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TC 9410-03

**SITE INVESTIGATION**

**ORGANIZATIONAL MAINTENANCE  
SHOP (OMS) NO. 35  
16501 ASHLAND AVENUE  
SAN LORENZO, CA**

**FINAL REPORT**

Standard Agreement No. UT 048R  
Work Order MAR 112  
Assignment Number 2

*Prepared for:*

**OFFICE OF THE STATE ARCHITECT**  
c/o Special Projects  
400 P Street, 5th Floor  
Sacramento, CA 95814

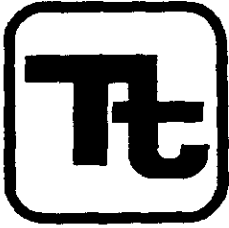
August 1993

*Prepared by:*

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August 19, 1993

Mr. Mike Golden  
Office of the State Architect  
Special Projects  
400 P Street, 5th Floor  
Sacramento, CA 95814

Subject: Final Report for the Site Investigation at Organizational Maintenance Shop No. 35 (OMS #35), 16501 Ashland Avenue, San Lorenzo, CA  
TC 9410-03

Dear Mr. Golden:

Enclosed find five (5) copies of the Final Report for the Site Investigation at Organizational Maintenance Shop No. 35 (OMS #35) in San Lorenzo, CA. A single copy of the Final Report has also been sent to Juliet Shin of Alameda County Department of Environmental Health. Ms. Shin has informed us that the San Francisco Regional Water Quality Control Board (RWQCB) has asked Alameda County to maintain files on the RWQCB's behalf for sites in Alameda County, and that a copy of the report therefore need not be sent to the RWQCB.

A feasibility study for remediation of the soil and ground water and a report describing available options to allow the existing 5,000-gallon diesel tank to remain in place and be permitted by Alameda County are both in progress and should be submitted to OSA by the beginning of September, 1993.

If you have any questions regarding the report, or if I may otherwise be of assistance, please call me at (415) 974-1221.

Very truly yours,

  
Mike Wopat  
Project Manager

INTEROFFICE CORRESPONDENCE

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93 AUG 23 AM 11:34

**Date:** August 20, 1993  
**From:** Mike Wopat  
Tetra Tech  
**Subject:** Final Report, San Lorenzo Organizational Maintenance Shop 35 (OMS #35)  
**To:** Ms. Juliet Shin  
Alameda Cty DEH

Here's your copy of the Final Report of the site investigation at the National Guard site in San Lorenzo. Mike Golden of OSA asked that I send it directly to you. He also asked that I send one to the RWQCB, but I have not done so, based on the conversation that you and I had regarding the board's request that Alameda Cty take care of the files for the Alameda Cty sites.

If you have any questions regarding the report, or if I can otherwise be of assistance, please contact me at (415) 974-1221.



**SAN FRANCISCO OFFICE**  
180 Howard Street, Suite 250, San Francisco, CA 94105  
(415) 974-1221



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August 1993

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## I.0 EXECUTIVE SUMMARY

Gasoline contamination of soil and ground water at the San Lorenzo OMS #35 site was discovered during a piping retrofit in 1989 and confirmed during removal of a 2,000 gallon gasoline tank in April, 1993. Tetra Tech carried out a site investigation in July 7, 8, and 9, 1993. A total of eleven soil borings were drilled and sampled and three of the borings were converted to monitoring wells. Use of an on-site mobile laboratory and determination of a ground water gradient from the first three borings drilled allowed siting of subsequent borings so as to track and define the ground water and soil contamination plume during the three days of drilling.

Results of the site investigation show that the soil and ground water adjacent to and north of the pit from which the gasoline tank had been removed is contaminated with gasoline and BTEX compounds. The ground water gradient is towards the north, and the resulting contamination plume extends northwards more than 33 feet (and less than 100 feet) from the tank pit. Most of the soil contamination is confined to thin sand beds and adjacent silty clay between depths of 9 and 16 feet below the ground surface. Near the tank pit, the upper limit of soil contamination is shallower. Free product was observed both within the tank pit when the tank was removed, and in soil borings located 8 feet north and 33 feet north-northwest of the pit.

Ground water contamination is confined to the upper aquifer, which consists of thin sand beds within the silty clay that makes up most of the upper 22-25 feet of soil. Ground water containing detectable amounts of TPH-G was found in the two borings 8 and 33 feet north of the pit and in a boring 18 feet northeast of the pit. No evidence of contamination was found in soil and ground water samples collected from a lower aquifer that consists of several feet of well-sorted fine to coarse sand below a depth of 22 to 25 feet.

No soil or ground water contamination was observed south or east of the tank pit, and only a trace of TPH-D contamination was discerned in ground water west of the pit.

The horizontal extent of ground water contamination has been largely defined by this investigation. Two to three additional borings would be useful to define the extent of ground water contamination to the northwest and north-northeast of the tank pit. Information from these proposed borings would allow definition of the extent of ground water contamination and would facilitate the development of the Feasibility Study that will address possible remediation methods for the soil and ground water.

## 2.0 INTRODUCTION

This Final Report has been prepared following the completion of a site investigation at the Organizational Maintenance Shop No. 35 (OMS #35) at 16501 Ashland Avenue, San Lorenzo, California. This report addresses the nature and extent of soil and ground water contamination associated with a former 2,000-gallon gasoline underground storage tank (UST). The contamination had been observed both during a piping retrofit in 1989 and during removal of the tank in April 1993.

### 2.1 PURPOSE

The site investigation was conducted in order to:

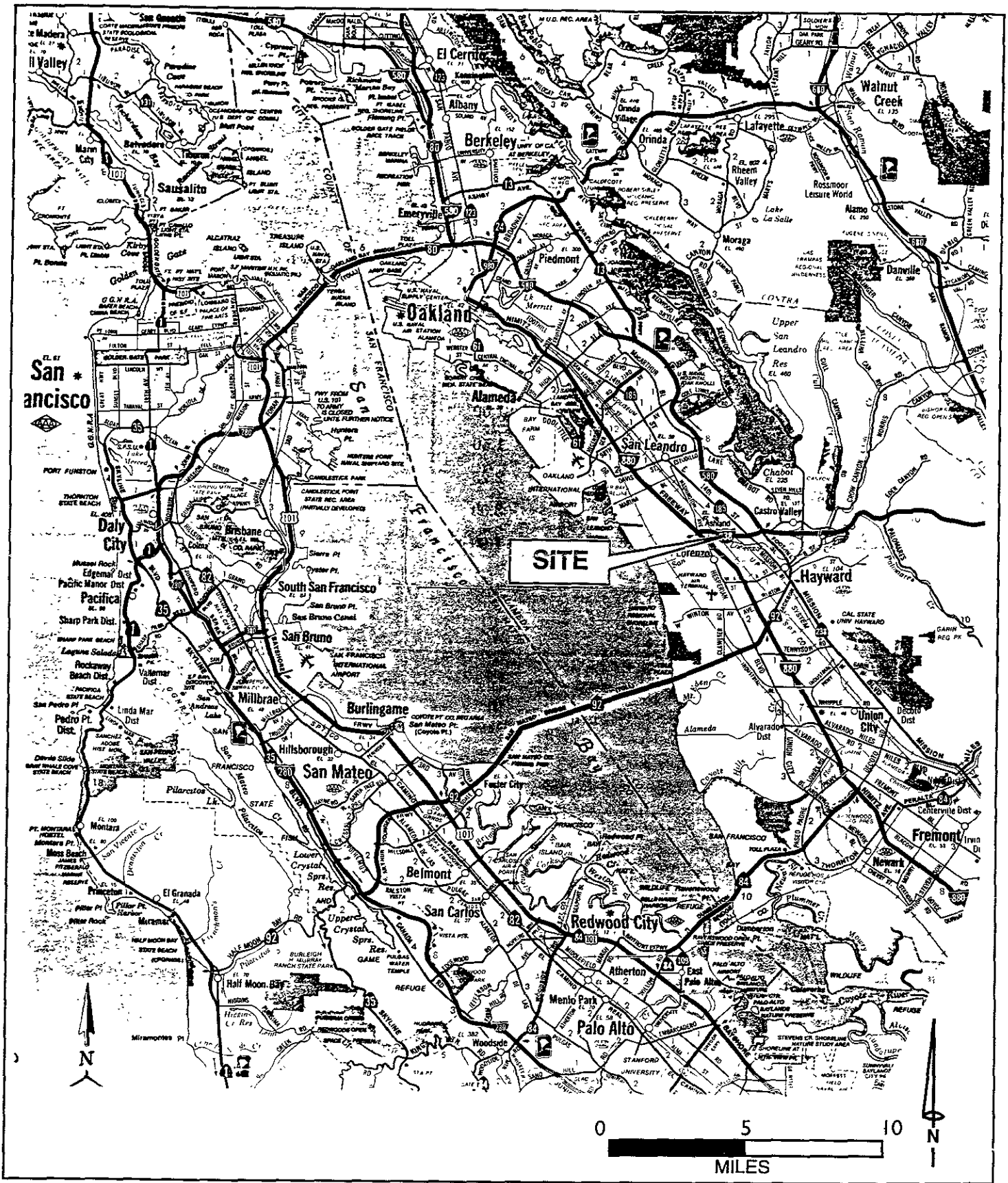
- Determine the vertical and horizontal extent of soil contamination at the site, and;
- Determine the degree and extent of ground water contamination.

This information will be used to:

- Conduct a feasibility study for remediation of the soil and ground water; and
- Determine available options to allow an existing 5,000 gallon diesel tank to remain in place and be permitted by the County.

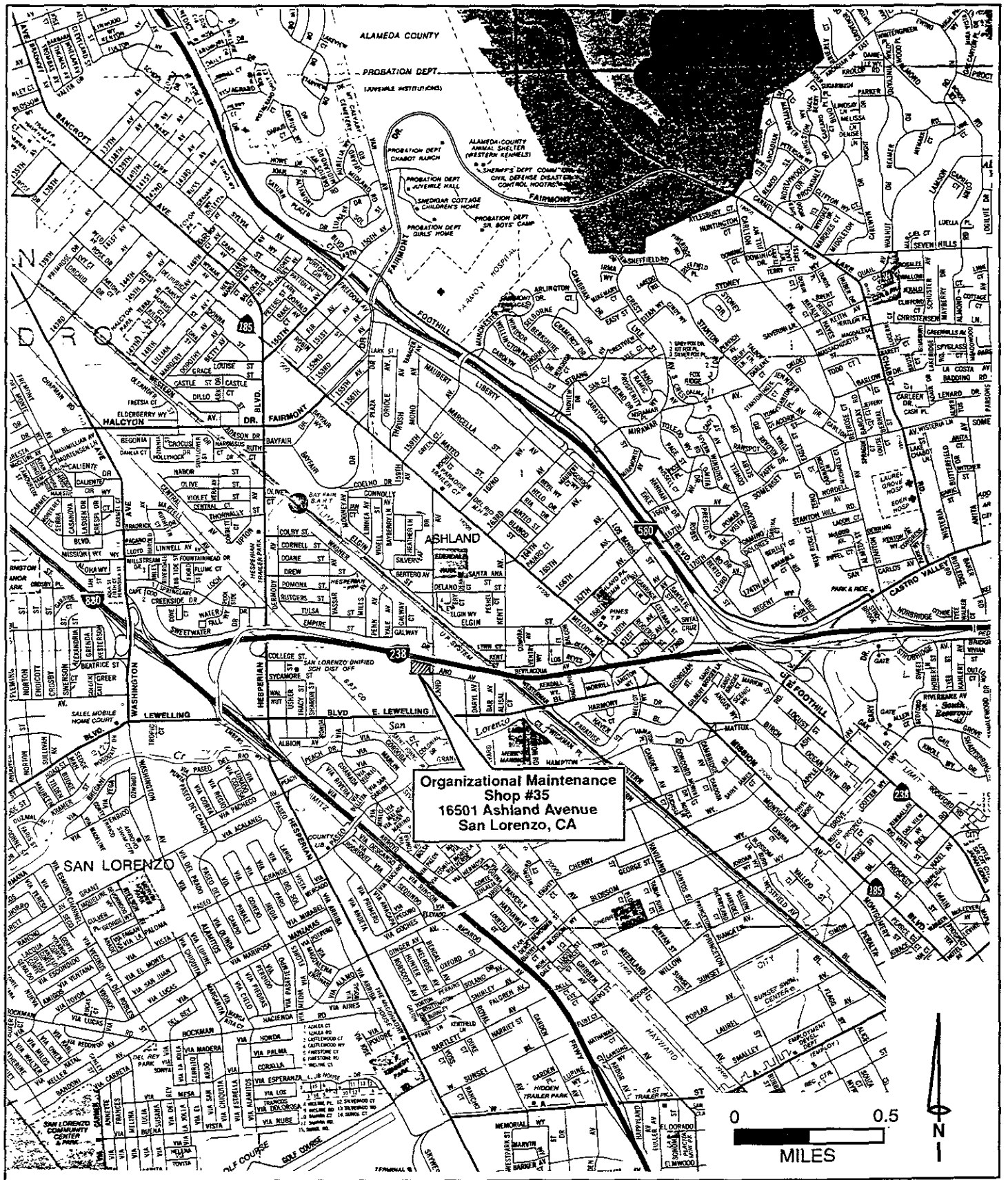
### 2.2 SITE DESCRIPTION

The two-acre site is west of Ashland Avenue and immediately south of Interstate Highway 238 (Figures 1A and 1B). The land and underground storage tanks are owned by the State of California.



**Figure 1A Regional Site Location Map**





**Figure 1B Site Location Map**



The site comprises two major buildings, a California National Guard armory, adjacent to Ashland Avenue, and the U.S. Army Organizational Maintenance Shop (OMS), located at the southwestern corner of the site. About 100 feet north of the OMS are the fuel island, the remaining 5,000-gallon diesel UST, and the pit that formerly contained the 2,000-gallon gasoline UST (Figure 2). The remainder of the site is an asphalt-paved lot used largely for parking of military vehicles.

Land surface in the vicinity of the site is at an elevation of 35-40 feet above mean sea level. The site has a relatively flat asphalt-paved surface. Regionally, the land slopes very gently west-southwest toward San Francisco Bay, which is 2.7 miles away.

The nearest surface water is the westward-flowing San Lorenzo Creek, located about 1,000 feet south of the site and immediately south of East Lewelling Boulevard.

### **2.2.1 Physical Setting**

Land use in the vicinity of the site is predominantly residential. San Lorenzo High School bounds the property to the south and west. Interstate 238 forms the northern boundary and Ashland Avenue the eastern boundary.

### **2.2.2 Geologic Setting**

The district of San Lorenzo is located on the alluvial plain that extends from the Oakland Hills on the east to San Francisco Bay on the west. The site is located on Holocene alluvial fan sediments deposited by westward-flowing streams from the uplands. The sediments are mapped by Helley and others (1979) as coarse-grained Holocene alluvium consisting of loose, well-drained, moderately sorted sands and gravels that locally contain beds of well-sorted silt. The coarse-grained alluvium is intercollated with medium-grained Holocene alluvium. Both the coarse- and medium-grained Holocene alluvium overlie late Pleistocene alluvial fan deposits. Thickness of the coarse-grained alluvium ranges from 50 feet near fan heads to 20 feet where it grades into medium-grained alluvium.

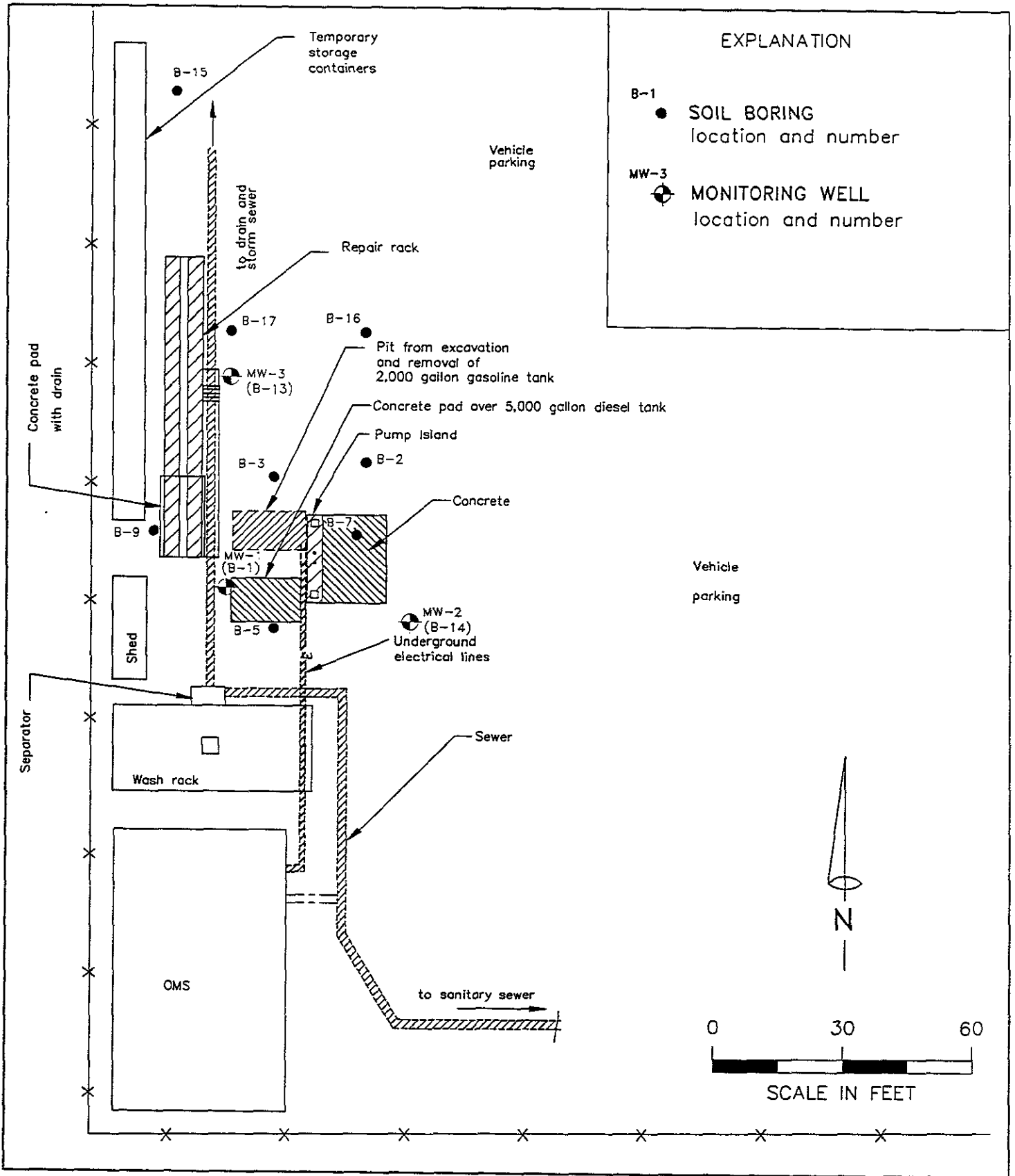


Figure 2

Site Plan with Soil Boring and Monitoring Well Locations



Sediments observed at the site are finer than those described above. West and Hansen (1989b) describe the soil underlying the site to be "dense adobe clay". Soil removed from the excavation during removal of the tank in 1993 consists of clay, silty clay, and fine micaceous sand. No coarse sediments were observed from the pit, which is approximately 7.5 to 8 feet deep.

Soils observed during this investigation were similar to those described by West and Hansen (1989b) and observed during the tank pull. The soils were predominantly silty clay, clayey silt, and clay with thin lenses of fine to medium-grained sand.

The site is 0.9 miles west of the trace of the Hayward fault, which trends north-northwest along the base of the Oakland Hills.

### **2.2.3 Hydrogeology**

Depth to static ground water has varied from 11 feet below ground surface (bgs) in late 1989 (West and Hansen, 1989b) to about 7 feet bgs in April 1993 (Alameda County, 1993). Regional ground water flow is west-southwest toward San Francisco Bay. Water levels during this investigation were measured between seven and eight feet below ground surface. The ground water flow direction at the site was determined to be towards the north, not west-southwest to southward towards San Lorenzo Creek as was expected.

## **2.3 SITE HISTORY**

The site, located at 16501 Ashland Avenue in San Lorenzo, California, has been a military staging depot since the beginning of the Korean War. Owned by the State of California, the site currently houses the National Guard Armory and the United States Army Organizational Maintenance Shop (OMS #35), which maintains the National Guard vehicles.

A 2,000-gallon underground gasoline tank was installed in 1951 (Sergeant Burns, 1993, personal communication). The area immediately surrounding the tank has been used for military vehicle parking and will continue to be used for that purpose in the foreseeable future. Prior to its removal, the 2,000-gallon, single-wall steel underground gasoline tank was used intermittently at the site. At one point it was dormant for six years (1981-1986). The tank was initially used to store regular leaded gas, but more recently has contained unleaded gasoline. Single-wall steel product and vent piping was replaced in 1989 with double-wall fiberglass piping.

The 2,000-gallon gasoline tank underwent yearly precision testing from November 1986 to April 5, 1991, and was removed in April 1993. Both the tank and piping passed all tests. OMS personnel reported no noticeable problems dispensing fuel with a suction pump. Based on OMS personnel inventory records, there was no loss of product noted (West and Hansen, 1989b).

In an attempt to upgrade fueling capability at the OMS, a project to rehabilitate the gasoline tank and add a 5,000-gallon diesel tank was undertaken in late 1989. Hydrocarbon contamination was discovered southeast and southwest of the 2,000-gallon tank during excavation.

Other potentially hazardous material historically used onsite include lube oils, solvents, brake fluid and paint. These materials are stored and used in small quantities. There have been no recorded spills.

## **2.4 PREVIOUS INVESTIGATIONS**

In 1989, an investigation was undertaken to assess the extent of the hydrocarbon contamination discovered during the tank upgrade project. During the investigation it was discovered that the backfill around the tank was saturated with gasoline (West and Hansen, 1989a), and that product was floating on the ground water surface in hand-augured borings in the backfill (West and Hansen, 1989b). The product piping, which was removed and replaced, exhibited large corrosion holes through which the gasoline probably leaked. Surface spillage undoubtedly occurred from filling and dispensing, though it is most likely that the majority of contamination resulted from product line leaks. There is no accurate estimate of the quantity of product released.



In April 1993, the gasoline tank was removed by ATR Enterprises of Los Angeles, CA, and disposed of at Erickson, Inc., in Richmond, CA. Backfill and native soil exposed during the removal of the gasoline tank had a strong odor of gasoline and were discolored due to reduction of iron in the soil by the gasoline. Backfill was locally saturated with gasoline. Discoloration in the sediments extended through almost the entire vertical extent of the eastern end of the excavation. Discoloration at the western end of the excavation did not extend above a depth of five feet. Ground water was encountered during tank excavation at a depth of seven feet. A thin layer of floating product covered the ground water in the pit. Results of analyses of the ground water and soil samples collected at the eastern and western ends of the excavation are presented in Table 1.

**Table 1**  
**Analytical Results for Ground Water and Soil Samples Collected April 22, 1993**  
**from the Tank Removal Excavation at OMS #35**  
**16501 Ashland Avenue, San Lorenzo, CA**

Sample No.	Sample type and location	Depth (ft)	TPH-g (ppm) <sup>1</sup>	Benzene (ppb) <sup>2</sup>	Ethyl benzene (ppb) <sup>2</sup>	Toluene (ppb) <sup>2</sup>	Xylenes (ppb) <sup>2</sup>
SL-1	stockpiled soil	N/A	297	450	5,790	6,420	35,800
SL-2	ground water in the excavation	~7.0	51.4	7,210	2,680	13,500	12,000
SL-3	soil, E sidewall	~5.0	73	438	1,700	3,410	10,400
SL-4	soil, W sidewall	~6.5	ND<1.0	ND<5	ND<5	ND<5	ND<15
SL-5	soil, W sidewall	~7.0	ND<1.0	ND<5	ND<5	ND<5	23

- (1) ppm = parts per million = mg/l for water, mg/kg for soil
- (2) ppb = parts per billion =  $\mu\text{g/l}$  for water,  $\mu\text{g/kg}$  for soil
- (3) N/A = Not Applicable
- (4) ND = Not Detectable at indicated detection limit.

Source: ATR Enterprises, personal communication

At present, the tank excavation is still open, and the excavated soil is stockpiled north of the pit. According to ATR Enterprises, the water in the pit will be pumped out and properly disposed of with the excavated soil.

## 2.5 SCOPE OF WORK

The work performed for this investigation includes the following tasks:

- surveying the vertical elevations of three boring locations to allow an initial determination of the ground water gradient;
- drilling and sampling 11 exploratory soil borings;
- collection of one ground water grab sample from each soil boring;
- analysis of selected soil samples and all ground water samples for petroleum hydrocarbons at an on-site mobile laboratory;
- analysis of selected soil and ground water samples for total and organic lead at an off-site laboratory.
- installation, development and sampling of three ground water monitoring wells;
- analysis of ground water samples from the wells for petroleum hydrocarbons;
- disposal of the development and purge water; and,
- preparation and submission of a final site investigation report.

## 3.0 METHODS OF INVESTIGATION

Investigation methods utilized during this investigation are discussed in detail in the Site Investigation Work Plan and are summarized below.

### 3.1 DRILLING AND SOIL SAMPLING

Prior to drilling, all boring locations were marked in white paint. Underground Service Alert (USA) was contacted to arrange for markouts of the underground utilities. Final soil boring locations were adjusted, as necessary, to account for the locations of marked and inferred underground tanks and utilities.

Drilling at the San Lorenzo Operation Maintenance Station #35 took place July 7, 8 and 9, 1993. A total of 11 soil borings were drilled during this investigation. Ten of the soil borings were drilled using a Mobile B61 drill rig with 8-inch outer diameter continuous flight hollow stem augers, operated by Great Sierra Exploration, Inc., from Union City, California. The remaining boring, B-9, was drilled using a Simco drill rig using 8-inch hollow stem augers. The Simco is a five-foot wide rig, modified to enable drilling in locations with restricted access.

An initial evaluation of the ground water gradient was made by measuring the depth to ground water in B-1, B-2 and B-3. Several successive measurements were made in each boring to demonstrate that the depth to water had stabilized. Prior to drilling, elevations of the asphalt at the edges of these boring locations had been determined by surveying. Relative elevations of the ground water were then calculated for each of the borings and used to determine a preliminary ground water gradient. The preliminary gradient determined indicated a ground water flow to the north-northwest rather than to the west or southwest as was originally expected. This required a revision of the soil boring locations. Six of the original borings were not drilled but five new soil borings were added to define the extent of the contamination. The final soil boring locations are shown in Figure 2.

### **3.1.1 Soil Borings and Sampling**

The depths of most borings ranged from 15.5 to 20.5 feet below the ground surface. Although ground water was expected to be encountered at 7 or 8 feet below the ground surface, the dense clay in the upper 20+ feet of the soil restricted water flow, and water was usually not discerned in the borings until depths of 10 to 17 feet had been reached. The depths of the borings varied based on the depth at which ground water was encountered and whether there was sufficient ground water in the boring to collect a grab sample. Once a grab ground water sample had been collected, drilling of the boring was terminated.

Two borings, B-2 and B-17, were drilled to depths of 25.5 and 28.5 feet, respectively. Boring B-2 discovered the existence of a well sorted sand aquifer at a depth of 22 (according to driller) or 25 feet (well log). Boring B-17, discussed below, was drilled to sample ground water and soil in this aquifer down-gradient from the tank pit.

Soil samples were collected at five-foot intervals beginning five feet below the ground surface. Continuous sampling to obtain lithologic information was carried out in B-1, B-7, and B-15, beginning at 4 feet and extending to depths of 20, 18.5 and 15.5 feet, respectively.

Soil samples were collected with an 18-inch split-spoon sampler containing three 2 x 6 inch brass sample liners. Samples were obtained by driving the sampler into undisturbed soil ahead of the augers. After the sampler was recovered, the bottom two sample sleeves were removed and prepared for shipment to the analytical laboratory and delivery to the on-site laboratory, respectively, by placing teflon film over both ends of the sample liner, capping the liner ends with plastic caps, taping the caps with duct tape, and labeling the liner. Samples to be shipped to the off-site laboratory were then sealed inside a plastic bag and immediately placed in a cooler containing sufficient ice or blue ice to preserve the sample at four degrees Celsius until delivered to the laboratory. Samples for the on-site laboratory were hand-delivered to the laboratory for analysis. The field geologist then recorded the lithological description of the sample in accordance with the Unified Soil Classification System (USCS). Field soil boring logs are in Appendix A.

Soil borings B-1 (MW-1), B-5, B-7, B-9 and B-3 were located closest to the open tank pit to establish the condition of the soil in the immediate area of the tank. B-2 was intended to be an up-gradient well and was located in the presumed up-gradient direction. The locations of the other borings were based on the initial determination of the ground water gradient from borings B-1, B-2, and B-3 and the results of the soil and grab ground water sample analyses for TPHd and TPHG by the on-site laboratory. MW-2 (B-14) was located upgradient of the tank pit to establish the condition of the upgradient soil and ground water. MW-3 (B-13) and B-15 were located downgradient of the old tank pit to establish the extent of the contamination downgradient. B-9 and B-16 were located cross-gradient to define the edges of the plume.

B-17 was drilled to a depth of 28.5 feet to sample soil and ground water from the aquifer found below 22 feet depth. B-17 was located and drilled 10 feet north of B-13. This location was chosen because it was down gradient from the tank pit and from the free product observed in the ground water and soil of B-13 at a depth of approximately 10 feet. Twelve-inch outside diameter augers were used to drill 19 feet into the silty clay overlying the lower aquifer. This effectively sealed off the thin sand layers in the clay without penetrating the underlying aquifer. Four-inch outside diameter augers were lowered through the center of the 12-inch augers, and a soil sample was collected to confirm the lithology. The 12-inch augers were then filled with Bentonite slurry to further seal off the upper aquifer, and the smaller boring was then drilled and continuously sampled from 19 to 28.5 feet.

Soil cuttings from drilling were added to the soil stockpile still on-site from excavation and removal of the 2,000 gallon gasoline.

### **3.1.2 Ground Water Grab Sampling**

Grab ground water samples were collected from all borings except B-13. Ground water in boring B-13 was not sampled because of the presence of 0.05 inches of floating product. All borings were drilled to several feet below the water table and the augers left in the hole. When sufficient ground water had collected in the borehole, a sample of the water was collected.

Samples were collected by lowering a bottom-emptying disposable Teflon bailer through the augers and below the water surface. The samples were placed in appropriate containers, labelled with the sample I.D., date, and time collected, and hand-delivered to the on-site laboratory for analysis for petroleum hydrocarbons. Duplicate samples to be sent to an off-site laboratory for lead analysis were placed in appropriate containers, labeled, sealed inside a plastic bag, and immediately placed in a cooler containing sufficient blue ice to preserve the sample at 4 degrees Celsius until delivered to the laboratory.

### **3.1.3 Borehole Abandonment and Surface Repair**

All exploratory borings were abandoned by backfilling the borings with neat cement. The borings were finished with a one-foot cap of asphalt patch, or patched with cement with black coloring added to match the surrounding pavement.

### **3.1.4 Decontamination**

All auger flights were decontaminated before and between borings using a steam cleaner. Soil sampling equipment was cleaned before and between each sampling event by scrubbing with a brush and laboratory grade detergent, triple-rinsing with tap water, and rinsing with distilled water. One 55-gallon steel drum was filled with wash water from the steam cleaning of the augers and decontamination of the sampling equipment.

### **3.1.5 Soil Sample and Grab Ground Water Sample Analyses**

The following methods were used by Mobile Chem Labs. Inc. of Martinez, the on-site laboratory, to analyze all samples:

- EPA Method 8015 modified, for Total Purgeable Hydrocarbons as gasoline (TPHG);

- EPA Method 8020, for Benzene, Toluene, Xylene, and Ethylbenzene (BTEX); and,
- EPA Method 418.1 for Total Recoverable Petroleum Hydrocarbons (TRPH).

Selected samples from all borings except B-14 and B-16 were also analyzed on site by:

- EPA Method 8015 modified, for Total Extractable Hydrocarbons as diesel (TPHD);

Duplicates of soil samples containing the highest concentrations of TPH-G from each boring and grab ground water samples containing TPH-G were sent to Coast-to-Coast Analytical Services in San Jose, CA, for analysis by the following methods:

- EPA Method 6010 for Total Lead; and,
- LUFT Method for Organic Lead.

Each laboratory performed the appropriate QA/QC procedures for each analytical method used.

### 3.2 MONITORING WELLS

Borings B-1, B-14, and B-13 were converted to monitoring wells MW-1, MW-2, and MW-3 respectively (see Figure 2). Analytical results from soil and grab ground water samples collected from the borings, and the direction of the ground water gradient determined the locations of the wells. MW-1 is located 10 feet south-southwest and upgradient of the tank pit. MW-2 was sited further upgradient from pit after the initial NNW gradient was determined and hydrocarbon contamination was detected in the ground water of boring B-2. The location of MW-2 was chosen to avoid any soil or ground water contamination associated with the fuel tanks and to allow testing of upgradient ground water for possible contamination from any unknown upgradient sources. MW-3 was located downgradient of the tank pit and from contamination in the soil and ground water at boring B-3.

### **3.2.1 Well Permitting**

The Alameda County Flood Control and Water Conservation District-Zone 7 is the permitting agency for monitoring wells installed in the San Lorenzo Area. A permit for the drilling and construction of monitoring wells at this site was issued June 16, 1993 (Appendix B).

### **3.2.2 Well Construction**

MW-1 was constructed by reaming out the 8-inch borehole with 10-inch outer diameter hollow stem augers and installing 4 inch, Schedule 40 PVC casing and factory-slotted 0.01-inch screen in the hole. Four-inch casing was used in MW-1 because initially it had been anticipated that this boring would be used in soil and ground water remediation. MW-2 and MW-3 were constructed using 2-inch diameter Schedule 40 PVC casing and factory-slotted 0.01-inch screen with 16 slots per inch. Fifteen feet of screen were used in MW-1 and MW-2, which were drilled to 20 feet below ground surface. Twelve feet of screen were used in MW-3 because the depth of the boring was only 17 feet below ground surface.

No. 2/12 Monterey Sand was used for filter pack and emplaced to one foot above the top of the screen. A one and a half-foot bentonite seal was placed above the sand. A cement-bentonite seal was emplaced in the annular space around the blank casing to make the sanitary seal. Traffic-proof, flush-mounted, waterproof well covers were used at the ground surface to complete the well. Locking plug caps were installed on the casing and the identification number of the well permanently marked on the cap. A graphical depiction of the Monitoring Well construction is shown in Figure 3.

### **3.2.3 Well Development**

The wells were developed on July 13, 1993, using a Smeal well-development rig operated by Great Sierra Exploration. Development was performed by gentle surging with a vented surge block for approximately ten minutes on each well. A mechanical bailer was then used to remove sediment. The ground water had high turbidity because of the high silt and clay content of the geologic formations in



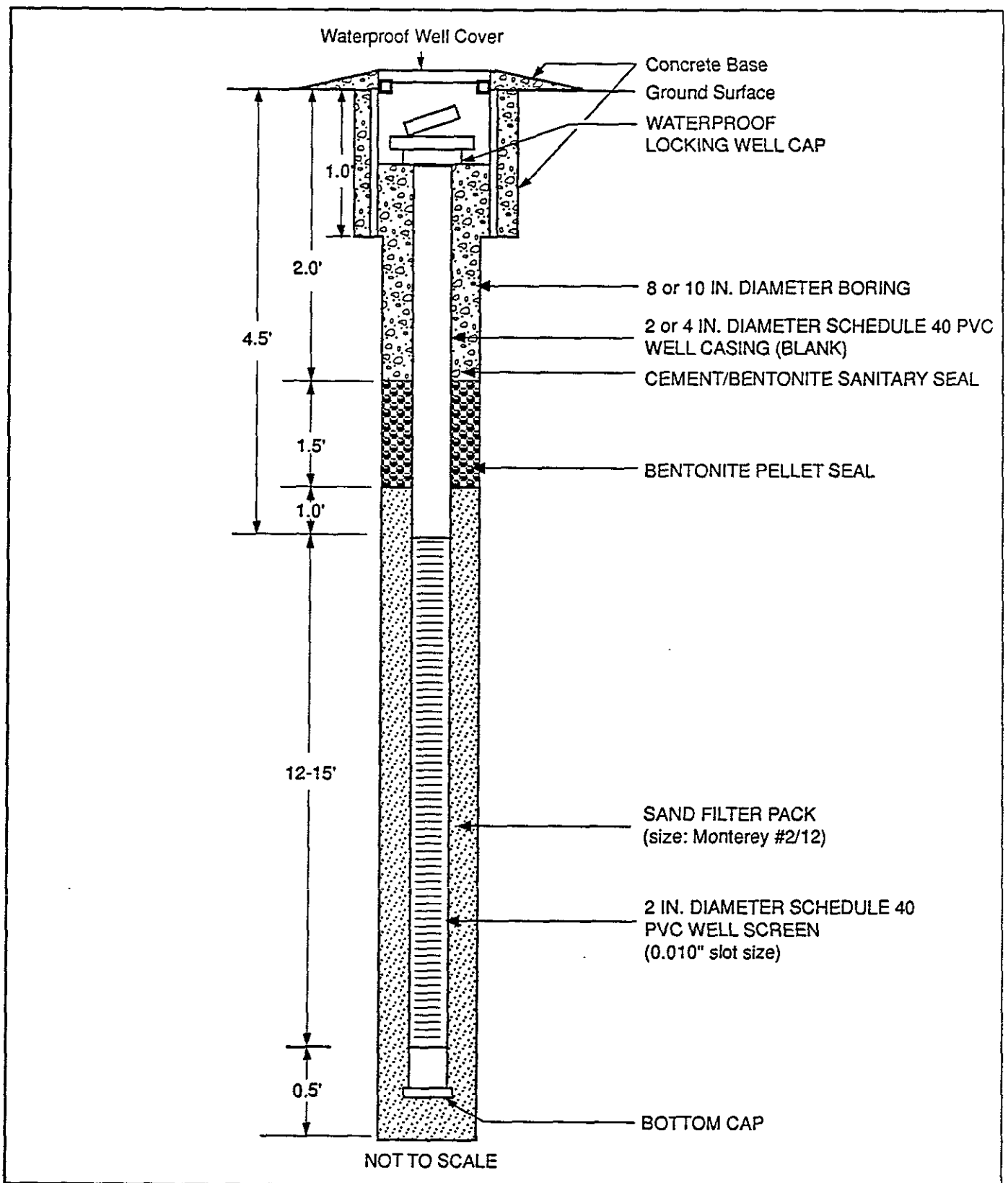


Figure 3

# Monitoring Well Construction Diagram



which the wells were screened. Bailing continued until medium turbidity was obtained. Fifty-five gallons of development water were extracted from each well and stored in DOT-17 drums pending disposal.

#### **3.2.4 Ground Water Sampling**

To allow equilibrium to be established in the well and surrounding aquifer, ground water samples were not collected until July 14, 1993, 24 hours after development was completed.

Prior to sampling, water levels were measured to 0.01 feet in all wells using an electronic interface tape. The time, date, depth to the nearest 0.01 foot to product and/or water, and other observations were recorded in the log book.

Three well volumes were purged from each of the wells. Water samples were collected using a Teflon bailer equipped with a bottom-emptying device. The bailer was decontaminated before and between all sampling events by scrubbing with a brush and laboratory-grade detergent, then rinsed three times in potable water, final rinsed in distilled water, and air dried.

Ground water samples were placed in appropriate containers, labelled with the sample I.D., date, and time collected, and stored in coolers on ice (to maintain at temperature of about four degrees Celsius) for shipment under chain-of-custody to a state-certified laboratory.

Purge water was put in DOT-17 drums and stored in a secure location on site pending disposal.

#### **3.2.5 Ground Water Sample Analysis**

Ground water samples were analyzed by Coast-to-Coast Analytical Services in San Jose, CA. All ground water samples were analyzed by the following methods:

- EPA Method 8015 modified, for Total Purgeable Hydrocarbons as gasoline;

- EPA Method 8015 modified, for Total Extractable Hydrocarbons as diesel (TPHD);
- EPA Method 602; for Benzene, Toluene, Xylene, and Ethylbenzene (BTEX); and,
- EPA Method 418.1 for Total Recoverable Petroleum Hydrocarbons (TRPH).

*Also for lead*

The laboratory was required to perform the appropriate QA/QC procedures for each method used.

### 3.2.6 Well Survey

The elevation of each well was surveyed to an accuracy of 0.01 feet by surveyors from Marton M. Ron Associates, Inc., of San Francisco. Elevations were reported relative to mean sea level and were measured relative to a permanent notch made on the north rim of the casing. The horizontal location of each well was located to an accuracy of 0.1 feet by Tetra Tech personnel using a fiber glass tape.

### 3.3 DISPOSAL OF DRILL CUTTINGS AND WASH, RINSATE, DEVELOPMENT AND PURGE WATER

Drill cuttings were added to the on-site soil stockpile that resulted from excavation and removal of the gasoline tank. The cuttings will be disposed of, along with soil from the excavation, by ATR Enterprises, who removed the tank.

Water from washing and rinsing the augers and sampling equipment, and ground water from development and purging of the monitoring wells prior to sampling was stored in DOT-17 55-gallon drums. These drums were picked up Friday, August 13, 1993 by Armour Petroleum Service and Equipment Corporation of Vacaville, CA (Appendix D).

## 4.0 RESULTS OF THE FIELD INVESTIGATION

### 4.1 SITE GEOLOGY

The site geology was determined from the soil samples collected during drilling. The boring logs are in Appendix A. Evaluation of the lithologic logs indicates that there are two aquifers present at the site. The upper aquifer consists of dense silty sandy clays and clayey silts containing a few fine-to medium-grained sand lenses up to one foot thick. Sand lenses were most commonly encountered between 8 and 14 feet below ground surface. The lower aquifer is sand approximately 5 feet thick, first encountered about 22 feet below ground surface. The two aquifers are separated by 8 to 10 feet of dense silty clay. Figures 4a and 4b show lithologic cross sections of the site.

### 4.2 ANALYTICAL RESULTS

Analytical results are presented in Tables 2 through 4 and Figures 5 and 6. Laboratory reports and chain-of-custody documentation are included in Appendix C.

#### 4.2.1 Soil Samples

A total of 46 soil samples were collected and analyzed. Only five samples contained detectable concentrations of hydrocarbons.

Samples collected at a depth of 10 feet from B-3 and B-13 contained concentrations of TPH-G at 450 ppm and 5.9 ppm respectively (Table 2). PID readings supported the presence of hydrocarbons in the soil. BTEX, TRPH and TPH-G and total lead concentrations were detected at moderate levels in B-3 at this depth. All soil lead concentrations were normal and not elevated. No concentrations above the reporting limits were detected in sample collected from B-17 at 24.5 feet, which represented the soils

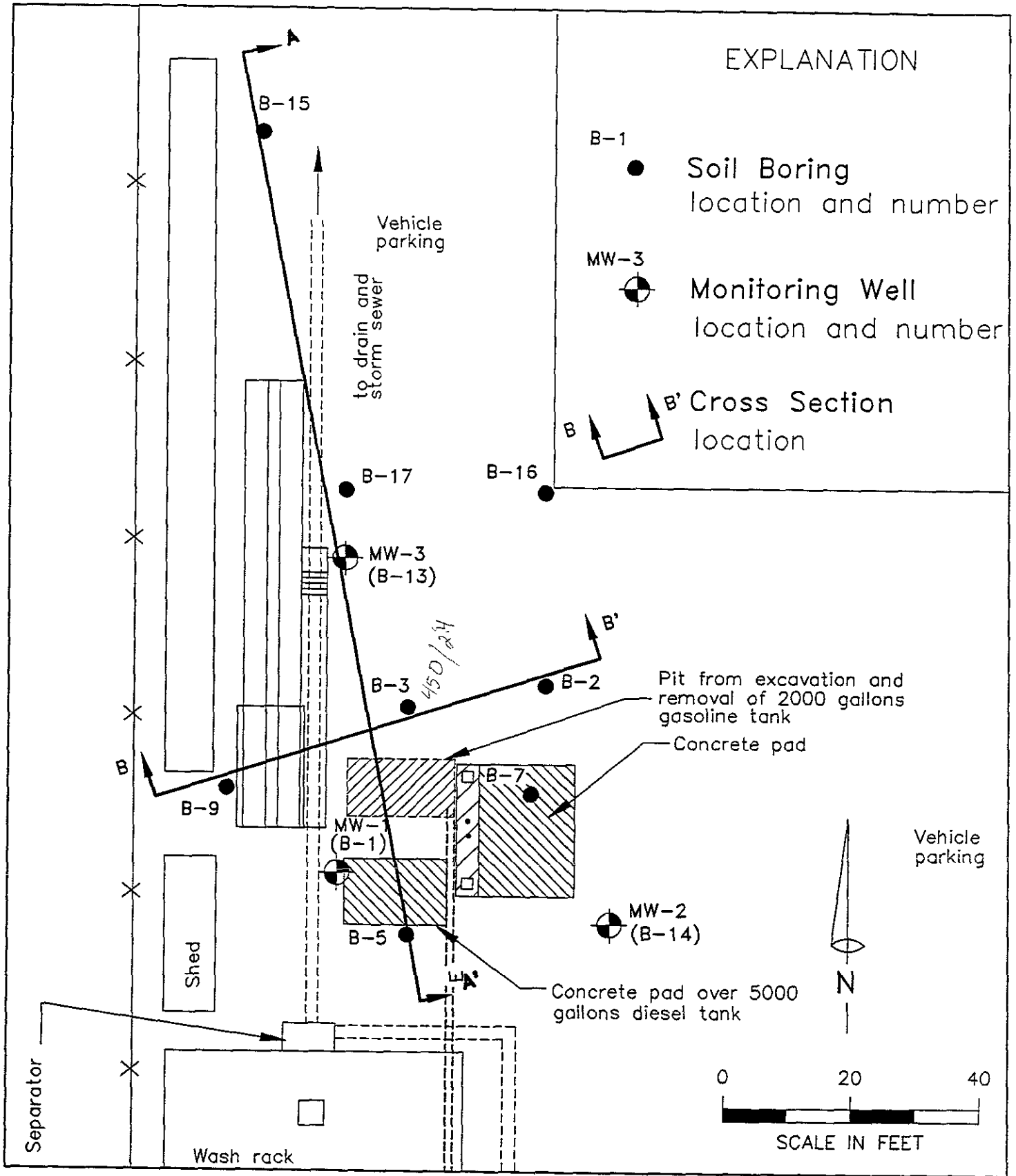


Figure 4

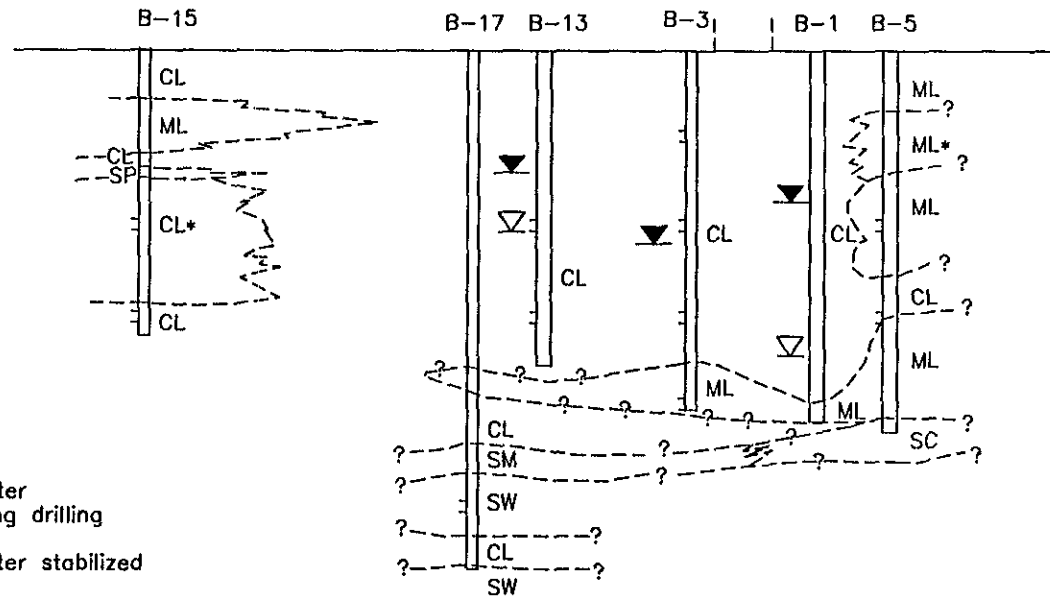
Site Plan showing Locations of cross-sections



North  
A

South  
A'

Location of  
Tank Pit



EXPLANATION

- ▽ Depth at which Ground Water was first encountered during drilling
- ▼ Depth at which Ground Water stabilized
- | Location of Soil Sample in Boring

NOTES:

- Lithologic Contacts dashed where inferred.
- Soil descriptions according to Unified Soil Classification System (See Appendix A).
- \* Denotes presence of thin lenses of sand

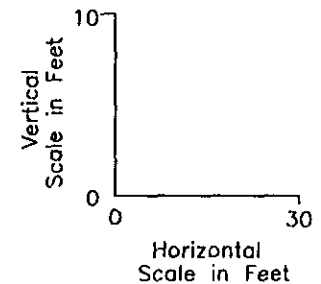


Figure 4a

Lithologic  
Cross Section A-A'



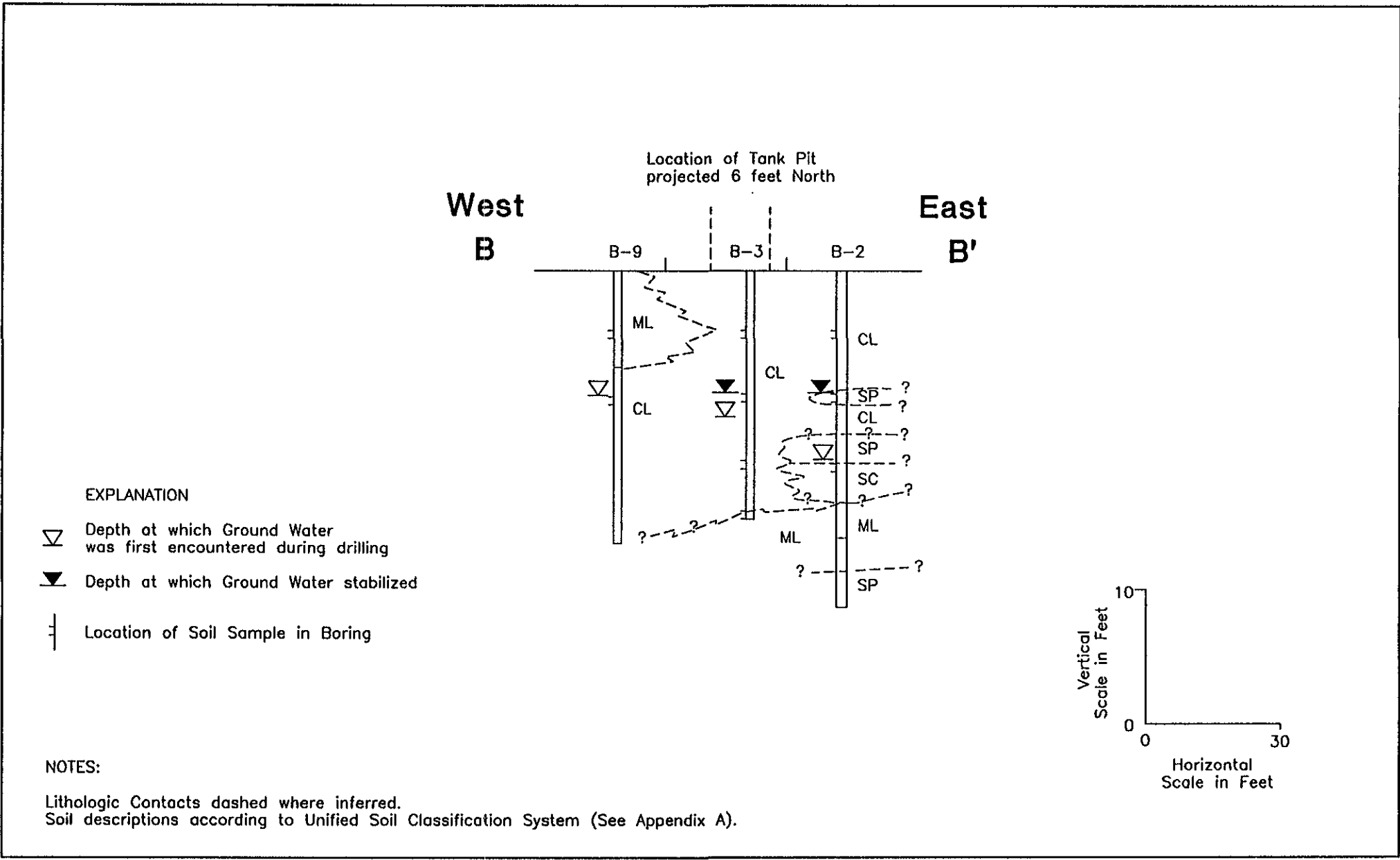


Figure 4b      Lithologic Cross Section B-B'

**Table 2**  
**Analytical Results for Petroleum Hydrocarbons and Lead in Soil Samples Collected From**  
**Soil Borings Drilled July 7, 8, and 9, 1993 at San Lorenzo, OMS #35**

Sample Number	Depth (ft)	TRPH (418.1) (mg/kg)	TPH - D (8015mod) (mg/kg)	TPH - G (8015mod) (mg/kg)	Organic Pb (22 CAC) (mg/kg)	Total Pb (7420) (mg/kg)	Benzene (8020) (mg/kg)	Toluene (8020) (mg/kg)	Ethylbenzene (8020) (mg/kg)	Xylene (8020) (mg/kg)	PID (ppm)
B1-5	5.0 - 5.5	ND	ND	ND	na	na	ND	ND	ND	ND	0.6
B1-9.5&10	9.5 - 10.5	ND	ND	ND	ND	17	ND	ND	ND	ND	0.3
B1-15	15.0 - 15.5	ND	ND	ND	na	na	ND	ND	ND	ND	0.4
B1-20	20.0 - 20.5	ND	ND	ND	na	na	ND	ND	ND	ND	0.4
B2-5	5.0 - 5.5	ND	ND	ND	na	na	ND	ND	ND	ND	0.3
B2-9.5&10	9.5 - 10.5	ND	ND	ND	ND	10	ND	ND	ND	ND	0.6
B2-15	15.0 - 15.5	ND	ND	ND	na	na	ND	ND	ND	ND	0.6
B3-5	5.0 - 5.5	ND	ND	ND	na	na	ND	ND	ND	ND	0
B3-9.5&10	9.5 - 10.5	82	17	450	ND	13	2.4	11	8	8	151
B3-15	15.0 - 15.5	19	ND	7	na	na	0.066	0.32	0.2	0.75	54
B3-20	20.0 - 20.5	ND	ND	ND	na	na	ND	ND	ND	ND	0
B5-5	5.0 - 5.5	ND	ND	ND	na	na	ND	ND	ND	ND	0
B5-10	10.0 - 10.5	ND	ND	ND	na	na	ND	ND	ND	ND	0
B5-15	15.0 - 15.5	ND	ND	ND	na	na	ND	ND	ND	ND	0
B7-5	5.0 - 5.5	ND	ND	ND	na	na	ND	ND	ND	ND	0
B7-10	10.0 - 10.5	ND	ND	ND	na	na	ND	ND	ND	ND	0
B7-15	15.0 - 15.5	ND	ND	ND	na	na	ND	ND	ND	ND	0
B9-5	5.0 - 5.5	ND	ND	ND	na	na	ND	ND	ND	ND	0
B9-10	10.0 - 10.5	ND	na	ND	na	na	ND	ND	ND	ND	0
B13-9.5&10	9.5 - 10.5	ND	ND	5.9	ND	17	0.19	0.006	0.04	0.31	6.4
B13-15	15.0 - 15.5	ND	ND	ND	na	na	ND	ND	ND	0.008	2.8
B14-10	10.0 - 10.5	ND	na	ND	na	na	ND	ND	ND	ND	0
B14-15	15.0 - 15.5	ND	na	ND	na	na	ND	ND	ND	ND	0
B15-5	5.0 - 5.5	ND	ND	ND	na	na	ND	ND	ND	ND	0
B15-10	10.0 - 10.5	ND	na	ND	na	na	ND	ND	ND	ND	0
B15-15	15.0 - 15.5	ND	na	ND	na	na	ND	ND	ND	ND	0
B16-5	5.0 - 5.5	ND	na	ND	na	na	ND	ND	ND	ND	0
B16-10	10.0 - 10.5	ND	na	ND	na	na	ND	ND	ND	ND	0
B16-15	15.0 - 15.5	ND	na	ND	na	na	ND	ND	ND	ND	0
B17-25	25.0 - 25.5	ND	ND	ND	na	na	ND	ND	ND	ND	0
Detection Limit:		10	5	1	1	1	0.005	0.005	0.005	0.005	---
Average		3.37	0.77	15.43	ND	14.25	0.09	0.38	0.27	0.30	7.20
Maximum		82	17	450	ND	17	2.4	11	8	8	151
Minimum		ND	ND	ND	ND	10	ND	ND	ND	ND	0

Note: Only soil samples which had detectable concentrations of TPHg were analyzed for lead

na = not analyzed for this analyte

ND = not detected at or above detection limit

Bold = TPH-G > 100 mg/kg

Averages are computed assuming that ND = 0 mg/kg.



of the lower aquifer.

Samples collected from a depth of 15 feet from boring B-3 contained concentration of TRPH and TPH-G of 19 ppm and 7 ppm, respectively. Trace amounts of xylene were detected in the 15-foot sample from B-13.

The results of the analyses are summarized on Figures 5, 5a, and 5b.

#### **4.2.2 Grab Ground Water Samples from Borings**

Of the 10 grab ground water samples collected and analyzed, only one, B3-W1, had high concentrations of petroleum hydrocarbons (Table 3). Sample B3-W1 contained 110,000  $\mu\text{g/L}$  TPHG, 3.3 mg/L TRPH, 3,400  $\mu\text{g/L}$  benzene, 7,600  $\mu\text{g/L}$  toluene, 2,600  $\mu\text{g/L}$  ethylbenzene, 10,000  $\mu\text{g/L}$  xylene. No soluble or organic lead was detected.

Grab ground water sample B2-W1, collected from boring B-2 when it had been advanced to a depth of 15 feet, contained 61  $\mu\text{g/L}$  TPH-G, 0.6  $\mu\text{g/L}$  benzene, and a combined total of 64.9  $\mu\text{g/L}$  toluene, ethylbenzene, and xylenes. Boring B-2 was then advanced to a depth of 25.5 feet into the lower aquifer in anticipation of installing a monitoring well. Upon receipt of the B2-W1 analytical results, it was realized that contamination of the lower aquifer could occur. Subsequently, boring B-2 was purged of several well volumes of water and ground water sample B2-W2 collected. Following collection of sample B2-W2, the boring was pressure-grouted with neat cement from the bottom up, using a tremmie pipe. Analytical results from B2-W2 showed this sample to contain no detectable concentrations of any of the analyses.

Grab ground water sample B9-W1 contained 56  $\mu\text{g/L}$  TPH-D. A ground water grab sample was not collected from Boring 13 because the water was presumed to be contaminated because of the presence of 0.005 feet of free product on the water surface. Except for 1.7 mg/l ethylbenzene, the grab ground water sample collected from the lower aquifer penetrated by B-17 contained no detectable concentrations of TPH-G, TPH-D, TRPH, BTEX, or organic or metallic lead. Results of the analyses are presented in Table 3 and in Figure 6.

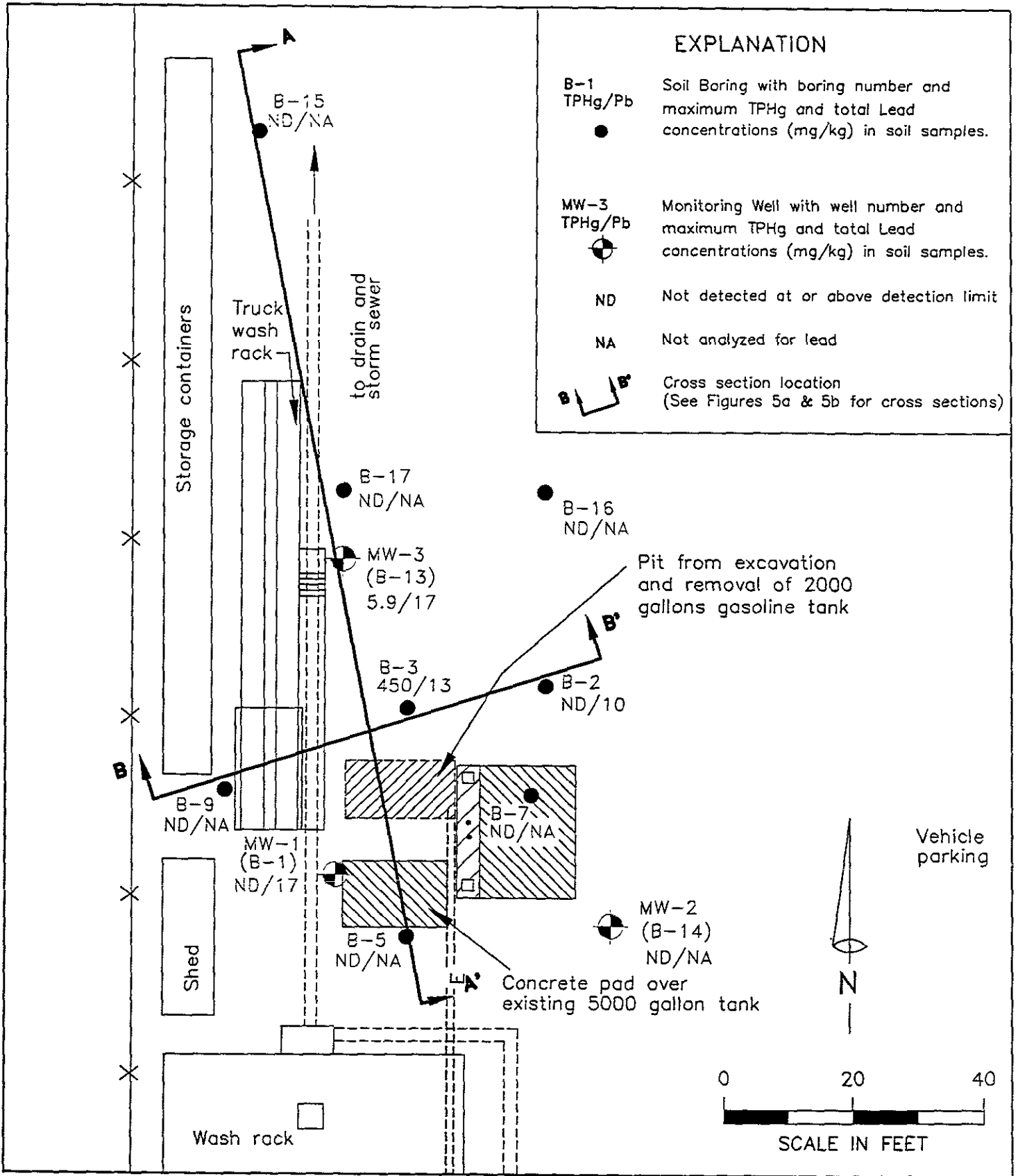


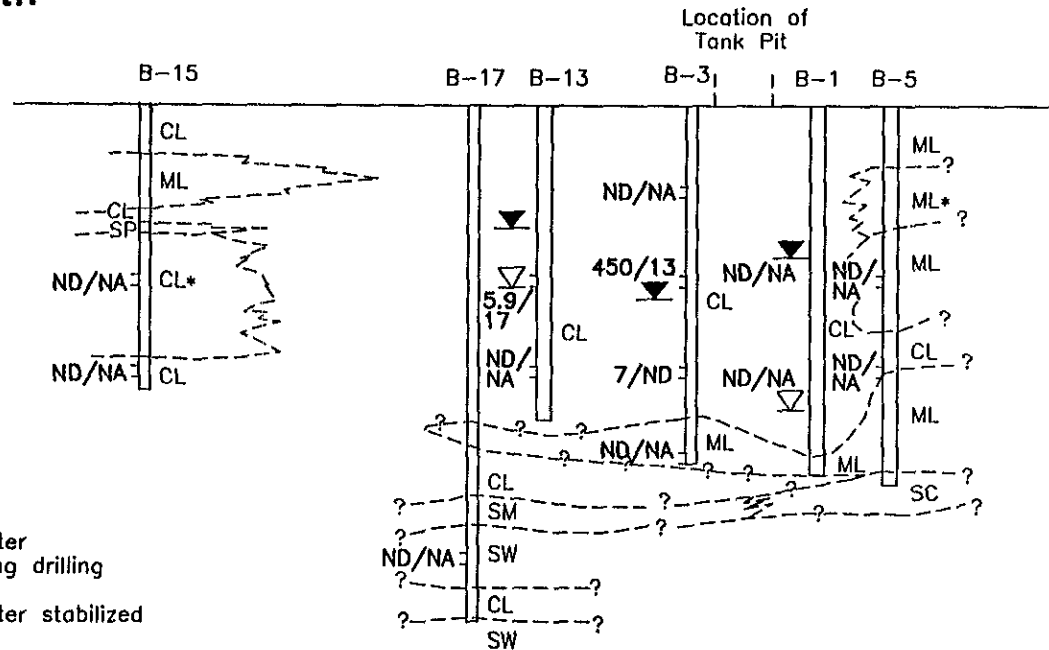
Figure 5

Site Map Showing Soil TPHg and Lead Concentrations



North  
A

South  
A'



EXPLANATION

- ▽ Depth at which Ground Water was first encountered during drilling
- ▾ Depth at which Ground Water stabilized
- | Location of Soil Sample in Boring

NOTES:

- ND Not detected at or above detection limits
- NA Not analyzed for this analyte
- \* Denotes presence of thin lenses of sand

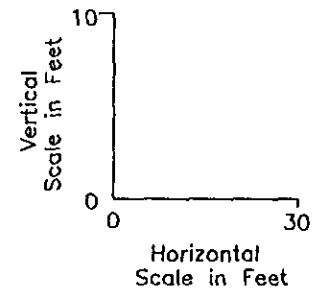
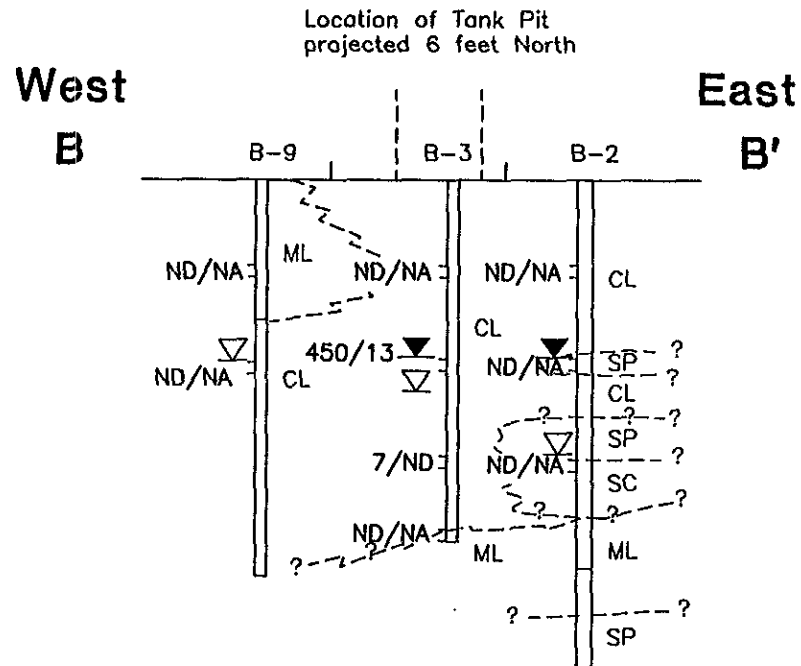


Figure 5a

Cross-Section A-A' Showing TPHg and Total Lead Concentrations in Soil Samples





EXPLANATION

- ▽ Depth at which Ground Water was first encountered during drilling
- ▾ Depth at which Ground Water stabilized
- | Location of Soil Sample in Boring

- NOTES:
- ND Not detected at or above detection limit
  - NA Not analyzed for this analyte

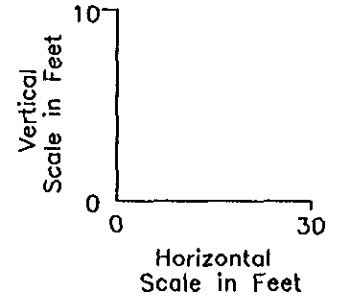


Figure 5b Cross Section B-B' Showing TPHg and Total Lead Concentrations in Soil Samples

**Table 3**  
**Analytical Results for Petroleum Hydrocarbons and Lead in Grab Ground Water Samples**  
**Collected From Soil Borings Drilled July 7, 8, and 9, 1993 at San Lorenzo, OMS #35**

Sample Number	TRPH (418.1) (mg/L)	TPH - D (8015mod) (ug/L)	TPH - G (8015mod) (ug/L)	Organic Pb (22 CAC) (mg/L)	Dissolved Pb EPA 7421 (mg/L)	Benzene (8020) (ug/L)	Toluene (8020) (ug/L)	Ethylbenzene (8020) (ug/L)	Xylenes (8020) (ug/L)
B1-W1	ND	ND	ND	na	na	ND	ND	ND	ND
B2-W1	ND	ND	61	ND	ND	0.6	2.1	62	0.8
B2-W2	ND	ND	ND	na	na	ND	ND	ND	ND
B3-W1	3.3	ND	11000	ND	ND	3400	7600	2600	10000
B5-W1	ND	ND	ND	na	na	ND	ND	ND	ND
B7-W1	ND	ND	ND	na	na	ND	ND	ND	ND
B9-W1	ND	56	ND	na	na	ND	ND	ND	ND
B13-W1	Free Product	na	na	ND	ND	na	na	na	na
B14-W1	ND	na	ND	na	na	ND	ND	ND	ND
B15-W1	ND	ND	ND	na	na	ND	ND	ND	ND
B16-W1	ND	na	ND	na	na	ND	ND	ND	ND
B17-W1	ND	ND	ND	na	na	ND	ND	1.7	ND
Detection Limit	1	50	50	0.05	0.005	0.5	0.5	0.5	0.5
Average	0.33	7.00	11000.00	ND	ND	340.06	760.21	266.37	1000.1
Maximum	3.3	56	110000	ND	ND	3400	7600	2600	10000
Minimum	ND	ND	ND	ND	ND	ND	ND	ND	ND
<b>Maximum Contaminant Levels (MCLs) for Drinking Water</b>									
EPA MCL	---	---	---	---	0.05	5	1,000	700	11,000
Cal DHS MCL	---	---	---	---	0.05	1	---	680	1,750

Note: Only water samples which had detectable concentrations of TPHg were analyzed for lead.

na = not analyzed for this analyte

ND = not detected at or above detection limit

Shading = TPH > 10 mg/L, BTEX > MCLs

Averages are computed assuming ND = 0.

#### **4.2.3 Ground Water Samples from Monitoring Wells**

Ground water samples from monitoring wells MW-1 and MW-2 contained no detectable concentration of hydrocarbons (Table 4). Ground water from well MW-3 contained 1.0 mg/L TRPH, 4,100  $\mu\text{g/L}$  TPH-G and 640  $\mu\text{g/L}$  Xylenes. No other hydrocarbons were detected in sample MW3 at or above the moderately increased detection limits. Results of the analysis are presented in Table 4 and Figure 6.

#### **4.3 DEPTH TO GROUND WATER AND GROUND WATER GRADIENT**

The depth to ground water at the site on July 14, 1993 was 7.34-8.86 feet (Table 5) and inferred direction of ground water flow was toward N 15° E with a gradient of 0.006. The results are summarized in Table 5 and displayed in Figure 7.

Depths to ground water were remeasured August 12, 1993 and were 7.89-9.43 feet (Table 5). The ground water gradient on August 12, 1993 was determined to be 0.004 towards N05°E (Figure 8).

**Table 4**  
**Analytical Results for Petroleum Hydrocarbons and Lead in Ground Water Samples**  
**Collected July 14, 1993 at San Lorenzo, OMS #35**

Sample Number	TRPH (418,1) (mg/L)	TPH - D (8015mod) (ug/L)	TPH - G (8015mod) (ug/L)	Benzene (8020) (ug/L)	Toluene (8020) (ug/L)	Ethylbenzene (8020) (ug/L)	Xylene (8020) (ug/L)
MW1	ND	ND	ND	ND	ND	ND	ND
MW2	ND	ND	ND	ND	ND	ND	ND
MW3	1.0	ND < 200	4100	ND < 5	ND < 5	ND < 5	640
Detection Limit	0.5	50	50	0.5	0.5	0.5	0.5
Average	0.33	ND	1366.67	ND	ND	ND	213.33
Maximum	1	ND	4100	ND	ND	ND	640
Minimum	ND	ND	ND	ND	ND	ND	ND
<b>Maximum Contaminant Levels (MCLs) for Drinking Water</b>							
EPA MCL	---	---	---	5	1,000	700	11,000
Cal DHS MCL	---	---	---	1	---	680	1,750

NA = not analyzed for this analyte  
 ND = not detected at or above detection limit  
 Averages are computed assuming ND = 0.

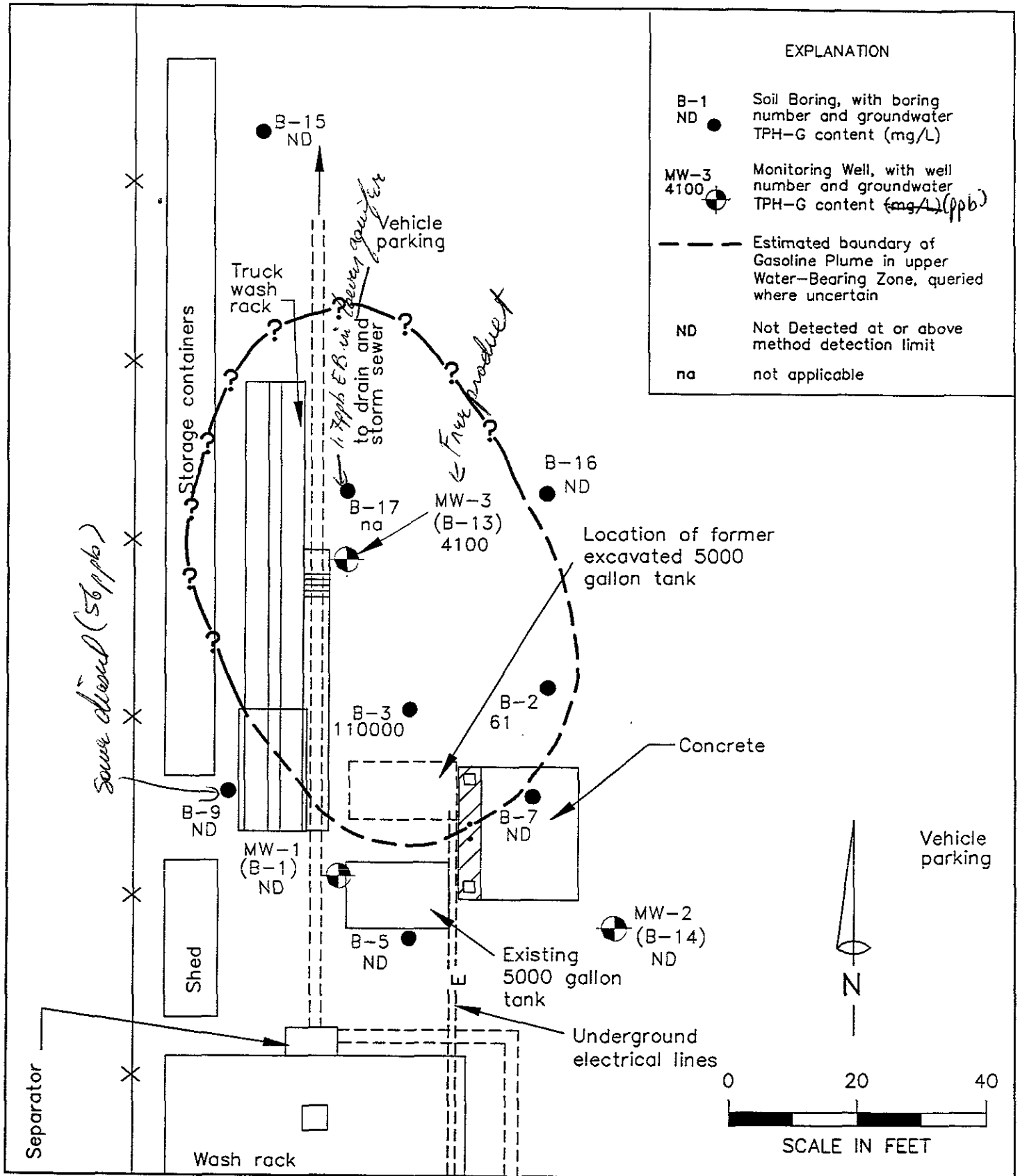


Figure 6 Map Showing Extent of Gasoline Plume in the Upper Water-Bearing Zone





Table 5				
Ground Water Elevations at San Lorenzo, OMS #35				
Monitoring Well	Date Measured	Elevation at Top of Casing (feet MSL)	Depth to Water (feet)	Ground Water Elevation (feet MSL)
MW-1	7/14/93	35.53	8.05	27.48
	8/12/93		8.66	26.87
MW-2	7/14/93	36.32	8.86	27.46
	8/12/93		9.43	26.89
MW-3	7/14/93	34.54	7.34	27.20
	8/12/93		7.89	26.67

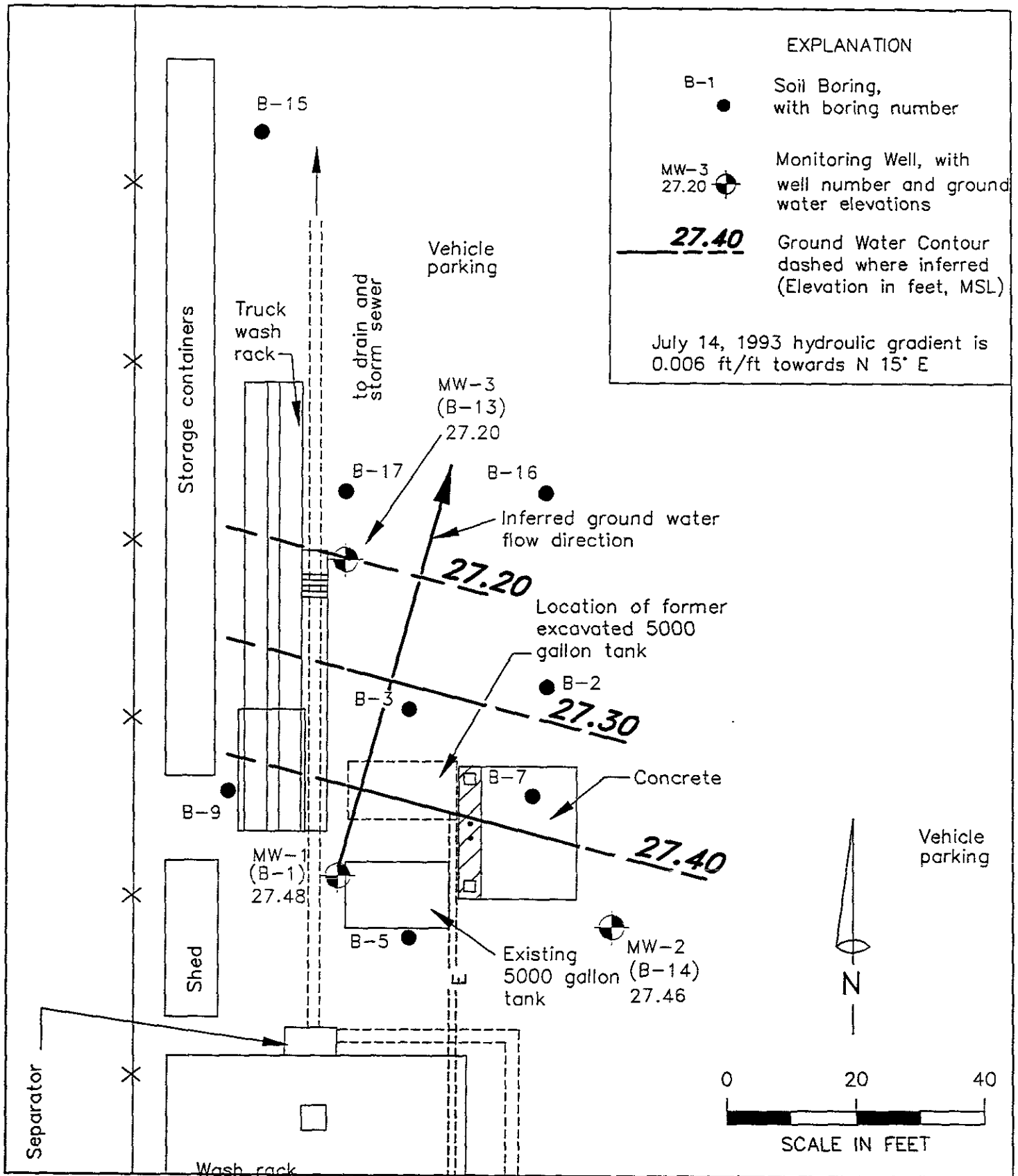


Figure 7

Water Table Contours and Hydraulic Gradient for July 14, 1993



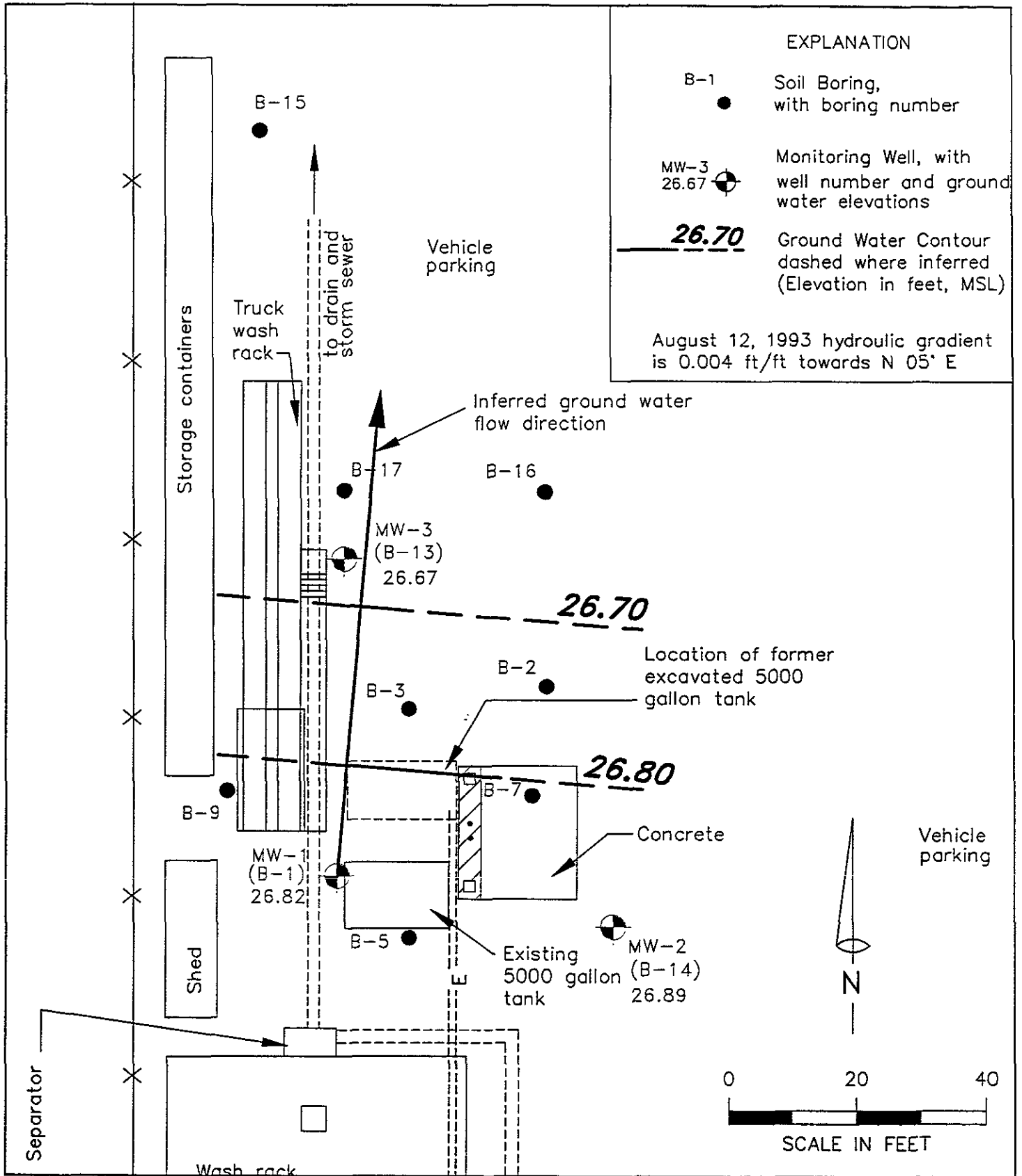


Figure 8

Water Table Contours and Hydraulic Gradient for August 12, 1993



## 5.0 DATA EVALUATION AND DISCUSSION

Analytical results show the soil and ground water to be contaminated with gasoline adjacent to and north of the tank pit. Boring B-3 contains 450 mg/kg TPH-G and 17 mg/kg TPH-D at a depth of 10 feet. This contamination extends to at least a depth of 15 feet (7 mg/kg TPH-G) but is not detectable in soil samples collected at 20 ft or from 5 feet depth. The soil sample collected from a depth of 10 feet in boring 13 also contains gasoline contamination (5.9 mg/kg). Soil from both borings contained some free product (see boring logs, App. A).

Water samples from these two borings contained significant gasoline contamination as well. The grab ground water sample from boring B-3 contained 110 mg/L TPH-G and 3,400  $\mu\text{g/l}$  benzene (well above the 1  $\mu\text{g/l}$  cal DHS MCL for benzene in drinking water); ground water in boring B-13 was covered by a thin (0.005 ft) layer of free product and was not sampled. A ground water sample collected from monitoring well MW-3, installed in boring B-13, contained 4,100  $\mu\text{g/L}$  TPH-G. Also, the grab ground water sample from boring B-2 contained 61  $\mu\text{g/L}$  TPH-G.

PID readings in borings B-3 and B-13 (Table 2) are consistent with the amount of gasoline found in the soil samples. The very low PID readings noted in borings B-1 and B-2 may be due to stray volatiles from the drill rig or from other vehicles on the site, or may reflect instrumental drift from the initial zero value. The readings show no relation to sample depth and probably do not indicate soil gas hydrocarbon contamination.

The 56  $\mu\text{g/L}$  TPH-D found in the grab ground water sample from boring B-9 is only slightly above the detection limit. It may result from fuel spills that occurred when, according to Sgt. Burns, a fueling station was sited in this location. However, no soil samples from boring B-9 contained detectable concentrations of any hydrocarbons.

Based on the analytical results from the soil borings and from the PID readings and geologist's observations, the soil contamination away from the immediate vicinity of the tank pit appears to be

vertically constrained to depths between approximately 9 and 16 feet. For that reason, no soil samples were collected at five foot depths from borings B-9, B-13, and B-14.

The horizontal extent of gasoline contamination on the soil and ground water must extend beyond boring B-13 (MW-3), located about 33 feet north-northwest of the tank pit, but does not extend to boring B-15, about 100 feet north-northwest of the pit. The maximum extent of contamination to the east is delineated by borings B-2, B-7, and B-16. Although boring B-2 contained 61  $\mu\text{g/l}$  TPH-g in the grab ground water sample collected when the boring was at a depth of 15 feet, no hydrocarbon contamination of the soil was discerned. No evidence of soil or ground water contamination was found in borings B-7 (12 feet east of the pit) or in boring B-17 (45 feet north-northeast of the pit). South of the pit, no evidence of soil or ground water hydrocarbon contamination was found in borings B-1 (MW-1) or B-5. West of the pit, boring B-9 contained no detectable hydrocarbon contamination in soil samples, but a trace of TPH-D contamination (56  $\mu\text{g/L}$ ) was found in the grab ground water sample. An estimate of the extent of gasoline contamination in the upper aquifer is shown in Figure 6.

Analyses of soil and grab ground water samples collected from the lower aquifer penetrated by borings B-2 (water sample B2-W2) and B-17 show no evidence of contamination. Sample B2-W2 was collected from boring B-2 after it had been drilled to a depth of 25 feet and then purged of several volumes of water. The absence of TPH-G in this sample, when 61  $\mu\text{g/l}$  TPH-G had been discerned in the grab ground water sample collected from the boring when it was 15 ft deep, is believed to result from the diluting effect of the relatively clean and abundant water from the lower aquifer; the lower aquifer is composed of well-sorted fine to coarse sand several feet thick, whereas the upper aquifer consists of sparse, thin sand beds within the silty clay that makes up the bulk of the upper part of the soil. The interpretation that the lower aquifer is uncontaminated is reinforced by the absence of detectable contamination in samples collected from the lower aquifer in boring B-17, located downgradient from both the tank pit and the free product in boring B-3.

The ground water gradient at this site was expected to be towards the west-southwest or southwest, towards San Francisco Bay and nearby San Lorenzo Creek. The initial determination of the gradient, from borings B-1, B-2, and B-3 during field work July 7, 1993, found the gradient to be toward the north-northwest, essentially following the local topography. Subsequent locations of soil borings and

monitoring wells were based upon this gradient. More recent water table information obtained from the monitoring wells has shown the gradient to be more easterly, varying from N15°E to N05°E.

## 6.0 CONCLUSIONS AND RECOMMENDATIONS

Soil and ground water are significantly contaminated by gasoline at the San Lorenzo OMS #35 site. Contamination mainly extends northward more than 33 feet from the pit from which the gasoline tank was removed in April, 1993. Most of the soil contamination is between depths of 9 and 16 feet, although shallower contamination occurs in the walls of the tank pit. The full extent of ground water contamination is not yet known; it is unconstrained west of boring B-3 (MW-3) and northeast of boring B-17. An estimate of the horizontal extent of ground water contamination is shown in Figure 6.

Ground water contamination is confined to thin sand lenses and the surrounding silty clays that form the upper aquifer. Soil and ground water samples from the lower aquifer that was encountered at 22-25 feet bgs show no evidence that the lower aquifer has been impacted. Ground water gradient is essentially to the north.

The vertical and horizontal extent of the gasoline contamination at the San Lorenzo OMS# 35 has been defined satisfactorily in all directions except to the west and possibly, the north-northeast. Given the general hydraulic gradient and the high gasoline concentrations detected in B-13, the contamination probably extends under the truck wash rack. To fully constrain the plume on the west side, an additional one or two borings should be drilled west of the truck wash rack. Because the ground water has a more easterly gradient than was initially determined, a boring northeast of B-17 is also recommended to define the plume to the northeast.

One of the objectives of this investigation was to define the extent of the contamination so a feasibility study for remediation of the soil and ground water could be conducted. As mentioned above, the extent of contamination has been fully defined in all directions with the exception of an area to the west of MW-3 (cross-gradient) and to the north-northeast of B-17. The feasibility study (FS) will be completed using the information in hand. However, in order to further define the extent of soil and ground water contamination, Tetra Tech recommends that the additional borings be considered.

## 7.0 REFERENCES CITED

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West and Hansen Engineers, Inc., 1989b. Report of Findings, Informal Site Investigations, OMS #35, San Lorenzo, 1 p., map (no scale).

\* Tri-Regional Board Staff is composed of the staff of North Coast Regional Water Quality Control Board, San Francisco Bay Regional Water Quality Control Board, and Central Valley Regional Water Quality Control Board.



**APPENDIX A**  
**FIELD SOIL BORING LOGS**

**KEY TO EXPLORATORY BORINGS**  
**UNIFIED SOIL CLASSIFICATION SYSTEM (USCS)**

PRIMARY DIVISIONS			GROUP SYMBOL	TYPICAL NAMES
<b>COARSE GRAINED SOILS</b>  more than half of material is larger than no. 200 sieve size (0.74 mm)	<b>GRAVELS</b>  more than half of coarse fractions is larger than no. 4 sieve (4.75 mm)	<b>CLEAN GRAVEL</b>  (less than 5% fines)	<b>GW</b>	Well-graded gravels, gravel-sand mixtures, little or no fines
		<b>GRAVEL WITH FINES</b>	<b>GP</b>	Poorly graded gravels or gravel-sand mixtures, little or no fines
			<b>GM</b>	Silty gravels, gravel-sand-silt mixtures, non-plastic fines
		<b>SANDS</b>  more than half of coarse fractions is smaller than no. 4 sieve (4.75 mm)	<b>CLEAN SANDS</b>  (less than 5% fines)	<b>GC</b>
	<b>SW</b>			Well-graded sands, gravelly sands, little or no fines.
	<b>SANDS WITH FINES</b>		<b>SP</b>	Poorly graded sands or gravelly sands, little or no fines.
			<b>SM</b>	Silty sands, sand-silt mixtures, non-plastic fines.
	<b>FINE GRAINED SOILS</b>  more than half of material is smaller than no. 200 sieve size (0.074 mm)	<b>SILTS</b>  AND	Low liquid limit < (50%)	<b>SC</b>
<b>ML</b>				Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity.
<b>CL</b>				Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays
<b>CLAYS</b>		High liquid limit (> 50%)	<b>OL</b>	Organic silts and organic silty clays of low plasticity
			<b>MH</b>	Inorganic silty, micaceous or diatomaceous fine sandy or silty soils, elastic silts.
			<b>CH</b>	Inorganic clays of high plasticity, fat clays.
			<b>OH</b>	Organic clays of medium to high plasticity, organic silts.
<b>HIGHLY ORGANIC SOILS</b>			<b>Pt</b>	Peat and other highly organic soils.



TETRA TECH, INC.  
FIELD LOG OF BORING

Boring #: B-1/HW-1  
Sheet 1 of 2

Project Name and Location: SAN LORENZO, GMS #35 TC Number: 9410-02  
 Elevation: 35.69' Date and Time Started: 7/7/93 @ 8:30 Date and Time Completed: 7/7/93 @ 10:00.  
 Completion Depth: 20' Number of Samples: 4 Drive: 4 1-liter: 1 VOA: 6 VOAS Other: 1 - 200ml.  
 Boring Diameter & Drilling Method: 8" HOLLOW STEM AUGER Water Level: First (date/time): 15' 7/7/93 NT-02 Second (date/time): 10.85 (7/7/93/1425)  
 Sampler: SPLIT SPOON Hammer Wt.: 140 Drop: 60" Boring Location: 126' NORTH, 30' EAST.

Drilling Co: GREAT SIERRA EXPLOSION Driller: Philip Reise Geologist: K. Bishop

Depth (ft.)	Sample No.	Sample Interval	Recovery	Blow Count	Description	Graphic Symbol	USCS Symbol	Estimated % of				P.I.D. Reading	Comments
								Gr	Sa	Si	Cl		
0	BY HAND				0-4" ASPHALT								
1	ROSERIN 9				PLA GRAVEL								
	TO 2 1/2'				PET GRAVEL								
2					DARK BROWN DAMP DENSE SLTY CLAY (CL)		CL		20	80			
					DARK BROWN DAMP DENSE CLAY				20	80			
3	CONTINUOUS		///	4	AS ABOVE				20	80			
	CORE		///	4					20	80			
4			///	6					20	80			
	KB 81-4.5		///	4	DARK BROWN DAMP-MOIST CLAY		CL				0		
5			///	6	DARK BROWN DAMP-MOIST CLAY		CL				0.0	0900.	
	B1-5		///	6	HARD, NO ODOOR				10	10	80	0.0	0900.
6	CC		///	3	DARK BROWN, MOIST, DENSE CLAY				10	10	80		
	CC		///	6	NO ODOOR				10	10	80		
	CC		///	11	AS ABOVE DAMP				10	10	80		
	CC		///	5	AS ABOVE				10	10	80		
8	CC		///	14	AS ABOVE				10	10	80		
	CC		///	16	DARK BROWN, CLAY, DAMP NO ODOOR				10	10	80		
9			///	3									
			///	3	DE BROWN CLAY, MOIST, HARD, NO		(CL)		20	80			
10	B1-9.5		///	6	ODOOR				20	80	0.3	0915	
	B1-10		///	6	AS ABOVE				20	80	0.2	0915	
11			///	6									
			///	9									
12			///	11									
			///	5	BROWN BLACK, CLAY DAMP, HARD		(CL)		20	80			
13			///	7	NO ODOOR, WHITE CALCAREOUS STREAKS		CL		20	80			
			///	4	AS ABOVE				20	80			
14			///	5									
			///	5	BROWN BLACK CLAY, DAMP, HARD		CL						
15	B1-14.5		///	6							0.4	0933	
	B1-15		///	11	GRAY, BROWN CLAY DAMP, HARD.						0.3	0933	
16			///	5	BROWN, SILTY CLAY, MOIST.		CL	20	50				
			///	7	BROWN, CLAY, MOIST, HARD,								

NO ODOOR.









TETRA TECH, INC.  
FIELD LOG OF BORING

Boring #: B3/1536  
Sheet 1 of

Project Name and Location: San Antonio, OMS #35 TC Number: 9410-02  
 Elevation: 35.64 ~~882~~ Date and Time Started: 7/7/93 @ 11:40 Date and Time Completed: 7/8/93 @  
 Completion Depth: 15.0' Number of Samples: Drive: 4 1-liter: 1 VOA: 7 Other: 1 + 200ml  
 Boring Diameter & Drilling Method: 8" Hollow Stem Auger Water Level: First (date/time): M.S. 7/7/93 12.0' Second (date/time): 9.91' (7/7/93/1536)  
 Sampler: SPLIT SPOON Hammer Wt.: 140 Drop: 60" Boring Location: 15' NORTH 41' EAST  
 Drilling Co: Good Sierra Driller: Philip Geologist: Kathy Bishop

Depth (ft.)	Sample No.	Sample Interval	Recovery	Blow Count	Description	Graphic Symbol	USCS Symbol	Estimated % of				P.I.D. Reading	Comments
								Gr	Sa	Si	Cl		
0					0-6" ASPHALT								
5	<del>B3-5.5</del> B3-5.0			5 7	BLACK SILTY CLAY, STIFF, DAMP, SLIGHT SEWER ODR.		CL			30	70		
6				3	AS ABOVE		CL					0.0	12.00
6				4	BLACK FINE SANDY CLAY, MOST -		CL					0.0	12.00
6				6	WET		CL						
7				9	BLACK SILTY CLAY, MOIST, STIFF.		CL						
7				3	BLACK SILTY CLAY, MOIST, STIFF.		CL						
8				6	AS ABOVE		CL						
8				11	AS ABOVE		CL						
9				<del>13</del>									
10	<del>B3-9.5</del> B3-10			4 7	BLACK SILTY CLAY, STRONG <sup>HC</sup> ODR		CL			30	70		
11				14	AS ABOVE							151	1220
11					0.5" FREE PRODUCT - NO H <sub>2</sub> O.							145	1220
11				6	BLACK SILTY CLAY, MOIST, STIFF		CL						0.5" FREE PRODUCT.
12	<del>B3-11</del> B3-12			11 14	STRONG <sup>HC</sup> ODR		CL			60			1230
12				14	AS ABOVE								
13				8	BLACK SILTY CLAY, STRONG <sup>HC</sup> ODR		CL						54
13				11	STIFF DAMP								46
14				12	BLACK SILTY CLAY, BLIGHT <sup>HC</sup> ODR		CL						23
15	<del>B3-14.5</del> B3-15			9 11	BLACK SILTY CLAY, SLIGHT HC ODR, STIFF, DAMP.		CL						35
15				13	AS ABOVE GREEN OLIVE SILTY CLAY		CL			70			1248
16				7	SLIGHT <sup>HC</sup> ODR.		CL			61			1248











TETRA TECH, INC.  
FIELD LOG OF BORING

Boring #: 87

Sheet 1 of 2

Project Name and Location: SAN LORENZO, CA, OMS #35 TC Number: 9410-02

Elevation: \_\_\_\_\_ Date and Time Started: 7/9/93 0950 Date and Time Completed: 7/9/93 11:00

Completion Depth: 18.5' Number of Samples: 3 Drive: 3 1-liter: 1 VOA: 7 Other: \_\_\_\_\_

Boring Diameter & Drilling Method: 10" HELIX STEM AUGER Water Level: \_\_\_\_\_ First (date/time): 7/9/93 115 Second (date/time): \_\_\_\_\_

Sampler: SPLIT SPADN Hammer Wt.: \_\_\_\_\_ Drop: \_\_\_\_\_ Boring Location: 138' NORTH 62' EAST

Drilling Co: GREAT SECRET EXPLORATION Driller: PAUL ROSE Geologist: F. BISTOP

Depth (ft.)	Sample No.	Sample Interval	Recovery	Blow Count	Description	Graphic Symbol	USCS Symbol	Estimated % of				P.I.D. Reading	Comments
								Gr	Sa	Si	Cl		
0					Asphalt.								
1					Bedrock.								
2					Dr. brown silty clay, damp in place.							CUTTINGS	
3													
4													
5	B7-4.5	6	6	6	DK BROWN - BULKY SILTY CLAY, DAMP, STIFF, NO ODR.		CL				0.0	1015	
5	B7-5.0	6	6	11	as above								
6					MED. BROWN - SILTY CLAY, W/ST, NO ODR.								
6					as above								
7					as above								
7					" "								
8					" "								
8					" "								
9					MOTTLED BLACK & OLIVE BROWN, SILTY CLAY, DAMP, NO ODR.								
9													
9					MED BROWN SILTY CLAY, STIFF, NO ODR.								
10	B7-9.5	6	6	5	BLACK & OLIVE BROWN, MOTTLED SILTY CLAY, DAMP, STIFF, NO ODR.		CL				0.0	1025	
10	B7-10.0	6	6	6	GREEN CLAYEY SILT, SLIGHT SEWER ODR, DAMP, MED STIFF.		ML				0.0	1025	
11													
12					OLIVE CLAYEY SILT, SLIGHT SEWER ODR, DAMP, MED STIFF.								
12					BLACK SILTY CLAY, V. STIFF, DAMP, NO ODR.		CL						
13					as above								
14													
14					OLIVE BROWN SILTY CLAY, V. STIFF, DAMP, NO ODR.		CL						
15	B7-14.5	7	7	7	as above		CL				0.0	1040	
15	B7-15.0	13	13	13	as above		CL				0.0	10	
16							ML						









TETRA TECH, INC.  
FIELD LOG OF BORING

Boring #: 13 14W3  
Sheet 1 of 2

Project Name and Location: SAN LORENZO, OMC #35' TC Number: 9410-C2  
 Elevation: \_\_\_\_\_ Date and Time Started: 7/8/93 0853 Date and Time Completed: 7/8/93 1502  
 Completion Date: 17' Number of Samples: 2 Drive: 1-liter: 1 VOA: 7 Other: \_\_\_\_\_  
 Boring Diameter & Drilling Method: 10" HOLLOW STEM AUGER Water Level: 10.5' 7/8/93 0920 First (date/time): \_\_\_\_\_ Second (date/time): \_\_\_\_\_  
 Sampler: SPLIT SPHERICAL Hammer Wt.: 140 Drop: 60" Boring Location: 30' NORTH OF TANK PIT

Drilling Co.: GREAT STORM EXCAVATION Driller: P. ROSE Geologist: K. Bishop

Depth (ft.)	Sample No.	Sample Interval	Recovery	Blow Count	Description	Graphic Symbol	USCS Symbol	Estimated % of				P.I.D. Reading	Comments
								Gr	Sa	Si	Cl		
0					A/C								
1					BASE ROCK								
2					DK BROWN SILTY CLAY, DAMP.								
3													
4													
5			4		DK BROWN SILTY CLAY, DAMP		CL				20	0855	
5			6		NO ODR								
5			9		DK BROWN-BLACK SILTY CLAY w/ GREEN MOTTLES NO ODR DAMP.								
6													
7													
8			7		DK BROWN-GREEN SILTY CLAY, DAMP								
8			8		NO ODR STCF, MOTTLES GREEN/BLACK.		CL						
9			13										
9			8		DK GREEN-BLACK SILTY CLAY, DAMP, STIFF SLIGHT MC ODR		CL			0.6		0920	
10	B13-9.5		6		AS ABOVE		CL						
10	B13-10		15		BLACK SILTY CLAY w/ GREEN MOTTLES, STIFF, MC SHELLS CALSON, TIGHT MC ODR		CL			0.6		0920	
11					STIFF, H2O ENCOUNTERED, SEE ABOVE GREEN ON SAMPLES COLLECTED.		CL			6x		0920	
12													
13													
14													
14			2		CLAY BROWN SILTY CLAY, SOME MOTTLES DAMP, SLIGHT MC ODR, STIFF		CL			2.8		1446	
15	B13-14.5		3		as above		CL						
15	B13-15		5		as above.		CL			2.6		1446	
16							CL						











TETRA TECH, INC.  
FIELD LOG OF BORING

Boring #: B15  
Sheet 1 of 1

Project Name and Location: SAN LORENZO, ONS #35 TC Number: 9410-02  
 Elevation: Date and Time Started: 7/9/93 0830 Date and Time Completed: 7/9/93 0935  
 Completion Depth: 15.5' Number of Samples: 3 Drive: 1-liter: 1 VOA: 7 Other:  
 Boring Diameter & Drilling Method: 18" HOLLOW STEEL AUGER Water Level: First (date/time): 7.5' 7/9/93 0900 Second (date/time):  
 Sampler: SPLIT SPORN Hammer Wt.: 140 Drop: 60" Boring Location: NW CORNER of SITE  
 Drilling Co: GREAT SAFETY EXPLORATION Driller: PHILIP REBE Geologist: K. BISHOP

Depth (ft.)	Sample No.	Sample Interval	Recovery	Blow Count	Description	Graphic Symbol	USCS Symbol	Estimated % of				P.I.D. Reading	Comments
								Gr	Sa	Si	Cl		
0					Asphalt 0-2"								
1					Bedrock								
2					Black-DR BROWN SILTY CLAY, DAMP NO ODR.		CL					CUTTINGS.	
3													
4			7	7	MEDIUM BROWN CLAYEY SANDY SILT MIST FIRM, NO ODR, SOME MOTTLING						00	0845	
5	B15-4.5		6	8	AS ABOVE								
5	B15-5.0		6	11	AS ABOVE		ML						
6			6	8	DR BROWN-BLACK SILTY CLAY, DAMP NO ODR. ROOTLET.		CL						
6			6	11	SAND POCKETS								
7			6	13	MEDIUM FINE SAND, BROWN, DAMP, NO ODR, STIFF.						00	08	
7			6	5	DR BROWN SILTY CLAY, DAMP, NO ODR WET, H2O ENCOUNTERED.		SP						
8			6	7	AS ABOVE, POCKETS OF FINE SAND		CL/SP					H2O	
8			6	9	AS ABOVE, 1" LAYER OF COARSE CLEAN SAND DIVE BROWN SILTY CLAY.		CL/SP					H2O sample taken	
9			6	6	BLACK SILTY CLAY, WET, NO ODR, STIFF INCREASING SAND		CL						
10	B15-9.5		6	7	CLAY + SAND AS ABOVE								
10	B15-10		6	9	BROWN, MED MEDIUM GRAINED SAND SOME SILT, NO ODR, WELL SORTED. BLACK SILTY CLAY						00	0915	
11			6	7	BLACK SILTY CLAY, NO ODR WET,		CL					0915	
11			6	8	AS ABOVE.							H2O sample 0930	
12			6	12	BLACK SILTY CLAY + MED WELL SORTED SAND, WET NO ODR.		CL/SP						
12			6	5	BLACK SILTY CLAY + MED. WELL SORTED SAND, WET, NO ODR		CL/SP						
13			6	6	SLICED THROUGH THE SIDE OF A SAND LENS - EXTENDS EXTENDS TO								
13			6	14	13.5'								
14			6	4	BLACK SILTY CLAY, J. STIFF, WET NO ODR.		CL						
15	B15-14.5		6	8	AS ABOVE						0.0	0925	
15	B15-15.0		6	9	AS ABOVE.		CL					0925	
16			6	9									

B.O.H. @ 15.5'



TETRA TECH, INC.  
FIELD LOG OF BORING

Boring #: 10  
Sheet 1 of 1

Project Name and Location: San Lorenzo AMS #35 TC Number: 9410-02  
 Elevation: \_\_\_\_\_ Date and Time Started: 7/9/93 @ 1145 Date and Time Completed: 7/9/93 1235  
 Completion Depth: 15.5' Number of Samples: 3 Drive: 1 1-liter: 7 VOA: 7 Other: 2-200 ml  
 Boring Diameter & Drilling Method: 8" Hollow Stem Auger Water Level: 9.5' First (date/time): 7/9/93/1205 Second (date/time): \_\_\_\_\_  
 Sampler: SPLIT SPOON Hammer Wt.: 140 Drop: 60" Boring Location: NE of TANK PIT  
 Drilling Co.: Great Street Exploration Driller: Philip Reiser Geologist: K. Bishop

Depth (ft.)	Sample No.	Sample Interval	Recovery	Blow Count	Description	Graphic Symbol	Estimated % of				P.I.D. Reading	Comments
							USCS Symbol	Gr	Sa	Si		
0					0-3" asphalt							
1					base rock							
2					dk brown, clayey silt, damp no odor	ML						Drill Cuttings
3												
4				3	Brown, clayey silt, moist, soft, no odor	ML						
5	B16-4.5	14-6	6	6	same							
5	B16-5.0	14-6	6	9	same					0.0	1155	
6		14-6	6	4	Brown clayey silt, moist soft, no odor					0.0	1155	
6		14-6	6	8	dk brown, silty clay; stiff, moist no odor	CL						
7		14-6	6	3	"							
7		14-6	6	4	dk brown, silty clay; stiff damp; no odor							
8		14-6	6	7	"							
8		14-6	6	11	"							
9		14-6	6	4	medium brown <del>fine</del> sand wet; soft, no odor	SW						H2O
10	B16-9.5	14-6	6	4	"							
10	B16-10.0	14-6	6	11	"					0.0	1205	
11		14-6	6	12	med brown sand, moist, wet black silty clay; damp, v. stiff	CL						H2O sampled
11		14-6	6	9	no odor, - same							1215
12		14-6	6	14	- same	CL						
13												
14		14-6	6	9	BLACK CLAY, v. STIFF, WET, NO ODOR.	CL						1
15	B16-14.5	14-6	6	7	same					0.0	1230	
15	B16-15	14-6	6	23	same					0.0	1230	
16					P.O.H. @ 15.5'							





**APPENDIX B**  
**DRILLING AND MONITORING WELL PERMIT**



# ZONE 7 WATER AGENCY

5997 PARKSIDE DRIVE

PLEASANTON, CALIFORNIA 94588

VOICE (510) 484-2600

FAX (510) 462-3914

## DRILLING PERMIT APPLICATION

FOR APPLICANT TO COMPLETE

FOR OFFICE USE

LOCATION OF PROJECT National Guard Site  
16,501 Ashland Avenue  
San Lorenzo, CA 94580

PERMIT NUMBER 93322  
LOCATION NUMBER \_\_\_\_\_

### CLIENT

Name California Office of the State Architect, Special Projects  
Address 400 P St., 5th Floor Voice (916) 523-9827  
City Sacramento, CA Zip 95814

### PERMIT CONDITIONS

Circled Permit Requirements Apply

### APPLICANT

Name Mike Wopat, R.G.  
Tetra Tech, Inc. Fax (415) 974-5914  
Address 180 Howard St. Ste. 250 Voice (415) 974-1221  
City San Francisco, CA Zip 94105

### TYPE OF PROJECT

Well Construction \_\_\_\_\_ Geotechnical Investigation \_\_\_\_\_  
Cathodic Protection \_\_\_\_\_ General \_\_\_\_\_  
Water Supply \_\_\_\_\_ Contamination  \_\_\_\_\_  
Monitoring  Well Destruction \_\_\_\_\_

PROPOSED WATER SUPPLY WELL USE N/A  
Domestic \_\_\_\_\_ Industrial \_\_\_\_\_ Other \_\_\_\_\_  
Municipal \_\_\_\_\_ Irrigation \_\_\_\_\_

### DRILLING METHOD:

Mud Rotary \_\_\_\_\_ Air Rotary \_\_\_\_\_ Auger  \_\_\_\_\_  
Cable \_\_\_\_\_ Other \_\_\_\_\_

DRILLER'S LICENSE NO. C 57 610487

### WELL PROJECTS

Drill Hole Diameter 8" + 10" in. Maximum \_\_\_\_\_  
Casing Diameter 2" + 4" in. Depth 25 ft.  
Surface Seal Depth 2 ft. Number 4

### GEOTECHNICAL PROJECTS

Number of Borings \_\_\_\_\_ Maximum \_\_\_\_\_  
Hole Diameter \_\_\_\_\_ in. Depth \_\_\_\_\_ ft.

ESTIMATED STARTING DATE June 29, 1993  
ESTIMATED COMPLETION DATE June 30, 1993

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

APPLICANT'S SIGNATURE Mike Wopat Date 6/10/93

### A. GENERAL

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

### B. WATER WELLS, INCLUDING PIEZOMETERS

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

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

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

E. WELL DESTRUCTION. See attached.

See Well Construction Diagram

Approved Wyman Hong Date 16 Jun 93  
Wyman Hong



**APPENDIX C**  
**LABORATORY REPORTS OF ANALYTICAL RESULTS AND**  
**CHAINS-OF-CUSTODY**

Tetra Tech  
# T9410-02

①



# MOBILE CHEM LABS INC.

5011 Blum Road, Suite 1, Martinez, CA 94553  
Phone (510) 372-3700 • Fax (510) 372-6955

## CHAIN OF CUSTODY

SAMPLER: Mike Wopat

DATE/TIME OF COLLECTION: 7-7-93

FORWARDED TIME: on site

SAMPLE DESCRIPTION AND PROJECT NUMBER:

NATIONAL GUARD

San Lorenzo

SAMPLE #	ANALYSIS	GRAB OR COMP.	NUMBER OF CONTAINERS	SOIL/WATER
F073 001 (B1-5)	TPH+BTX, DIESEL, 418.1	g	1	S
002 (B1-10)	↓ ↓ ↓	g	1	S
003 (B1-15)	↓ ↓ ↓	g	1	S
004 (B1-20)	↓ ↓ ↓	g	1	S
005 (B1-W1)	TPH+BTX, DIESEL 418.1	g	1	S
006 (B3-5)	TPH+BTX ↓ 418.1	g	1	W
007 (B3-10)	TPH+BTX ↓ 418.1	g	1	S
008 (B3-15)	TPH+BTX ↓ ↓	g	1	S

RELEASED BY:

TIME/DATE

RECEIVED BY:

TIME/DATE

Mike Wopat

7/7/93

Brian Schaefer

7-7-93

STAMP AND SIGNATURE HERE TO SIGNATURE

REMARKS:



# MOBILE CHEM LABS INC.

6021 Blum Road, Suite 3 • Martinez, CA 94553  
Phone (415) 372-3700 • Fax (415) 372-6955

Tetra Tech (2)  
#T9410-02

## CHAIN OF CUSTODY

SAMPLER: Mike Wopet

DATE/TIME OF COLLECTION: 7-7-93

TURNAROUND TIME: on Site!

SAMPLE DESCRIPTION AND PROJECT NUMBER:

National Guard  
San Lorenzo

SAMPLE #	ANALYSIS	GRAB OR COMP.	NUMBER OF CONTAINERS	SOIL/WATER
073 009 (B3-W1)	TPH+BTEX, DIESEL, 418.1	g	1	Water
010 (B2-5')	↓ ↓ ↓	g	1	SOIL
011 (B2-10')	↓ ↓ ↓	g	1	SOIL
012 (B2-15')	↓ ↓ ↓	g	1	SOIL
013 (B2-W1)	↓ ↓ ↓	g	1	Water
014 (B5-5')	↓ ↓ ↓	g	1	SOIL
015 (B5-10')	↓ ↓ ↓	g	1	SOIL
016 (B5-15')	↓ ↓ ↓	g	1	SOIL

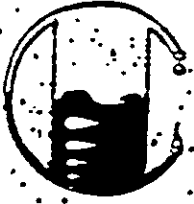
RELINQUISHED BY:	TIME/DATE	RECEIVED BY:	TIME/DATE
<u>Mike Wopet</u>	<u>7/7/93</u>	<u>Brian Scherler</u>	<u>7-7-93</u>

\* STATE AFFILIATION NEXT TO SIGNATURE

REMARKS: \_\_\_\_\_

Tetra Tech  
#T9410-02

3



# MOBILE CHEM LABS INC.

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Phone (510) 372-3700 • Fax (510) 372-6955

## CHAIN OF CUSTODY

SAMPLER: Nike Wopat

DATE/TIME OF COLLECTION: 7-7-93

FORWARDED TIME: on Site!

SAMPLE DESCRIPTION AND PROJECT NUMBER:

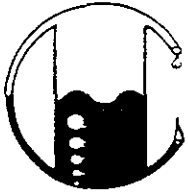
National Guard  
San Lorenzo

SAMPLE #	ANALYSIS	GRAB OR COMP.	NUMBER OF CONTAINERS	SOIL/WATER
<u>F073 017 (85-W1)</u>	<u>TPH &amp; BTEX, DIESEL, 418.1</u>	<u>g</u>	<u>1</u>	<u>Water</u>

RELINQUISHED BY	TIME/DATE	RECEIVED BY	TIME/DATE
<u>Nike Wopat</u>	<u>7/7/93</u>	<u>Brian Scherler</u>	<u>7-7-93</u>

STAMP AFFILIATION NEXT TO SIGNATURE

REMARKS:



# MOBILE CHEM LABS INC.

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T9410-02\1342\012803

Tetra Tech  
180 Howard Street, #250  
San Francisco, CA 94105  
Attn: Mike Wopat  
Project Manager

Date Sampled: 07-07-93  
Date Received: 07-07-93  
Date Analyzed: 07-07-93

Sample Number	Sample Description	Detection Limit	Total Recoverable Hydrocarbons as Petroleum Oil
		ppm	ppm

Project # T9410-02  
OMS #35 - San Lorenzo  
16501 Ashland Ave.

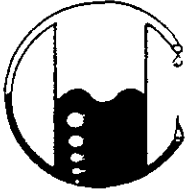
F073001	B1-5	10	<10
F073002	B1-10	10	<10
F073003	B1-15	10	<10
F073004	B1-20	10	<10
F073006	B3-5	10	<10
F073007	B3-10	10	82
F073008	B3-15	10	19
F073010	B2-5	10	<10
F073011	B2-10	10	<10
F073012	B2-15	10	<10

QA/QC: Spike Recovery on F073002 is 115%  
Duplicate Deviation on F073007 is 1%

Note: Analysis was performed using EPA method 418.1  
(ppm) = (mg/kg)

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Ronald G. Evans  
Lab Director



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T9410-02\1342\012803

Tetra Tech  
180 Howard Street, #250  
San Francisco, CA 94105  
Attn: Mike Wopat  
Project Manager

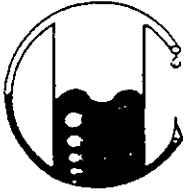
Date Sampled: 07-07-93  
Date Received: 07-07-93  
Date Analyzed: 07-07-93

Sample Number	Sample Description	Detection Limit	SOIL	
			Total Recoverable Hydrocarbons	as Petroleum Oil
		ppm		ppm
Project # T9410-02 OMS #35 - San Lorenzo 16501 Ashland Ave.				
F073014	B5-5	10		<10
F073015	B5-10	10		<10
F073016	B5-15	10		<10

Note: Analysis was performed using EPA method 418.1  
(ppm) = (mg/kg)

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180 Howard Street, #250  
San Francisco, CA 94105  
Attn: Mike Wopat  
Project Manager

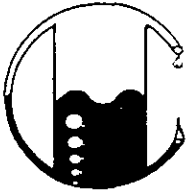
Date Sampled: 07-07-93  
Date Received: 07-07-93  
Date Analyzed: 07-07-93

Sample Number	Sample Description	Detection Limit ppm	WATER Total Recoverable Hydrocarbons as Petroleum Oil ppm
Project # T9410-02 OMS #35 - San Lorenzo 16501 Ashland Ave.			
F073005	B1-W1	1.0	<1.0
F073009	B3-W1	1.0	3.3
F073013	B2-W1	1.0	<1.0
F073017	B5-W1	1.0	<1.0

Note: Analysis was performed using EPA method 418.1  
(ppm) = (mg/L)

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Attn: Mike Wopat  
Project Manager

T9410-02\1342\012803

Date Sampled: 07-07-93  
Date Received: 07-07-93  
Date Analyzed: 07-07-93

Sample Number	Sample Description	Detection Limit ppm	SOIL Total Petroleum Hydrocarbons as Diesel ppm
OMS #35 - San Lorenzo 16501 Ashland Ave. Proj # T9410-02			
F073001	B1-5	5.0	<5.0
F073002	B1-10	5.0	<5.0
F073003	B1-15	5.0	<5.0
F073004	B1-20	5.0	<5.0
F073006	B3-5	5.0	<5.0
F073007	B3-10	5.0	17
F073008	B3-15	5.0	<5.0
F073010	B2-5	5.0	<5.0
F073011	B2-10	5.0	<5.0
F073012	B2-15	5.0	<5.0

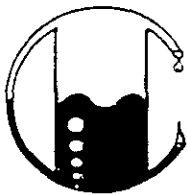
QA/QC: Spike Recovery on F073002 is 98%  
Duplicate Deviation on F073002 is 1%

Note: Analysis was performed using EPA method 3550 and TPH LUFT.  
(ppm) = (mg/kg)

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Attn: Mike Wopat  
Project Manager

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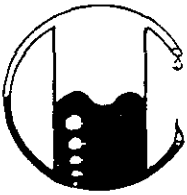
Date Sampled: 07-07-93  
Date Received: 07-07-93  
Date Analyzed: 07-07-93

Sample Number	Sample Description	Detection Limit ppb	WATER Total Petroleum Hydrocarbons as Diesel ppb
	OMS #35 - San Lorenzo 16501 Ashland Ave. Proj # T9410-02		
F073005	B1-W1	50	<50
F073009	B3-W1	50	<50
F073013	B2-W1	50	<50

Note: Analysis was performed using EPA method 3510 and TPH LUFT.  
(ppb) = ( $\mu\text{g/L}$ )

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San Francisco, CA 94105  
Attn: Mike Wopat  
Project Manager

Date Sampled: 07-07-93  
Date Received: 07-07-93  
Date Analyzed: 07-07-93

Sample Number  
-----  
F073001

Sample Description  
-----  
Project # T9410-02  
OMS #35 - San Lorenzo  
16501 Ashland Ave.  
B1-5 SOIL

## ANALYSIS

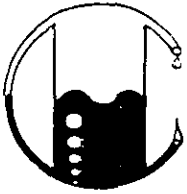
-----

	Detection Limit ----- ppm	Sample Results ----- ppm
Total Petroleum Hydrocarbons as Gasoline	1.0	<1.0
Benzene	0.005	<0.005
Toluene	0.005	<0.005
Xylenes	0.005	<0.005
Ethylbenzene	0.005	<0.005

Note: Analysis was performed using EPA methods 5030 and TPH  
LUFT with method 8020 used for BTX distinction.  
(ppm) = (mg/kg)

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Attn: Mike Wopat  
Project Manager

T9410-02\1342\012803

Date Sampled: 07-07-93  
Date Received: 07-07-93  
Date Analyzed: 07-07-93

Sample Number  
-----  
F073002

Sample Description  
-----  
Project # T9410-02  
OMS #35 - San Lorenzo  
16501 Ashland Ave.  
B1-10 SOIL

## ANALYSIS

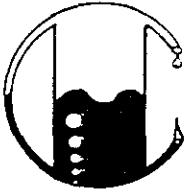
-----

	Detection Limit	Sample Results
	----- ppm	----- ppm
Total Petroleum Hydrocarbons as Gasoline	1.0	<1.0
Benzene	0.005	<0.005
Toluene	0.005	<0.005
Xylenes	0.005	<0.005
Ethylbenzene	0.005	<0.005

Note: Analysis was performed using EPA methods 5030 and TPH  
LUFT with method 8020 used for BTX distinction.  
(ppm) = (mg/kg)

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Lab Director



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San Francisco, CA 94105  
Attn: Mike Wopat  
Project Manager

T9410-02\1342\012803

Date Sampled: 07-07-93  
Date Received: 07-07-93  
Date Analyzed: 07-07-93

Sample Number

F073003

Sample Description

Project # T9410-02  
OMS #35 - San Lorenzo  
16501 Ashland Ave.  
B1-15 SOIL

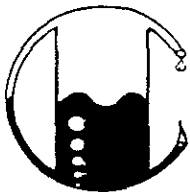
ANALYSIS

	Detection Limit	Sample Results
	ppm	ppm
Total Petroleum Hydrocarbons as Gasoline	1.0	<1.0
Benzene	0.005	<0.005
Toluene	0.005	<0.005
Xylenes	0.005	<0.005
Ethylbenzene	0.005	<0.005

Note: Analysis was performed using EPA methods 5030 and TPH  
LUFT with method 8020 used for BTX distinction.  
(ppm) = (mg/kg)

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Lab Director



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Tetra Tech  
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San Francisco, CA 94105  
Attn: Mike Wopat  
Project Manager

Date Sampled: 07-07-93  
Date Received: 07-07-93  
Date Analyzed: 07-07-93

Sample Number  
-----

F073004

Sample Description  
-----

Project # T9410-02  
OMS #35 - San Lorenzo  
16501 Ashland Ave.  
Bl-20 SOIL

ANALYSIS  
-----

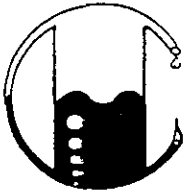
	Detection Limit ----- ppm	Sample Results ----- ppm
Total Petroleum Hydrocarbons as Gasoline	1.0	<1.0
Benzene	0.005	<0.005
Toluene	0.005	<0.005
Xylenes	0.005	<0.005
Ethylbenzene	0.005	<0.005

QA/QC: Spike Recovery is 93%

Note: Analysis was performed using EPA methods 5030 and TPH  
LUFT with method 8020 used for BTX distinction.  
(ppm) = (mg/kg)

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Lab Director



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Tetra Tech  
180 Howard Street, #250  
San Francisco, CA 94105  
Attn: Mike Wopat  
Project Manager

Date Sampled: 07-07-93  
Date Received: 07-07-93  
Date Analyzed: 07-07-93

Sample Number  
-----  
F073005

Sample Description  
-----  
Project # T9410-02  
OMS #35 - San Lorenzo  
16501 Ashland Ave.  
B1-W1 WATER

## ANALYSIS

-----

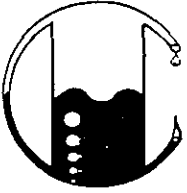
	Detection Limit ----- ppb	Sample Results ----- ppb
Total Petroleum Hydrocarbons as Gasoline	50	<50
Benzene	0.5	<0.5
Toluene	0.5	<0.5
Xylenes	0.5	<0.5
Ethylbenzene	0.5	<0.5

QA/QC: Duplicate Deviation is 1%

Note: Analysis was performed using EPA methods 5030 and TPH  
LUFT with method 602 used for BTX distinction.  
(ppb) = (µg/L)

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Lab Director



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Tetra Tech  
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San Francisco, CA 94105  
Attn: Mike Wopat  
Project Manager

T9410-02\1342\012803

Date Sampled: 07-07-93  
Date Received: 07-07-93  
Date Analyzed: 07-07-93

Sample Number  
-----  
F073006

Sample Description  
-----  
Project # T9410-02  
OMS #35 - San Lorenzo  
16501 Ashland Ave.  
B3-5 SOIL


## ANALYSIS

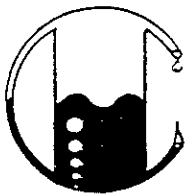
-----

	Detection Limit	Sample Results
	----- ppm	----- ppm
Total Petroleum Hydrocarbons as Gasoline	1.0	<1.0
Benzene	0.005	<0.005
Toluene	0.005	<0.005
Xylenes	0.005	<0.005
Ethylbenzene	0.005	<0.005

Note: Analysis was performed using EPA methods 5030 and TPH  
LUFT with method 8020 used for BTX distinction.  
(ppm) = (mg/kg)

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Ronald G. Evans  
Lab Director



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Tetra Tech  
180 Howard Street, #250  
San Francisco, CA 94105  
Attn: Mike Wopat  
Project Manager

T9410-02\1342\012803

Date Sampled: 07-07-93  
Date Received: 07-07-93  
Date Analyzed: 07-07-93

Sample Number

-----  
F073007

Sample Description

-----  
Project # T9410-02  
OMS #35 - San Lorenzo  
16501 Ashland Ave.  
B3-10 SOIL

ANALYSIS

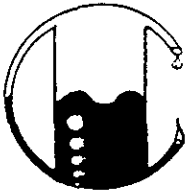
	Detection Limit	Sample Results
	----- ppm	----- ppm
Total Petroleum Hydrocarbons as Gasoline	1.0	450
Benzene	0.005	2.4
Toluene	0.005	11
Xylenes	0.005	40
Ethylbenzene	0.005	8.0

Note: Analysis was performed using EPA methods 5030 and TPH  
LUFT with method 8020 used for BTX distinction.  
(ppm) = (mg/kg)

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Lab Director





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Tetra Tech  
180 Howard Street, #250  
San Francisco, CA 94105  
Attn: Mike Wopat  
Project Manager

Date Sampled: 07-07-93  
Date Received: 07-07-93  
Date Analyzed: 07-07-93

Sample Number

F073008

Sample Description

Project # T9410-02  
OMS #35 - San Lorenzo  
16501 Ashland Ave.  
B3-15 SOIL

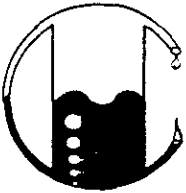
ANALYSIS

	<u>Detection Limit</u>	<u>Sample Results</u>
	ppm	ppm
Total Petroleum Hydrocarbons as Gasoline	1.0	7.2
Benzene	0.005	0.066
Toluene	0.005	0.32
Xylenes	0.005	0.75
Ethylbenzene	0.005	0.2

Note: Analysis was performed using EPA methods 5030 and TPH  
LUFT with method 8020 used for BTX distinction.  
(ppm) = (mg/kg)

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Lab Director



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Tetra Tech  
180 Howard Street, #250  
San Francisco, CA 94105  
Attn: Mike Wopat  
Project Manager

Date Sampled: 07-07-93  
Date Received: 07-07-93  
Date Analyzed: 07-07-93

Sample Number

F073009

Sample Description

Project # T9410-02  
OMS #35 - San Lorenzo  
16501 Ashland Ave.  
B3-W1 WATER

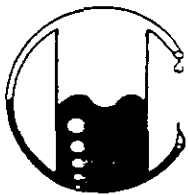
ANALYSIS

	<u>Detection Limit</u>	<u>Sample Results</u>
	ppm	ppm
Total Petroleum Hydrocarbons as Gasoline	50	110,000
Benzene	0.5	3,400
Toluene	0.5	7,600
Xylenes	0.5	10,000
Ethylbenzene	0.5	2,600

Note: Analysis was performed using EPA methods 5030 and TPH  
LUFT with method 602 used for BTX distinction.  
(ppb) = (µg/L)

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Lab Director



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T9410-02\1342\012803

Tetra Tech  
180 Howard Street, #250  
San Francisco, CA 94105  
Attn: Mike Wopat  
Project Manager

Date Sampled: 07-07-93  
Date Received: 07-07-93  
Date Analyzed: 07-07-93

Sample Number

F073010

Sample Description

Project # T9410-02  
OMS #35 - San Lorenzo  
16501 Ashland Ave.  
B2-5 SOIL

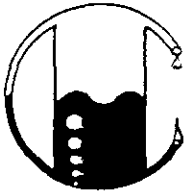
ANALYSIS

	<u>Detection Limit</u>	<u>Sample Results</u>
	ppm	ppm
Total Petroleum Hydrocarbons as Gasoline	1.0	<1.0
Benzene	0.005	<0.005
Toluene	0.005	<0.005
Xylenes	0.005	<0.005
Ethylbenzene	0.005	<0.005

Note: Analysis was performed using EPA methods 5030 and TPH LUFT with method 8020 used for BTX distinction.  
(ppm) = (mg/kg)

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Lab Director



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T9410-02\1342\012803

Tetra Tech  
180 Howard Street, #250  
San Francisco, CA 94105  
Attn: Mike Wopat  
Project Manager

Date Sampled: 07-07-93  
Date Received: 07-07-93  
Date Analyzed: 07-07-93

Sample Number  
-----  
F073011

Sample Description  
-----  
Project # T9410-02  
OMS #35 - San Lorenzo  
16501 Ashland Ave.  
B2-10 SOIL

## ANALYSIS

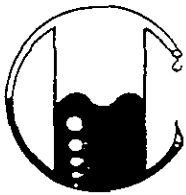
-----

	Detection Limit	Sample Results
	----- ppm	----- ppm
Total Petroleum Hydrocarbons as Gasoline	1.0	<1.0
Benzene	0.005	<0.005
Toluene	0.005	<0.005
Xylenes	0.005	<0.005
Ethylbenzene	0.005	<0.005

Note: Analysis was performed using EPA methods 5030 and TPH  
LUFT with method 8020 used for BTX distinction.  
(ppm) = (mg/kg)

MOBILE CHEM LABS

Ronald G. Evans  
Lab Director



# MOBILE CHEM LABS INC.

5011 Blum Road, Suite 1 • Martinez, CA 94553  
Phone (510) 372-3700 • Fax (510) 372-6955

Tetra Tech  
180 Howard Street, #250  
San Francisco, CA 94105  
Attn: Mike Wopat  
Project Manager

T9410-02\1342\012803

Date Sampled: 07-07-93  
Date Received: 07-07-93  
Date Analyzed: 07-07-93

Sample Number

-----  
F073012

Sample Description

-----  
Project # T9410-02  
OMS #35 - San Lorenzo  
16501 Ashland Ave.  
B2-15 SOIL

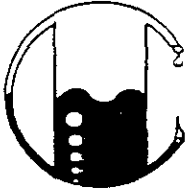
ANALYSIS

	Detection Limit	Sample Results
	----- ppm	----- ppm
Total Petroleum Hydrocarbons as Gasoline	1.0	<1.0
Benzene	0.005	<0.005
Toluene	0.005	<0.005
Xylenes	0.005	<0.005
Ethylbenzene	0.005	<0.005

Note: Analysis was performed using EPA methods 5030 and TPH  
LUFT with method 8020 used for BTX distinction.  
(ppm) = (mg/kg)

MOBILE CHEM LABS

Ronald G. Evans  
Lab Director



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T9410-02\1342\012803

Tetra Tech  
180 Howard Street, #250  
San Francisco, CA 94105  
Attn: Mike Wopat  
Project Manager

Date Sampled: 07-07-93  
Date Received: 07-07-93  
Date Analyzed: 07-07-93

Sample Number  
-----  
F073013

Sample Description  
-----  
Project # T9410-02  
OMS #35 - San Lorenzo  
16501 Ashland Ave.  
B2-W1                      WATER


## ANALYSIS

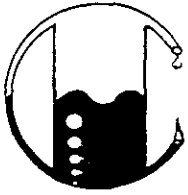
-----

	Detection Limit ----- ppb	Sample Results ----- ppb
Total Petroleum Hydrocarbons as Gasoline	50	61
Benzene	0.5	0.6
Toluene	0.5	2.1
Xylenes	0.5	62
Ethylbenzene	0.5	0.8

Note: Analysis was performed using EPA methods 5030 and TPH  
LUFT with method 602 used for BTX distinction.  
(ppb) = (µg/L)

MOBILE CHEM LABS

  
Ronald G. Evans  
Lab Director



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T9410-02\1342\012803

Tetra Tech  
180 Howard Street, #250  
San Francisco, CA 94105  
Attn: Mike Wopat  
Project Manager

Date Sampled: 07-07-93  
Date Received: 07-07-93  
Date Analyzed: 07-08-93

Sample Number  
-----  
F073014

Sample Description  
-----  
Project # T9410-02  
OMS #35 - San Lorenzo  
16501 Ashland Ave.  
B5-5 SOIL

## ANALYSIS

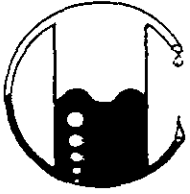
-----

	Detection Limit ----- ppm	Sample Results ----- ppm
Total Petroleum Hydrocarbons as Gasoline	1.0	<1.0
Benzene	0.005	<0.005
Toluene	0.005	<0.005
Xylenes	0.005	<0.005
Ethylbenzene	0.005	<0.005

Note: Analysis was performed using EPA methods 5030 and TPH  
LUFT with method 8020 used for BTX distinction.  
(ppm) = (mg/kg)

MOBILE CHEM LABS

  
Ronald G. Evans  
Lab Director



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T9410-02\1342\012803

Tetra Tech  
180 Howard Street, #250  
San Francisco, CA 94105  
Attn: Mike Wopat  
Project Manager

Date Sampled: 07-07-93  
Date Received: 07-07-93  
Date Analyzed: 07-08-93

Sample Number  
-----  
F073015

Sample Description  
-----  
Project # T9410-02  
OMS #35 - San Lorenzo  
16501 Ashland Ave.  
B5-10 SOIL

## ANALYSIS

-----

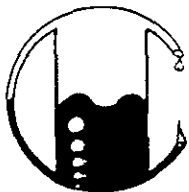
	Detection Limit	Sample Results
	----- ppm	----- ppm
Total Petroleum Hydrocarbons as Gasoline	1.0	<1.0
Benzene	0.005	<0.005
Toluene	0.005	<0.005
Xylenes	0.005	<0.005
Ethylbenzene	0.005	<0.005

Note: Analysis was performed using EPA methods 5030 and TPH  
LUFT with method 8020 used for BTX distinction.  
(ppm) = (mg/kg)

MOBILE CHEM LABS

Ronald G. Evans  
Lab Director





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T9410-02\1342\012803

Tetra Tech  
180 Howard Street, #250  
San Francisco, CA 94105  
Attn: Mike Wopat  
Project Manager

Date Sampled: 07-07-93  
Date Received: 07-07-93  
Date Analyzed: 07-08-93

Sample Number

-----  
F073016

Sample Description

-----  
Project # T9410-02  
OMS #35 - San Lorenzo  
16501 Ashland Ave.  
B5-15 SOIL

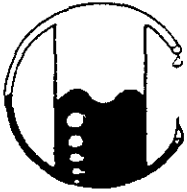
ANALYSIS

	Detection Limit	Sample Results
	----- ppm	----- ppm
Total Petroleum Hydrocarbons as Gasoline	1.0	<1.0
Benzene	0.005	<0.005
Toluene	0.005	<0.005
Xylenes	0.005	<0.005
Ethylbenzene	0.005	<0.005

Note: Analysis was performed using EPA methods 5030 and TPH  
LUFT with method 8020 used for BTX distinction.  
(ppm) = (mg/kg)

MOBILE CHEM LABS

Ronald G. Evans  
Lab Director



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T9410-02\1342\012803

Tetra Tech  
180 Howard Street, #250  
San Francisco, CA 94105  
Attn: Mike Wopat  
Project Manager

Date Sampled: 07-07-93  
Date Received: 07-07-93  
Date Analyzed: 07-08-93

Sample Number

F073017

Sample Description

Project # T9410-02  
OMS #35 - San Lorenzo  
16501 Ashland Ave.  
B5-W1 WATER

ANALYSIS

	<u>Detection Limit</u>	<u>Sample Results</u>
	ppb	ppb
Total Petroleum Hydrocarbons as Gasoline	50	<50
Benzene	0.5	<0.5
Toluene	0.5	<0.5
Xylenes	0.5	<0.5
Ethylbenzene	0.5	<0.5

Note: Analysis was performed using EPA methods 5030 and TPH LUFT with method 602 used for BTX distinction.  
(ppb) = (µg/L)

MOBILE CHEM LABS

Ronald G. Evans  
Lab Director

Suburban Road San Diego 93401 (619) 543-2665 FAX (619) 543-2665  
 751 S. Kellogg, Suite A Goleta, CA 93117 (805) 964-7838 FAX (805) 967-4386  
 6006 Egret Ct. Benicia, CA 94510 (707) 747-2757 FAX (707) 747-2765  
 2400 Cumberland Dr. Valparaiso, Indiana 46383 (219) 464-2389 FAX (219) 462-2953  
 4765 Calle Quetzal Camarillo, CA 93012 (805) 389-1353 FAX (805) 389-1438  
 340 County Road No. 5 Westbrook, ME 04092 (207) 874-2400 FAX (207) 775-4029

PLEASE PRINT IN PEN

Client **TETRA TECH.** Contact **Mike Wopat** Phone # **(415) 974-1221** FAX # **(415) 974-5914**  
 Address **180 Howard St, Suite 250** City **San Francisco** State **CA** Zip **94103**  
 Project Name/Number **San Lorenzo OMS #35 / TC-9410-02** Project MGR **MIKE WOPAT**  
 Bill (if different than above) Address **10 day TAT**  
 Sampler (Print and sign) **Mike Wopat** Due Date **7/23/93** Circle for **RUSH\*** Copies To: Auth. Init.

Sample Description	Date/Time Coll'd	*Matrix	# of Containers	Pres.	Fill. y/n	* Subject to Availability Analysis	Remarks	Lab ID #
B1 - 10 9.5	7/7/93 0915	Soil	1			TOTAL LEAD - 6010 ORGANIC LEAD - LUFT		1042-1
B2 - 10 9.5	7/7/93 1341	Soil	1			" " "		2
B3 - 10 9.5	7/7/93 1220 1244	Soil	1			" " "		3
B3 - W1	7/7/93 1250	GROUND WATER	4 VOLS 1 500ml			TOTAL DISSOLVED LEAD - EPA 7421 ORGANIC LEAD - LUFT	<i>See below</i>	4
B2 - W1	7/7/93 1405	GW	4 VOLS 1 500 ml			Total dissolved lead - EPA 7421 Organic Lead - LUFT	* See below	5

Relinquished By	Date/Time	Received By	Relinquished By	Date/Time	Received By
<i>Mike Wopat</i>	7/9/93 11:11	<i>Tetra Tech</i>	<i>Tetra Tech</i>	7/9/93 13:30	

Shipping Method **Peter Dando** Shipping # **Shelley Hyl** Received By **1993** Date/Time **1330** Condition (See Remarks) Cold  Sealed  Intact   
 REMARKS **Water samples - passed filter prior to sampling**  
**Total lead analyses**  
**Samples held until 8/9/93 in cooler at Tetra**  
*Thanks!*

- \* Matrix:
- DW - Drinking Water
  - WW - Wastewater
  - GW - Groundwater
  - SW - Surface Water
  - IM - Impinger
  - FI - Filler
  - FP - Free Product
  - A/G - Air/Gas
  - SL - Sludge/Soil/Solid
  - OT - Other



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NorCal Division (San Jose Laboratory)  
2059 Junction Ave.

San Jose, CA 95131  
(408) 955-9077

CLIENT: Mike Wopat  
Tetra Tech Inc.  
180 Howard Street, Ste.250  
San Francisco, CA 94105

Lab Number : JJ-1042-1  
Project : OMS#35/TC-9410-02 San  
Lorenzo

REPORT OF ANALYTICAL RESULTS

Page 1 of 1

SAMPLE DESCRIPTION	MATRIX	SAMPLED BY	SAMPLED DATE RECEIVED				
B1-9.5	Soil	Mike Wopat	07/07/93	07/09/93			
CONSTITUENT	*PQL	RESULT	UNITS	METHOD	ANALYZED	BY	NOTES
Lead, Organic	1.	ND	mg/Kg	22CAC	07/20/93	KP	1
Lead, Total	1.	17.	mg/Kg	EPA 7420	07/15/93	DO	2

San Jose Lab Certifications: CAELAP #1204

\*RESULTS listed as 'ND' were not detected at or above the listed PQL (Practical Quantitation Limit)

- (1) Sample Preparation on 07/14/93 by NT
- (2) Sample Preparation on 07/13/93 by NT using EPA 3050

07/20/93

NG/nfg/jst  
PBO93071402

Respectfully submitted,  
COAST-TO-COAST ANALYTICAL SERVICES, INC.

*Nick J. Gaone*  
Nick Gaone  
Inorganics Manager



Air, Water & Hazardous Waste Sampling, Analysis & Consultation  
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2059 Junction Ave.

San Jose, CA 95131  
(408) 955-9077

CLIENT: Mike Wopat  
Tetra Tech Inc.  
180 Howard Street, Ste.250  
San Francisco, CA 94105

Lab Number : JJ-1042-2  
Project : OMS#35/TC-9410-02 San  
Lorenzo

REPORT OF ANALYTICAL RESULTS

Page 1 of 1

SAMPLE DESCRIPTION	MATRIX	SAMPLED BY	SAMPLED DATE RECEIVED	
B2-9.5	Soil	Mike Wopat	07/07/93	07/09/93
CONSTITUENT	*PQL	RESULT	UNITS METHOD	ANALYZED BY NOTES
Lead, Organic	1.	ND	mg/Kg 22CAC	07/20/93 KP 1
Lead, Total	1.	10.	mg/Kg EPA 7420	07/15/93 DO 2

San Jose Lab Certifications: CAELAP #1204

\*RESULTS listed as 'ND' were not detected at or above the listed PQL (Practical Quantitation Limit)

- (1) Sample Preparation on 07/14/93 by NT
- (2) Sample Preparation on 07/13/93 by NT using EPA 3050

07/20/93

NG/nfg/jst  
PBO93071402

Respectfully submitted,  
COAST-TO-COAST ANALYTICAL SERVICES, INC.

*Nick J. Gaone*

Nick Gaone  
Inorganics Manager



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Anaheim, CA • Tempe, AZ • Valparaiso, IN • Westbrook, ME • Indianapolis, IN

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(408) 955-9077

CLIENT: Mike Wopat  
Tetra Tech Inc.  
180 Howard Street, Ste.250  
San Francisco, CA 94105

Lab Number : JJ-1042-3  
Project : OMS#35/TC-9410-02 San  
Lorenzo

REPORT OF ANALYTICAL RESULTS

Page 1 of 1

SAMPLE DESCRIPTION	MATRIX	SAMPLED BY	SAMPLED DATE RECEIVED	
B3-9.5	Soil	Mike Wopat	07/07/93	07/09/93
CONSTITUENT	*PQL	RESULT	UNITS METHOD	ANALYZED BY NOTES
Lead, Organic	1.	ND	mg/Kg 22CAC	07/20/93 KP 1
Lead, Total	1.	13.	mg/Kg EPA 7420	07/15/93 DO 2

San Jose Lab Certifications: CAELAP #1204

\*RESULTS listed as 'ND' were not detected at or above the listed PQL (Practical Quantitation Limit)

(1) Sample Preparation on 07/14/93 by NT

(2) Sample Preparation on 07/13/93 by NT using EPA 3050

07/20/93

NG/nfg/jst  
PBO93071402

Respectfully submitted,  
COAST-TO-COAST ANALYTICAL SERVICES, INC.

*Nick J. Gaone*

Nick Gaone  
Inorganics Manager



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NorCal Division (San Jose Laboratory)  
2059 Junction Ave.

San Jose, CA 95131  
(408) 955-9077

QC Batch ID: PBO93071402

CLIENT: Coast-to-Coast Analytical Services, Inc.

METHOD BLANK  
REPORT OF ANALYTICAL RESULTS

Page 1 of 1

SAMPLE DESCRIPTION	MATRIX	SAMPLED BY	SAMPLED DATE RECEIVED					
METHOD BLANK	Solid							
CONSTITUENT	*PQL	RESULT	UNITS	METHOD	ANALYZED	BY	NOTE	
Lead, Organic	1.	ND	mg/Kg	22CAC	07/20/93	KP	1	
Lead, Total	1.	ND	mg/Kg	EPA 7420	07/15/93	DO	2	

San Jose Lab Certifications: CAELAP #1204

\*RESULTS listed as 'ND' were not detected at or above the listed PQL (Practical Quantitation Limit)

- (1) Sample Preparation on 07/14/93 by NT
- (2) Sample Preparation on 07/13/93 by NT using EPA 3050

07/20/93

NG/nfg/jst  
JJ1042-3

Respectfully submitted,  
COAST-TO-COAST ANALYTICAL SERVICES, INC.

*Nick J. Gaone*

Nick Gaone  
Inorganics Manager



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NorCal Division (San Jose Laboratory)  
2059 Junction Ave.

San Jose, CA 95131  
(408) 955-9077

QC Batch ID: PBO93071402

CLIENT: Coast-to-Coast Analytical Services, Inc.

QC MATRIX SPIKE  
REPORT OF ANALYTICAL RESULTS

Page 1 of 1

SAMPLE DESCRIPTION	MATRIX	SAMPLED BY		SAMPLED DATE RECEIVED				
MATRIX SPIKE	Solid							
CONSTITUENT	ORIGINAL	SPIKE	RESULT	%REC	UNITS METHOD	ANALYZED	BY	NOTE
Lead, Organic	ND	10.	10.	100.	mg/Kg 22CAC	07/20/93	KP	1
Lead, Total	13.	24.	37.	100.	mg/Kg EPA 7420	07/15/93	DO	2

San Jose Lab Certifications: CAELAP #1204

\*RESULTS listed as 'ND' were not detected at or above the listed PQL (Practical Quantitation Limit)

- (1) Sample Preparation on 07/14/93 by NT
- (2) Sample Preparation on 07/13/93 by NT using EPA 3050

07/20/93

NG/nfg/jst  
JJ1042-3

Respectfully submitted,  
COAST-TO-COAST ANALYTICAL SERVICES, INC.

*Nick J. Gaone*  
Nick Gaone  
Inorganics Manager





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Anaheim, CA • Tempe, AZ • Valparaiso, IN • Westbrook, ME • Indianapolis, IN

NorCal Division (San Jose Laboratory)  
2059 Junction Ave.

San Jose, CA 95131  
(408) 955-9077

QC Batch ID: PBO93071402

CLIENT: Coast-to-Coast Analytical Services, Inc.

QC MATRIX SPIKE  
REPORT OF ANALYTICAL RESULTS

Page 1 of 1

SAMPLE DESCRIPTION	MATRIX	SAMPLED BY		SAMPLED DATE RECEIVED				
MATRIX SPIKE DUPLICATE	Solid							
CONSTITUENT	ORIGINAL	SPIKE	RESULT	%DIFF	UNITS METHOD	ANALYZED	BY	NOTE
Lead, Organic	ND	10.	11.	9.5	mg/Kg 22CAC	07/20/93	KP	1
Lead, Total	13.	23.	37.	4.3	mg/Kg EPA 7420	07/15/93	DO	2

San Jose Lab Certifications: CAELAP #1204

\*RESULTS listed as 'ND' were not detected at or above the listed PQL (Practical Quantitation Limit)

(1) Sample Preparation on 07/14/93 by NT

(2) Sample Preparation on 07/13/93 by NT using EPA 3050

07/20/93

NG/nfg/jst  
JJ1042-3

Respectfully submitted,  
COAST-TO-COAST ANALYTICAL SERVICES, INC.

Nick Gaone  
Inorganics Manager



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NorCal Division (San Jose Laboratory)  
2059 Junction Ave.

San Jose, CA 95131  
(408) 955-9077

CLIENT: Mike Wopat  
Tetra Tech Inc.  
180 Howard Street, Ste.250  
San Francisco, CA 94105

Lab Number : JJ-1042-4  
Project : OMS#35/TC-9410-02 San  
Lorenzo

REPORT OF ANALYTICAL RESULTS

Page 1 of 1

SAMPLE DESCRIPTION	MATRIX	SAMPLED BY		SAMPLED DATE RECEIVED	
B3-W1	Groundwater	Mike Wopat		07/07/93	07/09/93
CONSTITUENT	*PQL	RESULT	UNITS	METHOD ANALYZED	BY NOTES
Lead, Organic	0.05	ND	mg/L	22CAC 07/20/93	KP 1

San Jose Lab Certifications: CAELAP #1204

\*RESULTS listed as 'ND' were not detected at or above the listed PQL (Practical Quantitation Limit)  
(1) Sample Preparation on 07/14/93 by NT

07/20/93

NG/nfg/jst  
FBO93071401

Respectfully submitted,  
COAST-TO-COAST ANALYTICAL SERVICES, INC.

*Nick Gaone*  
Nick Gaone  
Inorganics Manager



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Anaheim, CA • Tempe, AZ • Valparaiso, IN • Westbrook, ME • Indianapolis, IN

NorCal Division (San Jose Laboratory)  
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(408) 955-9077

CLIENT: Mike Wopat  
Tetra Tech Inc.  
180 Howard Street, Ste.250  
San Francisco, CA 94105

Lab Number : JJ-1042-5  
Project : QMS#35/TC-9410-02 San  
Lorenzo

REPORT OF ANALYTICAL RESULTS

Page 1 of 1

SAMPLE DESCRIPTION	MATRIX	SAMPLED BY		SAMPLED DATE RECEIVED	
B2-W1	Groundwater	Mike Wopat		07/07/93	07/09/93
CONSTITUENT	*PQL	RESULT	UNITS	METHOD ANALYZED	BY NOTES
Lead, Organic	0.05	ND	mg/L	22CAC 07/20/93	KP 1

San Jose Lab Certifications: CAELAP #1204

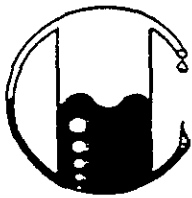
\*RESULTS listed as 'ND' were not detected at or above the listed PQL (Practical Quantitation Limit)  
(1) Sample Preparation on 07/14/93 by NT

07/20/93

NG/nfg/jst  
PBO93071401

Respectfully submitted,  
COAST-TO-COAST ANALYTICAL SERVICES, INC.

Nick Gaone  
Inorganics Manager



# MOBILE CHEM LABS INC.

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Phone (415) 372-3700 • Fax (415) 372-6955

Tetra Tech ①  
#T9410-02

## CHAIN OF CUSTODY

Cathy Bishop

SAMPLER: Nike Wopat

DATE/TIME OF COLLECTION: 7-8-93

TURNAROUND TIME: on site?

SAMPLE DESCRIPTION AND PROJECT NUMBER:

NATIONAL GUARD

San Lorenzo

<u>SAMPLE #</u>	<u>ANALYSIS</u>	<u>GRAB OR COMP.</u>	<u>NUMBER OF CONTAINERS</u>	<u>SOIL/WATER</u>
F073018(B2-W2)	TPH+BTX, DIESEL, 418.1	g	1	Water
F073019(B13-10')	↓ ↓ ↓	g	1	SOIL
F073020(B9-5')	TPH+BTX, 418.1	g	1	SOIL
F073021(B9-W1)	TPH+BTX, 418.1	g	1	Water
F073022(B9-10')	TPH+BTX 418.1	g	1	SOIL
F073023(B13-15')	TPH+BTX, DIESEL, 418.1	g	1	SOIL
F073024(B14-10')	TPH+BTX	g	1	SOIL
F073025(B14-W1)	TPH+BTX	g	1	Water

<u>RELINQUISHED BY*</u>	<u>TIME/DATE</u>	<u>RECEIVED BY*</u>	<u>TIME/DATE</u>
* Cathy Bishop	7/8/93 1700	* Brian Skelton	5:00 PM
			7-8-93

\* STATE AFFILIATION NEXT TO SIGNATURE

REMARKS:



# MOBILE CHEM LABS INC.

5021 Blum Road, Suite 3 • Martinez, CA 94553  
Phone (415) 372-3700 • Fax (415) 372-6955

Tetra Tech  
#T9410-02

2

## CHAIN OF CUSTODY

*Cathy Bishop*

SAMPLER: Mike Wopat

DATE/TIME OF COLLECTION: 7-8-93

TURNAROUND TIME: on site

SAMPLE DESCRIPTION AND PROJECT NUMBER:

NATIONAL GUARD

Sam Lorenzo

AMPLE #	ANALYSIS	GRAB OR COMP.	NUMBER OF CONTAINERS	SOIL/WATER
073026 (B14-15)	TPHE/BTEX	g	1	SOIL

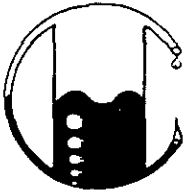
RELINQUISHED BY*	TIME/DATE	RECEIVED BY*	TIME/DATE
* <i>Kathy Bishop</i>	1700 / 7/8/93	* <i>B. Scheraga</i>	5:00 PM 7-8-93

\* STATE AFFILIATION NEXT TO SIGNATURE

REMARKS: \_\_\_\_\_

Add  
418.1 oh

F073026  
024  
g water  
025



# MOBILE CHEM LABS INC.

5011 Blum Road, Suite 1 • Martinez, CA 94553  
Phone (510) 372-3700 • Fax (510) 372-6955

Tetra Tech  
180 Howard Street, #250  
San Francisco, CA 94105  
Attn: Mike Wopat  
Project Manager

T9410-02\1342\012803

Date Sampled: 07-08-93  
Date Received: 07-08-93  
Date Analyzed: 07-08-93

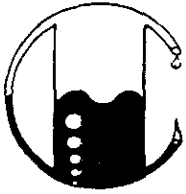
Sample Number	Sample Description	Detection Limit	SOIL	
			Total Recoverable Hydrocarbons	as Petroleum Oil
		ppm		ppm
			Project # T9410-02 OMS #35 - San Lorenzo 16501 Ashland Ave.	
F073019	B13-10	10		<10
F073020	B9-5	10		<10
F073022	B9-10	10		<10
F073023	B13-15	10		<10

QA/QC: Spike Recovery on F073019 is 92%  
Duplicate Spike Deviation is 1.7%

Note: Analysis was performed using EPA method 418.1  
(ppm) = (mg/kg)

MOBILE CHEM LABS

Ronald G. Evans  
Lab Director



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180 Howard Street, #250  
San Francisco, CA 94105  
Attn: Mike Wopat  
Project Manager

T9410-02\1342\012803

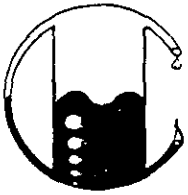
Date Sampled: 07-08-93  
Date Received: 07-08-93  
Date Analyzed: 07-08-93

Sample Number	Sample Description	Detection Limit	WATER	
			Total Recoverable Hydrocarbons	as Petroleum Oil
		ppm		ppm
		Project # T9410-02 OMS #35 - San Lorenzo 16501 Ashland Ave.		
F073018	B2-W2	1.0		<1.0
F073021	B9-W9	1.0		<1.0

Note: Analysis was performed using EPA method 418.1  
(ppm) = (mg/L)

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Tetra Tech  
180 Howard Street, #250  
San Francisco, CA 94105  
Attn: Mike Wopat  
Project Manager

T9410-02\1342\012803

Date Sampled: 07-08-93  
Date Received: 07-08-93  
Date Analyzed: 07-08-93

<u>Sample Number</u>	<u>Sample Description</u>	<u>Detection Limit</u> ppm	<u>SOIL</u> <u>Total Petroleum</u> <u>Hydrocarbons as Diesel</u> ppm
OMS #35 - San Lorenzo 16501 Ashland Ave. Proj # T9410-02			
F073014	B5-5	5.0	<5.0
F073015	B5-10	5.0	<5.0
F073016	B5-15	5.0	<5.0
F073019	B13-10	5.0	<5.0
F073023	B13-15	5.0	<5.0

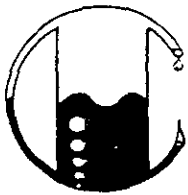
QA/QC: Spike Recovery on F073014 is 96%

Note: Analysis was performed using EPA method 3550 and TPH LUFT.  
(ppm) = (mg/kg)

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Lab Director





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T9410-02\1342\012803

Tetra Tech  
180 Howard Street, #250  
San Francisco, CA 94105  
Attn: Mike Wopat  
Project Manager

Date Sampled: 07-08-93  
Date Received: 07-08-93  
Date Analyzed: 07-08-93

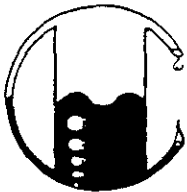
Sample Number	Sample Description	Detection Limit ppb	WATER
			Total Petroleum Hydrocarbons as Diesel ppb
OMS #35 - San Lorenzo 16501 Ashland Ave. Proj # T9410-02			
F073017	B5-W1	50	<50
F073018	B2-W2	50	<50
F073021	B9-W1	50	56

QA/QC: Duplicate Deviation is 2.4%

Note: Analysis was performed using EPA method 3510 and TPH LUFT.  
(ppb) = (µg/L)

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Lab Director



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T9410-02\1342\012803

Tetra Tech  
180 Howard Street, #250  
San Francisco, CA 94105  
Attn: Mike Wopat  
Project Manager

Date Sampled: 07-08-93  
Date Received: 07-08-93  
Date Analyzed: 07-08-93

Sample Number  
-----

F073018

Sample Description  
-----

Project # T9410-02  
OMS #35 - San Lorenzo  
16501 Ashland Ave.  
B2-W2 WATER

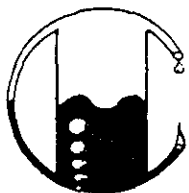
ANALYSIS  
-----

	Detection Limit ----- ppb	Sample Results ----- ppb
Total Petroleum Hydrocarbons as Gasoline	50	<50
Benzene	0.5	<0.5
Toluene	0.5	<0.5
Xylenes	0.5	<0.5
Ethylbenzene	0.5	<0.5

Note: Analysis was performed using EPA methods 5030 and TPH  
LUFT with method 602 used for BTX distinction.  
(ppb) = (µg/L)

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Ronald G. Evans  
Lab Director



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T9410-02\1342\012803

Tetra Tech  
180 Howard Street, #250  
San Francisco, CA 94105  
Attn: Mike Wopat  
Project Manager

Date Sampled: 07-08-93  
Date Received: 07-08-93  
Date Analyzed: 07-08-93

Sample Number

-----  
F073019

Sample Description

-----  
Project # T9410-02  
OMS #35 - San Lorenzo  
16501 Ashland Ave.  
B13-10 SOIL

ANALYSIS

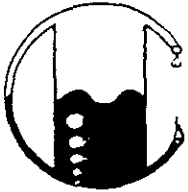
	Detection Limit	Sample Results
	----- ppm	----- ppm
Total Petroleum Hydrocarbons as Gasoline	1.0	5.9
Benzene	0.005	0.19
Toluene	0.005	0.006
Xylenes	0.005	0.04
Ethylbenzene	0.005	0.31

QA/QC: Duplicate Deviation is 16.7%

Note: Analysis was performed using EPA methods 5030 and TPH  
LUFT with method 8020 used for BTX distinction.  
(ppm) = (mg/kg)

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T9410-02\1342\012803

Tetra Tech  
180 Howard Street, #250  
San Francisco, CA 94105  
Attn: Mike Wopat  
Project Manager

Date Sampled: 07-08-93  
Date Received: 07-08-93  
Date Analyzed: 07-08-93

Sample Number

F073020

Sample Description

Project # T9410-02  
OMS #35 - San Lorenzo  
16501 Ashland Ave.  
B9-5 SOIL

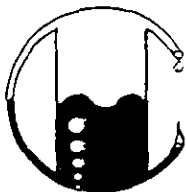
ANALYSIS

	Detection Limit	Sample Results
	ppm	ppm
Total Petroleum Hydrocarbons as Gasoline	1.0	<1.0
Benzene	0.005	<0.005
Toluene	0.005	<0.005
Xylenes	0.005	<0.005
Ethylbenzene	0.005	<0.005

Note: Analysis was performed using EPA methods 5030 and TPH  
LUFT with method 8020 used for BTX distinction.  
(ppm) = (mg/kg)

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Ronald G. Evans  
Lab Director



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T9410-02\1342\012803

Tetra Tech  
180 Howard Street, #250  
San Francisco, CA 94105  
Attn: Mike Wopat  
Project Manager

Date Sampled: 07-08-93  
Date Received: 07-08-93  
Date Analyzed: 07-08-93

Sample Number

F073021

Sample Description

Project # T9410-02  
OMS #35 - San Lorenzo  
16501 Ashland Ave.  
B9-W1 SOIL

ANALYSIS

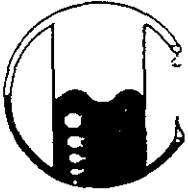
	Detection Limit	Sample Results
	ppb	ppb
Total Petroleum Hydrocarbons as Gasoline	50	<50
Benzene	0.5	<0.5
Toluene	0.5	<0.5
Xylenes	0.5	<0.5
Ethylbenzene	0.5	<0.5

QA/QC: Spike Recovery is 92%

Note: Analysis was performed using EPA methods 5030 and TPH LUFT with method 602 used for BTX distinction.  
(ppb) = (µ/L)

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Ronald G. Evans  
Lab Director



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T9410-02\1342\012803

Tetra Tech  
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San Francisco, CA 94105  
Attn: Mike Wopat  
Project Manager

Date Sampled: 07-08-93  
Date Received: 07-08-93  
Date Analyzed: 07-08-93

Sample Number

F073022

Sample Description

Project # T9410-02  
OMS #35 - San Lorenzo  
16501 Ashland Ave.  
B9-10 SOIL

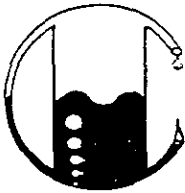
ANALYSIS

	<u>Detection Limit</u>	<u>Sample Results</u>
	ppm	ppm
Total Petroleum Hydrocarbons as Gasoline	1.0	<1.0
Benzene	0.005	<0.005
Toluene	0.005	<0.005
Xylenes	0.005	<0.005
Ethylbenzene	0.005	<0.005

Note: Analysis was performed using EPA methods 5030 and TPH  
LUFT with method 8020 used for BTX distinction.  
(ppm) = (mg/kg)

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Lab Director



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T9410-02\1342\012803

Tetra Tech  
180 Howard Street, #250  
San Francisco, CA 94105  
Attn: Mike Wopat  
Project Manager

Date Sampled: 07-08-93  
Date Received: 07-08-93  
Date Analyzed: 07-08-93

Sample Number  
-----

F073023

Sample Description  
-----

Project # T9410-02  
OMS #35 - San Lorenzo  
16501 Ashland Ave.  
B13-15 SOIL

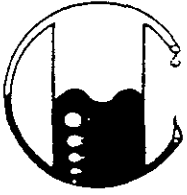
ANALYSIS  
-----

	Detection Limit ----- ppm	Sample Results ----- ppm
Total Petroleum Hydrocarbons as Gasoline	1.0	<1.0
Benzene	0.005	<0.005
Toluene	0.005	<0.005
Xylenes	0.005	0.008
Ethylbenzene	0.005	<0.005

Note: Analysis was performed using EPA methods 5030 and TPH  
LUFT with method 8020 used for BTX distinction.  
(ppm) = (mg/kg)

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Ronald G. Evans  
Lab Director



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T9410-02\1342\012803

Tetra Tech  
180 Howard Street, #250  
San Francisco, CA 94105  
Attn: Mike Wopat  
Project Manager

Date Sampled: 07-08-93  
Date Received: 07-08-93  
Date Analyzed: 07-08-93

Sample Number  
-----  
F073024

Sample Description  
-----  
Project # T9410-02  
OMS #35 - San Lorenzo  
16501 Ashland Ave.  
B14-10 SOIL

## ANALYSIS

-----

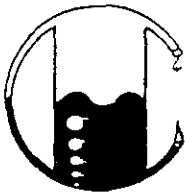
	Detection Limit	Sample Results
	ppm	ppm
Total Petroleum Hydrocarbons as Gasoline	1.0	<1.0
Benzene	0.005	<0.005
Toluene	0.005	<0.005
Xylenes	0.005	<0.005
Ethylbenzene	0.005	<0.005

Note: Analysis was performed using EPA methods 5030 and TPH  
LUFT with method 8020 used for BTX distinction.  
(ppm) = (mg/kg)

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Lab Director





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T9410-02\1342\012803

Tetra Tech  
180 Howard Street, #250  
San Francisco, CA 94105  
Attn: Mike Wopat  
Project Manager

Date Sampled: 07-08-93  
Date Received: 07-08-93  
Date Analyzed: 07-08-93

Sample Number

-----  
F073025

Sample Description

-----  
Project # T9410-02  
OMS #35 - San Lorenzo  
16501 Ashland Ave.  
B14-W1 WATER

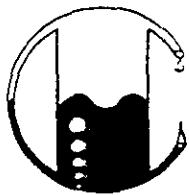
ANALYSIS

	Detection Limit	Sample Results
	----- ppb	----- ppb
Total Petroleum Hydrocarbons as Gasoline	50	<50
Benzene	0.5	<0.5
Toluene	0.5	<0.5
Xylenes	0.5	<0.5
Ethylbenzene	0.5	<0.5

Note: Analysis was performed using EPA methods 5030 and TPH  
LUFT with method 602 used for BTX distinction.  
(ppb) = (µg/L)

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Ronald G. Evans  
Lab Director



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Tetra Tech  
180 Howard Street, #250  
San Francisco, CA 94105  
Attn: Mike Wopat  
Project Manager

T9410-02\1342\012803

Date Sampled: 07-08-93  
Date Received: 07-08-93  
Date Analyzed: 07-08-93

Sample Number

-----  
F073026

Sample Description


-----  
Project # T9410-02  
OMS #35 - San Lorenzo  
16501 Ashland Ave.  
B14-15 SOIL

ANALYSIS

	Detection Limit	Sample Results
	----- ppm	----- ppm
Total Petroleum Hydrocarbons as Gasoline	1.0	<1.0
Benzene	0.005	<0.005
Toluene	0.005	<0.005
Xylenes	0.005	<0.005
Ethylbenzene	0.005	<0.005

Note: Analysis was performed using EPA methods 5030 and TPH  
LUFT with method 8020 used for BTX distinction.  
(ppm) = (mg/kg)

MOBILE CHEM LABS

  
Ronald G. Evans  
Lab Director



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2400 Cumberland Dr.  
4765 Calle Quetzal  
340 County Road No. 5

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Goleta, CA 93117  
Benicia, CA 94510  
Valparaiso, Indiana 46383  
Camarillo, CA 93012  
Westbrook, ME 04092

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(707) 747-2757 FAX (707) 747-2765  
(219) 464-2389 FAX (219) 462-2953  
(805) 389-1353 FAX (805) 389-1438  
(207) 874-2400 FAX (207) 775-4029

# Chain of Custody

PLEASE PRINT IN PEN

Client **TETRA TECH** Contact **MIKE WOPAT** Phone # **(415) 974-1221** FAX # **( )**

Address **150 HOWARD ST, SUITE 250 City SAN FRANCISCO State CA Zip 94105**

Project Name/Number **SAN LORRENZO, OMS #35** Project MGR **MIKE WOPAT**

Bill (if different than above) **same** Address **KATHY BISLER** Due Date **7/18/93** Circle for RUSH **NO** Copies To: **6** Auth. Init. **MIKE WOPAT**

Sample Description	Date/Time Col'd	*Matrix	# of Containers	Pres.	Fill. y/n	* Subject to Availability Analysis	Remarks	Lab ID #
B13-10	7/8/93 0920	SL	1			TOTAL LEAD 6010 ORGANIC LEAD (LUFT)		SJ 1044-1
B13-W	7/8/93 0920	WATER	400MS 2 200ML			TOTAL DISSOLVED LEAD 7421 ORGANIC LEAD (LUFT)		-2

Relinquished By	Date/Time	Received By	Relinquished By	Date/Time	Received By
<i>K. Bisler</i>	7/9/93 1705	<i>T. L. R. P.</i>	<i>P. Wilson</i>	7/9/93 12/18:00	

Shipping Method	Shipping #	Received By	Date/Time	Condition (See Remarks)		
<i>Peter Nahas</i>		<i>Shelley Hylf</i>	7-9-93 1800	Cold Y	Sealed Y	Intact Y

REMARKS

- \* Matrix:
- DW - Drinking Water
- WW - Wastewater
- GW - Groundwater
- SW - Surface Water
- IM - Impinger
- FI - Filter
- FP - Free Product
- A/G - Air/Gas
- SL - Sludge/Soil/Solid
- OT - Other



Air, Water & Hazardous Waste Sampling, Analysis & Consultation  
Certified Hazardous Waste, Chemistry, Bacteriology & Bioassay Laboratories

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Anaheim, CA • Tempe, AZ • Valparaiso, IN • Westbrook, ME • Indianapolis, IN

NorCal Division (San Jose Laboratory)  
2059 Junction Ave.

San Jose, CA 95131  
(408) 955-9077

CLIENT: Mike Wopat  
Tetra Tech Inc.  
180 Howard Street, Ste.250  
San Francisco, CA 94105

Lab Number : JJ-1044-1  
Project : OMS#35 / TC-9410-02 San  
Lorenzo

REPORT OF ANALYTICAL RESULTS

Page 1 of 1

SAMPLE DESCRIPTION	MATRIX	SAMPLED BY		SAMPLED DATE RECEIVED			
B13-10	Soil	Kathy Bishop		07/08/93	07/09/93		
CONSTITUENT	*PQL	RESULT	UNITS	METHOD	ANALYZED	BY	NOTES
Lead, Organic	1.	ND	mg/Kg	22CAC	07/20/93	KP	1
Lead, Total	1.	17.	mg/Kg	EPA 7420	07/15/93	DO	2

San Jose Lab Certifications: CAELAP #1204

\*RESULTS listed as 'ND' were not detected at or above the listed PQL (Practical Quantitation Limit)

- (1) Sample Preparation on 07/14/93 by NT
- (2) Sample Preparation on 07/13/93 by NT using EPA 3050

07/20/93

NG/nfg/jst  
PBO93071402

Respectfully submitted,  
COAST-TO-COAST ANALYTICAL SERVICES, INC.

Nick Gaone  
Inorganics Manager



Air, Water & Hazardous Waste Sampling, Analysis & Consultation  
Certified Hazardous Waste, Chemistry, Bacteriology & Bioassay Laboratories

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Anaheim, CA • Tempe, AZ • Valparaiso, IN • Westbrook, ME • Indianapolis, IN

NorCal Division (San Jose Laboratory)  
2059 Junction Ave.

San Jose, CA 95131  
(408) 955-9077

CLIENT: Mike Wopat  
Tetra Tech Inc.  
180 Howard Street, Ste.250  
San Francisco, CA 94105

Lab Number : JJ-1044-2  
Project : OMS#35 / TC-9410-02 San  
Lorenzo

REPORT OF ANALYTICAL RESULTS

Page 1 of 1

SAMPLE DESCRIPTION	MATRIX	SAMPLED BY	SAMPLED DATE RECEIVED				
B13-W	Groundwater	Kathy Bishop	07/08/93	07/09/93			
CONSTITUENT	*PQL	RESULT	UNITS	METHOD	ANALYZED	BY	NOTES
Lead, Dissolved	0.005	ND	mg/L	EPA 7421	07/15/93	DO	1
Lead, Organic	0.05	ND	mg/L	22CAC	07/20/93	KP	2

San Jose Lab Certifications: CAELAP #1204

\*RESULTS listed as 'ND' were not detected at or above the listed PQL (Practical Quantitation Limit)

- (1) Sample Preparation on 07/15/93 by NT using EPA 3005
- (2) Sample Preparation on 07/14/93 by NT

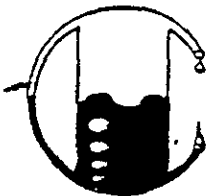
07/20/93

NG/nfg/jst  
0593071402

Respectfully submitted,  
COAST-TO-COAST ANALYTICAL SERVICES, INC.

*Nick J. Gaone*

Nick Gaone  
Inorganics Manager



# MOBILE CHEM LABS INC.

5021 Blum Road, Suite 3 • Martinez, CA 94553  
Phone (415) 372-3700 • Fax (415) 372-6955

tetra tech  
# T-9410-02 (1)

## CHAIN OF CUSTODY

SAMPLER: Kathy Bishop

DATE/TIME OF COLLECTION: 7-9-93

TURNAROUND TIME: on site

SAMPLE DESCRIPTION AND PROJECT NUMBER:

NATIONAL GUARD

San Lorenzo

SAMPLE #	ANALYSIS	GRAB OR. COMP.	NUMBER OF CONTAINERS	SOIL/WATER
027 (B15-5')	TPH+BTX, 418.1	g	1	SOIL
028 (B15-10')	↓ ↓	g	1	SOIL
029 (B15-W1)	↓ DIESEL ↓	g	4	Water
030 (B15-15')	↓ ↓	g	1	SOIL
031 (B7-5')	↓ DIESEL ↓	g	1	SOIL
032 (B7-10')	↓ DIESEL ↓	g	1	SOIL
033 (B7-15')	↓ DIESEL ↓	g	1	SOIL
034 (B7-W1)	↓ DIESEL ↓	g	300's 1 Liter	Water

RELINQUISHED BY\*

TIME/DATE

RECEIVED BY\*

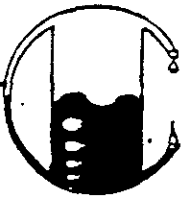
TIME/DATE

\* Kathy Bishop 1715 7/9/93

\* Brian Scherdel 5:15 PM 7-9-93

STATE AFFILIATION NEXT TO SIGNATURE

REMARKS:



# MOBILE CHEM LABS INC.

5021 Blum Road, Suite 3 • Martinez, CA 94553  
Phone (415) 372-3700 • Fax (415) 372-6955

Tetra Tech  
#T9410-02

## CHAIN OF CUSTODY

SAMPLER: Kathy Bishop

DATE/TIME OF COLLECTION: 7-9-93

TURNAROUND TIME: on site

SAMPLE DESCRIPTION AND PROJECT NUMBER:

NATIONAL GUARD

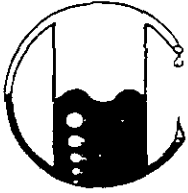
San Lorenzo

SAMPLE #	ANALYSIS	GRAB OR COMP.	NUMBER OF CONTAINERS	SOIL/WATER
F013035(B16-5')	TPH+G+BTEX, 418.1	g	1	SOIL
036(B16-10')	↓	g	1	SOIL
037(B16-15')	↓	g	1	SOIL
038(B16-W1)	↓	g	1 liter 1 VOA	Water
039(B17-25')	↓ #DIESEL ↓	g	1	SOIL
040	↓ ↓ ↓	g	2 Liter 2 VOA's	Water

RELINQUISHED BY*	TIME/DATE	RECEIVED BY*	TIME/DATE
* Kathy Bishop	7/9/93 1515	* Bernd Scherdel	5:15 pm 7-9-93
2.			
3.			
4.			

\* STATE AFFILIATION NEXT TO SIGNATURE

REMARKS: \_\_\_\_\_



# MOBILE CHEM LABS INC.

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T9410-02\1342\012803

Tetra Tech  
180 Howard Street, #250  
San Francisco, CA 94105  
Attn: Mike Wopat  
Project Manager

Date Sampled: 07-08/09-93  
Date Received: 07-08/09-93  
Date Analyzed: 07-09-93

Sample Number	Sample Description	Detection Limit	Total Recoverable Hydrocarbons as Petroleum Oil
		ppm	ppm

Project # T9410-02  
OMS #35 - San Lorenzo  
16501 Ashland Ave.

F073024	B14-10	10	<10
F073026	B14-15	10	<10
F073027	B15-5	10	<10
F073028	B15-10	10	<10
F073030	B15-15	10	<10
F073031	B7-5	10	<10
F073032	B7-10	10	<10
F073033	B7-15	10	<10
F073035	B16-5	10	<10
F073036	B16-10	10	<10
F073037	B16-15	10	<10
F073039	B17-25	10	<10

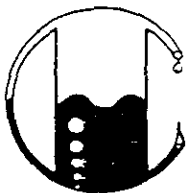
QA/QC: Spike Recovery on F073024 is 91%  
Duplicate Spike Deviation is 3.1%

Note: Analysis was performed using EPA method 418.1  
(ppm) = (mg/kg)

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Lab Director





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T9410-02\1342\012803

Tetra Tech  
180 Howard Street, #250  
San Francisco, CA 94105  
Attn: Mike Wopat  
Project Manager

Date Sampled: 07-08/09-93  
Date Received: 07-08/09-93  
Date Analyzed: 07-09-93

Sample Number	Sample Description	Detection Limit ppm	WATER Total Recoverable Hydrocarbons as Petroleum Oil ppm
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Project # T9410-02  
OMS #35 - San Lorenzo  
16501 Ashland Ave.

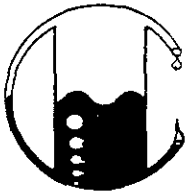
F073025	B14-W1	1.0	<1.0
F073029	B15-W1	1.0	<1.0
F073034	B7-W1	1.0	<1.0
F073038	B16-W1	1.0	<1.0
F073040	B17-W1	1.0	<1.0

QA/QC: Spike Recovery on F073029 is 92%

Note: Analysis was performed using EPA method 418.1  
(ppm) = (mg/L)

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Tetra Tech  
180 Howard Street, #250  
San Francisco, CA 94105  
Attn: Mike Wopat  
Project Manager

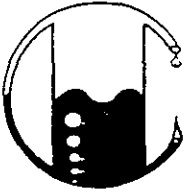
Date Sampled: 07-09-93  
Date Received: 07-09-93  
Date Analyzed: 07-09-93

<u>Sample Number</u>	<u>Sample Description</u>	<u>Detection Limit</u> ppm	<u>SOIL</u> <u>Total Petroleum</u> <u>Hydrocarbons as Diesel</u> ppm
	OMS #35 - San Lorenzo 16501 Ashland Ave. Proj # T9410-02		
F073031	B7-5	5.0	<5.0
F073032	B7-10	5.0	<5.0
F073033	B7-15	5.0	<5.0
F073039	B17-25	5.0	<5.0

Note: Analysis was performed using EPA method 3550 and TPH LUFT.  
(ppm) = (mg/kg)

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T9410-02\1342\012803

Tetra Tech  
180 Howard Street, #250  
San Francisco, CA 94105  
Attn: Mike Wopat  
Project Manager

Date Sampled: 07-09-93  
Date Received: 07-09-93  
Date Analyzed: 07-09-93

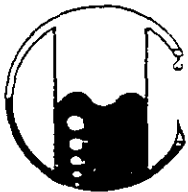
Sample Number	Sample Description	Detection Limit ppb	WATER
			Total Petroleum Hydrocarbons as Diesel ppb
OMS #35 - San Lorenzo 16501 Ashland Ave. Proj # T9410-02			
F073029	B15-W1	50	<50
F073034	B7-W1	50	<50
F073040	B17-W1	50	<50

QA/QC: Spike Recovery on F073034 is 92%  
Duplicate Spike Deviation is 2%

Note: Analysis was performed using EPA method 3510 and TPH LUFT.  
(ppb) = (µg/L)

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San Francisco, CA 94105  
Attn: Mike Wopat  
Project Manager

T9410-02\1342\012803

Date Sampled: 07-09-93  
Date Received: 07-09-93  
Date Analyzed: 07-09-93

Sample Number

F073027

Sample Description

Project # T9410-02  
OMS #35 - San Lorenzo  
16501 Ashland Ave.  
B15-5 SOIL

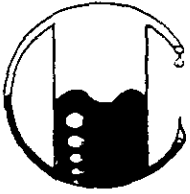
ANALYSIS

	<u>Detection Limit</u>	<u>Sample Results</u>
	ppm	ppm
Total Petroleum Hydrocarbons as Gasoline	1.0	<1.0
Benzene	0.005	<0.005
Toluene	0.005	<0.005
Xylenes	0.005	<0.005
Ethylbenzene	0.005	<0.005

Note: Analysis was performed using EPA methods 5030 and TPH  
LUFT with method 8020 used for BTX distinction.  
(ppm) = (mg/kg)

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Tetra Tech  
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San Francisco, CA 94105  
Attn: Mike Wopat  
Project Manager

Date Sampled: 07-09-93  
Date Received: 07-09-93  
Date Analyzed: 07-09-93

Sample Number  
-----  
F073028

Sample Description  
-----  
Project # T9410-02  
OMS #35 - San Lorenzo  
16501 Ashland Ave.  
B15-10 SOIL

## ANALYSIS

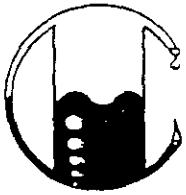
-----

	Detection Limit	Sample Results
	----- ppm	----- ppm
Total Petroleum Hydrocarbons as Gasoline	1.0	<1.0
Benzene	0.005	<0.005
Toluene	0.005	<0.005
Xylenes	0.005	<0.005
Ethylbenzene	0.005	<0.005

Note: Analysis was performed using EPA methods 5030 and TPH  
LUFT with method 8020 used for BTX distinction.  
(ppm) = (mg/kg)

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Project Manager

Date Sampled: 07-09-93  
Date Received: 07-09-93  
Date Analyzed: 07-09-93

Sample Number  
F073029

Sample Description  
Project # T9410-02  
OMS #35 - San Lorenzo  
16501 Ashland Ave.  
B15-W1 WATER

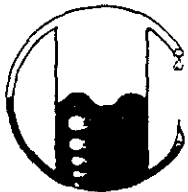
## ANALYSIS

	<u>Detection Limit</u>	<u>Sample Results</u>
	ppb	ppb
Total Petroleum Hydrocarbons as Gasoline	50	<50
Benzene	0.5	<0.5
Toluene	0.5	<0.5
Xylenes	0.5	<0.5
Ethylbenzene	0.5	<0.5

Note: Analysis was performed using EPA methods 5030 and TPH LUFT with method 602 used for BTX distinction.  
(ppb) = (µg/L)

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Attn: Mike Wopat  
Project Manager

T9410-02\1342\012803

Date Sampled: 07-09-93  
Date Received: 07-09-93  
Date Analyzed: 07-09-93

Sample Number  
-----  
F073030

Sample Description  
-----  
Project # T9410-02  
OMS #35 - San Lorenzo  
16501 Ashland Ave.  
B15-15 SOIL


## ANALYSIS

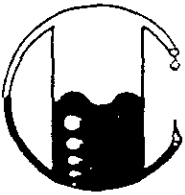
-----

	Detection Limit ----- ppm	Sample Results ----- ppm
Total Petroleum Hydrocarbons as Gasoline	1.0	<1.0
Benzene	0.005	<0.005
Toluene	0.005	<0.005
Xylenes	0.005	<0.005
Ethylbenzene	0.005	<0.005

Note: Analysis was performed using EPA methods 5030 and TPH  
LUFT with method 8020 used for BTX distinction.  
(ppm) = (mg/kg)

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T9410-02\1342\012803

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180 Howard Street, #250  
San Francisco, CA 94105  
Attn: Mike Wopat  
Project Manager

Date Sampled: 07-09-93  
Date Received: 07-09-93  
Date Analyzed: 07-09-93

Sample Number  
-----  
F073031

Sample Description  
-----  
Project # T9410-02  
OMS #35 - San Lorenzo  
16501 Ashland Ave.  
B7-5 SOIL

## ANALYSIS

-----

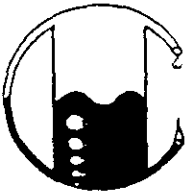
	Detection Limit	Sample Results
	ppm	ppm
Total Petroleum Hydrocarbons as Gasoline	1.0	<1.0
Benzene	0.005	<0.005
Toluene	0.005	<0.005
Xylenes	0.005	<0.005
Ethylbenzene	0.005	<0.005

Note: Analysis was performed using EPA methods 5030 and TPH  
LUFT with method 8020 used for BTX distinction.  
(ppm) = (mg/kg)

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Lab Director





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T9410-02\1342\012803

Tetra Tech  
180 Howard Street, #250  
San Francisco, CA 94105  
Attn: Mike Wopat  
Project Manager

Date Sampled: 07-09-93  
Date Received: 07-09-93  
Date Analyzed: 07-09-93

Sample Number

F073032

Sample Description

Project # T9410-02  
OMS #35 - San Lorenzo  
16501 Ashland Ave.  
B7-10 SOIL

ANALYSIS

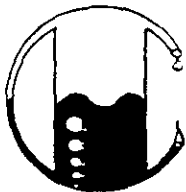
	<u>Detection Limit</u>	<u>Sample Results</u>
	ppm	ppm
Total Petroleum Hydrocarbons as Gasoline	1.0	<1.0
Benzene	0.005	<0.005
Toluene	0.005	<0.005
Xylenes	0.005	<0.005
Ethylbenzene	0.005	<0.005

QA/QC: Duplicate Deviation is 18%

Note: Analysis was performed using EPA methods 5030 and TPH  
LUFT with method 8020 used for BTX distinction.  
(ppm) = (mg/kg)

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Attn: Mike Wopat  
Project Manager

Date Sampled: 07-09-93  
Date Received: 07-09-93  
Date Analyzed: 07-09-93

Sample Number

-----  
F073033

Sample Description

-----  
Project # T9410-02  
OMS #35 - San Lorenzo  
16501 Ashland Ave.  
B7-15 SOIL

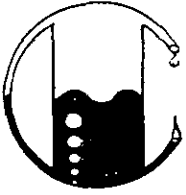
ANALYSIS

	Detection Limit	Sample Results
	----- ppm	----- ppm
Total Petroleum Hydrocarbons as Gasoline	1.0	<1.0
Benzene	0.005	<0.005
Toluene	0.005	<0.005
Xylenes	0.005	<0.005
Ethylbenzene	0.005	<0.005

Note: Analysis was performed using EPA methods 5030 and TPH  
LUFT with method 8020 used for BTX distinction.  
(ppm) = (mg/kg)

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T9410-02\1342\012803

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180 Howard Street, #250  
San Francisco, CA 94105  
Attn: Mike Wopat  
Project Manager

Date Sampled: 07-09-93  
Date Received: 07-09-93  
Date Analyzed: 07-09-93

Sample Number  
-----  
F073034

Sample Description  
-----  
Project # T9410-02  
OMS #35 - San Lorenzo  
16501 Ashland Ave.  
B7-W1 WATER

## ANALYSIS

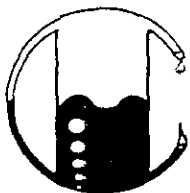
-----

	Detection Limit	Sample Results
	----- ppb	----- ppb
Total Petroleum Hydrocarbons as Gasoline	50	<50
Benzene	0.5	<0.5
Toluene	0.5	<0.5
Xylenes	0.5	<0.5
Ethylbenzene	0.5	<0.5

Note: Analysis was performed using EPA methods 5030 and TPH  
LUFT with method 602 used for BTX distinction.  
(ppb) = (µg/L)

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T9410-02\1342\012803

Tetra Tech  
180 Howard Street, #250  
San Francisco, CA 94105  
Attn: Mike Wopat  
Project Manager

Date Sampled: 07-09-93  
Date Received: 07-09-93  
Date Analyzed: 07-09-93

Sample Number  
-----  
F073035

Sample Description  
-----  
Project # T9410-02  
OMS #35 - San Lorenzo  
16501 Ashland Ave.  
B16-5 SOIL


## ANALYSIS

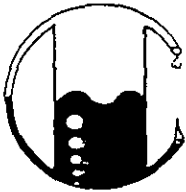
-----

	Detection Limit	Sample Results
	ppm	ppm
Total Petroleum Hydrocarbons as Gasoline	1.0	<1.0
Benzene	0.005	<0.005
Toluene	0.005	<0.005
Xylenes	0.005	<0.005
Ethylbenzene	0.005	<0.005

Note: Analysis was performed using EPA methods 5030 and TPH  
LUFT with method 8020 used for BTX distinction.  
(ppm) = (mg/kg)

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T9410-02\1342\012803

Tetra Tech  
180 Howard Street, #250  
San Francisco, CA 94105  
Attn: Mike Wopat  
Project Manager

Date Sampled: 07-09-93  
Date Received: 07-09-93  
Date Analyzed: 07-09-93

Sample Number  
F073036

Sample Description  
Project # T9410-02  
OMS #35 - San Lorenzo  
16501 Ashland Ave.  
B16-10 SOIL

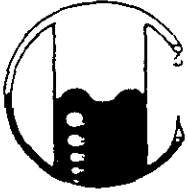
## ANALYSIS

	<u>Detection Limit</u> ppm	<u>Sample Results</u> ppm
Total Petroleum Hydrocarbons as Gasoline	1.0	<1.0
Benzene	0.005	<0.005
Toluene	0.005	<0.005
Xylenes	0.005	<0.005
Ethylbenzene	0.005	<0.005

Note: Analysis was performed using EPA methods 5030 and TPH  
LUFT with method 8020 used for BTX distinction.  
(ppm) = (mg/kg)

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T9410-02\1342\012803

Tetra Tech  
180 Howard Street, #250  
San Francisco, CA 94105  
Attn: Mike Wopat  
Project Manager

Date Sampled: 07-09-93  
Date Received: 07-09-93  
Date Analyzed: 07-09-93

Sample Number  
-----  
F073037

Sample Description  
-----  
Project # T9410-02  
OMS #35 - San Lorenzo  
16501 Ashland Ave.  
B16-15 SOIL

## ANALYSIS

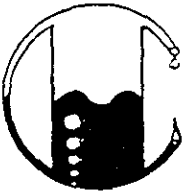
-----

	Detection Limit	Sample Results
	----- ppm	----- ppm
Total Petroleum Hydrocarbons as Gasoline	1.0	<1.0
Benzene	0.005	<0.005
Toluene	0.005	<0.005
Xylenes	0.005	<0.005
Ethylbenzene	0.005	<0.005

Note: Analysis was performed using EPA methods 5030 and TPH  
LUFT with method 8020 used for BTX distinction.  
(ppm) = (mg/kg)

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T9410-02\1342\012803

Tetra Tech  
180 Howard Street, #250  
San Francisco, CA 94105  
Attn: Mike Wopat  
Project Manager

Date Sampled: 07-09-93  
Date Received: 07-09-93  
Date Analyzed: 07-09-93

Sample Number  
F073038

Sample Description  
Project # T9410-02  
OMS #35 - San Lorenzo  
16501 Ashland Ave.  
B16-W1 WATER

## ANALYSIS

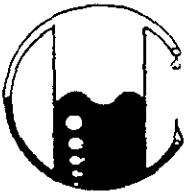
	<u>Detection Limit</u> ppb	<u>Sample Results</u> ppb
Total Petroleum Hydrocarbons as Gasoline	50	<50
Benzene	0.5	<0.5
Toluene	0.5	<0.5
Xylenes	0.5	<0.5
Ethylbenzene	0.5	<0.5

QA/QC: Spike Recovery is 97%

Note: Analysis was performed using EPA methods 5030 and TPH LUFT with method 602 used for BTX distinction.  
(ppb) = (µg/L)

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T9410-02\1342\012803

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180 Howard Street, #250  
San Francisco, CA 94105  
Attn: Mike Wopat  
Project Manager

Date Sampled: 07-09-93  
Date Received: 07-09-93  
Date Analyzed: 07-09-93

Sample Number  
-----  
F073039

Sample Description  
-----  
Project # T9410-02  
OMS #35 - San Lorenzo  
16501 Ashland Ave.  
B17-25 SOIL

## ANALYSIS

-----

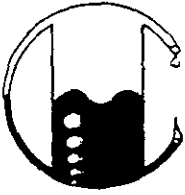
	Detection Limit ----- ppm	Sample Results ----- ppm
Total Petroleum Hydrocarbons as Gasoline	1.0	<1.0
Benzene	0.005	<0.005
Toluene	0.005	<0.005
Xylenes	0.005	<0.005
Ethylbenzene	0.005	<0.005

Note: Analysis was performed using EPA methods 5030 and TPH  
LUFT with method 8020 used for BTX distinction.  
(ppm) = (mg/kg)

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Ronald G. Evans  
Lab Director





# MOBILE CHEM LABS INC.

5011 Blum Road, Suite 1 • Martinez, CA 94553  
Phone (510) 372-3700 • Fax (510) 372-6955

T9410-02\1342\012803

Tetra Tech  
180 Howard Street, #250  
San Francisco, CA 94105  
Attn: Mike Wopat  
Project Manager

Date Sampled: 07-09-93  
Date Received: 07-09-93  
Date Analyzed: 07-09-93

Sample Number  
-----  
F073040

Sample Description  
-----  
Project # T9410-02  
OMS #35 - San Lorenzo  
16501 Ashland Ave.  
B17-W1           WATER

## ANALYSIS

-----

	Detection Limit ----- ppb	Sample Results ----- ppb
Total Petroleum Hydrocarbons as Gasoline	50	<50
Benzene	0.5	<0.5
Toluene	0.5	<0.5
Xylenes	0.5	<0.5
Ethylbenzene	0.5	1.7

Note: Analysis was performed using EPA methods 5030 and TPH  
LUFT with method 602 used for BTX distinction.  
(ppb) = (µg/L)

MOBILE CHEM LABS

Ronald G. Evans  
Lab Director

141 Suburban Road	• San Luis Obispo, CA 93401	• (805) 543-2553	FAX (805) 543-2685
751 S. Kellogg, Suite A	• Goleta, CA 93117	• (805) 964-7838	FAX (805) 967-4386
6006 Egret Ct.	• Benicia, CA 94510	• (707) 747-2757	FAX (707) 747-2765
2400 Cumberland Dr.	• Valparaiso, Indiana 46383	• (219) 464-2389	FAX (219) 462-2953
4765 Calle Quetzal	• Camarillo, CA 93012	• (805) 389-1353	FAX (805) 389-1438
340 County Road No. 5	• Westbrook, ME 04092	• (207) 874-2400	FAX (207) 775-4029

• PLEASE PRINT IN PEN

Client <b>TETRA TECH</b>		Contact <b>MIKE WOPAR</b>	Phone # <b>(510) 974-1221</b>	FAX # <b>(510) 974-5914</b>
Address <b>150 HOWARD STREET, SUITE 250</b>		City <b>SAN FRANCISCO</b>	State <b>CA</b>	Zip <b>94105</b>
Project Name/Number <b>SAN LORENZO OMS #35 / TC 9410-02</b>			Project MGR <b>MIKE WOPAR</b>	
Bill (if different than above) <b>sewn</b>		Address		
Sampler (Print and sign) <b>R. B. [Signature]</b>		Due Date <b>STANDARD SAT</b>	Circle for <b>RUSH*</b>	Copies To: _____
				Auth. Init. _____

Sample Description	Date/Time Coll'd	*Matrix	# of Containers	Pres.	Filt. y/n	* Subject to Availability Analysis	Remarks	Lab ID #
MW1	7/14/93 1000	GW	4 (2 Lit) (2 UOA)	N	Y	TRPH, TPHg, TPHdiesel, BTEX	HOLD SURPLUS SAMPLES FOR ASSAY	JJ 1103-1
MW2	7/14/93 1030	GW	4 (2 Lit) (2 UOA)	N	Y	TRPH, TPHg, TPHd, BTEX	TOTAL LEAD + ORGANIC LEAD	3
MW3	7/14/93 1110	GW	7 (2 Lit) (2 UOA) (3 UOA)	N	Y	TRPH, TPHg, TPHd, BTEX	↓ ↓ ↓	3, 4
						HOLD SURPLUS SAMPLE FOR POSSIBLE LEAD ANALYSIS. NEED TO FILTER AND ADD NITRIC ACID. TO INCREASE HOLDING TIME		

Relinquished By	Date/Time	Received By	Relinquished By	Date/Time	Received By
<b>R. B. [Signature]</b>	7/14/93 1800	<b>Pat L. Pen</b>	<b>Pat L. Pen</b>	7/15/93 12:30	

Shipping Method	Shipping #	Received By	Date/Time	Condition (See Remarks)			<b>* Matrix:</b> DW - Drinking Water WW - Wastewater GW - Groundwater SW - Surface Water IM - Impinger FI - Filler FP - Free Product A/G - Air/Gas SL - Sludge/Soil/Solid OT - Other
<b>Peter Nanas</b>		<b>Chellie [Signature]</b>	7-15-93 1230	Cold	Sealed	Intact	
REMARKS							

FOR LAB USE ONLY



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NorCal Division (San Jose Laboratory)  
2059 Junction Ave.

San Jose, CA 95131  
(408) 955-9077

CLIENT: Mike Wopat  
Tetra Tech Inc.  
180 Howard Street, Ste.250  
San Francisco, CA 94105

Lab Number : JJ1103  
Project : San Lorenzo, QMS #35,  
TC9410-02

REPORT OF ANALYTICAL RESULTS

Page 1 of 1

SAMPLE ID	SAMPLE DESCRIPTION	MATRIX	SAMPLED BY	SAMPLED DATE RECEIVED			
JJ1103-1	MW1	Groundwater	Kim Bishop	07/14/93	07/15/93		
JJ1103-2	MW2	Groundwater	Kim Bishop	07/14/93	07/15/93		
JJ1103-3	MW3	Groundwater	Kim Bishop	07/14/93	07/15/93		
CONSTITUENT			UNITS	*PQL	JJ1103-1	JJ1103-2	JJ1103-3
Total Recoverable Petroleum Hydrocarbons			mg/L	0.5	ND	ND	1.0
Method:					EPA 418.1	EPA 418.1	EPA 418.1
Analyzed by:					MT	MT	MT
Analyzed on:					07/19/93	07/19/93	07/19/93

San Jose Lab Certifications: CAELAP #1204

\*RESULTS of 'ND' not detected at or above the listed PQL times Dilution Factor.

07/22/93

NG/sab/jst/mt  
41893071901

Respectfully submitted,  
COAST-TO-COAST ANALYTICAL SERVICES, INC.

*Nick J. Gaone*

Nick Gaone  
Inorganics Manager



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(408) 955-9077

CLIENT: Mike Wopat  
Tetra Tech Inc.  
180 Howard Street, Ste.250  
San Francisco, CA 94105

Lab Number : JJ-1103-1  
Project : San Lorenzo, OMS #35,  
TC9410-02  
Analyzed : 07/23/93  
Analyzed by: CB  
Method : E602/8015M

REPORT OF ANALYTICAL RESULTS

Page 1 of 1

SAMPLE DESCRIPTION	MATRIX	SAMPLED BY	SAMPLED DATE RECEIVED		
MW1	Groundwater	Kim Bishop	07/14/93	07/15/93	
CONSTITUENT	(CAS RN)	*PQL µg/L	RESULT µg/L	NOTE	
BTEX + TPH (Gasoline)				1	
Benzene		0.5	ND		
Toluene		0.5	ND		
Ethylbenzene		0.5	ND		
Xylenes		0.5	ND		
Total Petroleum Hydrocarbons (Gasoline)		50.	ND		
Percent Surrogate Recovery			100.		

San Jose Lab Certifications: CAELAP #1204

\*RESULTS listed as 'ND' were not detected at or above the listed PQL (Practical Quantitation Limit)  
(1) EXTRACTED by EPA 5030 (purge-and-trap)

07/27/93  
GC#2-722B345D  
MC/mcc/cb  
W-BTX-072293

Respectfully submitted,  
COAST-TO-COAST ANALYTICAL SERVICES, INC.

Marissa Coronel  
Laboratory Director



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(408) 955-9077

CLIENT: Mike Wopat  
Tetra Tech Inc.  
180 Howard Street, Ste.250  
San Francisco, CA 94105

Lab Number : JJ-1103-2  
Project : San Lorenzo, OMS #35,  
TC9410-02  
Analyzed : 07/23/93  
Analyzed by: CB  
Method : E602/8015M

REPORT OF ANALYTICAL RESULTS

Page 1 of 1

SAMPLE DESCRIPTION	MATRIX	SAMPLED BY	SAMPLED DATE RECEIVED		
MW2	Groundwater	Kim Bishop	07/14/93	07/15/93	
CONSTITUENT	(CAS RN)	*PQL µg/L	RESULT µg/L	NOTE	
BTEX + TPH (Gasoline)				1	
Benzene		0.5	ND		
Toluene		0.5	ND		
Ethylbenzene		0.5	ND		
Xylenes		0.5	ND		
Total Petroleum Hydrocarbons (Gasoline)		50.	ND		
Percent Surrogate Recovery			97.		

San Jose Lab Certifications: CAELAP #1204

\*RESULTS listed as 'ND' were not detected at or above the listed PQL (Practical Quantitation Limit)  
(1) EXTRACTED by EPA 5030 (purge-and-trap)

07/27/93  
GC#2-722B345E  
MC/mcc/cb  
W-BTX-072293

Respectfully submitted,  
COAST-TO-COAST ANALYTICAL SERVICES, INC.

Marissa Coronel  
Laboratory Director

**COAST-TO-COAST  
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San Jose, CA 95131  
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CLIENT: Mike Wopat  
 Tetra Tech Inc.  
 180 Howard Street, Ste.250  
 San Francisco, CA 94105

Lab Number : JJ-1103-3  
 Project : San Lorenzo, OMS #35,  
 TC9410-02  
 Analyzed : 07/26/93  
 Analyzed by: CB  
 Method : E602/8015M

REPORT OF ANALYTICAL RESULTS

Page 1 of 1

SAMPLE DESCRIPTION	MATRIX	SAMPLED BY	SAMPLED DATE RECEIVED		
MW3	Groundwater	Kim Bishop	07/14/93	07/15/93	
CONSTITUENT	(CAS RN)	*PQL µg/L	RESULT µg/L	NOTE	
BTEX + TPH (Gasoline)				1	
Benzene		5.	ND		
Toluene		5.	ND		
Ethylbenzene		5.	ND		
Xylenes		5.	640.		
Total Petroleum Hydrocarbons (Gasoline)		500.	4100.		
Percent Surrogate Recovery			116.		

San Jose Lab Certifications: CAELAP #1204

\*RESULTS listed as 'ND' were not detected at or above the listed PQL (Practical Quantitation Limit)  
 (1) EXTRACTED by EPA 5030 (purge-and-trap)

07/27/93  
 GC#2-726A311  
 MC/mcc/cb  
 W-BTX-072693

Respectfully submitted,  
 COAST-TO-COAST ANALYTICAL SERVICES, INC.

*Marissa Coronel*  
 Marissa Coronel  
 Laboratory Director



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CLIENT: Mike Wopat  
Tetra Tech Inc.  
180 Howard Street, Ste.250  
San Francisco, CA 94105

Lab Number : JJ-1103-1  
Project : San Lorenzo, OMS #35,  
TC9410-02  
Analyzed : 07/23/93  
Analyzed by: TN  
Method : EPA 8015M

REPORT OF ANALYTICAL RESULTS

Page 1 of 1

SAMPLE DESCRIPTION	MATRIX	SAMPLED BY	SAMPLED DATE RECEIVED		
MW1	Groundwater	Kim Bishop	07/14/93	07/15/93	
CONSTITUENT	(CAS RN)	*PQL µg/L	RESULT µg/L	NOTE	
Total Petroleum Hydrocarbons (Diesel)		50.	ND	1	

San Jose Lab Certifications: CAELAP #1204

\*RESULTS listed as 'ND' were not detected at or above the listed PQL (Practical Quantitation Limit)

(1) Sample Preparation on 07/22/93 by ILB

07/27/93  
ECD2-723009  
MC/mcc/ttn  
DSL072293A

Respectfully submitted,  
COAST-TO-COAST ANALYTICAL SERVICES, INC.

Marissa Coronel  
Laboratory Director

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CLIENT: Mike Wopat  
 Tetra Tech Inc.  
 180 Howard Street, Ste.250  
 San Francisco, CA 94105

Lab Number : JJ-1103-2  
 Project : San Lorenzo, OMS #35,  
 TC9410-02  
 Analyzed : 07/23/93  
 Analyzed by: TN  
 Method : EPA 8015M

REPORT OF ANALYTICAL RESULTS

Page 1 of 1

SAMPLE DESCRIPTION	MATRIX	SAMPLED BY	SAMPLED DATE RECEIVED		
MW2	Groundwater	Kim Bishop	07/14/93	07/15/93	
CONSTITUENT	(CAS RN)	*PQL µg/L	RESULT µg/L	NOTE	
Total Petroleum Hydrocarbons (Diesel)		50.	ND	1	

San Jose Lab Certifications: CAELAP #1204

\*RESULTS listed as 'ND' were not detected at or above the listed PQL (Practical Quantitation Limit)  
 (1) Sample Preparation on 07/22/93 by LLB

07/27/93  
 ECD2-723C010  
 MC/mcc/ttn  
 DSL072293A

Respectfully submitted,  
 COAST-TO-COAST ANALYTICAL SERVICES, INC.

*Marissa Coronel*  
 Marissa Coronel  
 Laboratory Director





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(408) 955-9077

CLIENT: Mike Wopat  
Tetra Tech Inc.  
180 Howard Street, Ste.250  
San Francisco, CA 94105

Lab Number : JJ-1103-3  
Project : San Lorenzo, OMS #35,  
TC9410-02  
Analyzed : 07/24/93  
Analyzed by: TN  
Method : EPA 8015M

REPORT OF ANALYTICAL RESULTS

Page 1 of 1

SAMPLE DESCRIPTION	MATRIX	SAMPLED BY	SAMPLED DATE RECEIVED		
MW3	Groundwater	Kim Bishop	07/14/93	07/15/93	
CONSTITUENT	(CAS RN)	*PQL µg/L	RESULT µg/L	NOTE	
Total Petroleum Hydrocarbons (Diesel)		200.	ND	1,2	

San Jose Lab Certifications: CAELAP #1204

\*RESULTS listed as 'ND' were not detected at or above the listed PQL (Practical Quantitation Limit)

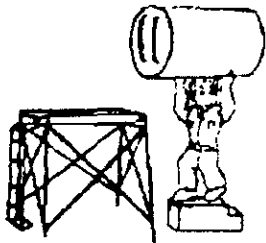
- (1) Sample Preparation on 07/22/93 by LLB
- (2) High detection limit is due to high concentration of gasoline in the sample.

07/27/93  
ECD2-723C021  
MC/mcc/ttn  
DSL072293A

Respectfully submitted,  
COAST-TO-COAST ANALYTICAL SERVICES, INC.

Marissa Coronel  
Laboratory Director

**APPENDIX D**  
**DRUM REMOVAL DATA SHEET**



# Armour Petroleum Service and Equipment Corporation

SINCE 1980

P.O. BOX 507 • VACAVILLE, CA 95696-0507

FACILITY NAME: National Guard Facility  
 ADDRESS: 16501 Ashland San Lorenzo  
 NUMBER OF DRUMS ON SITE: 6 CONSULTANT Tetra Tech  
 ARE DRUMS LABELED? YES X NO \_\_\_\_\_ TYPE OF LABEL Tetra Tech

DRUM	TYPE	GAL. HO	GAL. GAS.	GAL. REMOVED	GAL. LEFT ON SITE	COMMENTS:
1	H	55	0	55	0	emptied all drums ↓ ↓ ↓ ↓
2	H	55	0	55	0	
3	H	55	0	55	0	
4	H	55	0	55	0	
5	H	40	0	40	0	
6	H	33	0	33	0	
7						
8						
9						
10						
11						
12						

LIST BELOW THE DRUMS THAT WERE NOT EMPTIED

DRUM	TYPE	LABELING (IF ANY)	CONTENT	GALLONAGE LEFT IN DRUM	REASON FOR NOT EMPTYING DRUM
1					
2					
3					
4					
5					
6					
7					
8					

TOTAL GAL. REMOVED: 293 EMPTY BARRELS LEFT ON SITE: 0  
 BARRELS REMOVED: 6 TOTAL # OF BARRELS REMAINING ON SITE: 0  
 FIELD TECHNICIAN: Charly DATE: 8-13-93