ND	150
85-01-8	Phenanthrene	ND	150
120-12-7	Anthracene	ND	150
84-74-2	Di-n-butyl phthalate	ND	150
206-44-0	Fluoranthene	ND	150
92-87-5	Benzidine	ND	1200
111-91-1	Bis(2-Chloroethoxy)methane	ND	300
129-00-0	Pyrene	ND	150
85-68-7	Butyl benzyl phthalate	ND	150
91-94-1	3,3-Dichlorobenzidine	ND	300
218-01-9	Chrysene	ND	150
56-55-3	Benzo(a)anthracene	ND	150
117-81-7	Bis(2-Ethylhexyl)phthalate	ND	1000
207-08-9	Benzo(k)fluoranthene	ND	150
205-99-2	Benzo(b)fluoranthene	ND	150
50-32-8	Benzo(a)pyrene	ND	150
193-39-5	Indeno(1,2,3-cd)pyrene	ND	150
53-70-3	Dibenzo(a,h)anthracene	ND	150
191-24-2	Benzo(g,h,i)perylene	ND	150
78-59-1	Isophorone	ND	150

III. PESTICIDES

319-84-6	a-BHC	ND	500
58-89-9	g-BHC	ND	500
319-85-7	b-BHC	ND	500
319-86-8	d-BHC	ND	500
76-44-8	Heptachlor	ND	500
309-00-2	Aldrin	ND	500
1024-57-3	Heptachlor epoxide	ND	500
60-57-1	Dieldrin	ND	500
72-55-9	4,4'-DDE	ND	500
959-98-8	Endosulfan I	ND	1000
33213-65-9	Endosulfan II	ND	1000
72-20-8	Endrin	ND	1000
72-54-8	4,4'-DDD	ND	500
50-29-3	4,4'-DDT	ND	500
1031-07-8	Endosulfan sulfate	ND	1000
57-74-9	Chlorodane	ND	5000
8001-35-2	Toxaphene	ND	10000
	PCB	ND	10000

IV. HAZARDOUS SUBSTANCES LIST

62-53-3	Aniline	ND	150
100-51-6	Benzyl alcohol	ND	150
95-48-7	o-Cresol	ND	150
106-44-5	p-Cresol	ND	150
65-85-0	Benzoic acid	ND	800
106-47-8	4-Chloroaniline	ND	150

ORGANIC ANALYSIS REPORT
Semi-Volatile Compound, EPA Method 8270

CLIENT: WOODWARD-CLYDE CONSULTANTS Order No.: 90-08-149
SAMPLE ID: F4-1

95-95-4	2,4,5-Trichlorophenol	ND	800
88-74-4	2-Nitroaniline	ND	800
99-09-2	3-Nitroaniline	ND	800
132-64-9	Dibenzofuran	ND	150
100-01-6	4-Nitroaniline	ND	800

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

08/25/90
Date

ND=NOT DETECTED AT OR BELOW DETECTION LIMIT
NA=NOT AVAILABLE

ORGANIC ANALYSIS REPORT
Semi-Volatile Compound, EPA Method 8270

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

Order No.: 90-08-149
Hazardous Waste Testing
Certification No.: E765

CLIENT: WOODWARD-CLYDE CONSULTANTS
SAMPLE ID: F15-1,F15-2,F15-4,F15-5
REPORT UNIT: ppb (ug/Kg)
SAMPLE LOCATION:

DATE SAMPLED: 08/14/90
DATE RECEIVED: 08/16/90
DATE EXTRACTED: 08/22/90
DATE COMPLETED: 08/24/90
DILUTION FACTOR: 1.00

CAS#	COMPOUND	RESULT	DET.LIMIT
I. PRIORITY POLLUTANT ACID COMPOUNDS			
108-95-2	Phenol	ND	150
95-57-8	2-Chlorophenol	ND	150
88-75-5	2-Nitrophenol	ND	150
105-67-9	2,4-Dimethylphenol	ND	150
120-83-2	2,4-Dichlorophenol	ND	150
59-50-7	4-Choro-3-methylphenol	ND	150
88-06-2	2,4,6-Trichlorophenol	ND	150
51-28-5	2,4-Dinitrophenol	ND	800
100-02-7	4-Nitrophenol	ND	800
534-52-1	2-Methyl-4,6-Dinitrophenol	ND	800
87-86-5	Pentachlorophenol	ND	150
II. PRIORITY POLLUTANT BASE/NEUTRAL COMPOUNDS			
62-75-9	N-Nitrosodimethylamine	ND	150
111-44-4	Bis(2-Chloroethyl)ether	ND	150
541-73-1	1,3-Dichlorobenzene	ND	150
95-50-1	1,2-Dichlorobenzene	ND	150
106-46-7	1,4-Dichlorobenzene	ND	150
118-74-1	Hexachlorobenzene	ND	150
67-72-1	Hexachloroethane	ND	150
621-64-7	N-Nitrosodi-n-propylamine	ND	150
98-95-3	Nitrobenzene	ND	150
117-84-0	Di-n-octyl phthalate	ND	150
120-82-1	1,2,4-Trichlorobenzene	ND	150
91-20-3	Naphthalene	ND	150
87-68-3	Hexachlorobutadiene	ND	150
91-57-6	2-Methylnaphthalene	ND	150
77-47-4	Hexachlorocyclopentadiene	ND	150
91-58-7	2-Chloronaphthalene	ND	150
131-11-3	Dimethyl phthalate	ND	150
208-96-8	Acenaphthylene	ND	150
83-32-9	Acenaphthene	ND	150
121-14-2	2,4-Dinitrotoluene	ND	300
606-20-2	2,6-Dinitrotoluene	ND	300
86-73-7	Fluorene	ND	150
84-66-2	Diethyl phthalate	ND	150
7005-72-3	4-Chlorophenyl phenyl ether	ND	150
86-30-6	N-Nitrosodiphenylamine	ND	300
101-55-3	4-Bromophenyl phenyl ether	ND	150

ORGANIC ANALYSIS REPORT
Semi-Volatile Compound, EPA Method 8270

CLIENT: WOODWARD-CLYDE CONSULTANTS Order No.: 90-08-149
SAMPLE ID: F15-1,F15-2,F15-4,F15-5

39638-32-9	Bis(2-Chloroisopropyl)ether	ND	150
85-01-8	Phenanthrene	ND	150
120-12-7	Anthracene	ND	150
84-74-2	Di-n-butyl phthalate	ND	150
206-44-0	Fluoranthene	ND	150
92-87-5	Benzidine	ND	1200
111-91-1	Bis(2-Chloroethoxy)methane	ND	300
129-00-0	Pyrene	ND	150
85-68-7	Butyl benzyl phthalate	ND	150
91-94-1	3,3-Dichlorobenzidine	ND	300
218-01-9	Chrysene	ND	150
56-55-3	Benzo(a)anthracene	ND	150
117-81-7	Bis(2-Ethylhexyl)phthalate	ND	1000
207-08-9	Benzo(k)fluoranthene	ND	150
205-99-2	Benzo(b)fluoranthene	ND	150
50-32-8	Benzo(a)pyrene	ND	150
193-39-5	Indeno(1,2,3-cd)pyrene	ND	150
53-70-3	Dibenzo(a,h)anthracene	ND	150
191-24-2	Benzo(g,h,i)perylene	ND	150
78-59-1	Isophorone	ND	150

III. PESTICIDES

319-84-6	a-BHC	ND	500
58-89-9	g-BHC	ND	500
319-85-7	b-BHC	ND	500
319-86-8	d-BHC	ND	500
76-44-8	Heptachlor	ND	500
309-00-2	Aldrin	ND	500
1024-57-3	Heptachlor epoxide	ND	500
60-57-1	Dieldrin	ND	500
72-55-9	4,4'-DDE	ND	500
959-98-8	Endosulfan I	ND	1000
33213-65-9	Endosulfan II	ND	1000
72-20-8	Endrin	ND	1000
72-54-8	4,4'-DDD	ND	500
50-29-3	4,4'-DDT	ND	500
1031-07-8	Endosulfan sulfate	ND	1000
57-74-9	Chlorodane	ND	5000
8001-35-2	Toxaphene	ND	10000
	PCB	ND	10000

IV. HAZARDOUS SUBSTANCES LIST

62-53-3	Aniline	ND	150
100-51-6	Benzyl alcohol	ND	150
95-48-7	o-Cresol	ND	150
106-44-5	p-Cresol	ND	150
65-85-0	Benzoic acid	ND	800
106-47-8	4-Chloroaniline	ND	150

ORGANIC ANALYSIS REPORT
Semi-Volatile Compound, EPA Method 8270

CLIENT: WOODWARD-CLYDE CONSULTANTS Order No.: 90-08-149
SAMPLE ID: F15-1,F15-2,F15-4,F15-5

95-95-4	2,4,5-Trichlorophenol	**ND**	800
88-74-4	2-Nitroaniline	**ND**	800
99-09-2	3-Nitroaniline	**ND**	800
132-64-9	Dibenzofuran	**ND**	150
100-01-6	4-Nitroaniline	**ND**	800

Chemist Chung P. Li

Chung P. Li, Ph.D.

08/25/90

Date

ND=NOT DETECTED AT OR BELOW DETECTION LIMIT
NA=NOT AVAILABLE

ORGANIC ANALYSIS REPORT
Semi-Volatile Compound, EPA Method 8270

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

Order No.: 90-08-149
Hazardous Waste Testing
Certification No.: E765

CLIENT: WOODWARD-CLYDE CONSULTANTS
SAMPLE ID: F18-1 & F18-2 COMPOSITE
REPORT UNIT: ppb (ug/Kg)
SAMPLE LOCATION:

DATE SAMPLED: 08/14/90
DATE RECEIVED: 08/16/90
DATE EXTRACTED: 08/22/90
DATE COMPLETED: 08/24/90
DILUTION FACTOR: 1.00

CAS#	COMPOUND	RESULT	DET.LIMIT
I. PRIORITY POLLUTANT ACID COMPOUNDS			
108-95-2	Phenol	ND	150
95-57-8	2-Chlorophenol	ND	150
88-75-5	2-Nitrophenol	ND	150
105-67-9	2,4-Dimethylphenol	ND	150
120-83-2	2,4-Dichlorophenol	ND	150
59-50-7	4-Choro-3-methylphenol	ND	150
88-06-2	2,4,6-Trichlorophenol	ND	150
51-28-5	2,4-Dinitrophenol	ND	800
100-02-7	4-Nitrophenol	ND	800
534-52-1	2-Methyl-4,6-Dinitrophenol	ND	800
87-86-5	Pentachlorophenol	ND	150
II. PRIORITY POLLUTANT BASE/NEUTRAL COMPOUNDS			
62-75-9	N-Nitrosodimethylamine	ND	150
111-44-4	Bis(2-Chloroethyl)ether	ND	150
541-73-1	1,3-Dichlorobenzene	ND	150
95-50-1	1,2-Dichlorobenzene	ND	150
106-46-7	1,4-Dichlorobenzene	ND	150
118-74-1	Hexachlorobenzene	ND	150
67-72-1	Hexachloroethane	ND	150
621-64-7	N-Nitrosodi-n-propylamine	ND	150
98-95-3	Nitrobenzene	ND	150
117-84-0	Di-n-octyl phthalate	ND	150
120-82-1	1,2,4-Trichlorobenzene	ND	150
91-20-3	Naphthalene	ND	150
87-68-3	Hexachlorobutadiene	ND	150
91-57-6	2-Methylnaphthalene	ND	150
77-47-4	Hexachlorocyclopentadiene	ND	150
91-58-7	2-Chloronaphthalene	ND	150
131-11-3	Dimethyl phthalate	ND	150
208-96-8	Acenaphthylene	ND	150
83-32-9	Acenaphthene	ND	150
121-14-2	2,4-Dinitrotoluene	ND	300
606-20-2	2,6-Dinitrotoluene	ND	300
86-73-7	Fluorene	ND	150
84-66-2	Diethyl phthalate	ND	150
7005-72-3	4-Chlorophenyl phenyl ether	ND	150
86-30-6	N-Nitrosodiphenylamine	ND	300
101-55-3	4-Bromophenyl phenyl ether	ND	150

ORGANIC ANALYSIS REPORT
Semi-Volatile Compound, EPA Method 8270

CLIENT: WOODWARD-CLYDE CONSULTANTS Order No.: 90-08-149
SAMPLE ID: F18-1 & F18-2 COMPOSITE

39638-32-9	Bis(2-Chloroisopropyl)ether	ND	150
85-01-8	Phenanthrene	400	150
120-12-7	Anthracene	ND	150
84-74-2	Di-n-butyl phthalate	ND	150
206-44-0	Fluoranthene	637	150
92-87-5	Benzidine	ND	1200
111-91-1	Bis(2-Chloroethoxy)methane	ND	300
129-00-0	Pyrene	911	150
85-68-7	Butyl benzyl phthalate	ND	150
91-94-1	3,3-Dichlorobenzidine	ND	300
218-01-9	Chrysene	390	150
56-55-3	Benzo(a)anthracene	264	150
117-81-7	Bis(2-Ethylhexyl)phthalate	ND	1000
207-08-9	Benzo(k)fluoranthene	245	150
205-99-2	Benzo(b)fluoranthene	259	150
50-32-8	Benzo(a)pyrene	240	150
193-39-5	Indeno(1,2,3-cd)pyrene	ND	150
53-70-3	Dibenzo(a,h)anthracene	ND	150
191-24-2	Benzo(g,h,i)perylene	ND	150
78-59-1	Isophorone	ND	150

III. PESTICIDES

319-84-6	a-BHC	ND	500
58-89-9	g-BHC	ND	500
319-85-7	b-BHC	ND	500
319-86-8	d-BHC	ND	500
76-44-8	Heptachlor	ND	500
309-00-2	Aldrin	ND	500
1024-57-3	Heptachlor epoxide	ND	500
60-57-1	Dieldrin	ND	500
72-55-9	4,4'-DDE	ND	500
959-98-8	Endosulfan I	ND	1000
33213-65-9	Endosulfan II	ND	1000
72-20-8	Endrin	ND	1000
72-54-8	4,4'-DDD	ND	500
50-29-3	4,4'-DDT	ND	500
1031-07-8	Endosulfan sulfate	ND	1000
57-74-9	Chlorodane	ND	5000
8001-35-2	Toxaphene	ND	10000
	PCB	ND	10000

IV. HAZARDOUS SUBSTANCES LIST

62-53-3	Aniline	ND	150
100-51-6	Benzyl alcohol	ND	150
95-48-7	o-Cresol	ND	150
106-44-5	p-Cresol	ND	150
65-85-0	Benzoic acid	ND	800
106-47-8	4-Chloroaniline	ND	150

ORGANIC ANALYSIS REPORT
Semi-Volatile Compound, EPA Method 8270

CLIENT: WOODWARD-CLYDE CONSULTANTS Order No.: 90-08-149
SAMPLE ID: F18-1 & F18-2 COMPOSITE

95-95-4	2,4,5-Trichlorophenol	ND	800
88-74-4	2-Nitroaniline	ND	800
99-09-2	3-Nitroaniline	ND	800
132-64-9	Dibenzofuran	ND	150
100-01-6	4-Nitroaniline	ND	800

Chemist Chung P. Li 08/25/90

Chung P. Li, Ph.D. Date

ND=NOT DETECTED AT OR BELOW DETECTION LIMIT
NA=NOT AVAILABLE

ORGANIC ANALYSIS REPORT
Semi-Volatile Compound, EPA Method 8270

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

Order No.: 90-08-149
Hazardous Waste Testing
Certification No.: E765

CLIENT: WOODWARD-CLYDE CONSULTANTS
SAMPLE ID: F1-1 & F1-2 COMPOSITE
REPORT UNIT: ppb (ug/Kg)
SAMPLE LOCATION:

DATE SAMPLED: 08/13/90
DATE RECEIVED: 08/16/90
DATE EXTRACTED: 08/22/90
DATE COMPLETED: 08/24/90
DILUTION FACTOR: 1.00

CAS#	COMPOUND	RESULT	DET.LIMIT
I. PRIORITY POLLUTANT ACID COMPOUNDS			
108-95-2	Phenol	ND	150
95-57-8	2-Chlorophenol	ND	150
88-75-5	2-Nitrophenol	ND	150
105-67-9	2,4-Dimethylphenol	ND	150
120-83-2	2,4-Dichlorophenol	ND	150
59-50-7	4-Choro-3-methylphenol	ND	150
88-06-2	2,4,6-Trichlorophenol	ND	150
51-28-5	2,4-Dinitrophenol	ND	800
100-02-7	4-Nitrophenol	ND	800
534-52-1	2-Methyl-4,6-Dinitrophenol	ND	800
87-86-5	Pentachlorophenol	ND	150
II. PRIORITY POLLUTANT BASE/NEUTRAL COMPOUNDS			
62-75-9	N-Nitrosodimethylamine	ND	150
111-44-4	Bis(2-Chloroethyl)ether	ND	150
541-73-1	1,3-Dichlorobenzene	ND	150
95-50-1	1,2-Dichlorobenzene	ND	150
106-46-7	1,4-Dichlorobenzene	ND	150
118-74-1	Hexachlorobenzene	ND	150
67-72-1	Hexachloroethane	ND	150
621-64-7	N-Nitrosodi-n-propylamine	ND	150
98-95-3	Nitrobenzene	ND	150
117-84-0	Di-n-octyl phthalate	ND	150
120-82-1	1,2,4-Trichlorobenzene	ND	150
91-20-3	Naphthalene	267	150
87-68-3	Hexachlorobutadiene	ND	150
91-57-6	2-Methylnaphthalene	ND	150
77-47-4	Hexachlorocyclopentadiene	ND	150
91-58-7	2-Chloronaphthalene	ND	150
131-11-3	Dimethyl phthalate	ND	150
208-96-8	Acenaphthylene	506	150
83-32-9	Acenaphthene	ND	150
121-14-2	2,4-Dinitrotoluene	ND	300
606-20-2	2,6-Dinitrotoluene	ND	300
86-73-7	Fluorene	ND	150
84-66-2	Diethyl phthalate	ND	150
7005-72-3	4-Chlorophenyl phenyl ether	ND	150
86-30-6	N-Nitrosodiphenylamine	ND	300
101-55-3	4-Bromophenyl phenyl ether	ND	150

ORGANIC ANALYSIS REPORT
Semi-Volatile Compound, EPA Method 8270

CLIENT: WOODWARD-CLYDE CONSULTANTS Order No.: 90-08-149
SAMPLE ID: F1-1 & F1-2 COMPOSITE

39638-32-9	Bis(2-Chloroisopropyl)ether	ND	150
85-01-8	Phenanthrene	3320	150
120-12-7	Anthracene	370	150
84-74-2	Di-n-butyl phthalate	ND	150
206-44-0	Fluoranthene	5690	150
92-87-5	Benzidine	ND	1200
111-91-1	Bis(2-Chloroethoxy)methane	ND	300
129-00-0	Pyrene	8150	150
85-68-7	Butyl benzyl phthalate	ND	150
91-94-1	3,3-Dichlorobenzidine	ND	300
218-01-9	Chrysene	2610	150
56-55-3	Benzo(a)anthracene	2140	150
117-81-7	Bis(2-Ethylhexyl)phthalate	ND	1000
207-08-9	Benzo(k)fluoranthene	2410	150
205-99-2	Benzo(b)fluoranthene	2340	150
50-32-8	Benzo(a)pyrene	3500	150
193-39-5	Indeno(1,2,3-cd)pyrene	1940	150
53-70-3	Dibenzo(a,h)anthracene	439	150
191-24-2	Benzo(g,h,i)perylene	2770	150
78-59-1	Isophorone	ND	150

III. PESTICIDES

319-84-6	a-BHC	ND	500
58-89-9	g-BHC	ND	500
319-85-7	b-BHC	ND	500
319-86-8	d-BHC	ND	500
76-44-8	Heptachlor	ND	500
309-00-2	Aldrin	ND	500
1024-57-3	Heptachlor epoxide	ND	500
60-57-1	Dieldrin	ND	500
72-55-9	4,4'-DDE	ND	500
959-98-8	Endosulfan I	ND	1000
33213-65-9	Endosulfan II	ND	1000
72-20-8	Endrin	ND	1000
72-54-8	4,4'-DDD	ND	500
50-29-3	4,4'-DDT	ND	500
1031-07-8	Endosulfan sulfate	ND	1000
57-74-9	Chlorodane	ND	5000
8001-35-2	Toxaphene	ND	10000
	PCB	ND	10000

IV. HAZARDOUS SUBSTANCES LIST

62-53-3	Aniline	ND	150
100-51-6	Benzyl alcohol	ND	150
95-48-7	o-Cresol	ND	150
106-44-5	p-Cresol	ND	150
65-85-0	Benzoic acid	ND	800
106-47-8	4-Chloroaniline	ND	150

ORGANIC ANALYSIS REPORT
Semi-Volatile Compound, EPA Method 8270

CLIENT: WOODWARD-CLYDE CONSULTANTS Order No.: 90-08-149
SAMPLE ID: F1-1 & F1-2 COMPOSITE

95-95-4	2,4,5-Trichlorophenol	ND	800
88-74-4	2-Nitroaniline	ND	800
99-09-2	3-Nitroaniline	ND	800
132-64-9	Dibenzofuran	ND	150
100-01-6	4-Nitroaniline	ND	800

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

08/25/90
Date

ND=NOT DETECTED AT OR BELOW DETECTION LIMIT
NA=NOT AVAILABLE

ORGANIC ANALYSIS REPORT
Semi-Volatile Compound, EPA Method 8270

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

Order No.: 90-08-149
Hazardous Waste Testing
Certification No.: E765

CLIENT: WOODWARD-CLYDE CONSULTANTS
SAMPLE ID: METHOD BLANK
REPORT UNIT: ppb (ug/Kg)
SAMPLE LOCATION:

DATE SAMPLED:
DATE RECEIVED: 08/16/90
DATE EXTRACTED: 08/22/90
DATE COMPLETED: 08/23/90
DILUTION FACTOR: 1.00

CAS#	COMPOUND	RESULT	DET.LIMIT
I. PRIORITY POLLUTANT ACID COMPOUNDS			
108-95-2	Phenol	ND	150
95-57-8	2-Chlorophenol	ND	150
88-75-5	2-Nitrophenol	ND	150
105-67-9	2,4-Dimethylphenol	ND	150
120-83-2	2,4-Dichlorophenol	ND	150
59-50-7	4-Choro-3-methylphenol	ND	150
88-06-2	2,4,6-Trichlorophenol	ND	150
51-28-5	2,4-Dinitrophenol	ND	800
100-02-7	4-Nitrophenol	ND	800
534-52-1	2-Methyl-4,6-Dinitrophenol	ND	800
87-86-5	Pentachlorophenol	ND	150
II. PRIORITY POLLUTANT BASE/NEUTRAL COMPOUNDS			
62-75-9	N-Nitrosodimethylamine	ND	150
111-44-4	Bis(2-Chloroethyl)ether	ND	150
541-73-1	1,3-Dichlorobenzene	ND	150
95-50-1	1,2-Dichlorobenzene	ND	150
106-46-7	1,4-Dichlorobenzene	ND	150
118-74-1	Hexachlorobenzene	ND	150
67-72-1	Hexachloroethane	ND	150
621-64-7	N-Nitrosodi-n-propylamine	ND	150
98-95-3	Nitrobenzene	ND	150
117-84-0	Di-n-octyl phthalate	ND	150
120-82-1	1,2,4-Trichlorobenzene	ND	150
91-20-3	Naphthalene	ND	150
87-68-3	Hexachlorobutadiene	ND	150
91-57-6	2-Methylnaphthalene	ND	150
77-47-4	Hexachlorocyclopentadiene	ND	150
91-58-7	2-Chloronaphthalene	ND	150
131-11-3	Dimethyl phthalate	ND	150
208-96-8	Acenaphthylene	ND	150
83-32-9	Acenaphthene	ND	150
121-14-2	2,4-Dinitrotoluene	ND	300
606-20-2	2,6-Dinitrotoluene	ND	300
86-73-7	Fluorene	ND	150
84-66-2	Diethyl phthalate	ND	150
7005-72-3	4-Chlorophenyl phenyl ether	ND	150
86-30-6	N-Nitrosodiphenylamine	ND	300
101-55-3	4-Bromophenyl phenyl ether	ND	150

ORGANIC ANALYSIS REPORT
Semi-Volatile Compound, EPA Method 8270

CLIENT: WOODWARD-CLYDE CONSULTANTS Order No.: 90-08-149
SAMPLE ID: METHOD BLANK

39638-32-9	Bis(2-Chloroisopropyl)ether	ND	150
85-01-8	Phenanthrene	ND	150
120-12-7	Anthracene	ND	150
84-74-2	Di-n-butyl phthalate	ND	150
206-44-0	Fluoranthene	ND	150
92-87-5	Benzidine	ND	1200
111-91-1	Bis(2-Chloroethoxy)methane	ND	300
129-00-0	Pyrene	ND	150
85-68-7	Butyl benzyl phthalate	ND	150
91-94-1	3,3-Dichlorobenzidine	ND	300
218-01-9	Chrysene	ND	150
56-55-3	Benzo(a)anthracene	ND	150
117-81-7	Bis(2-Ethylhexyl)phthalate	ND	1000
207-08-9	Benzo(k)fluoranthene	ND	150
205-99-2	Benzo(b)fluoranthene	ND	150
50-32-8	Benzo(a)pyrene	ND	150
193-39-5	Indeno(1,2,3-cd)pyrene	ND	150
53-70-3	Dibenzo(a,h)anthracene	ND	150
191-24-2	Benzo(g,h,i)perylene	ND	150
78-59-1	Isophorone	ND	150

III. PESTICIDES

319-84-6	a-BHC	ND	500
58-89-9	g-BHC	ND	500
319-85-7	b-BHC	ND	500
319-86-8	d-BHC	ND	500
76-44-8	Heptachlor	ND	500
309-00-2	Aldrin	ND	500
1024-57-3	Heptachlor epoxide	ND	500
60-57-1	Dieldrin	ND	500
72-55-9	4,4'-DDE	ND	500
959-98-8	Endosulfan I	ND	1000
33213-65-9	Endosulfan II	ND	1000
72-20-8	Endrin	ND	1000
72-54-8	4,4'-DDD	ND	500
50-29-3	4,4'-DDT	ND	500
1031-07-8	Endosulfan sulfate	ND	1000
57-74-9	Chlorodane	ND	5000
8001-35-2	Toxaphene	ND	10000
	PCB	ND	10000

IV. HAZARDOUS SUBSTANCES LIST

62-53-3	Aniline	ND	150
100-51-6	Benzyl alcohol	ND	150
95-48-7	o-Cresol	ND	150
106-44-5	p-Cresol	ND	150
65-85-0	Benzoic acid	ND	800
106-47-8	4-Chloroaniline	ND	150

ORGANIC ANALYSIS REPORT
Semi-Volatile Compound, EPA Method 8270

CLIENT: WOODWARD-CLYDE CONSULTANTS Order No.: 90-08-149
SAMPLE ID: METHOD BLANK

95-95-4	2,4,5-Trichlorophenol	**ND**	800
88-74-4	2-Nitroaniline	**ND**	800
99-09-2	3-Nitroaniline	**ND**	800
132-64-9	Dibenzofuran	**ND**	150
100-01-6	4-Nitroaniline	**ND**	800

Chemist Chung P. Li

Chung P. Li, Ph.D.

08/25/90

Date

ND=NOT DETECTED AT OR BELOW DETECTION LIMIT
NA=NOT AVAILABLE

ORGANIC ANALYSIS REPORT
Semi-Volatile Compound, EPA Method 8270

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

Order No.: 90-08-149
Hazardous Waste Testing
Certification No.: E765

CLIENT: WOODWARD-CLYDE CONSULTANTS
SAMPLE ID: SPIKE RECOVERY
REPORT UNIT: %
SAMPLE LOCATION:

DATE SAMPLED:
DATE RECEIVED: 08/16/90
DATE EXTRACTED: 08/22/90
DATE COMPLETED: 08/23/90

CAS#	COMPOUND	RESULT
	I. PRIORITY POLLUTANT ACID COMPOUNDS	
108-95-2	Phenol	88%
95-57-8	2-Chlorophenol	93%
88-75-5	2-Nitrophenol	NA
105-67-9	2,4-Dimethylphenol	NA
120-83-2	2,4-Dichlorophenol	NA
59-50-7	4-Choro-3-methylphenol	101%
88-06-2	2,4,6-Trichlorophenol	NA
51-28-5	2,4-Dinitrophenol	NA
100-02-7	4-Nitrophenol	107%
534-52-1	2-Methyl-4,6-Dinitrophenol	NA
87-86-5	Pentachlorophenol	102%
	II. PRIORITY POLLUTANT BASE/NEUTRAL COMPOUNDS	
62-75-9	N-Nitrosodimethylamine	NA
111-44-4	Bis(2-Chloroethyl)ether	NA
541-73-1	1,3-Dichlorobenzene	NA
95-50-1	1,2-Dichlorobenzene	NA
106-46-7	1,4-Dichlorobenzene	108%
118-74-1	Hexachlorobenzene	NA
67-72-1	Hexachloroethane	NA
621-64-7	N-Nitrosodi-n-propylamine	93%
98-95-3	Nitrobenzene	NA
117-84-0	Di-n-octyl phthalate	NA
120-82-1	1,2,4-Trichlorobenzene	102%
91-20-3	Naphthalene	NA
87-68-3	Hexachlorobutadiene	NA
91-57-6	2-Methylnaphthalene	NA
77-47-4	Hexachlorocyclopentadiene	NA
91-58-7	2-Chloronaphthalene	NA
131-11-3	Dimethyl phthalate	NA
208-96-8	Acenaphthylene	NA
83-32-9	Acenaphthene	109%
121-14-2	2,4-Dinitrotoluene	98%
606-20-2	2,6-Dinitrotoluene	NA
86-73-7	Fluorene	NA
84-66-2	Diethyl phthalate	NA
7005-72-3	4-Chlorophenyl phenyl ether	NA
86-30-6	N-Nitrosodiphenylamine	NA
101-55-3	4-Bromophenyl phenyl ether	NA

ORGANIC ANALYSIS REPORT
Semi-Volatile Compound, EPA Method 8270

CLIENT: WOODWARD-CLYDE CONSULTANTS Order No.: 90-08-149
SAMPLE ID: SPIKE RECOVERY

39638-32-9	Bis(2-Chloroisopropyl)ether	NA
85-01-8	Phenanthrene	NA
120-12-7	Anthracene	NA
84-74-2	Di-n-butyl phthalate	NA
206-44-0	Fluoranthene	NA
92-87-5	Benzidine	NA
111-91-1	Bis(2-Chloroethoxy)methane	NA
129-00-0	Pyrene	112%
85-68-7	Butyl benzyl phthalate	NA
91-94-1	3,3-Dichlorobenzidine	NA
218-01-9	Chrysene	NA
56-55-3	Benzo(a)anthracene	NA
117-81-7	Bis(2-Ethylhexyl)phthalate	NA
207-08-9	Benzo(k)fluoranthene	NA
205-99-2	Benzo(b)fluoranthene	NA
50-32-8	Benzo(a)pyrene	NA
193-39-5	Indeno(1,2,3-cd)pyrene	NA
53-70-3	Dibenzo(a,h)anthracene	NA
191-24-2	Benzo(g,h,i)perylene	NA
78-59-1	Isophorone	NA

III. PESTICIDES

319-84-6	a-BHC	NA
58-89-9	g-BHC	NA
319-85-7	b-BHC	NA
319-86-8	d-BHC	NA
76-44-8	Heptachlor	NA
309-00-2	Aldrin	NA
1024-57-3	Heptachlor epoxide	NA
60-57-1	Dieldrin	NA
72-55-9	4,4'-DDE	NA
959-98-8	Endosulfan I	NA
33213-65-9	Endosulfan II	NA
72-20-8	Endrin	NA
72-54-8	4,4'-DDD	NA
50-29-3	4,4'-DDT	NA
1031-07-8	Endosulfan sulfate	NA
57-74-9	Chlorodane	NA
8001-35-2	Toxaphene	NA
	PCB	NA

IV. HAZARDOUS SUBSTANCES LIST

62-53-3	Aniline	NA
100-51-6	Benzyl alcohol	NA
95-48-7	o-Cresol	NA
106-44-5	p-Cresol	NA
65-85-0	Benzoic acid	NA
106-47-8	4-Chloroaniline	NA

ORGANIC ANALYSIS REPORT
Semi-Volatile Compound, EPA Method 8270

CLIENT: WOODWARD-CLYDE CONSULTANTS Order No.: 90-08-149
SAMPLE ID: SPIKE RECOVERY

95-95-4	2,4,5-Trichlorophenol	**NA**
88-74-4	2-Nitroaniline	**NA**
99-09-2	3-Nitroaniline	**NA**
132-64-9	Dibenzofuran	**NA**
100-01-6	4-Nitroaniline	**NA**

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

08/25/90
Date

ND=NOT DETECTED AT OR BELOW DETECTION LIMIT
NA=NOT AVAILABLE

ORGANIC ANALYSIS REPORT
Semi-Volatile Compound, EPA Method 8270

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

Order No.: 90-08-149
Hazardous Waste Testing
Certification No.: E765

CLIENT: WOODWARD-CLYDE CONSULTANTS
SAMPLE ID: SPIKE RECOVERY DUPLICATE
REPORT UNIT: %
SAMPLE LOCATION:

DATE SAMPLED:
DATE RECEIVED: 08/16/90
DATE EXTRACTED: 08/22/90
DATE COMPLETED: 08/23/90

CAS#	COMPOUND	RESULT
	I. PRIORITY POLLUTANT ACID COMPOUNDS	
108-95-2	Phenol	100%
95-57-8	2-Chlorophenol	110%
88-75-5	2-Nitrophenol	NA
105-67-9	2,4-Dimethylphenol	NA
120-83-2	2,4-Dichlorophenol	NA
59-50-7	4-Choro-3-methylphenol	87%
88-06-2	2,4,6-Trichlorophenol	NA
51-28-5	2,4-Dinitrophenol	NA
100-02-7	4-Nitrophenol	105%
534-52-1	2-Methyl-4,6-Dinitrophenol	NA
87-86-5	Pentachlorophenol	84%
	II. PRIORITY POLLUTANT BASE/NEUTRAL COMPOUNDS	
62-75-9	N-Nitrosodimethylamine	NA
111-44-4	Bis(2-Chloroethyl)ether	NA
541-73-1	1,3-Dichlorobenzene	NA
95-50-1	1,2-Dichlorobenzene	NA
106-46-7	1,4-Dichlorobenzene	105%
118-74-1	Hexachlorobenzene	NA
67-72-1	Hexachloroethane	NA
621-64-7	N-Nitrosodi-n-propylamine	91%
98-95-3	Nitrobenzene	NA
117-84-0	Di-n-octyl phthalate	NA
120-82-1	1,2,4-Trichlorobenzene	97%
91-20-3	Naphthalene	NA
87-68-3	Hexachlorobutadiene	NA
91-57-6	2-Methylnaphthalene	NA
77-47-4	Hexachlorocyclopentadiene	NA
91-58-7	2-Chloronaphthalene	NA
131-11-3	Dimethyl phthalate	NA
208-96-8	Acenaphthylene	NA
83-32-9	Acenaphthene	90%
121-14-2	2,4-Dinitrotoluene	105%
606-20-2	2,6-Dinitrotoluene	NA
86-73-7	Fluorene	NA
84-66-2	Diethyl phthalate	NA
7005-72-3	4-Chlorophenyl phenyl ether	NA
86-30-6	N-Nitrosodiphenylamine	NA
101-55-3	4-Bromophenyl phenyl ether	NA

ORGANIC ANALYSIS REPORT
Semi-Volatile Compound, EPA Method 8270

CLIENT: WOODWARD-CLYDE CONSULTANTS Order No.: 90-08-149
SAMPLE ID: SPIKE RECOVERY DUPLICATE

39638-32-9	Bis(2-Chloroisopropyl)ether	NA
85-01-8	Phenanthrene	NA
120-12-7	Anthracene	NA
84-74-2	Di-n-butyl phthalate	NA
206-44-0	Fluoranthene	NA
92-87-5	Benzidine	NA
111-91-1	Bis(2-Chloroethoxy)methane	NA
129-00-0	Pyrene	107%
85-68-7	Butyl benzyl phthalate	NA
91-94-1	3,3-Dichlorobenzidine	NA
218-01-9	Chrysene	NA
56-55-3	Benzo(a)anthracene	NA
117-81-7	Bis(2-Ethylhexyl)phthalate	NA
207-08-9	Benzo(k)fluoranthene	NA
205-99-2	Benzo(b)fluoranthene	NA
50-32-8	Benzo(a)pyrene	NA
193-39-5	Indeno(1,2,3-cd)pyrene	NA
53-70-3	Dibenzo(a,h)anthracene	NA
191-24-2	Benzo(g,h,i)perylene	NA
78-59-1	Isophorone	NA

III. PESTICIDES

319-84-6	a-BHC	NA
58-89-9	g-BHC	NA
319-85-7	b-BHC	NA
319-86-8	d-BHC	NA
76-44-8	Heptachlor	NA
309-00-2	Aldrin	NA
1024-57-3	Heptachlor epoxide	NA
60-57-1	Dieldrin	NA
72-55-9	4,4'-DDE	NA
959-98-8	Endosulfan I	NA
33213-65-9	Endosulfan II	NA
72-20-8	Endrin	NA
72-54-8	4,4'-DDD	NA
50-29-3	4,4'-DDT	NA
1031-07-8	Endosulfan sulfate	NA
57-74-9	Chlorodane	NA
8001-35-2	Toxaphene	NA
	PCB	NA

IV. HAZARDOUS SUBSTANCES LIST

62-53-3	Aniline	NA
100-51-6	Benzyl alcohol	NA
95-48-7	o-Cresol	NA
106-44-5	p-Cresol	NA
65-85-0	Benzoic acid	NA
106-47-8	4-Chloroaniline	NA

ORGANIC ANALYSIS REPORT
Semi-Volatile Compound, EPA Method 8270

CLIENT: WOODWARD-CLYDE CONSULTANTS Order No.: 90-08-149
SAMPLE ID: SPIKE RECOVERY DUPLICATE

95-95-4	2,4,5-Trichlorophenol	**NA**
88-74-4	2-Nitroaniline	**NA**
99-09-2	3-Nitroaniline	**NA**
132-64-9	Dibenzofuran	**NA**
100-01-6	4-Nitroaniline	**NA**

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

08/25/90
Date

ND=NOT DETECTED AT OR BELOW DETECTION LIMIT
NA=NOT AVAILABLE

Woodward-Clyde Consultants

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

Chain of Custody Record

PROJECT NO. 90C0039D

SAMPLERS (Signature) T. R. Kalhe

DATE	TIME	SAMPLE NUMBER	Sample Matrix (S)oil, (W)ater, (A)ir	EPA Method	EPA Method	EPA Method	EPA Method	503 OIL & GREASE	TOTAL LEAD	CAM 17 Metals	8270 VOC	608/8080	TPH - diesel	Number of Containers	REMARKS (Sample preservation, handling procedures, etc.)
8/13	4m	F-1-1						X	X	X	X	X	X		> COMPOSITE
		F1-2								X	X	X			
		F1-3	(N)												
		F2-1													
		F2-2	(N?)												
		F3-1													
		F3-2													
		F3-3	(N?)												
		F3-4	(N)												
		F4-1								X	X	X	X		
		F4-2													
		F5-1													
		F5-2											X		
		F5-3													
		F5-4	(N?)												← HOLD
		F5-5	(N)												
		F6-1													
		F6-2													
		F7-1													>
		F7-2													← HOLD
		F7-3	(N)												
		F8-1													
		F8-2													
		F8-3													
		F9-1													← HOLD
		F													
		F9-3													
		F10-1													

TOTAL NUMBER OF CONTAINERS: 28

RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)	RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)
T. R. Kalhe	8/14 12:30				

METHOD OF SHIPMENT:	SHIPPED BY: (Signature)	COURIER: (Signature)	RECEIVED FOR LAB BY: (Signature)	DATE/TIME
			Pat Egan	8/16 3:50

08-20-90 11:32AM MCC OAKLAND P02/**

Woodward-Clyde Consultants

50ç 12th Street, Suite 100, Oakland, CA 94607-4041
(415) 893-3600

Chain of Custody Record

PROJECT NO. 90C00390

SAMPLERS (Signature) T.R. Kalla

DATE	TIME	SAMPLE NUMBER	Sample Matrix (S)oil, (W)ater, (A)ir	EPA Method	EPA Method	EPA Method	EPA Method	503 OIL & GREASE	TOTAL LEAD	CAM 17 Metals	8270 VOC	608/8080	TPH-diesel	Number of Containers	REMARKS (Sample preservation, handling procedures, etc.)
8/13/90	NA	F10-2 (N?)						X	X						
		F11-1													
		F11-2 (N?)													
		F11-3 (N)													
		F12-1													← HOLD
		F12-2													
		F12-3													← HOLD
		F12-4													
		F12-5													
		F12-6													
		F12-7 (N)													
		F13-1													
		F13-2													
		F13-3													
		F14-1													
		F14-2													no O+G or Pb analysis
8/14/90		F15-1								⊗	⊗	⊗	X		COMPOSITE
		F15-2								⊗	⊗	⊗			
		F15-3 NO SAMPLE								⊗	⊗	⊗			
		F15-4								⊗	⊗	⊗			
		F15-5								⊗	⊗	⊗			
		F15-6 (N?)													
		F16-1													
		F16-2													
		F17-1													
		F17-2													
		F17-3													
		F17-4													

TOTAL NUMBER OF CONTAINERS: 28

RELINQUISHED BY (Signature)	DATE/TIME	RECEIVED BY : (Signature)	RELINQUISHED BY : (Signature)	DATE/TIME	RECEIVED BY : (Signature)
T.R. Kalla	8/14/90 12:30				
METHOD OF SHIPMENT :		SHIPPED BY : (Signature)	COURIER : (Signature)	RECEIVED FOR LAB BY : (Signature)	DATE/TIME 8/16 3:50

Woodward-Clyde Cons...
500 12th Street, Suite 100, Oakland, CA
(415) 893-3600

Chain of Custody Record

PROJECT NO. 90C0039D

SAMPLERS (Signature) [illegible signature]

DATE	TIME	SAMPLE NUMBER	Sample Matrix (S)oil, (W)ater	EPA Method	EPA Method	EPA Method	EPA Method	5520 OIL & GREASE	Total LEAD	CAM 17 Metals	8270 Voc	608/8080	TPH-diesel	Number of Containers	REMARKS (Sample preservation, handling procedures, etc.)
8/14/90	NA	E 13-1						X	X	⊗	⊗	⊗			> COMPOSITE
8/14/90		E 13-2						↓	↓	⊗	⊗	⊗	X		
8/14/90	↓	E 13-3						↓	↓						

NORMAL TAT

Questions + Results to George Ford 874-3203

TOTAL NUMBER OF CONTAINERS: 3

RELINQUISHED BY (Signature)	DATE/TIME	RECEIVED BY (Signature)	RELINQUISHED BY (Signature)	DATE/TIME	RECEIVED BY (Signature)
T. K. [illegible]	8/14/90 12:30				

METHOD OF SHIPMENT	SHIPPED BY (Signature)	COURIER (Signature)	RECEIVED FOR LAB BY (Signature)	DATE/TIME
			Pat Eppin	8/16 3:50