A Report Prepared for

Blue Print Service Company
149 Second Street
San Francisco, California 94105

ADDITIONAL INVESTIGATIONS
CITY BLUE PRODUCTION FACILITY SITE
1700 JEFFERSON STREET
OAKLAND, CALIFORNIA

HLA Job. No. 18106,006.04

by

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1.0 INTRODUCTION

This report presents the results of the additional investigations performed by Harding Lawson Associates (HLA) for Blue Print Service Company at the City Blue Production Facility at 1700 Jefferson Street in Oakland, California. The objective of the investigation was to determine if potential off-site sources of gasoline contamination have contributed to the concentrations detected in the wells installed by HLA for Blue Print Service Company. The results of this investigation will be used to help finalize a soil and ground-water remediation plan for the site. The services were performed under the Service Agreements executed by Blue Print Service Company on May 12, and August 18, 1989.

2.0 SCOPE OF WORK

The scope of services for this site investigation, originally outlined in HLA's proposal dated May 2, and August 9, 1989, consisted of the following:

2.1 Task 1 - Regulatory Agency/Historical Review

HLA used existing sources of data, including aerial photographs and regulatory agency files, to investigate historical uses of the surrounding properties to identify known and potential source of petroleum hydrocarbons and other hazardous material contamination.

Information sought included known or suspected cases of petroleum hydrocarbon contamination at nearby locations, the presence and status of underground tanks on surrounding properties, and tank registration records.

2.2 Task 2 - Off-Site Reconnaissance

HLA performed a sidewalk examination of the surrounding properties to corroborate any indications of possible hazardous waste contamination sources uncovered during the historical and regulatory reviews.

2.3 Task 3 - Ground-Water and Product Quality Sampling

Four ground-water monitoring wells exist on site, and one monitoring well exists off site and downgradient from the City Blue property. As part of this task, HLA collected ground-water samples from each well for laboratory analyses. HLA also measured the water level and product thickness in all wells. The depth to ground-water data and product thickness data will be used to assess if changes in product thickness have occurred as a result of the product removal program being performed by Blue Print Service Company. In addition, HLA collected floating product samples from Monitoring Wells MW-1 and MW-4 to evaluate whether the gasoline present in the wells is the same type as stored in the past at the City Blue property.

2.4 Task 4 - Soil-Gas Survey

HLA performed a soil-gas survey at and in the vicinity of the City Blue site. A soil-gas survey involves the sampling and measuring of the concentrations of organic compounds contained within the pore spaces of soils above the water table. The results can give an indication of the presence of petroleum hydrocarbons in soil and ground water at the sampling location and can be used to define the boundaries of the hydrocarbon plume or identify other potential off-site sources of contamination.

2.5 Task 5 - Report Preparation

HLA prepared this written report which includes the results of Tasks 1 through 4.

3.0 BACKGROUND

During February 1987, five soil borings were drilled by HLA as part of a preliminary hazardous waste assessment at the City Blue property. Two of the five soil borings were drilled to a depth of 30 feet adjacent to the three underground storage tanks used by the service station formerly located on the northwestern portion of the property. Selected soil samples were analyzed for total petroleum hydrocarbons (TPH) using EPA Method 8015. TPH concentrations from the two borings ranged from 46 ppm to 3300 parts per million (ppm). The highest concentration values were detected at depths from approximately 19 to 27 feet. These soil sampling analysis and the observations during the subsequent removal of the tanks indicated that one or more of the tanks had released petroleum hydrocarbons.

During the tank excavation in June 1987, the soil beneath the tanks was excavated to a depth of approximately 9 feet, aerated at the surface in accordance with Bay Area Air Quality Control Management District's Regulation 8, Rule 40, and used as backfill for the excavation. Subsequently during June 1987, three monitoring wells (MW-1, MW-2, and MW-3) were installed on the property to evaluate the distribution of petroleum hydrocarbons in the soil and ground water and determine the direction of ground-water flow (Plate 1).

Petroleum hydrocarbons, presumably gasoline or degraded gasoline, were found floating on the ground water in Monitoring Well MW-1. The floating gasoline has been skimmed on a daily basis since early September 1987 by City Blue personnel. In January 1988, two additional monitoring wells (MW-1A and MW-4) were installed by HLA at the facility. Well MW-1A was installed adjacent to Monitoring Well MW-1. Monitoring Wells MW-1 and MW-1A are currently being used for product recovery.

One off-site monitoring well (MW-5) was installed by HLA in August 1988, approximately 170 feet north-northeast (downgradient) of the location of the former on-site underground tanks. Petroleum hydrocarbons were detected in Monitoring Well MW-5 during two prior rounds of ground-water sampling.

4.0 SITE DESCRIPTION

The site, which is currently owned and operated by Blue Print Service Company, is a 126,000-square-foot parcel. A single-story building is on the eastern two-thirds of the site. The site is bounded by 17th Street to the southwest, Jefferson Street to the northwest, a hair salon to the southeast, and three-story brick building and a small park to the northeast. Single- and multi-family residences are located to the southwest and northwest.

4.1 Topography

The topography of the site is flat; the elevation is approximately 35 feet above sea level. The topography of the area immediately surrounding the site slopes gradually down to the north. To the east, the topography is relatively flat, then slopes down toward Lake Merritt, approximately 3/4 mile away. To the west, the topography is also relatively flat, then slopes toward San Francisco Bay.

4.2 Geology

The site is in the San Francisco Bay Coastal Plain, and is underlain by unconsolidated sediments, including interbedded sand, silts, and clay. The depth to bedrock beneath the site is unknown. The site is approximately 2-1/2 miles east of San Francisco Bay and approximately 4 miles from the Hayward fault, the nearest known active fault.

4.3 Hydrogeology

On the basis of ground water data collected from on-site monitoring wells, ground water in the on-site wells exists at a depth of between 24 and 28 feet below ground surface. Previous calculations have indicated that ground-water flow is in a north to northeasterly direction.

Ground water in the area is not used as a source of drinking water. No private wells are known to exist in close proximity to the site.

5.0 SITE HISTORY

Records at the Alameda County Assessor's Recorder's Offices were examined to determine the site ownership history. Sanborn maps from 1889, 1902, and 1912 were examined to research the history of the site and surrounding area. Historical aerial photographs were also examined to determine the history of site occupancy and changes in land use that have occurred over the past 40 years. The aerial photographs examined were taken in 1947, 1953, 1969, 1973, 1977, 1981, 1985, and 1988.

5.1 Written History

Table 1 summarizes the ownership history of the site, known as Assessor's Parcel Number 3-63-8, from 1940 to 1987.

Table 1. Site Ownership History

Date	Owner
5/87	Blue Print Service
10/80	Bantam Properties
1/78	Leon and Estelle Hartman
3/73	City of Oakland (portion)
10/68	Shriner's Hospital for Crippled Children/Masonic Homes of California (portion)
1940	Bruning Family

According to the 1889 Sanborn map, Jefferson Street ended at 17th Street and did not run past the site. The site was occupied by two residential buildings. Residential buildings were located on either side of the site along 17th Street. A winery was located to the northeast of and adjacent to the site in 1889. Most of the area was residential, with some small repair shops and two tamale factories to the north and northeast and a candy factory to the southwest.

There was no change in the site configuration on the 1902 Sanborn map. The winery adjacent to the site had been replaced by residences by 1902. An athletic club was located about 75 to 100 feet east of the site. The area surrounding the site was still primarily residential. Many of the small repair shops and factories recorded on the 1889 map were no longer noted on the 1902 map. Other small businesses, such as restaurants and a second-hand store, were present.

On the 1912 Sanborn map, the block containing the site was divided by Jefferson Street, which had been extended. The site was occupied by a building resembling a gas station. A vacant lot and an apartment building had replaced smaller residential buildings northeast of the site. A building denoted as being vacant and a movie theater were located to the east. The area was still mainly residential, but many residences had been replaced by commercial enterprises. Sign painting shops, printing shops, a bus depot, a gas station, and a hotel were some of the businesses in the area at that time. The gas station was one block to the south of the site, and the bus depot was one block to the north. There were also about four parking lots in the area.

5.2 Aerial Photograph Review

Historical and current land uses of the site and adjacent areas were also reviewed by examining aerial photographs at Pacific Aerial Surveys in Oakland, California.

An L-shaped building appeared on the site in the photographs taken in 1947, 1953, 1969, 1971, 1973, 1977, 1981, and in 1985. The building likely was part of the service station that occupied the site until 1987.

Details of the area were difficult to make out in the 1947 photograph because of the small scale of the photograph. In the 1953 photograph, the area surrounding the site appeared to be mixed residential and commercial. The residences appeared to be both single- and multi-family dwellings. Another L-shaped building appeared one block south of the site. Most of the commercial enterprises to the northwest and southwest

appeared to be small in size; only two or three of the businesses appeared to occupy an entire city block. To the northeast, across San Pablo Avenue, the area appeared to be entirely commercial.

The site and surrounding area appeared to be the same in the 1969 photograph as in the 1953 photograph.

Interstate 980, approximately 1/4 mile northwest of the site, was being built when the 1973 photograph was taken. Several cars were parked on a parking lot north of the site. The area was occupied by the same residential and commercial buildings in 1973, 1977, and 1981, as observed in the previous photograph. The 1981 photograph showed the beginning of development of the Oakland City Center complex within 1/4 mile of the site to the southwest.

When the 1985 photograph was taken, several highrises had been built as part of the City Center complex. At that time, much of the City Center complex to the west of the highrises was still vacant. The character of the neighborhood around the site appeared to change from predominantly residential to commercial. Many large buildings, either apartment buildings or office buildings, were present to the southwest. Some of the smaller residential buildings to the northwest were still present. By the time the 1985 photograph was taken, the L-shaped building to the south of the City Blue site had been removed. The area to the northeast, across San Pablo Avenue appeared to still be occupied by large commercial buildings and parking lots.

By the time that the 1988 photograph was taken, the on-site L-shaped building had been removed and replaced with the recently constructed City Blue building and adjacent parking lot. The rest of the area appeared to be much the same as in the 1985 photograph, with the exception of the City Center complex which was nearly completed.

5.2.1 Conclusions from Aerial Photograph Review

None of the photographs reviewed showed obvious evidence of underground storage tanks. In photographs between 1953 and 1985, a small L-shaped building exists one block south of the subject site at the corner of 16th and Jefferson Streets. This building may be a gasoline station, but at the scale of the photograph (which is not stated but may be 1:12,000) small details are difficult to make out. There appeared to be no other buildings upgradient that could be readily interpreted as gasoline stations. City-owned buildings located where the City Center is currently may have had underground storage tanks in the past.

6.0 REVIEW OF REGULATORY AGENCY CONTACTS

The discussion presented in this section is based on available information provided by government agencies. In addition to reviewing agency lists that contain general information about sites that have had reported problems with hazardous materials, HLA personnel reviewed agency files for detailed information about sites that appeared on these lists. The purpose of the regulatory agency review was to determine if any of the site impacted by releases of hazardous materials are located upgradient of the City Blue site. If a site is upgradient, the potential exists that hazardous materials in the soil and ground water could impact the City Blue site.

HLA reviewed and evaluated the following regulatory agency lists:

1. **The U.S. Environmental Protection Agency (EPA) Comprehensive Environmental Response Compensation, and Liability Information System (CERCLIS)**

   CERCLIS provides a list of businesses or properties that are in the Federal Superfund program. Under this program, a business or property is identified and a preliminary assessment is performed to assess whether the site shall become a Federal Superfund site.

   None of the properties listed are within 1/4 mile of the site. The nearest CERCLIS properties in Oakland are:

   - PG&E Gas Plant
     First Street between Market and Jefferson
     Preliminary Assessment (PA) completed 12/1/87
     approximately 3/4 mile west of the site; crossgradient

   - PG&E Gas Plant
     First and Washington Streets
     PA completed 12/1/87
     approximately 3/4 mile west of the site; crossgradient

   HLA has no further information regarding the progress of the two investigations. Because of their distance and crossgradient location, it is unlikely that contamination from these sites has impacted the site.

2. **The Hazardous Waste and Substances Site List (Cortese) is compiled by the California State Office of Planning and Research**

The Cortese List provides information concerning identified hazardous wastes/substance sites within the State of California.

The following properties in Oakland are located within 1/4 mile of the site:

- Bramalea Pacific
  12th and Clay Streets
  problem: tank leak
  upgradient of the site; discussed under RWQCB Fuel Leaks Section

- City of Oakland
  1417 Clay Street
  problem: tank leak
  upgradient of the site; discussed under RWQCB Fuel Leaks Section

- City of Oakland/Community Development
  1417 Clay Street
  problem: tank leak
  upgradient of the site

- Blue Print Service Company
  1160 Jefferson Street
  problem: tank leak
  This site is probably a misprint for the subject site at 1700 Jefferson Street.

- Chevron
  1911 Telegraph Avenue
  problem: tank leak
  crossgradient of the site; discussed under RWQCB Fuel Leaks

3. **The Expenditure Plan for the Hazardous Substance Cleanup Bond Act of 1984 (State Bond Expenditure Plan)**

The State Bond Expenditure Plan is compiled by the California Department of Health Services (DHS). It provides a list of identified hazardous waste sites located in the State of California that have been targeted for cleanup by responsible parties, the DHS or the EPA within the next five fiscal years.

There are no properties listed within 1/4 mile of the site. The nearest site listed in Oakland is:

- Port of Oakland
  Dennison and Embarcadero Streets

This site is approximately 2-1/2 miles south of the site. Because of the distance, the likelihood that this property will have an affect on the site is low.

4. **The DHS Abandoned Sites List**

The DHS Abandoned Site List provides information concerning past and present potential hazardous waste sites that could be considered potential State Bond Expenditure Plan sites.

Table 2 presents a list of properties in Oakland that are on the DHS Abandoned Sites List located within 1/4 mile of the site.

Table 2. DHS Abandoned Sites

Name	Address	Status
Art Weeks	1350 Franklin Street	1
Batte Resources International	1221 Broadway	2
East Bay Blue Print Supply Company	1742 Franklin Street	3
Laxas Sewing	337 13th Street	4
Oakland Graphics	864 14th Street	2
The Champion Company	610 16th Street	2

1 = decision of no further action needed dated December 1980
2 = decision of no further action needed dated November 1980
3 = decision of no further action needed dated August 1980
4 = decision of no further action needed dated October 1980

5. **The Regional Water Quality Control Board (RWQCB) North Bay Toxics List**

The RWQCB List provides a list of cases included in the RWQCB Site Management System for Alameda County.

Only one property is listed within 1/4 mile of the site:

- Oakland Redevelopment Agency
  1300 Clay Street
  San Francisco, California
  1/4 miles southwest of the site, upgradient

The file for the Oakland Redevelopment agency property contained a letter from Woodward-Clyde Consultants to Bramalea Pacific, dated June 29, 1988, regarding chemical analysis of ground-water samples taken from beneath 5 City Center. The results showed 400 parts per billion (ppb) of total petroleum hydrocarbons (TPH) as gasoline. Bramalea was not suspected to be an on-site source of contamination. A July 8, 1988 letter from the City of Oakland to RWQCB confirmed the 400 ppb contamination and stated that soil samples were forthcoming. HLA has no further information on this site.

6. **The Regional Water Quality Control Board (RWQCB) Fuel Leaks List for Alameda County**

The RWQCB provides a list of site names and addresses and types of reported fuel leaks from underground storage tanks.

The following listed properties are located within 1/4 mile of the site:

- The subject site is recorded on the RWQCB Fuel Leaks List.

- Bramalea Pacific
  12th and Clay Street
  approximately 1/4 mile southwest of the site;
  upgradient of the site

In 1987, soil contamination was discovered on the Bramalea site during excavation for removal of an underground storage tank. Soil berms were constructed to contain the release to a 50-square-foot area and approximately 20 cubic yards of soil were removed. Chemical analysis of soil samples showed 420 parts per million (ppm) to 990 ppm as diesel below the tank and spill site.

In 1989, Bramalea notified RWQCB of discovery of petroleum hydrocarbons in soil and ground water. Analysis of soil samples showed 260 ppm TPH as gasoline. Ground-water analysis showed 25 ppm TPH as gasoline and 15 ppm benzene. No free product was found. Contamination was believed to be from an off-site source. Ground water was to be treated with an activated carbon system and discharged to the East Bay Municipal Utilities District sewer system.

- Chevron
  1911 Telegraph Avenue
  approximately 1/4 mile to the northeast of the site; crossgradient

The file for the Chevron site contained information regarding soil and ground-water sampling and construction of a monitoring well. Soil samples were taken beneath the bottom of a waste oil tank. TPH values for both soil and ground water were less than 10 ppm. Closure of the tank has been completed.

- City of Oakland
  1417 Clay Street
  approximately 650 to 700 feet to the south of the site; upgradient of the site

During removal of two underground tanks in November 1987, a fuel release was discovered. An Alameda County Health Department letter to the Oakland Office of Community Development, dated March 1988, stated that TPH concentrations of up to 760 ppm were identified in the soil adjacent to the tanks. After completion of a soil removal program, TPH values beneath the excavated area were less than 100 ppm. The case was then considered closed.

- 5 City Center
  1300 Clay Street
  approximately 1000 feet south of the site; upgradient

A release of diesel fuel was discovered in 1987 upon removal of an unknown number of tanks. According to the RWQCB file, this is possibly the source for the Bramalea Pacific site contamination. There is no further information regarding remediation of this site.

- Oakland Redevelopment Agency
  1330 Martin Luther King Jr. Way
  approximately 1000 feet to the southwest; upgradient or crossgradient

A soil boring in July 1988 during removal of an underground storage tank identified hydrocarbon contamination. It was thought that contamination extended off-site across Martin Luther King Jr. Way. No contaminated soil was removed. Soil samples were analyzed and contaminant levels were as follows: total volatile hydrocarbons (TVH) 54 to 7660 ppm; benzene 15.9 to 39.3 ppm, toluene 0.2 to 447 ppm, total xylenes 3.0 to 752 ppm; ethylbenzene 0.5 to 122 ppm. Ground-water contamination levels were as follows: TPH less than 10 to 90 ppm; benzene 1800 to 3100 ppb; toluene nondetected to 2700 ppb; total xylenes and ethylbenzene non-detectable. The source of contamination was believed to be the fuel tanks that were removed. As of November 1988, remediation had not been performed.

7. **The State Water Resources Control Board (SWRCB) Hazardous Substance Storage Container Information for Alameda County**

The SWRCB identifies underground containers (underground storage tanks and sumps) by owner. The list provides information pertaining to the type of container, the year installed, and the type of product reported to be stored in the container.

Table 3 lists registered containers that are located within 1/2-mile of the site.

Table 3. Registered Underground Storage Containers

Owner	Capacity (gallons)	Type of Product
Blue Print Service Company	1,000	gasoline
1700 Jefferson	1,000	gasoline
(site)	500	waste oil
Peerless Stages	10,000	diesel
2120 Brush Street	2,000	gasoline
Pacific Bell	7,500	diesel
1587 Franklin Street	7,500	diesel
	7,500	diesel
	7,500	diesel
	7,000	diesel
Pacific Bell		
1519 Franklin Street	1,000	diesel
West Grand Carrier Annex	10,000	gasoline
577 W. Grand Avenue		
Blue Cross Building	5,000	diesel
1950 Franklin Street		
Chevron #94800	1,000	unknown
1700 Castro Street	10,000	unknown
	10,000	unknown
	10,000	unknown
	10,000	unknown
Chevron #91853	6,000	unknown
580 W. Grand Avenue	2,000	unknown
	6,000	unknown
	550	unknown
Emporium-Capwell	2,000	diesel
20th and Broadway	2,000	diesel

The nearest site to the City Blue facility with recorded tank leak problems are 1/8 to 1/4 mile away to the southwest in the current City Center complex.

Underground storage tanks were removed from three sites in the City Center; several of

these were found to be leaking. Since contamination plumes may be up to several hundred feet long, there is a possibility these sites may affect ground water in the vicinity of the subject site.

There are two sites approximately 1/4 mile to the southeast that have registered underground storage tanks (Pacific Bell sites), one to the east (Blue Cross), and one 1/8 mile of the west (Chevron). At these time, none of these sites are reported to have fuel leak problems.

7.0 FIELD INVESTIGATION

7.1 Off-Site Reconnaissance

HLA personnel performed a reconnaissance of the study area (i.e. the off-site area within 1/4-mile radius of the site) to identify possible upgradient sources of petroleum hydrocarbon contamination. The reconnaissance is used to corroborate the existence of surrounding sites of potential concern identified during the historical and regulatory reviews and to identify any surrounding sites of concern not previously recognized. Emphasis was put on the area upgradient of the City Blue site.

The area upgradient of the City Blue site consists primarily of residential, office and retail buildings, and parking lots. During the off-site reconnaissance, three upgradient sites were identified as being potential sources of petroleum hydrocarbon contamination. Two of the sites, City Hall West and the Oakland Redevelopment Agency property, had previously been identified as having documented fuel releases as discussed in Section 6.0, Review of Regulatory Agency Contacts under the RWQCB Fuel Leaks List.

City Hall West is owned by the City of Oakland at 1417 Clay Street. The property consists of an office building and parking maintenance garage for city vehicles. An above-ground waste oil tank currently exists on site. City of Oakland personnel on site indicated to HLA that a former leaky waste oil tank had been removed from the site and had been replaced by the current tank. The site is approximately 700 feet to the south of the City Blue property. Because the documented release is waste oil and not gasoline, this site does not likely represent a source of contamination on the City Blue site.

A recently graded vacant lot and parking lot at 1330 Martin Luther King Jr. Way was observed in the city block adjacent to 14th Street between Martin Luther King, Jr. Way and Jefferson Street. The property is owned by the Oakland Redevelopment Agency. This site is listed on the RWQCB Fuel Leaks List. The site is believed to have been the location of a former Oakland city garage.

An asphalt-paved parking lot containing several 55-gallon drums was observed adjacent to 14th Street between Jefferson and Clay Streets. The drums possibly are a result of a soils investigation on the property. The property is the proposed site of a federal building.

7.2 Ground-Water Investigation

7.2.1 Ground-Water and Product Sampling

On July 12 and 13, 1989, the five monitoring wells (MW-1, MW-1A, MW-3, MW-4, and MW-5) were purged and sampled. Prior to the purging, the depth to water was measured with a steel tape and a clear lucite bailer was lowered into the wells to check for floating petroleum product. Floating product was observed in Monitoring Wells MW-1, MW-1A, MW-4, and MW-5. Table 4 lists water levels and product thicknesses recorded. Product thickness measurements collected from the five monitoring wells on September 12, 1988 are included in Table 4 for comparison. The product thickness in two of the wells, MW-1 and MW-1A has decreased by 0.29 feet and 0.8 feet respectively. However, the product thickness in Well MW-5 has remained relatively unchanged.

Table 4. Water Level Data
July 12, 1989
City Blue Production Facility
Oakland, California

Well Number	Top of Casing Elevation (feet)	Depth to Ground Water (feet)	Ground Water Elevation (feet)	Product Thickness 07/12/89 (feet)	Product Thickness 09/12/88 (feet)
MW-1	31.44	26.00	5.44	1.80	2.09
MW-1A	30.74	26.00	4.74	1.55	2.35
MW-3	31.77	24.44	7.33	0	0
MW-4	31.59	27.35	4.24	2.10	0.49
MW-5	29.22	24.91	4.31	0.03	0.04

At least three well volumes from each well were removed using a PVC bailer prior to collection of ground-water samples. HLA measured the temperature, pH, and electrical conductivity of the purged water, These measurements were used as criteria to determine when fresh formation water was in the well. Ground-water samples were collected using a clean stainless steel bailer. The ground-water samples were decanted from the bailer into laboratory-prepared 40-milliliter, volatile organic analysis (VOA) vials. The vials were then immediately sealed, labeled, and placed in ice coolers until delivered under chain-of-custody procedures to the analytical laboratory. Purged water was placed in Department of Transportation-approved drums and left on site for later disposal. The ground water was subsequently disposed of by Decon Environmental Services.

While at the analytical laboratory, the vials containing ground water from Monitoring Well MW-5 were broken. On July 27, 1989, Monitoring Well MW-5 was resampled using procedures outlined above and samples were resubmitted to the testing laboratory.

On August 18, 1989, HLA personnel sampled floating petroleum product from Monitoring Wells MW-1 and MW-4 to have them analyzed for gasoline type. Product samples were collected using a clean bailer. Product samples were decanted from the bailer into laboratory prepared 40-milliliter volatile organic analysis (VOA) vials. The filled vials were then sealed and placed in ice coolers until delivered under chain-of-custody procedure to the testing laboratory.

7.2.2 Ground-Water Chemical Testing Results

HLA submitted the five ground-water samples to Analytical Science Association, Inc. of Emeryville, California, a state-certified laboratory. Ground-water samples were analyzed for Total Petroleum Hydrocarbons (TPH) using modified EPA Test Method 8015 and benzene, toluene, ethyl benzene, and xylenes (BTEX) using EPA Test Method 8020.

Ground-water samples in all five monitoring wells (MW-1, MW-1A, MW-3, MW-4, and MW-5) were determined to contain concentrations of TPH and BTEX. The highest concentrations of TPH and BTEX were identified in ground-water samples from on-site Monitoring Wells MW-1 and MW-1A. Lower concentrations of TPH and BTEX were detected in on-site Monitoring Wells MW-3 and MW-5. Table 5 summarizes the results of the chemical analyses of the ground-water samples. The laboratory reports and the accompanying chain-of-custody documentation are contained in Appendix A.

Table 5. Ground-Water Sampling Results
City Blue Production Facility
Oakland, California
(Concentrations in ppm)

Well Number	Total Petroleum Hydrocarbons Gasoline Range	Benzene	Toluene	Ethyl-benzene	Xylenes
MW-1	190	1.0	8.9	2.9	19
MW-1A	220	1.2	9.21	3.1	24
MW-3	13	0.004	0.16	0.21	0.42
MW-4	93	0.46	4.2	1.2	9.7
MW-5	14	0.007	0.19	0.21	0.50
Detection Limit	0.05	0.0005	0.001	0.001	0.001

ppm = parts per million

7.2.3 Product Chemical Testing Results

HLA submitted the two product samples to SGS Control Services, Inc. in El Sobrante, California. Product samples were analyzed for lead using Test Method D-3237. The purpose of the product testing was to determine if the product in Monitoring Wells MW-1 and MW-4 is leaded or unleaded gasoline.

The product samples collected from Monitoring Wells MW-1 and MW-4 were determined to contain 0.33 grams per gallon (gpg) lead and 1.40 gpg lead, respectively. The results of the chemical testing indicates that the two product samples are likely leaded gasoline.

Alternatively, the lead may have been incorporated into the product as a result of leaching from surrounding soil. However, we judge that possibility as remote. The results of the product testing differ from the product inventory records which indicate that unleaded gasoline was used at the site from approximately 15 years ago until the tanks were removed from the site. The laboratory results are contained in Appendix B.

7.3 Soil-Gas Survey

7.3.1 Methodology

A soil-gas survey involves sampling and analyzing the vapor from the pore spaces of the unsaturated soils (vadose zone) above the water table. This reconnaissance method helps measure the distribution of organic chemicals in soil and ground water. Because many petroleum hydrocarbons have relatively high vapor pressures, their introduction into subsurface soil results in vapor-phase permeation and transport. If they reach the water table and travel in solution with ground water, vapors can emanate into the overlying soil if the soil has a relatively high permeability. Thus, measuring the concentrations of organic compounds in the soil-gas can give some indication of their presence in soil or ground water. The soil-gas data can be used to assess the size of the area affected by petroleum hydrocarbons as well as to site ground-water monitoring wells.

HLA contracted Tracer Research Corporation (Tracer) of Tucson, Arizona to perform a soil-gas survey of the City Blue property and surrounding streets to assess hydrocarbon concentrations in the shallow soils. Underground Services Alert was contacted to have pre-selected locations in surrounding streets cleared of underground utilities and pipelines. Appropriate permits/approvals were obtained from the City of Oakland to perform the soil-gas survey in Oakland streets. Also, a traffic control plan was approved by the City of Oakland Traffic Engineer, Mike Veccio.

The approach of the soil-gas survey was to provide on-site sampling and analysis of soil-gas samples so that subsequent soil-gas sampling locations could be chosen based on the relative absence or presence of petroleum hydrocarbons at previous sampled locations. Soil-gas samples were to be obtained at the following locations:

- Adjacent to one of the on-site monitoring wells to establish a relationship between hydrocarbon concentrations in soil-gas data and the hydrocarbon concentrations in the ground-water plume.
- Downgradient of the City Blue site to determine the approximate size of the hydrocarbon plume.
- Upgradient of the City Blue site to determine if properties suspected of having hydrocarbon releases to the soil and ground water have impacted the subject site.

Tracer's van-mounted hydraulic press is used to push and/or hammer a 3/4-inch-diameter hollow steel probe to the target depth. Once the probe is at the target depth, a vacuum of approximately 18 inches of mercury is applied. Soil-gas from the target depth is then collected in a glass syringe from plastic tubing between the probe and vacuum pump. The soil-gas is then analyzed in the field using gas chromatography. The following compounds were analyzed in this investigation: total petroleum hydrocarbons (TPH) and benzene, toluene, ethylbenzene, and xylenes (BTEX). These compounds are common constituents of gasoline and exhibit relatively high vapor pressures.

7.3.2 Soil-Gas Survey Results

On August 14, 1989, HLA and Tracer attempted to perform a soil-gas survey at the City Blue facility and surrounding streets (Plate 2). The first sampling location was placed beside Monitoring Well MW-1A. Because of the soil conditions, the probe could not be pushed or hammered to the 15-foot target sampling depth. The soil-gas sample was collected at 5 feet below the ground surface. The soil-gas sample contained 5 parts per billion (ppb) TPH, 1 ppb toluene, and 2 ppb xylenes. Benzene and ethylbenzene

were not detected in the sample. The TPH concentrations in the soil-gas sample were lower than anticipated. The low permeability nature of the soil may have reduced the rate of vertical hydrocarbon migration.

A total of seven attempts were made to collect soil-gas samples through the surrounding streets, including Jefferson Street, San Pablo Avenue, 17th Street, and 19th Street. The sampling locations all contained concrete pavement, often greater than one foot thick, beneath the asphalt pavement. Tracer drilling equipment was not able to penetrate the concrete pavement, which was reinforced with steel rebar. Soil-gas samples were not obtained at the seven locations. The soil-gas survey was terminated when it was realized that data could not be collected because of the presence of concrete beneath the asphalt pavement. A report submitted by Tracer is attached in Appendix C.

8.0 CONCLUSIONS AND RECOMMENDATIONS

1. The site history review, review of regulatory agency contacts, and off-site reconnaissance have identified that the following sites may be potential sources of petroleum hydrocarbon contamination into the ground water. These sites are potentially upgradient of the City Blue site.

    - L-shaped building (possible service station) at 16th and Jefferson Streets
    - Bramalea Pacific at 12th and Clay Streets
    - City of Oakland at 1417 Clay Street
    - Oakland Redevelopment Agency at 1300 Clay Street
    - Oakland Redevelopment Agency at 1330 Martin Luther King, Jr. Way
    - Asphalt-paved parking lot (part of the City Center) off 14th Street between Jefferson and Clay Streets

2. The product thickness in Monitoring Wells MW-1 and MW-1A has decreased between September 1988 and July 1989. The product thicknesses in Monitoring Well MW-4 has increased during this period. The product thickness in off-site Monitoring Well MW-5 is relatively unchanged. No product has been detected in Monitoring Well MW-3.

3. The results of product lead testing indicates that the product is leaded gasoline. This finding conflicts with the City Blue product inventory records that state that unleaded gasoline was stored in the tanks during a 15-year period prior to tank excavation.

4. Off-site soil-gas samples were not obtained in nearby streets because of the presence of reinforced concrete beneath the asphalt pavement. The soil-gas survey was not effective on site because of the low permeability and high density nature of vadoze zone soils.

5. On the basis of our site history review, regulatory agency contacts, and off-site reconnaissance, there does not appear to be another potential source for the floating product on-site and in Monitoring Well MW-5 within a two-block radius. The fact that southern upgradient Monitoring Well MW-3 does not contain floating product suggests that floating product in all on- and off-site monitoring wells originated from the City Blue property. This conclusion is made despite the discrepancy between the gasoline analysis and site inventory records which indicate that only unleaded gasoline was stored on site.

6. Because upgradient Monitoring Well MW-3 contained dissolved gasoline constituents in the ground water and upgradient potential sources have been identified, it has not been determined that the sole source of dissolved gasoline in ground water at the site is from the City Blue property. HLA recommends that one or two monitoring wells be installed off-site, upgradient from the City Blue property to determine whether potential off-site sources of gasoline dissolved in the ground water have impacted the subject site. These monitoring well installations could be performed during subsequent phases of investigation and remediation at the property.

7. HLA recommends that options be evaluated for recovery of product, and remediation of contaminated soil and ground water. A remedial program should be implemented following the selection of technically feasible alternatives.

9.0 BIBLIOGRAPHY

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10.0 ILLUSTRATIONS

102147

JEFFERSON STREET

SEVENTEENTH STREET

EIGHTEENTH STREET

Concrete Sidewalk

MW-2
(ABANDONED)

Approximate Boundary of Tank Removal Excavation

Site Boundary

MW-1A

MW-1

MW-3

MW-4

PRODUCTION FACILITY

APPROXIMATE GROUNDWATER FLOW DIRECTION

Concrete Sidewalk

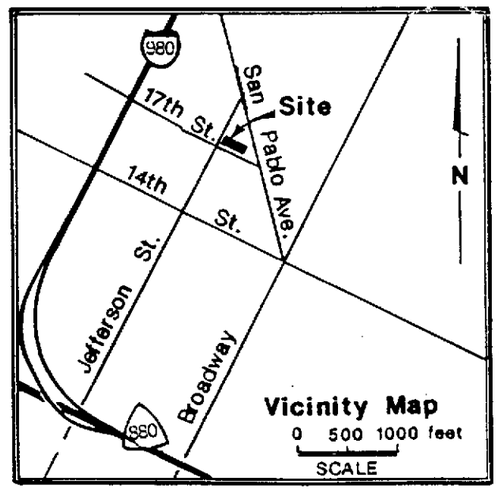
MW-5

N

EXPLANATION

MW-1 Monitoring Well Location and Number

0 10 20 40 60
Scale in Feet

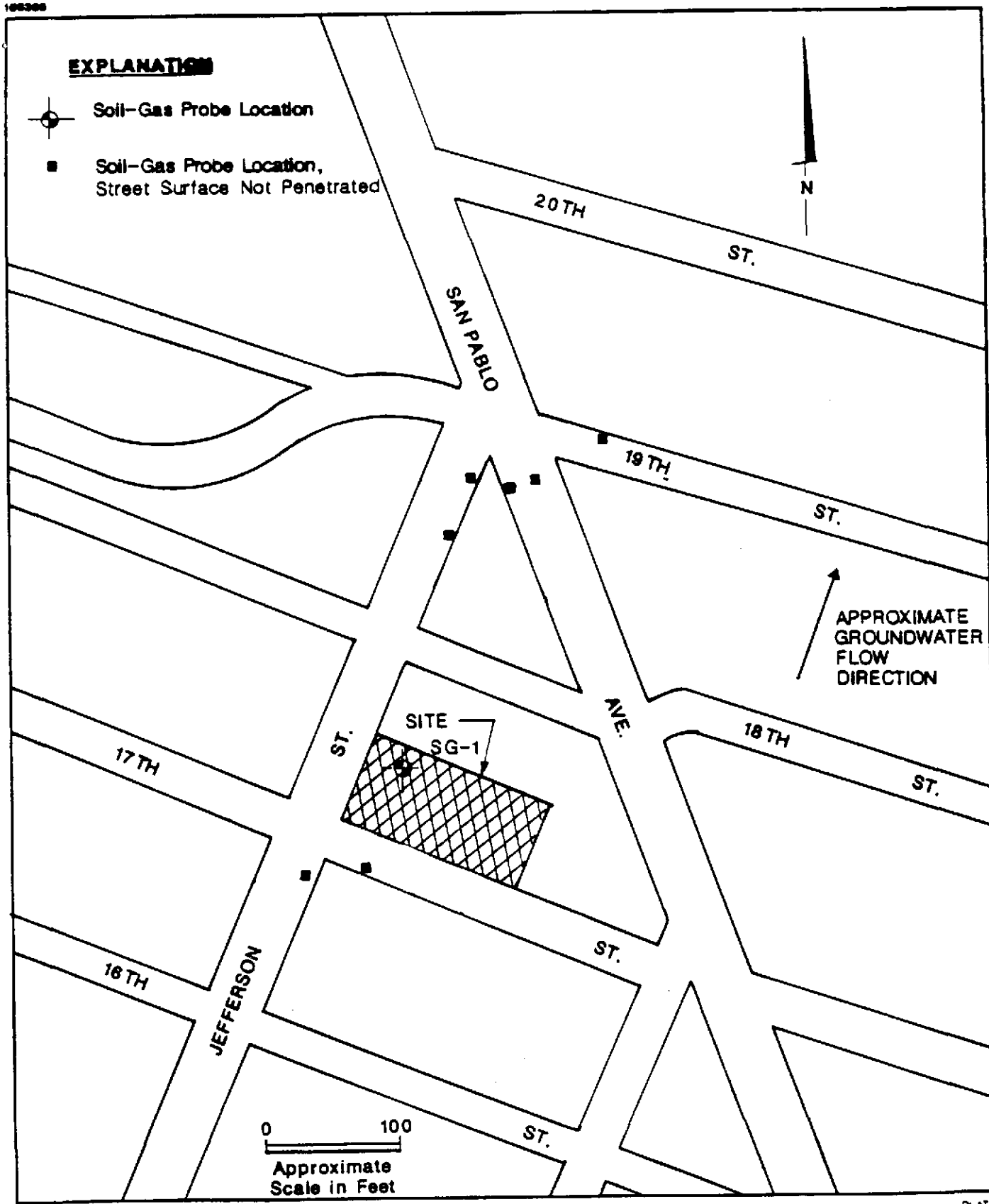


Harding Lawson Associates
Engineers, Geologists & Geophysicists

Site Plan
City Blue Production Facility
Oakland, California

PLATE **1**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
RS	18106,006.04	RFM	10/89		



PLATE

2

Harding Lawson Associates
Engineers, Geologists & Geophysicists

Soil-Gas Probe Locations
City Blue Production Facility
Oakland, California

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
TY	18106,006.04	AFM	10/89		

Appendix A

GROUND-WATER CHEMICAL TESTING RESULTS

ANALYTICAL SCIENCE ASSOCIATES, Inc.

@R 475 EL ALAMO • DANVILLE, CA 94526 • (415) 820-9058 • (415) 547-6390

7/20/89

HLA PROJECT NO.	18106,006.04
HLA CLIENT:	CITY BLUE
ATTENTION:	B. BREYNAERT
DATE SAMPLED:	7/12/89
DATE RECEIVED:	7/12/89
DATE ANALYZED:	7/18/89
METHOD:	8015, 602
MATRIX:	WATER
PREFIX:	MW-

	MW5 15:00	MW3 17:00	D.L.
TPH AS GASOLINE	*	13	0.05
BENZENE	*	0.004	0.0005
TOLUENE	*	0.16	0.001
XYLENE(S)	*	0.42	0.001
ETHYL BENZENE	*	0.21	0.001

*Sample broken.
All values in ppm.

Signed: William Prater

William Prater
Senior Scientist

Harding Lawson Associates
666 Howard Street, Third Floor
San Francisco, California 94105
415/543-8422
Telecopy: 415/777-9706

CHAIN OF CUSTODY FORM

Lab: ASA

* Collection Codes *

Job Number: 18106,008.04

Name/Location:

Project Manager: B. Breyfogle

Samplers: [illegible] D. [illegible]

Recorder: [illegible] (Signature Required)

SOURCE CODE	MATRIX: Water	Sediment	Soil	Oil	#CONTAINERS & PRESERV.: Unpres.	H_2SO_4	HNO_3	SAMPLE NUMBER OR LAB NUMBER (Yr / Wk / Seq)	DATE: Yr	Mo	Dy	Time	STATION DESCRIPTION/ NOTES
23	X						X	MW-5	89	07	12	1500	
23	X						X	MW-3	89	07	12	1700	

ANALYSIS REQUESTED

Sample	EPA 601/8010	EPA 602/8020	EPA 624/8240	EPA 625/8270	Priority Pllmt. Metals	Benzene/Toluene/Xylene	Total Petrol. Hydrocarb. (as gas)
MW-5	X						X
MW-3	X						X

LAB NUMBER (Yr / Wk / Seq)	DEPTH IN FEET	COL MTD CD	QA CODE	MISCELLANEOUS

CHAIN OF CUSTODY RECORD

RELINQUISHED BY: (Signature)	RECEIVED BY: (Signature)	DATE/TIME
[illegible signature]		7/12/89 17:30
RELINQUISHED BY: (Signature)	RECEIVED BY: (Signature)	DATE/TIME
RELINQUISHED BY: (Signature)	RECEIVED BY: (Signature)	DATE/TIME
RELINQUISHED BY: (Signature)	RECEIVED BY: (Signature)	DATE/TIME
DISPATCHED BY: (Signature) DATE/TIME	RECEIVED FOR LAB BY: (Signature)	DATE/TIME

METHOD OF SHIPMENT

Laboratory Copy White | Project Office Copy Yellow | Field or Office Copy Pink

6533

ANALYTICAL SCIENCE ASSOCIATES, Inc.

@R 475 EL ALAMO • DANVILLE, CA 94526 • (415) 820-9058 • (415) 547-6390

7/20/89

HLA PROJECT NO.	18106.006.04
HLA CLIENT:	CITY BLUE
ATTENTION:	B. BREYNAERT
DATE SAMPLED:	7/13/89
DATE RECEIVED:	7/13/89
DATE ANALYZED:	7/14-17/89
METHOD:	8015, 602
MATRIX:	WATER
PREFIX:	MW-

AUG 2 19[illegible]

	MW-1	MW-1A	MW-4	D.L.
TPH AS GASOLINE	190	220	93	0.05
BENZENE	1.0	1.2	0.46	0.01
TOLUENE	8.9	9.1	4.2	0.01
XYLENE(S)	19	24	9.7	0.01
ETHYL BENZENE	2.9	3.1	1.2	0.01

All values in ppm.
All other 602 parameters on attached table are ND.

Signed: William Prater

William Prater
Senior Scientist

Harding Lawson Associates
666 Howard Street, Third Floor
San Francisco, California 94105
415/543-8422
Telecopy: 415/777-9706

CHAIN OF CUSTODY FORM

Lab: ASA

Job Number: 18106.006.04
Name/Location: City Blue
Project Manager: [illegible]

Samplers: [illegible]

Recorder: [illegible]
(Signature Required)

SOURCE CODE		MATRIX: Water	Sediment	Soil	Oil	#CONTAINERS & PRESERV.: Unpres.	H_2SO_4	HNO_3	ICE	SAMPLE NUMBER OR LAB NUMBER: Yr	Wk	Seq	DATE: Yr	Mo	Dy	Time	STATION DESCRIPTION/NOTES	EPA 601/8010	EPA 602/8020	EPA 624/8240	EPA 625/8270	Priority Pllnt. Metals	Benzene/Toluene/Xylene	Total Petrol. Hydrocarb.	# Red Gas
2	3	X							X	MW-	1		89	07	13	1700	2x VOA		X					X	
2	3	X							X	MW-	1a		89	07	13	1700	"		X					X	
2	3	X							X	MW-	4		89	07	13	1700	"		X					X	

LAB NUMBER: Yr	Wk	Seq	DEPTH IN FEET	COL MTD CD	QA CODE	MISCELLANEOUS

CHAIN OF CUSTODY RECORD

RELINQUISHED BY: (Signature)	RECEIVED BY: (Signature)	DATE/TIME
[illegible]		7/13 1700

DISPATCHED BY: (Signature)	DATE/TIME	RECEIVED FOR LAB BY: (Signature)	DATE/TIME

METHOD OF SHIPMENT

Laboratory Copy White | Project Office Copy Yellow | Field or Office Copy Pink

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ANALYTICAL SCIENCE ASSOCIATES, Inc.

475 EL ALAMO • DANVILLE, CA 94526 • (415) 820-9058 • (415) 547-6390

eR

AUG 2

7/31/89

HLA PROJECT NO.	18106.006.04
HLA CLIENT:	CITY BLUE
ATTENTION:	B. BREYNAERT
DATE SAMPLED:	7/27/89
DATE RECEIVED:	7/27/89
DATE ANALYZED:	7/29/89
METHOD:	8015, 602
MATRIX:	WATER
PREFIX:	MW

	MW-5	D.L.
TPH AS GASOLINE	14	0.05
BENZENE	0.007	0.001
TOLUENE	0.19	0.001
XYLENE(S)	0.50	0.001
ETHYL BENZENE	0.21	0.001

All values in ppm.

Signed: William Prater

William Prater
Senior Scientist

HLA
Harding Lawson Associates
666 Howard Street, Third Floor
San Francisco, California 94105
415/543-8422
Telecopy: 415/777-9706

CHAIN OF CUSTODY FORM

Lab: ASA

Job Number: 18106,006.04

Name/Location: City Blue

Project Manager: B. Breynaert

Samplers: D Dixon

Recorder: (Signature Required)

SOURCE CODE	MATRIX: Water	Sediment	Soil	Oil	#CONTAINERS & PRESERV.: Unpres.	H_2SO_4	HNO_3		SAMPLE NUMBER OR LAB NUMBER: Yr	Wk	Seq	DATE: Yr	Mo	Dy	Time	STATION DESCRIPTION/ NOTES	ANALYSIS REQUESTED: EPA 601/8010	EPA 602/8020	EPA 624/8240	EPA 625/8270	Priority Pllmt. Metals	Benzene/Toluene/Xylene	Total Petrol. Hydrocarb.	
23	X							X	MW	-	5	89	07	27	1030	2 X VOA						X	X	

Please call with oral results as soon as possible

LAB NUMBER: Yr	Wk	Seq	DEPTH IN FEET	COL MTD CD	QA CODE	MISCELLANEOUS

Delivered intact at 12:15

CHAIN OF CUSTODY RECORD

RELINQUISHED BY: (Signature)	RECEIVED BY: (Signature)	DATE/TIME
[signature]		
RELINQUISHED BY: (Signature)	RECEIVED BY: (Signature)	DATE/TIME
RELINQUISHED BY: (Signature)	RECEIVED BY: (Signature)	DATE/TIME
RELINQUISHED BY: (Signature)	RECEIVED BY: (Signature) [signature]	DATE/TIME

DISPATCHED BY: (Signature)	DATE/TIME	RECEIVED FOR LAB BY: (Signature)	DATE/TIME

METHOD OF SHIPMENT

Laboratory Copy White | Project Office Copy Yellow | Field or Office Copy Pink

6533

Appendix B

PRODUCT CHEMICAL TESTING RESULTS

SGS Control Services Inc.
Redwood Petroleum and Petrochemical Division

435 Valley View
El Sobrante, CA 94803
Tel. (415) 236-3007
TWX 910-382-6013
FAX (415) 223-0956

THIS DOCUMENT HAS BEEN ISSUED IN ______ ORIGINALS. EACH BEARING THE SAME NUMBERS & DATES.

AUGUST 21, 1989

Analytical Report No. 205841

LAB REFERENCE NO.: 8908-1805-ES

SAMPLE DESCRIPTION: MOTOR GASOLINE

SAMPLE MARKED: SUBMITTED SAMPLE

DATE SAMPLED: AUGUST 18, 1989

SUBMITTED BY: HARDING LAWSON ASSOC.

LOCATION: SAN FRANCISCO, CA

RESULTS OF ANALYSIS:

BASED ON SAMPLES SUBMITTED TO US AND TESTED IN OUR LABORATORY, WE REPORT TO YOU THE FOLLOWING:

METHOD	TEST	SOURCE : 23 LAB# : MW-4	SOURCE : 23 LAB# : MW-1
D-3237	LEAD, g/gal	1.40	0.33

SGS CONTROL SERVICES, INC.

GUY P. CHANDLER
REDWOOD DIVISION

GPC:cc

Member of the **SGS** Group (Société Générale de Surveillance)

"Description of the tested sample material is as indicated by our customer. This report covers only those chemical components and physical properties for which tests were required. No other tests were performed and no liability is assumed for anything not tested and reported."

Appendix C

SOIL-GAS SAMPLING RESULTS

Tracer Research Corporation

3855 North Business Center Drive Tucson, Arizona 85705 (602) 888-9400

September 11, 1989

Rick McCartney
Harding Lawson Associates
666 Howard Street
San Francisco, California 94105
(415)543-8422

Dear Mr. McCartney:

Tracer Research Corporation (TRC) attempted to perform a soil gas survey at the City Blue Production facility site in Oakland, California. The survey was attempted on August 14, 1989 under contract to Harding Lawson Associates. The purpose of the investigation was to delineate petroleum compounds in groundwater where evidence of contamination was present or suspected and to locate potential sources of these compounds in soil.

Attempts were made to collect soil gas samples at eight sampling locations on-site and along the streets in the vicinity of the site. However, only one soil gas sample was collected and analyzed in the field. Proposed sampling locations were planned in the street, which consists of a shallow layer of asphalt over a layer of concrete. Samples were unable to be collected due to the difficulty in penetrating both layers with a Kango roto-hammer. Sampling probes could not be inserted into the ground. In addition, low permeability soils at 10 feet prevented the collection of soil gas at sampling location SG-01.

Soil gas sample SG-01 was collected at 5 feet and analyzed for benzene, toluene, ethylbenzene, xylenes and total hydrocarbons. The condensed data for SG-01 is enclosed and reported in micrograms per liter (ug/L). Xylenes are reported as the total of the three xylene isomers and total hydrocarbons are approximately C4-C9 aliphatic, alicyclic and aromatic compounds. If you need further information or have any questions, please do not hesitate to contact me.

Best regards,
TRACER RESEARCH CORPORATION

Martin D. Favero
Senior Staff Hydrogeologist

HARDING LAWSON ASSOCIATES/CITY BLUE/OAKLAND,CALIFORNIA JOB#H-169-89-SG
8-14-89
CONDENSED DATA

SAMPLE	BENZENE ug/l	TOLUENE ug/l	ETHYL BENZENE ug/l	XYLENE ug/l	TOTAL HYDROC. ug/l
AIR SAMPLE	<0.03	0.07	<0.04	<0.04	0.07
SG-01-3	<0.03	1	<0.04	2	5

Analyzed by: J. Tangeman
Checked by: K. Ptak
Proofed by: L. Laplander

Tracer Research Corporation

DISTRIBUTION

3 copies: Blue Print Service Company
149 Second Street
San Francisco, California 94105
Attention: Mr. Paul Koze

TLO/dm/B4187-R22

QUALITY CONTROL REVIEWER

James Ordons
Geologist