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TRANSMITTAL

DATE: 2/6/92

ES PROJECT #: SY132.31

TO: Alameda Co. Dept. of
Environmental Health
80 Swan Way, Room 200
Oakland, CA 94621

ATTN: Mr. Dennis Byrne

RE: Greyhound Terminal, Location 8934
Oakland, CA

WE ARE SENDING YOU:

ATTACHED x **UNDER SEPARATE COVER** _____

DOCUMENTS x **OTHER** _____

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QUANTITY	DATE	ITEM
1	January 1992	Preliminary Site Investigation Report, Greyhound Terminal, Location 8934, Redding, CA

REMARKS:

SIGNED: Neal E. Siler

Neal E. Siler

COPY TO: **FILE** ___ **AUTHOR** ___ **READING** ___ **OTHER** _____

PRELIMINARY SITE INVESTIGATION REPORT
GREYHOUND TERMINAL
Location 8934
Oakland, California

PREPARED FOR

GREYHOUND LINES, INC.
Dallas, Texas

PREPARED BY

ES
ENGINEERING-SCIENCE
Liverpool, New York

JANUARY 1992
SY132.31

Preliminary Site Investigation Report

GREYHOUND TERMINAL
LOCATION 8934
OAKLAND, CALIFORNIA

Prepared for

Greyhound Lines, Inc.
Dallas, Texas

January 1992

Prepared by

ENGINEERING-SCIENCE, INC.
DESIGN • RESEARCH • PLANNING
1301 MARINA VILLAGE PARKWAY, ALAMEDA, CA 94501 • 510/769-0100
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27 January 1992

Mr. Dennis Byrne
Alameda County Department of Environmental Health
80 Swan Way, Room 200
Oakland, California 94621

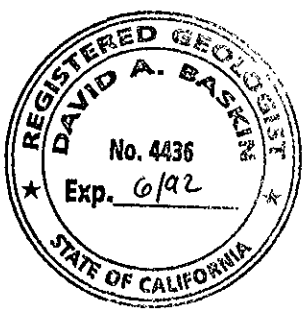
Subject: Site Assessment for Greyhound Location 8934, Oakland, California

Dear Mr. Byrne:

Enclosed is your copy of the Site Assessment Report prepared for the Greyhound Terminal, 2103 San Pablo Avenue, Oakland, California. Descriptions of work implemented, evaluations formulated and conclusions made are presented in this report.

The scope of work discussed in this report consists of an exploratory soil boring/sampling program, installation of permanent monitoring wells and implementation of groundwater monitoring. Analytical results for the soil and groundwater samples collected are interpreted in accordance with current California regulations and guidelines concerning leaking underground fuel tanks (LUFTs).

We look forward to your favorable review of this report. In the interim, should you require any additional information and/or clarifications, please contact us at (510) 769-0100.



Very truly yours,

ENGINEERING-SCIENCE, INC.

David A. Baskin

David A. Baskin, R.G.
Principal Hydrogeologist

James N. Baker/NES

James N. Baker, P.G.
Program Manager

RSM/dka/194-39a.R2

cc: Mr. Thomas Portele, GLI, Dallas, Texas
Mr. Richard Hiatt, RWQCB, Oakland, California

Preliminary Site Investigation Report

GREYHOUND TERMINAL
LOCATION 8934
OAKLAND, CALIFORNIA

Prepared for

Greyhound Lines, Inc.
Dallas, Texas

January 1992

Prepared by

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PRELIMINARY SITE INVESTIGATION REPORT
GREYHOUND TERMINAL

Location 8934
Oakland, California

PROJECT BACKGROUND

Greyhound Lines, Inc. (Greyhound) operates a passenger bus terminal at 2103 San Pablo Avenue, Oakland, California (Figures 1 and 2). As part of routine terminal operations, Greyhound maintained six underground fuel storage tanks (UFSTs) for refueling buses. Reportedly, these UFSTs were used to store diesel and/or gasoline and have not been in service for the past thirty years (Brown and Caldwell Consulting Engineers, 1989). In 1989, the number, size, and geometry of these UFSTs were characterized (Figure 3). The exact size and orientation of one of the tanks (T6) could not be confirmed at the time of the 1989 investigation due to restricted access. The tank contents were also analyzed for BTEX (Table 1). Based on the analytical results, it was concluded that the tanks probably contained a mixture of degraded diesel fuel and water (Brown and Caldwell Consulting Engineers, 1989). A copy of the report documenting the 1989 investigation is included as Appendix A.

In addition, a soil boring/sampling program was implemented during the 1989 investigation to assess the potential for environmental contamination associated with the past operations of the UFSTs. A total of three soil borings were advanced at the locations shown on Figure 3. Two samples were collected from each borehole and analyzed for total fuel hydrocarbons (TFH) and benzene, toluene, ethylbenzene and total xylenes (BTEX). Soil analytical results from the 1989 investigation are presented in Table 2. TFH concentrations ranged from non-detect to 4,260 mg/Kg. Toluene, ethylbenzene and total xylenes concentrations ranged from non-detect to 4.0, 0.0008 to 49.5 and non-detect to 2.0 mg/Kg, respectively. Benzene was either not detected or interpretation of the results was not possible (see Table 2; Appendix A).

The six UFSTs were removed after the 1989 investigation. Although the site is listed on the San Francisco Bay Region of the California Regional Water Quality Control Board's (RWQCB's) fuel leak list (RWQCB, 1991), documentation of the removal of the UFSTs was not available at the RWQCB. The perimeter of the excavation boundary can be observed at the site, and, three existing monitoring wells are located within the excavation boundary. Two additional monitoring wells were identified 35 to 50 feet west of the site in Castro Street (Figure 4). These wells are not listed in the Alameda County Public Works Agency (ACPWA) well inventory (1991).

On November 11, 1991, a preliminary site assessment was initiated at the project site. The purpose of the assessment is to comply with recommendations outlined in the Leaking Underground Fuel Tank (LUFT) Field Manual (1989) and RWQCB documentation (1985; 1990). A total of five soil borings were advanced to evaluate the type, magnitude and lateral and vertical extent of any soil contamination that might be present as a result of Greyhound's past fueling operations. A soil sample was collected from each boring and analyzed for total petroleum hydrocarbons as diesel (TPHD) and (BTEX). The soil borings were converted to monitoring wells to characterize hydrogeologic conditions and groundwater quality. The wells were monitored for free-product accumulation and depth to groundwater (see Table 3 and Figure 5), and groundwater samples were collected and analyzed for TPHD and BTEX (see Figure 7).

This report describes the implementation of post-closure site assessment work performed by Engineering-Science, Inc. (ES) at the Greyhound Terminal, 2103 San Pablo Avenue, Oakland, California. The scope of work was presented to Greyhound in a proposal dated September 17, 1991. This scope of work was performed between November 11 and 25, 1991.

SITE DESCRIPTION

This section presents a description of the site, including surrounding land use, climate, geology, hydrology and surface and groundwater use.

Local Description and Surrounding Land Use and Climate

The triangular-shaped Greyhound site is located at the corner of San Pablo Avenue and Castro Street near the central business district of Oakland, California (Section 26,

Township 1S, Range 4W; United States Geological Survey, 1980) (Figures 1 and 2). The site, which encompasses an area of approximately 61,250 square feet, is entirely paved with asphalt and concrete. Land use in the immediate vicinity of the terminal is mixed (commercial/residential). The terminal is bordered on the west by Castro Street, on the east by San Pablo Avenue and Martin Luther King Way, on the south by 20th Street and on the north by Castro Street/San Pablo Avenue.

The Oakland area has a climate characterized by mild, wet winters and warm dry summers. Precipitation is seasonal, falling mostly between November and March. Average annual precipitation recorded over a ninety year period (1885-1975) for the Oakland area is 20 inches (Alameda County Flood Control and Water Conservation District, 1988). However, the area is entering the sixth year of below normal rainfall and a much dryer climate is more characteristic of current conditions.

Local Geology

The site is located in the San Francisco Bay Region of the Coast Ranges Geomorphic Province of California (Norris and Webb, 1990). The area, including the Greyhound facility, is underlain by a thick sequence of unconsolidated Pleistocene deposits that include the Merritt Sand and Older Alluvium. The Merritt Sand encountered directly below the site consists of loose, moderate- to well-sorted, fine- to medium-grained, clayey to silty sand and lenses of sandy clay and clay. It has a maximum thickness of 65 feet in the East Bay Plain Area. Underlying the Merritt Sand is 700 to 800 feet of Older Alluvium comprised of poorly consolidated to unconsolidated clay, silt, sand and gravel (Helley, Lajoie and Burke, 1972; Alameda County Flood Control and Water Conservation District, 1988).

Beneath the Greyhound facility the subsurface materials encountered during this investigation include sand, silt and clay. The predominant materials encountered during boring operations were silty, sandy clay with layers/lenses of fine- to medium-grained sand, silty sand and clayey sand interbedded within layers of clay and silty clay (see Appendix B). Hydraulic conductivity values reported for silty, sandy clays range from 10^{-9} to 10^{-4} cm/sec (Freeze and Cherry, 1979; Domenico and Schwartz, 1990).

Hydrology

The nearest surface water body to the Greyhound site is Lake Merritt (Figure 1), located approximately 1,700 feet east of the site. Lake Merritt is a brackish-water estuarine environment, connected to and influenced by the tidal fluctuations of San Francisco Bay. The Oakland Inner Harbor, the closest portion of the bay, is located approximately 2,700 feet south-southwest of the site.

The Greyhound facility lies within the Merritt Sand subarea of the East Bay Plain groundwater basin. Locally, groundwater is encountered under water-table conditions at a depth of 19 to 20 feet below ground surface (bgs). Regional groundwater flow is to the west-southwest (Alameda County Flood Control and Water Conservation District, 1988). At the Greyhound site shallow groundwater flow is to the north-northwest (Figure 5).

Local Surface Water and Groundwater Use

The City of Oakland obtains its municipal and industrial water from the East Bay Municipal Utility District (EBMUD). EBMUD imports this water primarily from the surface waters of the Sierra Nevada Mountain Range, located approximately 200 miles east of the site.

Groundwater in the area is utilized for limited irrigation and industrial purposes. The area is not considered a primary source of water supply because of the limited areal extent and thickness of the water-bearing unit (Alameda County Flood Control and Water Conservation District, 1988).

Approximately 384 wells are located within Section 26, Township 1S, Range 4W (ACPWA, 1991). The vast majority (99%) of these wells are used to monitor or extract contaminated groundwater at commercial/industrial sites. One of the wells is used to supply water for irrigation. None of the wells located in Section 26 are used for municipal water supply.

SITE INVESTIGATION

The tasks described in this section were performed between November 11 and 25, 1991 and include: soil boring and sampling, monitoring well construction, groundwater monitoring and storm drain inspection. All borehole cuttings, decontamination rinsate

liquids and purge water produced were stored on-site in labeled, 55-gallon drums to be disposed of by Greyhound.

Prior to the initiation of site activities, soil boring/well construction permits were obtained from the Alameda County Flood Control and Water Conservation District. Copies of the permit application are included in Appendix B.

Soil Boring and Sampling Procedures ES-1 through ES-5

Between November 11 and 14, 1991, a total of five soil borings were advanced at the site to characterize the type, magnitude and lateral and vertical extent of hydrocarbon contamination. Appendix B contains descriptions of subsurface materials encountered and soil sampling intervals.

Each borehole was initially advanced using a 7-inch (outside diameter) hollow-stem auger. Soil samples were collected using continuous thin-wall sampling techniques (ASTM Standard D-1587). No soil samples designated for chemical analysis were collected in the saturated zone.

Representative soil samples were collected in the internal brass sleeves of the thin-wall sampler. Soil in each sleeve section was visually inspected for signs of staining, screened for the presence of hydrocarbon odors and tested for organic vapors with a photoionization detector (PID). Based on PID readings, one soil sample per boring was selected and sent to an approved California Department of Toxic Substance Control (DTSC) certified hazardous waste laboratory where it was analyzed for TPHD by DTSC Leaking Underground Fuel Tank (LUFT) Method (modified EPA Method 8015) and BTEX by EPA Method 8020.

Soil sampling protocol consisted of capping each end of the brass sleeve section with Teflon-tape and non-reactive plastic caps. A chain-of-custody record accompanied each sample shipment from collection at the site to the laboratory. Each sample was individually labeled, recorded in the field notebook and on the chain-of-custody record, packed in ice and sealed inside an insulated shipping container for same day delivery to the analytical laboratory. The remaining portions of the thin-wall sample were used to describe subsurface materials on the boring log form.

Prior to advancing each boring, all downhole drilling and sampling equipment was decontaminated with an Alconox solution followed by steam cleaning.

Well Installation Procedures

Each soil boring was enlarged and deepened using a 10.5-inch (outside diameter) hollow-stem auger and converted to a groundwater monitoring well. Well construction summaries are contained in Appendix B.

Each new permanent monitoring well was constructed of four-inch inside diameter (ID) flush joint Schedule 40 polyvinyl chloride (PVC) well screen and casing. The final depth of the borings and screened intervals were determined in the field based on data collected at the time the borings were advanced. All of the wells except ES-3 were completed to a depth of 30 feet bgs. Well ES-3 was completed to a depth of 35-feet bgs to characterize the competency of the clay layer encountered at 25 feet (Appendix B). A clay layer in excess of 5 feet in thickness is defined as competent (RWQCB, 1985).

Each well was completed with 20 feet of 0.010-inch factory-milled screen positioned to straddle the water table, with 5-feet above and 15-feet below the unsaturated/saturated interface. The assembled well casing was installed through the 10.5 inch outside diameter (OD) augers and No. 3 Monterey sand, a size compatible with the well screen slot size (0.010-inch), was tremied through the annular space between the well casing and auger. The sand pack was constructed to extend at least one foot above the top of the well screen. Bentonite pellets were tremied through the annular space to form a one foot thick bentonite seal above the sand pack. Potable water was then added to hydrate the bentonite. A cement/bentonite grout (95% Portland cement/5% bentonite) was then backfilled from the top of the bentonite plug to ground surface. The PVC casing was completed with a vented locking cap and covered by a flush mounted, steel protective curb box. The curb box was grouted in place to limit disturbance to the well casing.

Approximately twenty-four hours after completion of the wells, the drilling contractor developed the wells by bailing. Removal of water continued until each well produced clear, sediment-free water or at least six well volumes had been removed from each well. After development, the wells were left undisturbed for 96 hours, allowing static water levels to equilibrate prior to groundwater monitoring. Between well locations, all

equipment used to develop the wells was thoroughly steam-cleaned to prevent the possibility of cross-contamination.

Groundwater Monitoring

On November 19, 1991, 96 hours after the wells were developed, groundwater monitoring of the five newly installed wells was performed. Groundwater monitoring consisted of measurement for free-product thickness and depth to water, and the collection of water quality samples from the wells. The free-product thickness and the static water level were measured in each well using an electronic oil-water interface probe and a water level indicator. After each measurement, the water level indicator and the oil-water interface probe were washed with an Alconox solution followed by two rinsings in deionized water.

Groundwater sampling protocol followed the recommended guidelines of the RWQCB for sampling "free-phase" floating product (RWQCB, 1985). A quartz/Teflon bailer was used to collect a sample at the free-product/groundwater interface. This sample was field inspected for free product thickness and the presence of any odor or sheen. Water quality samples were collected using a quartz/Teflon bailer after purging a minimum of three (3) times the submerged volume of the well casing from each well. Wells were purged with a 2-inch diameter, stainless steel, submersible, electric pump (Grundfos Model Redi-Flow 2) then sampled with a quartz/Teflon bailer. During the purging of the wells, physical parameters (temperature, hydrogen ion index, and electric conductivity) were measured to characterize the stability of the sampled groundwater (see Groundwater Sampling Field Notes, Appendix C).

Samples were collected in two 1-liter amber bottles (TPHD) and three 40-ml glass volatile organic analysis (VOA) vials (BTEX). All samples were labeled, refrigerated and transported to a DHS certified hazardous waste laboratory for analysis of TPHD using the DTSC/LUFT Method and BTEX using EPA Method 8020.

Following each well sample collection, all sampling equipment was washed with an Alconox/water solution and rinsed three times with deionized water. In addition, wells that showed the lowest PID readings were sampled first, so that the potential for cross-contamination during sampling was minimized.

Free-Product Thickness Measurements and Groundwater Elevations

Each well was monitored for free-product thickness and depth to water. Only one well installed as part of this investigation, ES-5, contained a measurable free-product thickness (approximately 0.08-feet). Monitoring Well BC-1 (Figure 4), installed prior to this investigation, had a free-product thickness of 2.63-feet. No other newly installed or existing monitoring well contained free-product.

An oily-sheen was noted in water purged from four of the five wells sampled (ES-1, ES-2, ES-3 and ES-5). In addition, water from three wells (ES-1, ES-2 and ES-3) had a petroleum odor (see Appendix C).

Depth to water ranged from 19.25 to 20.54 feet bgs (Table 3). Depth to water was not measured in BC-2 and BC-3 because well construction documentation is not available and the well casings are out of plumb. Thus, accurate water level depths could not be obtained.

All monitoring wells were surveyed to a single fixed datum on site (later converted to an elevation above mean sea level) in order to create an accurate groundwater elevation contour map (Figure 5). Figure 5 reflects groundwater elevations on November 14, 1991 (Table 3). The groundwater elevation for BC-1 was not included on Figure 5 because of depression effects of the free-product layer. Groundwater flow at the site is in a north-northwesterly direction with a hydraulic gradient of approximately 0.002 ft/ft.

Storm Drain Inspection

On November 25, 1991, two storm drains serving the site were inspected for evidence of hydrocarbon accumulation (visible staining, hydrocarbon odors). In addition, the storm drains were monitored for total ionizable vapors (TIV) using a PID. One drain is located approximately 100-feet south of the site at the southeast corner of 20th and Castro Streets. The other drain is located about 70 feet north of the site (Figure 2). Neither storm drain displayed physical evidence of hydrocarbon accumulation and TIV measurements above background were not detected.

ANALYTICAL RESULTS

Soil and groundwater samples collected for this site investigation were analyzed for TPHD and for the aromatic hydrocarbons BTEX. TPHD analysis was performed using the DTSC/LUFT method (modified EPA Method 8015). BTEX was quantified using EPA Method 8020. All analyses were performed by a DTSC certified hazardous waste laboratory.

Tables 4 and 5 summarize the analytical results for soil and groundwater samples, respectively. These results are displayed on Figures 6 (soil) and 7 (groundwater). Complete certified analytical results are presented in Appendix D.

Soil Analytical Results

A total of five soil samples were collected and submitted for laboratory analysis. Soil samples from each borehole were screened using a PID and the sample from each borehole having the highest TIV measurement was submitted for laboratory analysis. Soil sample analytical results are summarized in Table 4 and shown on Figure 6 at the corresponding well locations.

Total Petroleum Hydrocarbons

TPHD was detected in only one of the five soil samples collected (Table 4). Sample ES-5, collected from a depth of 16.0-18.0 feet bgs, contained TPHD at a concentration of 160 mg/Kg. TPHD was not detected at any of the other well locations.

Aromatic Hydrocarbons

All samples collected were analyzed for BTEX (Table 4). Total BTEX concentration ranged from non-detect (ES-3 and ES-4) to 205,000 µg/Kg (ES-2). None of the samples contained detectable quantities of benzene. Toluene concentrations ranged from non-detect (ES-3 and ES-4) to 27,000 ug/Kg (ES-2). Ethylbenzene concentrations ranged from non-detect (ES-3 and ES-4) to 28,000 ug/Kg (ES-2). Xylene concentrations ranged from non-detect (ES-3 and ES-4) to 150,000 ug/Kg (ES-2).

Groundwater Analytical Results

A groundwater sample was collected from each of the newly constructed monitoring wells for laboratory analysis. Groundwater analytical results are summarized in Table 5 and shown on Figure 7 at the corresponding well locations.

Total Petroleum Hydrocarbons

Only one sample, ES-5, contained detectable quantities of TPHD (Table 5). The sample contained a TPHD concentration of 950 mg/L.

Aromatic Hydrocarbons

Four of the five groundwater samples contained detectable concentrations of BTEX (Table 5). No BTEX was detected in the water sample collected from ES-4. In the other four monitoring wells, benzene concentrations ranged from 61 µg/L (ES-3) to 2,100 µg/L (ES-5), toluene from 16 (ES-3) to 3,900 µg/L (ES-5), ethylbenzene from 10 (ES-1) to 840 µg/L (ES-5) and xylenes from 33 (ES-3) to 6,000 µg/L (ES-5).

REGULATORY ASSESSMENT

In California, the impacts of contamination on the environment by TPHD and BTEX are evaluated on a case-by-case basis. None of the compounds have a Total Threshold Limit Concentration (TTLC) or a Soluble Threshold Limit Concentration (STLC) value reported in Title 26, California Code of Regulations, Division 22, Section 66680. TTLC and STLC values are one criteria used to identify materials as either non-hazardous or hazardous.

The RWQCB uses 100 mg/Kg as a minimum criteria in soil samples for characterization of groundwater in leaking underground fuel tank cases. The California Department of Toxic Substance Control uses 1,000 mg/Kg as a minimum criteria for remediation. One thousand mg/Kg is considered hazardous because of its potential ignitibility.

Many local implementing agencies (LIAs), such as Alameda County Department of Environmental Health (ACDEH), use the LUFT Manual (1989) as guidance in the assessment and cleanup of UFST sites. Three site investigation categories are recognized by the LUFT Manual: Category 1, no evidence of soil contamination; Category 2, known

soil contamination; and Category 3, known or suspected groundwater contamination. Analytical results for soil samples collected during the 1989 investigation (Brown and Caldwell Consulting Engineers, 1989) and this investigation indicate that the site falls under Category 2 (known soil contamination). However, the analytical results for groundwater samples collected during this investigation indicate that the site should be considered a Category 3 (known or suspected groundwater contamination).

TPHD was detected only in the groundwater sample collected from ES-5 (950 mg/L). TPHD contamination in groundwater is evaluated on a case-by-case basis with cleanup levels assessed using RWQCB evaluations of existing and potential beneficial uses of groundwater, objectives set to meet these uses, basin plan(s) for the area, statewide policy, RWQCB policy and guidance, any existing cleanup activities and any pending enforcement actions.

All of the aromatic hydrocarbon compounds (benzene, toluene, ethylbenzene and xylenes) were detected at concentrations in excess of either their federal and/or California maximum contaminant levels (MCLs) (Title 40, Code of Federal Regulations, Sections 141.11-141.16; California Code of Regulations, Title 26, Division 22, Sections 64431-64473, Water Quality). The California MCL for benzene was exceeded in groundwater collected from ES-1, ES-2, ES-3 and ES-5 (Table 5). Toluene, ethylbenzene and xylenes were detected at concentrations in excess of their federal (toluene) and/or California (ethylbenzene, xylenes) MCLs in groundwater collected from ES-5 (Table 5).

SUMMARY AND CONCLUSIONS

The summary and conclusions presented in this section are based on data collected for and interpretations developed in this report. The summary and conclusions are presented in sections on: 1) site investigation, 2) site stratigraphy and hydrogeology, 3) soil chemistry and 4) groundwater chemistry.

Site Investigation

- Between November 11 and 14, 1991, ES advanced five soil borings at the Greyhound Terminal in Oakland, California. These boreholes were utilized for soil sampling locations.

- Groundwater in the vicinity of the site is utilized for limited irrigation and industrial purposes. The area is not currently considered a primary source of water supply. The City of Oakland obtains its drinking water from EBMUD. EBMUD imports its water from surface water supplies located 200 miles away.

Soil Chemistry

- TPHD was detected in one sample, ES-5 (collected at a depth of 16.0-18.0 feet bgs), at a concentration of 160 mg/Kg. No other soil samples contained detectable concentrations of TPHD.

- Benzene was not detected in any soil samples submitted for analysis. Toluene (non-detect to 27,000 ug/Kg), ethylbenzene (non-detect to 28,000 ug/Kg) and xylenes (non-detect to 150,000 ug/Kg) were measured in soil samples collected from ES-1, ES-2 and ES-5. BTEX was not detected in samples collected from ES-3 and ES-4.

Groundwater Chemistry

- TPHD was detected in only one sample (ES-5) at a concentration of 950 mg/L.

- Benzene (61 to 2,100 µg/L), toluene (16 to 3,900 µg/L), ethylbenzene (10 to 840 µg/L) and xylenes (33 to 6,000 µg/L) were detected in ES-1, ES-2, ES-3 and ES-5. BTEX was not detected in the sample collected from ES-4.

- The California MCLs for benzene, ethylbenzene and xylenes are 0.5 µg/L, 680 µg/L and 1,750 µg/L, respectively. There is no California MCL for toluene; however, the federal MCL for toluene is 1,000 µg/L.

- The MCL for benzene (0.5 µg/L) was exceeded in ES-1 (130 µg/L), ES-2 (390 µg/L), ES-3 (61 µg/L) and ES-5 (2,100 µg/L). The concentrations of toluene (3,900 µg/L), ethylbenzene (840 µg/L) and xylenes (6,000 µg/L) detected in ES-5 exceeded their respective federal or California MCLs.

- Analytical results indicate that groundwater quality underlying the site has been impacted by past operation of the UFST system.

- Soil samples were collected continuously during advancement of the soil borings. The sample displaying the highest TIV measurement in each borehole was submitted for chemical analysis. Soil samples were analyzed for TPHD and BTEX.

- All five soil borings were converted to permanent monitoring wells. The wells were constructed to monitor potential contamination associated with past operations of the UFST system.

- On November 14 and 19, 1991, the wells were monitored for free-product thickness and depth to water. Water quality samples were collected on November 19, 1991. The samples were analyzed for TPHD and BTEX.

- On November 25, 1991, storm drains in the vicinity of the site were monitored for physical evidence (staining, presence of odors) of hydrocarbon contamination and screened for TIV with a PID. No physical evidence of hydrocarbon contamination was observed at any of the storm drains and TIV measurements above background could not be detected with the PID.

Site Stratigraphy and Hydrogeology

- Subsurface materials encountered during boring operations consisted of silty, sandy clays with layers/lenses of sand, silty sand and clayey sand interbedded with layers of clay and silty clay. Representative hydraulic conductivity values for these materials range from 10^{-9} to 10^{-4} cm/sec. These materials are indicative of the Merritt Sand.

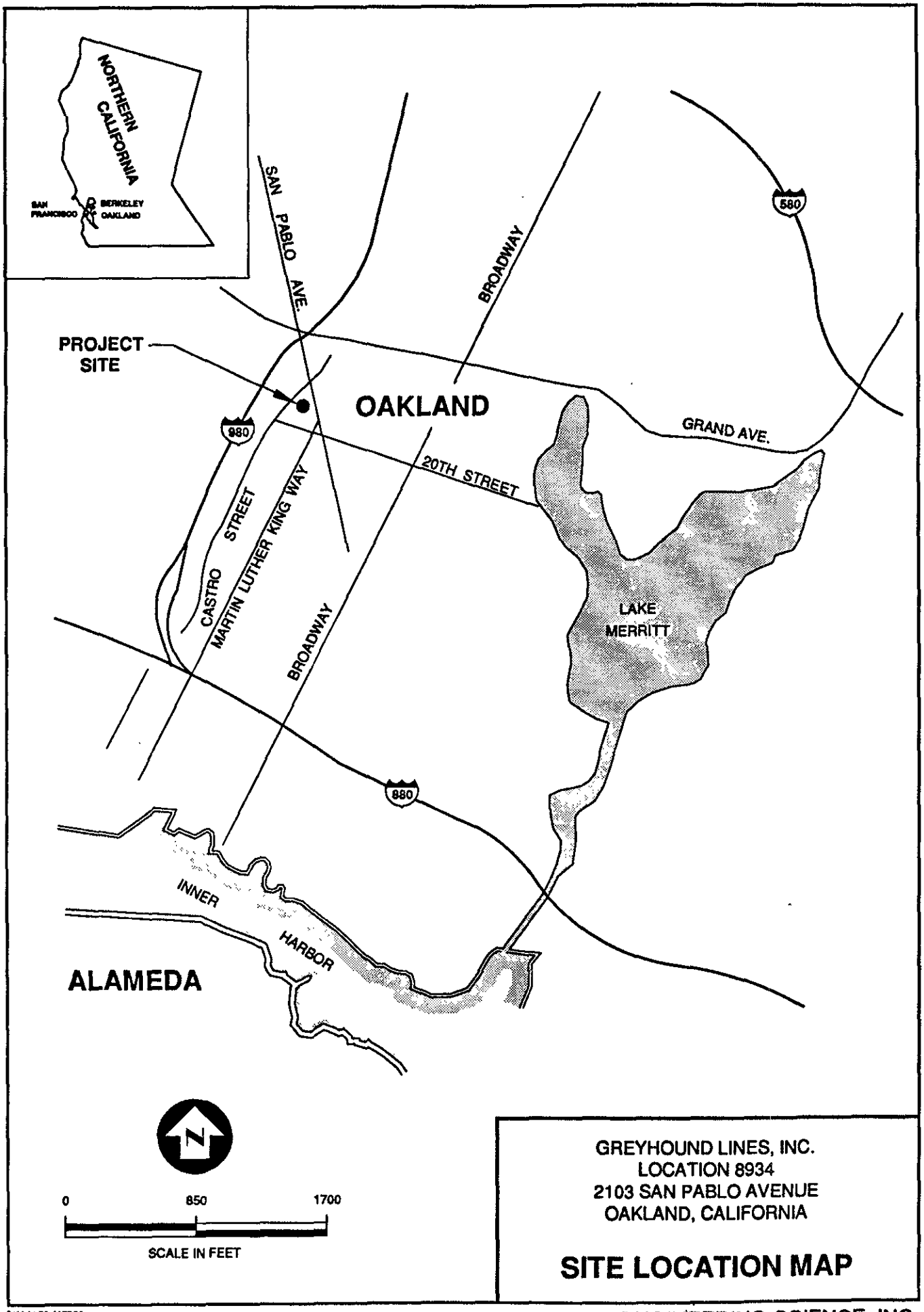
- Shallow groundwater underlying the site occurs under unconfined (water table) conditions. Groundwater was encountered at depths between 19 and 20 feet bgs.

- Groundwater flows to the north-northwest with a hydraulic gradient of 0.002 ft/ft.

- Free-product was measured in two wells, existing well BC-1 and newly installed well ES-5. Free-product thickness was measured at 0.08-feet (ES-5) and 2.63-feet (BC-1).

- The entire site is paved with asphalt/concrete, which should inhibit the vertical and horizontal migration of contamination through recharge from the surface.

FIGURE 1



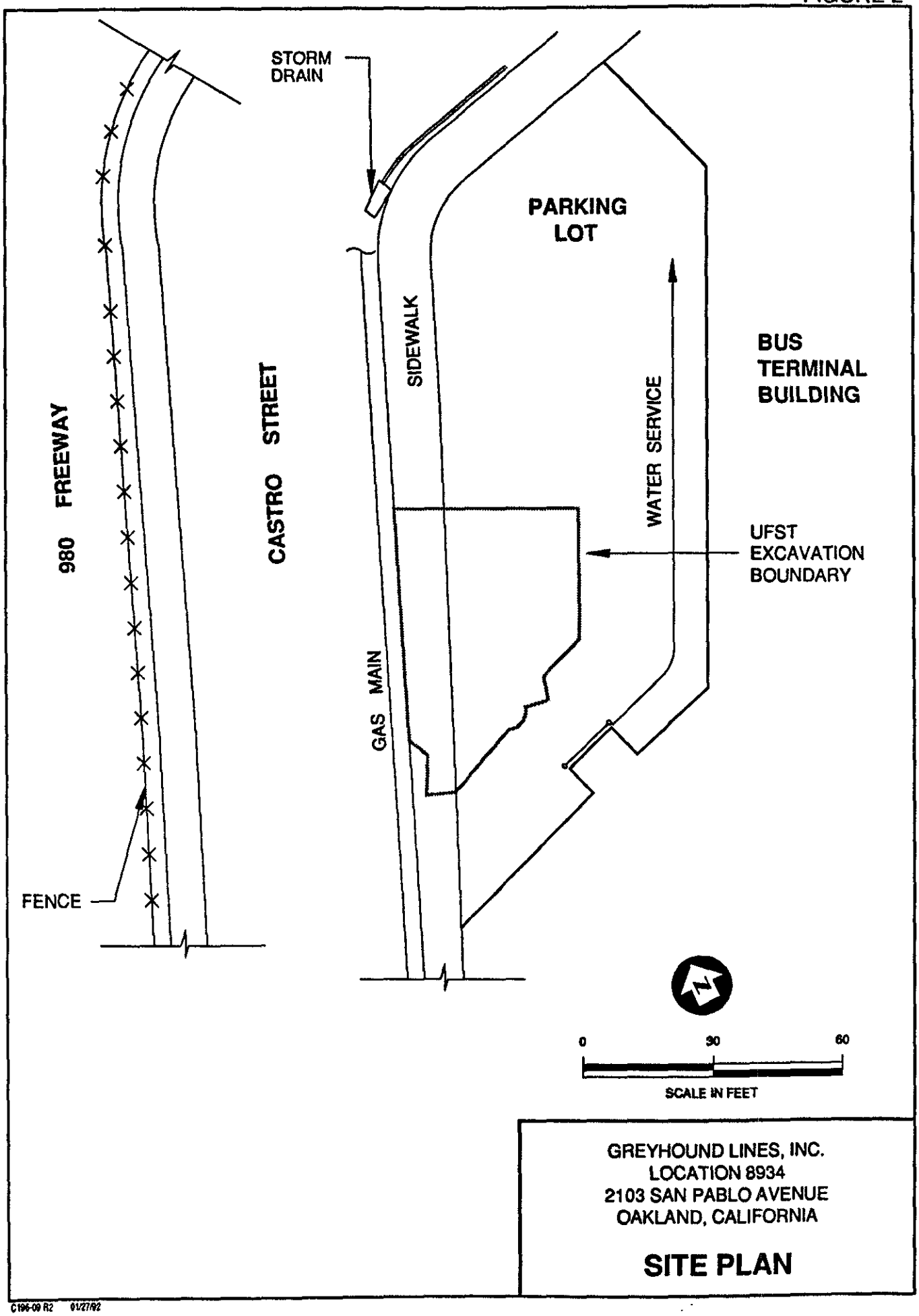
GREYHOUND LINES, INC.
LOCATION 8934
2103 SAN PABLO AVENUE
OAKLAND, CALIFORNIA

SITE LOCATION MAP

C196-04.R2 01/27/92

ENGINEERING-SCIENCE, INC.

FIGURE 2

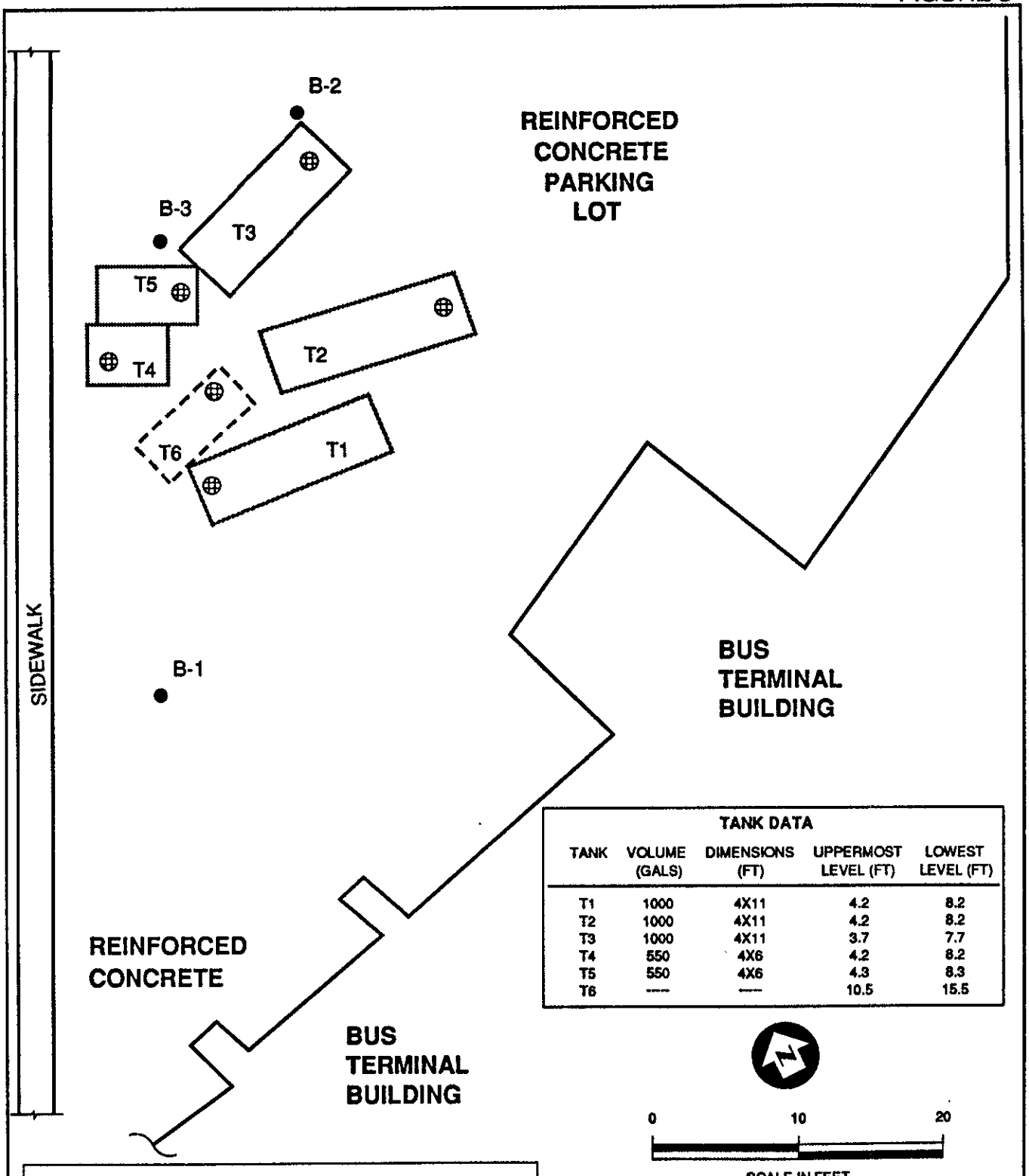


GREYHOUND LINES, INC.
LOCATION 8934
2103 SAN PABLO AVENUE
OAKLAND, CALIFORNIA

SITE PLAN

C196-09 R2 01/27/92

FIGURE 3



TANK DATA

TANK	VOLUME (GALS)	DIMENSIONS (FT)	UPPERMOST LEVEL (FT)	LOWEST LEVEL (FT)
T1	1000	4X11	4.2	8.2
T2	1000	4X11	4.2	8.2
T3	1000	4X11	3.7	7.7
T4	550	4X6	4.2	8.2
T5	550	4X6	4.3	8.3
T6	----	----	10.5	15.5

EXPLANATION

- SURFACE TRACE OF SUBSURFACE TANK
- SUSPECTED SURFACE TRACE OF SUBSURFACE TANK
- EXPLORATORY BORING SITE
- VAULT LID

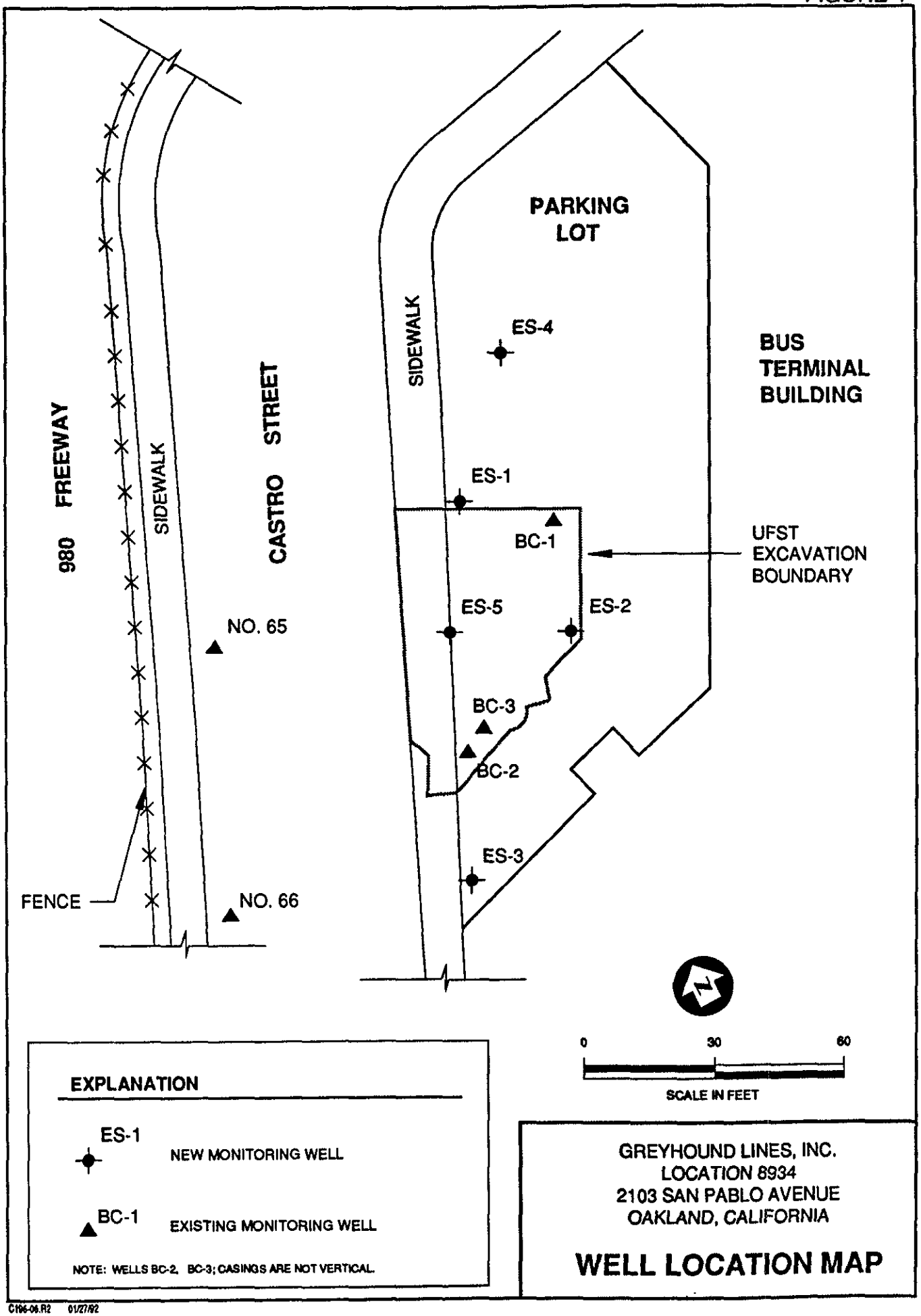
SOURCE: BROWN AND CALDWELL CONSULTING ENGINEERS, 1989

GREYHOUND LINES, INC.
LOCATION 8934
2103 SAN PABLO AVENUE
OAKLAND, CALIFORNIA

LOCATION OF TANKS AND BOREHOLES FROM 1989 INVESTIGATION

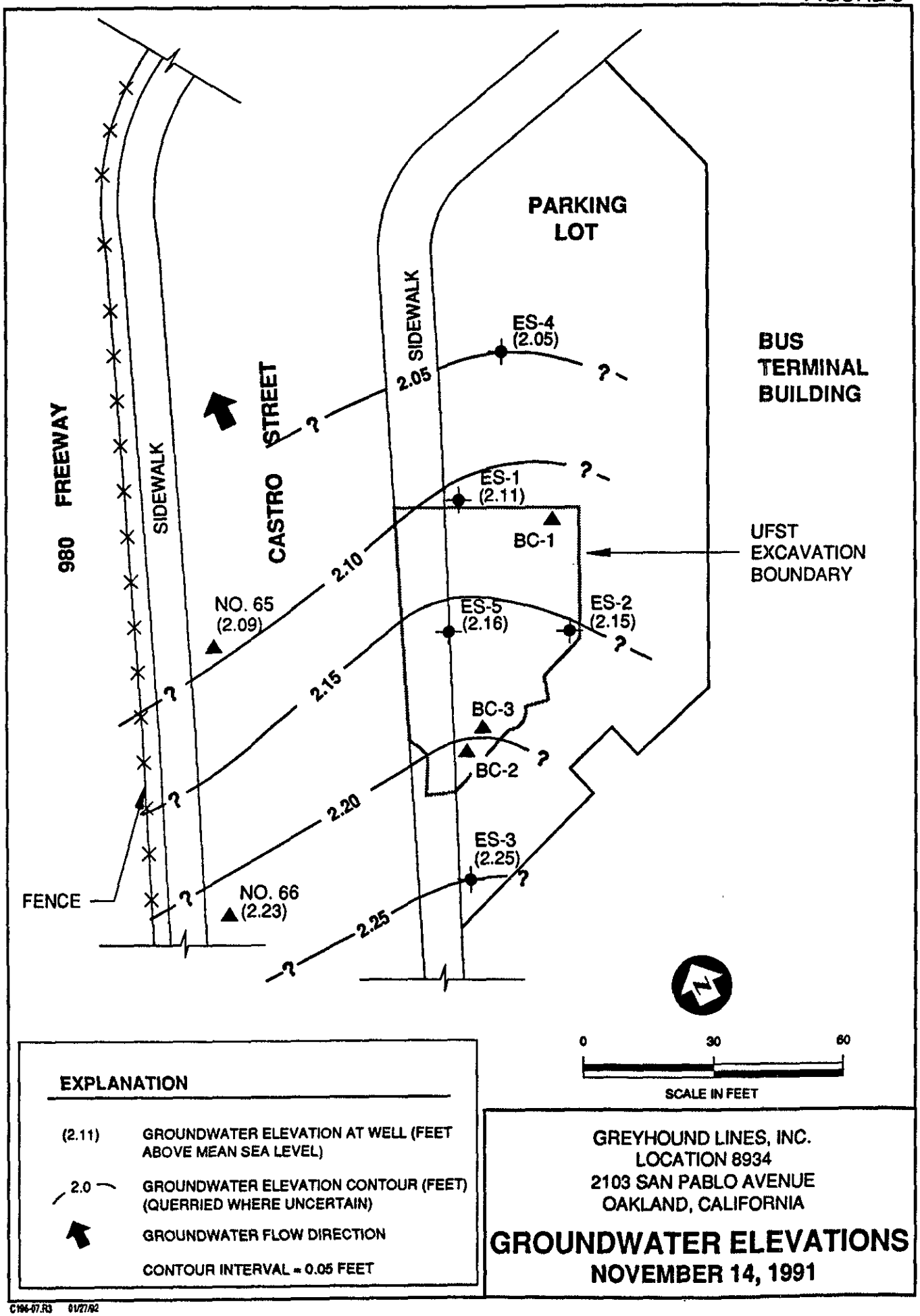
C196-05.R1 01/27/92

FIGURE 4



C196-06.R2 01/27/92

FIGURE 5



EXPLANATION

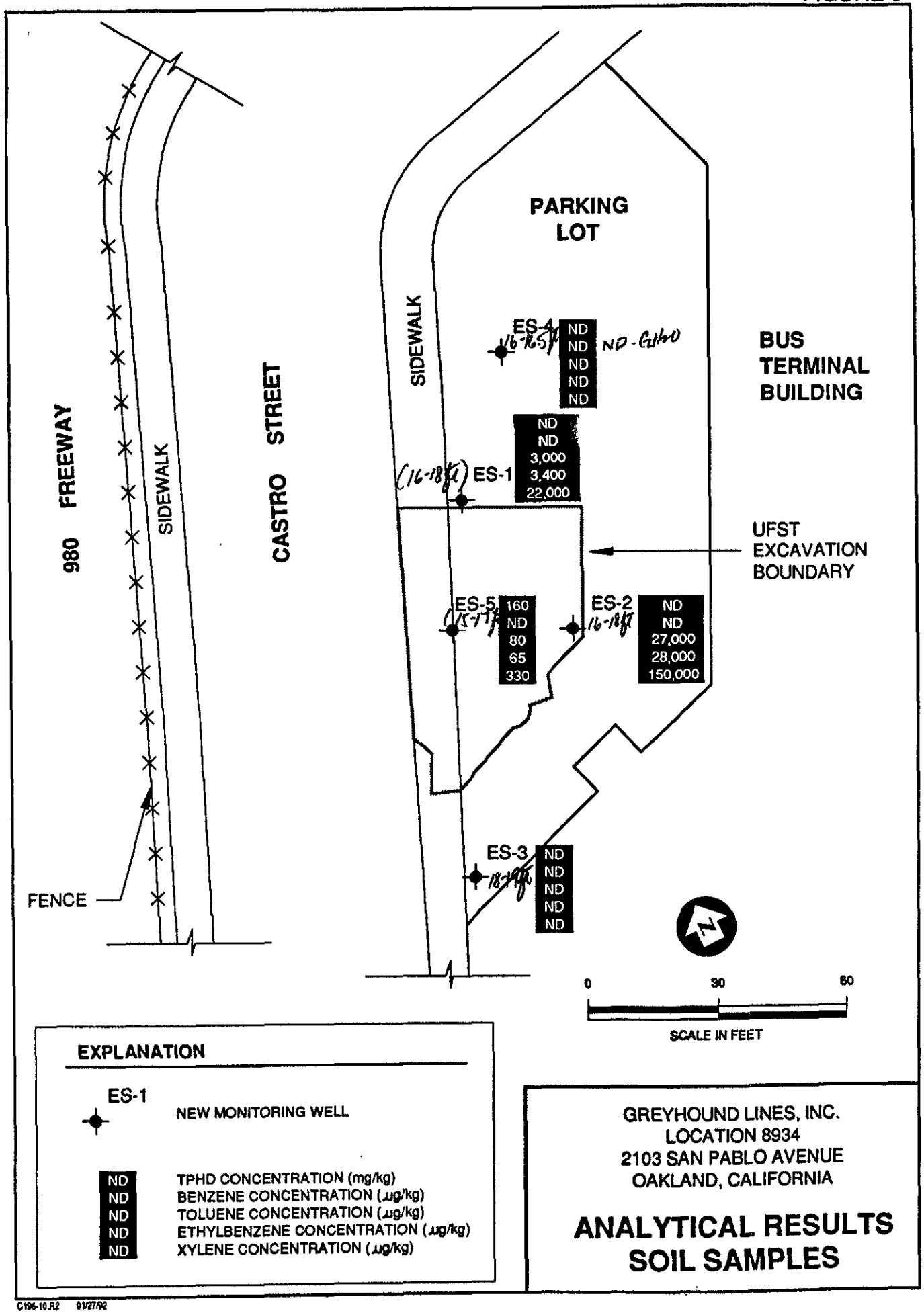
(2.11)	GROUNDWATER ELEVATION AT WELL (FEET ABOVE MEAN SEA LEVEL)
2.0	GROUNDWATER ELEVATION CONTOUR (FEET) (QUERRIED WHERE UNCERTAIN)
	GROUNDWATER FLOW DIRECTION
	CONTOUR INTERVAL = 0.05 FEET

GREYHOUND LINES, INC.
LOCATION 8934
2103 SAN PABLO AVENUE
OAKLAND, CALIFORNIA

GROUNDWATER ELEVATIONS
NOVEMBER 14, 1991

C194-07.R3 01/27/92

FIGURE 6

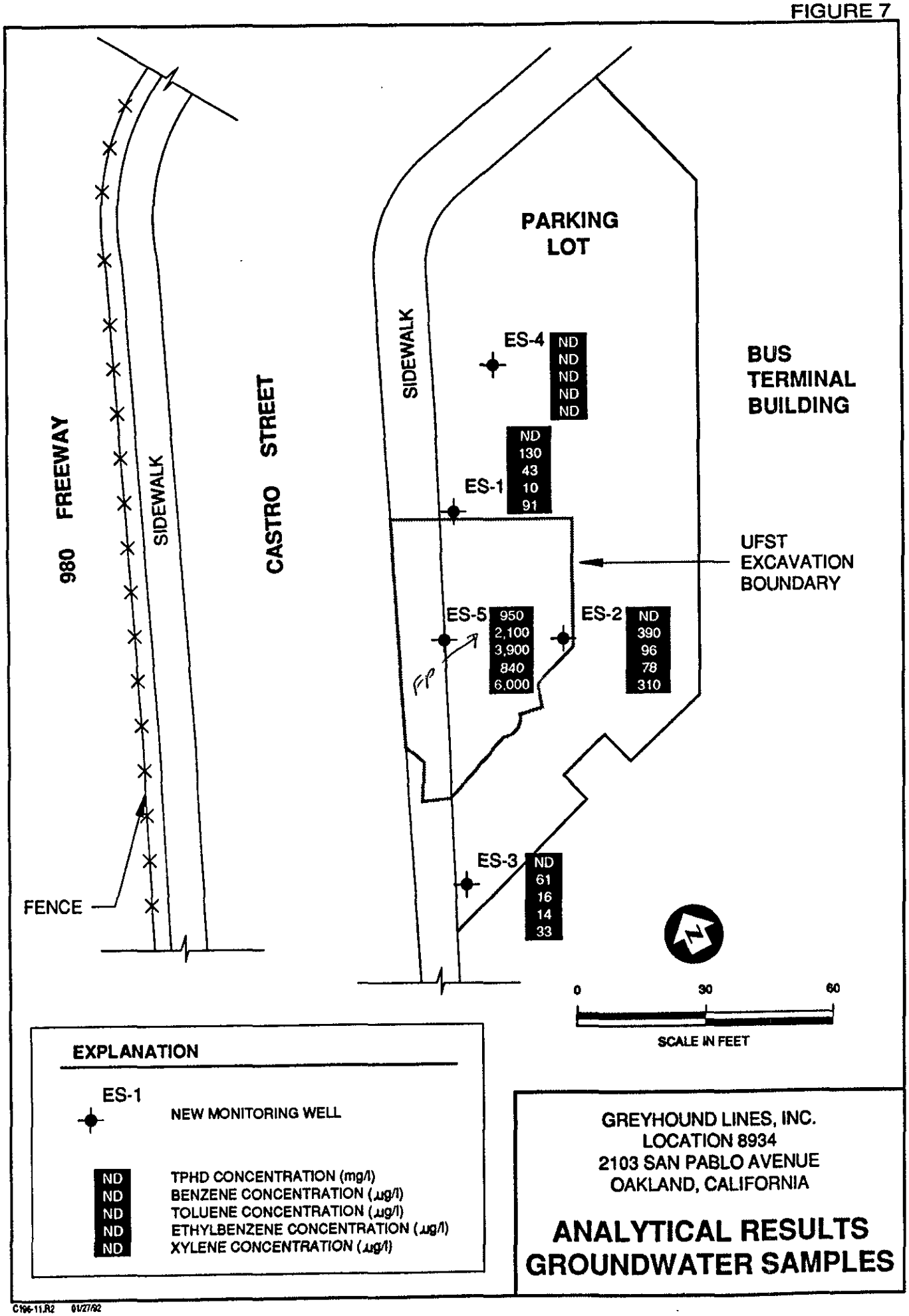


GREYHOUND LINES, INC.
LOCATION 8934
2103 SAN PABLO AVENUE
OAKLAND, CALIFORNIA

ANALYTICAL RESULTS SOIL SAMPLES

C196-10.R2 01/27/92

FIGURE 7



GREYHOUND LINES, INC.
LOCATION 8934
2103 SAN PABLO AVENUE
OAKLAND, CALIFORNIA

ANALYTICAL RESULTS GROUNDWATER SAMPLES

C196-11.R2 01/27/92

TABLE 1
UFST ANALYTICAL RESULTS, 1989 INVESTIGATION
GREYHOUND TERMINAL, OAKLAND, CALIFORNIA

Tank	Sample	Benzene mg/kg	Toluene mg/kg	Ethylbenzene mg/kg	Xylenes mg/kg
T-1	O-2	86.1	231	100	663
T-2	O-1	26.1	42.7	7.5	49.8
T-3	O-5	3,730	8,110	3,730	16,700
T-4	O-6	NS	NS	NS	NS
T-5	O-4	7.16	78.2	42.6	285
T-6	O-3	137	5.99	155	980

NOTES:

NS = not sampled (insufficient volume to sample).
Source: Brown and Caldwell Consulting Engineers (1989).

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TABLE 2
SOIL ANALYTICAL RESULTS, 1989 INVESTIGATION
GREYHOUND TERMINAL, OAKLAND, CALIFORNIA

Sample/ Depth*	TFH mg/kg	Benzene mg/kg	Toluene mg/kg	Ethylbenzene mg/kg	Xylenes mg/kg
BC-1 (16-16.5)	3,060	NR	1.780	37.500	1.130
BC-1 (25-25.5)	ND	ND	ND	0.027	0.008
BC-2 (16-16.5)	4,260	NR	4.000	49.500	2.000
BC-2 (26-26.5)	ND	ND	0.090	0.402	0.154
BC-3 (16-16.5)	1,850	NR	2.240	28.900	1.030
BC-3 (25-25.5)	ND	ND	ND	0.008	ND

NOTES:

* Depth given in feet below ground surface.
ND = not detected.
NR = interpretation of results not possible as reported in 1989 Investigation; the analytical results reported for TPH may be composite samples of each borehole; source: Brown and Caldwell Consulting Engineers (1989).

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TABLE 3
WATER LEVEL DATA
NOVEMBER 14, 1991
GREYHOUND TERMINAL, OAKLAND, CALIFORNIA

Well ID	Ground Surface Height from T.O.C.	Well Depth from T.O.C.	Well Casing Inside Diameter (inches)	Well Elevation USGS Ground Surface	Water Level From Ground Surface	T.O.C. Elevation USGS (ft above MSL)	Water Level from T.O.C.	Water Elevation USGS (ft above MSL)	Well Casing Volume (gallons)
ES-1	0.22	30.00	4.00	21.55	19.44	21.33	19.22	2.11	7.01
ES-2	0.18	30.00	4.00	22.01	19.86	21.83	19.68	2.15	6.71
ES-3	0.30	35.00	4.00	22.63	20.38	22.33	20.08	2.25	9.70
ES-4	0.28	30.00	4.00	21.37	19.32	21.09	19.04	2.05	7.12
ES-5	0.45	30.00	4.00	21.69	19.53	21.24	19.08	2.16	7.10
BC-1	0.28	29.46	4.00	21.83	19.25	21.55	18.97	2.58*	6.82
No. 65	0.30	29.00	4.00	21.89	19.80	21.59	19.50	2.09	6.18
No. 66	0.44	29.70	4.00	22.77	20.54	22.33	20.10	2.23	6.24

NOTES:

T.O.C. = top of casing MSL = mean sea level ft = feet
All measurements in feet unless otherwise noted.
USGS datum source: City of Oakland, Station 27C, Elevation 15.67 feet above MSL.
4 inch diameter well casing = 0.65 gallons per linear casing foot.
* Uncorrected datum: effects of free-product depression.
Depth to water not measured in BC-2 and BC-3 as the integrity of their well-casings was suspect.

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TABLE 4
SOIL ANALYTICAL DATA SUMMARY
GREYHOUND TERMINAL, OAKLAND, CALIFORNIA

Location Sample Depth*	Benzene ug/kg	Toluene ug/kg	Ethylbenzene ug/kg	Xylenes ug/kg	Total BTEX ug/kg	TPHD(a) mg/kg
ES-1 (16-18)	ND	3,000	3,400	22,000	28,400	ND
ES-2 (16-18)	ND	27,000	28,000	150,000	205,000	ND
ES-3 (18-19)	ND	ND	ND	ND	ND	ND
ES-4 (16-16.5)	ND	ND	ND	ND	ND	ND
ES-5 (15-17)	ND	80	65	330	475	160
California ARARs:	0.3-1(b) (mg/kg)	0.3-50(b) (mg/kg)	1-50(b) (mg/kg)	1-50(b) (mg/kg)	---	100(c), 1000(d) (mg/kg)

NOTES:

ARAR = Available Applicable or Relevant Appropriate Requirements.

ND = Parameter analyzed for but not detected above method detection limit.
* Depth given in feet below ground surface.
(a) Total petroleum hydrocarbons as diesel (TPHD) were analyzed and characterized by GCFID in accordance with DHS/LUFT Method (modified EPA Method 8015).
(b) California LUFT criteria. Note the ARARs are given in ppm, whereas the results are in ppb.
(c) RWQCB - Level that initiates a soil/groundwater characterization investigation.
(d) California Hazardous Waste based on ignitability.

TABLE 5
GROUNDWATER ANALTYICAL DATA SUMMARY
GREYHOUND TERMINAL, OAKLAND, CALIFORNIA

Location	Benzene ug/l	Toluene ug/l	Ethylbenzene ug/l	Xylenes ug/l	Total BTEX ug/l	TPHD* mg/l
ES-1	130	43	10	91	274	ND
ES-2	390	96	78	310	874	ND
ES-3	61	16	14	33	124	ND
ES-4	ND	ND	ND	ND	ND	ND
ES-5	2,100	3,900	840	6,000	12,840	950
California ARARs:	0.5(a) (ug/l)	1000(b) (ug/l)	680(a) (ug/l)	1750(a) (ug/l)	---	(c)

NOTES:

ARAR = Available Applicable or Relevant Appropriate Requirements.

ND = Parameter analyzed for but not detected above method detection limit.
* Total petroleum hydrocarbons as diesel (TPHD) were analyzed and characterized by GCFID in accordance with DHS/LUFT Method (modified EPA Method 8015).
(a) California MCL.
(b) Federal MCl; not effective as a California ARAR until July 1992.
(c) Evaluated on a case-by-case risk assessment basis.

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01/27/92

APPENDIX A

BROWN AND CALDWELL
PHASE I INVESTIGATION

BROWN AND CALDWELL
CONSULTING ENGINEERS

June 22, 1989

Vernon H. Sorgee, P.E.
Director of Environmental Management
Greyhound Lines, Inc.
901 Main Street, Suite 2525
Dallas, Texas 75202

4529-01/1

Subject: Phase I Investigation, Oakland, California Terminal

Dear Mr. Sorgee:

In accordance with the terms of the engineering agreement between Greyhound Lines, Inc.(Greyhound) and Brown and Caldwell Consulting Engineers (BC), dated March 16, 1988 and authorization granted under Purchase Order No. 357498, dated May 16, 1989, BC conducted a preliminary (Phase I) site investigation of 6 underground storage tanks (USTs) at Greyhound's Oakland, California Bus Terminal. This report includes project objectives, geologic and hydro-geologic setting, field investigation methods, laboratory analysis results, conclusions, and recommendations.

Site Background

Figure 1 presents the location of the Greyhound Bus Terminal (Site) in Oakland, California. The Site is located at 2103 San Pablo Avenue; the back of the terminal, where the USTs are located, faces Castro Street. Formerly Greyhound maintained 6 USTs for fueling buses. The locations of these 6 USTs are presented on Figure 2. Five of the tanks range in volume from 550 to 1000 gallons and are made of steel. The sixth tank is also steel but its dimensions could not be measured because of a drop pipe within the UST. The USTs reportedly contained either diesel or gasoline and have not been in operation for the past 30 years. Five of the USTs contain what is probably degraded diesel fuel and water.

Project Objectives

Based on a site visit conducted on April 26, 1989 with Mr. Vernon Sorgee, BC developed a list of objectives for the Phase I investigation. The objectives of this investigation were:

1. Determine the contents of the tanks;

2. Determine if hydrocarbon residues exist in the soil beneath the site as a result of leaks or overspills from the tanks;

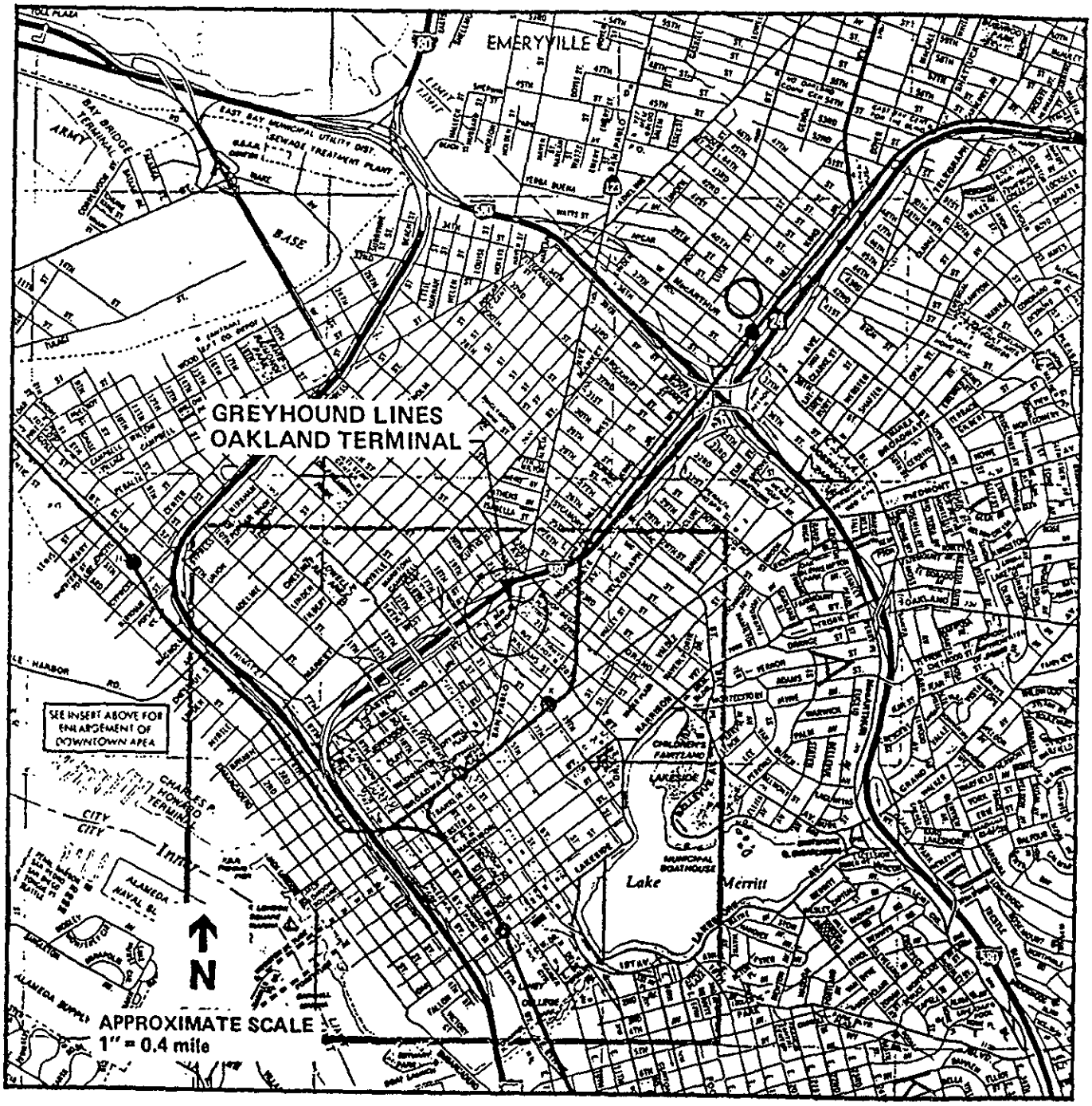


Figure 1 Location Map

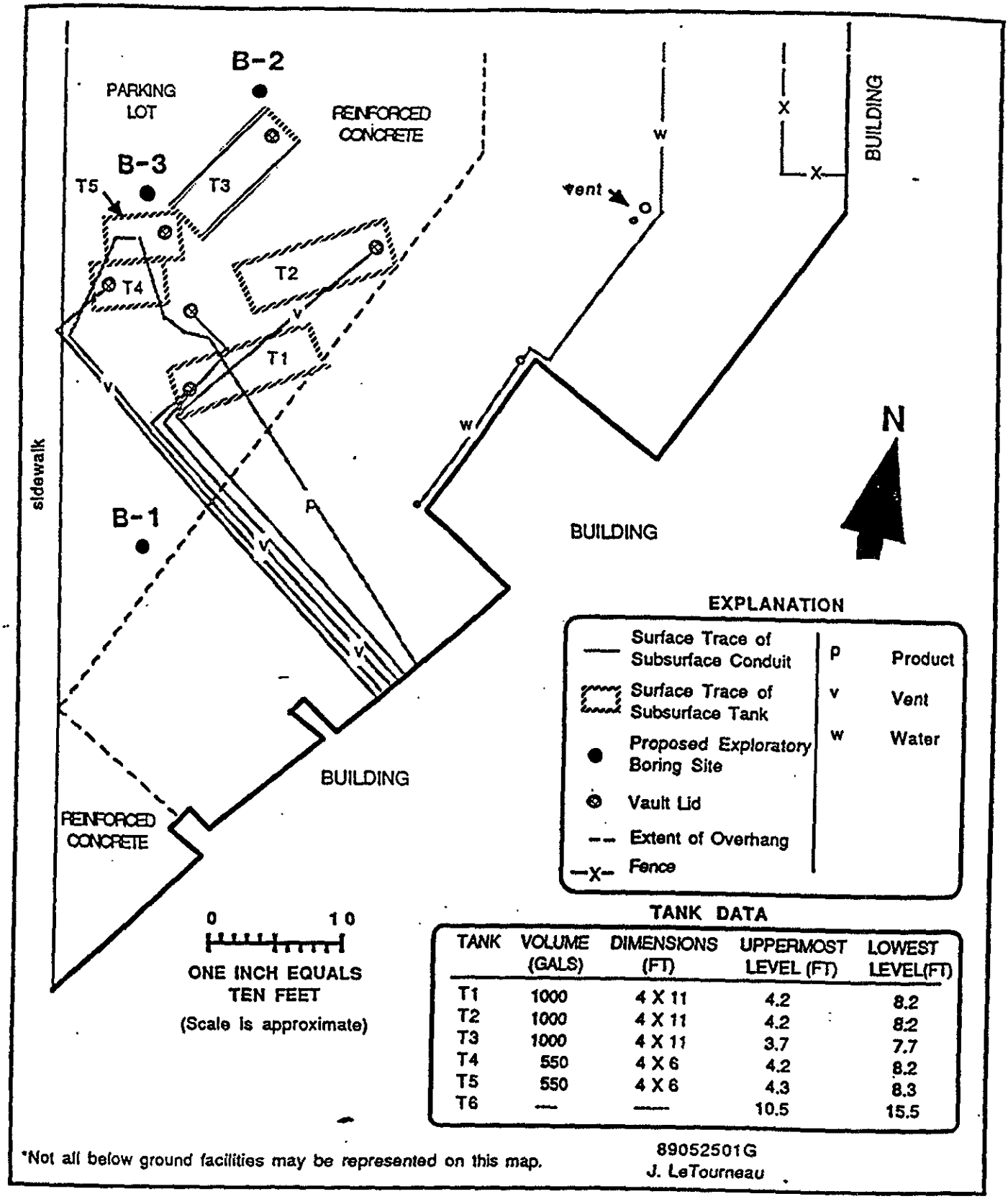


Figure 2 Site Plan

3. Provide recommendations for tank closures;

4. Provide a letter report describing the findings of the Phase I investigation.

Geologic and Hydrogeologic Setting

The Oakland Bus Terminal lies approximately 1 1/4 miles northeast of the Alameda Estuary, in the eastern central portion of San Francisco Bay. Land surface elevation at the site is approximately 25 feet above mean sea level.

A highly variable sequence of clays, silts and sands of low to moderate permeability underlie the site. The principal water-bearing units in are found in discontinuous sand lenses and stringers within the silt and clay units. The depth to groundwater beneath the site is approximately 20 feet.

Cultural Features

The site is located within Oakland's central business district, which is predominantly commercial. Interstate highway 980 is located across Castro Street and northwest of the site. San Pablo Avenue is the main north-south thoroughfare in this area. The district within 3 blocks of the site is occupied by various businesses, churches, residences, and city streets.

Field Investigation

On April 26, 1989, during a site visit with Mr. Vernon Sorgee, six UST fill pipes were noted. However, the fill pipe caps could not be removed to measure the UST contents.

On May 26, 1989, Spectrum E.S.I. conducted a site survey of the USTs under the supervision of BC. The purpose of this survey was to determine the number, size, depths, and orientations of the USTs and associated piping, and to select locations for boreholes in the immediate vicinity of the tank cluster. The confirmed locations of 5 of the 6 USTs and the three selected borehole locations are noted on Figure 2.

At the same time as the UST survey, BC collected samples from the residual UST liquids. BC collected samples by lowering a teflon bailer with a foot valve into the tank. Two 40 milliliter (ml) vials were filled from the foot valve. Teflon caps were placed on the vials such that there was no headspace; the samples were immediately placed in a chilled cooler.

Tank T-1 is 4 feet in diameter, 11 feet in length, and has a volume of 1,000 gallons. T-1 had approximately 1.3 feet of hydrocarbon product which was clear orange to rust color and viscous.

Tank T-2 is also 4 feet in diameter, 11 feet in length, and has a volume of 1,000 gallons. T-2 had 3 to 4 inches of water with 1 inch of floating product which appears to be diesel fuel.

Tank T-3 has the same dimensions and volume as T-1 and T-2 and had approximately 8 inches of dark red product.

Tank T-4 is 4 feet in diameter, 6 feet in length, and has a volume of 550 gallons. T-4 had about 1 inch of liquid. There was not enough liquid to collect a sample with the bailer. The liquid was rust-brown and oily with a strong diesel fuel odor.

Tank T-5 has the same dimensions and volume as T-4 and had approximately 2 inches of water and product. Spectrum indicated that Tanks T-4 and T-5 are probably linked together in series. The vent lines are manifolded together and the probe used to determine the internal dimensions of the tanks could enter T-5 from the fill pipe of T-4.

The true orientation and dimensions of tank T-6 could not be ascertained because of the possible presence of a welded drop pipe extending into the tank. Spectrum speculates three possible configurations for Tank T-6. These three possible tank orientations are presented on Figure 3.

Configuration A assumes the tank has a welded drop pipe which extends to a depth of 10.5 feet. The drop pipe extends inside the tank an unknown distance. The tank may be as much as 12 feet in diameter, assuming the top is 3 feet below grade. If the tank has a this configuration, the long dimension probably runs toward the street, in the same direction as T-2.

Configuration B assumes the tank is a deep burial UST with the top of the tank at 10.5 feet and the base at 15.5 feet below grade. The diameter would be 5 feet in diameter and it may lie beneath Tanks T-4 and T-5.

Configuration C assumes the long axis of tank is oriented vertically. This could explain the depth of the base of the tank and how it could fit in between the other tanks.

T-6 had a minimum of 3 feet of product which was dark rust to black and had very degraded appearance. This product was floating on about 1 foot of water.

The bottoms of tanks T-1 through T-5 are approximately 8 feet below grade level. The bottom of UST T6 is 15.5 feet below grade. All six tanks are covered by a reinforced concrete pad. Vent lines for five of the USTs run up the outside of the building near the former location of the pump island.

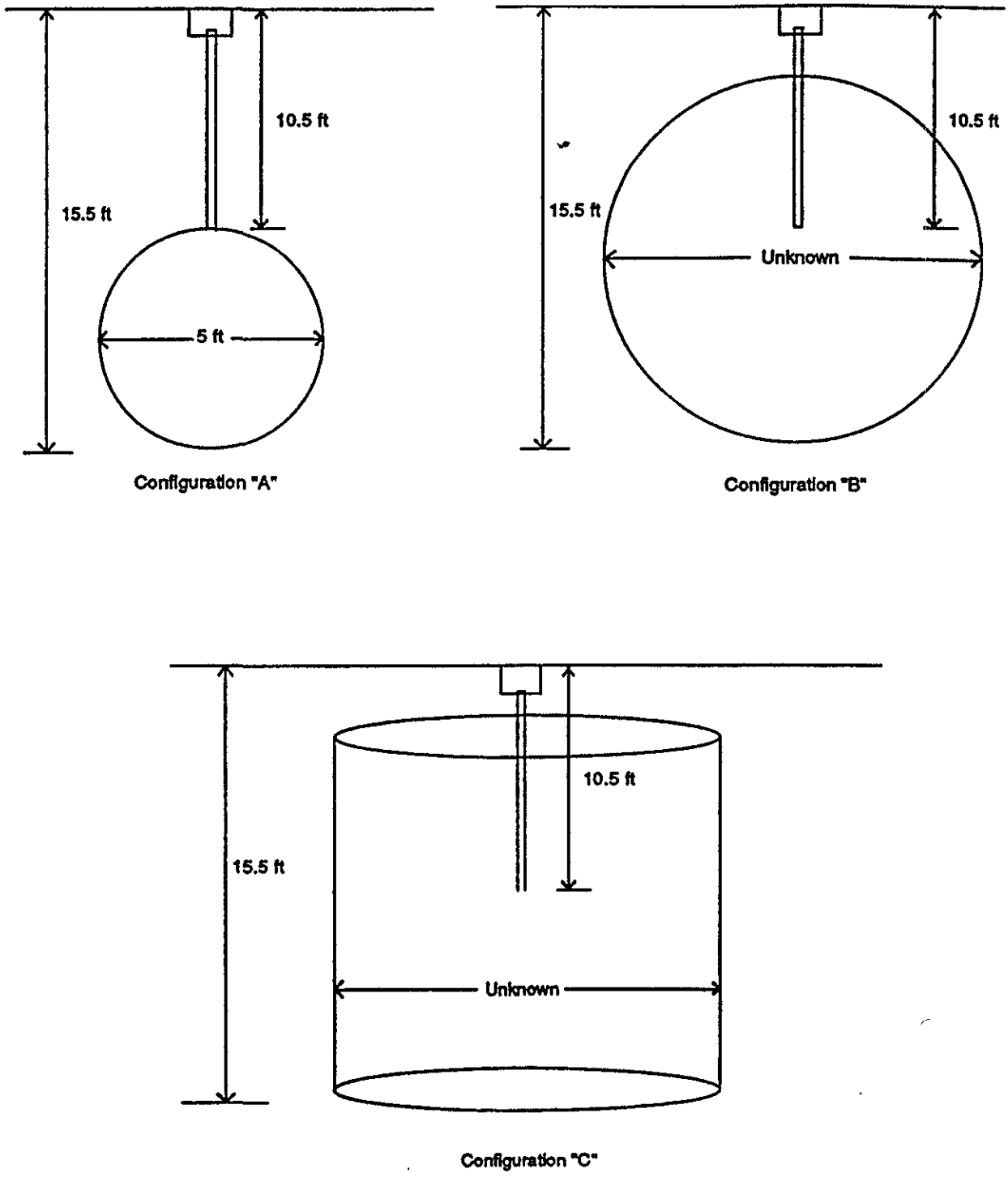


Figure 3. Possible Orientations of Tank T-6

On June 7, 1989, four 10-inch diameter cores were cut through the 7-inch thick reinforced concrete pad in the vicinity of the USTs by Herold Concrete Sawing. On June 8, 1989, 3 soil boreholes were drilled (BC-1, BC-2, and BC-3) by Aquifer Science Engineers under the supervision of BC using a Mobile B-61 hollow-stem auger drilling rig and 8-inch diameter augers.

Borehole BC-1 is located south of the tank cluster. This borehole initially encountered 14 feet of clayey sand to sandy clay. A fine to medium-grained sand was encountered from 14 feet to the termination of the borehole at 25 feet. Groundwater was encountered at approximately 22 feet. Soil samples were collected from intervals of 16.0-16.5 ft and 25.0-25.5 ft using a modified California sampler equipped with 3 brass tubes which were each 2-inches in diameter and 6-inches long. One tube from each sampled interval was capped, securely sealed, labeled, and preserved on ice until submitted to the laboratory under chain-of-custody procedures. Soils were monitored continuously for combustible vapors during the drilling of this borehole with a Bacharach TLV Sniffer. Background values for the TLV Sniffer were established at 0 parts per million (ppm) prior to drilling activities. Sniffer readings of the soils from BC-1 ranged from 38 ppm at 6.5 ft to 520 ppm at 20 ft. There was an especially heavy hydrocarbon odor associated with the sandy soil below 14 ft.

Borehole BC-2 is located north of the tank cluster. This borehole initially encountered 9 feet of sandy clay. A medium-grained sand was encountered from 10 ft to the termination of the borehole at 25 feet. Groundwater was encountered at approximately 22 feet. Soil samples were collected from intervals of 16.0-16.5 ft and 26.0-26.5 ft. TLV Sniffer readings ranged from 12 ppm at 6.5 ft to 560 ppm at 16.5 ft.

Borehole BC-3 is located northwest of the tank cluster. This borehole initially encountered 2 feet of sand which had a strong hydrocarbon odor. A silty to sandy clay was observed from 4 to 14 feet and the medium-grained sand was again logged from 14 to the termination of the borehole at 25 ft. Groundwater was encountered at approximately 22 feet. Soil samples were collected from intervals of 16.0-16.5 ft and 25.0-25.5 ft. TLV Sniffer readings ranged from 140 ppm at 7 ft to 4400 ppm at 15.5 ft.

Borehole logs with more complete descriptions of the geologic conditions encountered are included as Attachment A. Upon completion of drilling, the boreholes were backfilled with soil cuttings and the cement cores were placed over the boreholes at the surface. Samples were sent under chain-of-custody procedures via priority air freight to Southern Petroleum Laboratories (SPL) in Lafayette, Louisiana for 48 hour turnaround analysis. The chain-of-custody form is included in Attachment B.

Laboratory Analysis and Results

UST Liquid Samples. Five UST liquid samples were analyzed by SPL for benzene, toluene, xylene, and ethylbenzene (BTXE) by EPA Method 602. Results of the liquid analyses are presented below in Table 1. Complete UST liquid laboratory reports are included in Attachment C.

Table 1. UST Liquids Laboratory Results

		Concentration in parts per million (ppm)			
Tank	Sample	Benzene	Toluene	Xylene	Ethylbenzene
T-1	O-2	86.1	231	663	100
T-2	O-1	26.1	42.7	49.8	7.5
T-3	O-5	3,730	8,110	16,700	3,730
T-4	O-6	NS	NS	NS	NS
T-5	O-4	7.16	78.2	285	42.6
T-6	O-3	137	5.99	980	155

Mr. John Trahan of SPL indicated that T-1 and T-6 contain #2 diesel fuel. The gas chromatograph response for T-2 indicated the sample contains gasoline, water, and diesel fuel. T-3 contains degraded #1 diesel fuel with some water. T-5 contains mostly #2 diesel but also some #1 diesel and water.

Soil Samples. Six soil samples were analyzed by SPL for benzene, toluene, xylene, and ethylbenzene (BTXE) by EPA Method 8020, for total petroleum hydrocarbons (TPH) by EPA Method 418.1, and for total fuel hydrocarbons (TFH) by Modified EPA Method 8015. Results of the soil analyses are presented below in Table 2. Complete soil laboratory reports are included in Attachment C.

Table 2. Soil Laboratory Results

			Concentration in parts per million (ppm)			
Sample/Depth	TPH	TFH	Benzene	Toluene	Xylene	Ethylbenzene
BC-1/16.0-16.5	11.300	3,060	NR	1.780	1.130	37.500
BC-1/25.0-25.5		<10	<10	<0.001	0.008	0.027
BC-2/16.0-16.5	13.200	4,260	NR	4.000	2.000	49.500
BC-2/26.0-26.5		<10	<10	0.090	0.154	0.402
BC-3/16.0-16.5	6.990	1,850	NR	2.240	1.030	28.900
BC-3/25.0-25.5	<0.001	<10	<10	<0.001	<0.001	0.008

Note: NR - Interpretation of results not possible. See below.

TLV Sniffer measurements and soil samples results from boreholes BC-1, BC-2, and BC-3 yield the highest hydrocarbon concentrations at a depth of 16.0-16.5 feet. The bottom of the USTs is 8 feet to 15.5 feet below grade. These results suggest that there has been an uncontrolled release from one or more of the USTs.

Interpretation of the TFH analyses for the soil samples from the 16.0-16.5 foot interval was difficult. The product had degraded significantly and matching its "fuel fingerprint" with that of known compounds was not possible. However, since the TPH and BTXE analyses indicate that there is significant contamination of the soil at this depth, the TFH results are not critical to this investigation.

Alameda County Health Department guidelines call for further investigation of a site exhibiting concentrations of TPH or TFH greater than 100 ppm as an uncontrolled release.

Quality Assurance/Quality Control Analyses

The validity of the laboratory analyses performed for this project is verified through three quality assurance/quality control procedures.

Laboratory control standards (LCS) are organic-free deionized water, also called blanks. Analysis of a blank provides a check of the laboratory instruments to determine if the reagents have been contaminated or if contamination of the instruments from previously analyzed samples is present. The analysis of a blank for TPH by EPA Method 418.1 yielded no detectable TPH and meets QA/QC requirements.

Batch duplicates are aliquots of a sample subjected to the same preparation and analytical scheme as the original sample. Analysis of duplicate aliquots of a TPH sample did not yield a detectable concentration (<10 ppm) for either aliquot. This is within the acceptable limits for analytical precision.

A matrix spike is an LCS to which a known amount of an analyte is added. These standards are then subjected to the same sample preparation or extraction and analyzed in the same manner as the field samples.

The percent recovery is a comparison of the measured spike as a percent of the theoretical spike. Low percent recoveries (below 100 percent) indicate the matrix has retained a portion of the compound. In soil samples this would indicate compounds adsorbed to the soil matrix. High recoveries (above 100 percent) indicate the matrix is adding to the analysis. The relative percent deviation (RPD) compares the average analyte concentration with their difference. Thus the smaller the RPD the closer the concentration of the measured sample is to its theoretical value.

The original known concentration of a sample prepared in the laboratory for TPH analysis was 0 ppm which is below the method detection limit of 10 ppm. A spike of 100 ppm was added to the sample thus the theoretical concentration was 100 ppm. The measured concentration of the spiked sample was 96 ppm, indicating a method recovery of 96%. This is within acceptable limits.

BTXE spikes were added to known soil sample concentrations. The spiked samples were analyzed by EPA Method 8020. All percent recoveries and RPDs except for one fall within acceptable limits. The exception is a toluene spike of 50 micrograms/liter (ug/l) which was added to a known concentration of 34 ug/l. The percent recovery was 68% and the RPD was 21 which is one point above the tolerance limit for this analysis. The QA/QC laboratory reports are included as Attachment D.

Conclusions

The following conclusions are based upon the results of this Phase I field investigation and laboratory testing program:

1. Native soils encountered during the sampling of 3 boreholes consisted primarily of clays, silts, and sands. Clays and silts were predominant to a depth of 9 to 14 feet. Medium to fine-grained sands were encountered below the silts and clays to a depth of 26 feet.

2. Groundwater was encountered at a depth of approximately 22 feet below ground surface.

3. Hydrocarbon concentrations in the tank liquids indicate the USTs contain #1 or #2 diesel. Water is also present in some tanks.

4. The TLV Sniffer readings and soil sample analyses suggest that one or more of the USTs have leaked or that overflows or spills to the USTs have occurred in the past.

Recommendations

We understand that Greyhound wishes to abandon the tanks by excavation and removal. The following recommendations are presented regarding methods for closure:

1. File an Underground Storage Tank Unauthorized Release Report with the Alameda County Department of Environmental Health and the San Francisco Bay Regional Water Quality Control Board. A copy of this reporting form was sent to you previously.

2. Pump out liquids remaining in the tanks using a vacuum truck. The names of 3 licensed operators were provided to you previously.

3. File closure permits with both the Alameda County Department of Environmental Health and the City of Oakland Fire Prevention Bureau. These permits are included as Attachment E. The permits require submittal of a site safety plan, the identification of the rinsate transporter, tank excavation contractor, tank transporter, contaminated soil transporter, sample collector, analytical laboratory, and application or inspection fees.

4. File a site investigation work plan to the Alameda County Department of Environmental Health and the San Francisco Bay Regional Water Quality Control Board which will address the approach and methods to delineate the lateral and vertical extent of soil and groundwater contamination. This plan will include the installation and sampling of at least 3 shallow groundwater monitoring wells.

5. Send a notification form to the Bay Area Air Quality Management District notifying them at least 5 days prior to removal of the tanks.

6. Remove the concrete slab and expose the top of the tanks.

7. Add dry ice to the tanks to purge all flammable vapors. The fire department inspector will test the tank vapors with a sniffer to ensure that vapors are below the lower explosive limit (LEL).

8. If no manway exists, saw a hole into USTs after receiving fire department approval. Triple rinse tanks and product lines pursuant to Alameda County requirements. The final rinse must contain less than 100 ppm of TFH (EPA Method 602) or TPH (EPA Method 418.1). The interiors of the USTs must be free from deposits or residues upon a visual examination of the tank by the fire inspector.

9. Excavate the tank and associated product lines and have them certified clean by the fire inspector. Properly label the tank with the name and address of the contractor and display a notice "triple rinsed; laboratory certified analysis available upon request". Haul USTs away for appropriate disposal.

11. Excavate and properly dispose of soils with TFH or TPH concentrations greater than 100 ppm or to a depth of 22 feet, whichever comes first. These soils must be transported under a Uniform Hazardous Waste Manifest that

must be signed by the Greyhound Lines, Inc. or their authorized agent.

12. Upon completion of each soil excavation, collect 2 soil samples from the base of the excavation and from every 20 lineal feet of product line trench to verify that contaminated soil has been removed. Analyze for TPH by EPA Method 418.1, TFH by Modified EPA Method 8015, and BTXE by EPA Method 8020. If groundwater is encountered, collect a sample and analyze for TPH by EPA Method 418.1, TFH by Modified EPA Method 8015 and BTEX by EPA Method 602.

13. Prepare a closure/soil remediation report detailing closure procedures, soil disposal activities, and laboratory results. Submit report to the Alameda County Department of Environmental Health, San Francisco Bay Regional Water Quality Control Board and the City of Oakland Fire Prevention Bureau.

This completes the scope of services for this Phase I investigation. We are prepared to begin tank closure/soil remediation and site investigation activities (Phase 2) at your request. If you have any questions or comments please call us at your convenience.

Very truly yours,

BROWN AND CALDWELL

Tim Cook

Tim D. Cook
Project Manager

Denis M. O'Malley

Denis M. O'Malley
Principal-in-Charge

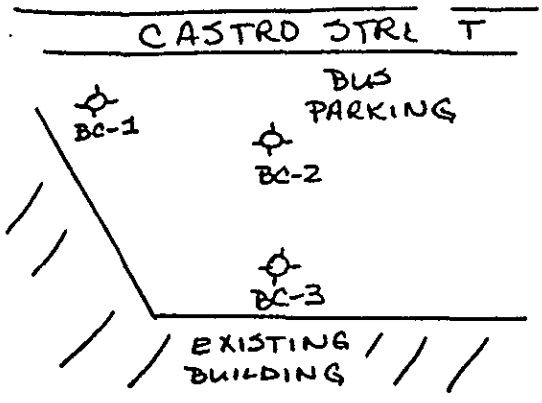
TDC:

Attachments (5)

ATTACHMENT A

BOREHOLE LOGS

LOCATION OF BORING



CLIENT	Western Greyhound Lines
LOCATION	Oakland
JOB NO.	4529-01
BORING NO.	BC-1
SHEET	1 OF 1
WATER LEVEL	
TIME	
DATE	
CASING DEPTH	
DRILLING CONTRACTOR	A. S. E.
DRILLING METHOD	8" Hollow Stem Augers
SAMPLING METHOD	Cal. mod. 2", 140#/30" in (cm)
DRILLING START TIME	0844
DRILLING FINISH TIME	0934
DRILLING START DATE	6/8/89
DRILLING FINISH DATE	6/8/89

DRILLER Chris St. Pierre RIG Mobile Drill B-61

BY D. Covington DATE 6/8/89 CHK'D BY

N/S E/W ELEV.

SURFACE CONDITIONS asphalt + concrete parking lot

WELL CONST. CASING	WELL CONST. ANNULUS	SAMPLER TYPE	INCHES DRIVEN / INCHES RECOVERED	SAMPLE NO. / SAMPLE DEPTH	BLOWS/6" SAMPLER	DEPTH IN FEET	SOIL CALLOUT
	backfilled with cuttings					0	
						1	
						2	
						3	
						4	
						5	
						6	
						7	
						8	
						9	
						10	
						1	
						2	
						3	
						14	
		Cm			9/15	15	
					27	6	
						7	
						8	
						9	
		Cm			27	25	

MATERIALS ENCOUNTERED AND DRILLING CONDITIONS

0-0.5' - CONCRETE

0.5'-1.5' - clayey sand and gravel, gray, moist, strong hydrocarbon odors

1.5'-4.0' - silty sand and gravel, dk. olive to gray, damp, loose
TLV = 1160 ppm

4.0'-6.5' - sandy clay, medium tan, damp, slightly plastic, soft,
TLV@ ~4' = 120 ppm

6.5'-14' - sandy clay, greenish-gray, damp, highly plastic, soft,
TLV@ ~6.5' = 38 ppm
TLV@ ~ 10' = 220 ppm

14'-15' - silty med. sand, brown to rust, damp, loose, TLV = 40 ppm

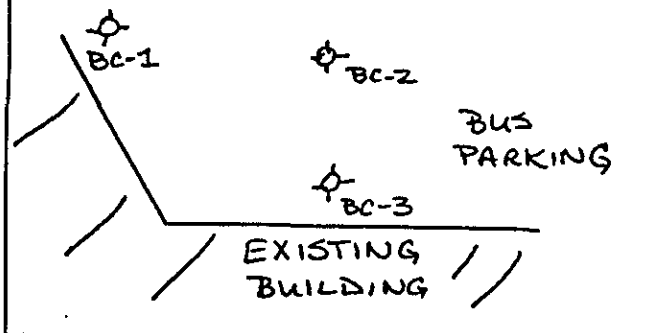
15'-25' - sand, gray-brown with rust staining, damp, loose, trace silt, fine to med.-grained
TLV@ 15.5' = 400 ppm
TLV@ 20' = 520 ppm

wet @ ~ 22'

T.D. = 25'

LOCATION OF BORING

CASTRO ST.



CLIENT Western Greyhound Lines

LOCATION Oakland

JOB NO. 4529-01

BORING NO. BC-2

WATER LEVEL				
TIME				
DATE				
CASING DEPTH				

SHEET 1 OF 1

DRILLING

START TIME	FINISH TIME
1005	1050
DATE 6/8/89	DATE 6/8/89

DRILLING CONTRACTOR A.J.E.

DRILLING METHOD 8" Hollow Stem Augers

SAMPLING METHOD Cal. Mod. 2", 140#/30 in. (cm)

DRILLER Chris ST. Pierre RIG Mobile Drill B-53

BY D. Covington DATE 6/8/89 CHK'D BY

N/S E/W ELEV.

SURFACE CONDITIONS asphalt + concrete parking lot

WELL CONST. CASING	WELL CONST. ANNULUS	SAMPLER TYPE	INCHES DRIVEN / INCHES RECOVERED	SAMPLE NO. / SAMPLE DEPTH	BLOWS/6" SAMPLER	DEPTH IN FEET	SOIL CALLOUT
	Backfilled with cuttings	CM			7/16	15	
					26		
		CM			15/24	25	
					50(5")/26		

MATERIALS ENCOUNTERED AND DRILLING CONDITIONS

Concrete

gravelly sand + clay

1.0'-4.0' - sandy clay, olive green, damp, high plasticity, v.y. soft, trace gravel

4'-6.5' - sandy clay, med. tan to brown, damp, soft, high plasticity, TLV = 180 ppm

6.5'-9.0' - sandy clay, gray-green, soft, high plasticity
TLV @ 6.5' = 12 ppm
TLV @ 9' = 28 ppm

9'-10' - as above with increase in sand content

10'-14' - sand, orange to dk. rust, damp, loose, medium-grained, trace silt

14'-25' above with color change to gray

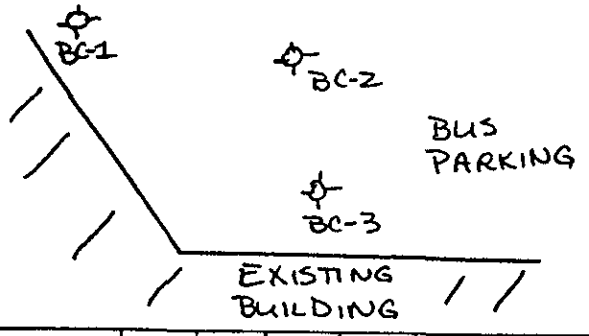
TLV @ 16.5' = 560 ppm
TLV @ 24' = 380 ppm

saturated @ ~22'

T.D. = 25'

LOCATION OF BORING

CASTRO ST.



CLIENT	Western Greyhound Lines
LOCATION	Oakland
JOB NO.	4529-01
BORING NO.	BC-3
SHEET	1 OF 1
WATER LEVEL	
TIME	
DATE	
CASING DEPTH	
DRILLING START TIME	1220
DRILLING FIN SH TIME	1308
DRILLING CONTRACTOR	A.S.E.
DRILLING METHOD	8" Hollow Stem Augers
DRILLING START DATE	6/8/89
DRILLING FIN SH DATE	6/8/89
SAMPLING METHOD	Cal. mod. 2", 140# / 30 in (cm)

DRILLER Chris St. Pierre
RIG Mobile Drill B-61
DATE 6/8/89 CHK'D BY

WELL CONST. CASING	WELL CONST. ANNULUS	SAMPLER TYPE	INCHES DRIVEN / INCHES RECOVERED	SAMPLE NO. / SAMPLE DEPTH	BLOWS/6" SAMPLER	DEPTH IN FEET	SOIL CALLOUT
	Backfilled with cuttings	C3			11/18	0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26	
		CM			27		
					35/50		

N/S E/W ELEV.

SURFACE CONDITIONS asphalt + concrete parking lot

MATERIALS ENCOUNTERED AND DRILLING CONDITIONS

concrete

sand + gravel, gray, dry, loose

1.5'-2' - sand, dk. brown, damp, loose, strong hydrocarbon odor

2'-4' - silty clay, dk. olive green, damp, soft, high plasticity
TLV = 300 ppm

4'-6.5' - silty clay, lt. gray, damp, less odor than above

6.5'-14' - sandy clay, olive green, damp, soft, high plasticity
TLV @ ~7' = 140 ppm

14'-25' - sand, rust to brown, damp, wet at ~22', loose, medium-grained,

TLV @ 14' = 110 ppm
TLV @ 15.5' = 4400 ppm

T.D. = 25'

ATTACHMENT B

CHAIN OF CUSTODY FORM

Southern Petroleum Laboratories, Inc.
104 Guilbeau Road
Lafayette, Louisiana 70506
(318) 984-2374

Analysis Request and Chain of Custody Record

Project No.	Client/Project Name	Project Location
4529	Tim Cook / Greyhound Oakland	Oakland, CA

Field Sample No./ Identification	Date and Time	Grab	Comp	Sample Container (Size/Mat'l)	Sample Type (Liquid, Sludge, Etc.)	Preservative	ANALYSIS REQUESTED	LABORATORY REMARKS
O-1	5/26	✓		VOA	liquid	NONE	418.1 and mod 8015 + BTXE	product samples
O-2	"	✓		"	"	"	"	"
O-3	"	✓		"	"	"	"	"
O-4	"	✓		"	"	"	"	"
O-5	"	✓		"	"	"	"	"

Samplers: (Signature)	Relinquished by: (Signature)	Date: 5/30/89 Time: 1126	Received by: (Signature)	Date: Time:	Intact
Donna Cousins	Tim Cook				
Brown & Caldwell	Relinquished by: (Signature)	Date: Time:	Received by: (Signature)	Date: Time:	Intact
Affiliation	Relinquished by: (Signature)	Date: Time:	Received by: (Signature)	Date: Time:	Intact
			Received for laboratory: (Signature)	Date: Time:	Laboratory No.
SAMPLER REMARKS:			Data Results to:		
Seal #					

Southern Petroleum Laboratories, Inc.
104 Guilbeau Road
Lafayette, Louisiana 70506
(318) 984-2374

Analysis Request and Chain of Custody Record

Project No.	Client/Project Name	Project Location
4529-01	T. Cook / Greyhound Oakland	Greyhound Oakland

Field Sample No./ Identification	Date and Time	Grab	Comp	Sample Container (Size/Mat'l)	Sample Type (Liquid, Sludge, Etc.)	Preservative	ANALYSIS REQUESTED	LABORATORY REMARKS
BC1 (16'-16.5')	6-8-89	✓		2" x 6" brassliner	Soil	None	8020(BTEX); Mod 8015; 418.1	
BC1 (25'-25.5')								Hold don't analyze
BC2 (16'-16.5')							" "	
BC2 (26'-26.5')								Hold
BC3 (16'-16.5')							" "	
BC3 (25')								Hold

Samplers: (Signature)	Relinquished by: (Signature)	Date: 6/8/89 Time: 1550	Received by: (Signature)	Date: Time:	Intact
Donna Cunningham	Tim Cook				
Affiliation	Relinquished by: (Signature)	Date: Time:	Received by: (Signature)	Date: Time:	Intact
	Relinquished by: (Signature)	Date: Time:	Received by: (Signature)	Date: Time:	Intact

SAMPLER REMARKS: Analyze 3 samples @ 16'
Hold 25' samples

Seal #

Received for Laboratory: (Signature)
Date: 6/9/89 Time: 10:20Am
Laboratory No.

Data Results to:

ATTACHMENT C

LABORATORY REPORTS

APPENDIX B

DRILLING PERMITS, DRILLING LOGS AND WELL CONSTRUCTION SUMMARIES AND WATER WELL DRILLER'S REPORTS

DRILLING PERMITS

ALAMEDA COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

5997 PARKSIDE DRIVE • PLEASANTON, CALIFORNIA 94588 • (415) 484-2600

DRILLING PERMIT APPLICATION

FOR APPLICANT TO COMPLETE

LOCATION OF PROJECT Greyhound Terminal
location 8934,2103 San Pablo Ave.
Oakland, California

CLIENT
Name Greyhound Lines, Inc., Environmental Dept.
Address P.O.Box 660362 Phone
City Dallas, TX Zip 75266-0362

APPLICANT
Name Engineering-Science, Inc.
Suite 200
Address 1301 Marina Village Phone 510 769-0100
City Parkway, Alameda,CA Zip 94501

TYPE OF PROJECT

Well Construction		Geotechnical Investigation	
Cathodic Protection	___	General	___
Water Supply	___	Contamination	___
Monitoring	x	Well Destruction	___

PROPOSED WATER SUPPLY WELL USE
Domestic ___ Industrial ___ Other ___
Municipal ___ Irrigation ___

DRILLING METHOD:
Mud Rotary ___ Air Rotary ___ Auger x
Cable ___ Other ___

DRILLER'S LICENSE NO. 487000-A

WELL PROJECTS
Drill Hole Diameter 10 in. Maximum
Casing Diameter 4 in. Depth 30 ft.
Surface Seal Depth 10 ft. Number 5

GEOTECHNICAL PROJECTS
Number of Borings ___ Maximum
Hole Diameter ___ in. Depth ___ ft.

ESTIMATED STARTING DATE 11/11/91
ESTIMATED COMPLETION DATE 11/15/91

I hereby agree to comply with all requirements of this permit and Alameda County Ordinance No. 73-68.

APPLICANT'S SIGNATURE [signature] Date 11/5/91

FOR OFFICE USE

PERMIT NUMBER 91640
LOCATION NUMBER

PERMIT CONDITIONS

Circled Permit Requirements Apply

(A.) GENERAL
1. A permit application should be submitted so as to arrive at the Zone 7 office five days prior to proposed starting date.
2. Submit to Zone 7 within 60 days after completion of permitted work the original Department of Water Resources Water Well Drillers Report or equivalent for well projects, or drilling logs and location sketch for geotechnical projects.
3. Permit is void if project not begun within 90 days of approval date.

(B.) WATER WELLS, INCLUDING PIEZOMETERS
1. Minimum surface seal thickness is two inches of cement grout placed by tremie.
2. Minimum seal depth is 50 feet for municipal and industrial wells or 20 feet for domestic and irrigation wells unless a lesser depth is specially approved. Minimum seal depth for monitoring wells is the maximum depth practicable or 20 feet.

C. GEOTECHNICAL. Backfill bore hole with compacted cuttings or heavy bentonite and upper two feet with compacted material. In areas of known or suspected contamination, tremied cement grout shall be used in place of compacted cuttings.

D. CATHODIC. Fill hole above anode zone with concrete placed by tremie.

E. WELL DESTRUCTION. See attached.

Approved Wyman Hong Date 6 Nov 91
Wyman Hong

51991

DRILLING LOGS AND WELL CONSTRUCTION SUMMARIES

ES ENGINEERING - SCIENCE

CLIENT: GREYHOUND LINES, INC.

TEST HOLE NUMBER: ES-1

LOCATION: 2103 SAN PABLO AVENUE, OAKLAND, CALIFORNIA

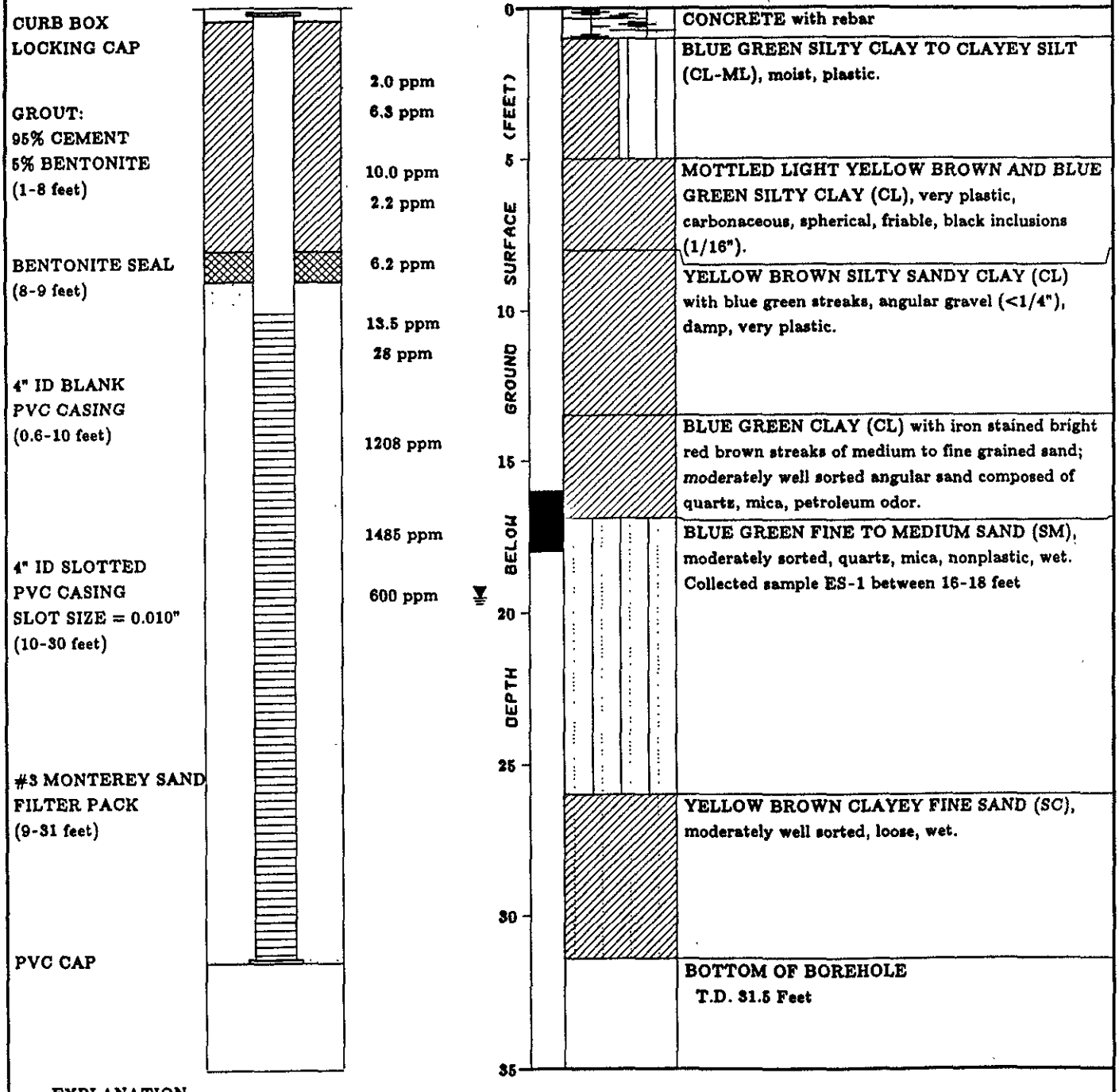
DRILLER: AQUA SCIENCE ENGINEERS

COMPLETION DATE: 11 November 1991

DRILLING METHOD: HOLLOW-STEM AUGER

GEOLOGIST: H. PIETROPAOLI

HOLE DIAMETER: 10.5-INCHES



EXPLANATION

▼ Water Level during drilling

—— Contact (approximate)

PID Photoionization Detector Reading

■ Location of sample

ES ENGINEERING - SCIENCE

CLIENT: GREYHOUND LINES, INC.

LOCATION: 2103 SAN PABLO AVENUE, OAKLAND, CALIFORNIA

COMPLETION DATE: 12 November 1991

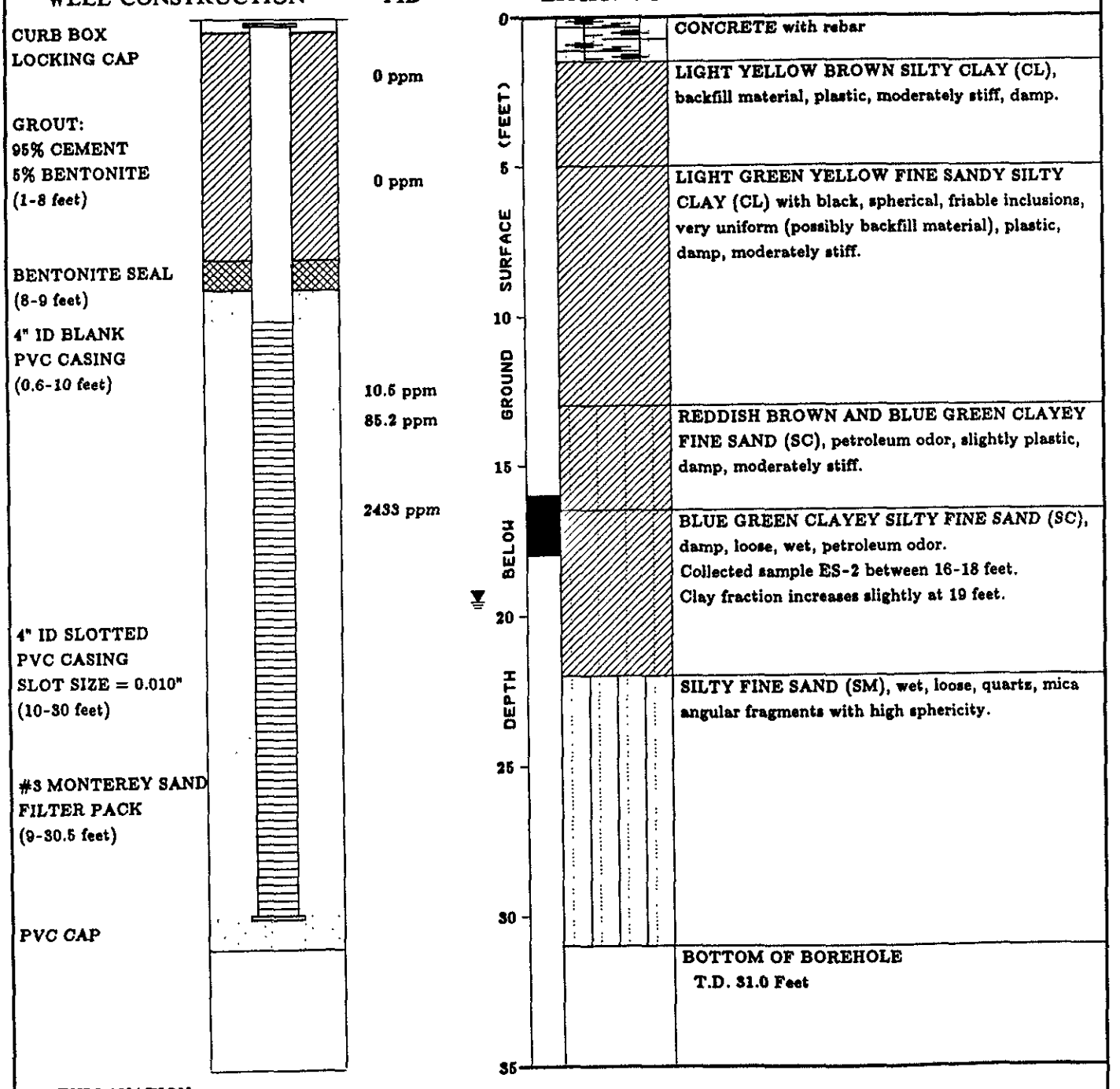
GEOLOGIST: H. PIETROPAOLI

TEST HOLE NUMBER: ES-2

DRILLER: AQUA SCIENCE ENGINEERS

DRILLING METHOD: HOLLOW-STEM AUGER

HOLE DIAMETER: 10.5-INCHES



EXPLANATION

Water Level during drilling

Contact (approximate)

PID Photoionization Detector Reading

Location of sample

ES ENGINEERING - SCIENCE

CLIENT: GREYHOUND LINES, INC.

LOCATION: 2103 SAN PABLO AVENUE, OAKLAND, CALIFORNIA

COMPLETION DATE: 12 November 1991

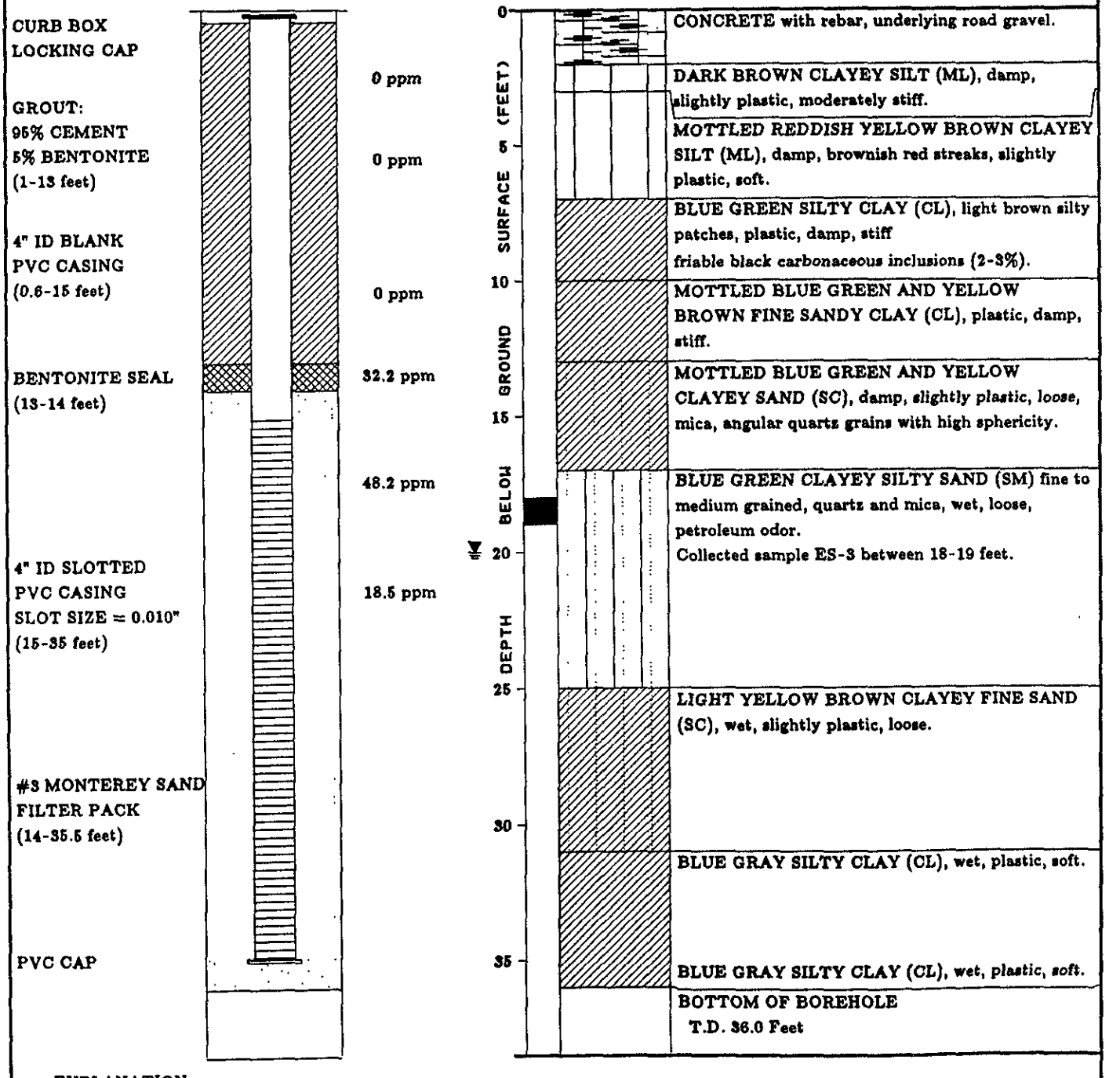
GEOLOGIST: H. PIETROPAOLI

TEST HOLE NUMBER: ES-3

DRILLER: AQUA SCIENCE ENGINEERS

DRILLING METHOD: HOLLOW-STEM AUGER

HOLE DIAMETER: 10.5-INCHES



EXPLANATION

▼ Water Level during drilling

—— Contact (approximate)

PID Photoionization Detector Reading

■ Location of sample

ES ENGINEERING - SCIENCE

CLIENT: GREYHOUND LINES, INC.

TEST HOLE NUMBER: ES-4

LOCATION: 2103 SAN PABLO AVENUE, OAKLAND, CALIFORNIA

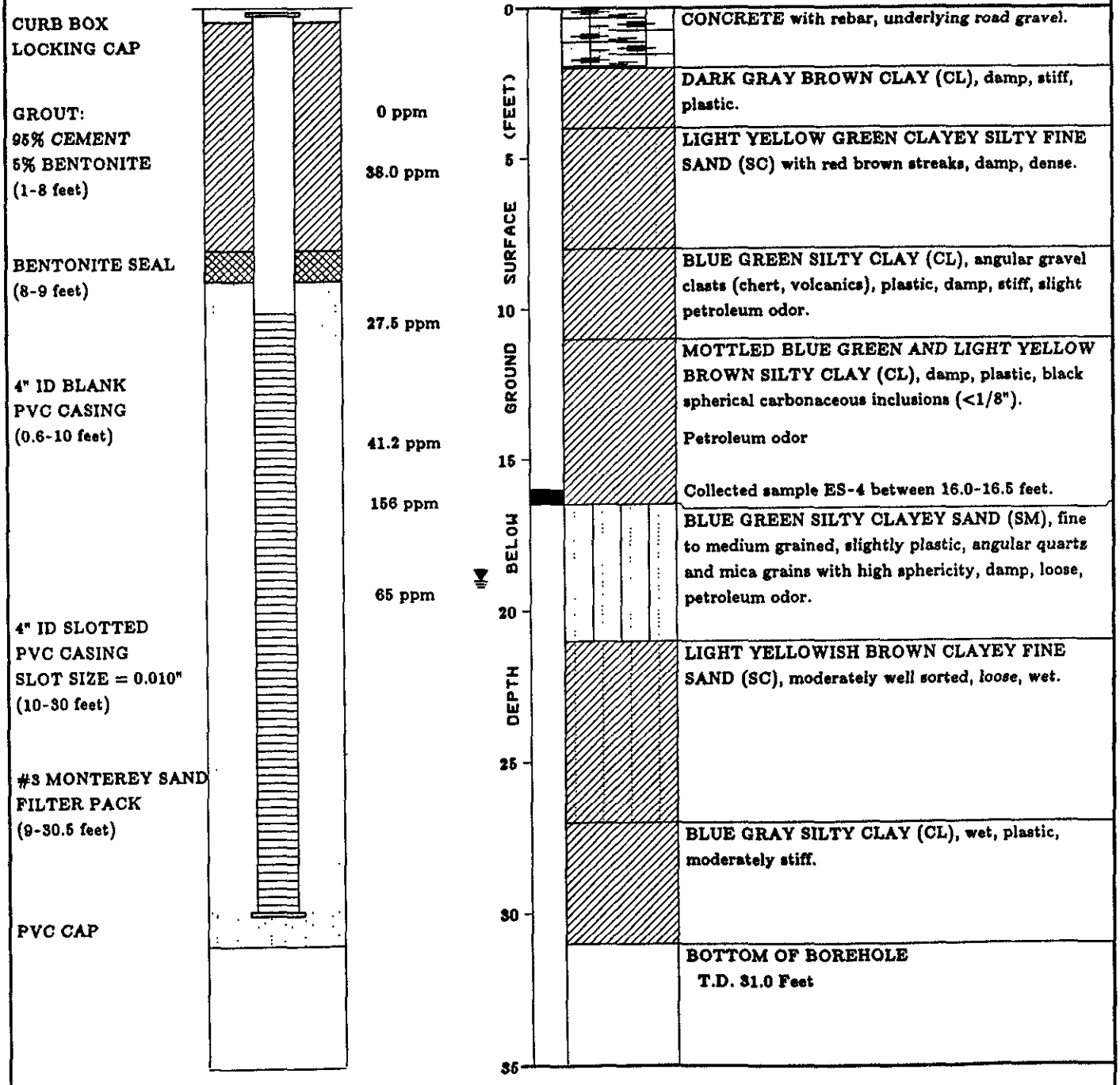
DRILLER: AQUA SCIENCE ENGINEERS

COMPLETION DATE: 13 November 1991

DRILLING METHOD: HOLLOW-STEM AUGER

GEOLOGIST: H. PIETROPAOLI

HOLE DIAMETER: 10.5-INCHES



EXPLANATION

▼ Water Level during drilling

—— Contact (approximate)

PID Photoionization Detector Reading

■ Location of sample

ES ENGINEERING - SCIENCE

CLIENT: GREYHOUND LINES, INC.

LOCATION: 2103 SAN PABLO AVENUE, OAKLAND, CALIFORNIA

COMPLETION DATE: 14 November 1991

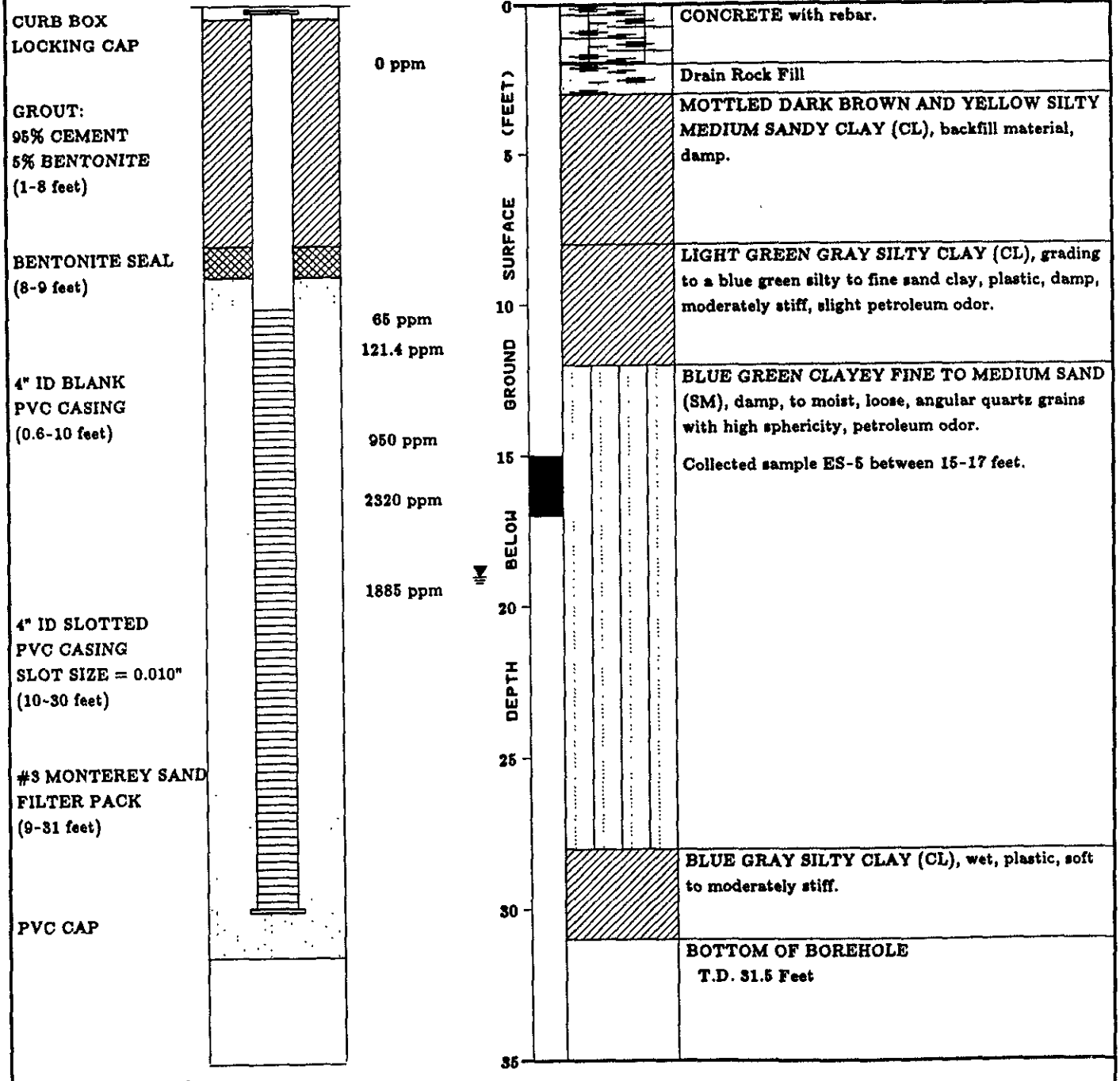
GEOLOGIST: H. PIETROPAOLI

TEST HOLE NUMBER: ES-5

DRILLER: AQUA SCIENCE ENGINEERS

DRILLING METHOD: HOLLOW-STEM AUGER

HOLE DIAMETER: 10.5-INCHES



EXPLANATION

▼ Water Level during drilling

—— Contact (approximate)

PID Photoionization Detector Reading

■ Location of sample

WATER WELL DRILLERS REPORTS

CONFIDENTIAL

STATE OF CALIFORNIA DWR
WELL COMPLETION REPORT
(WELL LOGS)

REMOVED

CONFIDENTIAL

STATE OF CALIFORNIA DWR
WELL COMPLETION REPORT
(WELL LOGS)

REMOVED

CONFIDENTIAL

STATE OF CALIFORNIA DWR
WELL COMPLETION REPORT
(WELL LOGS)

REMOVED

CONFIDENTIAL

STATE OF CALIFORNIA DWR
WELL COMPLETION REPORT
(WELL LOGS)

REMOVED

CONFIDENTIAL

STATE OF CALIFORNIA DWR
WELL COMPLETION REPORT
(WELL LOGS)

REMOVED

APPENDIX C

WATER LEVEL DATA AND GROUNDWATER SAMPLING FIELD NOTES

WATER LEVEL DATA

GREYHOUND LINES, INC.

NOVEMBER 1991

PERSONNEL: H. Pietropaoli, A. Peel

DATE: November 14, 1991

WELL ID	WATER LEVEL FROM T.O.C. (Feet)	WELL DEPTH FROM T.O.C. (Feet)	WELL CASING DIA (Inches)	G.S. HEIGHT FROM T.O.C (Feet)	WELL CASING VOLUME (gallons)	WELL ELEVATION USGS GROUND SURFACE	T.O.C. ELEVATION USGS (Ft. Above MSL)	WATER ELEVATION USGS (Ft. Above MSL)	WATER LEVEL FROM G.S. (Feet)
ES-1	19.22	30.00	4.00	0.22	7.01	21.55	21.33	2.11	19.44
ES-2	19.68	30.00	4.00	0.18	6.71	22.01	21.83	2.15	19.86
ES-3	20.08	35.00	4.00	0.30	9.70	22.63	22.33	2.25	20.38
ES-4	19.04	30.00	4.00	0.28	7.12	21.37	21.09	2.05	19.32
ES-5	19.08	30.00	4.00	0.45	7.10	21.69	21.24	2.16	19.53
BC-1	18.97	29.46	4.00	0.28	6.82	21.83	21.55	2.58	19.25
NO. 65	19.50	29.00	4.00	0.30	6.18	21.89	21.59	2.09	19.80
NO. 66	20.10	29.70	4.00	0.44	6.24	22.77	22.33	2.23	20.54

WL111491

NOTES:

T.O.C. = Top of Casing. All Measurements in Feet Relative to Top of Casing.

USGS DATUM: = City of Oakland, Station 27C, Elevation 15.67 Feet Above MSL.

4" ID CASING = 0.65 Gallons Per Linear Casing Foot.

BC-2 and BC-3 were not monitored due to suspect casing integrity.

GROUNDWATER SAMPLING FIELD NOTES

ENGINEERING-SCIENCE, INCORPORATED

NOVEMBER 1991

PROJECT/LOCATION: *GREYHOUND, OAKLAND*
PROJECT NUMBER: *SY132.31*

PERSONNEL: H. PIETROPAOLI, A. PEEL
DATE: 11/19/91

WELL ID	SAMPLE DATE, TIME AND SAMPLER	WATER LEVEL* BEFORE, WELL DIAMETER AND DEPTH (feet)	WATER LEVEL AFTER* (Feet)	GALLONS PER CASING VOLUME	WELL PURGING METHOD**	PUMP ON/OFF	TEMP. oC	SPEC. CONDC. (UMHOS/CM)	pH	TOTAL WATER PURGED (gals.)	SAMPLE COLL. METHOD	ANALYSIS & PRESERVATIVE NO.& TYPE OF CONTAINERS	COMMENTS
ES-4	11/19/91 0945 HP/ACP	19.12 4" 30.00	19.38	7.07	G	NR	23.5 25.4 26.0	950 900 850	7.43 7.35 7.33	0 7 21	B	(a) & (b)	Not recorded.
ES-3	11/19/91 1045 HP/ACP	20.14 4" 35.00	21.04	9.01	G	NR	28.8 18.3 17.5 18.2	600 600 650 650	7.19 7.25 7.40 7.44	0 20 29 34	B	(a) & (b)	Petroleum odor oil sheen, turbid purged dry after 25 gallons.
ES-2	11/19/91 1125 HP/ACP	19.74 4" 30.00	20.00	6.67	G	NR	18.1 19.2 19.9	550 400 365	7.15 7.48 7.57	0 13.5 20	B	(a) & (b)	Semi-turbid, sheen, petroleum odor.
ES-1	11/19/91 1200 HP/ACP	19.39 4" 30.00	19.96	6.90	G	NR	19.4 20.6 21.4	700 700 700	7.09 7.23 7.20	0 14 21	B	(a) & (b)	Petroleum odor, sheen.
ES-5	11/19/91 1235 HP/ACP	20.02 4" 30.00	19.30	6.49	G	NR	18.3 19.3 18.6	425 400 450	7.88 7.80 7.71	0 13 20	B	(a) & (b)	Approximately 1" of free-product in bailer, odor, sheen.

NOTES:

* *Water level from top of casing in feet*
** *WW - Well Wizard; G - Grundfos Pump; B - Bailer*
NA *Not Applicable*
NR *Not Recorded*

(a) BTEX, EPA 8020 with HCl preservative (3-40mL VOA's)
(b) TPH Diesel, [DHS/LUFT EPA Modified Method 8015] (2-1-Liter amber bottles)

APPENDIX D

CHAIN-OF-CUSTODY RECORDS AND ANALYTICAL LABORATORY RESULTS

CHAIN-OF-CUSTODY RECORDS

ENGINEERING – SCIENCE, INC.
CHAIN OF CUSTODY RECORD

LAB: PAGE ___ OF ___

CLIENT: ENGINEERING-SCIENCE, INC. BERKELEY

PROJECT MANAGER: J. Baker

PROJ. NO.: SY132

PROJECT NAME / LOCATION: Greyhound, Oakland Calif.

SAMPLER(S): (SIGNATURE) H. Pietropaoli

SAMPLE ID	DATE	TIME	MATRIX	SAMPLE LOCATION	NO. OF CONTAINERS	ANALYSES REQUIRED: EPA 8020 BTEX	ANALYSES REQUIRED: TPH-diesel mod 8015 Dist/Ext	ANALYSES REQUIRED	PRESERVED	TO BE COMPOSITED BY LAB	TURNAROUND TIME	REMARKS
ES-1	11/11/91	1125	Soil	16-18' bgs	1	✓	✓					
												Temp = 5°C

RELINQUISHED BY: (SIGNATURE)	DATE/TIME	RECEIVED BY: (SIGNATURE)	RELINQUISHED BY: (SIGNATURE)	DATE/TIME	RECEIVED BY: (SIGNATURE)
Henry Pietropaoli	11/11/91 1545	Don Gleason			

RELINQUISHED BY: (SIGNATURE)	DATE/TIME	RECEIVED FOR LABORATORY BY: (SIGNATURE)	DATE/TIME	REMARKS

FILE – ORIGINAL ACCOMPANIES SHIPMENT, COPY TO COORDINATOR FIELD FILES

ENGINEERING – SCIENCE, INC.
CHAIN OF CUSTODY RECORD

LAB:

PAGE ___ OF ___

CLIENT:	PROJECT MANAGER:	PROJ. NO.:
ENGINEERING-SCIENCE, INC. BERKELEY	J. Baker	54132

PROJECT NAME / LOCATION: Greyhound, Oakland, Calif

SAMPLER(S): (SIGNATURE) H. Pietropaoli

SAMPLE ID	DATE	TIME	MATRIX	SAMPLE LOCATION	NO. OF CONTAINERS	TPH-diesel DHS/LUFT mod 8015	BTEX EPA 8020				PRESERVED	TO BE COMPOSITED BY LAB	TURNAROUND TIME	REMARKS
ES-2	11/12/91	0915	Soil	16-18 feet bgs	1	✓	✓							
ES-3	11/12/91	1305	Soil	18-19 feet bgs	1	✓	✓							

RELINQUISHED BY: (SIGNATURE)	DATE/TIME	RECEIVED BY: (SIGNATURE)	RELINQUISHED BY: (SIGNATURE)	DATE/TIME	RECEIVED BY: (SIGNATURE)
Henry Pietropaoli	11/12/91 1750	John Gomez			

RELINQUISHED BY: (SIGNATURE)	DATE/TIME	RECEIVED FOR LABORATORY BY: (SIGNATURE)	DATE/TIME	REMARKS

DISTRIBUTION: ORIGINAL ACCOMPANIES SHIPMENT; COPY TO COORDINATOR FIELD FILES

ENGINEERING – SCIENCE, INC.
CHAIN OF CUSTODY RECORD

PAGE ___ OF ___

LAB: _____

CLIENT:	PROJECT MANAGER:	PROJ. NO.:
ENGINEERING-SCIENCE, INC. BERKELEY	J. Baker	SY132

PROJECT NAME / LOCATION: Greyhound Oakland, Calif

SAMPLER(S): (SIGNATURE) H. Pietropaoli

SAMPLE ID	DATE	TIME	MATRIX	SAMPLE LOCATION	NO. OF CONTAINERS	ANALYSES REQUIRED: TPH diesel	ANALYSES REQUIRED: BTEX EPA 8020	TURNAROUND TIME	REMARKS
SS-4	11/13/91	0925	Soil	15' bgs	1	✓	✓		
									TEMP = 4°C

RELINQUISHED BY: (SIGNATURE)	DATE/TIME	RECEIVED BY: (SIGNATURE)	RELINQUISHED BY: (SIGNATURE)	DATE/TIME	RECEIVED BY: (SIGNATURE)
Henry Pietropaoli	11/13/91 1700				
RELINQUISHED BY: (SIGNATURE)	DATE/TIME	RECEIVED FOR LABORATORY BY: (SIGNATURE)	DATE/TIME	REMARKS	
			11/13/91 1700		

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ENGINEERING - SCIENCE, INC.
CHAIN OF CUSTODY RECORD

PAGE 1 OF 1

LAB: _____

CLIENT: ENGINEERING-SCIENCE, INC. BERKELEY

PROJECT MANAGER: J. Barker

PROJ. NO.: SY132

PROJECT NAME / LOCATION: Greyhound, Oakland, Calif

SAMPLER(S): (SIGNATURE) H. Pietropaoli

SAMPLE ID	DATE	TIME	MATRIX	SAMPLE LOCATION	NO. OF CONTAINERS	ANALYSES REQUIRED: TPH-diesel (Modified 8015)	ANALYSES REQUIRED: BTEX 8020	TURNAROUND TIME	REMARKS
ES-5	11/14/91	0910	Soil	15-17' bgs	1	✓	✓		

RELINQUISHED BY: (SIGNATURE)	DATE/TIME	RECEIVED BY: (SIGNATURE)	RELINQUISHED BY: (SIGNATURE)	DATE/TIME	RECEIVED BY: (SIGNATURE)
Henry Pietropaoli	11/14/91 1725				

RELINQUISHED BY: (SIGNATURE)	DATE/TIME	RECEIVED FOR LABORATORY BY: (SIGNATURE)	DATE/TIME	REMARKS
		Dawn Bauman	11/14/91 1725	

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ES-ENGINEERING SCIENCE, INC.
600 Bancroft Way
Berkeley. CA 94710

QUALITY CONTROL RESULTS SUMMARY
VOLATILE ORGANICS ANALYSIS
EPA METHOD 8020 / BTEX

Work Order No.: 3441

QC sample No.: SSVG3911126 Date analyzed: 11-26-91

Matrix: SOIL Dilution factor: 1

Units: ug/Kg

COMPOUND	SA	BR	BS	BS	BSD	BSD	RPD	QC LIMITS	
8020 analysis	ug/Kg	ug/Kg	ug/Kg	PR	ug/Kg	PR		RPD	PR
Benzene	20	ND	12.5	63	14.3	72	13	28	39-150
Toluene	20	ND	11.9	60	12.8	64	7	31	46-148

BS = Spike Blank
BSD = Spike Blank Duplicate
BR = Blank Result
SA = Spike added

ND = Not Detected

RPD = 100 x (BS-BSD)/((BS+BSD)/2)

PR = 100 x ((BS or BSD) -BR)/SA

ANALYST: LR

QA: EMS

ENGINEERING - SCIENCE, INC.
CHAIN OF CUSTODY RECORD

LAB: ES - Berkeley

CLIENT: ENGINEERING-SCIENCE, INC. BERKELEY

PROJECT MANAGER: J. Baker

PROJ. NO.:

PROJECT NAME / LOCATION: Greyhound, Oakland

SAMPLER(S): (SIGNATURE) H. Pietropaoli

SAMPLE ID	DATE	TIME	MATRIX	SAMPLE LOCATION	NO. OF CONTAINERS	TPH-diesel	BTEX					ES Preserved w/ HCl	TURNAROUND TIME	REMARKS
ES-4	11/19/91	0945	Water		2	✓								
ES-4		0945			3		✓					✓		
ES-3		1045			2	✓								
ES-3		1045			3		✓					✓		
ES-2		1125			2	✓								
ES-2		1125			3		✓					✓		
ES-1		1200			2	✓								
ES-1		1200			3		✓					✓		
ES-5	↓	1235	↓		2	✓								obvious fuel product present
ES-5	11/19/91	1235	Water		3		✓					✓		" " " ✓
														Temp 5°C

RELINQUISHED BY: (SIGNATURE)	DATE/TIME	RECEIVED BY: (SIGNATURE)	RELINQUISHED BY: (SIGNATURE)	DATE/TIME	RECEIVED BY: (SIGNATURE)
H. Pietropaoli	11/19/91 1500				
RELINQUISHED BY: (SIGNATURE)	DATE/TIME	RECEIVED FOR LABORATORY BY: (SIGNATURE)	DATE/TIME	REMARKS	
			11/19/91 1500		

DISTRIBUTION: ORIGINAL ACCOMPANIES SHIPMENT; COPY TO COORDINATOR FIELD FILES

SOIL ANALYTICAL RESULTS

ES-ENGINEERING SCIENCE, INC.
600 Bancroft Way
Berkeley,CA 94710

GC ANALYTICAL REPORT
Analytical Method
8020 Aromatic Compounds

Work Order NO.: 3441 % Moisture:NA

Client ID:ES-1 Matrix:SOIL

Laboratory ID:3441-01 Level:MEDIUM

Unit:ug/Kg

Dilution Factor: 10 Date Analyzed:11-25-91

Date Confirmed:NA

Compound	Result	Reporting Limit
Benzene	ND	1000
Ethyl Benzene	3,400	2000
Toluene	3,000	2000
Xylenes (total)	22,000	4000

ND-Not Detected
NA-Not Applicable
D-Dilution Factor

ANALYST: LR GROUP LEADER:

ES-ENGINEERING SCIENCE, INC.
600 Bancroft Way
Berkeley,CA 94710

GC ANALYTICAL REPORT
Analytical Method
8020 Aromatic Compounds

Work Order NO.: 3441 % Moisture:NA

Client ID:BLANK Matrix:SOIL

Laboratory ID:MSVG3911125A Level:MEDIUM

Unit:ug/Kg

Dilution Factor: 1 Date Analyzed:11-25-91
Date Confirmed:NA

Compound	Result	Reporting Limit
Benzene	ND	100
Ethyl Benzene	ND	200
Toluene	ND	200
Xylenes (total)	ND	400

ND-Not Detected
NA-Not Applicable
D-Dilution Factor

ANALYST: LR GROUP LEADER: SF

ES-ENGINEERING SCIENCE, INC.

600 Bancroft Way
Berkeley,CA 94710

GC ANALYTICAL REPORT
Analytical Method
Modified EPA 8015

Work Order NO.:3441
Laboratory ID:3441-01
Client ID:ES-1

% Moisture:NA
Matrix:SOIL
Level:NA
Units:mg/Kg

DIESEL:
Date Extracted:11/19/91
Dilution Factor: 1.0
Date Analyzed:12/02/91

Compound	Result	Reporting Limit
DIESEL	ND	2.5

ND-Not Detected
NA-Not Applicable

ANALYST:

GROUP LEADER:

ES-ENGINEERING SCIENCE, INC.
600 Bancroft Way
Berkeley,CA 94710

GC ANALYTICAL REPORT
Analytical Method
Modified EPA 8015

Work Order NO.:3441
Laboratory ID:MSDES911119
Client ID:(BLANK)

% Moisture:NA
Matrix:SOIL
Level:NA
Units:mg/Kg

DIESEL:
Date Extracted:11/19/91
Dilution Factor: 1.0
Date Analyzed:12/02/91

Compound	Result	Reporting Limit
DIESEL	ND	2.5

ND-Not Detected
NA-Not Applicable

ANALYST:

GROUP LEADER:

ES-ENGINEERING SCIENCE, INC.

600 Bancroft Way
Berkeley. CA 94710

QUALITY CONTROL RESULTS SUMMARY
EPA 8015

Work Order No.: 3441, 3446, 3450, 3460, 3471
QC Sample No. : SSDES911119A&B
Matrix : SOIL(LOW)

Date Extracted : 11/19/91
Date Analyzed : 12/02/91
Inst. Ser. # : EGC2-911202
Dilution Factor: 1

QC Batch Number: S91QCB012DES

COMPOUND	SA mg/Kg	SR mg/Kg	BS mg/Kg	BS PR	BSD mg/Kg	BSD PR	RPD	QC LIMITS RPD	QC LIMITS PR
DIESEL	250	ND	196	78	196	78	0	25	75-125

BS = Spike sample
BSD = Spike sample duplicate
SR = Sample result
SA = Spike added

NC = Not calculated
NA = Not Applicable
D = Diluted Out
* = Out of limits

RPD = 100 x (BS-BSD)/((BS+BSD)/2)

PR = 100 x ((BS or BSD) - SR)/SA

ANALYST:

QC: MWB

ES-ENGINEERING SCIENCE, INC.
600 Bancroft Way
Berkeley,CA 94710

GC ANALYTICAL REPORT
Analytical Method
BTEX Aromatic Compounds By 8020

Work Order NO.: 3450 % Moisture:NA

Client ID:ES-4 Matrix:SOIL

Laboratory ID:3450-01 Level:LOW

Unit:ug/Kg

Dilution Factor: 1 Date Analyzed:11-27-91
Date Confirmed:NA

Compound	Result	Reporting Limit
Benzene	ND	1.0
Ethyl Benzene	ND	2.0
Toluene	ND	2.0
Xylenes (total)	ND	4.0

ND-Not Detected
NA-Not Applicable
D-Dilution Factor

ANALYST: LR

GROUP LEADER: SR

ES-ENGINEERING SCIENCE, INC.
600 Bancroft Way
Berkeley,CA 94710

GC ANALYTICAL REPORT
Analytical Method
BTEX Aromatic Compounds By 8020

Work Order NO.: 3450 % Moisture:NA

Client ID:BLANK Matrix:SOIL

Laboratory ID:MSVG5911127 Level:LOW

Unit:ug/Kg

Dilution Factor: 1 Date Analyzed:11-27-91
Date Confirmed:NA

Compound	Result	Reporting Limit
Benzene	ND	1.0
Ethyl Benzene	ND	2.0
Toluene	ND	2.0
Xylenes (total)	ND	4.0

ND-Not Detected
NA-Not Applicable
D-Dilution Factor

ANALYST: LR GROUP LEADER:

ES-ENGINEERING SCIENCE, INC.

600 Bancroft Way
Berkeley. CA 94710

QUALITY CONTROL RESULTS SUMMARY
VOLATILE ORGANICS ANALYSIS
EPA METHOD 8020 / BTEX

Work Order No.: 3450

QC sample No.: SSVG5911127 Date analyzed: 11-27-91

Matrix: SOIL Dilution factor: 1

Units: ug/Kg

COMPOUND 8020 analysis	SA ug/Kg	BR ug/Kg	BS ug/Kg	BS PR	BSD ug/Kg	BSD PR	RPD	QC LIMITS RPD	QC LIMITS PR
Benzene	20	ND	21.0	105	16.5	83	24	28	39-150
Toluene	20	ND	18.7	94	18.5	93	1	31	46-148

BS = Spike Blank
BSD = Spike Blank Duplicate
BR = Blank Result
SA = Spike added

ND = Not Detected

RPD = 100 x (BS-BSD)/((BS+BSD)/2)

PR = 100 x ((BS or BSD) -BR)/SA

ANALYST: LR

QA: MMB

ES-ENGINEERING SCIENCE, INC.

600 Bancroft Way
Berkeley,CA 94710

GC ANALYTICAL REPORT
Analytical Method
Modified EPA 8015

Work Order NO.:3450
Laboratory ID:3450-01
Client ID:ES-4

% Moisture:NA
Matrix:SOIL
Level:NA
Units:mg/Kg

DIESEL:
Date Extracted:11/19/91
Dilution Factor: 1.0
Date Analyzed:12/03/91

Compound	Result	Reporting Limit
DIESEL	ND	2.5

ND-Not Detected
NA-Not Applicable

ANALYST:

GROUP LEADER:

ES-ENGINEERING SCIENCE, INC.

600 Bancroft Way
Berkeley,CA 94710

GC ANALYTICAL REPORT
Analytical Method
Modified EPA 8015

Work Order NO.:3450
Laboratory ID:MSDES911119
Client ID:(BLANK)

% Moisture:NA
Matrix:SOIL
Level:NA
Units:mg/Kg

DIESEL:
Date Extracted:11/19/91
Dilution Factor: 1.0
Date Analyzed:12/02/91

Compound	Result	Reporting Limit
DIESEL	ND	2.5

ND-Not Detected
NA-Not Applicable

ANALYST:

GROUP LEADER:

ES-ENGINEERING SCIENCE, INC.

600 Bancroft Way
Berkeley. CA 94710

QUALITY CONTROL RESULTS SUMMARY
EPA 8015

Work Order No.: 3441, 3446, 3450, 3460, 3471
QC Sample No. : SSDES911119A&B
Matrix : SOIL(LOW)

QC Batch Number: S91QCB012DES

Date Extracted : 11/19/91
Date Analyzed : 12/02/91
Inst. Ser. # : EGC2-911202
Dilution Factor: 1

COMPOUND	SA mg/Kg	SR mg/Kg	BS mg/Kg	BS PR	BSD mg/Kg	BSD PR	RPD	QC LIMITS RPD	QC LIMITS PR
DIESEL	250	ND	196	78	196	78	0	25	75-125

BS = Spike sample
BSD = Spike sample duplicate
SR = Sample result
SA = Spike added

NC = Not calculated
NA = Not Applicable
D = Diluted Out
* = Out of limits

RPD = 100 x (BS-BSD)/((BS+BSD)/2)

PR = 100 x ((BS or BSD) - SR)/SA

ANALYST:

QC: MWB

ES-ENGINEERING SCIENCE, INC.
600 Bancroft Way
Berkeley,CA 94710

GC ANALYTICAL REPORT
Analytical Method
BTEX Aromatic Compounds By 8020

Work Order NO.: 3446 % Moisture:NA

Client ID:ES-2 Matrix:SOIL

Laboratory ID:3446-01 Level:MEDIUM

Unit:ug/Kg

Dilution Factor: 20 Date Analyzed:11-26-91
Date Confirmed:NA

Compound	Result	Reporting Limit
Benzene	ND	2000.0
Ethyl Benzene	28,000	4000.0
Toluene	27,000	4000.0
Xylenes (total)	150,000	8000.0

ND-Not Detected
NA-Not Applicable
D-Dilution Factor

ANALYST: LR GROUP LEADER:

ES-ENGINEERING SCIENCE, INC.
600 Bancroft Way
Berkeley,CA 94710

GC ANALYTICAL REPORT
Analytical Method
BTEX Aromatic Compounds By 8020

Work Order NO.: 3446 % Moisture:NA

Client ID:ES-3 Matrix:SOIL

Laboratory ID:3446-02 Level:LOW

Unit:ug/Kg

Dilution Factor: 1 Date Analyzed:11-26-91
Date Confirmed:NA

Compound	Result	Reporting Limit
Benzene	ND	1.0
Ethyl Benzene	ND	2.0
Toluene	ND	2.0
Xylenes (total)	ND	4.0

ND-Not Detected
NA-Not Applicable
D-Dilution Factor

ANALYST: LR GROUP LEADER:

ES-ENGINEERING SCIENCE, INC.
600 Bancroft Way
Berkeley,CA 94710

GC ANALYTICAL REPORT
Analytical Method
BTEX Aromatic Compounds By 8020

Work Order NO.: 3446 % Moisture:NA

Client ID:BLANK Matrix:SOIL

Laboratory ID:MSVG5911126A Level:LOW

Unit:ug/Kg

Dilution Factor: 1 Date Analyzed:11-26-91
Date Confirmed:NA

Compound	Result	Reporting Limit
Benzene	ND	1.0
Ethyl Benzene	ND	2.0
Toluene	ND	2.0
Xylenes (total)	ND	4.0

ND-Not Detected
NA-Not Applicable
D-Dilution Factor

ANALYST: LR GROUP LEADER:

ES-ENGINEERING SCIENCE, INC.
600 Bancroft Way
Berkeley,CA 94710

GC ANALYTICAL REPORT
Analytical Method
BTEX Aromatic Compounds By 8020

Work Order NO.: 3446 % Moisture:NA

Client ID:BLANK Matrix:SOIL

Laboratory ID:MSVG5911126A Level:MEDIUM

Unit:ug/Kg

Dilution Factor: 1 Date Analyzed:11-26-91
Date Confirmed:NA

Compound	Result	Reporting Limit
Benzene	ND	100.0
Ethyl Benzene	ND	200.0
Toluene	ND	200.0
Xylenes (total)	ND	400.0

ND-Not Detected
NA-Not Applicable
D-Dilution Factor

ANALYST: LR GROUP LEADER:

ES-ENGINEERING SCIENCE, INC.

600 Bancroft Way
Berkeley. CA 94710

QUALITY CONTROL RESULTS SUMMARY
VOLATILE ORGANICS ANALYSIS
EPA METHOD 8020 / BTEX

Work Order No.: 3446

QC sample No.: SSVG5911127 Date analyzed: 11-27-91

Matrix: SOIL Dilution factor: 1

Units: ug/Kg

COMPOUND	SA	BR	BS	BS	BSD	BSD	RPD	QC LIMITS	
8020 analysis	ug/Kg	ug/Kg	ug/Kg	PR	ug/Kg	PR		RPD	PR
Benzene	20	ND	21.0	105	16.5	83	24	28	39-150
Toluene	20	ND	18.7	94	18.5	93	1	31	46-148

BS = Spike Blank
BSD = Spike Blank Duplicate
BR = Blank Result
SA = Spike added

ND = Not Detected

RPD = 100 x (BS-BSD)/((BS+BSD)/2)

PR = 100 x ((BS or BSD) -BR)/SA

ANALYST: LR

QA: MWB

ES-ENGINEERING SCIENCE, INC.

600 Bancroft Way
Berkeley,CA 94710

GC ANALYTICAL REPORT
Analytical Method
Modified EPA 8015

Work Order NO.:3446
Laboratory ID:3446-01
Client ID:ES-2

% Moisture:NA
Matrix:SOIL
Level:NA
Units:mg/Kg

DIESEL:
Date Extracted:11/19/91
Dilution Factor: 1.0
Date Analyzed:12/03/91

Compound	Result	Reporting Limit
DIESEL	ND	2.5

ND-Not Detected
NA-Not Applicable

ANALYST:

GROUP LEADER:

ES-ENGINEERING SCIENCE, INC.

600 Bancroft Way
Berkeley,CA 94710

GC ANALYTICAL REPORT
Analytical Method
Modified EPA 8015

Work Order NO.:3446
Laboratory ID:3446-02
Client ID:ES-3

% Moisture:NA
Matrix:SOIL
Level:NA
Units:mg/Kg

DIESEL:
Date Extracted:11/19/91
Dilution Factor: 1.0
Date Analyzed:12/03/91

Compound	Result	Reporting Limit
DIESEL	ND	2.5

ND-Not Detected
NA-Not Applicable

ANALYST:

GROUP LEADER: SF

ES-ENGINEERING SCIENCE, INC.

600 Bancroft Way
Berkeley,CA 94710

GC ANALYTICAL REPORT
Analytical Method
Modified EPA 8015

Work Order NO.:3446
Laboratory ID:MSDES911119
Client ID:(BLANK)

% Moisture:NA
Matrix:SOIL
Level:NA
Units:mg/Kg

DIESEL:
Date Extracted:11/19/91
Dilution Factor: 1.0
Date Analyzed:12/02/91

Compound	Result	Reporting Limit
DIESEL	ND	2.5

ND-Not Detected
NA-Not Applicable

ANALYST:

GROUP LEADER:

ES-ENGINEERING SCIENCE, INC.

600 Bancroft Way
Berkeley. CA 94710

QUALITY CONTROL RESULTS SUMMARY
EPA 8015

Work Order No.: 3441, 3446, 3450, 3460, 3471
QC Sample No. : SSDES911119A&B
Matrix : SOIL(LOW)

Date Extracted : 11/19/91
Date Analyzed : 12/02/91
Inst. Ser. # : EGC2-911202
Dilution Factor: 1

QC Batch Number: S91QCB012DES

COMPOUND	SA mg/Kg	SR mg/Kg	BS mg/Kg	BS PR	BSD mg/Kg	BSD PR	RPD	QC LIMITS RPD	QC LIMITS PR
DIESEL	250	ND	196	78	196	78	0	25	75-125

BS = Spike sample
BSD = Spike sample duplicate
SR = Sample result
SA = Spike added

NC = Not calculated
NA = Not Applicable
D = Diluted Out
* = Out of limits

RPD = 100 x (BS-BSD)/((BS+BSD)/2)

PR = 100 x ((BS or BSD) - SR)/SA

ANALYST:

QC: MWB

ES-ENGINEERING SCIENCE, INC.
600 Bancroft Way
Berkeley,CA 94710

GC ANALYTICAL REPORT
Analytical Method
BTEX Aromatic Compounds By 8020

Work Order NO.: 3460 % Moisture:NA

Client ID:ES-5 Matrix:SOIL

Laboratory ID:3460-01 Level:LOW

Unit:ug/Kg

Dilution Factor: 1 Date Analyzed:11-27-91
Date Confirmed:NA

Compound	Result	Reporting Limit
Benzene	ND	1.0
Ethyl Benzene	65	2.0
Toluene	80	2.0
Xylenes (total)	330	4.0

ND-Not Detected
NA-Not Applicable
D-Dilution Factor

ANALYST: LR

GROUP LEADER: [signature]

ES-ENGINEERING SCIENCE, INC.
600 Bancroft Way
Berkeley,CA 94710

GC ANALYTICAL REPORT
Analytical Method
BTEX Aromatic Compounds By 8020

Work Order NO.: 3460 % Moisture:NA

Client ID:BLANK Matrix:SOIL

Laboratory ID:MSVG5911127 Level:LOW

Unit:ug/Kg

Dilution Factor: 1 Date Analyzed:11-27-91
Date Confirmed:NA

Compound	Result	Reporting Limit
Benzene	ND	1.0
Ethyl Benzene	ND	2.0
Toluene	ND	2.0
Xylenes (total)	ND	4.0

ND-Not Detected
NA-Not Applicable
D-Dilution Factor

ANALYST: GROUP LEADER:

ES-ENGINEERING SCIENCE, INC.

600 Bancroft Way
Berkeley. CA 94710

QUALITY CONTROL RESULTS SUMMARY
VOLATILE ORGANICS ANALYSIS
EPA METHOD 8020 / BTEX

Work Order No.: 3460

QC sample No.: SSVG5911127 Date analyzed: 11-27-91

Matrix: SOIL Dilution factor: 1

Units: ug/Kg

COMPOUND 8020 analysis	SA ug/Kg	BR ug/Kg	BS ug/Kg	BS PR	BSD ug/Kg	BSD PR	RPD	QC LIMITS RPD	QC LIMITS PR
Benzene	20	ND	21.0	105	16.5	83	24	28	39-150
Toluene	20	ND	18.7	94	18.5	93	1	31	46-148

BS = Spike Blank
BSD = Spike Blank Duplicate
BR = Blank Result
SA = Spike added

ND = Not Detected

RPD = 100 x (BS-BSD)/((BS+BSD)/2)

PR = 100 x ((BS or BSD) -BR)/SA

ANALYST:

QA:

ES-ENGINEERING SCIENCE, INC.

600 Bancroft Way
Berkeley,CA 94710

GC ANALYTICAL REPORT
Analytical Method
Modified EPA 8015

Work Order NO.:3460
Laboratory ID:3460-01
Client ID:ES-5

% Moisture:NA
Matrix:SOIL
Level:NA
Units:mg/Kg

DIESEL:
Date Extracted:11/19/91
Dilution Factor: 1.0
Date Analyzed:12/03/91

Compound	Result	Reporting Limit
DIESEL	160	2.5

ND-Not Detected
NA-Not Applicable

ANALYST:

GROUP LEADER:

ES-ENGINEERING SCIENCE, INC.

600 Bancroft Way
Berkeley,CA 94710

GC ANALYTICAL REPORT
Analytical Method
Modified EPA 8015

Work Order NO.:3460
Laboratory ID:MSDES911119
Client ID:(BLANK)

% Moisture:NA
Matrix:SOIL
Level:NA
Units:mg/Kg

DIESEL:
Date Extracted:11/19/91
Dilution Factor: 1.0
Date Analyzed:12/02/91

Compound	Result	Reporting Limit
DIESEL	ND	2.5

ND-Not Detected
NA-Not Applicable

ANALYST:

GROUP LEADER:

ES-ENGINEERING SCIENCE, INC.

600 Bancroft Way
Berkeley. CA 94710

QUALITY CONTROL RESULTS SUMMARY
EPA 8015

Work Order No.: 3441, 3446, 3450, 3460, 3471
QC Sample No. : SSDES911119A&B
Matrix : SOIL(LOW)

Date Extracted : 11/19/91
Date Analyzed : 12/02/91
Inst. Ser. # : EGC2-911202
Dilution Factor: 1

QC Batch Number:S91QCB012DES

COMPOUND	SA mg/Kg	SR mg/Kg	BS mg/Kg	BS PR	BSD mg/Kg	BSD PR	RPD	QC LIMITS RPD	QC LIMITS PR
DIESEL	250	ND	196	78	196	78	0	25	75-125

BS = Spike sample
BSD = Spike sample duplicate
SR = Sample result
SA = Spike added

NC = Not calculated
NA = Not Applicable
D = Diluted Out
* = Out of limits

RPD = 100 x (BS-BSD)/((BS+BSD)/2)

PR = 100 x ((BS or BSD) - SR)/SA

ANALYST:

QC:

GROUNDWATER ANALYTICAL RESULTS

ES-ENGINEERING SCIENCE, INC.
600 Bancroft Way
Berkeley,CA 94710

GC ANALYTICAL REPORT
Analytical Method
BTEX Aromatic Compounds By 8020

Work Order NO.: 3474 % Moisture:NA

Client ID:ES-4 Matrix:WATER

Laboratory ID:3474-01 Level:NA

Unit:ug/L

Dilution Factor: 1 Date Analyzed:11-27-91
Date Confirmed:NA

Compound	Result	Reporting Limit
Benzene	ND	1.0
Ethyl Benzene	ND	2.0
Toluene	ND	2.0
Xylenes (total)	ND	4.0

ND-Not Detected
NA-Not Applicable
D-Dilution Factor

ANALYST: LR GROUP LEADER: [signature]

ES-ENGINEERING SCIENCE, INC.
600 Bancroft Way
Berkeley,CA 94710

GC ANALYTICAL REPORT
Analytical Method
BTEX Aromatic Compounds By 8020

Work Order NO.: 3474 % Moisture:NA

Client ID:ES-3 Matrix:WATER

Laboratory ID:3474-02 Level:NA

Unit:ug/L

Dilution Factor: 5 Date Analyzed:12-02-91
Date Confirmed:NA

Compound	Result	Reporting Limit
Benzene	61	5.0
Ethyl Benzene	14	10.0
Toluene	16	10.0
Xylenes (total)	33	20.0

ND-Not Detected
NA-Not Applicable
D-Dilution Factor

ANALYST: CR GROUP LEADER: [signature]

ES-ENGINEERING SCIENCE, INC.
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Berkeley,CA 94710

GC ANALYTICAL REPORT
Analytical Method
BTEX Aromatic Compounds By 8020

Work Order NO.: 3474 % Moisture:NA

Client ID:ES-2 Matrix:WATER

Laboratory ID:3474-03 Level:NA

Unit:ug/L

Dilution Factor: 10 Date Analyzed:12-02-91
Date Confirmed:NA

Compound	Result	Reporting Limit
Benzene	390	10.0
Ethyl Benzene	78	20.0
Toluene	96	20.0
Xylenes (total)	310	40.0

ND-Not Detected
NA-Not Applicable
D-Dilution Factor

ANALYST: LR GROUP LEADER: [signature]

ES-ENGINEERING SCIENCE, INC.
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GC ANALYTICAL REPORT
Analytical Method
BTEX Aromatic Compounds By 8020

Work Order NO.: 3474
% Moisture:NA

Client ID:ES-1
Matrix:WATER

Laboratory ID:3474-04
Level:NA

Unit:ug/L

Dilution Factor: 5
Date Analyzed:12-03-91
Date Confirmed:NA

Compound	Result	Reporting Limit
Benzene	130	5.0
Ethyl Benzene	10	10.0
Toluene	43	10.0
Xylenes (total)	91	20.0

ND-Not Detected
NA-Not Applicable
D-Dilution Factor

ANALYST: LR

GROUP LEADER: R. Wood

ES-ENGINEERING SCIENCE, INC.
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GC ANALYTICAL REPORT
Analytical Method
BTEX Aromatic Compounds By 8020

Work Order NO.: 3474 % Moisture:NA

Client ID:ES-5 Matrix:WATER

Laboratory ID:3474-05 Level:NA

Unit:ug/L

Dilution Factor: 200 Date Analyzed:12-03-91
Date Confirmed:NA

Compound	Result	Reporting Limit
Benzene	2,100	200.0
Ethyl Benzene	840	400.0
Toluene	3,900	400.0
Xylenes (total)	6,000	800.0

ND-Not Detected
NA-Not Applicable
D-Dilution Factor

ANALYST [illegible] GROUP LEADER [signature]

ES-ENGINEERING SCIENCE, INC.
600 Bancroft Way
Berkeley,CA 94710

GC ANALYTICAL REPORT
Analytical Method
BTEX Aromatic Compounds By 8020

Work Order NO.: 3474 % Moisture:NA

Client ID:BLANK Matrix:WATER

Laboratory ID:MWVG5911127 Level:NA

Unit:ug/L

Dilution Factor: 1 Date Analyzed:11-27-91
Date Confirmed:NA

Compound	Result	Reporting Limit
Benzene	ND	1.0
Ethyl Benzene	ND	2.0
Toluene	ND	2.0
Xylenes (total)	ND	4.0

ND-Not Detected
NA-Not Applicable
D-Dilution Factor

ANALYST: LR GROUP LEADER: R. Wert

ES-ENGINEERING SCIENCE, INC.
600 Bancroft Way
Berkeley,CA 94710

GC ANALYTICAL REPORT
Analytical Method
BTEX Aromatic Compounds By 8020

Work Order NO.: 3474 % Moisture:NA

Client ID:BLANK Matrix:WATER

Laboratory ID:MWVG2911202 Level:NA

Unit:ug/L

Dilution Factor: 1 Date Analyzed:12-02-91
Date Confirmed:NA

Compound	Result	Reporting Limit
Benzene	ND	1.0
Ethyl Benzene	ND	2.0
Toluene	ND	2.0
Xylenes (total)	ND	4.0

ND-Not Detected
NA-Not Applicable
D-Dilution Factor

ANALYST: LR GROUP LEADER: R. Ward

ES-ENGINEERING SCIENCE, INC.
600 Bancroft Way
Berkeley,CA 94710

GC ANALYTICAL REPORT
Analytical Method
BTEX Aromatic Compounds By 8020

Work Order NO.: 3474 % Moisture:NA

Client ID:BLANK Matrix:WATER

Laboratory ID:MWVG2911203 Level:NA

Unit:ug/L

Dilution Factor: 1 Date Analyzed:12-03-91
Date Confirmed:NA

Compound	Result	Reporting Limit
Benzene	ND	1.0
Ethyl Benzene	ND	2.0
Toluene	ND	2.0
Xylenes (total)	ND	4.0

ND-Not Detected
NA-Not Applicable
D-Dilution Factor

ANALYST: LR GROUP LEADER: RWard

ES-ENGINEERING SCIENCE, INC.
600 Bancroft Way
Berkeley. CA 94710

QUALITY CONTROL RESULTS SUMMARY
VOLATILE ORGANICS ANALYSIS
EPA METHOD 8020 / BTEX

Work Order No.: 3474

QC sample No.: SWVG2911203 Date analyzed: 12-03-91

Matrix: WATER Dilution factor: 1

Units: ug/L

COMPOUND	SA	BR	BS	BS	BSD	BSD	RPD	QC LIMITS	
8020 analysis	ug/L	ug/L	ug/L	PR	ug/L	PR		RPD	PR
Benzene	20	ND	14.6	73	15.0	75	3	29	39-150
Toluene	20	ND	14.5	73	14.7	74	1	28	46-148

BS = Spike Blank
BSD = Spike Blank Duplicate
BR = Blank Result
SA = Spike added

ND = Not Detected

RPD = 100 x (BS-BSD)/((BS+BSD)/2)

PR = 100 x ((BS or BSD) -BR)/SA

ANALYST: LR QA:

ES-ENGINEERING SCIENCE, INC.

600 Bancroft Way
Berkeley,CA 94710

GC ANALYTICAL REPORT
Analytical Method
Modified EPA 8015

Work Order NO.:3474
Laboratory ID:3474-01
Client ID:ES-4

% Moisture:NA
Matrix:WATER
Level:NA
Units:mg/L

DIESEL:
Date Extracted:11/26/91
Dilution Factor: 1.0
Date Analyzed:12/03/91

Compound	Result	Reporting Limit
DIESEL	ND	0.05

ND-Not Detected
NA-Not Applicable

ANALYST:

GROUP LEADER:

ES-ENGINEERING SCIENCE, INC.

600 Bancroft Way
Berkeley,CA 94710

GC ANALYTICAL REPORT
Analytical Method
Modified EPA 8015

Work Order NO.:3474
Laboratory ID:3474-02
Client ID:ES-3

% Moisture:NA
Matrix:WATER
Level:NA
Units:mg/L

DIESEL:
Date Extracted:11/26/91
Dilution Factor: 1.0
Date Analyzed:12/03/91

Compound	Result	Reporting Limit
DIESEL	ND	0.05

ND-Not Detected
NA-Not Applicable

ANALYST:

GROUP LEADER: R. Ward

ES-ENGINEERING SCIENCE, INC.

600 Bancroft Way
Berkeley,CA 94710

GC ANALYTICAL REPORT
Analytical Method
Modified EPA 8015

Work Order NO.:3474
Laboratory ID:3474-03
Client ID:ES-2

% Moisture:NA
Matrix:WATER
Level:NA
Units:mg/L

DIESEL:
Date Extracted:11/26/91
Dilution Factor: 1.0
Date Analyzed:12/03/91

Compound	Result	Reporting Limit
DIESEL	ND	0.05

ND-Not Detected
NA-Not Applicable

ANALYST:

GROUP LEADER:

ES-ENGINEERING SCIENCE, INC.

600 Bancroft Way
Berkeley,CA 94710

GC ANALYTICAL REPORT
Analytical Method
Modified EPA 8015

Work Order NO.:3474
Laboratory ID:3474-04
Client ID:ES-1

% Moisture:NA
Matrix:WATER
Level:NA
Units:mg/L

DIESEL:
Date Extracted:11/26/91
Dilution Factor: 1.0
Date Analyzed:12/03/91

Compound	Result	Reporting Limit
DIESEL	ND	0.05

ND-Not Detected
NA-Not Applicable

ANALYST:

GROUP LEADER:

ES-ENGINEERING SCIENCE, INC.

600 Bancroft Way
Berkeley,CA 94710

GC ANALYTICAL REPORT
Analytical Method
Modified EPA 8015

Work Order NO.:3474
Laboratory ID:3474-05
Client ID:ES-5

% Moisture:NA
Matrix:WATER
Level:NA
Units:mg/L

DIESEL:
Date Extracted:11/26/91
Dilution Factor: 100.0
Date Analyzed:12/03/91

Compound	Result	Reporting Limit
DIESEL	950	5.0

ND-Not Detected
NA-Not Applicable

ANALYST: JL

GROUP LEADER: K Ward

ES-ENGINEERING SCIENCE, INC.

600 Bancroft Way
Berkeley,CA 94710

GC ANALYTICAL REPORT
Analytical Method
Modified EPA 8015

Work Order NO.:3474
Laboratory ID:MWDES911126
Client ID:(BLANK)

% Moisture:NA
Matrix:WATER
Level:NA
Units:mg/L

DIESEL:
Date Extracted:11/26/91
Dilution Factor: 1.0
Date Analyzed:12/03/91

Compound	Result	Reporting Limit
DIESEL	ND	0.05

ND-Not Detected
NA-Not Applicable

ANALYST:

GROUP LEADER:

ES-ENGINEERING SCIENCE, INC.

600 Bancroft Way
Berkeley. CA 94710

QUALITY CONTROL RESULTS SUMMARY
EPA 8015

Work Order No.: 3474, 3492
QC Sample No. : SWDES911126A&B
Matrix : WATER

QC Batch Number: W91QCB010DES

Date Extracted : 11/26/91
Date Analyzed : 12/03/91
Inst. Ser. # : EGC2-911202
Dilution Factor: 1

COMPOUND	SA mg/L	SR mg/L	BS mg/L	BS PR	BSD mg/L	BSD PR	RPD	QC LIMITS RPD	QC LIMITS PR
DIESEL	5.00	ND	3.84	77	4.17	83	8	25	75-125

BS = Spike sample
BSD = Spike sample duplicate
SR = Sample result
SA = Spike added

NC = Not calculated
NA = Not Applicable
D = Diluted Out
* = Out of limits

RPD = 100 x (BS-BSD)/((BS+BSD)/2)

PR = 100 x ((BS or BSD) - SR)/SA

ANALYST: JK

QC: MWB

APPENDIX E

REFERENCES

REFERENCES

Alameda County Flood Control and Water Conservation District, 1988, Geohydrology and Groundwater Quality Overview of the East Bay Plain Area, Alameda County, California. 205(j) Report, June.

Alameda County Public Works Agency, 1991, Bay Plain Groundwater Study, Well Inventory Report. October 7.

Brown and Caldwell Consulting Engineers 1989, Phase I Investigation, Oakland, California Terminal. Consultant's report prepared for Greyhound Lines, Inc., Dallas Texas, June.

California Code of Regulations, Title 26, Division 22, Section 66680.

California Code of Regulations, Title 26, Division 22, Section 66699.

California Code of Regulations, Title 26, Division 22, Sections 64431-64473, Water Quality.

California Regional Water Quality Control Board, San Francisco Bay Region, 1985, Guidelines for Addressing Fuel Leaks. September.

California Regional Water Quality Control Board, San Francisco Bay Region, 1991, Fuel Leaks List, November 5.

California Regional Water Quality Control Board: North Coast Region, San Francisco Bay Region, Central Valley Region 1990, Revised Tri-Regional Recommendations: Regional Board Staff Recommendations for Initial Evaluation and Investigation of Underground Tanks. 10 August.

City of Oakland, 1983, Monument Map #237. February 17.

Domenico, P.A., and Schwartz, F.W., 1990, Physical and Chemical Hydrogeology. New York, N.Y., John Wiley and Sons, Inc., 824 p.

Freeze, R.A., and Cherry, J.A., 1979, Groundwater: Englewood Cliffs, New Jersey, Prentice Hall, Inc., 604 p.

Helley, E. J., and Lajoie, K. R., 1979, Flatland Deposits of the San Francisco Bay Region, California. United States Geological Survey Professional Paper No. 943.

Helly, E. J., Lajoie, K. R. and Burke, D. B. 1972, Geologic Map of Late Cenozoic Deposits, Alameda County, California. United States Geological Survey MF 429.

Norris, R., and Webb, R., 1990. Geology of California, 2nd Edition, John Wiley and Sons, Inc. 541 p.

State of California Leaking Underground Fuel Tank Task Force, 1989, Leaking Underground Fuel Tank Field Manual: Guidelines for Site Assessment, Cleanup and Underground Storage Tank Closure. October.

United States Environmental Protection Agency, Title 40, Code of Federal Regulations, Sections 141.11-141.16.

United States Geological Survey, 1980, Topographic Map - Oakland West, 7.5 Minute Quadrangle.

APPENDIX F

PHOTODOCUMENTATION

ENGINEERING-SCIENCE PHOTOGRAPHY LOG SHEET

CLIENT Greyhound Lines, Inc. JOB NO. SY132.31

DATE: *11/11/91*

DESCRIPTION:

Drill Rig set-up at Well ES-1.

PHOTOGRAPHED BY: *HP*

DATE: *11/11/91*

DESCRIPTION:

Breaking through concrete at Well ES-2.

PHOTOGRAPHED BY: *HP*

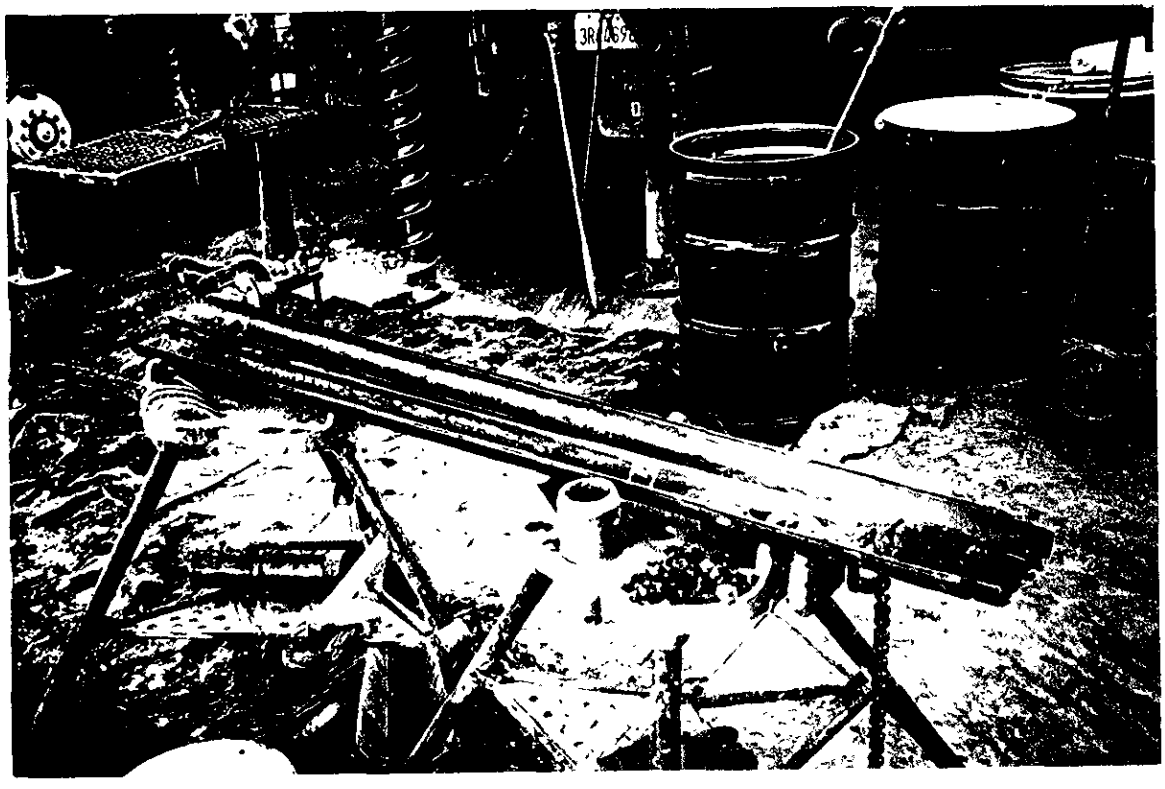
ENGINEERING-SCIENCE PHOTOGRAPHY LOG SHEET

CLIENT Greyhound Lines, Inc. **JOB NO.** SY132.31

DATE: *11/14/91*

DESCRIPTION:

Five-foot long thin-wall sampler, showing poor recovery (0-5' bgs) in backfill material at Well ES-5. Seven-inch outside diameter auger used during sampling seen in background.



PHOTOGRAPHED BY: *HP*

DATE: *11/12/91*

DESCRIPTION:

PID used for soil screening.

PHOTOGRAPHED BY: *HP*

ENGINEERING-SCIENCE PHOTOGRAPHY LOG SHEET

CLIENT Greyhound Lines, Inc. JOB NO. SY132.31

DATE: *11/14/91*

DESCRIPTION:

Auger being steam-cleaned. Rinsate is collected in bucket at left.

PHOTOGRAPHED BY: *HP*

DATE: *11/12/91*

DESCRIPTION:

Ten and one-half inch (outside diameter) hollow-stem auger used to enlarge boring for installation of monitoring well.

PHOTOGRAPHED BY: *HP*

ENGINEERING-SCIENCE PHOTOGRAPHY LOG SHEET

CLIENT Greyhound Lines, Inc. JOB NO. SY132.31

DATE: *11/13/91*

DESCRIPTION:

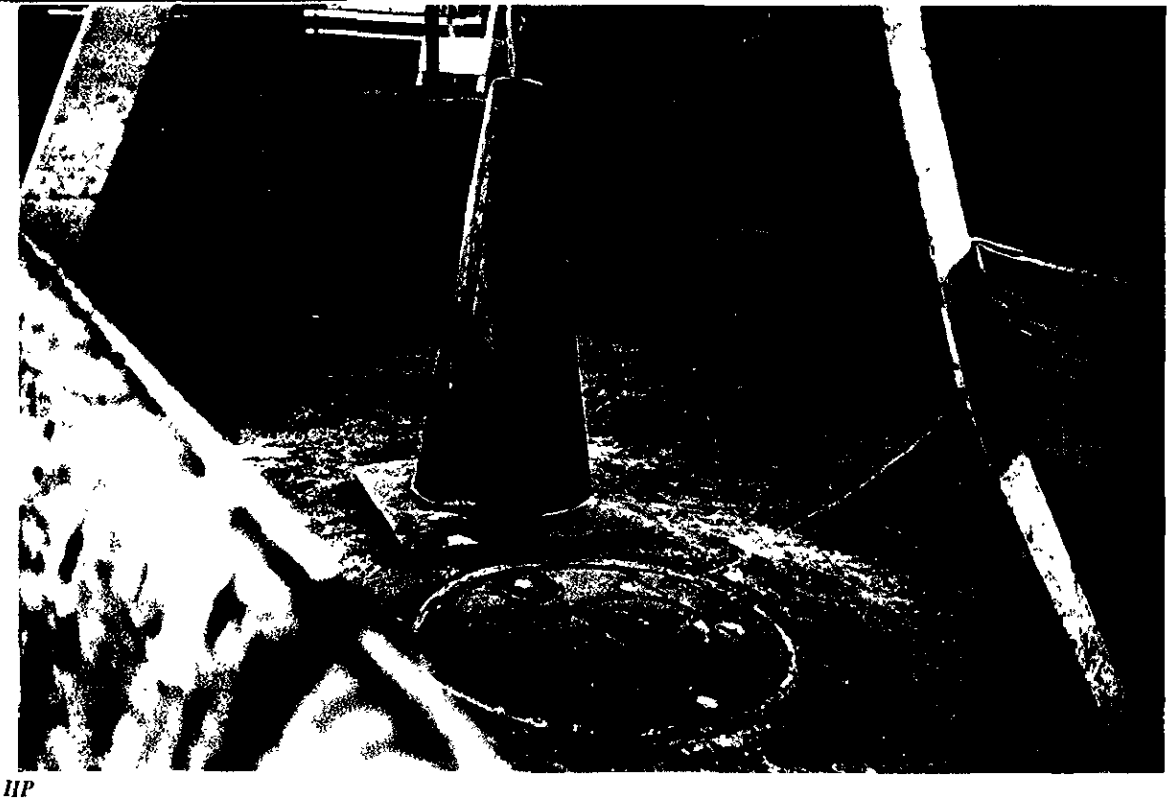
Wells ES-1 and ES-4 barricaded to prevent casing disturbances until grout cures.

PHOTOGRAPHED BY: *HP*

DATE: *11/14/91*

DESCRIPTION:

Completed Well ES-1.



PHOTOGRAPHED BY: *HP*

ENGINEERING-SCIENCE PHOTOGRAPHY LOG SHEET

CLIENT Greyhound Lines, Inc. JOB NO. SY132.31

DATE: *11/14/91*

DESCRIPTION:

Completed Well ES-2.

PHOTOGRAPHED BY: *HP*

DATE: *11/14/91*

DESCRIPTION:

Completed Well ES-3.

PHOTOGRAPHED BY: *HP*

ENGINEERING-SCIENCE PHOTOGRAPHY LOG SHEET

CLIENT Greyhound Lines, Inc. JOB NO. SY132.31

DATE: *11/14/91*

DESCRIPTION:

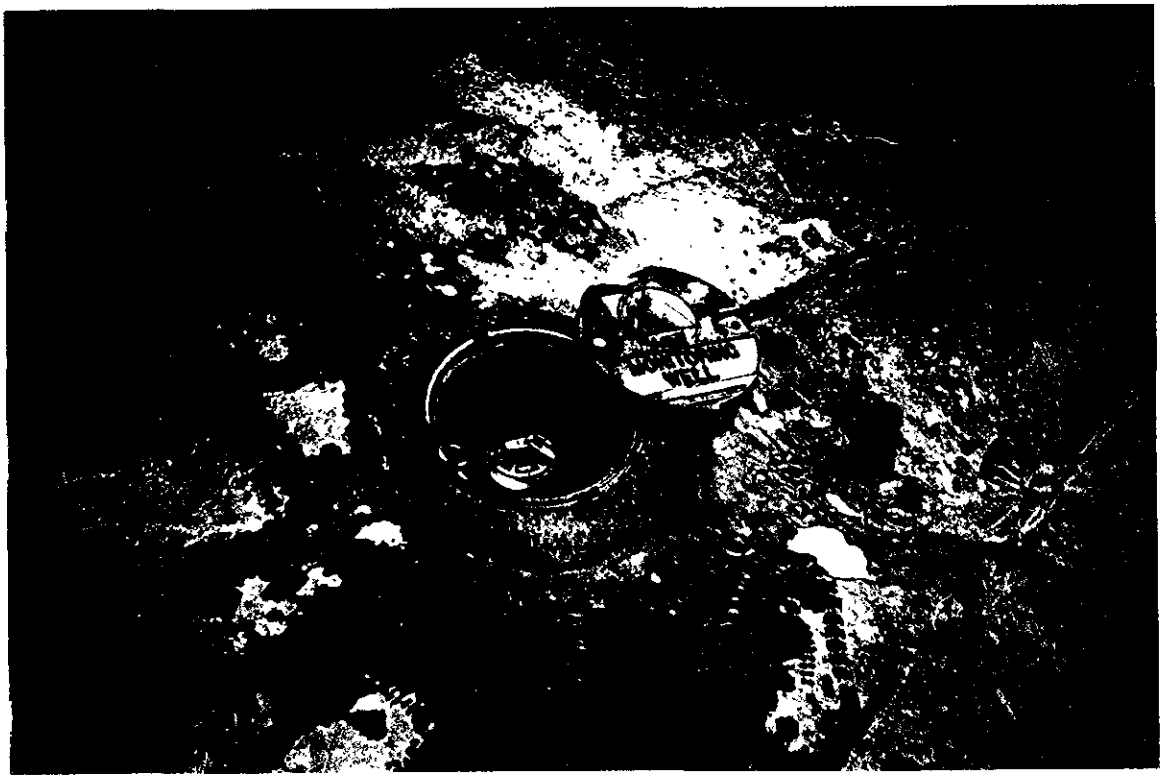
Completed Well ES-4.

PHOTOGRAPHED BY: *HP*

DATE: *11/15/91*

DESCRIPTION:

Completed Well ES-5 showing locking well cap.



PHOTOGRAPHED BY: *HP*

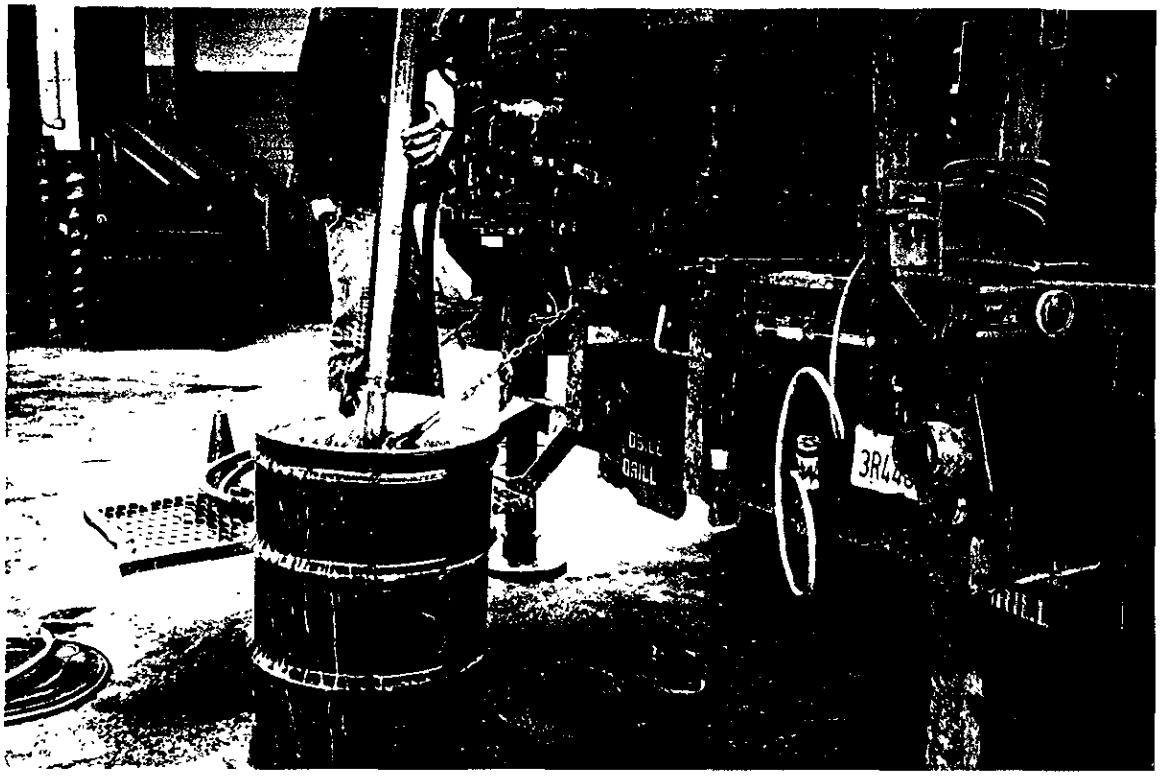
ENGINEERING-SCIENCE PHOTOGRAPHY LOG SHEET

CLIENT Greyhound Lines, Inc. JOB NO. SY132.31

DATE: *11/11/91*

DESCRIPTION:

Well ES-4 being developed.



PHOTOGRAPHED BY: *HP*

DATE: *11/15/91*

DESCRIPTION:

Water level indicator and oil-water interface probe at Well BC-1.

PHOTOGRAPHED BY: *HP*

IMPORTANT MESSAGE

FOR Dennis

DATE 10/31 TIME 10:20 A.M. / P.M.

M Tim Cook

OF B+C

PHONE 937-900
AREA CODE NUMBER EXTENSION

TELEPHONED		PLEASE CALL	X
CAME TO SEE YOU		WILL CALL AGAIN	
WANTS TO SEE YOU		RUSH	
RETURNED YOUR CALL		SPECIAL ATTENTION	

MESSAGE Soil Cleanup at Greyhound in Oak

SIGNED MHC

LITHO IN U.S.A.

TOPS FORM 3002S