ENVIRONMENTAL ENGINEERING • HYDROGEOLOGY • SITE ASSESSMENTS
• REMEDIATION OF CONTAMINATED SOIL AND GROUNDWATER •

MILLER ENVIRONMENTAL COMPANY

REPORT ON
LIMITED SUBSURFACE ENVIRONMENTAL INVESTIGATION AND REMEDIATION OF CONTAMINATED SOIL

SITE LOCATION:
2915 BROADWAY, OAKLAND, CALIFORNIA

Prepared for:

European Motors
2915 Broadway
Oakland, CA 94611

MEC Project No. 90-1006

By :

Reinhard Ruhmke
Project Geologist

Walter H. Howe
R. G. 730

April 2, 1990

MILLER ENVIRONMENTAL COMPANY
385 Pittsburg Avenue
Richmond, California 94801
415/233-9068

INTRODUCTION

This report describes the work performed by Miller Environmental Company for European Motors at 2915 Broadway in Oakland, California. The main purpose of the work was to investigate the nature and extent of petroleum hydrocarbon contamination which was initially discovered during tank removal operations at the site. This report includes a description of the work performed, field observations, results of analyses, and recommendations for further action based on the findings of this project.

The property is owned by European Motors. Correspondence can be directed to Mr. Jules Barsotti, 2915 Broadway, Oakland, California, 94611.

BACKGROUND/SITE HISTORY

The site is located near the intersection of 29th and Broadway streets in a mostly residential and light industrial area of Oakland (see site location map, Figure 1).

On November 20, 1989, the Robert J. Miller Co. removed and disposed of three underground storage tanks (USTs), all associated pumps and product piping. Two of the tanks, a 1000 gallon tank which contained diesel fuel and a 550 gallon tank which contained gasoline, were located in the lower parking area. A 4000 gallon capacity tank, which contained gasoline, was located in the upper parking area. The three tanks (one diesel and two unleaded, Figure 2) were removed because automotive fueling was being done elsewhere and, with the exception of the 4,000 gallon tank, the tanks were relatively old.

A Hazardous Materials Specialist from the Alameda County Health Care Services Agency witnessed the tank removal and noted possible product on the water that was in the excavation.

Upon inspection the three tanks appeared to be intact. No visible holes, pitting, or areas of weakness were observed. Soil samples were collected from the tank pit following tank removal. Soil samples collected from the upper parking area indicated non-detectable levels of hydrocarbon contamination. The soil in the tank pit located in the lower parking area contained low levels of petroleum hydrocarbon contamination. The highest amount detected was 60 milligrams per kilogram (mg/kg) of Total Petroleum Hydrocarbons (TPH) as waste oil. No diesel or gasoline contamination was detected. However, a water sample collected from the lower tank pit contained 1,500 milligrams per liter (mg/L) of TPH as waste oil and 590 (mg/L) of TPH/diesel (mg/L is equivalent to parts per million-ppm).

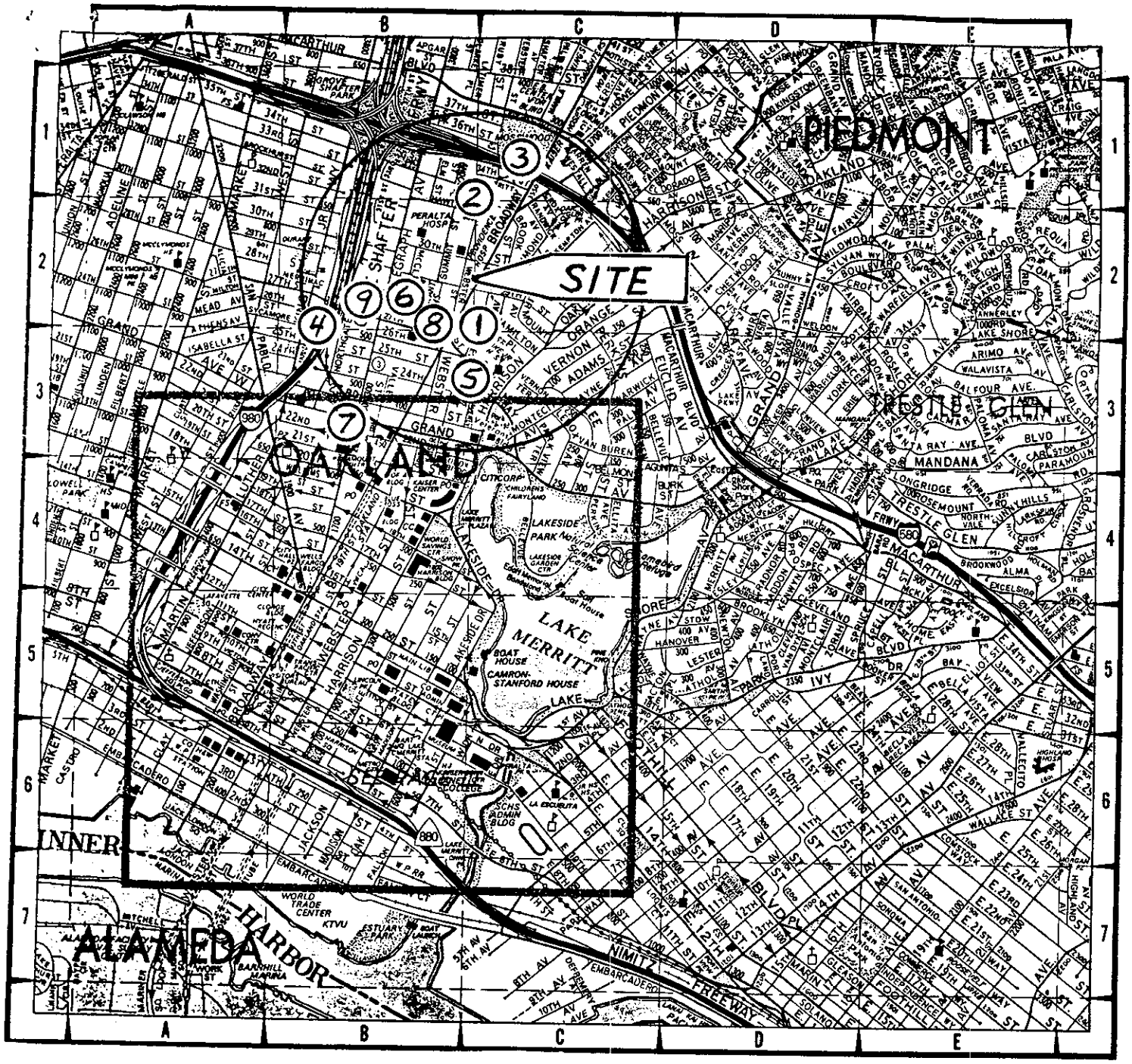


FIGURE 1.
SITE LOCATION MAP SHOWING SUBSURFACE CONTAMINATION SITES WITHIN 1/2-MILE RADIUS OF SITE

N

arc outlines radius of 1/2 mile
circled numbers denote fuel leak cases, Table 4

(map adapted from Thomas Bros. Maps, 1986)

All excavated soil was stockpiled on site. Composite soil samples were collected and analyzed for TPH/diesel and TPH/gasoline; 130 ppm of TPH/diesel was detected in the composite soil sample collected from the spoils pile. Additional laboratory analyses were performed on the stockpiled soil. The sample results indicated that the soil must be disposed of properly at a landfill licensed to accept Class II waste. All laboratory results are included in Appendix A.

SCOPE OF WORK - MILLER ENVIRONMENTAL COMPANY

A preliminary subsurface investigation and limited remediation work has been conducted by Miller Environmental Company. The primary objectives of the investigation were: 1) to estimate ground water depth and direction of flow, 2) to investigate the nature and extent of soil contamination, and 3) to determine whether ground water contamination has occurred. In addition, underground fuel leak cases on record at the Regional Water Quality Control Board (RWQCB) office in Oakland were reviewed as a means of identifying known contamination problems in the general vicinity of the site.

Three monitoring wells were installed as part of the subsurface investigation. Soil samples were collected from the borings and the monitoring wells were purged and sampled for ground water analyses. The wells were surveyed by a licensed surveyor and water levels were subsequently measured in all three monitoring wells. These data were used to estimate ground water gradient and flow direction.

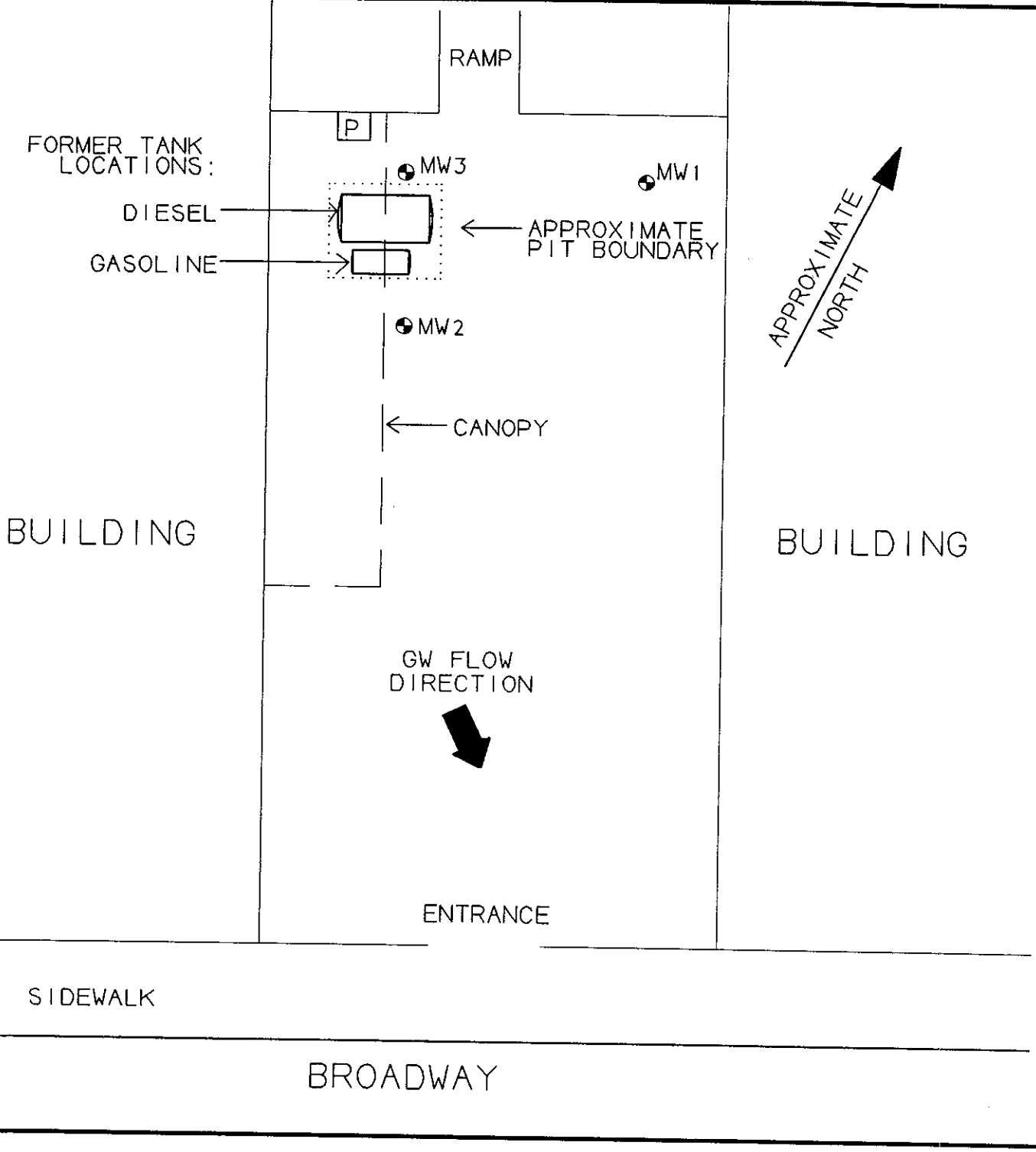
EXCAVATION AND DISPOSAL OF CONTAMINATED SOIL

Approximately 23 cubic yards of contaminated soil was hauled to and disposed of at Forward Inc., a landfill constructed to Class II specifications and licensed to accept petroleum contaminated soil. The Waste Characterization Form for this soil is included in Appendix B.

DRILLING AND WELL CONSTRUCTION

Three borings were drilled to describe the geology, locate the water table, and install the monitoring wells. The site plan (Figure 2) shows the location of the wells in relation to the site. Each of the borings was drilled into the water table with hollow stem augers, logged and sampled.

FIGURE 2: SITE PLAN FOR EUROPEAN MOTORS LTD.



◕ = MONITORING WELL LOCATION

APPROXIMATE SCALE IN FEET

0 25 50

P = PRODUCT PUMP LOCATION

MILLER ENVIRONMENTAL COMPANY
385 PITTSBURG AVENUE. RICHMOND. CA 94801

Two-inch diameter, threaded PVC casing was used in well construction. The casing was capped at both ends and a Christy box installed at the surface. Locks were attached to preclude tampering. Individual construction for each well is described below and shown on the boring logs (Appendix C).

Each monitoring well was bored to a depth of 30 feet below ground level. The wells were constructed with fifteen feet of .01-inch slotted casing between the 15 and 30 foot depths and blank casing was installed from 15 feet to the surface. Screening was placed primarily in sandy clay soil to a depth of 30 feet.

The annular space along the screened interval and two feet above this interval (from 13 feet to 30 feet below ground level) was packed with #2/16 Monterey sand. A bentonite plug was set above the sand pack at 13 to 11 feet and the remaining annular space was sealed to the surface with neat cement.

SAMPLING

Soil samples were collected at five foot intervals beginning at five feet below grade. Soil samples were collected with a modified split-tube sampler fitted with three clean brass liners. The lowermost brass liner containing the soil sample was covered with teflon wrap, capped and placed on ice for delivery to the laboratory for analysis. Laboratory analyses were conducted on soil samples from the 5,10,15 and 20 foot intervals for each of the three wells.

The wells were developed and allowed to recover to 80%. Samples of ground water were collected from all three wells on March 6, 1990. Ground water was bailed into clean glass bottles, placed on ice and transported to the laboratory for analysis.

Soil and ground water samples were delivered under chain-of-custody procedures to a state certified laboratory for hazardous waste testing. (A copy of the Chain of Custody Record is included in Appendix A.)

HYDROGEOLOGY

Geologic Setting

San Francisco Bay lies in a low area in the Coast Range province, a region of northwest trending faults, hills and valleys. The site itself is situated on the flatlands, approximately 1.5 miles north of the eastern edge of the present Bay and 0.5 miles north of the northwest edge of Lake Merritt. The Bay is a drowned valley which is thought to have originally formed by erosion of the ancestral

Sacramento River (Jenkins, 1951) and subsequently widened by subsidence and a rise in sea level. Quaternary (Pleistocene to recent) sediments deposited in what is now the Bay, include both shallow marine and continental deposits.

The youngest, surficial deposit is known as "Bay Mud" and occurs in areas adjacent to the Bay. Bay Mud is generally composed of unconsolidated, olive gray, blue gray, or black silty clay. It is typically plastic and varies from soft to stiff. Organic remains such as shells and peat are not uncommon. Permeability is generally low except where lenses of sand occur. Bay Mud is mainly derived from the sediment load carried by the Sacramento and San Joaquin Rivers and has been deposited in the Bay for almost 10,000 years (Helley et al.,1979). Bay Mud continues to be deposited today.

In the Oakland area, several other sedimentary units are noted by Radbruch and Case (1967). The upper two units, the Merritt Sand and the San Antonio Formation, lie within 100 feet below ground surface; this was documented at Clay and 12th Streets approximately 1/4 mile north of the site, by Woodward-Clyde (1987). A deeper sedimentary formation (the Alameda Formation) is also present and is assumed to overlie bedrock known as the Franciscan Formation. The Franciscan Formation is a complex assemblage of deformed and altered sediments and volcanic rocks of Jurassic-Cretaceous age which commonly form bedrock in the San Francisco Bay region.

Site Hydrogeology

Lithology encountered during drilling consisted of relatively clean to sand-rich clay soil. The clay is found on all three boring logs between approximately 7 and 30 feet and varies in color from brown to olive-green. Above this clay lies an unconsolidated gravel-sand-clay mixture. A six-inch brown clay lens separates the gravel bed from the asphalt and gravel base. The sandy member consists of fine-grained brown clay with varying proportions of sand. This sandy clay is found from 20 feet below grade to the end of the boring at 30 feet. In MW3 a sandy clay lens was encountered between 15 and 17 feet below grade. This sandy clay lens was not encountered in the other borings.

Ground water was estimated to be approximately 20 feet below ground surface during drilling. Water levels were measured with a Solinst electric water-level indicator after the wells had stabilized on March 7, 1990. All three wells had a significant rise from the water level observed during well installation, suggesting that the ground water is partially confined. The water found in the tank pit following tank removal appears to have originated from the gravel bed located beneath the asphalt. Water was continuously flowing from this bed into borehole MW2 during drilling operations.

The three wells were surveyed on March 2, 1990 by a California licensed surveyor. A plat of the site survey is included in Appendix D. The measured water levels and conversions to elevations are given in Table 1 below.

Table 1

WATER LEVEL DEPTHS AND ELEVATIONS FOR EUROPEAN MOTORS

		3/7/90	
WELL	TOC Elev.	Depth	Elev.
MW1	44.63	12.42	32.21
MW2	43.60	10.84	32.76
MW3	43.71	10.40	33.31

TOC = top of casing

Based on data from the three existing ground-water wells the ground water flow direction at the site may not be in the southwestward direction (towards Lake Merritt) inferred by regional geologic data and reports from other site investigations. Ground water flow at this site is in a southeast direction. Occasionally ground water flow is controlled by local conditions such as semi-confined aquifers or impermeable layers.

RESULTS OF ANALYSES

Soil and water samples were sent to a laboratory certified by the State of California Department of Health Services for testing and analysis of water and hazardous waste. Samples were analyzed using the following procedures developed by the Environmental Protection Agency (EPA):

EPA 5020/8015/602 - Total petroleum hydrocarbons as gasoline.
EPA 3550/3510/8015 - Total petroleum hydrocarbons as diesel.
EPA 418.1 - Total petroleum hydrocarbons (TPH).
EPA 5030/8020 - Benzene, toluene, ethylbenzene, and xylene (BTEX).

The complete laboratory results for all soil and ground water samples are presented in Appendix A.

Soil

The analytical results for soil samples are summarized in Table 2.

Table 2

ANALYTICAL RESULTS FOR SOIL SAMPLES
all concentrations in mg/kg*

Sample	ft Depth	TPH Gasoline	TPH Diesel	Waste Oil	B	T	E	X
MW1-5	5	ND	ND	ND	ND	ND	ND	ND
-10	10	ND	ND	ND	ND	ND	ND	ND
-15	15	ND	ND	ND	ND	ND	ND	ND
-20	20	ND	ND	ND	ND	ND	ND	ND
MW2-5	5	ND	ND	ND	ND	ND	ND	ND
-10	10	ND	ND	ND	ND	ND	ND	ND
-15	15	ND	ND	ND	ND	ND	ND	ND
-20	20	ND	ND	ND	ND	ND	ND	ND
MW3-5	5	ND	ND	ND	ND	ND	ND	ND
-10	10	ND	ND	ND	ND	ND	ND	ND
-15	15	ND	ND	ND	ND	ND	ND	ND
-20	20	ND	ND	ND	ND	ND	ND	ND

*mg/kg is equivalent to parts per million (ppm)

Ground Water

The analytical results for water samples collected from the three monitoring wells are summarized in Table 3.

Table 3

ANALYTICAL RESULTS FOR GROUND WATER SAMPLES
all concentrations in mg/l*

Well	TPH Gasoline	TPH Diesel	TPH	B	T	E	X
MW1	ND	ND	ND	ND	ND	ND	ND
MW2	ND	ND	ND	ND	ND	ND	ND
MW3	ND	0.06	ND	ND	ND	ND	ND

*mg/l is equivalent to parts per million (ppm)

REVIEW OF UNDERGROUND FUEL LEAK CASES IN AREA

Miller Environmental has reviewed the records of underground fuel leak cases on file at the RWQCB. Several soil and ground water contamination problems were found to exist in the nearby area. Within a 1/2 mile radius of the 2915 Broadway site are nine (9) reported releases. The locations of these releases are shown by number on Figure 1. The sites corresponding to these numbers are listed below in Table 4.

Table 4
Underground Fuel Leak Cases

	SITE NAME	LOCATION	* CLASS
1.	Broadway Volkswagon	2740 Broadway	C
2.	Broadway Medical Plaza	3300 Webster St.	C
3.	Kaiser Foundation	3505 Broadway	C
4.	Mostly Mustangs	2576 Martin Luther King	C
5.	Oakland Acura	255 27th St.	C
6.	Shell	2800 Telegraph Ave.	C
7.	Texaco/Exxon	2225 Telegraph Ave.	C
8.	Tracy Buick	2735 Broadway	C
9.	Tony & John's Foreign Cars	2730 Telegraph Ave.	C

Site specific ground water flow gradients are reported for four (4) of these sites. These include flow to the southwest at Broadway Medical Plaza, Oakland Acura, and Texaco/Exxon (Case nos. 2, 5, and 7).

CONCLUSIONS

After removal of three underground storage tanks and removal of contaminated soil from beneath the tanks, three ground-water monitoring wells were installed. Results of laboratory analyses of soil samples collected from the well borings indicated no detectable hydrocarbon contaminant to be present in the soil. Results of laboratory analyses of water samples from wells MW-1 and MW-2 were non-detectable for the purgeable hydrocarbon constituents analyzed, well MW-3 indicated no detectable hydrocarbons except for very low levels [< 1 ppm, just above detection limit] of diesel contaminant.

RECOMMENDATIONS

Based on results of laboratory analyses described above, Miller Environmental Company recommends that monitoring wells MW-1, MW-2 and MW-3 be purged and sampled on a quarterly basis for a period of one year. The water samples should be analyzed for TPH as diesel and for the purgeable hydrocarbon constituents benzene, ethylbenzene, toluene, and total xylene isomers (BTEX). Provided that the results of all water samples analyzed indicate no detectable diesel or BTEX contaminant for four successive monitoring events, a recommendation for site closure should be submitted to the RWQCB for approval.

WARRANTY

Miller Environmental Company warrants all services to be of high professional quality. No other warranty, either expressed or implied, as to the quality or result to be achieved as a consequence of this work, is made.

This report provides an assessment of the potential problems noted and represents professional opinion. All reports and recommendations are based upon conditions and information made available to Miller Environmental Company to date. Liability is not assumed in cases where the client or other parties involved have failed to disclose known environmental information. Reports do not purport to identify all problems or to indicate that other hazards do not exist. No responsibility is assumed for the control or correction of conditions or practices existing at the premises of the client. Data available from future subsurface exploration may modify the conclusions and recommendations of this report.