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**ALCO
HAZMAT**

93 DEC -6 PM 1:37

December 3, 1993
1708-003-00

Ms. Jennifer Eberle, Hazardous Materials Specialist
Division of Hazardous Materials
Department of Environmental Health
ALAMEDA COUNTY HEALTH AGENCY
80 Swan Way, Room 350
Oakland, California 94621

**RE: SITE CHARACTERIZATION REPORT
UNITED STATES POSTAL SERVICE VEHICLE MAINTENANCE FACILITY
1675 - 7TH STREET
OAKLAND, CALIFORNIA**

Dear Ms. Eberle:

Geo/Resource Consultants, Inc. (GRC) is pleased to submit the Site Characterization Report for the subject site to the Alameda County Health Agency's Department of Environmental Health (ACDEH) on behalf of the United States Postal Service (USPS).

The USPS and GRC welcome any comments or recommendations the ACDEH may provide concerning future self-directed environmental efforts at the facility based on the information contained in the Report. If you have any questions or concerns regarding the Report, or any other aspect of this project, please feel free to contact GRC at (415) 775-3177.

Sincerely,
GEO/RESOURCE CONSULTANTS, INC.

Gary A. Floyd
Senior Environmental Scientist

Attachment (1 copy)

cc: Mr. Larry Hanna, USPS (w/o attachment)
GRC File 1708-003-00
GRC Chron

GAF-MISC11:1708L

rev'd
12-6

REPORT

1708-003-00

SUBSURFACE SITE INVESTIGATION

United States Postal Service
General Mail Facility/
Vehicle Maintenance Facility
1675 7th Street
Oakland, California

October 1993

Prepared for :

United States Postal Service
Major Facilities Office
Memphis, Tennessee



Geo/Resource Consultants, Inc.

GEOLOGISTS / ENGINEERS / ENVIRONMENTAL SCIENTISTS
505 BEACH STREET, SAN FRANCISCO, CALIFORNIA 94133



October 29, 1993
1708-003-00

Mr. Larry Hanna, Project Manager
UNITES STATES POSTAL SERVICE
Major Facilities Office
1407 Union Avenue
Memphis, Tennessee 38166-0340

ALCO
HAZMAT
93 DEC -6 PM 1:37

RE: SITE CHARACTERIZATION REPORT
UNITED STATES POSTAL SERVICE VEHICLE MAINTENANCE FACILITY
1675 - 7TH STREET
OAKLAND, CALIFORNIA

Dear Mr. Hanna:

Geo/Resource Consultants, Inc. (GRC) is pleased to submit this Site Characterization Report for the subject site to the United States Postal Service in fulfillment of GRC's Scope of Work as outlined in GRC's Proposal Number 9301-138, dated June 18, 1993. GRC respectfully recommends that the USPS forward a copy of this report to the following local regulatory agencies:

Ms. Jennifer Eberle, Hazardous Materials Specialist
Division of Hazardous Materials
Department of Environmental Health
ALAMEDA COUNTY HEALTH AGENCY
80 Swan Way, Room 350
Oakland, California 94621

Mr. Rich Hiett
SAN FRANCISCO BAY REGIONAL WATER QUALITY CONTROL BOARD
2101 Webster Street, Suite 500
Oakland, California 94612

If you have any questions or concerns regarding this Report, or any other aspect of this project, please feel free to contact us.

Sincerely,
GEO/RESOURCE CONSULTANTS, INC.

Brian W. Barber

Brian W. Barber P.E.
Project Engineer

Gary A. Floyd

Gary A. Floyd, R.E.A.
Senior Environmental Scientist

Alan D. Tryhorn

Alan D. Tryhorn, C.E.G. #1019
Senior Vice President
Principal Engineering Geologist

Attachment (1 original, 4 copies)

cc: GRC File 1708-003-00
GRC Chron

SUBSURFACE SITE INVESTIGATION REPORT

UNITED STATES POSTAL SERVICE

VEHICLE MAINTENANCE FACILITY

1675 7TH STREET

OAKLAND, CALIFORNIA

PREPARED FOR:

UNITED STATES POSTAL SERVICE

MAJOR FACILITIES OFFICE

MEMPHIS, TENNESSEE

PREPARED BY:

GEO/RESOURCE CONSULTANTS, INC.

505 BEACH STREET

SAN FRANCISCO, CALIFORNIA

OCTOBER, 1993

JOB NUMBER: 1708-003-00



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EXECUTIVE SUMMARY

In September, 1993, Geo/Resource Consultants, Inc (GRC) conducted a subsurface site investigation at the United States Postal Service (USPS) General Mail Facility (GMF)/Vehicle Maintenance Facility (VMF), located at 1675 - 7th Street, Oakland, California. The investigative activities were completed in accordance with the Sampling and Testing Plan prepared by GRC on April 26, 1993, as approved by USPS and the Alameda County Department of Environmental Health (ACDEH). The purpose of this investigation was to assess the source(s) of and define the vertical and lateral extent of petroleum hydrocarbons in soil and groundwater at the USPS facility.

Field work included installation of five (5) groundwater monitoring wells to completion depths of approximately 20 to 21 feet below ground surface (bgs), and drilling three (3) soil borings, ranging from approximately 9 to 14 feet bgs. Soil and groundwater samples were retrieved from each of the monitoring wells and soil borings. Soil samples were collected at depths of approximately 3, 7 and 9 feet bgs.

The subsurface materials encountered generally included approximately 3 inches of asphalt underlain by approximately 4 to 6 inches of sandy gravel base. Fill was generally encountered from approximately 0.75 to 6 feet bgs, consisting of dark brown grey to lighter greenish grey, medium dense to dense silty and gravelly fine sands. Underlying the fill was generally orange, dense silty fine sand from approximately 6 to 20.5 feet bgs.

The monitoring wells were developed, purged, and surveyed prior to groundwater sampling. At the time of the borehole drilling on September 16 and 17, 1993, apparent groundwater was first noted at approximately 9 to 10 feet bgs in all the borings. After well development, groundwater table elevations in MW-1 through MW-5 stabilized and ranged from approximately 4.18 to 4.60 feet Above Mean Sea Level (AMSL). Groundwater level measurements were taken prior to sampling. Based on those groundwater elevation



measurements, the direction of groundwater flow was determined to be generally toward the south in the direction of San Francisco Bay with a calculated hydraulic gradient of 0.002 foot per foot across the site. Flow direction is expected to vary locally over time.

The soil and groundwater samples collected were analyzed for Total Petroleum Hydrocarbons as Gasoline (TPH-G), Total Petroleum Hydrocarbons as Diesel (TPH-D) and Benzene, Toluene, Xylene and Ethylbenzene (BTXE) by EPA Methods 6015M (TPH-G/TPH-D) and 6020 (BTXE).

The results of the soil sample analyses indicated the localized presence of TPH-D, TPH-G and BTEX in the upper 3 to 7 feet of fill soil as identified at two sampling locations. TPH-D concentrations in soil sample MW-4 at 3.0-3.5' exceeded the recommended hazardous waste concentration of 1,000 milligrams per kilogram (mg/kg) as gasoline in sandy soil according to guidelines set forth in the California State Water Resources Control Board (WRCB) Leaking Underground Fuel Tank (LUFT) Manual of 1989. Additionally, concentrations of TPH-G in soil sample B-8 at 6.0-6.5' exceeded LUFT Manual recommended Maximum Allowable Limits of 100 mg/kg and, therefore, can be classified as a designated waste.

The distribution of the detected TPH-D, TPH-G and BTEX in soil appears to be isolated and in close proximity to location of the former 10,000-gallon diesel USTs and former diesel fuel dispensing island. Furthermore, the detected petroleum hydrocarbons appear to be confined to the fill material, and do not appear to extend into the underlying native soils.

Analyses of groundwater samples collected from the five monitoring wells indicated TPH-D in MW-4 at a concentration of 580 micrograms per liter (ug/l). No TPH-D, TPH-G or BTEX were detected in the groundwater samples from the monitoring wells MW-1, MW-2, MW-3, or MW-5. The detection of TPH-D in groundwater from MW-4 is consistent with the detection of hydrocarbons found in the soils from MW-4.

Based on the findings of this investigation, the following conclusions are presented concerning the soils and groundwater at the study site:

- 1) The concentration of TPH-D in soil sample MW-4 at 3.0-3.5, exceeded the recommended concentration of 1000 mg/kg in soil according to guidelines set forth in the California State Water Resources Control Board (WRCB), (LUFT) Manual of 1989/ *(2400 ppm)*
- 2) Concentrations of TPH-G in soil sample B-8 at 6.0-6.5' exceeded the LUFT Manual recommended Maximum Allowable Limit of 100 mg/kg to be classified as a designated waste. *(180 ppm)*
According to the California Department of Health Services (DHS) review in similar previous cases, excavation of designated waste materials may require treatment and/or disposal at a Class II waste disposal facility, pending a case by case evaluation by the jurisdictional regulatory agency. In this case, the ACDEH is the designated regulatory agency having jurisdiction over the study site.
- 3) The hydrocarbon contaminants detected in the soils during this investigation appear to be restricted to the fill material at relatively shallow depths of approximately 3 to 6 feet bgs, in close proximity to the former 10,000 gallon diesel UST's and former diesel fuel dispensing island locations .
- 4) A concentration of 580 ^{mg/kg} ~~mg/kg~~ of TPH-D *mslk* was detected in the groundwater sample from MW-4. No TPH-D, TPH-G or BTEX were detected in the groundwater samples collected from the monitoring wells MW-1, MW-2, MW-3, or MW-5. The detection of TPH-D in groundwater collected from MW-4 is consistent with the detection of hydrocarbons found in the soils from MW-4.

*DTW
in MW 4
is 4.55'
on 9-21*

Data indicate that the area of primary concern at the site is adjacent to the former diesel fuel dispensing island where the concentration of hydrocarbons in soil at the MW-4 location exceeded recommended DHS levels.

Recommendations:

- 1) Implementation of a monthly groundwater elevation survey and quarterly groundwater sampling and reporting program (i.e. on a quarterly basis for 1 year). The program will be designed to establish a water quality data base for: 1) groundwater quality upgradient and downgradient of the former UST and dispensing island areas in meeting regulatory requirements; and 2) hydraulic gradient and groundwater flow direction to evaluate the possible extent, if any, of contamination impact on groundwater at the site.
- 2) Two additional soil borings south and west of MW-4 (See Figure 4); and two soil borings northwest and north of B-8 adjacent to the VMF to investigate the extent of TPH-G and TPH-D detected in the borings drilled during this investigation.
- 3) If initial quarterly monitoring confirms the presence of TPH-D in MW-4, two additional wells should be installed southwest and southeast of MW-4 to delimit the groundwater plume (See Figure 4).
- 4) Proper removal and disposal of the soil and water generated during this investigation.



1.0 INTRODUCTION

Section 1.0 provides information concerning project objective, study site history and regulatory framework for this site characterization report.

1.1 Project Objective

The objective of the this subsurface site investigation was to assess the source(s) and define the vertical and lateral extent of petroleum hydrocarbons in soil and groundwater at the United States Postal Service (USPS) Vehicle Maintenance Facility, located at 1675 - 7th Street, Oakland, California (site).

1.2 Study Site History

The site is located on the south side of 7th Street between Peralta and Wood Streets in Oakland, California (See Figure 1).

In November, 1991, one 5,000-gallon gasoline underground storage tank (UST), two 10,000-gallon diesel UST's, the associated fuel piping, and a 750-gallon waste oil UST, were removed from the study site. Geo/Resource Consultants, Inc. (GRC) personnel conducted UST removal observation activities and arranged for soil sampling during the UST removal project (GRC, 1992a).

Ten (10) soil samples were collected from the four UST excavations by R.S. Eagan Company (EAGAN) and submitted for laboratory analyses. In general, based on the laboratory data compiled by EAGAN, many of the soil samples analyzed indicated high concentrations (concentrations above 100 milligrams/kilogram (mg/kg); approximates parts per million (ppm)) of Total Petroleum Hydrocarbons as Diesel (TPH-D), Total Petroleum Hydrocarbons as Gasoline (TPH-G), and detectable concentrations of benzene, toluene, xylenes, and ethylbenzene (BTXE). Specifically, soil samples collected from the 5,000-gallon UST and the two 10,000-gallon UST excavations revealed concentrations for TPH-G ranging from "Not Detected" (ND) to 2,500 ppm; and individual analyses of

BTXE revealed concentrations ranging from ND to 130 ppm. Analysis of soil samples collected from the fuel piping excavation area revealed concentrations for TPH-D ranging from 1.4 ppm to 7,900 ppm; TPH-G from 36 ppm to 610 ppm; and BTXE from ND to 170 ppm.

Based on the review of the laboratory data, and discussions with Mr. Dennis Byrnes of the Alameda County Department of Environmental Health (ACDEH) on November 8, 1991, ACDEH had requested that this soil and groundwater investigation be conducted to satisfy the ACDEH's UST Closure Program.

In June, 1992, an additional 10,000-gallon diesel UST was removed from an area near the northwest corner of the Main Facility building (See Figure 2). Soil and groundwater samples were subsequently collected from the excavation. Laboratory results indicated that the samples collected from the excavation sidewall soil did not contain concentrations of the constituents of interest above the reported detection limits (ND). TPH-D results from the soils stockpile sample were reported to be 26 ppm, and xylenes were reported to be 0.007 ppm. Benzene, toluene, and ethylbenzene were all reported to be ND. Groundwater analyses detected TPH-D at 72,000 micrograms per liter (ug/l, approximates parts per billion (ppb)) and benzene and xylenes at 3.8 ppb and 12 ppb, respectively. Toluene and ethylbenzene were not detected.

The ACDEH requested that a groundwater investigation be conducted at the site (ACDEH, 1992), due to concentrations of hydrocarbons identified at the site in 1992. Additionally, the ACDEH stated that remaining soil contamination in the area of the two excavated and removed 10,000-gallon diesel UST's and piping (GRC, 1992a) should also be addressed.

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1.3 Regulatory Framework

This investigation was performed in accordance with the following regulations and guidelines:

- o *California Code of Regulations (CCR), Title 23 Waters, Chapter 16, Sections 2670, 2672, 2722; Underground Tank Regulations.*
- o *California Regional Water Quality Control Board (RWQCB), 1989. The Leaking Underground Fuel Tank (LUFT) Manual. October 18, 1989.*
- o *California Regional Water Quality Control Board (RWQCB), 1990. Tri-Regional Board Staff Recommendations for Preliminary Evaluation and Investigation of Underground Tank Sites. August 10, 1990.*
- o *California Regional Water Quality Control Board (RWQCB), 1990. Tri-Regional Board Staff Recommendations for Preliminary Evaluation and Investigation of Underground Tank Sites. Appendix A - Reports. August 10, 1990.*

2.0 PRE-FIELD ACTIVITIES

Section 2.0 describes the procedures and activities that were performed prior to commencement of the site investigation.

A Technical Workplan for the project, (GRC, 1993) was submitted and approved by the USPS Major Facilities Office in Memphis, Tennessee and by ACDEH. Pre-field activities included acquiring security clearance and coordinating field operations during business hours with site management.

2.1 Underground Utility Clearance

Prior to underground utility clearance, all boring locations were clearly marked on the ground surface using white paint at the locations delineated on Figure 2. GRC notified Underground Service Alert (USA) approximately seven working days prior to drilling the borings.

2.2 Above Ground Utility Clearance

Above ground utilities were examined simultaneously with underground utility clearance to assure that drill rig booms would not contact overhead power lines or building overhangs.

2.3 Health and Safety Plan

Prior to implementing any of the prescribed field work, a site-specific Health and Safety Plan was developed. The Health and Safety Plan was used by GRC and all subcontractors working on the site. The Plan was written to satisfy the requirements of the Occupational Safety & Health Administration (OSHA), Title 29 Code of Federal Regulations 1910.120.

3.0 FIELD INVESTIGATION

Section 3.0 discusses the field activities performed during the investigation. Investigative rationale for the USPS project was based on the findings from the previous investigations, discussed in Section 2.1, which were conducted during the UST removal activities at the study site, and per the ACDEH request (ACDEH, 1993). The boring locations were based on previously identified concentrations of petroleum hydrocarbons in soil, depth to groundwater, and expected groundwater flow direction. Monitoring wells were installed to calculate hydraulic gradient across the site, groundwater flow direction, and to collect representative groundwater samples.

3.1 Soil Boring Drilling

Gregg Drilling Company of Pacheco, California, under the supervision of GRC, drilled eight (8) soil borings (MW-1 through MW-5 and B-6 through B-8) on September 16 and 17, 1993. Figure 2 shows the locations of the borings. The location of Boring MW-1 was moved approximately 10 feet to the southeast of the original proposed location due to auger refusal in buried construction debris encountered at about 2 to 3 feet below ground surface (bgs).

Four (4) borings (MW-1 through MW-4) were drilled near the two removed 10,000-gallon diesel UST's and completed as groundwater monitoring wells. Boring MW-5 was drilled adjacent to the 10,000-gallon gasoline UST excavation located near the Main Facility building, and ultimately completed as a groundwater monitoring well.

Three (3) additional borings (B-6, B-7, and B-8) were drilled to further characterize the extent of petroleum hydrocarbons in soil near the two previously removed 10,000-gallon diesel tanks and the 5,000-gallon gasoline tank.

The soil borings were drilled using a truck mounted Simco D7 and Mobile B-61 drill rig equipped with 4-inch, 6-inch and 10-inch-diameter, continuous flight, hollow stem augers. Soil boring

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logs were prepared for each boring based on examination of the soil samples and drill cuttings obtained from the augers, and drilling conditions observed in the field. Soil was classified according to the Unified Soil Classification System (USCS). Photoionization detector (PID) meter readings from bagged soil samples and from within the open borehole were recorded on the Soil Boring Logs. Boring logs are contained on Appendix A.

All soil cuttings, steam-cleaning rinsate water, development/purge water and associated materials generated during the field activities were contained in 55-gallon drums, sealed, labeled as unclassified material, and temporarily stored on-site pending laboratory results and proper disposal.

3.2 Soil Sampling

The soil samples obtained during drilling were collected in three clean, 6-inch-long, stainless steel sample tubes contained within an 18-inch-long split barrel sampler. The sampler was driven into the soil with either a vibratory hammer (Simco D7 rig) or by a 140-pound, free-falling hammer (Mobile B-61 rig). The samples were collected at approximately 3- to 5-foot intervals to a depth of just above the apparent groundwater table as detected at the time of drilling.

Three soil samples were collected from each boring (with the exception of MW-1) and submitted for laboratory analyses. Only the bottom 12 inches of the 18-inch-long soil sample was retained for analyses to assure that undisturbed, representative soil was tested.

All sample tubes chosen for chemical analyses were labeled and the ends covered with Teflon sheeting and plastic caps. The sample tubes were sealed in individual plastic bags and stored in a cooler containing ice to preserve sample integrity until delivery to the laboratory. The soil samples were logged on Chain-of-Custody Records and transported to a California certified laboratory under strict Chain-Of-Custody protocol in accordance with the United States Environmental Protection Agency (EPA) document, Test Methods for Evaluating Solid Wastes,

Physical/Chemical Methods (EPA, 1986). Copies of the Chain-Of-Custody Records are contained in Appendix D.

3.3 Groundwater Monitoring Well Installation

The monitoring wells were constructed of 4-inch-diameter, polyvinyl chloride (PVC) casing to facilitate their use as extraction wells if groundwater remediation is necessary. The monitoring wells were installed to a depth of approximately 20 feet bgs as based on the depth to groundwater encountered at the time of drilling. The well construction consisted of 15 feet of 0.02-inch slotted screen from approximately 20 feet to 4.5 feet bgs, and blank casing from 5 feet to 0.5 feet bgs. A threaded PVC end cap was placed over the lower end of the well screen. A sand pack consisting of Number 3 Monterey sand was slowly poured into the annular space between the auger and the PVC casing as augers were lifted from the hole. Frequent depth measurements were taken during placement of the sand pack to prevent "bridging" of the sand in the borehole. The top of the sand pack was poured to approximately 1.5 feet above the top of the screen. A minimum 12-inch-thick layer of bentonite pellets was placed above the sand pack and hydrated with clean water prior to filling the remaining annular space with a cement grout mix. A locking water tight well caps and padlocks were fitted to the top of the PVC well casings. A 12-inch-diameter watertight, traffic rated, well box was set in concrete around the top of the well for protection. The well construction details are shown on the Boring Logs contained in Appendix A.

3.4 Well Development

The monitoring wells were developed by Gregg Drilling Company of Pacheco, California on September 20, 1993. The wells were developed by surging and bailing to remove fine sediment from within the sand pack and slotted well screen, to enhance the hydraulic connection between the wells, the sand pack, and the aquifer.

Well development water was periodically monitored for acidity (pH), electrical conductivity and temperature (degrees Celsius)

until consecutive readings obtained values with less than 10 percent variance indicating that equilibrium of the parameters had been achieved. In addition, development times, purge water volumes and other relevant observations during development activities were recorded on Well Development Logs contained in Appendix B.

3.5 Well Surveying and Groundwater Elevations

The vertical elevations at the top of each well casing and the horizontal locations of wells MW-1, MW-2, MW-3, MW-4 and MW-5 were surveyed on September 20, 1993, by KCA Surveyors of San Francisco. The well locations were surveyed relative to buildings and pertinent structures at the study area, and well elevations were surveyed relative to City of Oakland Datum and converted to feet Above Mean Sea Level (AMSL). The well elevations and horizontal control were measured to within an accuracy of 0.01 and 0.1 feet, respectively.

Groundwater depth measurements were taken from a designated reference mark at the top of the PVC casing of each well. Groundwater elevations were calculated by subtracting the depth to water from the elevation of the top of the well casing.

3.6 Well Purging

Static groundwater elevations were allowed to equilibrate for a minimum of 24 hours following development. Prior to purging, water level measurements were taken from the designated reference mark on the top of the PVC casing. The water level was recorded to within 0.01-foot accuracy. A clear, acrylic bailer was then lowered into each well to assess whether free product was present at the groundwater surface. No free product was observed in any of the wells at the site.

In order to collect representative groundwater samples, each well was purged of at least three to four casing volumes with a clean, acrylic bailer.

The casing volume was calculated using the following formula:

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$V = (3.1415 \times \text{SQRT } 2) \times (L) \times (7.481 \text{ gallons/cubic foot})$

V = Volume of water in the well in gallons

R = Inside radius of the well casing in feet

L = Height of standing water in the casing in feet

During purging, pH, electrical conductivity and temperature were measured at approximately 5-gallon increments in order to monitor the stabilization of these groundwater parameters. When three consecutive measurements of each parameter were obtained with less than 10 percent variance, the groundwater condition in the well was considered at equilibrium with the aquifer which was conducive to collecting a representative groundwater sample. Procedures used during well purging were documented on the Groundwater Sampling Logs contained in Appendix D.

3.7 Groundwater Sampling

Groundwater samples were collected on September 21, 1993 after purging by carefully decanting groundwater directly from the same bailer used during purging and placed into Volatile Organic Analysis (VOA) 40 milliliter vials and amber colored 1,000 milliliter glass bottles. In the case of the VOA vials, care was taken to eliminate headspace inside the vials to prevent entrapped air bubbles.

Groundwater sample containers were appropriately labeled and recorded on a Chain-of-Custody Record forms (See Appendix D) and stored in a cooler with ice to preserve sample integrity.

3.8 Equipment Decontamination

The following decontamination procedures were used in order to maintain sample integrity and to prevent cross-contamination from occurring between sampling locations:

- o All sample containers for soil sampling were pre-cleaned prior to use in the field. Groundwater sample containers were certified by the manufacturer, and were not opened prior to collecting the sample.

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- o All sampling equipment and items were cleaned with a non-phosphate detergent (e.g. Liqui-Nox) and triple rinsed with deionized water prior to use at a new sampling location. Sampling equipment included split barrel samplers, stainless steel sample tubes, sampling utensils, and clear acrylic and Teflon bailers.

- o Hollow stem augers and drill bits were steam-cleaned prior to use at each boring location and at the completion of field work.

3.9 Storage of Generated Material

All soil cuttings, steam-cleaning water, development/purge water and associated materials generated during the field activities were treated as potentially hazardous wastes. The disposition of these materials will be determined based on the laboratory analyses of representative samples. For this reason, all materials were contained in 55-gallon drums, sealed, labeled as unclassified material, and temporarily stored on-site pending laboratory results and proper disposal.

4.0 PHYSICAL SITE CHARACTERISTICS

The following discussion of geologic and hydrogeologic conditions is presented by the following specific designated areas:

- o Former 5,000 Gallon Gasoline UST Area
- o Former 10,000 Gallon Diesel UST-Vehicle Maintenance Building Area
- o Existing Fuel Dispensing Island Area
- o Demolished Diesel Fuel Dispensing Island Area
- o Eastside Former 10,000 Gallon Diesel UST Area

Geologic conditions at the site are described in the boring logs contained in Appendix A. Boring locations are shown on Figure 2.

4.1 Former 5,000-Gallon Gasoline UST Area

The subsurface materials encountered near the former 5,000-gallon underground gasoline tank area (See Figure 2, Legend Designation 1) were defined from borings MW-2 and B-6.

Beginning at the ground surface, the materials encountered in borings MW-2 and B-6 included approximately 3 inches of asphalt underlain by approximately 4 to 6 inches of sandy gravel base. Fill was encountered in boring MW-2 from approximately 0.75 to 6 feet bgs, consisting of dark brown grey to lighter greenish grey, medium dense to dense silty and gravelly fine sands. In boring B-6, fill was encountered from approximately 1 to 3 feet bgs, consisting of black, medium dense to dense gravelly fine sand. Underlying the fill in boring MW-2 was orange, dense silty fine sand from approximately 6 to 20.5 feet bgs, the maximum exploration depth in MW-2. At boring location B-6, the fill was underlain by dark grey to mottled orange brown grey, medium dense, silty clayey sands from approximately 3 to 10 feet bgs, in turn underlain by orange, dense silty fine sand from 10 to 11.5 feet bgs, the maximum depth of exploration in boring B-6.

Hydrocarbon odors were noted in the darker colored soils in boring B-6 from approximately 1 to 10 feet bgs. Headspace field monitoring using a photoionization detector (PID) detected vapor concentrations of approximately 400 ppm. An open borehole PID reading detected a hydrocarbon vapor concentration of 850 ppm at a monitoring depth of 12.5 feet bgs in boring B-6.

4.2 Former 10,000-Gallon Diesel UST-Vehicle Maintenance Building Area

The subsurface materials encountered near the former 10,000-gallon underground diesel tanks Vehicle-Maintenance Building area (See Figure 2, Legend Designations 2 and 3) were defined from borings MW-1, B-7 and B-8.

Beginning at the ground surface, the materials encountered in borings MW-1 and B-8 included approximately 9 inches of steel reinforced concrete and approximately 6 inches of asphalt at boring location B-7. Typically, the concrete and asphalt is underlain by approximately 4 to 6 inches of sandy gravel base. Fill was encountered in borings MW-1 and B-7, respectively, from 1 to 7 feet bgs and 1 to 3.5 feet bgs, consisting of dark grey, loose to medium dense fine silty sands with gravel. At boring location B-8, gravel backfill was encountered from about 0.75 to 4.5 feet bgs. Beneath the fill materials grey brown to brown orange, medium dense to dense fine silty sands were encountered to approximately 21.0 feet, 14 feet and 9.5 feet bgs, the maximum depths explored in borings MW-1, B-7 and B-8, respectively.

Strong hydrocarbon odors were noted in the gravel backfill and underlying soils in boring B-8 to a depth of approximately 8 feet bgs. Headspace field monitoring using a PID detected vapor concentrations ranging from 25 ppm in soil from boring MW-1 to 200 ppm in borings B-7 and B-8.

4.3 Existing Fuel Dispensing Island Area

The subsurface materials encountered near the existing fuel dispensing island area (See Figure 2) were defined from boring MW-3.

Beginning at the ground surface the materials encountered in boring MW-3 included approximately 9 inches of steel reinforced concrete, underlain by fill from approximately 0.75 to 2.5 feet bgs consisting of dark grey brown, medium dense to dense silty gravelly sand. Beneath the fill material from 2.5 to 10 feet bgs was mottled grey orange brown, medium dense to dense, fine silty sand grading into brown orange, dense fine sand from 10 to 20.5 feet bgs, the maximum depth explored in borings MW-3.

Headspace field monitoring of boring MW-3 using a PID detected very low (1 ppm; possibly background) to no vapor concentrations.

4.4 Demolished Diesel Fuel Dispensing Island Area

The subsurface materials encountered near the demolished diesel fuel dispensing island area (See Figure 2, Legend Designation 4) were defined from boring MW-4.

Beginning at the ground surface, the materials encountered in boring MW-4 included approximately 9 inches of steel reinforced concrete and 9 inches of base rock, underlain by dark grey to greenish grey, dense to medium dense silty fine sand from approximately 1.5 to 8 feet bgs. From 8 feet bgs was orange, dense, fine silty sand, to 20.5 feet bgs, the maximum depth explored in borings MW-4.

Hydrocarbon odors were noted in the soils from boring MW-4 at approximately 1.5 to 8 feet bgs. Headspace field monitoring using a PID in boring MW-4 detected vapor concentrations to a maximum of approximately 30 ppm.

4.5 Eastside Former 10,000-Gallon Diesel UST Area

The subsurface materials encountered near the eastside former 10,000-gallon diesel UST area (See Figure, Legend Designation 5) were defined from boring MW-5.

Beginning at the ground surface, the materials encountered in boring MW-5 included approximately 9 inches of steel reinforced concrete, underlain by dark to medium brown, medium dense to dense silty and clayey fine sands, from 0.75 to 8 feet bgs.

Orange brown, dense, fine silty sand grading into brown orange, dense fine sand was encountered from 8 to 21 feet bgs, the maximum depth explored in borings MW-5.

Headspace field monitoring using a PID revealed no detectable concentrations of organic vapors.

4.6 Hydrogeologic Conditions

Hydrogeologic conditions encountered at the site were defined by monitoring groundwater levels at the time of drilling (See Boring Logs, Appendix A), and by water level measurements taken after the wells were developed (See Table 1). At the time of the borehole drilling on September 16 and 17, 1993, apparent groundwater was first noted at approximately 9 to 10 feet bgs in all the borings. After well development, groundwater table elevations in MW-1 through MW-5 stabilized and ranged from approximately 4.18 to 4.60 feet Above Mean Sea Level (AMSL). Table 1 shows the depth to groundwater and groundwater elevations after well development. Figure 3 presents groundwater elevations and the calculated potentiometric surface at the site.

Based on the groundwater elevation measurements, the direction of groundwater flow is generally toward the south, in the direction of the Oakland Inner Harbor, with a calculated hydraulic gradient of 0.002 foot per foot across the site. Groundwater flow direction is expected to vary seasonally at the site.

5.0 LABORATORY ANALYSES PROGRAM

Selected soil and groundwater samples were submitted to a California certified laboratory for analyses. Appendix C contains the laboratory reports. Chain-Of-Custody Records are included in Appendix D.

5.1 Analytical Suite

Soil and groundwater samples collected were analyzed for the following suite of constituents:

- o TPH-Gasoline/BTXE EPA Test Method(s) 8015M/8020
- o TPD-Diesel EPA Test Method 8015M

5.2 Soil Chemistry

Soil data are summarized in Table 2 and the laboratory reports are included in Appendix C. Soil analyses did not detect concentrations above laboratory detection limits, with the exception of two soil samples from boring locations MW-4 and B-8. At sample location MW-4 at 3.0'-3.5', near the former diesel fuel dispensing island, detected constituents (and respective concentrations) included TPH-D (2,400 mg/kg), TPH-G (53 mg/kg) and Total Xylenes (0.087 mg/kg). At sample location B-8 at 6.0'-6.5', the detected constituents (and respective concentrations) included TPH-D (84 mg/kg), TPH-G (180 mg/kg), Benzene (0.15 mg/kg), Toluene (0.35 mg/kg), Ethylbenzene (2.1 mg/kg) and Total Xylenes (13 mg/kg).

5.3 Groundwater Chemistry

Groundwater data are summarized in Table 3 and the laboratory reports are included in Appendix C. Analytical data indicated TPH-D at a concentration of 580 micrograms per liter (ug/l; approximates parts per billion (ppb)) in groundwater sampled from monitoring well MW-4. No detection of TPH-D, TPH-G or BTEX above laboratory detection limits were found in MW-1, MW-2, MW-3, or

MW-5. No floating product was observed during the groundwater sampling program.



6.0 REGULATORY FRAMEWORK

6.1 Regulatory Standards - Soil

Soil data were evaluated relative to the guidelines set forth in the California State Water Resources Control Board (WRCB), Leaking Underground Fuel Tank (LUFT) Manual of 1989. The LUFT manual suggests a Maximum Allowable TPH limit in soil of 100 mg/kg. The California Department of Health Services (DHS) has recommended a TPH (as gasoline only) concentration limit of 1,000 mg/kg in sandy soil, which is not intended as a definitive waste classification.

As stated in Section 5.0, TPH-D was detected at a concentration 2,400 mg/kg in a soil sample obtained from MW-4 at 3.0'-3.5', which potentially exceeds the DHS recommended TPH (as gasoline only) concentration limit of 1,000 mg/kg in soil.

In addition, a soil sample tested from boring B-8 at 6.0'-6.5' detected TPH-G at concentration of 180 mg/kg, exceeding the LUFT manual suggested Maximum Allowable TPH limit of 100 mg/kg in soil.

The suggested 100 mg/kg and 1,000 mg/kg concentration limits for TPH in soil are recommendations, not definitive criteria for determining hazardous waste characteristics or cleanup levels. Additional toxicity tests, site specific studies and agency interpretations may be required at a later time to determine the fate of the petroleum based constituents found at the site.

BTXE constituents were detected in the soil samples from borings MW-4 and B-6 at relatively low concentrations.

6.2 Regulatory Standards-Groundwater

The California DHS Office of Drinking Water (October, 1990) has established State Action Levels (ALs) and Maximum Contaminant Levels (MCLs) for protecting potable groundwater resources. Although groundwater within the project area would probably not

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be considered as a potable water supply, the DHS water quality standards were reviewed as a conservative measure.

In this investigation, TPH-D was the only constituent of interest detected in groundwater (Groundwater sample MW-4). Detection of contaminants in groundwater could indicate a potential impact, and may possibly warrant further study to delimit TPH-D concentrations in groundwater.



7.0 CONCLUSIONS

Based on the findings of this investigation the following conclusions are presented concerning the soils and groundwater at the study site:

- 1) The concentration of TPH-D in soil sample MW-4 at 3.0-3.5, exceeded the recommended concentration of 1000 mg/kg in soil according to guidelines set forth in the California State Water Resources Control Board (WRCB), (LUFT) Manual of 1989.
- 2) Concentrations of TPH-G in soil sample B-8 at 6.0-6.5', exceeded LUFT Manual recommended Maximum Allowable Limits of 100 mg/kg to be classified as a designated waste. According to DHS review in similar previous cases, excavation of designated waste materials may require treatment and/or disposal to a Class II waste disposal facility, pending a case by case evaluation by the jurisdictional regulatory agency. In this case, the ACDEH is the proper regulatory agency having jurisdiction over the study site.
- 3) The hydrocarbon contaminants detected in the soils based on this investigation appear to be restricted to the fill material at relatively shallow subsurface depths of approximately 3 to 6 feet bgs in close proximity to the former 10,000 gallon diesel UST's and former diesel fuel dispensing island locations .
- 4) A concentration of 580 ~~mg/kg~~^{ppb} of TPH-D was detected in the groundwater sample from MW-4. No TPH-D, TPH-G or BTEX were detected in the groundwater samples collected from the monitoring wells MW-1, MW-2, MW-3, or MW-5. The detection of TPH-D in groundwater collected from MW-4 is consistent with the detection of hydrocarbons found in the soils from MW-4.



8.0 RECOMMENDATIONS

Based on the findings of this investigation, petroleum hydrocarbons were detected in soil and groundwater at two specific areas on-site that may require some limited additional investigation.

Data indicate that the area of primary concern at the site is adjacent to the former diesel fuel dispensing island where the concentration of hydrocarbons in soil at the MW-4 location exceeded recommended DHS levels. In addition, groundwater sampled at this location revealed detectable concentrations of diesel.

Near the former 10,000-gallon UST, analyses of soil sampled from boring B-8 indicated petroleum hydrocarbon concentrations in the soil that also exceeded recommended regulatory levels.

Recommendations:

- 1) Implementation of a monthly groundwater elevation survey and quarterly groundwater sampling and reporting program (i.e. on a quarterly basis for 1 year). The program will be designed to establish a water quality data base for: 1) groundwater quality upgradient and downgradient of the former UST and dispensing island areas in meeting regulatory requirements; and 2) hydraulic gradient and groundwater flow direction to evaluate the possible extent, if any, of contamination impact on groundwater at the site.
- 2) Two additional soil borings south and west of MW-4 (See Figure 4); and two soil borings northwest and north of B-8 adjacent to the VMF to investigate the extent of TPH-G and TPH-D detected in the borings drilled during this investigation.
- 3) If initial quarterly monitoring confirms the presence of TPH-D in MW-4, two additional wells should be installed southwest and southeast of MW-4 to delimit the groundwater plume (See Figure 4).

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Page 21

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- 4) Proper removal and disposal of the soil and water generated during this and subsequent investigations.



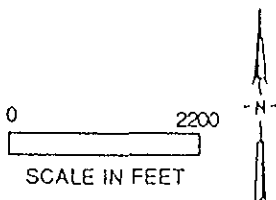
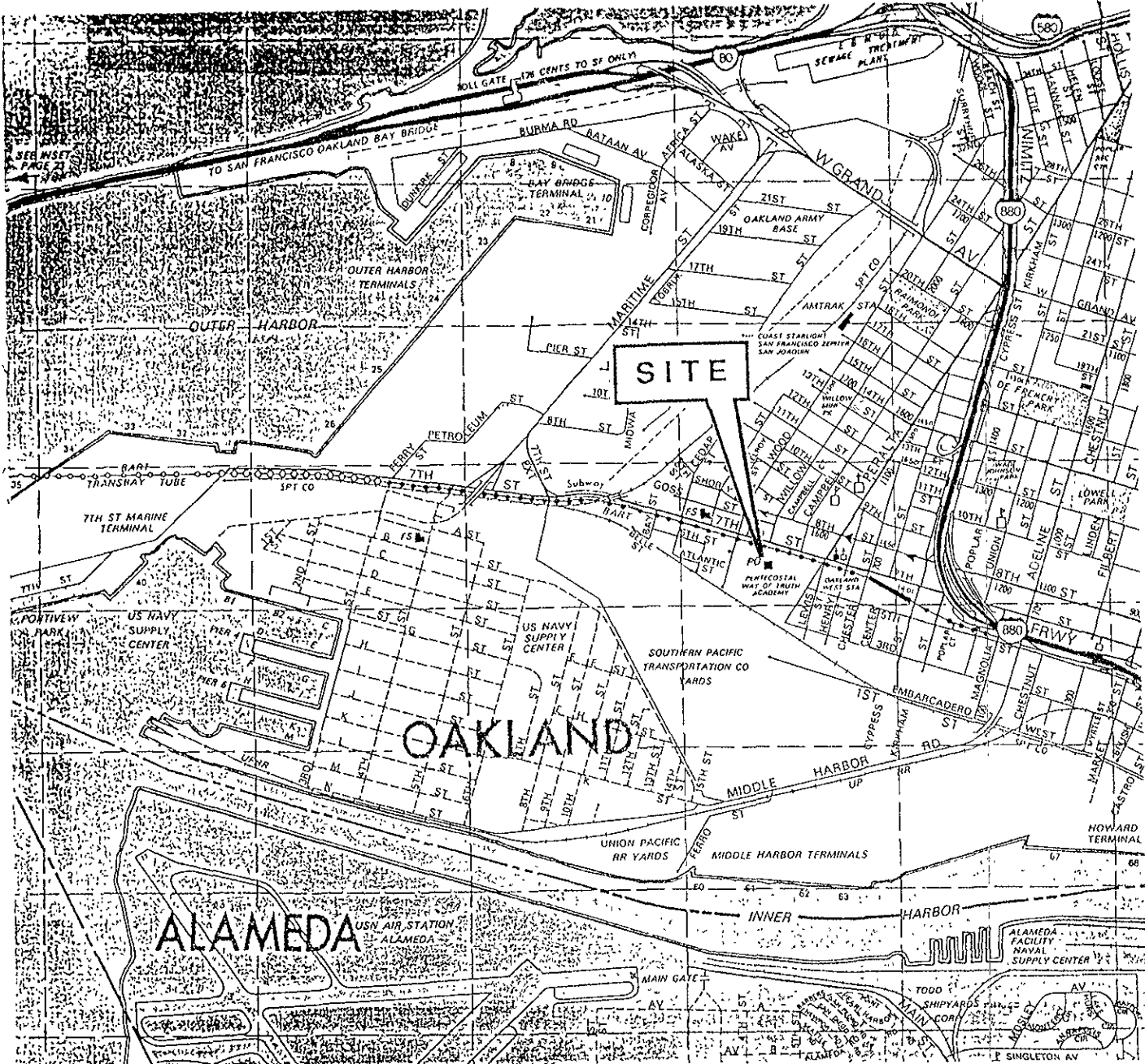
9.0 REFERENCES

- California Department of Health Services*, 1990. Memorandum: "Summary of Maximum Contaminant Levels (MCLs) and Action Levels (ALs) for Drinking Water in California." October 24, 1993.
- California Code of Regulations (CCR)*, Title 23 Waters, Chapter 16, Sections 2670, 2672, 2722; Underground Tank Regulations.
- California Regional Water Quality Control Board (RWQCB)*, 1989. The Leaking Underground Fuel Tank (LUFT) Manual. October 18, 1989.
- California Regional Water Quality Control Board (RWQCB)*, 1990. Tri-Regional Board Staff Recommendations for Preliminary Evaluation and Investigation of Underground Tank Sites. August 10, 1990.
- California Regional Water Quality Control Board (RWQCB)*, 1990. Tri-Regional Board Staff Recommendations for Preliminary Evaluation and Investigation of Underground Tank Sites. Appendix A - Reports. August 10, 1990.
- Geo/Resource Consultants, Inc.*, 1992a. Construction Observation of UST Activities, United States Postal Service, Oakland Main Post Office, 1675 7th Street, Oakland, California. April 23, 1992.
- Geo/Resource Consultants, Inc.*, 1992b. Supplemental Observation Letter, Underground Storage Tank (UST) program, U.S. Postal Service Vehicle Maintenance Facility, Oakland, California. September 17, 1992.
- Geo/Resource Consultants, Inc.*, 1993. Site Characterization Workplan, U.S. Postal Service Vehicle Maintenance Facility, 1675-7th Street, Oakland, California. August 26, 1993.
- United States Environmental Protection Agency*, 1986. Test Methods for Evaluating Solid Wastes, Physical/Chemical Methods. U.S. EPA Office of Solid Waste and Emergency Response, Washington, D.C., Document Number SW-846.




FIGURES

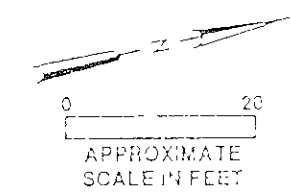
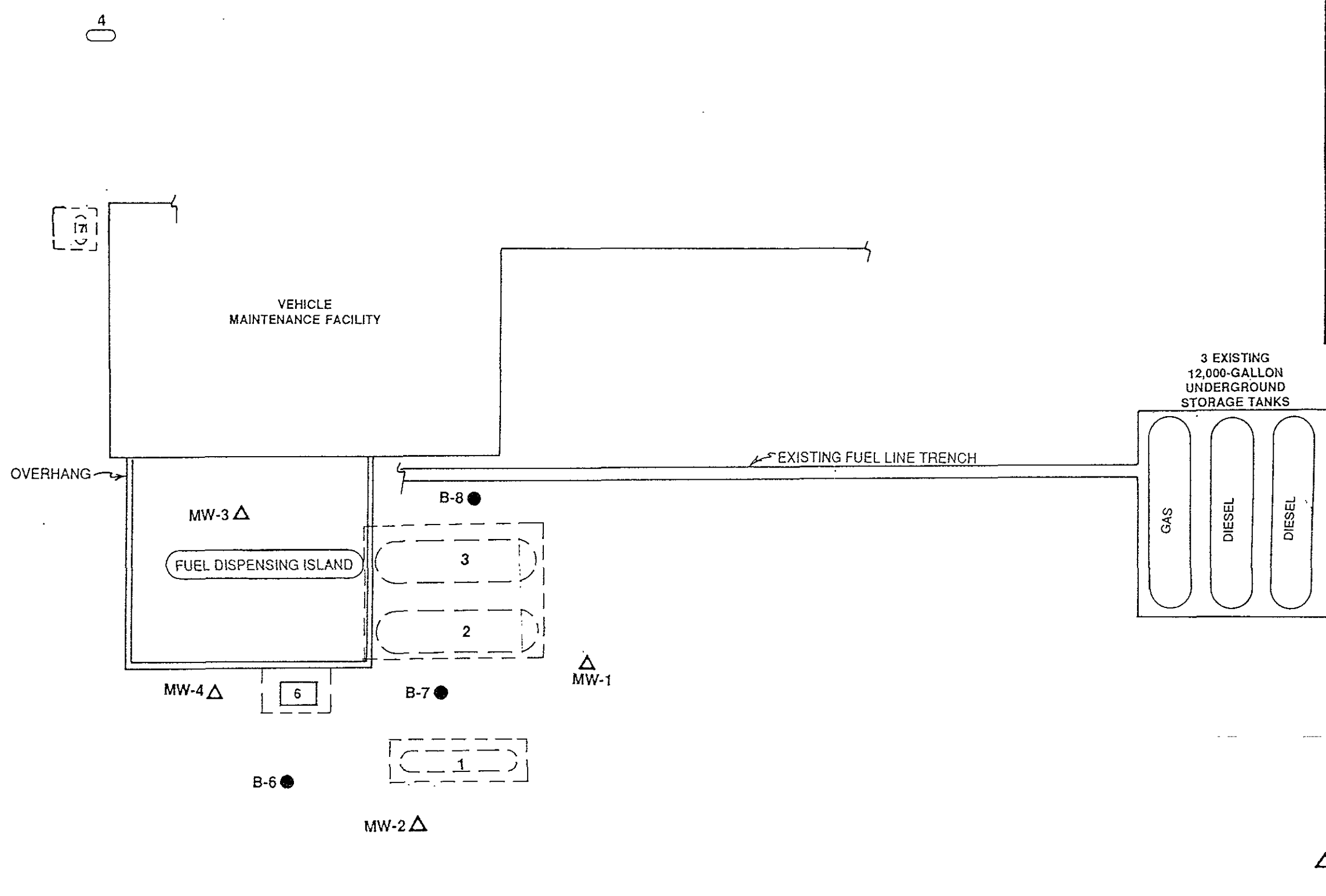





REFERENCE : Thomas Bros Maps, 1989

 <p>Geo/Resource Consultants, Inc. GEOLOGISTS / ENGINEERS / ENVIRONMENTAL SCIENTISTS 505 BEACH STREET, SAN FRANCISCO, CALIFORNIA 94133</p>	<p>VICINITY MAP SUBSURFACE SITE INVESTIGATION USPS - OAKLAND GMF/VMF OAKLAND, CALIFORNIA</p>	<p>FIGURE 1</p>
<p>Job No. 1708-003-00 Appr. _____ Date 10/19/93</p>		

EXPLANATION	
●	SOIL BORING LOCATION
△	MONITORING WELL LOCATION
⎓	LIMIT OF EXCAVATION
⎓	REMOVED UNDERGROUND STORAGE TANK TANK No.
⎓	EXISTING TANK (SEE DESIGNATION BELOW)
1	5,000-GALLON GASOLINE
2	10,000-GALLON DIESEL
3	10,000-GALLON DIESEL
4	750-GALLON WASTE OIL
5	10,000-GALLON DIESEL
6	FORMER DIESEL FUEL DISPENSING ISLAND
7	750-GALLON WASTE OIL TANK



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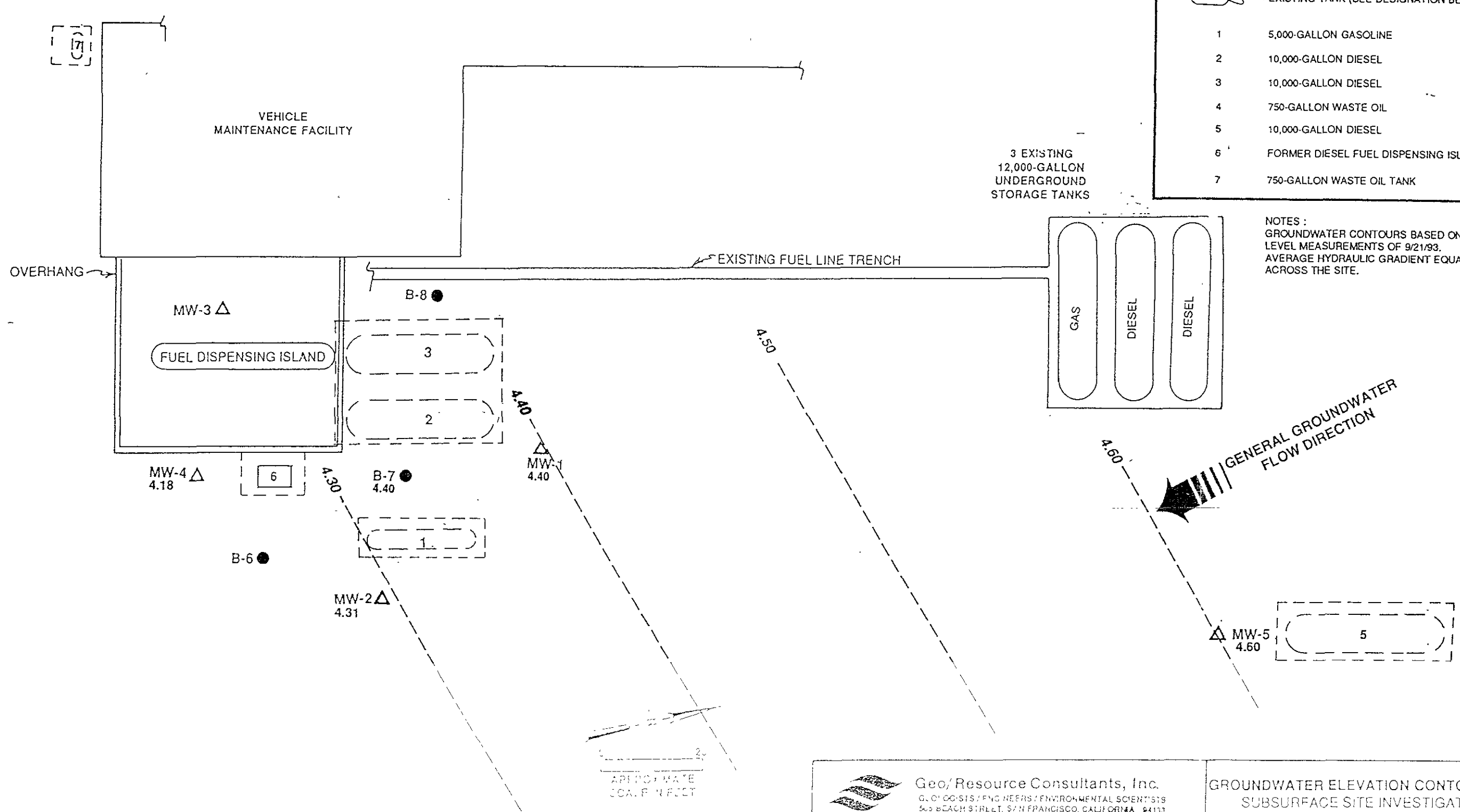
Job No. 1708-003-00 Appr. _____ Date 10/19/93

SOIL BORING AND WELL LOCATIONS
SUBSURFACE SITE INVESTIGATION
USPS - OAKLAND GMF/VMF
OAKLAND, CALIFORNIA

FIGURE
2

4

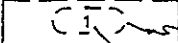
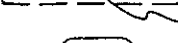
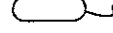
EXPLANATION	
●	SOIL BORING LOCATION
△	MONITORING WELL LOCATION
4.40	GROUNDWATER ELEVATION ABOVE MEAN SEA LEVEL
4.60	GROUNDWATER ELEVATION CONTOUR, 0.10 FOOT INTERVAL
	LIMIT OF EXCAVATION
	REMOVED UNDERGROUND STORAGE TANK TANK No.
	EXISTING TANK (SEE DESIGNATION BELOW)
1	5,000-GALLON GASOLINE
2	10,000-GALLON DIESEL
3	10,000-GALLON DIESEL
4	750-GALLON WASTE OIL
5	10,000-GALLON DIESEL
6	FORMER DIESEL FUEL DISPENSING ISLAND
7	750-GALLON WASTE OIL TANK

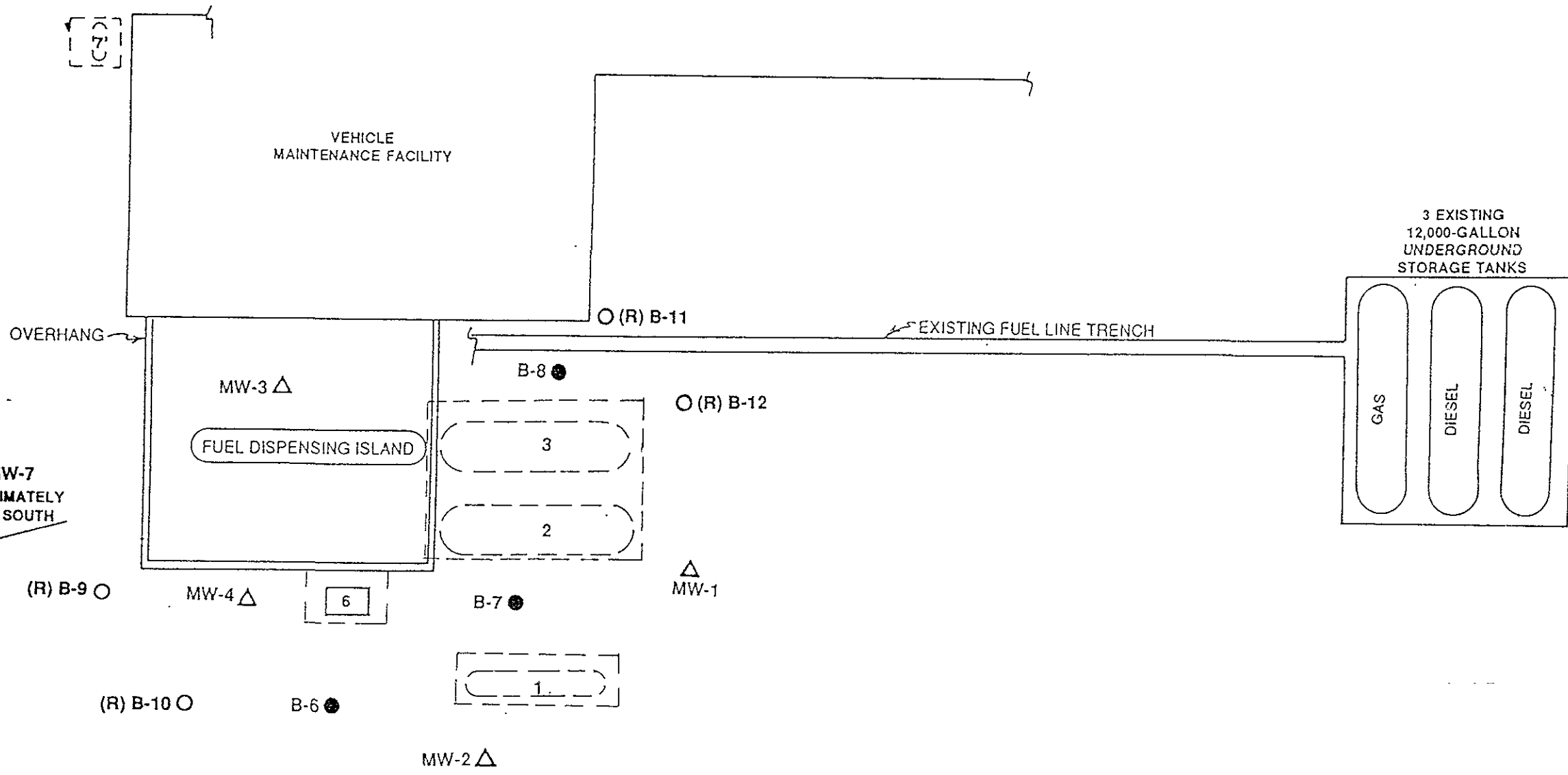


NOTES:
 GROUNDWATER CONTOURS BASED ON GROUNDWATER LEVEL MEASUREMENTS OF 9/21/93.
 AVERAGE HYDRAULIC GRADIENT EQUALS 0.002 FOOT/FOOT ACROSS THE SITE.

<p>Geo/Resource Consultants, Inc. GEOLOGISTS / ENGINEERS / ENVIRONMENTAL SCIENTISTS 505 BEACH STREET, SAN FRANCISCO, CALIFORNIA 94133</p>	<p>GROUNDWATER ELEVATION CONTOUR MAP SUBSURFACE SITE INVESTIGATION USPS - OAKLAND GMF/VMF OAKLAND, CALIFORNIA</p>	<p>FIGURE 3</p>

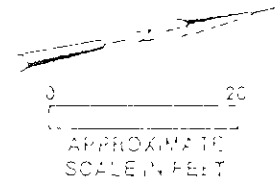
4


EXPLANATION	
●	SOIL BORING LOCATION
△	MONITORING WELL LOCATION
○	RECOMMENDED ADDITIONAL SOIL BORING
▲	RECOMMENDED ADDITIONAL MONITORING WELL
	LIMIT OF EXCAVATION
	REMOVED UNDERGROUND STORAGE TANK
TANK No.	
	EXISTING TANK (SEE DESIGNATION BELOW)
1	5,000-GALLON GASOLINE
2	10,000-GALLON DIESEL
3	10,000-GALLON DIESEL
4	750-GALLON WASTE OIL
5	10,000-GALLON DIESEL
6	FORMER DIESEL FUEL DISPENSING ISLAND
7	750-GALLON WASTE OIL TANK



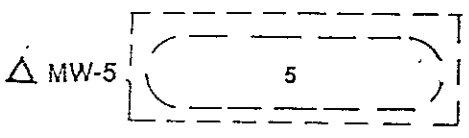
(R) MW-7
APPROXIMATELY
50-FEET SOUTH

(R) MW-6



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Job No. 1708-003-00 Appr. _____ Date 10/19/93



RECOMMENDED BORING/
WELL LOCATIONS
SUBSURFACE SITE INVESTIGATION
USPS - OAKLAND GMF/VMF
OAKLAND, CALIFORNIA

FIGURE
4

TABLES



TABLE 1
GROUNDWATER LEVEL MEASUREMENTS
SUBSURFACE SITE INVESTIGATION
U.S.P.S. OAKLAND
OAKLAND, CALIFORNIA

DATE OF MEASUREMENT	WELL NUMBER	TOP OF CASING ELEVATIONS	DEPTH TO GROUNDWATER (FEET)*	GROUNDWATER TABLE ELEVATION**
9/21/93	MW-1	8.30	3.90	4.40
9/21/93	MW-2	8.86	4.55	4.31
9/21/93	MW-3	9.28	5.00	4.28
9/21/93	MW-4	8.73	4.55	4.18
9/21/93	MW-5	8.23	3.63	4.60

Notes: * = Measured from top of casing (Well Elevation Survey conducted by KCA Engineers of San Francisco)
** = Above MSL Datum

→ good



TABLE 2
SUMMARY OF ANALYTICAL TEST RESULTS - SOIL
SUBSURFACE SITE INVESTIGATION
U.S.P.S. OAKLAND
OAKLAND, CALIFORNIA

SAMPLE I.D. #	SAMPLE DEPTH (Feet)	TPH-D (mg/kg)	TPH-G (mg/kg)	BENZENE (mg/kg)/Detection Limit (mg/kg)	TOLUENE (mg/kg)/Detection Limit (mg/kg)	ETHYLBENZENE (mg/kg)/Detection Limit (mg/kg)	TOTAL XYLENES (mg/kg)
MW-1	5.0	ND ✓	ND	ND	ND	ND	ND
MW-1	8.0	ND ✓	ND	ND	ND	ND	ND
MW-2	2.5 - 3.0	ND ✓	ND	0.040	ND	ND	ND
MW-2	7.0 - 7.5	ND ✓	ND	ND	ND	ND	ND
MW-2	8.5 - 9.0	ND ✓	ND	ND	ND	ND	ND
MW-3	3.0 - 3.5	ND ✓	ND	ND	ND	ND	ND
MW-3	7.0 - 7.5	ND ✓	ND	ND	ND	ND	ND
MW-3	9.0 - 9.5	ND ✓	ND	ND	ND	ND	ND
MW-4	3.0 - 3.5	2400 ✓	53 ✓	ND/0.15	ND/0.15	ND/0.15	0.087
MW-4	7.0 - 7.5	ND ✓	ND	ND	ND	ND	ND
MW-4	9.0 - 9.5	ND ✓	ND	ND	ND	ND	ND
MW-5	3.0	ND ✓	ND	ND	ND	ND	ND
MW-5	6.5	ND ✓	ND	ND	ND	ND	ND
MW-5	9.0	ND ✓	ND	ND	ND	ND	ND
Detection Limit		10	1	0.003 or as indicated above	0.003 or as indicated above	0.003 or as indicated above	0.009
Test Method		EPA 8015M	EPA 8015M	EPA 8020	EPA 8020	EPA 8020	EPA 8020
Regulatory Criteria		100-1000 mg/kg *	100-1000 mg/kg *	**	**	**	**

Notes: ND = Not detected above minimum laboratory detection limit.

TPH-D = Total petroleum hydrocarbons as diesel

TPH-G = Total petroleum hydrocarbons as gasoline

* = As per the California Water Resources Board (LUFT) Field Manual. Concentration of petroleum hydrocarbons in soil between 100 and 1000 mg/kg are considered "Designated Waste" requiring remediation or disposal at a Class II solid waste facility.

** = Regulatory criteria has not been established for these constituents in soil.

Laboratory analysis performed by Superior Precision Analytical, Inc.

TABLE 2 Continued
 SUMMARY OF ANALYTICAL TEST RESULTS - SOIL
 SUBSURFACE SITE INVESTIGATION
 U.S.P.S. OAKLAND
 OAKLAND, CALIFORNIA

9-16-93
 ↓

SAMPLE I.D. #	SAMPLE DEPTH (Feet)	TPH-D (mg/kg)	TPH-G (mg/kg)	BENZENE (mg/kg)/Detection Limit (mg/kg)	TOLUENE (mg/kg)/Detection Limit (mg/kg)	ETHYLBENZENE (mg/kg)/Detection Limit (mg/kg)	TOTAL XYLENES (mg/kg)
B-6	3.0 - 3.5	ND /	ND	ND	ND	ND	ND
B-6	7.0 - 7.5	ND /	ND	ND	ND	ND	ND
B-6	11.0 - 11.5	ND /	ND	ND	ND	ND	ND
B-7	4.5 - 5.0	ND /	ND	ND	ND	ND	ND
B-7	5.0 - 5.5	ND /	ND	ND	ND	ND	ND
B-7	10.0 - 10.5	ND /	ND	ND	ND	ND	ND
B-7	13.5 - 14.0	ND /	ND	ND	ND	ND	ND
B-8	6.0 - 6.5	84 /	180 /	0.15 /	0.35	2.1	13
B-8	8.5 - 9.0	ND /	ND	ND	ND	ND	0.12
B-8	9.0 - 9.5	ND /	ND	ND	ND	ND	ND
B-9	10.5 - 11.0	ND /	ND	ND	ND	ND	ND
Blind Split from B-6							
Detection Limit		10	1	0.003 or as indicated above	0.003 or as indicated above	0.003 or as indicated above	0.009
Test Method		EPA 8015M	EPA 8015M	EPA 8020	EPA 8020	EPA 8020	EPA 8020
Regulatory Criteria		100-1000 mg/kg *	100-1000 mg/kg *	**	**	**	**

Notes: ND = Not detected above minimum laboratory detection limit.

TPH-D = Total petroleum hydrocarbons as diesel

TPH-G = Total petroleum hydrocarbons as gasoline

* = As per the California Water Resources Board (LUFT) Field Manual. Concentration of petroleum hydrocarbons in soil between 100 and 1000 mg/kg are considered "Designated Waste" requiring remediation or disposal at a Class II solid waste facility.

** = Regulatory criteria has not been established for these constituents in soil.

Laboratory analysis performed by Superior Precision Analytical, Inc.

TABLE 3
SUMMARY OF ANALYTICAL TEST RESULTS - GROUNDWATER
SUBSURFACE SITE INVESTIGATION
U.S.P.S. OAKLAND
OAKLAND, CALIFORNIA

9-20-93

SAMPLE I.D. #	TPH-D (ug/l)	TPH-G (ug/l)	BENZENE (ug/l)	TOLUENE (ug/l)	ETHYLBENZENE (ug/l)	TOTAL XYLENES (ug/l)
MW-1	ND	ND	ND	ND	ND	ND
MW-2	ND	ND	ND	ND	ND	ND
MW-3	ND	ND	ND	ND	ND	ND
MW-4	580 ✓	ND	ND	ND	ND	ND
MW-5	ND	ND	ND	ND	ND	ND
MW-6 (Duplicate of MW-1)	ND	ND	ND	ND	ND	ND
Detection Limit	50	50	0.3	0.3	0.3	0.9
Test Method	EPA 8015M	EPA 8015M	EPA 8020	EPA 8020	EPA 8020	EPA 8020
Regulatory Criteria	*	*	*	*	*	*

Notes: ND = Not detected above minimum laboratory detection limit.

TPH-D = Total petroleum hydrocarbons as diesel

TPH-G = Total petroleum hydrocarbons as gasoline

* = Regulatory criteria has not been established for these constituents in groundwater.



Well & boring logs.

APPENDIX A
WELL CONSTRUCTION AND BORING LOGS



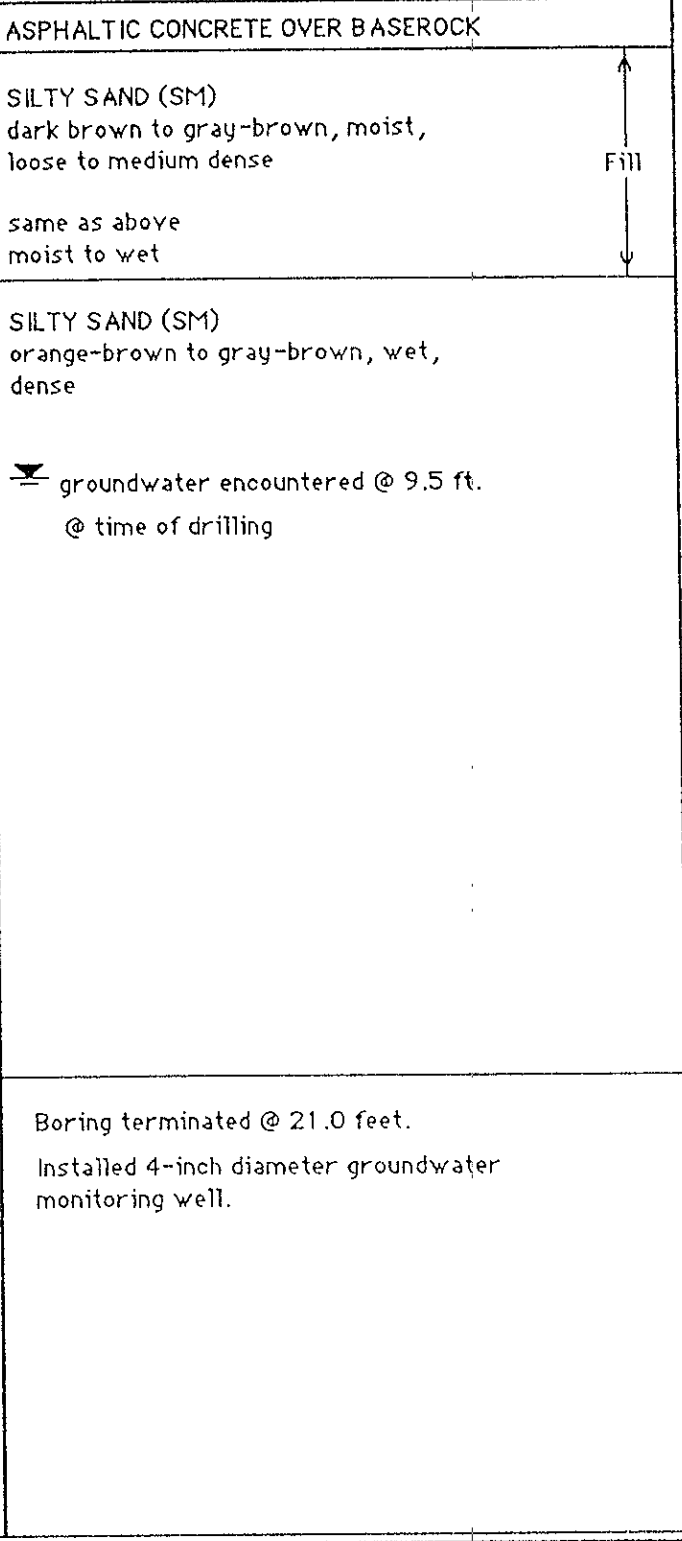
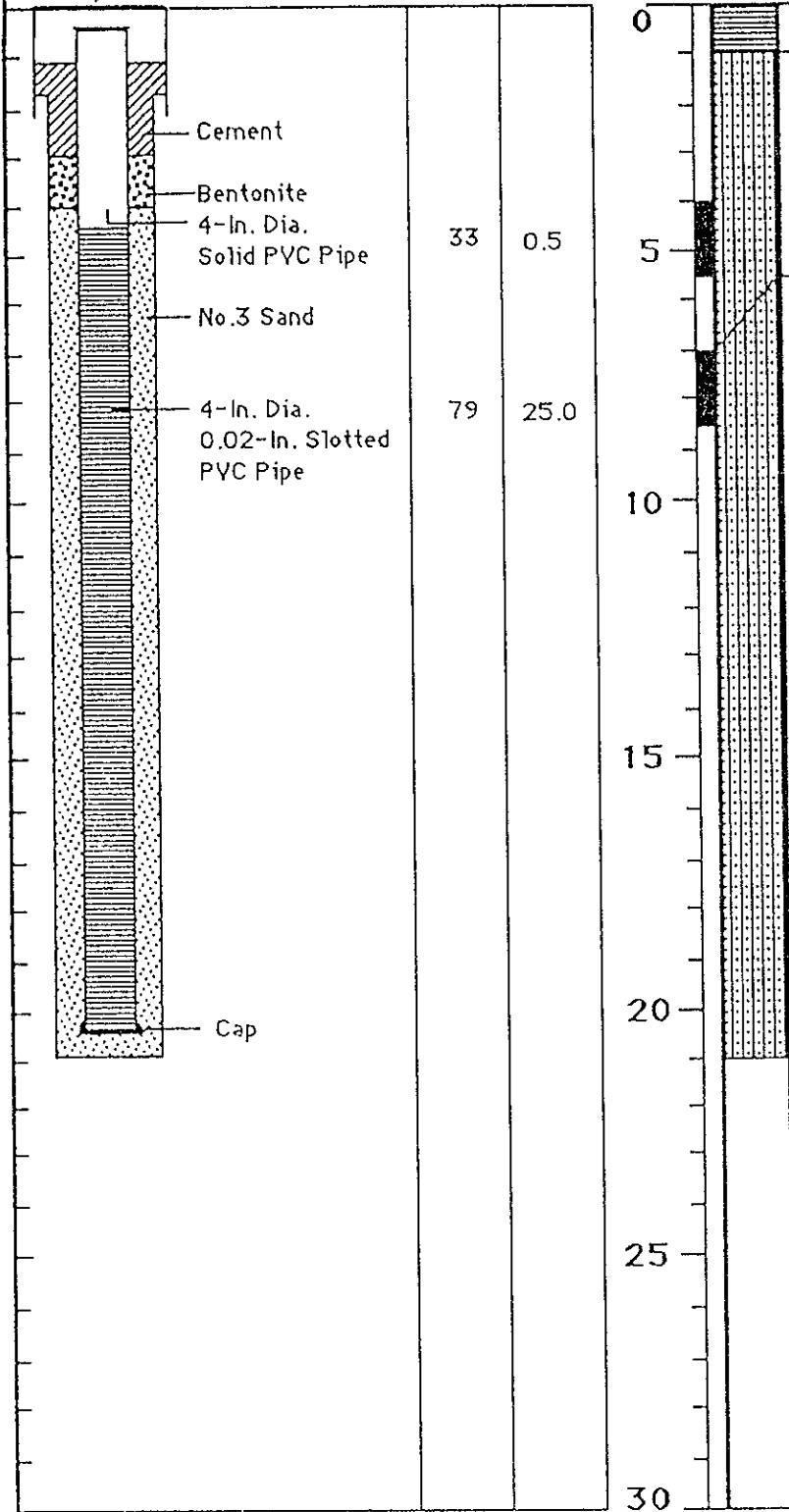
Well Installation
 Diagram 12-Inch Dia.
 Locking
 Well Cover

Blows/ft.
 Hnu
 Reading
 (ppm)

Depth (ft.)
 Sample pnts

LOG OF BORING MW-1

Equipment Mobile B-61 ; 6" & 10" Hollow Stem Auger
 Elevation 9.09 ft. Date 9/17/93



Geo/Resource Consultants, Inc.
 Geologists / Engineers / Environmental Scientists

LOG OF BORING MW-1
 SITE CHARACTERIZATION
 USPS - GMF/YMF
 1675 SEVENTH STREET
 OAKLAND, CALIFORNIA

FIGURE
 A-1

Job No. 1708-002 Appr: _____ Date 9/22/93

LOG OF BORING MW-2

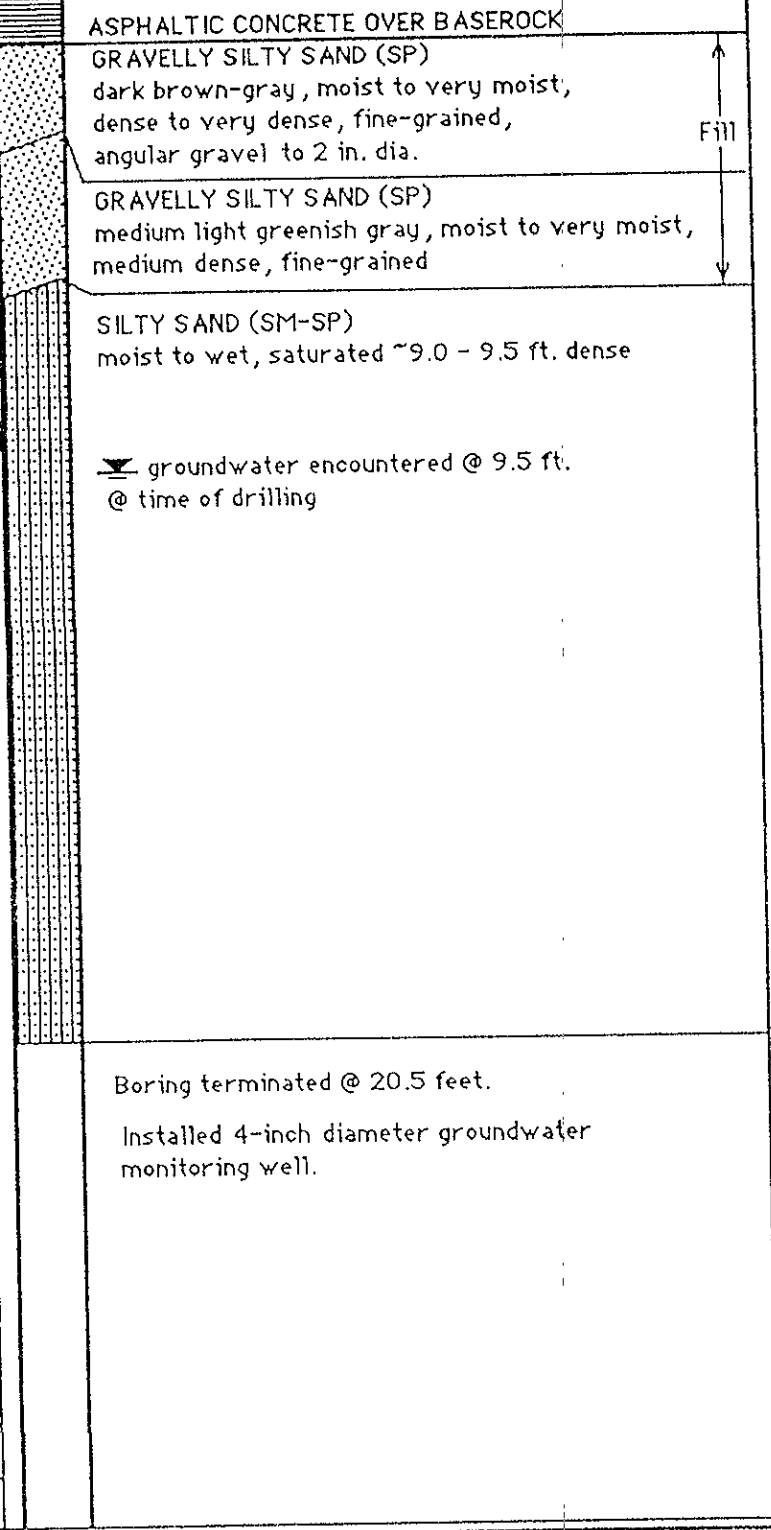
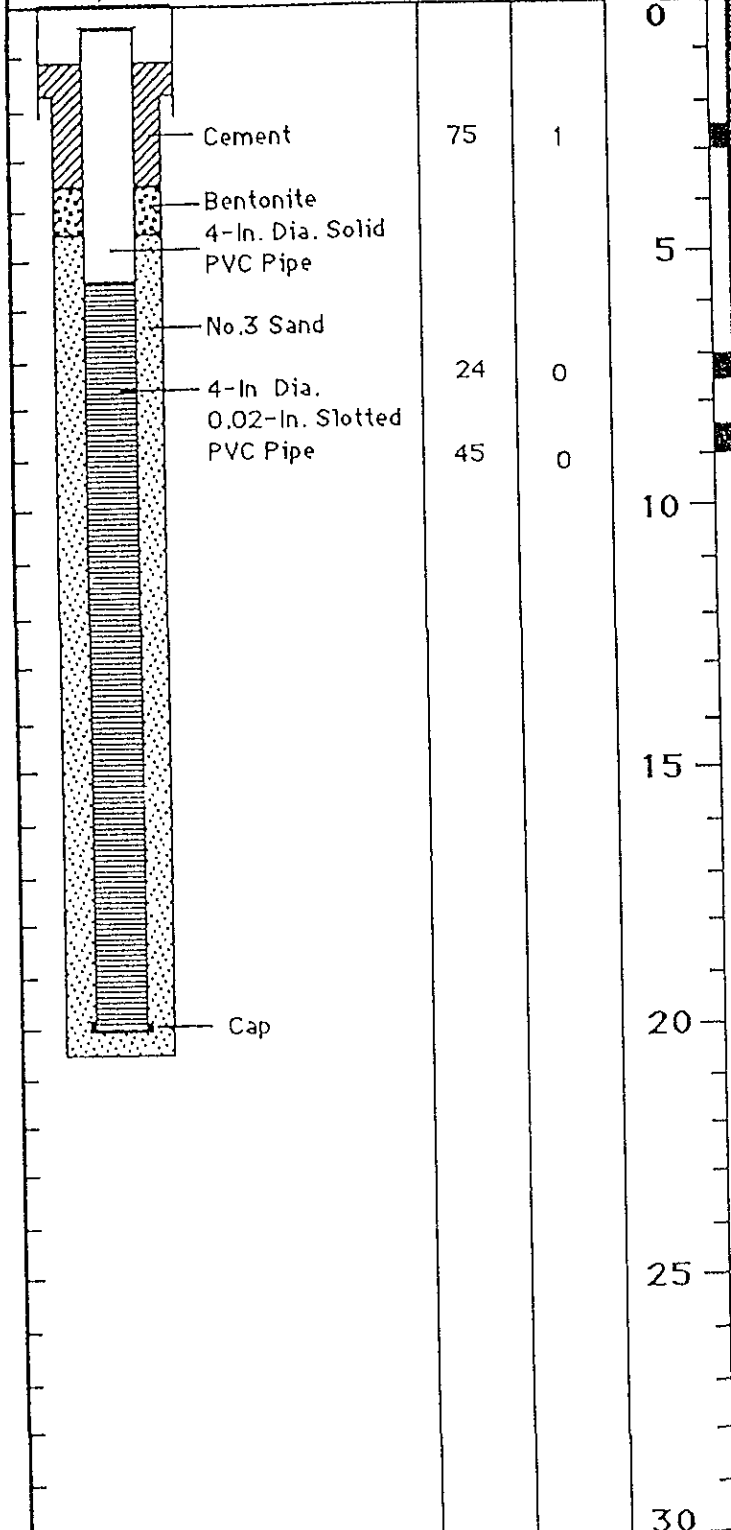
Equipment Mobile B-61; 6" & 10" Hollow Stem Auger

Elevation 9.5 ft. Date 9/17/93

Well Installation Diagram
12-In. Dia. Locking Well Cover

Blows/ft.
Hnu Reading (ppm)

Depth (ft.)
Sample pnts



Geo/Resource Consultants, Inc.
Geologists / Engineers / Environmental Scientists

LOG OF BORING MW-2
SITE CHARACTERIZATION
USPS - GMF/VMF
1675 SEVENTH STREET
OAKLAND, CALIFORNIA

FIGURE
A-2

Job No. 1708-003 Appr: _____ Date 9/22/93

LOG OF BORING MW-3

Equipment Simco D7, 4.5" & 10" Hollow Stem Auger

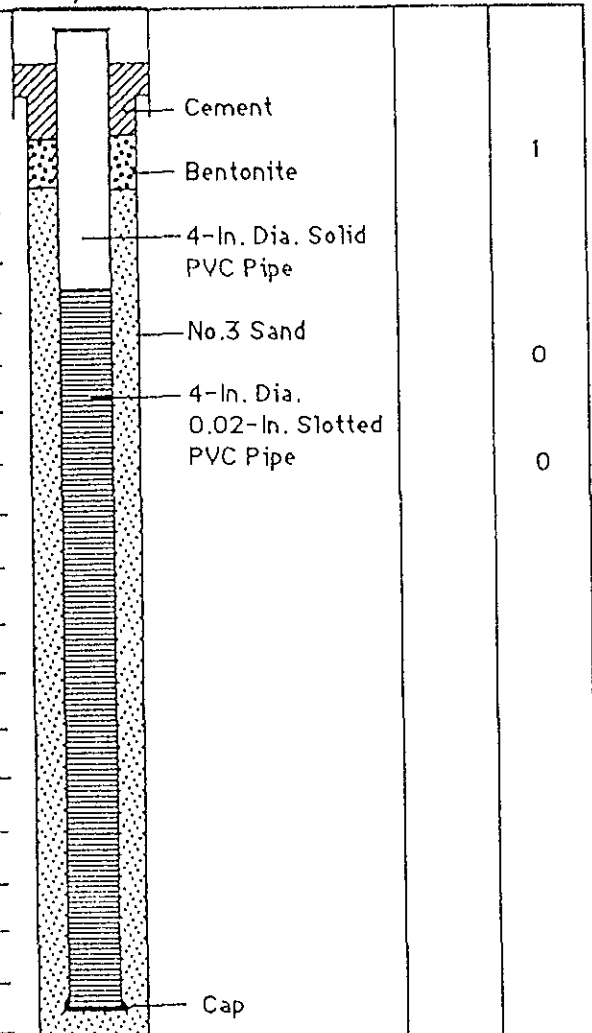
Elevation 9.81 ft. Date 9/17/93

Well Installation Diagram

12-In. Dia. Locking Well COVER

Blows/ft.
Hnu Reading (ppm)

Depth (ft.)
Sample pnts



0	STEEL REINFORCED CONCRETE	
0 - 1	SILTY GRAVELY SAND (SP) dark gray-brown, moist, medium dense to dense, FILL fine-grained	
1 - 5	SAND (SP) mottled gray, orange, and brown, moist to very moist, medium dense to dense, fine-grained	
9.5	groundwater encountered @ 9.5 ft. @ time of drilling	
10 - 20.5	SAND (SP) medium brown-orange to tan-orange, very moist, dense	
20.5	Boring terminated @ 20.5 feet. Installed 4-inch diameter groundwater monitoring well.	
25		
30		



GeolResource Consultants, Inc.
Geologists / Engineers / Environmental Scientists

LOG OF BORING MW-3
SITE CHARACTERIZATION
USPS - GMF/YMF
1675 SEVENTH STREET
OAKLAND, CALIFORNIA

FIGURE
A-3

Job No. 1708-003 Appr: _____ Date 9/22/93

LOG OF BORING MW-4

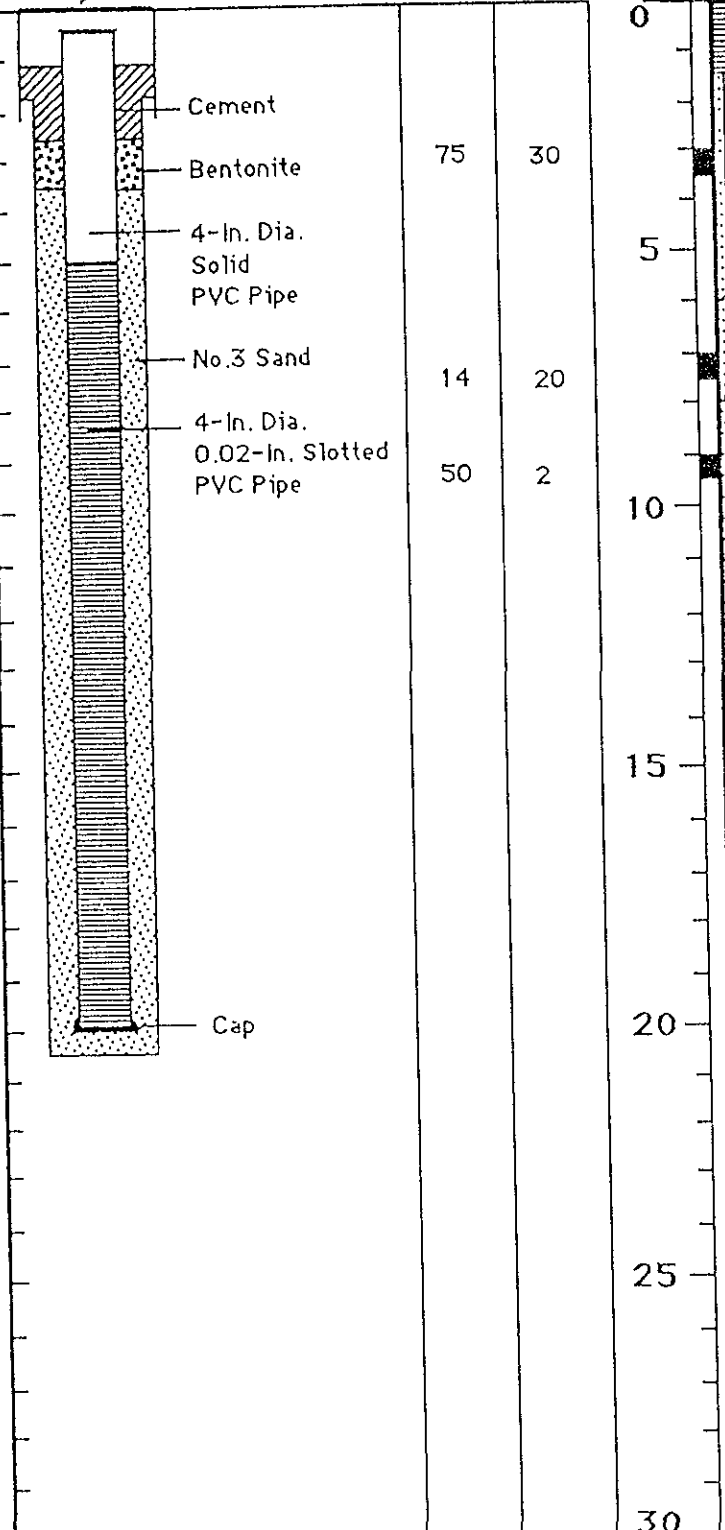
Equipment Mobile B-61; 6" & 10" Hollow Stem Auger

Elevation 9.73 ft. Date 9/17/93

Well Installation
Diagram 12-In. Dia. Locking Well Cover

Blows/ft.
Hnu
Reading
(ppm)

Depth (ft.)
Sample pnts



0 STEEL REINFORCED CONCRETE OVER BASEROCK

5 SILTY SAND (SM)
dark gray, slightly moist to moist, dense, fine-grained, strong product odor

5 SILTY SAND (SM)
greenish gray, very moist to wet, medium dense, fine-grained, scattered gravel, strong product odor

10 groundwater encountered @ 9.0-9.5 ft. @ time of drilling

10 SAND (SP)
medium orange, wet to saturated @ 9.0 ft., dense

20 Boring terminated @ 20.5 feet.
Installed 4-inch diameter groundwater monitoring well.

30



Geo/Resource Consultants, Inc.
Geologists / Engineers / Environmental Scientists

LOG OF BORING MW-4
SITE CHARACTERIZATION
USPS - GMF/VMF
1675 SEVENTH STREET
OAKLAND, CALIFORNIA

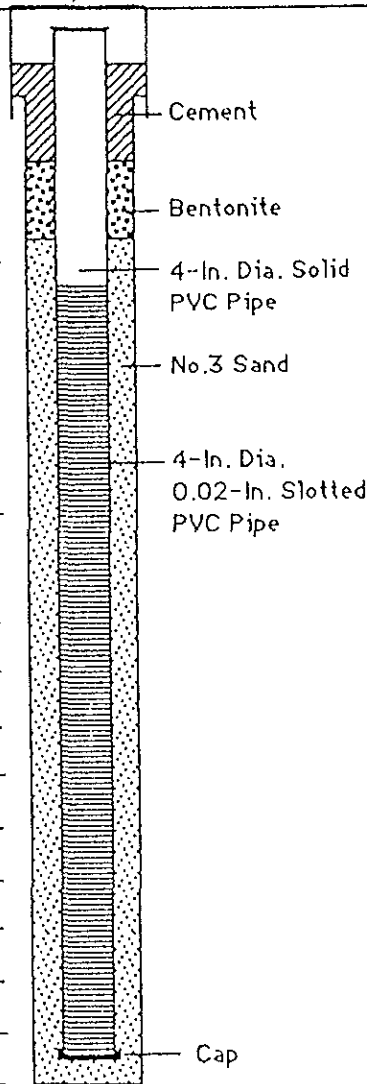
FIGURE
A-4

Job No. 1708-003 Appr: _____ Date 9/22/93

Well Installation
Diagram

12-In. Dia.
Locked
Well Cover

Blows/ft.
Hnu
Reading
(ppm)



Blows/ft.	Hnu Reading (ppm)
28	0
85	0
75	0


LOG OF BORING MW-5

Equipment Mobile B-61; 6" & 10" Hollow Stem Auger

Elevation 9.19 ft. Date 9/17/93

Depth (ft.) Sample pnts.

0	
5	
10	
15	
20	
25	
30	

0	ASPHALTIC CONCRETE OVER BASEROCK
0 - 5	SILTY SAND (SM) dark brown, moist, medium dense
5 - 10	CLAYEY SAND (SC) medium to light brown, moist to wet, medium dense to dense
10 - 21.0	SILTY SAND (SM) orange-brown, moist to wet, dense  groundwater encountered @ 10 ft. @ time of drilling
21.0 - 21.0	Boring terminated @ 21.0 feet. Installed 4-inch diameter groundwater monitoring well.



GeolResource Consultants, Inc.
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Job No. 1708-003 Appr. _____ Date 9/22/93

LOG OF BORING MW-5

SITE CHARACTERIZATION
USPS - GMF/YMF

1675 SEVENTH STREET
OAKLAND, CALIFORNIA

FIGURE

A-5

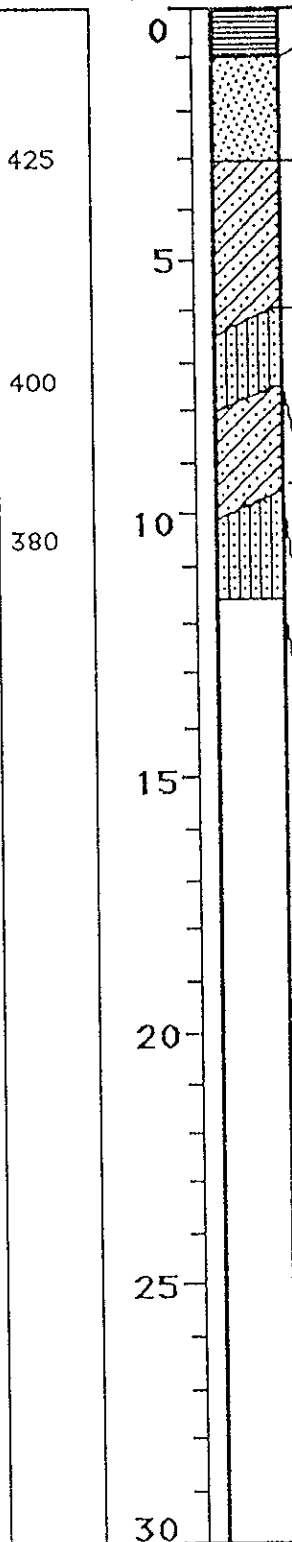
LOG OF BORING B-6

Equipment Simco-D7; 4.5" Hollow Stem Auger

Elevation 9.7 ft. Date 9/16/93

Hnu
Reading
(ppm)

Depth (ft.)
Sample pnts.



0	ASPHALT OVER BASEROCK	
	GRAVELLY SAND (SP) black, moist, medium dense, oily type odor	↑ Fill ↓
5	SILTY CLAYEY SAND (SC-SM) medium to dark gray, moist to very moist, medium dense, fine-grained, slight to moderate product odor	
	SILTY SAND (SM-SP) mottled orange, brown, and gray, very moist, medium dense to dense, minor clay, fine-grained	
	▼ groundwater encountered @ 9.5 ft. @ time of drilling	
10	CLAYEY SILTY SAND (SC) medium dark greeish gray, very moist to wet, medium dense, product odor	
	SILTY SAND (SM) orange, very moist to wet, dense	
15	Boring terminated @ 11.5 feet. Grouted boring to ground surface with cement/bentonite mix.	
20		
25		
30		



Geo/Resource Consultants, Inc.
Geologists / Engineers / Environmental Scientists

Job No. 1708-003 Appr: _____ Date 9/22/93

LOG OF BORING B-6
SITE CHARACTERIZATION
USPS - GMF/VMF
1675 SEVENTH STREET
OAKLAND, CALIFORNIA

FIGURE
A-6

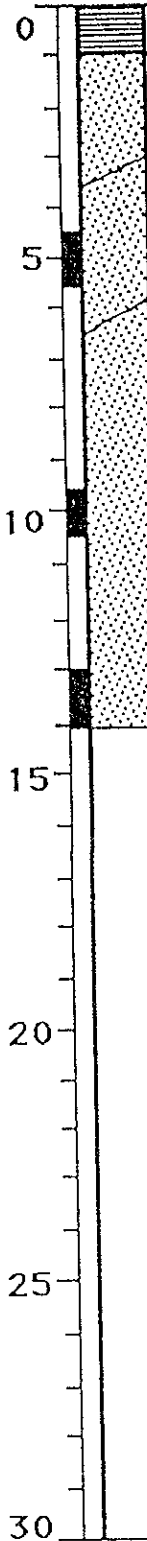
LOG OF BORING B-7

Equipment Simco 07; 4.5" Hollow Stem Auger

Elevation 9.3 ft. Date 8/23/93

Hnu
Reading
(ppm)

Depth (ft.)
Sample pnts.



0	ASPHALT OVER BASEROCK	
1	GRAVELLY SILTY SAND (SP) dark gray to black, moist, medium dense, angular gravel to 3 in., slight odor	↑ Fill ↓
5	SILTY SAND (SP-SM) medium to dark brown gray, moist, loose to medium dense, fine-grained	
10	SILTY SAND (SP-SM) mottled gray, brown, and orange, moist to very moist, medium dense to dense @ 8.5 ft. color change to orange with gray-brown	
12	⚡ groundwater encountered @ 12 ft @ time of drilling	
200		

Boring terminated @ 14.0 feet.
Grouted boring to ground surface
with cement-bentonite mix.



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LOG OF BORING B-7
SITE CHARACTERIZATION
USPS - GMF/YMF
1675 SEVENTH STREET,
OAKLAND, CALIFORNIA

FIGURE
A-7

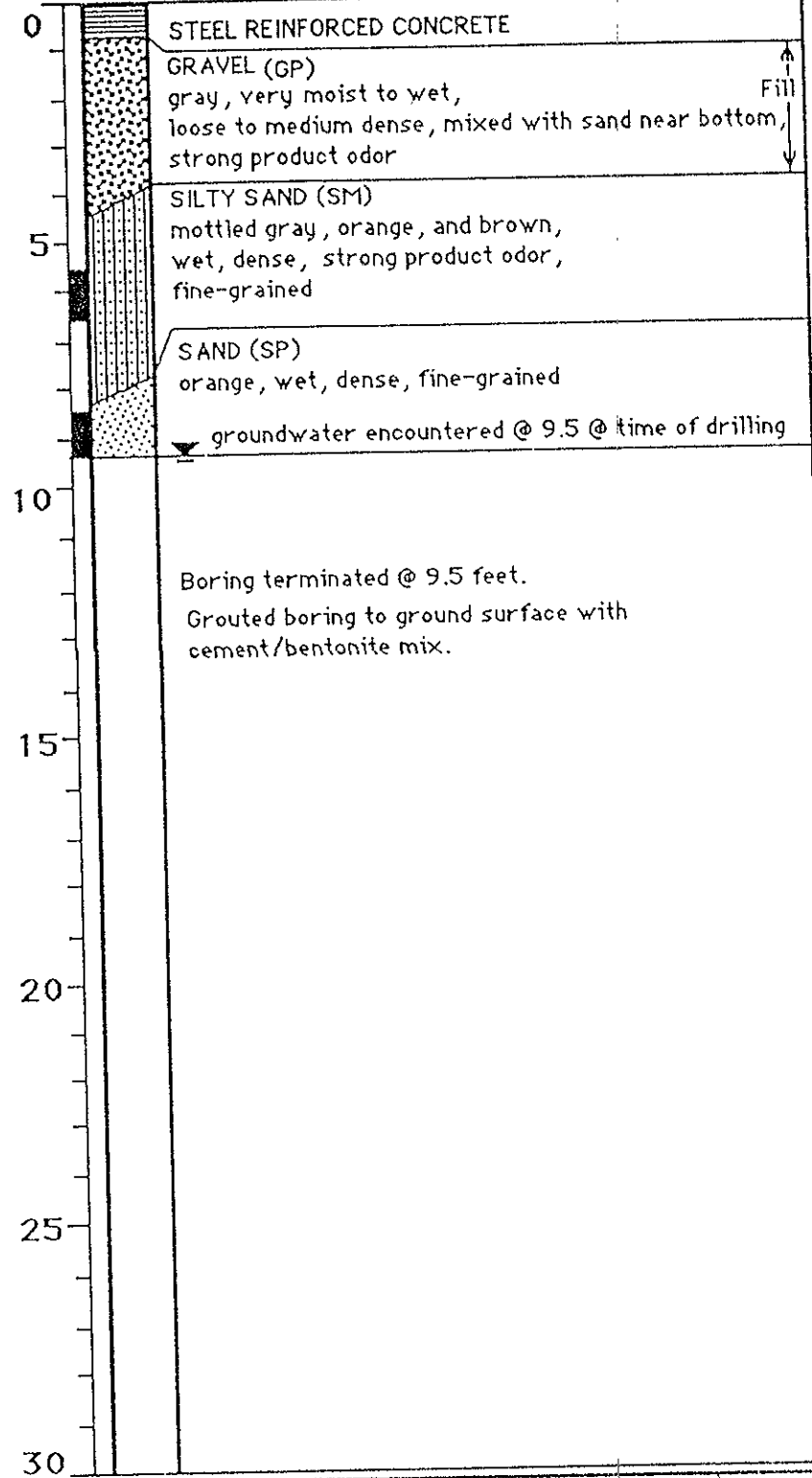
Job No. 1708-003 Appr: _____ Date 9/22/93

LOG OF BORING B-8

Equipment Simco D7;4.5" Hollow Stem Auger
 Elevation ~9.5 ft. Date 8/23/93

Hnu
Reading
(ppm)

Depth (ft.)
Sample pnts.



Boring terminated @ 9.5 feet.
 Grouted boring to ground surface with
 cement/bentonite mix.



GeolResource Consultants, Inc.
 Geologists / Engineers / Environmental Scientists

LOG OF BORING B-8
 SITE CHARACTERIZATION
 USPS - GMF/YMF
 1675 SEVENTH STREET
 OAKLAND, CALIFORNIA

FIGURE
A-8

Job No. 1708-003 Appr: _____ Date 9/22/93

APPENDIX B
WELL DEVELOPMENT LOGS, GROUNDWATER SAMPLING
LOGS, AND WELL SURVEY DATA



WELL DEVELOPMENT LOG

DATE 9/20/03 MW I.D. MW-1
 PROJECT USPS Oakland PROJECT NO. 1709-013
 WEATHER CONDITIONS Sunny - Cool (AM)
 OBSERVATIONS/COMMENTS _____
 DEVELOPMENT COMPLETED BY Gregg Drilling Co. (Gregg)

QUALITY CONTROL

Development Method Surge & Block
 Method to Measure Water Level Sounder Equip Decon Steam cleaner
 Comments _____

DEVELOPMENT DATA

Water Level 3.77 ft. Start 10:03 AM End 10:35 AM (Surging)
 End Dev. 14.60 ft. (11:22 AM)
 Reference Point T.O.C.

Time	Pump Rate	Discharge (gallons)	Color	% Sediment / Time	Turbidity	Comments EC(µpm); T(°F)
10:37 AM	Used	5	Brown			EC=618 T=65.1 pH=8.33
	Bailing					AE
10:42 AM	Method	10	Brown			EC=651 T=65.9 pH=8.11
10:46 AM		10	"			EC=654 T=65.6 pH=8.16
10:55 AM		10	Brown			EC=642 T=65.7 pH=8.30
11:05 AM		10	Lighter			EC=623 T=65.9 pH=8.30
11:17 AM		10	"			EC=625 T=65.7 pH=8.33

Total Discharge 55 gal. (1-Drum) Casing Volumes Extracted 5.1
 Sheet 1 of 1

WELL DEVELOPMENT LOG

DATE 9/2/93 MW I.D. MW-2
 PROJECT USPS Oakland PROJECT NO. 1708-003
 WEATHER CONDITIONS Sunny - Warm
 OBSERVATIONS/COMMENTS _____
 DEVELOPMENT COMPLETED BY Gregg Drilling Co. (Orug)

QUALITY CONTROL

Development Method Surge & Block
 Method to Measure Water Level Sounder Equip Decon Steam Clean
 Comments _____

DEVELOPMENT DATA

Water Level 4.38' Start 11:29 AM End 11:50 AM
 Reference Point T.O.C.
 End: 13.74 (2:48 PM)

Time	Pump Rate	Discharge (gallons)	Color	% Sediment / Time	Turbidity	Comments EC (ppm); T (°F)
11:54 AM	Used	5	Brown			EC=1194; T=72.2 pH=7.35
12:10 PM	Bailing	10	Brown			EC=1252; T=73.2 pH=7.18
12:08 PM	Muffled	10	" "			EC=1090; T=73.1 pH=7.40
12:15 PM		10	Clearer			EC=1087; T=73.6 pH=7.64
12:34 PM		10 20	" "			EC=1088; T=73.3 pH=7.51

Total Discharge 55 gal. (1-Drum) Casing Volumes Extracted 4.5

WELL DEVELOPMENT LOG

DATE 9/20/03 MW I.D. MW-3
 PROJECT USPS Oakland PROJECT NO. 1708-003
 WEATHER CONDITIONS _____
 OBSERVATIONS/COMMENTS _____
 DEVELOPMENT COMPLETED BY Gregg Drilling Co. (Mike)

QUALITY CONTROL

Development Method None (See Note Below)*
 Method to Measure Water Level Sounder Equip Decon Steam Clean
 Comments _____

DEVELOPMENT DATA

Water Level 4.82 (12:27PM) Start _____ End _____
 Reference Point T.O.C.

Time	Pump Rate	Discharge (gallons)	Color	% Sediment /Time	Turbidity	Comments
12:25PM	Used	1	Brown			EC=1122; T=67.2 pH=7.69
1:04PM	Manual	3	"			EC=1056; T=66.1 pH=7.55
1:23PM	Bailed	10	"			EC=1018; T=66.3 pH=7.25
1:38PM	Method	17	u			EC=1025; T=65.9 pH=7.29
1:53PM		20 10	"			EC=1028; T=65.4 pH=7.22
2:04PM		10	"			EC=1026; T=65.9 pH=7.22

Total Discharge 50 (2-Drum) Casing Volumes Extracted 5
 Sheet 1 of 1

*Note: Well MW-3 located under existing canopy preventing use of surge rig (boom to tall) so just bailed manually.

WELL DEVELOPMENT LOG

DATE 9/20/93 MW.I.D. MW-4
 PROJECT USPS Oakland PROJECT NO. 1708-003
 WEATHER CONDITIONS High clouds to sunny-cool (AM)
 OBSERVATIONS/COMMENTS _____
 DEVELOPMENT COMPLETED BY Gregg Drilling Co. (Gregg)

QUALITY CONTROL

Development Method Surge & Block
 Method to Measure Water Level Sounder Equip Decon Steam Cleaner
 Comments _____

DEVELOPMENT DATA

Water Level 4.55' (8:42 AM) Start 8:48 AM End 9:03 AM (Surging)
 End 17.76' (9:51 AM)
 Reference Point T.O.C.

Time	Pump Rate	Discharge (gallons)	Color	% Sediment /Time	Turbidity	Comments EC, EC(ppm), T(°F)
9:07 AM	Used Bailing Methods	5	Orange Br.			Con. 9.27; T=63.5°F Orange Brown pH=7.55
9:10 AM		15.10	"			EC=1008 T=63.4°F pH=7.90
9:18 AM		10	"			EC=1117; T=62.0°; pH=7.50
9:24 AM		10	Light tan			EC=1006; T=62.2°; pH=7.48
9:32 AM		10	"			EC=1005; T=62.5°; pH=7.63
9:48 AM		10	Lt. Tan Brown			EC=1007; T=62.5°; pH=7.72

Total Discharge 55 gal. (4-Drum) Casing Volumes Extracted ~ 5.4'
 Sheet 1 of 1

Well recharging ~ 1 ft/1.5 min.

WELL DEVELOPMENT LOG

DATE 9/20/93 MW.I.D. MW-5
PROJECT VSPS Oakland PROJECT NO. 1706-003
WEATHER CONDITIONS Sunny ~ Warm
OBSERVATIONS/COMMENTS _____
DEVELOPMENT COMPLETED BY _____

QUALITY CONTROL

Development Method Surge & Block
Method to Measure Water Level Sounder Equip Decon Steam Clean
Comments _____

DEVELOPMENT DATA

Water Level 3.90 ft. Start 1:20 PM End 1:48 PM (Surging)
End. 18.95 ft (2:34 PM)
Reference Point T.O.C.

Time	Pump Rate	Discharge (gallons)	Color	% Sediment /Time	Turbidity	Comments
1:57 PM	<u>Used Bailer</u>	<u>10</u>	<u>Brown Tan</u>			<u>EC=1118 1116 T=65.6 pH=7.10</u>
2:01 PM	<u>Method</u>	<u>10</u>	<u>''</u>			<u>EC=1127 T=65.2 pH=7.23</u>
2:18 PM		<u>10</u>	<u>Clearer</u>			<u>EC=1122 T=65.8 pH=7.29</u>
2:36 PM		<u>5</u>	<u>Clearer (Light tan)</u>			<u>EC=1125 T=65.3 pH=7.22</u>

Total Discharge 35 gal. Casing Volumes Extracted 3.3
Sheet 1 of 1

GROUND WATER SAMPLING LOG

DATE 9/21/93 MW I.D. NW2
 PROJECT USPS Oakland PROJECT NO. 1708
 WEATHER CONDITIONS Sunny, Wind
 OBSERVATIONS/COMMENTS Hydr: OK opening 0-1
 SAMPLING COMPLETED BY AG/KAT

QUALITY CONTROL

Purging Method Teflon bailer Sampling Method Teflon bailer
 Method to Measure Water Level Steel tape Equip Decon _____
 pH Meter _____
 Calibration Start _____ Units _____ Time _____
 Temperature Start _____ Time _____
 Calibration End _____ Units _____ Time _____
 Temperature End _____ Time _____
 Comments _____

Conductivity Meter _____
 Calibration Start _____ Time _____
 Temperature Start _____ Time _____
 Calibration End _____ Time _____
 Temperature End _____ Time _____
 Comments _____

Total depth = 19.42

SAMPLING DATA

Water Level _____ Start 4:55 @ 240 pm End 8:32 @ 350 pm
 Reference Point _____

	Time	Pump Rate	Discharge (gallons)	pH	Conductivity	Temp.	Comments (Color/Turb./Etc)
1	2:49		5	6.61	1350	180	H. turb, muddy
2	2:58		10	6.62	1350	170	"
3	3:10		15	6.58	1350	170	"
4	3:15		20	6.54	1300	170	"
5	3:35		25	6.52	1300	170	"
6	3:44		30	6.52	1300	170	"
7							
8							
9							
10							
11							
12							
13							
14							
15							

Total Discharge 30 Casing Volumes Extracted 3.1
 Sheet _____ of _____

GROUND WATER SAMPLING LOG

DATE 9/21/93 MW I.D. hw3
 PROJECT USPS Oakland PROJECT NO. _____
 WEATHER CONDITIONS Sunny
 OBSERVATIONS/COMMENTS No floaty product.
 SAMPLING COMPLETED BY AK/KH

QUALITY CONTROL

Purging Method teflon bailer Sampling Method teflon bailer
 Method to Measure Water Level Steel tape Equip Decon _____
 pH Meter _____
 Calibration Start _____ Units _____ Time _____
 Temperature Start _____ Time _____
 Calibration End _____ Units _____ Time _____
 Temperature End _____ Time _____
 Comments _____

Conductivity Meter _____
 Calibration Start _____ Time _____
 Temperature Start _____ Time _____
 Calibration End _____ Time _____
 Temperature End _____ Time _____
 Comments _____

SAMPLING DATA

Water Level 5.00' @ 11:20 a.m. Start _____ End 8.74' Below T.O.C. @ 1244
 Reference Point _____

	Time	Pump Rate	Discharge (gallons)	pH	Conductivity	Temp.	Comments (Color/Turb./Etc.)
1	11:20		5	6.83	1200	16.0C	tan, murky
2	11:38		10	6.86	1225	15.0C	"
3	11:44		15	6.90	1200	15.0C	"
4	11:52		20	6.83	1175	15.5C	"
5	12:00		25	6.82	1150	15.5C	"
6	12:05		30	6.78	1125	15.5C	"
7	12:10		35	6.77	1100	16.0C	"
8	12:40		40	6.78	1150	16.0C	"
9							
10							
11							
12							
13							
14							
15							

Total Discharge 40.88 Casing Volumes Extracted 4.1 Sheet _____ of _____

GROUND WATER SAMPLING LOG

DATE 7/21/63 MW I.D. MW 4
 PROJECT USPS Oakland PROJECT NO. 1708
 WEATHER CONDITIONS Partly cloudy
 OBSERVATIONS/COMMENTS No H₂S reading at top of well or 15' below water, no water produced observed
 SAMPLING COMPLETED BY AG/KH

QUALITY CONTROL

Purging Method teflon bailer Sampling Method teflon bailer
 Method to Measure Water Level stick tape Equip Decon _____
 pH Meter _____
 Calibration Start 1 Units 3.4 Time 9:50
 Temperature Start 1 18°C Time _____
 Calibration End 1 Units 4 Time 9:10
 Temperature End 1 20°C Time _____
 Comments _____

Conductivity Meter _____
 Calibration Start 900 Time 9:50
 Temperature Start 13°C Time _____
 Calibration End 900 Time 9:10
 Temperature End 13°C Time _____
 Comments _____

SAMPLING DATA

Water Level 4.5' ~~8.8'~~ Start 4.5' - stick tape End 6.28' @ 11:15 a.m.
 Reference Point ~~19.42'~~ 19.6' total depth

	Time	Pump Rate	Discharge (gallons)	pH	Conductivity	Temp.	Comments (Color/Turb/Etc.)
1	9:15		5	6.50	1300	16°C	Murky (t. brown)
2	9:45		10	6.70	1350	15°C	"
3	9:55		15	6.69	1300	15°C	"
4	10:10		20	6.70	1250	15°C	"
5	10:20		25	6.70	1200	15°C	"
6	10:30		30	6.73	1200	15°C	"
7							
8							
9							
10							
11							
12							
13							
14							
15							

Total Discharge 30 ~~88~~ Casing Volumes Extracted 3.0 ~~88~~
 Sheet _____ of _____

KCA ENGINEERS, INC.



CONSULTING ENGINEERS • SURVEYORS • PLANNERS

318 BRANNAN STREET • SAN FRANCISCO, CALIFORNIA 94107 • (415) 546-7111 • FAX: (415) 546-9472

TRANSMITTAL MEMORANDUM

TO: GEO RESOURCE CONSULTANTS INC. DATE: 10/19/93 TIME: _____

505 BEACH ST. SUBJECT: _____

S.F. CA. 94133 USPS- OAKLAND

FAX #: _____ KCA JOB #: 4522

ATTENTION: BRIAN BOBBER KCA FAX #: (415) 546-9472

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- For Approval
- Reviewed as noted
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REMARKS: _____

KCA ENGINEERS, INC.

Copies to:

BY Martin Lulig

GROUND WATER SAMPLING LOG

DATE 7/21/63 MW I.D. MW 4
 PROJECT USPS Oakland PROJECT NO. 1708
 WEATHER CONDITIONS Partly cloudy
 OBSERVATIONS/COMMENTS No H₂S reading at top of well or 15' below water; no water produced
 SAMPLING COMPLETED BY AG/KCF observed

QUALITY CONTROL

Purging Method Stainless steel Sampling Method inflator bailer
 Method to Measure Water Level steel tape Equip Decon _____
 pH Meter _____
 Calibration Start 1 Units 3.4 Time 9:50
 Temperature Start 1 18°C Time _____
 Calibration End 1 Units 4 Time 9:10
 Temperature End 1 20°C Time _____
 Comments _____

Conductivity Meter _____ Time _____
 Calibration Start 9:00 Time 9:50
 Temperature Start 13°C Time _____
 Calibration End 9:00 Time 9:10
 Temperature End 13°C Time _____
 Comments _____

SAMPLING DATA

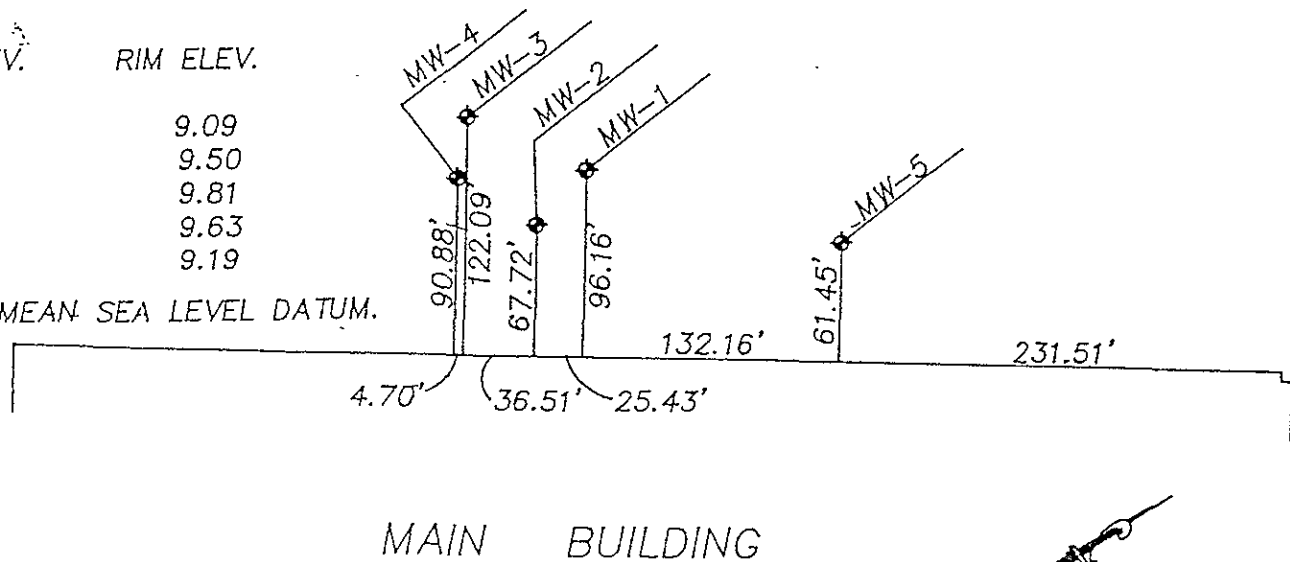
Water Level 4.5' ~~8.8'~~ ← Start _____ End 6.28' @ 11:15 a.m.
 Reference Point ~~2.0' below 19.6'~~ 19.6' - total depth

	Time	Pump Rate	Discharge (gallons)	pH	Conoconductivity	Temp.	Comments (Color/Turb./Etc.)
1	9:15		5	6.56	1300	16°C	Murky (t. brown)
2	9:45		10	6.70	1350	15°C	"
3	9:55		15	6.69	1300	15°C	"
4	10:10		20	6.70	1250	15°C	"
5	10:20		25	6.70	1200	15	"
6	10:30		30	6.73	1200	15	"
7							
8							
9							
10							
11							
12							
13							
14							
15							

Total Discharge 30 Casing Volumes Extracted 3.0 Sheet _____ of _____

WELL	PIPE ELEV.	RIM ELEV.
MW-1	8.30	9.09
MW-2	8.86	9.50
MW-3	9.28	9.81
MW-4 *	8.73	9.63
MW-5	8.23	9.19

NOTE: ELEVATIONS ARE ON MEAN SEA LEVEL DATUM.



SEVENTH STREET

* = Revised Elevations 10/18/93

MISSING
PAGES 2+6 OF
GAS + BTEX
ANALYSIS

APPENDIX C

SOIL AND GROUNDWATER LABORATORY REPORTS





GEO/RESOURCE CONSULTANTS, INC.
Attn: GARY FLOYD

Project 1708-003
Reported 24-September-1993

TOTAL PETROLEUM HYDROCARBONS AS DIESEL
BY EPA METHOD 8015M

Chronology Identification	Sampled	Received	Extracted	Laboratory Number 57087		
				Analyzed	Run #	Lab #
B.7@5.0'-5.5'	09/16/93	09/17/93	09/19/93	09/19/93		1
B.7@10.0'-10.5'	09/16/93	09/17/93	09/19/93	09/19/93		2
B.7@13.5'-14.0'	09/16/93	09/17/93	09/19/93	09/19/93		3
B.6@3.0'-3.5'	09/16/93	09/17/93	09/19/93	09/19/93		4
B.6@7.0'-7.5'	09/16/93	09/17/93	09/19/93	09/19/93		5
B.6@11.0'-11.5'	09/16/93	09/17/93	09/19/93	09/19/93		6
B.8@6.0'-6.5'	09/16/93	09/17/93	09/19/93	09/19/93		7
B.8@9.0'-9.5'	09/16/93	09/17/93	09/19/93	09/19/93		8
B.8@8.5'-9.0'	09/16/93	09/17/93	09/19/93	09/19/93		9
MW-3@3.0'-3.5'	09/16/93	09/17/93	09/19/93	09/19/93		10
MW-3@7.0'-7.5'	09/16/93	09/17/93	09/19/93	09/19/93		11
MW-3@9.0'-9.5'	09/16/93	09/17/93	09/19/93	09/19/93		12
MW-1B@5'	09/17/93	09/17/93	09/19/93	09/19/93		13
MW-1B@8'	09/17/93	09/17/93	09/19/93	09/19/93		14
MW-2@2.5-3.0'	09/17/93	09/17/93	09/19/93	09/20/93		15



GEO/RESOURCE CONSULTANTS, INC.
Attn: GARY FLOYD

Project 1708-003
Reported 24-September-1993

TOTAL PETROLEUM HYDROCARBONS AS DIESEL
BY EPA METHOD 8100

Chronology					Laboratory Number 57087	
Identification	Sampled	Received	Extracted	Analyzed	Run #	Lab #
MW-2@7.0-7.5'	09/17/93	09/17/93	09/19/93	09/20/93		16
MW-2@8.5-9.0'	09/17/93	09/17/93	09/19/93	09/20/93		17
MW-4@3.0-3.5	09/17/93	09/17/93	09/19/93	09/20/93		18
MW-4@7.0-7.5	09/17/93	09/17/93	09/19/93	09/20/93		19
MW-4@9.0-9.5	09/17/93	09/17/93	09/19/93	09/20/93		20
MW-5@3.0'	09/17/93	09/17/93	09/19/93	09/20/93		21
MW-5@6.5'	09/17/93	09/17/93	09/19/93	09/20/93		22
MW-5@9.0'	09/17/93	09/17/93	09/19/93	09/20/93		23
B-9@10.5-11.0	09/17/93	09/17/93	09/19/93	09/20/93		24
B-7@4.5-5.0'	09/17/93	09/17/93	09/19/93	09/20/93		25



GEO/RESOURCE CONSULTANTS, INC.
Attn: GARY FLOYD

Project 1708-003
Reported 24-September-1993

TOTAL PETROLEUM HYDROCARBONS AS DIESEL

Laboratory Number	Sample Identification	Matrix
57087- 1	B.7@5.0'-5.5'	Soil
57087- 2	B.7@10.0'-10.5'	Soil
57087- 3	B.7@13.5'-14.0'	Soil
57087- 4	B.6@3.0'-3.5'	Soil
57087- 5	B.6@7.0'-7.5'	Soil
57087- 6	B.6@11.0'-11.5'	Soil
57087- 7	B.8@6.0'-6.5'	Soil
57087- 8	B.8@9.0'-9.5'	Soil
57087- 9	B.8@8.5'-9.0'	Soil
57087-10	MW-3@3.0'-3.5'	Soil

RESULTS OF ANALYSIS

Laboratory Number:	57087- 1	57087- 2	57087- 3	57087- 4	57087- 5
Diesel:	ND<10 /	ND<10 /	ND<10 /	ND<10 /	ND<10 /
Concentration:	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg

Laboratory Number:	57087- 6	57087- 7	57087- 8	57087- 9	57087-10
Diesel:	ND<10 /	84	ND<10 /	ND<10 /	ND<10 /
Concentration:	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg



GEO/RESOURCE CONSULTANTS, INC.
Attn: GARY FLOYD

Project 1708-003
Reported 24-September-1993

TOTAL PETROLEUM HYDROCARBONS AS DIESEL

Laboratory Number	Sample Identification	Matrix
57087-11	MW-3@7.0'-7.5'	Soil
57087-12	MW-3@9.0'-9.5'	Soil
57087-13	MW-1B@5'	Soil
57087-14	MW-1B@8'	Soil
57087-15	MW-2@2.5-3.0'	Soil
57087-16	MW-2@7.0-7.5'	Soil
57087-17	MW-2@8.5-9.0'	Soil
57087-18	MW-4@3.0-3.5'	Soil
57087-19	MW-4@7.0-7.5'	Soil
57087-20	MW-4@9.0-9.5'	Soil

RESULTS OF ANALYSIS

Laboratory Number:	57087-11	57087-12	57087-13	57087-14	57087-15
Diesel:	ND<10 /	ND<10 /	ND<10 /	ND<10 /	ND<10 ✓
Concentration:	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg

Laboratory Number:	57087-16	57087-17	57087-18	57087-19	57087-20
Diesel:	ND<10 /	ND<10 /	2400	ND<10 /	ND<10 ✓
Concentration:	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg



GEO/RESOURCE CONSULTANTS, INC.
Attn: GARY FLOYD

Project 1708-003
Reported 24-September-1993

TOTAL PETROLEUM HYDROCARBONS AS DIESEL

Laboratory Number	Sample Identification	Matrix
57087-21	MW-5@3.0'	Soil
57087-22	MW-5@6.5'	Soil
57087-23	MW-5@9.0'	Soil
57087-24	B-9@10.5-11.0 SBB-6?	Soil
57087-25	B-7@4.5-5.0'	Soil

RESULTS OF ANALYSIS

Laboratory Number:	57087-21	57087-22	57087-23	57087-24	57087-25
Diesel:	ND<10	ND<10	ND<10	ND<10	ND<10
Concentration:	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg



TOTAL PETROLEUM HYDROCARBONS AS DIESEL
Quality Assurance and Control Data - Soil

Laboratory Number 57087

Compound	Method Blank (mg/kg)	RL (mg/kg)	Average Spike Recovery (%)	Limits (%)	RPD (%)
Diesel:	ND<10	10	108%	75-125	17%

Definitions:

ND = Not Detected

RPD = Relative Percent Difference

RL = Reporting Limit

mg/kg = Parts per million (ppm)

QC File No. 57087

Senior Chemist
Account Manager



GEO/RESOURCE CONSULTANTS, INC.
Attn: GARY FLOYD

Project 1708-003
Reported 24-September-1993

ANALYSIS FOR GASOLINE, BENZENE, TOLUENE, ETHYLBENZENE, AND XYLENES
by EPA SW-846 Methods 5030/8015M/8020.

Chronology						Laboratory Number 57087	
Identification	Sampled	Received	Extracted	Analyzed	Run #	Lab #	
B.7@5.0'-5.5'	09/16/93	09/17/93	/ /	09/23/93		1	
B.7@10.0'-10.5'	09/16/93	09/17/93	/ /	09/24/93		2	
B.7@13.5'-14.0'	09/16/93	09/17/93	/ /	09/23/93		3	
B.6@3.0'-3.5'	09/16/93	09/17/93	/ /	09/22/93		4	
B.6@7.0'-7.5'	09/16/93	09/17/93	/ /	09/22/93		5	
B.6@11.0'-11.5'	09/16/93	09/17/93	/ /	09/22/93		6	
B.8@6.0'-6.5'	09/16/93	09/17/93	/ /	09/22/93		7	
B.8@9.0'-9.5'	09/16/93	09/17/93	/ /	09/23/93		8	
B.8@8.5'-9.0'	09/16/93	09/17/93	/ /	09/24/93		9	
MW-3@3.0'-3.5'	09/16/93	09/17/93	/ /	09/22/93		10	
MW-3@7.0'-7.5'	09/16/93	09/17/93	/ /	09/23/93		11	
MW-3@9.0'-9.5'	09/16/93	09/17/93	/ /	09/22/93		12	
MW-1B@5'	09/16/93	09/17/93	/ /	09/22/93		13	
MW-1B@8'	09/16/93	09/17/93	/ /	09/22/93		14	
MW-2@2.5-3.0'	09/16/93	09/17/93	/ /	09/24/93		15	



GEO/RESOURCE CONSULTANTS, INC.
Attn: GARY FLOYD

Project 1708-003
Reported 24-September-1993

ANALYSIS FOR GASOLINE, BENZENE, TOLUENE, ETHYLBENZENE, AND XYLENES

Laboratory Number	Sample Identification	Matrix
57087- 1	B.7@5.0'-5.5'	Soil
57087- 2	B.7@10.0'-10.5'	Soil
57087- 3	B.7@13.5'-14.0'	Soil
57087- 4	B.6@3.0'-3.5'	Soil
57087- 5	B.6@7.0'-7.5'	Soil
57087- 6	B.6@11.0'-11.5'	Soil
57087- 7	B.8@6.0'-6.5'	Soil
57087- 8	B.8@9.0'-9.5'	Soil
57087- 9	B.8@8.5'-9.0'	Soil
57087-10	MW-3@3.0'-3.5'	Soil

RESULTS OF ANALYSIS

Laboratory Number: 57087- 1 57087- 2 57087- 3 57087- 4 57087- 5

Gasoline:	ND<1	ND<1	ND<1	ND<1	ND<1
Benzene:	ND<.003	ND<.003	ND<.003	ND<.003	ND<.003
Toluene:	ND<.003	ND<.003	ND<.003	ND<.003	ND<.003
Ethyl Benzene:	ND<.003	ND<.003	ND<.003	ND<.003	ND<.003
Xylenes:	ND<.009	ND<.009	ND<.009	ND<.009	ND<.009

Concentration: mg/kg mg/kg mg/kg mg/kg mg/kg

-- Surrogate Recoveries --

Surrogate Recovery: 66% 75% 89% 84% 84%

Laboratory Number: 57087- 6 57087- 7 57087- 8 57087- 9 57087-10

Gasoline:	ND<1	180	ND<1	ND<1	ND<1
Benzene:	ND<.003	0.15	ND<.003	ND<.003	ND<.003
Toluene:	ND<.003	0.35	ND<.003	ND<.003	ND<.003
Ethyl Benzene:	ND<.003	2.1	ND<.003	ND<.003	ND<.003
Xylenes:	ND<.009	13	ND<.009	0.012	ND<.009

Concentration: mg/kg mg/kg mg/kg mg/kg mg/kg

-- Surrogate Recoveries --

Surrogate Recovery: 82% 88% 84% 84% 84%



GEO/RESOURCE CONSULTANTS, INC.
Attn: GARY FLOYD

Project 1708-003
Reported 24-September-1993

ANALYSIS FOR GASOLINE, BENZENE, TOLUENE, ETHYLBENZENE, AND XYLENES

Laboratory Number	Sample Identification	Matrix
57087-11	MW-3@7.0'-7.5'	Soil
57087-12	MW-3@9.0'-9.5'	Soil
57087-13	MW-1B@5'	Soil
57087-14	MW-1B@8'	Soil
57087-15	MW-2@2.5-3.0'	Soil
57087-16	MW-2@7.0-7.5'	Soil
57087-17	MW-2@8.5-9.0'	Soil
57087-18	MW-4@3.0-3.5	Soil
57087-19	MW-4@7.0-7.5	Soil
57087-20	MW-4@9.0-9.5	Soil

RESULTS OF ANALYSIS

Laboratory Number:	57087-11	57087-12	57087-13	57087-14	57087-15
Gasoline:	ND<1	ND<1	ND<1	ND<1	ND<1
Benzene:	ND<.003	ND<.003	ND<.003	ND<.003	0.040
Toluene:	ND<.003	ND<.003	ND<.003	ND<.003	ND<.003
Ethyl Benzene:	ND<.003	ND<.003	ND<.003	ND<.003	ND<.003
Xylenes:	ND<.009	ND<.009	ND<.009	ND<.009	ND<.009
Concentration:	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
-- Surrogate Recoveries --					
Surrogate Recovery:	86%	71%	73%	67%	67%
Laboratory Number:	57087-16	57087-17	57087-18	57087-19	57087-20
Gasoline:	ND<1	ND<1	53	ND<1	ND<1
Benzene:	ND<.003	ND<.003	ND<.015	ND<.003	ND<.003
Toluene:	ND<.003	ND<.003	ND<.015	ND<.003	ND<.003
Ethyl Benzene:	ND<.003	ND<.003	ND<.015	ND<.003	ND<.003
Xylenes:	ND<.009	ND<.009	0.087	ND<.009	ND<.009
Concentration:	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
-- Surrogate Recoveries --					
Surrogate Recovery:	65%	63%	76%	53%	78%



GEO/RESOURCE CONSULTANTS, INC.
Attn: GARY FLOYD

Project 1708-003
Reported 24-September-1993

ANALYSIS FOR GASOLINE, BENZENE, TOLUENE, ETHYLBENZENE, AND XYLENES

Laboratory Number	Sample Identification	Matrix
57087-21	MW-5@3.0'	Soil
57087-22	MW-5@6.5'	Soil
57087-23	MW-5@9.0'	Soil
57087-24	B-9@10.5-11.0	Soil
57087-25	B-7@4.5-5.0'	Soil

RESULTS OF ANALYSIS

Laboratory Number:	57087-21	57087-22	57087-23	57087-24	57087-25
Gasoline:	ND<1	ND<1	ND<1	ND<1	ND<1
Benzene:	ND<.003	ND<.003	ND<.003	ND<.003	ND<.003
Toluene:	ND<.003	ND<.003	ND<.003	ND<.003	ND<.003
Ethyl Benzene:	ND<.003	ND<.003	ND<.003	ND<.003	ND<.003
Xylenes:	ND<.009	ND<.009	ND<.009	ND<.009	ND<.009
Concentration:	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
-- Surrogate Recoveries --					
Surrogate Recovery:	69%	61%	84%	85%	58%



Job Summary Report

Date: 09/29/93

Client: GEO/RESOURCE CONSULTANTS, INC.
 Project: 1708-003
 Job #: 57104

Lab#	Sam. ID	Analysis	Analyte	Result	Units
1	MW1	TPHLL	Diesel Surrogate	ND<50 NA%	ug/L %
2	MW2	TPHLL	Diesel Surrogate	ND<50 NA%	ug/L %
3	MW3	TPHLL	Diesel Surrogate	ND<50 NA%	ug/L %
4	MW4	TPHLL	Diesel Surrogate	580 NA%	ug/L %
5	MW5	TPHLL	Diesel Surrogate	ND<50 NA%	ug/L %
6	MW6	TPHLL	Diesel Surrogate	ND<50 NA%	ug/L %
1	MW1	VPHBTXE	Gasoline Benzene Toluene Ethyl Benzene Xylenes Surrogate Recovery	ND<50 ND<0.3 ND<0.3 ND<0.3 ND<0.9 72%	ug/L ug/L ug/L ug/L ug/L %
2	MW2	VPHBTXE	Gasoline Benzene Toluene Ethyl Benzene Xylenes Surrogate Recovery	ND<50 ND<0.3 ND<0.3 ND<0.3 ND<0.9 80%	ug/L ug/L ug/L ug/L ug/L %
3	MW3	VPHBTXE	Gasoline Benzene Toluene Ethyl Benzene Xylenes Surrogate Recovery	ND<50 ND<0.3 ND<0.3 ND<0.3 ND<0.9 82%	ug/L ug/L ug/L ug/L ug/L %
4	MW4	VPHBTXE	Gasoline Benzene Toluene Ethyl Benzene	ND<50 ND<0.3 ND<0.3 ND<0.3	ug/L ug/L ug/L ug/L

Certified Laboratories



Job Summary Report

Date: 09/29/93

Client: GEO/RESOURCE CONSULTANTS, INC.

Project: 1708-003

Job #: 57104

Lab#	Sam. ID	Analysis	Analyte	Result	Units
			Xylenes	ND<0.9	ug/L
			Surrogate Recovery	77%	%
5	MW5	VPHBTXE	Gasoline	ND<50	ug/L
			Benzene	ND<0.3	ug/L
			Toluene	ND<0.3	ug/L
			Ethyl Benzene	ND<0.3	ug/L
			Xylenes	ND<0.9	ug/L
			Surrogate Recovery	77%	%
6	MW6	VPHBTXE	Gasoline	ND<50	ug/L
			Benzene	ND<0.3	ug/L
			Toluene	ND<0.3	ug/L
			Ethyl Benzene	ND<0.3	ug/L
			Xylenes	ND<0.9	ug/L
			Surrogate Recovery	82%	%

START PENDING
RUN # 4348 SEP 28, 1993 21:32:15

START
IF

START PENDING
RUN # 4337 SEP 28, 1993 15:28:42

START
IF

ND 250 ppb

OK
you
9/28/93

ND 20 ppb

OK
AW
7/28/93

STOP

GC-3 SFCB 3M DB-624 0.53MM ID
RUNNUM: 4348 ALS POSITION: 16

SAMPLE: 57104-1
SAMPLE AMOUNT: 5 ML or G MW1

GASOLINE ANALYSIS
RT 3 MIN TO 15 MIN
AREA: 192510.
UG TOTAL: 0.128133
CONCENTRATION: 0.0256265 MG/L or MG/KG

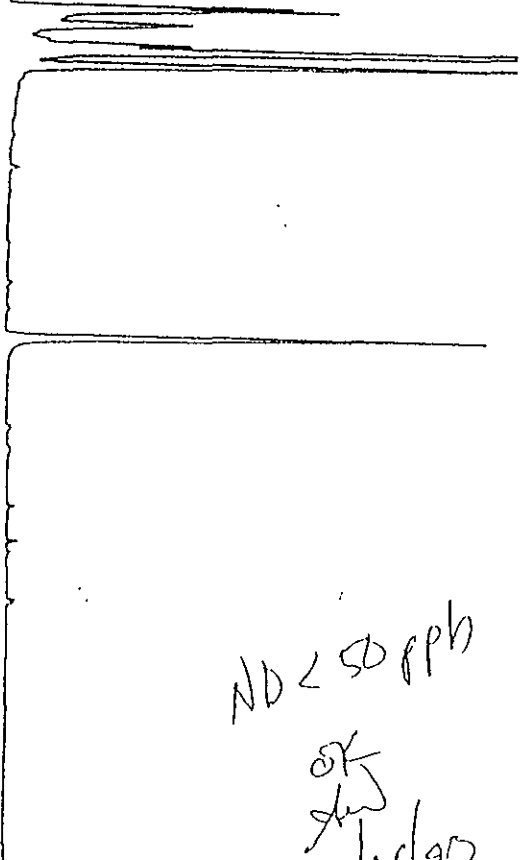
STOP

GC-3 SFCB 3M DB-624 0.53MM ID
RUNNUM: 4337 ALS POSITION: 2

SAMPLE: 57104-2
SAMPLE AMOUNT: 5 ML or G MW2

GASOLINE ANALYSIS
RT 3 MIN TO 15 MIN
AREA: 200615.
UG TOTAL: 0.132818
CONCENTRATION: 0.0265636 MG/L or MG/KG

START PENDING
RUN # 4338 SEP 28, 1993 15:58:53
START
IF



ND < 50 ppb
OK
glw
9/28/93

STOP

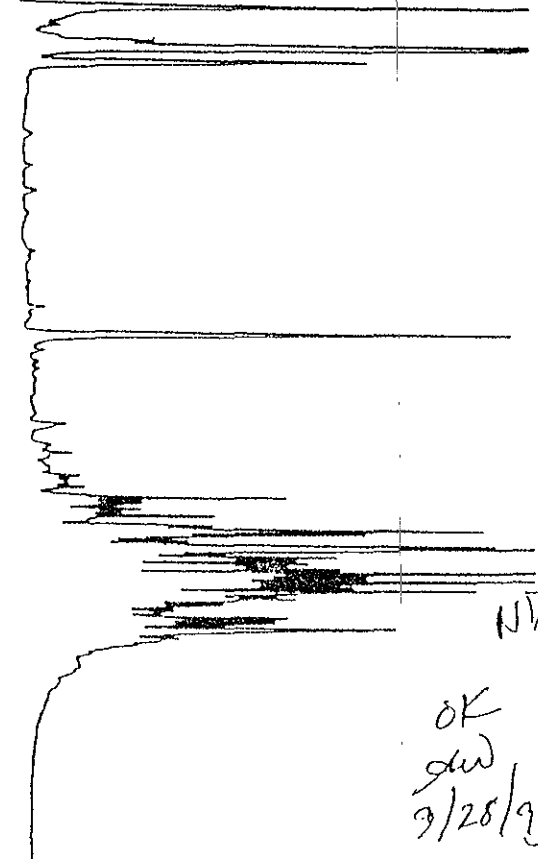
GC-3 SFCO 3M DB-624 0.53MM ID
RUNNUM: 4338 ALS POSITION: 4

SAMPLE: 57104-3
SAMPLE AMOUNT: 5 ML or G

GASOLINE ANALYSIS
RT 3 MIN TO 15 MIN
AREA: 205596.
UG TOTAL: 0.136116
CONCENTRATION: 0.0272233 MG/L or MG/KG

MW3

START PENDING
RUN # 4344 SEP 28, 1993 19:30:36
START
IF



ND < 50 ppb
OK
glw
9/28/93

STOP

GC-3 SFCO 3M DB-624 0.53MM ID
RUNNUM: 4344 ALS POSITION: 10

SAMPLE: 57104-4
SAMPLE AMOUNT: 5 ML or G

GASOLINE ANALYSIS
RT 3 MIN TO 15 MIN
AREA: 331409.
UG TOTAL: 0.219444
CONCENTRATION: 0.0438887 MG/L or MG/KG

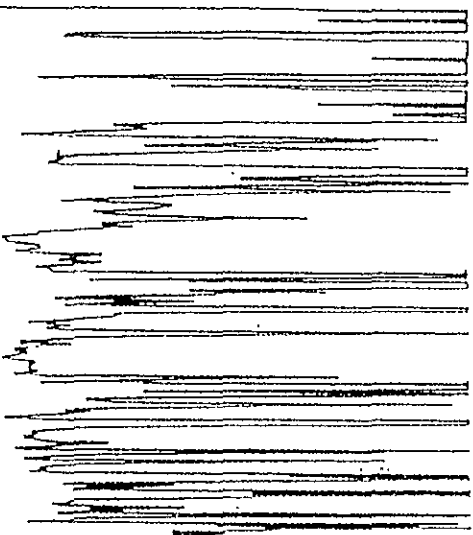
MW4

ENDING.

4339

SEP 28, 1993 11:12:48

START
IF



APPROVED
AW 7/28/93

STOP

GC-3 SFCO 3M DB-624 0.53MM ID

RUNNUM: 4339

ALS POSITION: 2

SAMPLE: GAS STD

Gasoline Standard

SAMPLE AMOUNT: 5 ML of G

GASOLINE ANALYSIS

RT 3 MIN TO 15 MIN

AREA: 14805496.

UG TOTAL: 9.96718

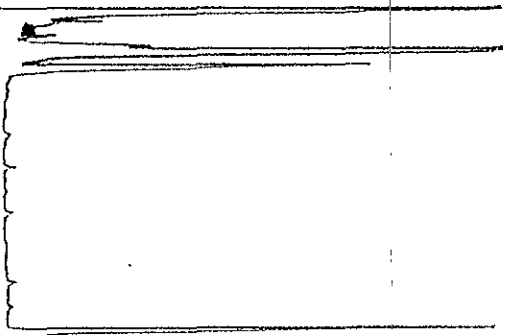
CONCENTRATION: 1.99344 MG/L or MG/KG

START PENDING

RUN # 4332

SEP 28, 1993 12:19:46

START
IF



APPROVED
AW 7/28/93

STOP

GC 3 SFCO 3M DB-624 0.53MM ID

RUNNUM: 4332

ALS POSITION: 1

SAMPLE: BLK

Blank

SAMPLE AMOUNT: 5 ML of G

GASOLINE ANALYSIS

RT 3 MIN TO 15 MIN

AREA: 252862.

UG TOTAL: 0.167418

CONCENTRATION: 0.0334936 MG/L or MG/KG

STOP: pending
RUN # 598 SEP 25, 1993 10:31:44
STOP: not ready
#415

START: not ready
#416

*Pierced
NO = 50556
Ply/15/15*

*Pinned
NO = 50556
Ply/15/15*

TIMETABLE STOP

SUPERIOR PRECISION ANALYTICAL
GC-6 SPCA DUAL COL FID
RUNNUM: 598 BOTTLE NO: 69

SAMPLE: 57104-2
DILUTION: 10

UWZ

SURROGATE COMPOUND RECOVERY= .02
SURROGATE PEAK AREA 299.

DIESEL ANALYSIS
RT 8.5 TO 28 MIN
C10 TO C24
AREA = 31970.
AREA-SURR = 31671.
CONC INJ: 0.585326 LIMIT 2000
CONC = 0.0146732 ng/L or ng/kg

MINERAL SPIRITS ANALYSIS
RT 6 TO 13 MIN
AREA = 8035.
CONC INJ= 0.12894 LIMIT 2000
CONC = 0.00447351 ng/L or ng/kg

MOTOR OIL ANALYSIS
RT 20 TO 36 MIN
AREA = 24675.
AREA-SURR = 24376.
CONC INJ = 1.37499 LIMIT 2000
CONC = 0.0343244 ng/L or ng/kg

TIMETABLE STOP

SUPERIOR PRECISION ANALYTICAL
GC-6 SPCA DUAL COL FID
RUNNUM: 589 BOTTLE NO: 68

SAMPLE: 57104-1
DILUTION: 10

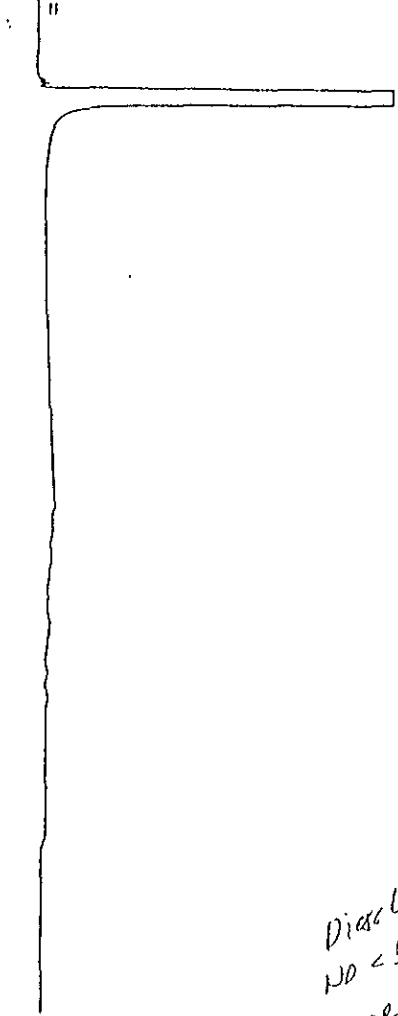
UWZ

SURROGATE COMPOUND RECOVERY= .02
SURROGATE PEAK AREA 283.

DIESEL ANALYSIS
RT 8.5 TO 28 MIN
C10 TO C24
AREA = 55755.
AREA-SURR = 55552.
CONC INJ: 1.02674 LIMIT 2000
CONC = 0.0256686 ng/L or ng/kg

MINERAL SPIRITS ANALYSIS
RT 6 TO 13 MIN
AREA = 7201.
CONC INJ= 0.162140 LIMIT 2000
CONC = 0.00405372 ng/L or ng/kg

MOTOR OIL ANALYSIS
RT 20 TO 36 MIN
AREA = 34259.
AREA-SURR = 34047.
CONC INJ = 1.2058 LIMIT 2000
CONC = 0.0400146 ng/L or ng/kg



*Diesel
ND < 50 ug/L
10/25/93*

TIMETABLE STOP

SUPERIOR PRECISION ANALYTICAL
GC-6 SFCA DUAL COL FID
RUNNUM: 591

BOTTLE NO: 20

SAMPLE: 57104-3
DILUTION: 40

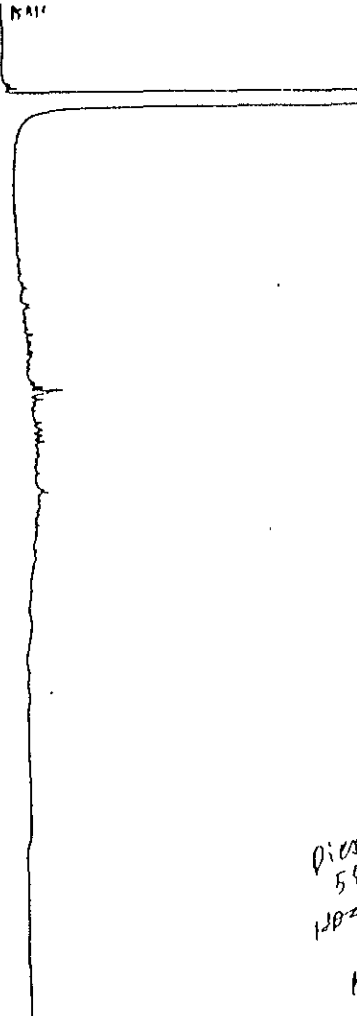
MW3

SURROGATE COMPOUND RECOVERY = .0%
SURROGATE PEAK AREA 291.

DIESEL ANALYSIS
RT 0.5 TO 28 MIN
C10 TO C24
AREA = 24440.
AREA-SURR = 24149.
CONC INJ: 0.4463 LIMIT 2000
CONC = 0.011575 ug/L or ng/kg

MINEPAL SPIRITS ANALYSIS
RT 6 TO 13 MIN
AREA = 4403.
CONC INJ = 0.0980551 LIMIT 2000
CONC = 0.00245138 ug/L or ng/kg

MOTOR OIL ANALYSIS
RT 29 TO 36 MIN
AREA = 22762.
AREA-SURR = 22471.
CONC INJ = 1.26751 LIMIT 2000
CONC = 0.0316077 ug/L or ng/kg



*Diesel
580 ug/L
ND < 50 ug/L
10/25/93*

TIMETABLE STOP

SUPERIOR PRECISION ANALYTICAL
GC-6 SFCA DUAL COL FID
RUNNUM: 592

BOTTLE NO: 21

SAMPLE: 57104-4
DILUTION: 40

MW4

SURROGATE COMPOUND RECOVERY = .0%
SURROGATE PEAK AREA 198.

DIESEL ANALYSIS
RT 0.5 TO 28 MIN
C10 TO C24
AREA = 1258016.
AREA-SURR = 1250648.
CONC INJ: 23.3324 LIMIT 2000
CONC = 0.58331 ug/L or ng/kg

MINEPAL SPIRITS ANALYSIS
RT 6 TO 13 MIN
AREA = 162902.
CONC INJ = 3.62027 LIMIT 2000
CONC = 0.0997065 ug/L or ng/kg

MOTOR OIL ANALYSIS
RT 29 TO 36 MIN
AREA = 216350.
AREA-SURR = 216150.
CONC INJ = 12.2048 LIMIT 2000
CONC = 0.30512 ug/L or ng/kg

START: not ready

START: not ready

TIMETABLE STOP

SUPERIOR PRECISION ANALYTICAL
GC-6 SPCA DUAL COL FID
RUNNUM: 593 BOTTLE NO: 72

SAMPLE: 57184-5
DILUTION: 10

MWS

SURROGATE COMPOUND RECOVERY= .0%
SURROGATE PEAK AREA 188.

DIESEL ANALYSIS
RT 8.5 TO 28 MIN
C18 TO C24
AREA = 32138.
AREA-SURR = 32212.
CONC INJ: 0.59589 LIMIT 2000
CONC = 0.014897 ng/L or ng/kg

MINERAL SPIRITS ANALYSIS
RT 6 TO 13 MIN
AREA = 2844.
CONC INJ = 0.063336 LIMIT 2000
CONC = 0.0015034 ng/L or ng/kg

MOTOR OIL ANALYSIS
RT 20 TO 36 MIN
AREA = 31748.
AREA-SURR = 31560.
CONC INJ = 1.78027 LIMIT 2000
CONC = 0.0445067 ng/L or ng/kg

Diesel
ND < 50 ug/L
PR 7/15/93

TIMETABLE STOP

SUPERIOR PRECISION ANALYTICAL
GC-6 SPCA DUAL COL FID
RUNNUM: 594 BOTTLE NO: 73

SAMPLE: 57184-6
DILUTION: 10

MWG

SURROGATE COMPOUND RECOVERY= .0%
SURROGATE PEAK AREA 462.

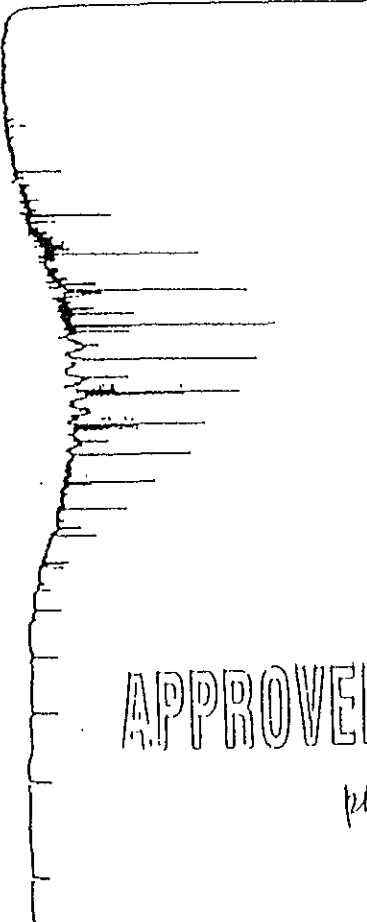
DIESEL ANALYSIS
RT 8.5 TO 28 MIN
C18 TO C24
AREA = 31127.
AREA-SURR = 30665.
CONC INJ: 0.565732 LIMIT 2000
CONC = 0.0141683 ng/L or ng/kg

MINERAL SPIRITS ANALYSIS
RT 6 TO 13 MIN
AREA = 5889.
CONC INJ = 0.113332 LIMIT 2000
CONC = 0.00203331 ng/L or ng/kg

MOTOR OIL ANALYSIS
RT 20 TO 36 MIN
AREA = 27102.
AREA-SURR = 26648.
CONC INJ = 1.5827 LIMIT 2000
CONC = 0.0375675 ng/L or ng/kg

Diesel
ND < 50 ug/L
PR 9/14/93

ENDING
RUN # 573 SEP 24, 1993 15:42:03
STOP: not ready
BANK



APPROVED

pl 1/15/93

TIMEABLE STOP

SUPERIOR PRECISION ANALYTICAL
GC-6 SPCA DUAL COL FID
RUNNUM: 573 BOTTLE INJ 52

SAMPLE: DIE 200
DILUTION: 1

Diesel Standard

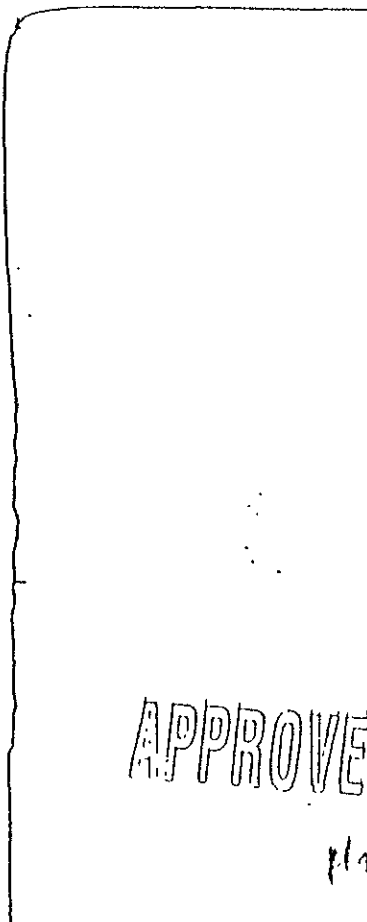
SURROGATE COMPOUND RECOVERY: 9.0%
SURROGATE PEAK AREA 85049.

DIETEL ANALYSIS
RI 8.5 TO 28 MIN
C18 TO C24
AREA = 10567221
AREA-SURR = 10101368
CONC INJ = 100.729 LIMIT 2000
CONC = 100.729 A/L OF A/L

MINERAL SPIRITS ANALYSIS
RI 6 TO 13 MIN
AREA = 1370094
CONC INJ = 35.0242 LIMIT 2000
CONC = 35.0242 A/L OF A/L

MOTOR OIL ANALYSIS
RI 20 TO 36 MIN
AREA = 3091245
AREA-SURR = 3790394
CONC INJ = 210.356 LIMIT 2000
CONC = 210.356 A/L OF A/L

START ENDING
RUN # 574 SEP 24, 1993 16:47:53
STOP: not ready
BANK



APPROVED

pl 1/15/93

TIMEABLE STOP

SUPERIOR PRECISION ANALYTICAL
GC-6 SPCA DUAL COL FID
RUNNUM: 574 BOTTLE INJ 53

SAMPLE: MCL2
DILUTION: 1

Blank

SURROGATE COMPOUND RECOVERY: 1.1%
SURROGATE PEAK AREA 10973.

DIETEL ANALYSIS
RI 8.5 TO 28 MIN
C18 TO C24
AREA = 53478
AREA-SURR = 42905
CONC INJ = 0.792969 LIMIT 2000
CONC = 0.792969 A/L OF A/L

MINERAL SPIRITS ANALYSIS
RI 6 TO 13 MIN
AREA = 4000
CONC INJ = 0.100678 LIMIT 2000
CONC = 0.100678 A/L OF A/L

MOTOR OIL ANALYSIS
RI 20 TO 36 MIN
AREA = 56306
AREA-SURR = 45733
CONC INJ = 2.57994 LIMIT 2000
CONC = 2.57994 A/L OF A/L

APPENDIX D
CHAIN-OF-CUSTODY RECORD FORMS



Geo/Resource Consultants, Inc.

GEOLOGISTS / ENGINEERS / ENVIRONMENTAL SCIENTISTS

505 BLVD ST SE 94132

3.1104
18TEXT

CHAIN OF CUSTODY RECORD

PROJECT NO. 1708-003
DATE 9/21/93 PAGE 1 OF 1

PROJECT NAME	Client	Address	SAMPLERS (SIGNATURE)	LABORATORY	ANALYSIS REQUESTED					COMMENTS/ CONTAINER TYPE	
					EPA NO. 8015/5030-TPH	EPA NO. 8015/5030-TDS	EPA NO. 8015/5030-TSS	EPA NO. 8015/5030-VOLATILES	EPA NO. 8015/5030-OTHER		5 DAY TAT
SAMPLE NO.	DATE	TIME	LOCATION								
MW1	9/21/93	2:05		X	X				X	4	12-glass amber + 3VOAs
MW2	9/21/93			X	X				X	4	"
MW3	9/21/93			X	X				X	4	"
MW4	9/21/93			X	X				X	4	"
MW5	9/20/93	3:45		X	X				X	4	"
MW6	9/21/93			X	X				X	4	"

Please initial: Y

Samples Stored in Ice

Appropriate containers

Samples preserved

VOAs without hex/septa

Comments: _____

1 RELINQUISHED BY:	DATE	3 RELINQUISHED BY:	DATE	5 RELINQUISHED BY:	DATE	TOTAL NUMBER OF CONTAINERS
<i>[Signature]</i>	9/22	<i>[Signature]</i>	9/22			
Signature	TIME	Signature	TIME	Signature	TIME	SAMPLE CONDITIONS
Printed Name	3:30	Printed Name	4:00 PM	Printed Name		SEALED <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO
Company		Company		Company		RECEIVED ON ICE <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO
2 RECEIVED BY:	DATE	4 RECEIVED BY:	DATE	6 RECEIVED BY (LAB):	DATE	SPECIAL SHIPMENT/HANDLING OR STORAGE REQUIREMENTS:
<i>[Signature]</i>	9/22	<i>[Signature]</i>	9/22			None per site
Signature	TIME	Signature	TIME	Signature	TIME	to GEC 415-775-2357
Printed Name	3:30	Printed Name	4:00 PM	Printed Name		SHIPPING TICKET NO.:
Company		Company		Company		

SAMPLER-GOLD
TRANSPORTER-PINK
LAB-YELLOW
GRC-WHITE AND GREEN



Geo/Resource Consultants, Inc.
 GEOLOGISTS / ENGINEERS / ENVIRONMENTAL SCIENTISTS
 221 LARSEN STREET, SAN FRANCISCO CALIFORNIA 94133
 505 BEACH 94133

CHAIN OF CUSTODY RECORD

PROJECT NO. 1708-003
 DATE 9/16/93 PAGE 1 OF 2

PROJECT NAME U.S.P.S. OAKLAND
 Client UNITED STATES POSTAL SERVICE
 Address 1407 UNION STREET
MEMPHIS, TENNESSEE
 SAMPLERS (SIGNATURE) Brian Barber
 LABORATORY _____

SAMPLE NO.	DATE	TIME	LOCATION	EPA NO. 8015(M) TPR-D					ANALYSIS REQUESTED					5-DAY T.A.T.	NO. OF CONTAINERS	COMMENTS/ CONTAINER TYPE
				EPA NO.	EPA NO.	EPA NO.	EPA NO.	EPA NO.								
B-7 @ 5.0' - 5.5'	9/16/93	9:40 AM	B-7	X	X	X							X	1	SOIL (BRASS TUBE)	
B-7 @ 10.0' - 10.5'	9/16/93	9:45 AM	B-7	X	X	X							X	1	SOIL (BRASS TUBE)	
B-7 @ 13.5' - 14.0'	9/16/93	9:55 AM	B-7	X	X	X							X	1	SOIL (BRASS TUBE)	
B-6 @ 3.0' - 3.5'	9/16/93	10:35 AM	B-6	X	X	X							X	1	SOIL (BRASS TUBE)	
B-6 @ 7.0' - 7.5'	9/16/93	10:45 AM	B-6	X	X	X							X	1	SOIL (BRASS TUBE)	
B-6 @ 11.0' - 11.5'	9/16/93	10:55 AM	B-6	X	X	X							X	1	SOIL (BRASS TUBE)	
B-8 @ 6.0' - 6.5'	9/16/93	11:40 AM	B-8	X	X	X							X	1	SOIL (BRASS TUBE)	
B-8 @ 9.0' - 9.5'	9/16/93	11:50 AM	B-8	X	X	X							X	1	SOIL (BRASS TUBE)	
B-8 @ 8.5' - 9.0'	9/16/93	11:50 AM	B-8	X	X	X							X	1	SOIL (BRASS TUBE)	

1 RELINQUISHED BY: <u>Brian Barber</u> Signature <u>Brian Barber</u> Printed Name <u>Geo/Resource</u> Company	DATE <u>9/17</u> TIME <u>4:57 PM</u>	3 RELINQUISHED BY: <u>Rob Vineyard</u> Signature <u>Rob Vineyard</u> Printed Name <u>HERO</u> Company	DATE <u>9-17</u> TIME <u>5:55</u>	5 RELINQUISHED BY: Signature Printed Name Company	DATE TIME	7 TOTAL NUMBER OF CONTAINERS <u>9</u> SAMPLE CONDITIONS SEALED <u>(YES)NO</u> RECEIVED ON ICE <u>(YES)NO</u>
	2 RECEIVED BY: <u>Rob Vineyard</u> Signature <u>Rob Vineyard</u> Printed Name <u>HERO</u> Company		DATE <u>9-17</u> TIME <u>4:52</u>		4 RECEIVED BY: <u>Cecilia G. Joaquin</u> Signature <u>Cecilia G. Joaquin</u> Printed Name <u>Superior Lat</u> Company	

SAMPLER-GOLD TRANSPORTER-PINK LAB-YELLOW GRO-WHITE AND GREEN



Geo/Resource Consultants, Inc.
 GEOLOGISTS / ENGINEERS / ENVIRONMENTAL SCIENTISTS
 2411 PRISON STREET, SAN FRANCISCO, CALIFORNIA 94133
 505 BEACH 74133

CHAIN OF CUSTODY RECORD

PROJECT NO. 1703-003
 DATE 9/16/93 PAGE 2 OF 2

PROJECT NAME U.S.P.S. OAKLAND
 Client UNITED STATES POSTAL SERVICE
 Address 1407 UNION STREET
MEMPHIS, TENNESSEE
 SAMPLERS (SIGNATURE) Brian Barber
 LABORATORY _____

ANALYSIS REQUESTED		5-DAY T.A.T.	NO. OF CONTAINERS	COMMENTS/ CONTAINER TYPE
EPA NO. 8015(m) TPH-D	EPA NO. 8020 BTXE			

SAMPLE NO.	DATE	TIME	LOCATION	EPA NO. 8015(m) TPH-D	EPA NO. 8020 BTXE	EPA NO. 8015(m) TPH-D	EPA NO.	EPA NO.	5-DAY T.A.T.	NO. OF CONTAINERS	COMMENTS/ CONTAINER TYPE
MW-3 @ 3.0' - 3.5'	9/16/93	1:05 PM	MW-3	X	X	X			X	1	SOIL (BRASS TUBE)
MW-3 @ 7.0' - 7.5'	9/16/93	1:15 AM	MW-3	X	X	X			X	1	SOIL (BRASS TUBE)
MW-3 @ 9.0' - 9.5'	9/16/93	1:20 PM	MW-3	X	X	X			X	1	SOIL (BRASS TUBE)
MW-1B @ 5'	9/17/93	2:30 PM	MW-1B	X	X	X			X	1	Soil (Brass Tube)
MW-1B @ 8'	9/17/93	2:45 PM	MW-1B	X	X	X			X	1	Soil (Brass Tube)
MW-2 @ 2.5-3.0'	9/17/93	10:30 AM	MW-2	X	X	X			X	1	Soil (Brass Tube)
MW-2 @ 7.0-7.5'	9/17/93	10:35 AM	MW-2	X	X	X			X	1	Soil (Brass Tube)
MW-2 @ 8.5-9.0'	9/17/93	10:40 AM	MW-2	X	X	X			X	1	Soil (Brass Tube)

1 RELINQUISHED BY:
 Signature Brian Barber
 Printed Name Brian Barber
 Company Geo/Resource

3 RELINQUISHED BY:
 Signature Kob Vineyard
 Printed Name Kob Vineyard
 Company AERO

5 RELINQUISHED BY:
 Signature _____
 Printed Name _____
 Company _____

8 TOTAL NUMBER OF CONTAINERS

2 RECEIVED BY:
 Signature Kob Vineyard
 Printed Name Kob Vineyard
 Company AERO

4 RECEIVED BY:
 Signature Cecilia G. Joaquin
 Printed Name Cecilia G. Joaquin
 Company Superior Lab

6 RECEIVED BY (LAB):
 Signature _____
 Printed Name _____
 Company _____

SAMPLE CONDITIONS
 SEALED YES/NO
 RECEIVED ON ICE YES/NO
 SPECIAL SHIPMENT/HANDLING OR STORAGE REQUIREMENTS:
Please fax results to Gary Floyd (415) 775-2359
 SHIPPING TICKET NO.:

SAMPLER-GOLD
TRANSPORTER-PINK
LAB-YELLOW
GRC-WHITE AND GREEN



Geo/Resource Consultants, Inc.
GEOLOGISTS / ENGINEERS / ENVIRONMENTAL SCIENTISTS
851 HARRISON STREET SAN FRANCISCO CALIFORNIA 94107

CHAIN OF CUSTODY RECORD

PROJECT NO. _____
DATE _____ PAGE _____ OF _____

PROJECT NAME U.S.P.S. Oakland
Client United States Postal Service
Address 1407 Union Street
Memphis, Tennessee
SAMPLERS (SIGNATURE) Brian Barber
LABORATORY _____

ANALYSIS REQUESTED
EPA NO. 8015 (M) TPH-D
EPA NO. 8020 BTX
EPA NO. 8015 (M) TPH
EPA NO.
EPA NO.
5-Day T.A.T
NO. OF CONTAINERS

COMMENTS/
CONTAINER TYPE

SAMPLE NO.	DATE	TIME	LOCATION	EPA NO. 8015 (M) TPH-D	EPA NO. 8020 BTX	EPA NO. 8015 (M) TPH	EPA NO.	EPA NO.	5-Day T.A.T	NO. OF CONTAINERS	COMMENTS/ CONTAINER TYPE
MW-4@3.0-3.5	9/17/93	8:55AM	MW-4	X	X	X			X		Sail (Brass Tube)
MW-4@7.0-7.5	9/17/93	9:00AM	↓	X	X	X			X		
MW-4@9.0-9.5	9/17/93	9:05AM	↓	X	X	X			X		
MW-5@3.0'	9/17/93	8:35AM	MW-5	X	X	X			X		
MW-5@ 6.5 '	9/17/93	8:40AM	↓	X	X	X			X		
MW-5@9.0'	9/17/93	8:45AM	↓	X	X	X			X		
B-9@10.5-11.0	9/16/93	10:55AM	B-9	X	X	X			X		
B-7@4.5-5.0	9/16/93	9:40AM	B-7	X	X	X			X		

1 RELINQUISHED BY: <u>Brian Barber</u> Signature <u>Brian Barber</u> Printed Name <u>Geo/Resource</u> Company	DATE	3 RELINQUISHED BY: <u>Rob Vineyard</u> Signature <u>Rob Vineyard</u> Printed Name <u>AREO</u> Company	DATE	5 RELINQUISHED BY: Signature Printed Name Company	DATE	TOTAL NUMBER OF CONTAINERS
	TIME		TIME		TIME	
9/17	9-17	5:55				
4:58PM						
2 RECEIVED BY: <u>Rob Vineyard</u> Signature <u>Rob Vineyard</u> Printed Name <u>AREO</u> Company	DATE	4 RECEIVED BY: <u>Cecilia G. Joaquin</u> Signature <u>Cecilia G. Joaquin</u> Printed Name <u>Superior Lab</u> Company	DATE	6 RECEIVED BY (LAB): Signature Printed Name Company	DATE	SAMPLE CONDITIONS SEALED <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO RECEIVED ON ICE <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO SPECIAL SHIPMENT/HANDLING OR STORAGE REQUIREMENTS: <u>Please FAX results to Gary Floyd (415) 775-2359</u> SHIPPING TICKET NO.:
	TIME		TIME		TIME	
9-17	9-17	9-17	9-17			
4:58	5:55 pm					

SAMPLER-GOLD

TRANSPORTER-PINK

LAB-YELLOW

GRC-WHITE AND GREEN



Geo/Resource Consultants, Inc.

GEOLOGISTS / ENGINEERS / ENVIRONMENTAL SCIENTISTS
851 HARRISON STREET, SAN FRANCISCO, CALIFORNIA 94109
505 Beach St 94133

CHAIN OF CUSTODY RECORD

PROJECT NO. 1708-003
DATE 9/21/93 PAGE 1 OF 1

PROJECT NAME USPS Oakland
Client USPS
Address OAKLAND, CALIFORNIA
SAMPLERS (SIGNATURE) K. Hawk
LABORATORY Superior Analytical

SAMPLE NO.	DATE	TIME	LOCATION	ANALYSIS REQUESTED					NO. OF CONTAINERS	COMMENTS/ CONTAINER TYPE		
				EPA NO. 3015	EPA NO. 3020-TPH	EPA NO. 3025-TPH-D	EPA NO.	EPA NO.			5 DAY TAT	
MW1	9/21/93	12:05	U.S.P.S. Oakland	X	X					Y	4	1 L - glass amber + 3 VOA's
MW2	9/21/93	3:55	U.S.P.S. Oakland	X	X					X	4	"
MW3	9/21/93	12:45pm	U.S.P.S. Oakland	X	X					X	4	"
MW4	9/21/93	10:35am	U.S.P.S. Oakland	X	X					X	4	"
MW5	9/21/93	5:45pm	U.S.P.S. Oakland	X	X					Y	4	"
MW6	9/21/93	—	U.S.P.S. Oakland	X	X					Y	4	"

1 RELINQUISHED BY:
Signature Andy Guadalupe
Printed Name Andy Guadalupe
Company GRC

DATE 9/22
TIME 3:30 PM
3 RELINQUISHED BY:
Signature
Printed Name
Company

DATE
TIME
5 RELINQUISHED BY:
Signature
Printed Name
Company

DATE 9/22 TOTAL NUMBER OF CONTAINERS

2 RECEIVED BY:
Signature PARM. J. BRAR
Printed Name PARM. J. BRAR
Company Aero

DATE 9/22
TIME 3:30
4 RECEIVED BY:
Signature
Printed Name
Company

DATE
TIME
6 RECEIVED BY (LAB):
Signature
Printed Name
Company

SEEALED YES/NO
RECEIVED ON ICE YES/NO
SPECIAL SHIPMENT/HANDLING OR STORAGE REQUIREMENTS:
Please fax results to GRC: 415-775-2359
SHIPPING TICKET NO.:

SAMPLER-GOLD
TRANSPORTER-PINK
LAB-YELLOW
GRC-WHITE AND GREEN