

9 January 1995

ENVIRONMENTAL SITE ASSESSMENT
AND
SUBSURFACE INVESTIGATION
FOR
PROPOSED QUIK STOP MARKET AT
126 SOUTH VASCO ROAD
LIVERMORE, CALIFORNIA

Prepared for:

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9 January 1995
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Attention: Mr. Michael J. Karvelot, Director of Environmental Affairs

SUBJECT: ENVIRONMENTAL SITE ASSESSMENT AND
SUBSURFACE INVESTIGATION FOR PROPOSED QUIK
STOP MARKET AT 126 SOUTH VASCO ROAD,
LIVERMORE, CALIFORNIA

Dear Mr. Karvelot:

Enclosed are two copies of the above-referenced report in general accordance with Attachment 1 to the Work Order between Quik Stop Markets, Inc. and Applied Geosciences Inc. dated 8 July 1994. If you have any questions regarding this report, please call me at your convenience.

Very truly yours,
APPLIED GEOSCIENCES INC.


ALEX J. GALLEGO
Project Manager

Enclosure

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1.0 INTRODUCTION

This report summarizes the results of an environmental site assessment (ESA) and a subsurface investigation conducted for the northerly 35,000 square-foot portion of lot 2 (APN #99B-8103-38), parcel map 6369, book 205, pages 29 and 30 filed with the Alameda County Department of Records on 6 January 1993. The subject property is located in the Vasco Industrial Park development at the southeastern corner of the South Vasco Road-Preston Avenue intersection (site) in northeastern Livermore, California (Figure 1). The assessment was conducted by Applied Geosciences Inc. in response to the request of Quik Stop Markets, Inc. and in general accordance with Attachment 1 of the Work Order dated 12 October 1994 between Quik Stop Markets, Inc. and Applied Geosciences Inc. The work was conducted by Applied Geosciences Inc. between 12 October 1994 and 6 January 1995 as a pre-development environmental site assessment and environmental subsurface investigation, as authorized by Mr. Michael Karvelot of Quik Stop Markets, Inc. It is anticipated that a Quik Stop Market is to be constructed at the site

2.0 OBJECTIVE

The objective of the investigation summarized in this report was to assess the likelihood that potentially hazardous materials are present at the site or in the subsurface of the site as a result of past and/or present uses of the site or site vicinity.

3.0 APPROACH

The approach used to meet the objective included the performance of an environmental site assessment ("Phase I") and a subsurface investigation ("Phase II"), which included soil and groundwater sampling and analysis, evaluation of data, and report preparation.

For the assessment, the following terms are used:

- "Site" refers to the area within the approximate boundaries of the property as detailed by Quik Stop Markets, Inc.;
- "Immediate site vicinity" refers to the properties immediately adjacent to the site that share a common boundary with the site;

- "Intermediate site vicinity" refers to the area within an approximate 0.5-mile radius of the site;
- "Site vicinity" refers to the area within an approximate one-mile radius of the site; and
- "Hazardous" is used in general accordance with its usage in Title 22, Division 4.5, Chapter 10, California Code of Regulations (CCR). The terms "hazardous materials" and "hazardous substances" are used interchangeably, and no legal distinction is implied between the two terms.

3.0 SCOPE

The scope of work to meet the objective consisted of the following three tasks:

Task 1 - Phase I Environmental Assessment

- A site reconnaissance to assess present site conditions and to look for evidence of present or past operations that use, or may have used, potentially hazardous materials was performed. Photographic documentation of site conditions was conducted.
- Discussions were held with various personnel familiar with the site.
- Selected readily available lists and records maintained by government agencies related to the presence of potentially hazardous materials on the site or in the vicinity of the site were reviewed, including:

For the site and a 1-mile radius of the site:

- U.S. Environmental Protection Agency (EPA) National Priority List (NPL);
- U.S. EPA, Resource Conservation and Recovery Information System (RCRIS), Resource Conservation and Recovery Act (RCRA) Treatment, Storage, and Disposal (TSD) facilities list;
- California Environmental Protection Agency (Cal-EPA), Department of Toxic Substances Control (DTSC), Annual Workplan (AWP) list; and

For the site and a 0.5-mile radius of the site:

- U.S. EPA Comprehensive Environmental Response, Compensation, and Liability Act List (CERCLIS);
- California Integrated Waste Management Board (CIWMB) lists of active; inactive and closed; and proposed landfills; and transfer stations and material recovery facilities;

- Regional Water Quality Control Board (RWQCB) Leaking Underground Storage Tank (LUST) list;
- RWQCB Spills, Leaks, Investigations, and Cleanups (SLIC) list or equivalent;
- RWQCB and/or State Water Resources Control Board, Solid Waste Assessment (SWAT) Program list; Test
- California Division of Oil and Gas (CADOG) Wildcat map;
- Cal-EPA, Office of Information, Hazardous Waste and Substances Sites List (HWSSL); and
- City Planning Department, methane zones.

For the site and parcels adjacent to the site:

- Cal-EPA, DTSC, Cal-sites list (formerly ASPIS);
- U.S. EPA, RCRIS, RCRA Generators list; and
- Local Fire Department listing of registered underground storage tanks (USTs).

For the site:

- U.S. EPA, Emergency Response Notification System (ERNS) list.
- A site vicinity reconnaissance was conducted to compile a list of companies/businesses in the immediate and intermediate site vicinity that use hazardous substances that in our judgement may impact the site.
- Selected readily available files were reviewed, and personal communications were held with personnel at various government agencies, including:
 - Livermore Building and Planning Departments;
 - Regional Water Quality Control Board;
 - Livermore Fire Department (hazardous materials division); and
 - Local Environmental Health Department.
- Available topographic maps, Sanborn Fire Insurance Maps (if available), historical aerial photographs, and historical business directories were reviewed to assess historical land use and chronological property development;

- A review of information regarding the hydrogeology of the site and site vicinity using selected available references was conducted;
- Readily available background data, building plans and reports prepared by others for the site and site vicinity (if available) were reviewed;
- Where appropriate, data obtained from previous reports prepared by Applied Geosciences Inc. for properties located in the site vicinity were utilized;

Task 2 - Phase II Subsurface Investigation

It is the understanding of Applied Geosciences Inc. that although preliminary information did not suggest that potentially hazardous materials were formerly used at the site, given the proposed use of the site for fueling services, and the potential degradation of groundwater quality from off-site facilities, baseline soil and groundwater quality data was desired by Quik Stop Markets, Inc. Because permanent monitoring of groundwater quality at the site did not appear to be necessary at this time, and leak detection systems would likely be used with the installation of future underground fueling equipment, cone penetrometer testing (CPT) and grab water sampling was conducted at the site. This method of soil and groundwater sampling was employed to minimize the expenses incurred. In this way, waste generated from field activities was limited to waste wash water from the washing of testing and sampling equipment.

Prior to the initiation of field activities, a site health and safety plan was prepared, subcontractors were scheduled, including underground utility locators, and boring locations were selected. The health and safety plan is an integral part of our hazardous materials practice, and is based on our understanding of the potentially hazardous materials that may be present at a site, and the safety concerns involved with personnel working at the site. It is intended to minimize the likelihood that Applied Geosciences Inc.'s personnel and subcontractors will be exposed to potentially hazardous materials and unsafe conditions during field work.

One cone penetrometer test (CPT) was conducted at the site to a depth of 60 feet below the ground surface (BGS). This depth was selected following a review of the available information on depth to groundwater at facilities in the site vicinity. The CPT data was processed on-site to provide a log of the interpreted soil stratigraphy and depth to first groundwater at the site. Following the assessment of site soil stratigraphy, soil and groundwater samples were collected utilizing the CPT rig. CPT sampling was conducted at three locations: two positioned near the south and southeast site boundary in the interpreted upgradient groundwater flow direction, and one location near the northwest site boundary in the interpreted downgradient groundwater flow direction.

It was initially anticipated that one soil sample and one groundwater sample would be collected at each sample location. However, following a reinterpretation of the CPT stratigraphic plot, samples were collected from two separate depths instead of one. Soil and groundwater samples were collected from a deep (27 to 33 feet BGS) water-bearing zone using the CPT rig, and from a shallow (12 to 15 feet BGS) water-bearing zone using hand-augered borings. Soil samples were collected from just above the soil/groundwater interface at both depths. All samples were placed in insulated coolers, and were chilled to approximately 4 degrees Celsius pending delivery

to the laboratory. Chain-of-custody (COC) procedures, including the use of COC forms, were used to document sample handling and transport from the time of sample collection to delivery to the laboratory for analysis. All sampling equipment was washed between sample locations. Upon completion of sampling, the CPT holes were filled to the surface with a cement/bentonite grout via a tremie pipe, and borings were backfilled with native soil cuttings.

Six soil samples and six groundwater samples - one from each depth and hole, were analyzed. Three additional groundwater samples were collected from the first boring after the initial laboratory results reported positive detection results. These samples were intended to serve as an additional quality check to verify that CPT decontamination procedures were properly implemented prior to the initial sampling event. All samples were analyzed for total petroleum hydrocarbons as gasoline (TPHg), benzene, toluene, ethylbenzene and xylenes (BTEX), total petroleum hydrocarbons as diesel (TPHd), and volatile organic compounds (VOCs) in general accordance with Environmental Protection Agency (EPA) Method Modified 8015 and 8020, Modified 8015, and 8010, respectively.

Task 3 - Data Evaluation and Report Preparation

- The results of the scope of work are presented in this report which contains the following:
 - A summary of the work performed including pertinent findings;
 - A table of regulatory listed facilities located within the site vicinity;
 - A discussion of identified facilities within the site vicinity that are known or suspected of having introduced potentially hazardous materials to the subsurface;
 - Figures showing the site location and regulatory listed facilities locations;
 - Site plan showing sampling locations, orientation of photographs of the site, and other pertinent information;
 - A summary of field activities performed;
 - A summary of analytical data; and
 - Conclusions regarding the likelihood that potentially hazardous materials are present at the site; and recommendations for further work, if warranted.

4.0 SITE AND SITE VICINITY RECONNAISSANCE

4.1 Site Setting

The site comprises approximately 35,000 square feet of vacant, undeveloped land flanked on the western and northern sides by a landscaped easement with sidewalk (Figure 2). The site is bounded by vacant fields to the south and east, and by Preston Avenue to the north, and by South Vasco Road to the west (Figure 2). Site boundary information, corresponding to the site study area specified by the client, was obtained from an assessors parcel map copied at the Livermore Planning Department, and from observations made during the site and site vicinity reconnaissances.

4.2 Site Reconnaissance

A site reconnaissance was conducted on 14 October 1994 by a representative of Applied Geosciences Inc. Color photographs of the site and immediate site vicinity are presented in Figures 3 and 4. At the time of the site reconnaissance, the site was observed to be occupied by a vacant, undeveloped lot (Figure 3). The site was covered with tall, dry weeds. The soil at the site appeared to have been disced sometime in the past. Scattered pieces of concrete, asphalt, and grass cuttings were present across the site. Refuse in the form of small paper, plastic, and glass wrappers, cups, and bottles were noted on the property. Numerous animal burrows were noted on the site property and in nearby fields. Potentially hazardous materials were not observed to be used at the site at the time of the site reconnaissance.

The site's borders on the north and west sides were observed to be landscaped with grass, trees, and a winding sidewalk. The landscaped areas were irrigated by an underground sprinkler system. The landscaped area also was observed to contain a number of utility markers and vaults. Labeled utilities were installed for PG&E, Pacific Bell, the City of Livermore, and cable television. No high-voltage transformers were observed to be present on-site, and no high-power transmission lines were observed to cross the site.

4.3 Site Vicinity Reconnaissance

A site vicinity reconnaissance was conducted by personnel from Applied Geosciences Inc. on 14 October 1994. The site vicinity was observed to consist of light industrial and commercial businesses with a large percentage of the surrounding land lying vacant and undeveloped. The site was bounded on the east and south by vacant, undeveloped land similar to the site. A portion of the vacant field adjacent to the site to the south was being utilized as an unpaved parking area for large tractor-trailer rigs (Figure 3). A Jack-in-the-Box fast food drive-up and associated paved asphalt parking lot (Figure 4) were present farther south at the intersection of South Vasco Road and Industrial Way. A structure, occupied by the Harland Company, was located across from the Jack-in-the-Box restaurant to the south on Industrial Way, and was observed to be placarded for potentially hazardous materials such as flammable liquids and oxidizers. Two large warehouse structures present beyond the vacant field east of the site were observed to be occupied by Heritage Paper and Pacific Coast Seed companies.

On the north and west sides, the site was bordered by Preston Avenue and South Vasco Road, respectively. Facilities located across Preston Avenue included a Ryder Rental facility at the northeastern corner of the South Vasco Road-Preston Avenue intersection, a fenced storage yard at the intersection of Preston Avenue and South Front Road, and a Cal-Trans Maintenance yard adjacent to the storage yard to the east. The Caltrans yard was observed to contain numerous 55-gallon drums, some of which had attached dispensing pumps. A fuel island with two fuel pumps, and nearby vehicle maintenance garages were observed in the Caltrans yard. A fenced gasoline and diesel service station (Figure 4) was present to the west of the site at the southwest corner of the South Vasco Road-Preston Avenue intersection (No. 3, Figure 1). The station appeared to have recently had new fuel pumps installed, but was not yet in operation at the time of the site reconnaissance. The gas station was bordered to the south by a vacant field. A

number of vehicle and equipment yard facilities, several of which were observed to have small above-ground fuel storage tanks (ASTs), were present to the west-southwest approximately 0.25-mile from the site.

A large abandoned steel mill was observed to be present approximately 0.125-mile southwest of the site (No. 1, Figure 1). Numerous large, plastic-covered piles of soil were observed within the fenced boundaries of the steel mill yard. Approximately 1.0-mile southeast of the site, on South Vasco Road, were the R&D facilities of Lawrence Livermore National Laboratories (LLNL) (Nos. 5 and 6, Figure 1). Several large, open fields surrounding the LLNL facilities were observed to contain rows of groundwater monitoring well stovepipe casings.

4.4 Hydrogeologic Setting

The site is located within the Livermore Valley, in the Diablo Range, in the San Francisco Bay Region of the Coast Range Geomorphic Province of California. The Coast Range Geomorphic Province is characterized by northwest-trending ridges and valleys which are underlain by strongly deformed sedimentary and metamorphic rocks. However, the Livermore Valley topographic and structural depression is oriented at an approximate right angle, trending east-west, to the Coast Ranges within which it lies (Carpenter and others, 1984). The area of the site has been dominated by sediment deposition within Recent geologic time. The site has been mapped as being underlain by Holocene alluvium described as unconsolidated deposits of clay, silt, sand, and gravel. The Livermore Formation underlying the unconsolidated alluvium has been described as massive beds of rounded gravel cemented within a sandy clay matrix (CDWR, 1974). Land surface in the immediate site vicinity has been graded nearly level, with no evidence of significant runoff to or from the site at the time of the site reconnaissance.

The site is reported to be located within the Spring Hydrogeologic Subbasin, which is bounded by three faults: Tesla, Carnegie, and an unnamed fault. The remaining side of the fault-bounded subbasin was formed by water-bearing alluvium within an upland drainage divide, and by water-bearing sediments that onlap low permeability materials. Therefore, groundwater is reported to occur in both the valley fill alluvium and in the deeper Livermore Formation. Beneath the site, groundwater is reportedly of poor quality, with respect to drinking water standards, and is somewhat salty (CDWR, 1974). Water quality in the area has been further degraded by a number of unauthorized releases of potentially hazardous materials from nearby facilities.

According to earlier research conducted by Applied Geosciences Inc. in the area, an Alameda Health Care Services (AHCS) preliminary underground storage tank information survey reported that the estimated depth to groundwater ranged from 30 to 50 feet BGS at the nearby Caltrans facility, once listed on the HWSSL (Cortese) list. This facility is located at 6153 South Front Road, approximately 800 feet northeast of the site. A report prepared for the Livermore-Dublin Disposal Company, now occupied by Oakland Scavenger Company (No. 2, Figure 1), located approximately 1,600 feet northeast of the site, reported that groundwater was encountered at 10 to 11 feet BGS, and flowed in a northwesterly direction under a gradient of 0.005 feet per foot (ft/ft) in December 1990 (Hydro-Search, Inc., 1991). A report prepared for Capitol Metals Inc., (No. 1, Figure 1), located approximately 1,540 feet southwest of the site, reported that groundwater was at about 20 feet BGS at that facility.

Soils encountered at the site during the subsurface investigation indicated that the shallow soils at the site consisted of silt and clay, with isolated zones of sandy clay and sandy silt. Soil samples collected from three boring locations at depths of 12 to 13, and 24 feet BGS, were observed to be damp, stiff, clayey silt with moderate plasticity. Some dark-colored, isolated, well-rounded coarse-grained clasts were present within the clayey silt matrix sampled at 24 feet BGS.

Two zones of interpreted higher-permeability sediments were identified by the CPT: a shallow zone extending from a depth of approximately 12.5 to 15.5 feet BGS, and a deeper zone extending from a depth of approximately 30.5 to 31.5 feet BGS. Groundwater was sampled from both water-bearing zones encountered in each of the three sample locations at depths of 12 to 15 feet, and 27 to 33 feet BGS.

5.0 HISTORICAL REVIEW

5.1 Permits

According to personnel at the Livermore Building Department (LBD) and the Livermore Planning Department (LPD), the LBD and LPD do not maintain files for the site, and no structures were known to have historically occupied the site. Additionally, personnel at the LPD were not aware of any methane zones in the intermediate site vicinity

5.2 Sanborn Fire Insurance Maps

A search for Sanborn Fire Insurance Maps for the site and immediate site vicinity was conducted through Sanborn Mapping and Geographic Information Service (Sanborn) of Pelham, New York. Sanborn reported that no map coverage for the site or immediate site vicinity was available.

5.3 Aerial Photographs

Readily available aerial photographs for the purpose of assessing the historical land use and development of the site and site vicinity were reviewed at Pacific Aerial Survey of Oakland, California. The earliest available aerial photographs for the site dated from 1957. The flight dates of the photographs provided for the review were as follows:

- 05-22-57 scale 1:12000
- 07-23-63 scale 1:36000
- 05-15-69 scale 1:12000
- 08-24-73 scale 1:12000
- 05-05-78 scale 1:12000
- 04-27-82 scale 1:12000
- 09-09-86 scale 1:12000
- 07-23-90 scale 1:12000
- 05-08-92 scale 1:12000
- 06-02-94 scale 1:36000

The following discussion provides a chronology of apparent usage of the site and site vicinity developed from our interpretation of the aerial photographs.

1957

Based on an interpretation of selected aerial photographs taken in 1957, the site was observed to be a vacant field covered with weeds or grass, except for a small white rectangular object the size of a small trailer in the northwest corner of the property. An apparently unpaved road was present along the northern border of the site, where Preston Avenue exists today. The lots to the immediate north, northeast, south and southwest were vacant fields. Farther to the southeast, a lot occupied by an orderly arrangement of approximately twenty-two white rectangular buildings, was observed. The structures appeared to include four small residential structures, a water tower, three long rectangular structures, and several small sheds. David Clemens, an Assistant Planning Director for the city of Livermore, reviewed the aerial photographs and suggested that the twenty-two buildings had been used as housing for immigrant farm laborers. What appeared to be a paved road was observed along the western border of the site where South Vasco Road currently exists. To the west of the site, across the road, there appeared to be a four-structure farm-residence complex with open farm land surrounding it.

1963

Based on an interpretation of selected aerial photographs taken in 1963, the site had remained essentially unchanged. However, the site no longer had the light-colored lines radiating outward from the center. The site vicinity had remained essentially unchanged as well, with the exception of a recently constructed large industrial structure south of the site where the Harland Company now exists.

1969

Based on an interpretation of selected aerial photographs taken in 1969, the site had not changed appreciably. On the site, to the north of the white rectangular object previously cited, were two unidentifiable small, dark-colored objects. The section of road where Preston Avenue currently exists appeared to have been paved. Three of the twenty-two rectangular buildings to the southeast of the site had been removed, and the remainder of the facility appeared to be overgrown with vegetation. The lots northeast of the previously mentioned industrial structure, located to the south of the site, had been modified to include additional structures and storage yards. Work appeared to be underway on the Vasco Road/Highway 580 overpass northwest of the site. South Front Road, trending parallel to Highway 580, was observed to have been constructed to the north of the site. Other developments observed in the site vicinity included additional buildings, parking lots, and storage yards.

1973

Based on an interpretation of selected aerial photographs taken in 1973, the site had not changed appreciably. The two dark-colored objects in the northwest corner, previously observed in aerial photographs from 1969, were no longer present. The industrial building to the south had been enlarged. The farm-residence historically located to the west of the site had apparently been replaced by two structures located in the center of the lot, interpreted to be a fuel service station facility. The "cloverleaf" at the Vasco Road/Highway 580 junction had been completed.

1978

Based on an interpretation of selected aerial photographs taken in 1978, the site had not changed appreciably. However, the white rectangular structure in the northwest corner of the site was no longer present. The interpreted fuel service station west of the site had numerous vehicles parked around it in an apparently paved lot. The paved section of Preston Avenue had been extended eastward.

1982

Based on an interpretation of selected aerial photographs taken in 1982, the site had remained essentially unchanged. A white rectangular building with a vacant paved parking lot was observed to be present across Preston Avenue north of the site. Two storage yards containing several parked trucks were present to the northeast of the site. The interpreted fuel service station west of the site appeared to have four heavily used driveways.

1986, 1990, and 1992

Based on an interpretation of selected aerial photographs taken in 1986, the northern and western borders of the site appeared to be occupied by a "wavy" white strip surrounded by a wider, darker-colored area interpreted to be the sidewalk and landscaped strip present on-site today. Two large, white, rectangular buildings with loading docks and parked trucks were present to the east of the site. To the southeast of the site, across present day Industrial Way, additional buildings and parking lots had been constructed. Storage yards were present to the southwest of the site. Parked trucks were observed northwest of the site, across South Vasco Road. Additional minor developments associated with light industrial/warehouse use were noted in the surrounding area.

1994

Based on an interpretation of selected aerial photographs taken in 1994, the site appeared to be essentially as it is today. The lot to the southeast of the site, where the twenty-two rectangular buildings were historically present, was observed to have a small white rectangular building, with associated parking lots. This structure is interpreted to be the Jack-in-the-Box drive-up restaurant currently present south of the site.

Obvious indicators of potential sources of hazardous waste from land use, such as apparent aboveground tanks, ponds, pits, sumps, landfills, and heavy-industry or oil-field-related developments, were not observed at the site.

6.0 AGENCY LIST REVIEW

To conduct some parts of the regulatory review for this environmental assessment, the services of Environmental Support Services (ESS, 1994) were used, and their report was provided to Applied Geosciences Inc. Appendix B presents the report that was provided by ESS, which provided the basis for most of the following agency information. A summary table of the agencies reviewed (Table 1), and a table of the facilities that were identified by the agency database review (Table 2) are provided in this report.

In the following sections, only facilities that are located in the immediate site vicinity, or those that are located upgradient (but are not necessarily located near the site) are discussed. These facilities were selected based on the assumption that potentially hazardous materials released to the subsurface generally do not migrate laterally within the soil for substantial distances, but can migrate in the groundwater in a generally downgradient flow direction; however, there are limitations to this interpretation.

6.1 Federal NPL Superfund Sites: Distance Searched - 1.0 mile

Federal NPL Superfund sites are facilities that have been assigned the highest priority for cleanup by EPA pursuant to the EPA Hazard Ranking System. According to these records, one NPL facility, Lawrence Livermore National Laboratories (LLNL) (Nos. 5 and 6, Figure 1), is located within the search area at a distance of approximately 5,280 feet southeast of the site in the general upgradient groundwater flow direction (ESS, 1994).

The LLNL facility encompasses approximately 800 acres and has been used by the federal government for a variety of military and non-military research projects since 1952. The known releases at the facility include: a groundwater contaminant plume of trichloroethylene (TCE), dichloroethene (DCE), and perchloroethylene (PCE) extending offsite; a petroleum hydrocarbon spill in the southeast corner extending offsite to the southeast; and soil and groundwater contaminated with TCE in the southeast corner (DHS, 1989). The offsite migration of a TCE-impacted groundwater plume in the southwest corner of the facility has resulted in the known contamination of two private wells, and further migration could reportedly result in human exposure through the ingestion of contaminated water.

According to previous research in the area by Applied Geosciences Inc., and from information and figures provided by Mr. Vince Christian, a LLNL case handler at the RWQCB, several large plumes of VOC-impacted groundwater have been characterized as migrating in a general westerly direction away from the LLNL property. The plume was reported to be at least a 0.5-mile distant from the site in 1992. According to isoconcentration contour maps provided by Mr. Christian, levels of total volatile organic compounds (VOCs) in groundwater, exceeding the California maximum contaminant levels (MCLs), have been mapped as extending to Brisa Street near the intersection of South Vasco Road approximately 0.5-miles south-southeast of the site.

6.2 Federal CERCLIS List: Distance Searched - 0.5 mile

The CERCLIS list is an EPA-maintained database of potential hazardous waste sites that have come to the attention of EPA, which discovers these sites through citizen reports, routine inspections of hazardous waste generators and treatment, storage, and disposal facilities, and reporting requirements. Sites on the CERCLIS list are not necessarily hazardous waste sites, but rather, sites that EPA plans to investigate in the future or has already investigated. According to EPA, no CERCLIS facilities are located within the search area (ESS, 1994).

6.3 EPA RCRA TSD Facilities List: Distance Searched - 1.0 mile

The RCRA TSD list is a database maintained by EPA for facilities at which treatment, storage and/or disposal of hazardous waste takes place, as defined and regulated by RCRA. According to the database, only one RCRA TSD facility, the LLNL facility previously cited, is listed within the search area (ESS, 1994).

6.4 EPA RCRA Generators List: Distance Searched - Site and Immediate Site Vicinity

The RCRA generators list is a database maintained by EPA of those facilities, entities, or persons that generate hazardous waste as defined and regulated by RCRA. According to information contained in the RCRA generators list, there are no RCRA Generator facilities located within the search area (ESS, 1994).

6.5 EPA ERNS List: Distance Searched - Site Only

The ERNS list is the EPA list of reported CERCLA hazardous substance releases or spills in quantities greater than the reportable quantity, as maintained at the National Response Center. Notification requirements for such releases or spills are codified in 40 CFR Parts 302 and 355. According to the ERNS list, the site was not listed (ESS, 1994).

6.6 Cal-EPA Department of Toxic Substances Control State Superfund List, AWP: Distance Searched - 1.0 mile

In California there is a State Superfund program, in addition to the Federal Superfund program, which is administered by Cal-EPA. According to these records, there is one AWP facility located within the search area -- the LLNL facility previously cited (ESS, 1994).

6.7 Cal-Sites: Distance Searched - Site and Immediate Site Vicinity

The Cal-Sites (formerly ASPIS) is a Cal-EPA-maintained database of active and inactive cases of site evaluation and/or site survey programs. This database is used as a tracking system for present or former sites by Cal-EPA. According to the information, there are no Cal-Sites facilities located within the search area (ESS, 1994).

6.8 Landfills: Distance Searched - 0.5 mile

CIWMB maintains a list of active and inactive landfills and transfer stations in California. Generally, CIWMB learns of locations of landfills through permit applications and from local enforcement agencies. The CIWMB list indicated that there are no landfills, transfer stations or proposed or special facilities located within the search area (ESS, 1994).

6.9 State Water Resources Control Board SWAT List

The site is currently not listed with the State Water Resources Control Board (SWRCB) SWAT Program list (1989). There are 37 ranked SWAT facilities located in Alameda County. The locations of these facilities were not readily available from the published list, the SWRCB, or from the RWQCB. However, many of these facilities are named according to the street or area for which they are located. Additionally, Applied Geosciences Inc. reviewed the computer database supplied by the SWRCB, which includes more detailed locations for some of the SWAT facilities. Based on a review of this information, it is the judgment of Applied Geosciences Inc. that the site is not listed as a SWAT facility and that none of the ranked facilities are located within a 0.5 mile radius of the site.

6.10 Permitted USTs: Distance Searched - Site and Immediate Site Vicinity

USTs can be sources of hazardous materials that could potentially impact the soil around the tanks and the underlying groundwater if leakage of the tank or associated piping were to occur. Information concerning permitted USTs in the immediate site vicinity was obtained from the State Wide Environmental Evaluation and Planning System (SWEEPS) database. According to the SWEEPS database of registered USTs, only one facility was listed as having registered USTs within the search area (ESS, 1994). The Texaco fuel service station (No. 3, Figure 1) located in a crossgradient groundwater flow direction approximately 100 feet west of the site at 115 South Vasco Road, was listed as having four registered USTs (ESS, 1994).

6.11 Unauthorized Releases: Distance Searched - 0.5 mile

Information contained in the RWQCB's LUST and SLIC lists, and the Cal-EPA HWSSL list reported that there are three facilities with reported unauthorized releases of potentially hazardous materials located within a 0.5-mile radius of the site (Table 2 and Figure 1) (ESS, 1994). Only those facilities judged to have a reasonable likelihood of impacting the site are discussed below. According to the records, two LUST facilities are located within the search area; neither of which are located in the immediate site vicinity. The nearest listed facility of concern with respect to the site is the Capitol Metals Company, Inc. facility located at 261 South Vasco Road, approximately 1,540 feet southwest of the site in an approximate crossgradient groundwater flow direction from the site. The RWQCB file for this facility was reviewed and is discussed below.

6.11.1 Capitol Metals Company (No. 1, Figure 1)

The Capitol Metals Company facility has had at least seven USTs removed from the facility, including three 10,000-gallon diesel fuel tanks, two unleaded gasoline tanks with capacities of 10,000 and 1,200-gallons, one 6,000-gallon bunker oil tank, and one 10,000-gallon tank for storing Chevron #225 paint thinner. According to a report, the tanks had been out of service since 1988, and were removed from the facility in 1990 (RSI, 1990). The facility was reported to be out of operation and vacant in 1990. At the time of removal, evidence of leakage was observed at several of the tank locations. According to a laboratory analysis of soil samples collected from the tank excavations, the maximum reported concentrations were 2,900 milligrams per kilogram (mg/kg) TPHg, 13 mg/kg benzene, 140 mg/kg toluene, 52 mg/kg ethylbenzene, and 270 mg/kg total xylenes in a tank excavation near the center of the facility property. TPHd was reported as high as 740 mg/kg, and 1,700 mg/kg of Oil & Grease were reported in the soil collected from the southwest corner of the facility's property.

The Alameda County Environmental Health Department (ACEHD) was reported to have requested that further investigations be conducted at the facility to determine the lateral and vertical extent of contaminant migration. According to the RSI report, they anticipated that the extent of contaminant migration would be limited, based on the depth to water (20 feet BGS) in relation to the bottom of the tank excavations and their field observations. No additional information regarding groundwater investigations at the facility was available in the files reviewed at the RWQCB in Oakland. However, according to previous research in the area by Applied Geosciences Inc., a report that was historically available in the RWQCB file indicated that concentrations of benzene (53 parts per million [ppm]), toluene (20 ppm), ethylbenzene (2.3 ppm), xylenes (9.7 ppm), TPHg (60 ppm) and TPHd (21,000 ppm) were reported in water samples collected and analyzed from one of the wells located just downgradient of the aforementioned central tank cluster (RSI, 1992). The Applied Geosciences Inc. report also discussed the contents of an ACHCS letter that stated that simply continuing to monitor the three wells installed at the facility was considered to be insufficient to assess the extent of soil and groundwater contamination. Consequently, the ACHCS was demanding a more aggressive and diligent approach to protect the groundwater at the facility from becoming further degraded. A remediation workplan (Excel, 1992) that proposed the decommissioning of existing wells at the facility, and the further excavation of the "contaminated" soils to depths below the groundwater level, was reported to have been in the file. However, there was no reported information in the file regarding the actual implementation of the workplan.

According to a recent report, the facility once contained a settling pond and a concrete oil-water separator sump installed approximately 11 feet below-grade (SES, 1994) near the southwestern corner of the property. The report stated that the laboratory analysis of soil samples collected from the bunker oil tank and sump excavation indicated that soils in the area of the excavation had been only minimally impacted. A nearby groundwater monitoring well was reported to have had no petroleum hydrocarbons detected in six quarterly sampling events conducted from January 1991 to May 1992, with the exception of December 1991, when benzene and xylenes were detected at 0.003 parts per million (ppm) each. The report also stated that Ms. Eva Chu of the ACEHD had stated that no further remedial or investigative action would be required in that specific work area.

6.12 Oil and Gas: Distance Searched - 0.5 mile

According to oil and gas records, no oil and/or gas production activities have been reported to have occurred at the site and/or within the area searched (ESS, 1994).

6.13 Alameda County Environmental Health Department (ACEHD): Distance Searched - Site

According to Mr. Kevin Tinsley of the ACEHD, his agency does not maintain a file for the site.

6.14 Livermore Fire Department (LFD): Distance Searched -Site

According to Ms. Danielle Stefani of the LFD, her department does not maintain a file for the site. Ms. Stefani stated that the LFD file for the gasoline service station at 115 South Vasco Road, across from the site to the west, did not contain any information regarding soil or groundwater investigations -- past or present. She further indicated that the ACEHD had recently been given oversight of such investigative concerns.

According to previous research in the area by Applied Geosciences Inc., the files at the LFD once contained information regarding the removal and excavation of a waste oil tank at the former Texaco station. This action was reportedly performed without ACHCS approval. Prior research regarding the former Texaco facility also indicated that documents previously maintained at the LFD included information regarding the unpermitted storage of a pulled tank, and the absence of an EPA hazardous materials generator facility identification number.

7.0 REPORTS REVIEW

No previous reports pertaining to the site or facilities in the site vicinity were made available to Applied Geosciences Inc. by the client. However, documentation of earlier research conducted by Applied Geosciences Inc. in the area was reviewed for this report. The research indicated that there was at least one listed source of potentially hazardous materials in the nearby crossgradient groundwater flow direction from the site within the intermediate site vicinity: Capitol Metals Company (No. 1, Figure 1).

8.0 SUBSURFACE INVESTIGATION

8.1 Pre-Field Activities and Health and Safety Plan

The Health and Safety Plan is an integral part of our hazardous materials practice. It is based on our understanding of the potentially hazardous materials that may be present at the site and safety concerns involving personnel working at the site. The plan is intended to minimize the likelihood of exposure to potentially hazardous materials and unsafe conditions by Applied Geosciences Inc.'s personnel and subcontractors during field work. Copies of the Health and Safety Plan were distributed to field personnel prior to the commencement of field activities.

Underground service alert (USA) was notified of the locations of the proposed intrusive activities. The field investigation was performed after using Cruz Brothers, a private underground utilities locating service, to evaluate the locations of underground utilities in the immediate vicinity of the proposed soil boring locations.

8.2 Field Investigation

Hydraulically-powered cone penetrometer test (CPT) soil penetrations were advanced at three locations onsite -- two near the site boundaries in the interpreted upgradient groundwater flow direction (south and southeast), and one near the site boundary in the interpreted downgradient groundwater flow direction (northwest). The CPT soil penetration and sampling locations were determined using information obtained from reports prepared by others for listed facilities in the site vicinity. The applicable information included depth to water and groundwater flow directions. From the reported data, groundwater was anticipated to be at approximately 20 to 30 feet BGS, and the general groundwater flow direction was reported to be toward the northwest.

The subsurface CPT services were provided by The Earth Technology Corporation (TETC) of Huntington Beach, California, using a fully-enclosed, 20-ton truck-mounted mobile CPT unit equipped with a cone penetrometer and friction sleeve designed to interpret soil behavior type and water content by electronically measuring cone pore pressure, pore pressure ratio, tip resistance, and friction ratio. Once the data was obtained, it was plotted on a graphical strip-chart printout in the field. The final plot provided by TETC is presented in Appendix C of this report. The CPT stratigraphic data was generated from exploratory sample location B1, advanced to a depth of 60 feet BGS. The subsurface stratigraphy in the two other sampling locations was extrapolated from data obtained from sample location B1. Soil samples were collected using rods equipped with a special sampler tip designed to be released by the operator to allow soil to be forced into stainless steel sample tubes inside the rod. Groundwater samples were collected using a push-in PVC piezometer (PIPP) utilizing slotted and blank 1-inch casings. The approximate sampling locations and designations are presented in Figure 2.

In situ CPT testing to a depth of 60 feet BGS provided a continuous data log of the subsurface lithology in boring B1. This data was used to select the locations of potential water-bearing zones. In addition to the printout log, the CPT operator stated that higher-permeability zones could often be "sensed" by the "feel" of the rod resistance, and from monitoring changes in the hydraulic pressure gauge. Consequently, two distinct zones of high tip resistance with accompanying low pore pressure were identified during the CPT test; one at approximately 12.5 to 15.5 feet BGS; the other at approximately 30.5 to 31.5 feet BGS. These zones were interpreted to be zones of "higher"-permeability. The 12.5 to 15.5 higher-permeability zone was initially considered to be too shallow, given the depth to water reported in several reports prepared for facilities in the intermediate site vicinity (i.e. approximately 20 to 30 feet BGS), and was therefore considered to be perched groundwater of local extent. Therefore, initial groundwater samples were collected from the deeper higher-permeability zone located between 30.5 to 31.5 feet BGS. Groundwater "grab" samples were collected using a 3/4-inch teflon bailer lowered into a PIPP installed within the steel rod casing, and exposed to the water-bearing sediments at the pre-selected depth.

Soil samples were to be collected from above the interpreted soil-water interface. However, an initial attempt to collect soil samples from a depth of 28.5 feet failed, apparently due to the saturated of the soil (i.e. the wet sample "flowed" out of the end of the sample tubes during rod extraction). A second attempt at 26.5 feet BGS at a location one foot away from the first sampling locale also failed. This depth appeared to be drier than the first, but the cohesive nature of the silty clay caused the sample to "pull" out of the sample tube end, despite the fact that a stainless steel "catcher" was installed at the end of the sampling rod. A third attempt was made at a sample location one foot away from the second sampling locale. Only partial samples, approximately 30 to 40% of a sample tube, were successfully obtained from each of the CPT penetrations at a depth of 24 feet BGS.

Subsequent additional evaluation of the CPT data by Applied Geosciences Inc. and TETC suggested that the shallow 12.5 to 15.5 foot BGS higher-permeability zone may actually have been water-bearing and laterally extensive, despite the hydrologic data from surrounding facilities suggesting a greater depth to groundwater. A boring was therefore subsequently advanced to a depth of approximately 13 feet using a hand auger at a location adjacent to boring B1 for the purpose of determining if the shallow zone identified by the CPT plot was actually a significant water-bearing zone. Groundwater was encountered within a silty fine-grained sand in this exploratory boring. Moreover, the groundwater in boring B1 was subsequently measured at a depth of approximately 11.5 feet BGS. This information prompted the addition of two borings near the two remaining CPT penetrations. Soil samples, and groundwater "grab" samples were collected from the three shallow borings and were submitted for laboratory analysis. The soil in each boring was sampled at approximately 12 to 13 feet BGS, within the soil-water interface zone, and then the boring was advanced to approximately 14.5 to 15 feet BGS for the purpose of groundwater sampling.

Following evaluation of the initial analytical results for the groundwater samples collected from the shallow and deeper water-bearing zones (the deeper samples were reported to contain petroleum hydrocarbons; while shallow samples did not), and from discussions with TETC, additional sampling of the deeper zone was performed to verify the initial results. Groundwater samples were subsequently collected from a new location positioned adjacent to sampling location B1. A different CPT rig and crew was utilized for the resampling event. Rigorous decontamination procedures were stressed, and two equipment rinse blanks were collected for analysis prior to the beginning of sampling: one collected from a random rod rinse; another from a rinse of the PIPP and PIPP-containing rod. The groundwater samples were collected from the same deep higher-permeability zone initially sampled at 27 to 32 feet BGS. Thus, sampling was performed to verify the results of the laboratory analysis, and to evaluate whether the petroleum hydrocarbons reported in earlier samples may have been introduced into the sample by the CPT and/or PIPP equipment.

Chain-of-custody procedures, including the use of chain-of-custody forms, were used to document sample handling and transport from the time of sample collection to the time of delivery to the laboratory for analysis. Procedures used to advance borings, CPTs, PIPPs, and to collect soil samples are summarized in Appendix D.

8.5 Soil Results

Laboratory analytical results for both the shallow (12 to 13 feet BGS) and deep (24 feet BGS) soil samples analyzed did not report any compound at or above the detection limit for the analytical methods used. Analytical results for soil samples are presented in Table 3.

8.6 Groundwater Results

Laboratory analytical results for the shallow (12.5 to 15 feet BGS) groundwater samples analyzed did not report any compound at or above the reporting limit for the analytical methods used.

Laboratory analytical results for the trip blank, and equipment rinse blanks analyzed did not report any compound at or above the reporting limits for the analytical methods used.

Laboratory analytical results for the deep (27 to 33 feet BGS) groundwater samples analyzed reported several compounds at or above the reporting limit for the analytical methods used:

- BTEX constituents were reported in the initial groundwater samples collected from the deeper water-bearing zone (27 to 32 feet BGS) at CPT penetration location B1. The reported concentrations were: benzene (0.5 $\mu\text{g/L}$), toluene (0.6 $\mu\text{g/L}$), ethylbenzene (1.2 $\mu\text{g/L}$), and total xylenes (3.3 $\mu\text{g/L}$). BTEX constituents were not reported in groundwater collected from the deeper water-bearing zone at sample locations B2 and B3.
- Upon receipt of the initial laboratory analysis results which had identified the presence of BTEX constituents in the deeper water-bearing zone, and the lack of BTEX in the shallow water-bearing zone, groundwater from the deeper water-bearing zone at CPT location B1 was resampled for quality control purposes. According to the second laboratory analysis, toluene, at a concentration of 1.4 $\mu\text{g/L}$, and total xylenes, at a concentration of 2.7 $\mu\text{g/L}$, were both reported, with benzene and ethyl benzene reported to be below the reporting limit of 0.5 $\mu\text{g/L}$.
- TPHd was also reported in the initial groundwater samples collected from the deeper water-bearing zone from all three of the CPT penetrations. The reported concentrations were 210, 100, and 89 $\mu\text{g/L}$ in samples collected from locations B1, B2, and B3, respectively, indicating that the concentrations apparently diminish somewhat in the downgradient groundwater flow direction. However, according to Superior Analytical Laboratory report, the reported concentrations of TPHd did not match the identifiable diesel chromatograph pattern. Moreover, they reported that the hydrocarbons reported as diesel were actually "within the chromatogram range for hydrocarbons heavier than diesel."
- TPHd was reported at a concentration of 330 $\mu\text{g/L}$ in the samples collected from the deeper water-bearing zone of B1 as part of the resampling for quality control purposes.

9.0 DISCUSSION

9.1 On-Site Potential Sources

According to the agency records and historical aerial photographs reviewed for the site, the site is, and has been, vacant, undeveloped land covered with grass-type vegetation since at least 1957. The site may have been utilized for livestock grazing at one time, but records that would indicate that the site had been utilized for agricultural purposes were not encountered at any of the agencies for this assessment. However, even if the site was historically used for agricultural purposes, it is our judgment that there is a low likelihood that agriculturally related chemicals are present at significant concentrations in the shallow subsurface beneath the site as a result of prior agricultural activities. Additionally, it is our judgment that there is a low likelihood that the soil at the site would be considered a waste, and therefore a hazardous waste, unless it was removed from the site. Moreover, based on our understanding that the site is to be largely capped by buildings, landscaping, and asphalt, it is judged that there would be a low likelihood of human exposure to agriculturally related chemicals, if they were present, based on the expected site usage. Information pertaining to likelihood statements is presented in Appendix F.

Potentially hazardous substances were not noted to be used at the site during the site reconnaissance. The site appeared to be generally undisturbed, except for past discing of the soil, and was relatively clean and devoid of large piles of debris or soil. Although scattered rubbish such as paper, cans, and bottles were present, there was no evidence that dumping or disposal of potentially hazardous materials had occurred at the site. Based on this information, it is our judgment that there is a low likelihood that historical or current activities conducted at the site have adversely impacted the site.

A subsurface investigation involving soil and groundwater sampling was also conducted at the site. Soil penetration, boring, and sampling locations were selected based on historical information reviewed regarding facilities in the site vicinity, and from an interpretation of groundwater flow direction based on local topography. Soil samples were collected from a depth of approximately 12 to 13 feet, and 24 feet BGS, and groundwater samples were collected from a screened interval of approximately 27 to 33 feet, and an unscreened interval of approximately 12.5 to 15 feet BGS in each of three boring locations. Two of the sample locations were placed in the interpreted upgradient groundwater flow direction (B1 and B2), and one was located in the interpreted downgradient groundwater flow direction (B3).

The laboratory analyses of the shallow (12 to 13 feet BGS) and deep (24 feet BGS) soil samples, and shallow (12.5 to 15 feet BGS) groundwater samples did not report any constituents at concentrations greater than the reporting limits for the analytical methods used. Based on the laboratory results, it is the judgment of Applied Geosciences Inc. that there is a low likelihood that the shallow soil and shallow, possibly perched, groundwater at the site has been impacted by the constituents analyzed for.

BTEX constituents were reported in the initial, and subsequent, groundwater samples collected from the deeper water-bearing zone (27 to 32 feet BGS) at CPT penetration location B1. TPHd was also reported in the initial groundwater samples collected from the deeper water-bearing zone in all three of the CPT penetrations, as well as in the second sampling of CPT penetration location B1. Concentrations of TPHd decreased in a downgradient direction.

Based on the laboratory analyses, the shallow soils, shallow groundwater, and deeper soils have not been impacted by any of the constituents analyzed for. However, according to the laboratory analyses, the deeper groundwater from each sample location has been impacted by TPHd, with the highest concentrations present in the upgradient sample location, and the deeper groundwater from the upgradient sample location has been impacted by BTEX constituents as well. Therefore, it is the judgment of Applied Geosciences Inc. that there is a moderate likelihood that the potentially hazardous materials identified in the deeper groundwater have likely migrated onto the site from an off-site source.

9.2 Off-Site Potential Sources

There was one listed off-site potential sources of potentially hazardous materials located within a 0.5-mile radius of the site in the general crossgradient groundwater flow direction which has a reasonable potential of impacting the subsurface of the site. This is the former Capitol Metals facility.

Based on a review of the available records for the Capitol Metals facility, the concentrations of petroleum hydrocarbons reported at the facility are considered to be high, and the vertical and lateral extent of impacted groundwater at the facility has not yet been adequately characterized. Therefore, it is the judgment of Applied Geosciences Inc. that although this facility is located in the crossgradient groundwater flow direction from the site, there is a moderate likelihood that the release of petroleum hydrocarbons reported at the Capitol Metals facility has impacted the subsurface of the site.

The judgments and conclusions described in this report pertain to the conditions judged to be present or applicable at the time the work was performed. Future conditions may differ from those described herein and this report is not intended for use in future evaluations of the site unless an update is conducted by a consultant familiar with environmental assessments. Use of this report is provided to Quik Stop Markets, Inc. for their exclusive use and shall be subject to the terms and conditions in the applicable contract between Quik Stop Markets, Inc. and Applied Geosciences Inc. Any third party use, of this report shall also be subject to the terms and conditions governing the work in the contract between Quik Stop Markets, Inc. and Applied Geosciences Inc. Any unauthorized release or misuse of this report shall be without risk or liability to Applied Geosciences Inc.

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10.0 CONCLUSION

Based on the data presented in this report, current regulatory guidelines, and the judgements of Applied Geosciences Inc., the following conclusions have been made:

- There is a low likelihood that agriculturally related chemicals are present in significant concentrations in the shallow subsurface of the site as a result of prior agricultural activities.
- There is a low likelihood that historical or current activities conducted at the site have adversely impacted the site.
- There is a low likelihood that the shallow soil and shallow, possibly perched, groundwater at the site has been impacted by the constituents analyzed for.
- There is a moderate likelihood that the potentially hazardous materials identified in the deeper groundwater have likely migrated onto the site from an off-site source.
- There is a moderate likelihood that the release of petroleum hydrocarbons reported at the Capitol Metals facility has impacted the subsurface of the site.

11.0 RECOMMENDATIONS

Based on the information obtained during this assessment, current regulatory guidelines, and the judgment of Applied Geosciences Inc., the following recommendation has been made:

- Have periodic communications with RWQCB regarding the status of the former Capitol Metals Company facility, and possible petroleum hydrocarbon-impacted groundwater at that facility.
- Permanent groundwater monitoring wells could be considered for the 27 to 33 foot BGS zone as a means of establishing consistent, repeatable groundwater quality data prior to the development of the site for its proposed use.

12.0 REFERENCES

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USGS, See United States Geological Survey.

**TABLE 1
REGULATORY AGENCY DATABASES REVIEWED**

AGENCY ¹	DATABASE ²	DATE	RADIUS
US EPA	NPL	July 1994	One mile
US EPA	CERCLIS	July 1994	One-half mile
US EPA	ERNS	May 1994	Site
US EPA	RCRIS TSD	June 1993	One mile
US EPA	RCRIS Generators	June 1993	100 feet
CAL EPA	AWP	December 1993	One mile
DTSC	Calsites	January 1994	100 feet
OPR	HWSSL	July 1992	One-half mile
CIWMB	SWIS	March of 1993	One-half mile
RWQCB	LUST	October 1994	One-half mile
RWQCB	SLIC	May 1994	One-half mile
SWRCB	SWEEPS	May 1993	100 feet
MUNGER	MAP W-21	1994	One-half mile

NOTES:

Data for 126 S. Vasco Road/6155 Preston Avenue, Livermore, California, Applied Geosciences Inc. Project No. A943062.

¹US EPA = United States Environmental Protection Agency

CAL EPA = California Environmental Protection Agency

DTSC = Department of Toxic Substances Control

OPR = Governor's Office of Planning and Research

CIWMB = California Integrated Waste Management Board

RWQCB = Regional Water Quality Control Board

SWRCB = State Water Resources Control Board

MUNGER = Munger Map Book

²NPL = National Priority List

CERC = CERCLIS: Comprehensive Environmental Response, Compensation, and Liability Information System

ERNS = Emergency Response Notification System

RCRST = RCRIS TSD: Resource Conservation and Recovery Information System/Treatment, Storage, and Disposal Facilities

RCRSG = RCRIS: Hazardous Waste Generators

AWP = Active Annual Workplan

Calsites = CAL EPA Sites

Haz Waste = Hazardous Waste and Substances Sites List (HW55L)

SWIS = CIWMB California Waste Management Board's - Solid Waste Information System

1) Transfer Stations & Material Recovery Facilities

2) Proposed Facilities

3) Closed & Inactive Landfills

4) Active Landfills

LUST = Leaking Underground Storage Tanks List

SLIC = Spills, Leaks, Investigations and Clean-ups

SWEEPS = California State Wide Environmental Evaluation and Planning System

**TABLE 2
FACILITIES IDENTIFIED DURING
REGULATORY AGENCY DATABASE REVIEW¹**

Summary Table

Sites	LUST	SLIC	SWIS	SWEET	HAZ. WASTE	AWP	*CAL SITES	RCRST	RCRSG	CERC	NPL	ERNS
1. Capitol Metals Co., Inc. 261 Vasco Rd S Livermore, CA Distance to site: 1540'	X				X							
2. Oakland Scavenger 6175 Front Rd S Livermore, CA Distance to site: 1600'	X				X							
3. Texaco 115 S Vasco Rd Livermore, CA 94550 Distance to site: 100'				X								
4. Bay Cal Equipment, Inc. 5605 Front Rd W Livermore, CA Distance to site: 2500'					X							
5. Lawrence Livermore Lab 7000 East Ave. Livermore, CA 94550 Distance to site: 5280'						X		X			X	
6. Lawrence Livermore Nat Lab Corral Hollow Rd Livermore, CA 94550 Distance to site: 5280'											X	

NOTES:

Data for 126 S. Vasco Road/6155 Preston Avenue, Livermore, California, Applied Geosciences Inc. Project No. A943062.

¹ Source is Environmental Support Services report dated 11 November 1994 provided in Appendix B.

² For definitions of the abbreviations above, see Table 1.

TABLE 3

PROPOSED QUIK STOP MARKET
126 S. VASCO ROAD
LIVERMORE, CALIFORNIA

SOIL SAMPLING RESULTS

TPHg, BTEX and TPHd
(results in milligrams per kilogram [mg/kg])

SAMPLE ID.	LOCATION	DEPTH (ft)	DATE	TPHg	BENZENE	TOLUENE	ETHYLBENZENE	XYLENES	TPHd
B1-13	B1	13	10 NOV 94	ND < 1	ND < .005	ND < .005	ND < .005	ND < .005	ND < 10
B2-12	B2	12	10 NOV 94	ND < 1	ND < .005	ND < .005	ND < .005	ND < .005	ND < 10
B3-12	B3	12	10 NOV 94	ND < 1	ND < .005	ND < .005	ND < .005	ND < .005	ND < 10
B1-24	B1	24	27 OCT 94	ND < 1	ND < .005	ND < .005	ND < .005	ND < .005	ND < 10
B2-24	B2	24	27 OCT 94	ND < 1	ND < .005	ND < .005	ND < .005	ND < .005	ND < 10
B3-24	B3	24	27 OCT 94	ND < 1	ND < .005	ND < .005	ND < .005	ND < .005	ND < 10

Notes:

ND < 1 = Not Detected above the numerical detection limit given in milligrams per kilogram (mg/kg).

(ft) = Sample depth reported in approximate feet below the ground surface (BGS).

TPHg = Total Petroleum Hydrocarbons as gasoline, analyzed by GC/FID following sample purge and trap by EPA SW-846 Method 5030.

BTEX = Benzene, Toluene, Ethylbenzene, and total Xylenes analyzed by modified EPA Method 8020 following sample purge and trap by EPA SW-846 Method 8020.

TPHd = Total Petroleum Hydrocarbons as diesel analyzed by EPA Method 8015 Modified.

GROUNDWATER SAMPLING RESULTS

TPHg, BTEX and TPHd
(results in micrograms per liter [u/L])

SAMPLE ID.	LOCATION	DEPTH (ft)	DATE	TPHg	BENZENE	TOLUENE	ETHYLBENZENE	XYLENES	TPHd
B1-2W	B1	12.5 -15	10 NOV 94	ND < 50	ND < .5	ND < .5	ND < .5	ND < .5	ND < 50
B2-2W	B2	12.5 -15	10 NOV 94	ND < 50	ND < .5	ND < .5	ND < .5	ND < .5	ND < 50
B3-2W	B3	12.5 -15	10 NOV 94	ND < 50	ND < .5	ND < .5	ND < .5	ND < .5	ND < 50
TB1-1W	TRIP BLANK	N/A	27 OCT 94	ND < 50	ND < .5	ND < .5	ND < .5	ND < .5	ND < 50
B1-1W	B1	27 - 32	27 OCT 94	ND < 50	0.5	0.6	1.2	3.3	* 210
B2-1W	B2	28 - 33	27 OCT 94	ND < 50	ND < .5	ND < .5	ND < .5	ND < .5	* 100
B3-1W	B3	28 - 33	27 OCT 94	ND < 50	ND < .5	ND < .5	ND < .5	ND < .5	* 89
ROD RINSE	EQUIP. BLANK	N/A	14 DEC 94	ND < 50	ND < .5	ND < .5	ND < .5	ND < .5	ND < 50
PIPP RINSE	EQUIP. BLANK	N/A	14 DEC 94	ND < 50	ND < .5	ND < .5	ND < .5	ND < .5	ND < 50
B1-30-2	B1	27 - 32	14 DEC 94	ND < 50	ND < .5	1.4	ND < .5	2.7	330
MCL ->					1		680	1750	

Notes:

ND < 1 = Not Detected above the numerical detection limit given in micrograms per liter (u/L).

* = The laboratory reported that the concentrations reported as diesel for samples MW1,2,3-1W did not match the diesel chromatogram pattern, but instead showed a pattern distinctive of hydrocarbons heavier than diesel.

TPHg = Total Petroleum Hydrocarbons as gasoline analyzed by GC/FID following sample purge and trap by EPA SW-846 Method 5030.

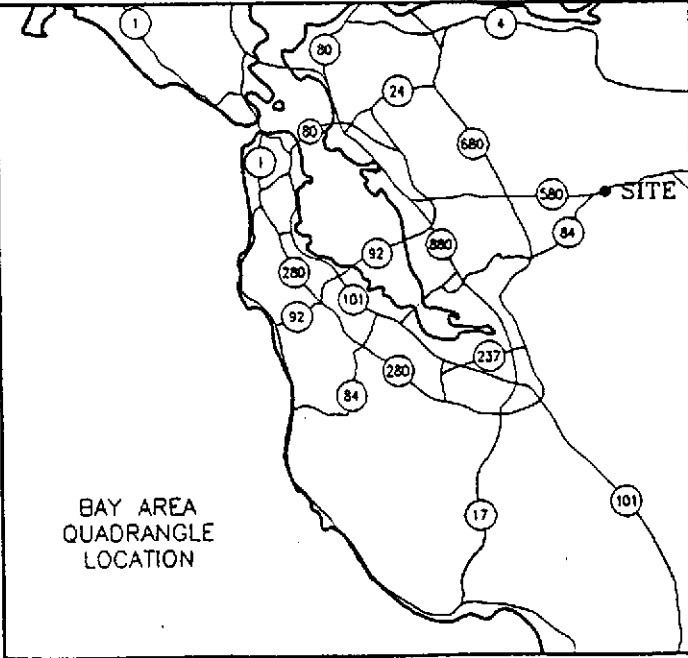
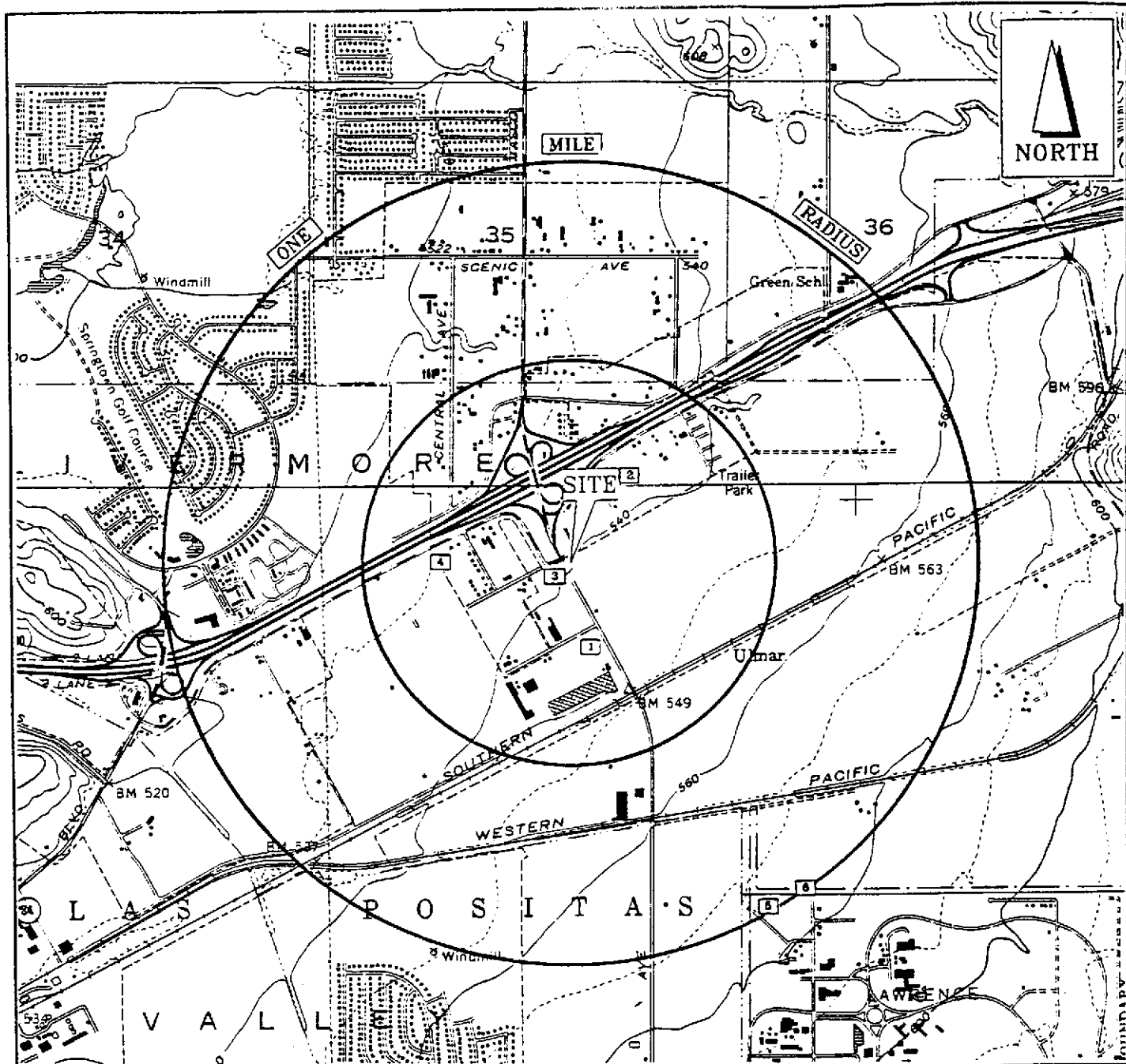
BTEX = Benzene, Toluene, Ethylbenzene, and total Xylenes analyzed by modified EPA Method 8020 following sample purge and trap by EPA SW-846 Method 5030.

TPHd = Total Petroleum Hydrocarbons as diesel; analyzed by EPA Method 8015 Modified.

TB1-1W was a trip blank sample used for QA/QC purposes.

Rod Rinse and PIPP Rinse blanks were equipment rinse samples analyzed for QA/QC purposes.

MCL = Maximum Contaminant Level, Department of Environmental Health, Title 22, Article 4, Primary standard-inorganic chemical and physical quality, Register 92, No. 28; 7 October 1992.



EXPLANATION:

I NUMBERED SITES ARE REFERRED TO IN TABLE 2.

NOTES:

- 1) BASE MAP FROM USGS ALTAMONT QUADRANGLE, 7.5-MINUTE SERIES (TOPOGRAPHIC) 1953, PHOTOREVISED 1981.
- 2) ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.

0 1/4 1/2 1

SCALE, MILES

APPLIED GEOSCIENCES INC.
Environmental Consultants

SITE LOCATION MAP

PROJECT NO. A943062 FIGURE 1



NORTH

Preston Avenue

Landscaped Area

Vacant, Undeveloped Field

South Vasco Road

Vacant Lot

Vacant Lot

B3

B2

B1

EXPLANATION

● B1 Designation and approximate location of sample locales.

--- Approximate location of site boundary

0 35



Scale, Feet

NOTES: 1) Base map from assessor's parcel map and observations made during the site reconnaissance.

2) All locations and dimensions are approximate.

APPLIED GEOSCIENCES INC.

Environmental Consultants



SITE PLOT PLAN

PROJECT NO. L943062

FIGURE 2



FIGURE 3A. VIEW TO NORTHEAST FROM THE SOUTHWEST CORNER OF THE SITE.
THE SITE IS LOCATED IN THE LEFT FOREGROUND.



FIGURE 3B. VIEW TO THE EAST FROM THE SOUTHWESTERN CORNER OF THE SITE
SHOWING TRUCKS USING UNPAVED PORTION OF ADJACENT PROPERTY.





FIGURE 4A. VIEW TO THE SOUTH FROM NEAR THE SOUTHWEST CORNER OF THE SITE SHOWING THE JACK-IN-THE-BOX RESTAURANT AND PARKING LOT.



FIGURE 4B. VIEW TO THE WEST FROM THE SOUTHWESTERN CORNER OF THE SITE SHOWING FORMER TEXACO FUEL STATION ON VASCO ROAD.



APPENDIX A

SANBORN MAP COMPANY CORRESPONDENCE

APPENDIX B

**REPORT PROVIDED BY
ENVIRONMENTAL SUPPORT SERVICES (ESS)**

Environmental Support Services

Environmental Research & Due Diligence Compliance



October 19, 1994

Project Name: Livermore

Applied Geosciences, Inc.
1641 North First Street, Suite 235
San Jose, CA 95112

Attention: Nicole Fourcade

Dear Ms. Fourcade,

Attached is the Environmental (Hazardous/Toxic Waste) Disclosure Report for the 126 S. Vasco Rd./6155 Preston Ave. ("Livermore") site located in Livermore, California. Environmental Support Services ("ESS") received the request on October 17, 1994 (See Appendix A). Should you have any questions regarding the disclosure, please call.

Sincerely,

A handwritten signature in black ink, appearing to read 'Suzan J. Hazard'.

Suzan J. Hazard
Project Manager

Governor's Office of Planning and Research

ESS reviewed the July, 1992 Edition of the Hazardous Waste and Substances Sites List Pursuant to Government Code Sec. 65962.5 database and found no listing of the Livermore site, but did find three other sites located within a surrounding one half mile radius (See Appendix D).

Active Annual Workplan (AWP)

ESS reviewed the Active Annual Workplan (AWP) database dated December of 1993 and found no listing of the Livermore site, but did find one other site located within a surrounding one mile radius (See Appendix E).

Calsites Database

ESS reviewed the Calsites database dated January of 1994 and found no listing of the Livermore site nor any other sites located within a surrounding 100 foot radius.

1994 Munger Map Book

ESS reviewed Map W-21 from the 1994 Munger Map Book to determine if there were any abandoned or producing oil/gas wells located within a surrounding one half mile radius of the Livermore site. Since one or more wells were found within that radius, ESS photocopied a portion of Map W-21 indicating their locations (See Appendix F).

EPA RCRIS Database - TSD Facilities

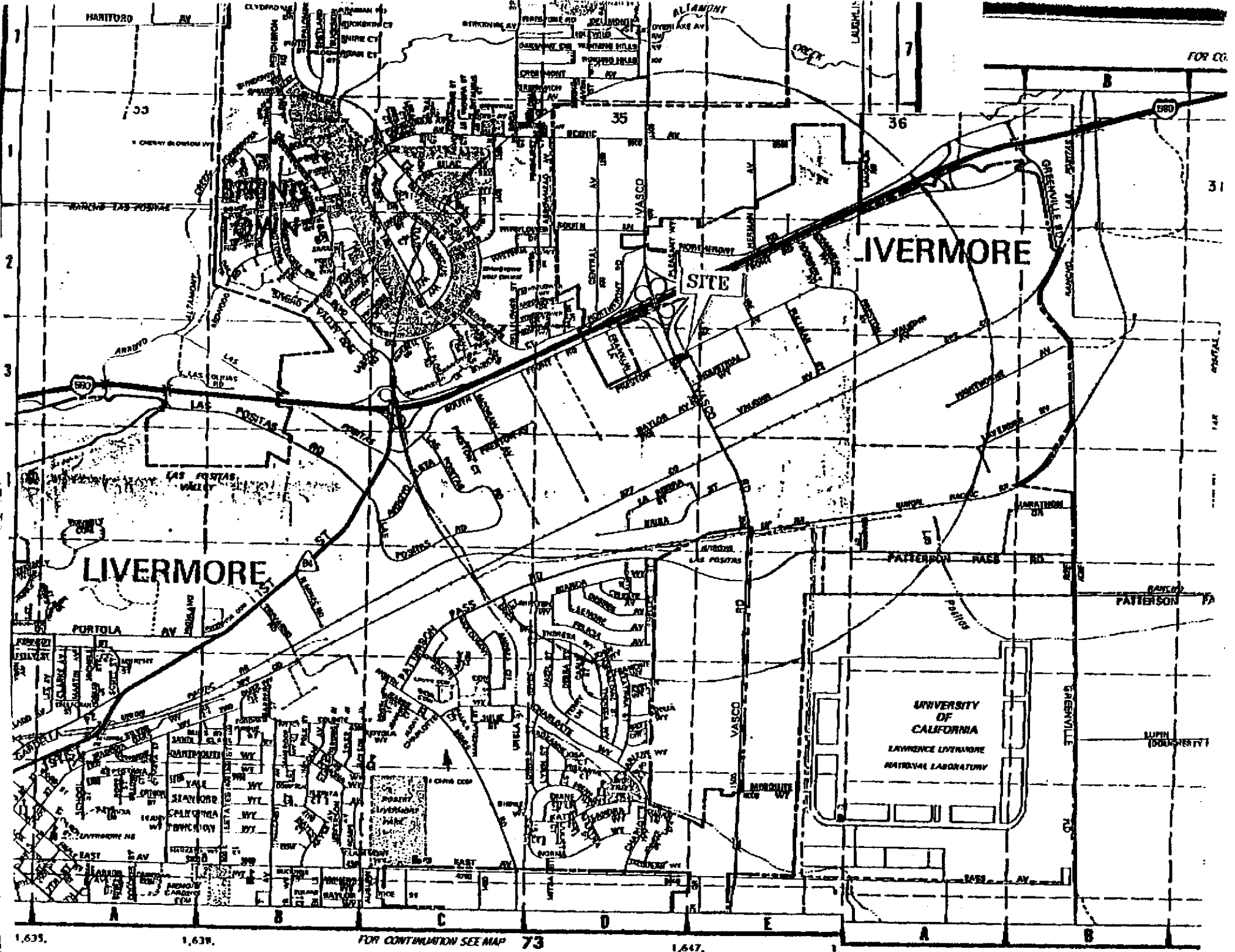
ESS reviewed the list of Treatment, Storage and Disposal (TSD) Facilities found in the Resource Conservation and Recovery Information System (RCRIS) database dated June of 1993 and found no listing of the Livermore site, but did find one other site located within a surrounding one mile radius (See Appendix G).

EPA RCRIS Database - Generators

ESS reviewed the list of Hazardous Waste Generators (GEN) found in the Resource Conservation and Recovery Information System (RCRIS) database dated June of 1993 and found no listing of the Livermore site nor any other sites located within a surrounding 100 foot radius.

Appendix A

**Environmental (Hazardous/Toxic Waste) Disclosure
Order Form**



1,635.

1,638.

FOR CONTINUATION SEE MAP 73

1,647.

FOR

**Sites Encountered Within a One Half Mile Radius of the
Livermore Site as Listed in the
Regional Water Quality Control Board's
Leaky Underground Storage Tank List**

1. Capitol Metals Company, Inc.
261 Vasco Rd S
Livermore, CA
Alameda

Regional Board: San Francisco Bay
Case Number: 01-0277

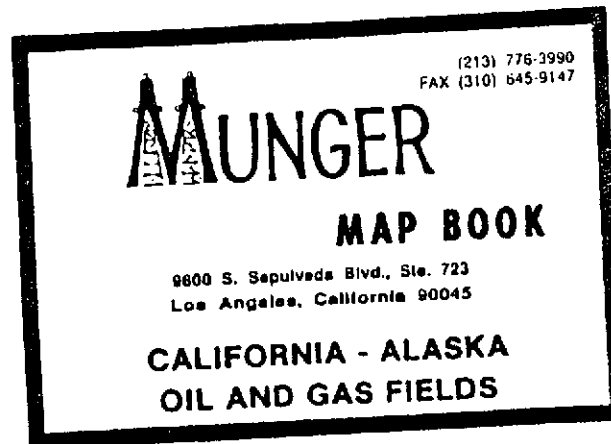
2. Oakland Scavenger
6175 Front Rd S
Livermore, CA
Alameda

Regional Board: San Francisco Bay
Case Number: 01-1081
Status: 5C - Pollution Characterization

**Sites Encountered Within a 100 Foot Radius of the
Livermore Site as Listed in the
California State Wide Environmental
Evaluation and Planning System (SWEEPS) Data**

1. Texaco
115 S Vasco Rd
Livermore, CA 94550
Alameda

Name Type: 1
Jurisdiction: 1000 -
Number of Tanks: 4
Business Description: Gas Station
Manager: Donald Goff
Care Of:
Phone Number:



THIRTY-EIGHTH EDITION, JUNE 1994

AVERILL H. MUNGER, Editor

PRICE \$100.00 plus tax and shipping

Legend

- Corehole
- Uncompleted drilling or location
- ◊ Uncompleted idle
- ◆ Uncompleted abandoned
- Completed producing
- ◆ Completed idle
- ◆ Completed abandoned
- ◆ Water Source
- ◆ Abandoned-dry converted to water source
- ◆ Abandoned oil converted to water source
- ◆ Gas
- ◆ Gas abandoned
- ◆ Water disposal
- ◆ Water flood
- ◆ Fire flood or air injection
- ◆ Gas injection
- ◆ Steam injection
- ◆ Observation
- Deep rights or unlied well
- ◆ Idle gas
- ◆ Directional hole
- ◆ Expandable well

Acknowledgments

Data on wells from State of California, Department of Natural Resources - Division of Oil and Gas, Oil Operators, Munger Ologram and other journals. Base and boundaries after Division of Oil and Gas, U.S.G.S., and Oil Operators.

Advertising Layouts Don Desfor
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**Sites Encountered Within a One Half Mile Radius of the
Livermore Site as Listed in the
July, 1992 Edition of the Hazardous
Waste and Substances Sites List**

1. Capitol Metals Company, Inc.
261 Vasco Rd S
Livermore, CA
Alameda

Capitol Metals Company, Inc. LTANK
2. Bay Cal Equipment, Inc.
5605 Front Rd W
Livermore, CA
Alameda

Bay Cal Equipment, Inc. LTANK
3. Oakland Scavenger
6175 Front Rd S
Livermore, CA 94550
Alameda

Oakland Scavenger LTANK

**Sites Encountered Within a One Mile Radius of the
Livermore Site as Listed in the
Active Annual Workplan (AWP) Listing dated December of 1993**

1. Lawrence Livermore National Lab
7000 East Avenue
Livermore, CA 94550
Alameda

IDNUM: 1730095
SITE TYPE: FED - Federal

Appendix G

Taken from the RCRIS Database of
Treatment, Storage and Disposal Facilities

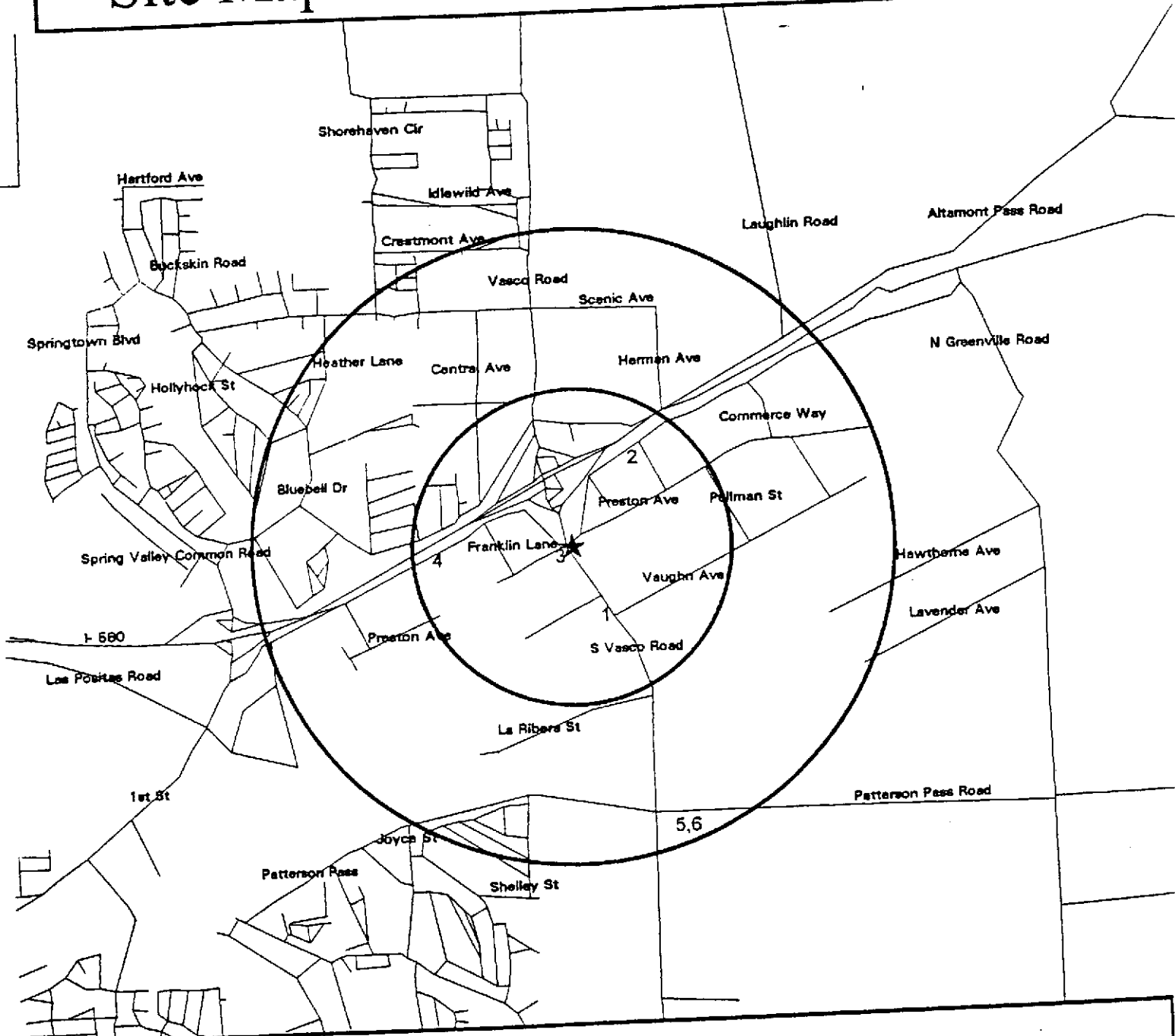
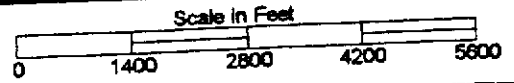
Appendix H

Taken from the EPA NPL Listing dated July of 1994

Appendix I

Summary Table and Location Map

Site Map



★ SWC of Preston Ave. & Vasco Rd.
Livermore, CA

Prepared For:
Applied Geosciences, Inc.



APPENDIX C

**REPORT PROVIDED BY
THE EARTH TECHNOLOGY CORPORATION**

November 7, 1994

Applied Geosciences
1641 N. First Street
Suite 235
San Jose, CA 95112

Project Name: Vasco Road-Livermore, CA

Project No.: A943062

Enclosed please find copies of the CPT data for the above referenced project along with a copy of the corresponding invoice.

Soil behavior type interpretations are based on the following reference:

Douglas, B.J. and R.S. Olsen (1981), "Soil Classification Using Electronic Penetrometer," Proceedings, Cone Penetration Testing Experience, Session Sponsored by the Geotechnical Engineering Division, ASCE National Convention, St. Louis, October, pp. 209-227.

Telephone

714.842.7011

Facsimile

714.842.3735

Limitations

Earth Tech (The Earth Technology Corporation) presents the attached data in accordance with ASTM Standard D3441-86 and generally accepted Cone Penetration Test practices and standards.

The attached data further relates only the specific project location discussed in the data.

When the measured cone tip resistance values are low (i.e. tip resistance of about 20 tsf or less), judgement may be required to verify the CPT soil behavior interpretations.

The "CLIENT" may distribute this data or excerpts therefrom provided the following statement is prominently displayed and included with the distribution:

"Neither CLIENT nor Earth Tech make any guarantee or warranty, express or implied, regarding this data. THE USE OF THIS INFORMATION SHALL BE AT THE USER'S SOLE RISK REGARDLESS OF ANY FAULT OR NEGLIGENCE OF THE CLIENT OR EARTH TECH."

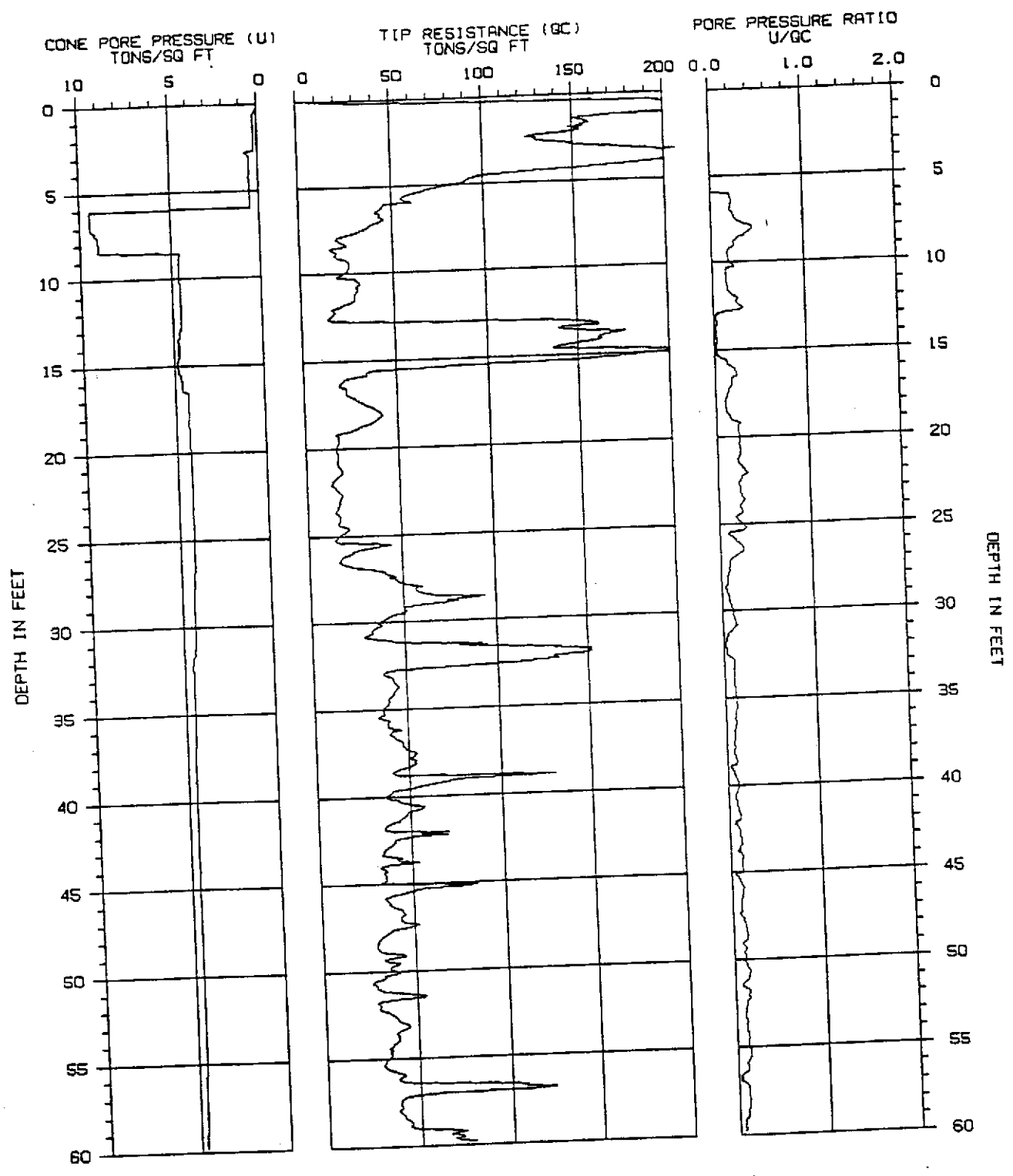
Please feel free to call me if you have any questions.

Very truly yours,

EARTH TECH
CPT Testing Services Group

Dick Carlton

Dick Carlton
Project Administrator



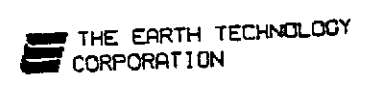
TIP RESISTANCE NOT CORRECTED FOR END AREA EFFECT

CONE PENETRATION TEST

SOUNDING NUMBER: B-1

PROJECT NAME : AGI/VASCO RD.
 PROJECT NUMBER : 95-381-05401

CONE/RIG : 471/T-2
 DATE/TIME : 10-27-94 09:22



SOUNDING : B-1

DEPTH (ft)	TIP RESISTANCE (tsf)	NORMALIZED TIP RESISTANCE (tsf)	FRICTION RATIO (%)	CONE PORE PRESSURE (tsf)	SOIL BEHAVIOR TYPE
20.67	17.1	16.1	3.39	4.23	CLAYEY SILT to SILTY CLAY
21.16	18.3	17.0	3.18	4.23	SANDY SILT to CLAYEY SILT
21.65	16.9	15.6	2.85	4.22	SANDY SILT to CLAYEY SILT
22.15	12.9	11.8	2.64	4.19	SANDY SILT to CLAYEY SILT
22.64	18.5	16.8	3.18	4.20	SANDY SILT to CLAYEY SILT
23.13	18.0	16.1	2.34	4.20	SANDY SILT to CLAYEY SILT
23.62	15.1	13.4	3.04	4.20	SANDY SILT to CLAYEY SILT
24.11	17.6	15.4	3.64	4.21	CLAYEY SILT to SILTY CLAY
24.61	22.6	19.6	2.48	4.22	SANDY SILT to CLAYEY SILT
25.10	15.6	13.5	2.69	4.21	SANDY SILT to CLAYEY SILT
25.59	43.8	37.3	2.65	4.24	SANDY SILT to CLAYEY SILT
26.08	22.6	19.0	1.86	4.23	SANDY SILT to CLAYEY SILT
26.57	16.0	13.4	2.00	4.23	SANDY SILT to CLAYEY SILT
27.07	36.9	30.5	2.87	4.26	SANDY SILT to CLAYEY SILT
27.56	45.7	37.5	3.72	4.28	SANDY SILT to CLAYEY SILT
28.05	57.0	46.3	3.70	4.30	SANDY SILT to CLAYEY SILT
28.54	68.4	55.0	5.60	4.33	*SANDY CLAY to SILTY CLAY
29.04	61.5	49.0	4.73	4.33	*SANDY CLAY to SILTY CLAY
29.53	47.7	37.6	3.69	4.33	SANDY SILT to CLAYEY SILT
30.02	35.7	27.9	3.42	4.33	SANDY SILT to CLAYEY SILT
30.51	32.5	25.2	2.46	4.33	SANDY SILT to CLAYEY SILT
31.00	36.4	28.0	2.99	4.33	*SANDY CLAY to SILTY CLAY
31.50	89.6	68.6	5.08	4.36	*SANDY CLAY to SILTY CLAY
31.99	152.0	115.9	3.01	4.50	*SILTY SAND to CLAYEY SAND
32.48	109.2	82.9	3.16	4.51	SANDY SILT to CLAYEY SILT
32.97	37.8	28.6	2.46	4.49	SANDY SILT to CLAYEY SILT
33.46	43.3	32.6	3.07	4.50	SANDY SILT to CLAYEY SILT
33.96	43.7	32.8	2.91	4.51	SANDY SILT to CLAYEY SILT
34.45	40.0	30.0	3.40	4.50	SANDY SILT to CLAYEY SILT
34.94	36.6	27.2	3.25	4.51	SANDY SILT to CLAYEY SILT
35.43	34.1	25.3	3.08	4.50	SANDY SILT to CLAYEY SILT
35.93	39.5	29.2	2.92	4.51	SANDY SILT to CLAYEY SILT
36.42	40.2	29.6	3.24	4.51	SANDY SILT to CLAYEY SILT
36.91	46.7	34.2	3.15	4.52	SANDY SILT to CLAYEY SILT
37.40	49.4	36.1	3.44	4.52	SANDY SILT to CLAYEY SILT
37.89	51.5	37.5	3.07	4.52	SANDY SILT to CLAYEY SILT
38.39	48.3	35.0	3.79	4.52	SANDY SILT to CLAYEY SILT
38.88	94.7	68.4	5.06	4.58	*SANDY CLAY to SILTY CLAY
39.37	59.1	42.6	4.35	4.52	*SANDY CLAY to SILTY CLAY
39.86	39.8	28.5	2.67	4.52	SANDY SILT to CLAYEY SILT
40.35	44.6	31.9	2.85	4.53	SANDY SILT to CLAYEY SILT
40.85	49.4	35.2	3.77	4.53	SANDY SILT to CLAYEY SILT
41.34	44.4	31.5	3.85	4.53	CLAYEY SILT to SILTY CLAY
41.83	36.0	25.4	3.17	4.53	SANDY SILT to CLAYEY SILT
42.32	52.9	37.2	3.61	4.52	SANDY SILT to CLAYEY SILT
42.81	38.9	27.3	3.34	4.52	SANDY SILT to CLAYEY SILT
43.31	34.1	23.9	3.57	4.52	CLAYEY SILT to SILTY CLAY
43.80	53.4	37.2	2.38	4.54	SANDY SILT to CLAYEY SILT
44.29	36.1	25.1	2.72	4.52	SANDY SILT to CLAYEY SILT
44.78	35.7	24.7	3.08	4.52	SANDY SILT to CLAYEY SILT

*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
 ASSUMED TOTAL UNIT WT = 110 PCF
 ASSUMED DEPTH OF WATER TABLE = 31.0 FT

Earth Tech
18411 Gothard Street
Unit F
Huntington Beach, CA 92648

Earth Tech
2239 Old Middlefield Road
Unit F
Mountain View, CA 94043

PIPP GROUNDWATER SAMPLER

The Push-In Plastic Piezometer (PIPP) groundwater sampling probe is pushed into the ground using the CPT rig. The PIPP is a hardened steel cylindrical probe (approximately 2-inch O.D.) with a disposable cone shaped stainless steel drive tip. The probe is used to skim floating product by means of a PVC screen and small diameter PVC or Teflon bailer.

To skim floating product samples with the PIPP system, a 5-foot long cylindrical PVC screen is attached to the top end of the disposable stainless steel drive tip, and inserted into the sampler barrel. The drive tip is slipped into the bottom end of the hard steel barrel, sealing the screen inside the barrel with an O-ring. Once the PIPP is pushed into the ground to desired sampling depth, the drive tip is detached from the barrel by retracting the push pipes approximately four feet, exposing most of the PVC screen, which remains attached to the drive tip. Liquids then flow into the screen and are sampled by lowering a small diameter (0.66 or 0.75 inch) PVC or Teflon bailer down the push pipes from the surface. When sampling is complete, the PVC screen is pulled out with the PIPP and push pipes leaving the stainless steel drive tip in place. Prior to removing the PIPP and push pipes, flexible plastic tubing is inserted to the bottom of the hole. The push pipes and PIPP are then removed from the ground leaving the plastic tubing in place. A slurry of bentonite and/or cement is pumped through the plastic tubing as it is slowly being removed from the hole, sealing the probe hole from the bottom up.

After the PIPP is removed from the ground, it is disassembled and subjected to a three-stage decontamination procedure before reassembly. The first stage consists of washing and scrubbing using a lab detergent solution. The components of the probe are then rinsed twice in deionized water. The PVC screen and stainless steel tip are replaced after each use.

APPENDIX D
SUMMARY OF FIELD PROCEDURES

SUMMARY OF FIELD PROCEDURES

The procedures used for the advancement of the CPT, and the collection of soil, groundwater, and equipment rinse blanks are presented below:

- An Hnu System organic vapor meter (OVM) with a 10.2 eV probe, was used to monitor the air for VOCs during drilling. The monitoring involved "sniffing" the annulus of the rods at selected depth intervals, and measuring the concentration of VOCs, if any, in the soil samples collected. VOCs are monitored to obtain data regarding the possible presence of potentially hazardous materials in the subsurface, and to minimize the likelihood that field personnel will be exposed to potentially harmful concentrations of hazardous materials.
- All non-disposable/dedicated equipment utilized during field activities was washed prior to the commencement of work, and between sample locations to minimize the likelihood of cross-contamination between sampling locations.
- Decontamination wastewater generated during the field investigation was stored on-site in two labeled 55-gallon drums. Disposal of the purgewater in accordance with current regulatory guidelines, based on the laboratory results, is the responsibility of the client.
- A single CPT penetration was advanced by The Earth Technology Corporation of Huntington Beach, California, using a fully-enclosed, 20-ton truck-mounted mobile CPT unit at sample location B1. The CPT penetration was advanced to a depth of 60 feet below the ground surface (BGS) to provide a continuous data log of the subsurface lithology. The downhole CPT equipment utilized a cone penetrometer and friction sleeve designed to electronically measure cone pore pressure, pore pressure ratio, tip resistance, friction ratio, and soil behavior type. Once the data was obtained from the first penetration location, designated B1, it was then plotted on a graphical strip-chart printout. This data was used to determine the locations of potential water-bearing zones, and was used to characterize the two nearby penetration locations designated B2 and B3. Soil samples were collected at approximately 24 feet BGS within the interpreted water-soil interface above the deeper water-bearing zone. Groundwater samples were collected from the deeper water-bearing zone identified at approximately 30.5 to 31.5 feet BGS. Groundwater samples were collected by CPT from each boring using a piezocone penetration push-in PVC piezometer (PIPP) that utilized slotted and blank 1-inch PVC casings. The "grab" samples were collected using a 3/4-inch teflon bailer lowered into PIPPs installed within the steel rod casing exposed to the water-bearing material at the pre-selected depth.
- Three additional borings were advanced by hand auger method at locations adjacent to the three initial CPT borings. These hand borings were advanced to a depth of approximately 12 to 13 feet BGS, and soil samples were collected from within the interpreted capillary zone using a slide-hammer sample driver. The borings were then advanced to approximately 15 feet BGS. Groundwater samples were collected from the borings after at least seven boring volumes of water had been purged using dedicated 2-inch disposable bailers.

- Soil sample descriptions and depths were recorded in field notes.
- Soil samples were collected in six-inch long, stainless steel sample tubes inserted inside the samplers. Prior to use, the manufacturer of the sample tubes reported that the tubes had been immersed in a sulfuric acid solution, an Alconox bath, two tap water rinses, and had undergone a final rinse in deionized water. The sample tubes were dried by air prior to use.
- Following retrieval, the soil sample tubes were removed from the sampler, the ends were covered with a piece of aluminum foil sheet and then were capped with PVC end caps. Each sample was labeled with the sample number, depth of collection, date, project number, and sampler's initials. Soil sample designations were based on the sample location and depth. The first number indicated the boring location, and the second number indicated the respective sampling depth within each boring.
- Due to the cohesive nature of the soil, and the fact that the recovery percentage was limited to approximately 30 to 40% because of soil "pullout" during sample rod extraction, the samples obtained by CPT were from the highest sample tube interval only. Any excess retained soil was used to describe the lithology and measure volatile organic compounds (VOCs) using an Hnu organic vapor meter (OVM) equipped with a 10.2 Ev probe. The probe was positioned near the recovered soil sample surface, and the highest measurement encountered was recorded on the boring log.
- Groundwater samples were placed in laboratory-provided containers containing the requisite preservatives for the analysis to be performed. Sample containers were labeled with designations based on the sample location and sampling round.
- Two equipment rinse blanks were collected from the deionized water poured into a randomly selected rod, and from the PIPP and PIPP-containing rod assembly, prior to their use in the resampling of location B1.
- Chain-of-Custody procedures were used to document sample handling and transport from the time of sample collection to delivery within 24 hours of sampling to a State-certified hazardous waste laboratory for analysis. The samples were placed into ziplock plastic bags and were stored on ice in an insulated chest along with an initial trip blank, pending delivery to the laboratory for analysis.
- Each CPT boring was backfilled to the ground surface using a Portland cement slurry provided by The Earth Technology Corporation. Each hand auger boring was backfilled to the ground surface using the native soil removed during augering.

APPENDIX E

LABORATORY RESULTS AND CHAIN-OF-CUSTODY FORMS

50114

APPLIED GEOSCIENCES INC.

CHAIN-OF-CUSTODY RECORD

Project Number		Project Name				No. of Cntrs	Type of Cntrs	Preservative	Type of Analysis										Condition of Samples	Initial				
Send Report Attention of:		Analytical Laboratory:							TPH ₅ /DTEX	TPH _d														
Sample Number	Date	Time	Matrix	Location	Cntrs	Type of Cntrs	Preservative	TPH ₅ /DTEX	TPH _d															
B1-30-2	12/14	1050	Water	B1	1	40 mL VDA	HCl	X																
					1			X																
					1			X																
					1	1 L Amber	None		X															
					1				X															
Random Rod		1025		Rod Rinse	1	40 mL VDA	HCl	X																
PIPP Rinse				PIPP & BAILEY RINSE	1			X																

Please initial: *[Signature]*

Samples Stored in ice: *yes 30C*

properly sealed: *yes*

filled with sufficient space: *yes*

numbered: *yes*

Relinquished by: <i>M. LeClair</i>	Date/Time: 12/14/94 1530	Received by: <i>A. BENNETT</i>	Date/Time: 14 Dec 94 1625	Remarks: <i>std. turn-around</i>
Relinquished by: <i>A. BENNETT</i>	Date/Time: 12/14/94 1800	Received by: _____	Date/Time: _____	
Relinquished by: _____	Date/Time: _____	Received by: <i>Cecilia J. [Signature]</i>	Date/Time: 12/15/94 0830	

Company: Applied Geosciences Inc.
Address: 1641 N. First St., #235, San Jose, CA 95112
Phone: (408) 452-0262 Fax: (408) 452-0265

Sampler →



Superior Precision Analytical, Inc.

A member of ESSCON Environmental Support Service Consortium

APPLIED GEOSCIENCES
Attn: MICHAEL LE CLAIR

Project A943062
Reported 04-November-1994

VOLATILE PETROLEUM HYDROCARBONS

Laboratory Number	Sample Identification	Matrix
92912- 1	B3-1W	Water
92912- 2	B2-1W	Water
92912- 3	B1-1W	Water
92912- 4	TB1-1W	Water
92912- 5	B1-1-24.0	Soil
92912- 6	B2-1-24.0	Soil
92912- 7	B3-1-24.0	Soil

RESULTS OF ANALYSIS

Laboratory Number:	92912- 1	92912- 2	92912- 3	92912- 4	92912- 5
Gasoline:	ND<50	ND<50	ND<50	ND<50	ND<1
Benzene:	ND<0.5	ND<0.5	0.5	ND<0.5	ND<.005
Toluene:	ND<0.5	ND<0.5	0.6	ND<0.5	ND<.005
Ethyl Benzene:	ND<0.5	ND<0.5	1.2	ND<0.5	ND<.005
Total Xylenes:	ND<0.5	ND<0.5	3.3	ND<0.5	ND<.005
Concentration:	ug/L	ug/L	ug/L	ug/L	mg/kg
-- Surrogate % Recoveries --					
Trifluorotoluene (SS):	92	115	88	91	91

Laboratory Number: 92912- 6 92912- 7

Gasoline:	ND<1	ND<1
Benzene:	ND<.005	ND<.005
Toluene:	ND<.005	ND<.005
Ethyl Benzene:	ND<.005	ND<.005
Total Xylenes:	ND<.005	ND<.005
Concentration:	mg/kg	mg/kg
-- Surrogate % Recoveries --		
Trifluorotoluene (SS):	92	92



Superior Precision Analytical, Inc.

A member of ESSCON Environmental Support Service Consortium

APPLIED GEOSCIENCES
Attn: MICHAEL LE CLAIR

Project A943062
Reported 17-November-1994

VOLATILE PETROLEUM HYDROCARBONS

Sample preparation by Purge and Trap (EPA SW-846 method 5030). Gasoline analysis by SW-846 method 8015 modified. Gasoline range quantified as all compounds between C6 and C10. Benzene, Toluene, Ethyl Benzene, and Xylenes analyses by EPA SW-846 method 8020.

Chronology					Laboratory Number 93022	
Identification	Sampled	Received	Extracted	Analyzed	Run #	Lab #
B1-2W	11/10/94	11/11/94	11/15/94	11/15/94		1
B2-2W	11/10/94	11/11/94	11/15/94	11/15/94		2
B3-2W	11/10/94	11/11/94	11/16/94	11/16/94		3
B1-13	11/10/94	11/11/94	11/16/94	11/16/94		4
B2-12	11/10/94	11/11/94	11/16/94	11/16/94		5
B3-12	11/10/94	11/11/94	11/16/94	11/16/94		6



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VOLATILE PETROLEUM HYDROCARBONS Quality Assurance and Control Data - Soil

Laboratory Number 92912

Compound	Method Blank (mg/kg)	RL (mg/kg)	Spike Recovery (%)	Limits (%)	RPD (%)
Gasoline:	ND<1	1	94/84	50-123	11%
Benzene:	ND<.005	.005	64/66	59-153	3%
Toluene:	ND<.005	.005	83/88	59-153	6%
Ethyl Benzene:	ND<.005	.005	91/93	59-153	2%
Total Xylenes:	ND<.005	.005	96/98	59-153	2%

Definitions:

ND = Not Detected

RPD = Relative Percent Difference

RL = Reporting Limit

mg/kg = Parts per million (ppm)

QC File No. 92912

Alfred Salgado 11/7/92
 Senior Chemist
 Account Manager

Certified Laboratories

825 Arnold Dr., Suite 114
 Martinez, California 94553
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1555 Burke St., Unit 1
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 (415) 647-2081 / fax (415) 821-7123

309 S. Cloverdale St., Suite B-24
 Seattle, Washington 98108
 (206) 763-2992 / fax (206) 763-8429



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A member of ESSCON Environmental Support Service Consortium

APPLIED GEOSCIENCES
Attn: MICHAEL LE CLAIR

Project A943062
Reported 18-November-1994

TOTAL PETROLEUM HYDROCARBONS AS DIESEL

Laboratory Number	Sample Identification	Matrix
93022- 1	B1-2W	Water
93022- 2	B2-2W	Water
93022- 3	B3-2W	Water
93022- 4	B1-13	Soil
93022- 5	B2-12	Soil
93022- 6	B3-12	Soil

RESULTS OF ANALYSIS

Laboratory Number:	93022- 1	93022- 2	93022- 3	93022- 4	93022- 5
--------------------	----------	----------	----------	----------	----------

Diesel:	ND<50	ND<50	ND<50	ND<10	ND<10
Concentration:	ug/L	ug/L	ug/L	mg/Kg	mg/Kg
-- Surrogate % Recoveries --					
Tetracosane Recovery:	98	101	99	107	107

Laboratory Number:	93022- 6
--------------------	----------

Diesel:	ND<10
Concentration:	mg/Kg
-- Surrogate % Recoveries --	
Tetracosane Recovery:	106

Certified Laboratories

A652J

93022

APPLIED GEOSCIENCES INC.

CHAIN-OF-CUSTODY RECORD

Project Number A943062		Project Name Quik Stop			No. of Cntrs	Type of Cntrs	Preservative	Type of Analysis										Condition of Samples	Initial
Send Report Attention of: Michael LeClair		Analytical Laboratory: Superior						TPHg	BTEX	TPHd									
Sample Number	Date	Time	Matrix	Location	Cntrs	Cntrs													
B1-2W	11/10	1700	Water	B1	1	40 ML VOA	HCl	X											
								X											
								X											
								X											
B2-2W		1715		B2	1	40 ML VOA	HCl	X											
								X											
								X											
B3-2W		1730		B3	1	40 ML VOA	HCl	X											
								X											
								X											
								X											
B1-13		1215	SOIL	B1	1	55 tube	N/A	X	X										
B2-12		1400		B2	1			X	X										
B3-12		1615		B3	1			X	X										
Relinquished by: M. LeClair	Date/Time 11/10/94 1030	Received by: Joe Castor	Date/Time 11/11/94 10:30 AM	Remarks: Samples = M. LeClair															
Relinquished by:	Date/Time	Received by:	Date/Time																
Relinquished by:	Date/Time	Received by: D. NEWTON JAN MTC	Date/Time 11-11-94 5:45 PM	Company: Applied Geosciences Inc. Address: 1641 N. First St., #235, San Jose, CA 95112 Phone: (408) 452-0262 Fax: (408) 452-0265															

2.10C

12 11 4

APPLIED GEOSCIENCES INC.

CHAIN-OF-CUSTODY RECORD

Project Number A943062		Project Name Vasco Rd.			No. of Cntrs	Type of Cntrs	Preservative	Type of Analysis										Condition of Samples	Initial
Send Report Attention of: Mike LeClair		Analytical Laboratory: Superior Analytical						TPH	TPH/STX	VOCs									
Sample Number	Date	Time	Matrix	Location															
1	B3-1W	18:30	10/27/94	Water	B3	1	12 Amber	/	X										
2	B2-1W	17:00	10/27/94		B2	1	12 Amber	/	X										
3	B1-1W	12:00	10/27/94		B1	1	12 Amber	/	X										
2	B2-1W	9:00	10/27/94		B2	3	40ml VOA	Hcl		X									
2	B2-1W	19:00	10/27/94		B2	3	40ml VOA	Hcl			X								
3	B3-1W	18:00	10/27/94		B3	3	40ml VOA	Hcl		X									
1	B3-1W	18:00	10/27/94		B3	3	40ml VOA	Hcl			X								
3	B1-1W	11:30	10/27/94		B1	3	40ml VOA	Hcl	X							Please initial: <u>ML</u>			
3	B1-1W	11:30	10/27/94		B1	3	40ml VOA	Hcl		X						Samples stored in ice <u>5-4°C</u>			
	EB2-1W	10:38	10/27/94		EB2	1	40ml VOA	Hcl								Appropriate container			
	EB1-1W	10:50	10/27/94		EB1	1	40ml VOA	Hcl								Samples preserved			
4	TB1-1W	13:00	10/27/94		TB1	1	40ml VOA	Hcl		X	X					VOA's without preservative			
5	B1-1-24.0	11:45	10/27/94	Soil	B1 #1	1	S.S. Tube	/	X	X	X					Comments:			
6	B2-1-24.0	11:37	10/27/94	Soil	B2	1	S.S. Tube	/	X	X	X								
7	B3-1-24.0	16:10	10/27/94	Soil	B3	1	S.S. Tube	/	X	X	X								
Relinquished by:		Date/Time		Received by:		Date/Time		Remarks:											
<u>Nicole Fourcade</u>		10/28/94 10:50		<u>Rhonda GAG</u>		10/28/94 10:50		Sampler: Nicole Fourcade											
Relinquished by:		Date/Time		Received by:		Date/Time													
<u>Rhonda GAG</u>		10/28/94 13:10		_____		_____													
Relinquished by:		Date/Time		Received by:		Date/Time		Company: Applied Geosciences Inc.											
_____		_____		<u>Plangyly</u>		10-28-94		Address: 1641 N. First St., #235, San Jose, CA 95112											
						1:10 AM		Phone: (408) 452-0262 Fax: (408) 452-0265											



Superior Precision Analytical, Inc.

A member of ESSCON Environmental Support Service Consortium

VOLATILE PETROLEUM HYDROCARBONS Quality Assurance and Control Data - Water

Laboratory Number 93022

Compound	Method Blank (ug/L)	RL (ug/L)	Spike Recovery (%)	Limits (%)	RPD (%)
Gasoline:	ND<50	50	88/84	56-117	5%
Benzene:	ND<0.5	0.5	80/74	59-149	8%
Toluene:	ND<0.5	0.5	88/80	59-149	10%
Ethyl Benzene:	ND<0.5	0.5	89/85	59-149	5%
Total Xylenes:	ND<0.5	0.5	96/93	59-149	3%

Definitions:

ND = Not Detected

RPD = Relative Percent Difference

L = Reporting Limit

ug/L = Parts per billion (ppb)

QC File No. 93022

Certified Laboratories

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San Francisco, California 94124
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Total Petroleum Hydrocarbons as Diesel
by EPA SW-846 Method 8015M
Diesel Range quantitated as all compounds from C10-C25

Quality Assurance and Control Data

Laboratory Number: 50174
Method Blank(s)

AL201.29-01
Conc. RL
ug/L

Diesel Range ND 50

> Surrogate Recoveries (%) <<

Tetracosane 144



Gasoline Range Petroleum Hydrocarbons and BTXE
by EPA SW-846 5030/8015M/8020
Gasoline Range quantitated as all compounds from C6-C10

Quality Assurance and Control Data

Laboratory Number: 50174
Method Blank(s)

AL091.20-07

Conc. RL
ug/L

Gasoline_Range	ND	50
Benzene	ND	0.5
Toluene	ND	0.5
Ethyl Benzene	ND	0.5
Total Xylenes	ND	0.5

>> Surrogate Recoveries (%) <<
Trifluorotoluene (SS) 97



Superior Precision Analytical, Inc.

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

Laboratory Number 92912

Compound	Method Blank (mg/Kg)	RL (mg/Kg)	Spike Recovery (%)	Limits (%)	RPD (%)
Diesel:	ND<10	10	110/106	50-150	4%

Definitions:

- ND = Not Detected
- RPD = Relative Percent Difference
- RL = Reporting Limit
- mg/Kg = Parts per million (ppm)
- QC File No. 92912

Abdul Salim 11/7/04
 Senior Chemist
 Account Manager



Superior Precision Analytical, Inc.

A member of ESSCON Environmental Support Service Consortium

APPLIED GEOSCIENCES
Attn: Michael Le Clair

Project A943062
Reported on December 22, 1994

Total Petroleum Hydrocarbons as Diesel
by EPA SW-846 Method 8015M
Diesel Range quantitated as all compounds from C10-C25

Chronology

Laboratory Number 50174

Sample ID	Sampled	Received	Extract.	Analyzed	QC Batch	LAB #
B1-30-2	12/14/94	12/15/94	12/20/94	12/21/94	AL201.29	01

QC Samples

QC Batch #	QC Sample ID	TypeRef.	Matrix	Extract.	Analyzed
AL201.29-01	Method Blank	MB	Water	12/20/94	12/21/94
AL201.29-02	Laboratory Spike	LS	Water	12/20/94	12/20/94
AL201.29-03	Laboratory Spike Duplicate	LSD	Water	12/20/94	12/20/94



Superior Precision Analytical, Inc.

A member of ESSCON Environmental Support Service Consortium

APPLIED GEOSCIENCES
Attn: Michael Le Clair

Project A943062
Reported on December 22, 1994

Gasoline Range Petroleum Hydrocarbons and BTXE
by EPA SW-846 5030/8015M/8020
Gasoline Range quantitated as all compounds from C6-C10

Chronology

Laboratory Number 50174

Sample ID	Sampled	Received	Extract.	Analyzed	QC Batch	LAB #
B1-30-2	12/14/94	12/15/94	12/15/94	12/15/94	AL091.20	01
Random Rod Rinse	12/14/94	12/15/94	12/15/94	12/15/94	AL091.20	02
PIPP Rinse	12/14/94	12/15/94	12/15/94	12/15/94	AL091.20	03

QC Samples

QC Batch #	QC Sample ID	Type	Ref.	Matrix	Extract.	Analyzed
AL091.20-04	MW-2	MS	50142-03	Water	12/09/94	12/09/94
AL091.20-05	MW-2	MSD	50142-03	Water	12/09/94	12/09/94
AL091.20-07	Method Blank	MB		Water	12/15/94	12/15/94

Certified Laboratories

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Superior Precision Analytical, Inc.

A member of ESSCON Environmental Support Service Consortium

HALOGENATED VOLATILE ORGANICS by EPA SW-846 Methods 5030/8010. Quality Assurance and Control Data - Water

Laboratory Number 92912

Compound	Method Blank (ug/L)	RL (ug/L)	Spike Recovery (%)	Limits (%)	RPD (%)
Chloromethane:	ND<0.5	0.5			
Vinyl Chloride:	ND<0.5	0.5			
Bromomethane:	ND<0.5	0.5			
Chloroethane:	ND<0.5	0.5			
Trichlorofluoromethane:	ND<0.5	0.5			
1,1-Dichloroethene:	ND<0.5	0.5	96/92	48-189	4%
Dichloromethane:	ND<1.0	1.0			
1,2-Dichloroethene:	ND<0.5	0.5			
1,1-Dichloroethane:	ND<0.5	0.5			
c-1,2-Dichloroethene:	ND<0.5	0.5			
Chloroform:	ND<0.5	0.5			
1,1,1-Trichloroethane:	ND<0.5	0.5			
Carbon tetrachloride:	ND<0.5	0.5			
1,2-Dichloroethane:	ND<0.5	0.5			
Trichloroethene:	ND<0.5	0.5	95/88	63-150	8%
c-1,3-Dichloropropene:	ND<0.5	0.5			
1,2-Dichloropropane:	ND<0.5	0.5			
1,3-Dichloropropene:	ND<0.5	0.5			
Bromodichloromethane:	ND<0.5	0.5			
1,1,2-Trichloroethane:	ND<0.5	0.5			
Tetrachloroethene:	ND<0.5	0.5			
1,1,1-Tribromochloromethane:	ND<0.5	0.5			
Chlorobenzene:	ND<0.5	0.5	108/102	70-158	6%
Chloroform:	ND<0.5	0.5			
1,1,2,2-Tetrachloroethane:	ND<0.5	0.5			
1,3-Dichlorobenzene:	ND<0.5	0.5			
1,2-Dichlorobenzene:	ND<0.5	0.5			
1,4-Dichlorobenzene:	ND<0.5	0.5			

Definitions:

- D = Not Detected
- PD = Relative Percent Difference
- RL = Reporting Limit
- ug/L = Parts per billion (ppb)
- C File No. 92912

Certified Laboratories

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Superior Precision Analytical, Inc.

A member of ESSCON Environmental Support Service Consortium

APPLIED GEOSCIENCES
Attn: MICHAEL LE CLAIR

Project A943062
Reported 07-November-1994

HALOGENATED VOLATILE ORGANICS by EPA SW-846 Methods 5030/8010.

Laboratory Number	Sample Identification	Matrix
92912- 1	B3-1W	Water
92912- 2	B2-1W	Water
92912- 3	B1-1W	Water
92912- 4	TB1-1W	Water
92912- 5	B1-1-24.0	Soil

RESULTS OF ANALYSIS

Laboratory Number:	92912- 1	92912- 2	92912- 3	92912- 4	92912- 5
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Chloromethane:	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5
Vinyl Chloride:	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5
Bromomethane:	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5
Chloroethane:	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5
Trichlorofluoromethane:	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5
1,1-Dichloroethene:	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5
Dichloromethane:	ND<1.0	ND<1.0	ND<1.0	ND<1.0	ND<10
t-1,2-Dichloroethene:	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5
1,1-Dichloroethane:	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5
c-1,2-Dichloroethene:	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5
Chloroform:	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5
1,1,1-Trichloroethane:	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5
Carbon tetrachloride:	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5
1,2-Dichloroethane:	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5
Trichloroethene:	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5
c-1,3-Dichloropropene:	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5
1,2-Dichloropropane:	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5
t-1,3-Dichloropropene:	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5
Bromodichloromethane:	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5
1,1,2-Trichloroethane:	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5
Tetrachloroethene:	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5
Dibromochloromethane:	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5
Chlorobenzene:	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5
Bromoform:	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5
1,1,2,2-Tetrachloroeth:	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5
1,3-Dichlorobenzene:	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5
1,2-Dichlorobenzene:	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5
1,4-Dichlorobenzene:	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5

Concentration:	ug/L	ug/L	ug/L	ug/L	ug/Kg
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Page 2 of 5

Certified Laboratories



Superior Precision Analytical, Inc.

A member of ESSCON Environmental Support Service Consortium

APPLIED GEOSCIENCES
Attn: MICHAEL LE CLAIR

Project A943062
Reported 03-November-1994

TOTAL PETROLEUM HYDROCARBONS AS DIESEL

Laboratory Number	Sample Identification	Matrix
92912- 1	B3-1W	Water
92912- 2	B2-1W	Water
92912- 3	B1-1W	Water
92912- 5	B1-1-24.0	Soil
92912- 6	B2-1-24.0	Soil
92912- 7	B3-1-24.0	Soil

RESULTS OF ANALYSIS

Laboratory Number:	92912- 1	92912- 2	92912- 3	92912- 5	92912- 6
Diesel:	*89	*100	*210	ND<10	ND<10
Concentration:	ug/L	ug/L	ug/L	mg/Kg	mg/Kg
-- Surrogate % Recoveries --					
Tetracosane Recovery:	114	117	132	92	91

Laboratory Number: 92912- 7

Diesel:	ND<10
Concentration:	mg/Kg
-- Surrogate % Recoveries --	
Tetracosane Recovery:	95

* Does not match diesel pattern. The chromatogram shows hydrocarbons heavier than diesel .

Certified Laboratories

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APPENDIX F
LIKELIHOOD STATEMENTS

LIKELIHOOD STATEMENTS

Many statements have been made in this report regarding the likelihood of the occurrence of certain adverse events. The term "likelihood," as used here, pertains to chances of a match between the prediction for the event and its actual occurrence. Likelihood statements are based on the professional judgments of Applied Geosciences Inc. A prediction made for the occurrence of an event will either match the actual occurrence or not. Uncertainty about the natural processes, lack of adequate scientific understanding of the physical and chemical interactions at the site, and insufficient data and information about the specific site conditions usually preclude a perfect or 100 percent likelihood of match between predictions and actual occurrences. Therefore, where a perfect match is not possible, the likelihood statement assigns a measure for a "degree of belief" or a "betting score" for the match between the prediction for the event and the actual event outcome.

The likelihood statements can be made either qualitatively, expressed verbally, or quantitatively, expressed in percent ranges. The qualitative terms expressed verbally, however, can be approximately related to percent ranges. The following approximate percent ranges have been used by Applied Geosciences Inc. for the qualitative terms used in likelihood statements.

QUALITATIVE TERMS	APPROXIMATE PERCENT RANGE
Very Low	Less than 10%
Low	10% to 20%
Low to Moderate	20% to 40%
Moderate	40% to 60%
Moderate to High	60% to 80%
High	80% to 90%
Very High	More than 90%

The following is a typical likelihood statement and its interpretation.

- **Statement:** Based on site conditions, data collected, and current regulatory guidelines delineating a hazardous waste, it is the judgment of Applied Geosciences Inc. that there is a low likelihood that hazardous waste from the landfill has migrated to the site.

- **Interpretation of Statement:** The statement reflects an extrapolation of a discrete data set to the entire site. This statement is made within the context of regulatory guidelines delineating hazardous wastes in effect at the time the statement is made. It is important to note that these guidelines periodically change; consequently, the judgment made corresponds to the guidelines cited in the report.

An extrapolation made from a discrete data set precludes making a statement with certainty that the event has occurred (i.e., one cannot really say with 100 percent certainty that hazardous waste from the landfill has not migrated to the site). Therefore, a professional judgment is made for the event that is expressed in terms of the likelihood (less than 100 percent) that the event either has or has not occurred.

- The statement given above renders a professional judgment that there is a low likelihood that the event has occurred. The above statement could also have been expressed as "there is a high likelihood that hazardous waste from the landfill has not migrated to the site."