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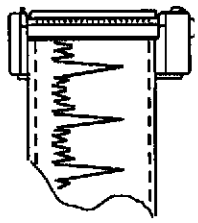


Chemist Enterprises
333-B Camino Verde
Boulder Creek, California 95006
ph. (408) 338-0198

October 25, 1994

Scott O. Seery
Senior Hazardous Materials Specialist
Alameda County Health Care Services Agency
Department of Environmental Health
1131 Harbor Bay Parkway, 2nd Floor
Alameda, CA 94502-6577

Re: PROPOSED SOIL AND WATER INVESTIGATION WORK PLAN

SUBJECT SITE: GERMAN AUTOCRAFT
301 EAST 14TH STREET, SAN LEANDRO

Dear Mr. Seery:

Our objective in submitting this **revised work plan** is to clarify several issues mentioned in your letters to Chemist Enterprises dated September 14 and October 6, 1994 so that this project may proceed.

I. INTRODUCTION

A. SCOPE OF WORK

The objective of these activities is to evaluate the nature and distribution of impacts to soils and groundwater which may have resulted from a hydrocarbon release from former Underground Storage Tanks (USTs) at the subject property.

B. BACKGROUND/SITE HISTORY

The German Autocraft property is an automotive repair outlet owned by Mr. Seung Lee located in northern San Leandro within the boundaries of the Zone 7 Water Agency. **Figure 1** shows the general location of the site. A total of six USTs were removed from the site in 1990. These included one 550-gallon leaded gasoline, two 1,000-gallon and two 2,000-gallon unleaded gasoline, and one 150-gallon waste oil USTs. **Figure 2** shows the previous locations of these tanks on a site map. When the USTs were removed, three of them (two 1,000 gallon unleaded gasoline and one 550-gallon regular gasoline) were observed to have holes in them. Hydrocarbon odor and staining of soils below all USTs was observed. A total of 14 soil samples were collected at that time. Nine of these samples were collected from the main tank pit and had concentrations of Total Petroleum Hydrocarbons as Gasoline (TPHg) ranging from less than 2.5 parts per million (ppm) to 840 ppm. A single soil sample collected from below the product lines had non-detectable or less than 2.5 ppm TPHg. A single soil sample collected from below the waste oil tank after over-excavation had non-detectable or less than 5 ppm Total Oil and Grease (TOG). Three composite samples were taken from over-excavation stockpiles. TPHg levels of 36 and 75 ppm were found in two of the stockpiles and TOG levels of 970 ppm was found in the waste oil tank stockpile. No diesel or solvents were identified in samples collected below the waste oil tank. The volume of hydrocarbon-impacted soils excavated from the main tank pit is unknown. The waste oil tank pit was over-excavated by approximately fifteen cubic yards. No information concerning the back fill material has been documented. A Preliminary Site Assessment was performed in 1991 which included the advancement of three soil borings and subsequent placement of a single monitoring well. **The locations of these borings were field-checked by CE and one boring location has been corrected as noted on Figure 2.** Soil samples collected during the soil boring resulted in the detection of TPHg at concentrations ranging from

1.7 to 2,100 ppm. A grab groundwater sample and water from the monitoring well contained dissolved TPHg concentrations of 28 ppm and 51 ppm respectively.

II. SITE DESCRIPTION/HYDROGEOLOGIC SETTING

The area of the site is relatively flat and is located approximately 3-miles east of the San Francisco Bay and 3,000-feet north of San Leandro Creek. The sediments under the site consist of Holocene and Late Pleistocene Alluvium. Available borehole logs indicate predominately clay soils with a gravel and clay zone at approximately 35-feet below grade. Groundwater was first encountered at approximately 35-feet below grade and rose to about 30-feet below grade following well installation.

III. PLAN FOR DETERMINING THE EXTENT OF SOIL CONTAMINATION ON SITE

Prior to beginning field work, all workers will be briefed on a Health and Safety plan. This plan will be site specific and will address hazardous waste operations and emergency response as required by 29 CFR 1910.120. A copy of this Health and Safety plan is attached to this work plan.

The boreholes will be advanced with a truck-mounted hollow stem auger drill rig. The following scope of work includes borehole drilling, soil sampling, laboratory analyses, and preparation of a technical report for submittal to the ACDEH. All work performed for this project will be under the direction of a California Registered Geologist. **Figure 2** shows the locations of the proposed borings. A total of four borings will be advanced and two of these borings will be constructed into monitoring wells. The anticipated depth of the borings is 35-feet and the total depth of the borings to be constructed into monitoring wells is anticipated to be 45-feet.

Prior to beginning drilling, we will ask that Mr. Lee provide a map showing underground utilities on the private property of the subject site or verify to the best of his knowledge that the proposed boring locations will not hit underground utilities that may be damaged by drilling activities. CE will hand auger at each borehole location to a depth of 4-feet to check for underground utilities.

Prior to beginning drilling, CE will obtain permits from the Zone 7 Water Agency, provide notification to Underground Service Alert, and may coordinate additional underground utility location efforts.

Soil samples will be collected every five-feet starting at five-feet below grade, using a 1.5-inch diameter California modified split-spoon sampler. **In addition to the samples collected every five feet, additional soil samples will be collected at any significant changes in lithology and where apparent contamination is encountered.** Once the split-spoon sampler is retrieved, the bottom 6-inch brass sleeve containing soils will be sealed with aluminum foil, plastic end caps and duct tape and stored on ice for potential laboratory analysis. The remaining soil in the middle brass sleeve and the auger spoils will be visually inspected for lithology, moisture content, and any obvious hydrocarbon impacts by a qualified technician. Soils from the top-most sleeve are generally cavings and do not represent undisturbed materials, therefore, these soils will not be used for any purpose. All soil samples will be screened with a hand held PID analyzer. **Based on the results of the field inspection, samples will be selected for analyses at a certified laboratory. In addition, all soil samples collected from the borings advanced through and within 10-feet of the tank pit will be submitted for laboratory analyses.** Two of the borehole locations fall into this category, one just outside the previous tank pit and one placed in the previous tank pit to characterize hydrocarbon-impacted soils that were used to back fill the tank pit and soils below this back fill material. **All samples from the other borings showing evidence of hydrocarbon**

contamination will also be submitted for laboratory analyses. The samples will be transported to the laboratory in iced storage under chain of custody documentation for analysis for TPHg and benzene, toluene, ethyl benzene and total xylenes (BTEX) and Total Lead using LUFT Methods. The soil borings which will be abandoned will be grouted up from the bottom.

All downhole drilling equipment will be steam cleaned in advance. The split-spoon sampler will be decontaminated between sampling locations by the following:

1. Remove loose soil and debris with a scrub brush using a mixture of tap water and laboratory grade cleaning solution (liquinox).
2. Tap water rinse.
3. Distilled water rinse.

Soils generated during drilling will be stockpiled on-site on top of and covered by visqueen. Decontamination derived liquid wastes will be stored in labeled, DOT-rated 55-gallon drums on-site. The disposition of these wastes are the responsibility of the property owner and are not a part of this work plan. Once the laboratory reports are issued, appropriate disposal options for all investigation derived wastes can be developed.

IV. PLAN FOR DETERMINING GROUNDWATER CONTAMINATION

The scope of work includes coordination with the Zone 7 Water Agency for inspection of well seal installation, monitoring well installations, well developments, sampling of water from the boreholes and wells, analyses of the water samples, taking depth to groundwater measurements, surveying well elevations, and presentation of the findings in the technical report.

We intend to collect grab groundwater samples at the two boring locations not selected for well installation. All groundwater samples will be collected using teflon or stainless steel bailers. The bailers will be cleaned prior to lowering into the groundwater by washing with liquinox detergent, rinsing with tap water, and rinsing with distilled water.

The boreholes selected for monitoring well constructions as located on **Figure 2** will be drilled approximately 10-feet below the first encountered groundwater zone. The locations selected for placement of the monitoring wells will allow us to make a groundwater gradient determination. **We expect the total depth of the wells to be approximately 45-feet with a 15-foot screened** interval. Following drilling, at the locations selected for well construction, 2-inch diameter monitoring wells will be installed. The actual construction of the wells will be determined in the field based on conditions encountered during drilling. The general construction will consist of an appropriate length of 2-inch diameter PVC well screen with 0.01-inch machine slotted perforations, bottom end cap, and an appropriate length of blank well casing. The top of the well screen will be placed approximately 3-feet above the water table surface, if feasible. The top of the blank well casing will be fitted with a water-tight locking cap. A #2/12 sand pack consisting of washed and graded silica sand will be placed in the remaining annulus from the bottom of the borehole to approximately 2-feet above the top of the well screening. A one-foot hydrated bentonite seal will be installed on top of the sand pack. A Portland cement-bentonite slurry will fill the remaining annulus. A flush mounted 8-inch diameter water-tight traffic-rated well box will be placed in concrete over the well. A Typical Well Construction Diagram is shown on **Figure 3** of this work plan.

After a minimum of 48-hours following well construction, the newly installed monitoring wells will be developed by swabbing and over-pumping to remove fine-grained sediments entrained in

the sand pack and near the well bore due to the drilling operations. Approximately 100 gallons of groundwater will be removed during development.

After a minimum of 48-hours following well development, groundwater monitoring well sampling will be initiated. The sampling will be conducted at each of three monitoring wells which will be present at the site at that time. Sampling activities will include measuring water levels in the wells using an electronic water level indicator, measurements of floating product if present will be taken as follows: lowering a teflon bailer into the liquid at each well approximately 2 feet, allowing the liquid level in the bailer to equilibrate with the liquid level in the well, and after raising the bailer, measuring the thickness of floating product if present in the transparent bailer with a ruler or noting the presence of sheen and odor, purging the well with the bailer or a pump a minimum of four well volumes or until groundwater temperature, pH, and specific conductance have stabilized; sampling groundwater by gently pouring from the bailer into a 40-milliliter vial until a positive meniscus is formed at the top of the vial, capping, and checking to make sure no bubbles are present; transport of samples on iced storage under chain of custody documentation to a State of California, Department of Health Services certified laboratory; and laboratory analyses for TPHg, BTEX, and Total Lead by LUFT Methods. All extracted groundwater will be stored on-site in labeled, DOT-rated 55-gallon drums and the disposition of these waters will be determined pending laboratory analyses.

Also included in this scope of work is an elevation survey of the monitoring wells by a California licensed land surveyor. **The elevation and water level measurements will be reported in relation to mean sea level to 1/100th of a foot from an established benchmark.** This data will allow us to determine groundwater flow direction.

V. QUALITY ASSURANCE/QUALITY CONTROL PLAN

As part of quality assurance/quality control measures related to soil sampling, we will submit 5% split/duplicate samples. Since we anticipate approximately 20 soil samples, 1 split/duplicate soil sample will be submitted.

As part of quality assurance/quality control measures related to the grab groundwater sampling from the boreholes not selected for well installations, samples will be collected in triplicate and one trip blank will be submitted for analyses. Also, duplicate samples will be collected from one of the two boreholes in triplicate and submitted for TPHg and BTEX analyses only.

As part of our quality assurance/quality control efforts related to groundwater sampling from the monitoring wells, we will collect samples in triplicate and include one trip blank water sample. Also, duplicate samples will be collected from one of the three monitoring wells and submitted for TPHg and BTEX analyses only.

VI. PREPARATION OF A TECHNICAL REPORT

CE will prepare a monitoring well installation and sampling report describing our methods and findings. The report will be prepared under the direction of a California Registered Geologist and will include: a site map showing relevant features and boring and well locations, boring lithology, water level contour maps, plume definition maps, geologic cross sections, soil inspection observations, analytical results of soil sampling, well installation procedures, groundwater sampling results, groundwater depth data, laboratory chain of custody documentation, analysis of accumulated data and recommendations based on the findings of the investigation. Well completion reports will be submitted to the Zone 7 Water Agency in

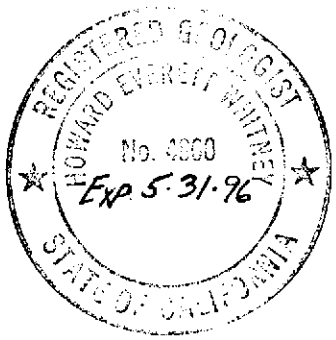
accordance with permit requirements. Also, copies of the report will be submitted to the Regional Water Quality Control Board.

If you have any questions concerning this work plan, please don't hesitate to contact us at (408) 338-0198. We intend to schedule these activities as soon as possible.

Sincerely yours,

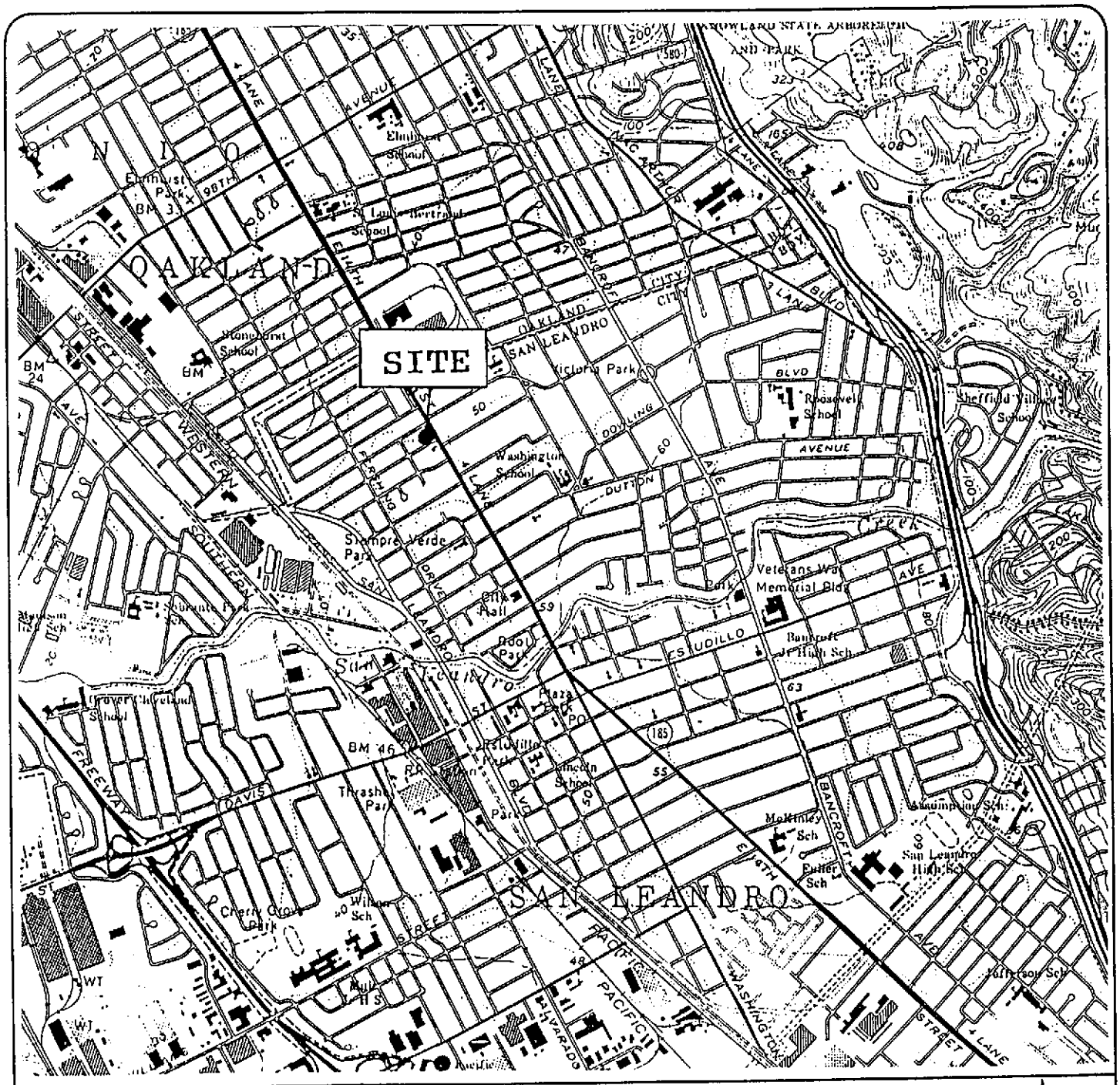
Tom Price
Consulting Chemist

Howard Whitney
Registered Geologist #4860



Attachments: Figure 1: Location Map
Figure 2: Site Map
Figure 3: Typical Well Construction Diagram

cc: Rafat A. Shahid, Agency Director, Environmental Services
Tom Peacock, ACDEH, LOP
Gil Jensen, Alameda County District Attorney's Office
Kevin Graves, RWQCB
Mike Bakaldin, San Leandro Fire Department
Deanne B. Politeo, Kincaid, Gianunzio, Caudle & Hubert
Seung Lee, German Autocraft



EXPLANATION:

Scale: 1"=2000'

0 1000' 2000'

Base Map Reference: U.S.G.S. San Leandro 7.5 Minute Topographic, Quadrangle.

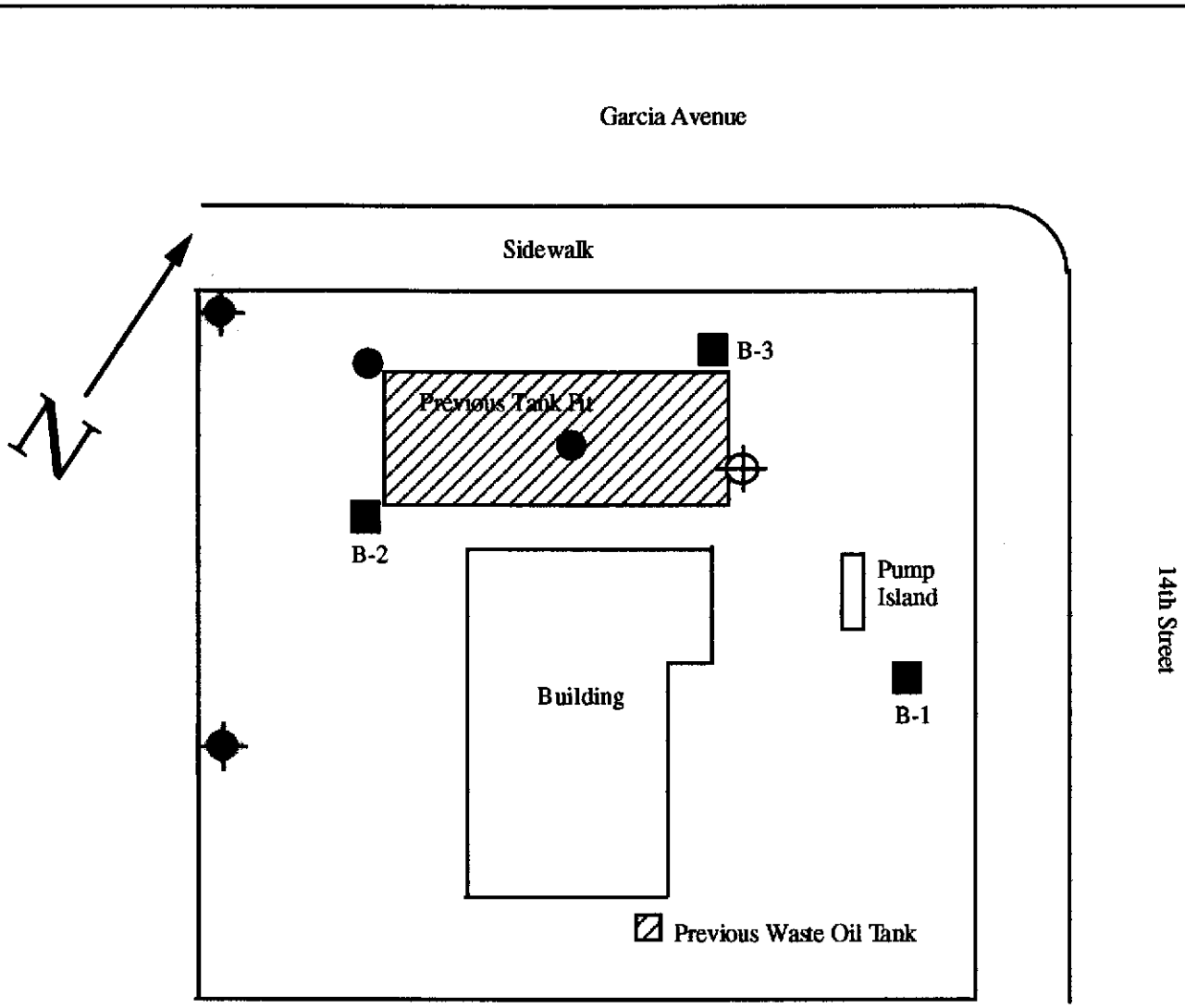
N

Chemist Enterprises
Boulder Creek, California

LOCATION MAP
German Autocraft
301 East 14th Street
San Leandro, California

Figure 1

Project No. 94-52
Date: 8/94



EXPLANATION:

Proposed Soil Boring Location

Monitoring Well

Scale: 1"=20'

0 10 20

Proposed Monitoring Well

Previous Soil Boring Location

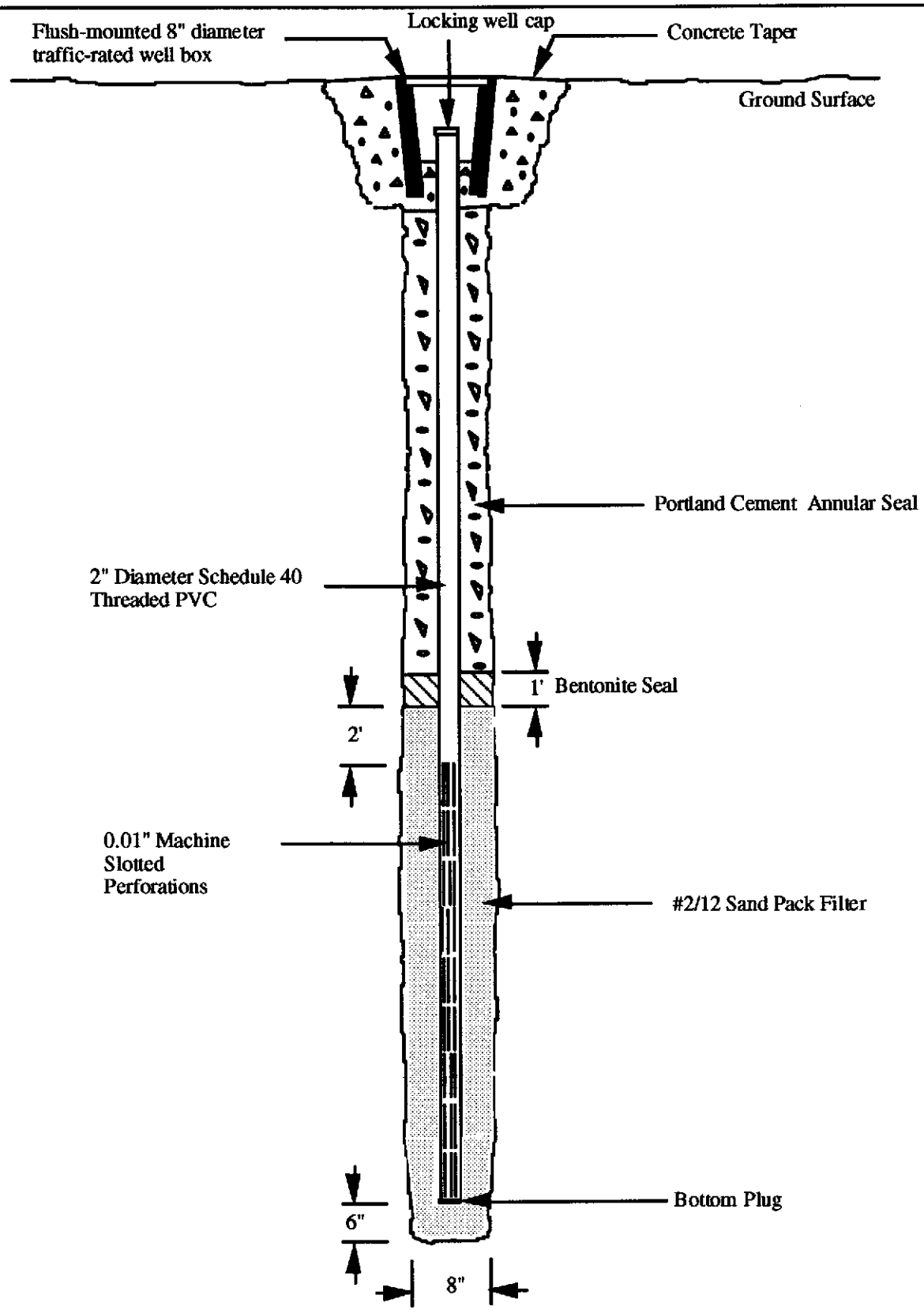
NOTE: THE LOCATION OF THE PREVIOUS SOIL BORING B-2 ON THIS MAP IS CORRECT. THIS BORING WAS ERRONEOUSLY LOCATED IN A PREVIOUS ENVIRONMENTAL REPORT. WE OBSERVED THE CEMENT AT THE SURFACE OF THE ABANDONDED BOREHOLE IN THE FIELD.

Chemist Enterprises
Boulder Creek, California

SITE MAP
German Autocraft
301 East 14th Street
San Leandro, California

Figure 2

Project No. 94-52
Date: 9/94



NOT TO SCALE

Chemist Enterprises
Boulder Creek, California

TYPICAL WELL CONSTRUCTION DIAGRAM
German Autocraft
301 East 14th Street
San Leandro, California

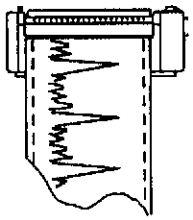
Figure 3

Project No. 94-52
Date: 9/94

SITE SAFETY PLAN

SOIL AND WATER INVESTIGATION

GERMAN AUTOCRAFT
301 EAST 14TH STREET
SAN LEANDRO, CALIFORNIA



Chemist Enterprises
333-B Camino Verde
Boulder Creek, California 95006

(408) 338-0198

October 25, 1994

QUICK REFERENCE GUIDE TO CONTENTS

SITE SAFETY PLAN
CE

SITE SAFETY PLAN

PROJECT NAME: German Autocraft

LOCATION: 301 East 14th Street, San Leandro, California

DATE: To Be Announced

TASK: Soil and Groundwater Investigation

SITE SAFETY OFFICER (SSO): Howard Whitney

SECONDARY SITE SAFETY OFFICER: Tom Price

NEAREST HOSPITAL: Fairmont Hospital
Phone: (510) 667-7800
Address: 15400 Foothill Boulevard
San Leandro

DIRECTIONS TO HOSPITAL: South 3.5 miles on E. 14th Street, Left on 150th Avenue, Right on Foothill Boulevard, Hospital is on the Left.

NEAREST FIRE DEPARTMENT: San Leandro Fire Department
Phone: (510) 577-3319
Address: 835 E. 14th Street
San Leandro

HAZARDOUS MATERIALS SPILL/CLEAN-UP CONTRACTOR
CHEMTREC: 1-(800) 424-9300

US ALERT SERVICE NUMBER: 1-(800) 642-2444

NEAREST PG&E OFFICE:
Phone: 1-(800) 743-5000
Address: 1919 Webster Street
Oakland, California

NEAREST TELEPHONE LOCATION: On site in the Office of the shop.

LOCATION OF SITE "CLEAN AREA" as Per SSO

LOCATION OF PERSONNEL DECON:STATION: as per SSO

A Pre-project Meeting allows all personnel on-site to familiarize themselves with the potential hazards associated with the job.

The following pages contain guidelines for on-site procedures to minimize risks to personnel at the job site, as well as information regarding basic first aid in the event of injury, among other points.

We, the undersigned, have read the Site Safety Plan and understand the potential hazards on-site. We will follow the guidelines set forth in order to decrease the likelihood of personal or public injury.

Name: _____ Title: _____

Name: _____ Title: _____

Name: _____ Title: _____

Name: _____ Title: _____

Name: _____ Title: _____

Name: _____ Title: _____

Name: _____ Title: _____

Name: _____ Title: _____

Name: _____ Title: _____

Name: _____ Title: _____

Name: _____ Title: _____

Name: _____ Title: _____

SITE SAFETY PLAN
CE

I. SAFETY AND HEALTH PLAN OVERVIEW

A. In order to promote safety and health awareness, the position of Site Safety Officer (SSO) is rotated among owners and employees for each project site.

B. It is the responsibility of the designated SSO to implement the Site Safety Plan (SSP) and to hold a pre-project safety meeting.

II. FACILITY BACKGROUND

A. Site History

1. The site is located at 301 E. 14th Street, at the southwest corner of 14th Street and Garcia Avenue, San Leandro, Alameda County, California. The site The site had six gasoline tanks removed in 1990. These included one 550 gallon leaded gasoline, two 1,000 gallon and two two-thousand gallon unleaded gasoline tanks. Laboratory results show gasoline in water and soil.

B. Chemical Constituents of Concern

1. Petroleum Hydrocarbons as Gasoline
2. Benzene and related compounds

C. Scope of Work

1. Conduct soil borings to groundwater.
2. Conduct field testing.
3. Collect grab groundwater samples.
4. Site demobilization.

III. SITE CHARACTERIZATION / JOB HAZARD ANALYSIS

A. Physical Hazards

1. Operation of heavy equipment

   a. Overhead hazards
   b. General traffic hazards
   c. Power actuated soil auger rig

2. Electrical Shock

   a. Faulty electric wiring on equipment
   b. Faulty electric service to equipment

3. Light Traffic Areas

a. Traffic barricade work areas with safety cones.

4. Exposure to Hazardous Chemicals
(additional information listed in Appendix A)

a. Soils, groundwater and/or soil gas vapors may contain an assortment of volatile petroleum hydrocarbons and possibly other other toxic components. Chemicals are moderately toxic and highly flammable, causing explosive concentrations in air over a range of 0.8% to 6% by volume.

5. Chemical Listing

a. Benzene

(1) Routes of entry

(a) Inhalation
(b) Ingestion
(c) Dermal contact
(d) Absorption

(2) Acute Symptoms

(a) Fatigue
(b) Eye, nose and skin irritation
(c) Giddiness
(d) Headache
(e) Nausea
(f) Staggered walk
(g) Anorexia
(h) Dermatitis
(i) Bone marrow depression
(j) Abdominal pain

b. Toluene

(1) Routes of entry

(a) Inhalation
(b) Ingestion
(c) Dermal contact
(d) Absorption

(2) Acute symptoms

(a) Fatigue
(b) Weakness
(c) Confusion
(d) Euphoria
(e) Dizziness
(f) Headache
(g) Dilated pupils
(h) Muscle fatigue
(i) Lacrimation
(j) Insomnia
(k) Parasthesia
(l) Dermatitis
(m) Photoprobia

c. Ethylbenzene

(1) Routes of entry

(a) Inhalation
(b) Ingestion
(c) Dermal contact

(2) Acute symptoms

(a) Eye and skin irritations
(b) Headache
(c) Coma
(d) Narcosis

d. Xylenes (ortho/meta/para isomers)

(1) Routes of entry

(a) Inhalation
(b) Ingestion
(c) Dermal contact
(d) Absorption

(2) Acute Symptoms

(a) Eyes, nose, throat and skin irritation
(b) Drowsiness
(c) Dizziness
(d) Excitement
(e) Incoherence
(f) Staggered walk
(g) Nausea
(h) Vomiting
(i) Abdominal pain
(j) Dermatitis
(k) Anorexia
(l) Corneal vacuolization

IV. TRAINING

A. Potential Hazards - All personnel working at the site are made aware of all potential on-site hazards prior to the beginning of field work.

B. Safe Work Practices - All personnel at the site are advised of safe work practices and hazard avoidance.

C. SSP - All personnel, subcontractors of CE and all visitors to the site, are to read the SSP and sign an acknowledgement indicating that they understand its contents.

D. OSHA - All CE personnel have completed a minimum of 40-hour OSHA training and are updated annually with an 8-hour refresher course.

V. PERSONAL PROTECTIVE EQUIPMENT

A. Level "D"

1. Chemically resistant steel toed boots
2. Hard hat
3. Safety glasses - Eye protection must be worn whenever the potential for flying debris and or chemical splash is present.
4. Hearing protection
5. Leather gloves
6. Denim or equivalent long pants
7. Button up shirt

B. Level "C"

1. All the above, plus the following;
2. Respirator - Half face respirator equipped with organic vapor cartridges. To be used when air monitoring reveals that action levels have been exceeded for any or all chemicals of concern.
3. Tyvek suit.
4. Neoprene or Nitrile gloves

VI. MEDICAL SURVEILLANCE

A. Health surveillance will be on an individual and on a "buddy system" basis.

B. All personnel are advised to pay "close" attention to the symptoms of chemical exposure outlined and listed above.

VII. EXPOSURE MONITORING PLAN

A. Direct reading instruments

(Equipment use depends on site specific conditions).

1. All vapors or gases are initially field screened / monitored using an organic vapor analyzer (OVA) or a flame ionization detector (FID).

VIII. SITE CONTROL

A. Work Zones - Areas designated during pre-field meeting.

1. Exclusion Zone
   a. Where work is performed, with all proper safety equipment, and, were safe work practices are employed.
   b. Public is excluded.
   c. Area is barricaded with fences, barricades, cones and caution tape.
   d. Cones placed to guide public away from work area.

2. Contamination Reduction Zone

   a. Located outside the exclusion zone.
   b. Place where personnel and/or equipment are decontaminated in the event of contact with hazardous chemicals, from either the soils, water and/or air (vapors).

3. Support Zone

   a. Clean zone or Support zone is located outside Contamination Reduction Zone.
   b. Contains all job related support services.

B. Location of Nearest Communication Equipment

1. On-site map shows nearest communication equipment. See Page 1 for address.

2. All persons in the various zones will have remote communication equipment if necessary.

C. Location of Nearest Medical Assistance

1. On-site map shows nearest hospital and fire department. See Page 1 for address and telephone numbers.

D. On-site Communication

1. All personnel on-site will be made aware of common hand signals.

E. Engineering Controls

1. Underground locator services (U. S. Alert) will be notified prior to commencing field work on-site to avoid hitting underground services (electric, phone, gas, etc.) on public property.

2. Property owners will either mark utilities on private property or a locator service may be utilized.

3. Site Map
   a. Indicates work locations.

IX. DECONTAMINATION

A. Material Handling

1. All hydraulic coring equipment will be steamcleaned prior to use.

2. Contaminated equipment will be taken off-site only after decontamination.

3. Disposal of wash and rinse water, and soil cuttings will be in compliance with all applicable regulations.

B. Personal Hygiene

1. No smoking, eating, or drinking will take place in the exclusion zone or in the contamination reduction zone.

2. A designated break area may be established off-site. However, any such facility must be established a minimum of at least 100 feet upwind of any of any vapor source and shall be tested for flammable gases and vapor at the start of work and prior to scheduled break periods each day.

3. Personnel must wash all exposed skin areas with soap and water in the decontamination area before departing the site or going on break.

X. STANDARD OPERATING PROCEDURES

A. Pre-project safety meeting prior to working.

B. Sampling equipment calibrated before use.

C. Respirator fit test (if required).

D. Site work initiated.

E. Decontamination protocol followed.

XI. CONTINGENCY PLAN / EMERGENCY PROCEDURES

A. Personal Exposure (First Aid)

1. In the event that exposure symptoms are manifested, the victim will be taken up-wind and off-site. Seek qualified medical attention immediately.

2. Wash skin with soap and water immediately.

3. Inhalation - Move to fresh air and administer immediate artificial respiration if required.

4. Ingestion - Do not induce vomiting. If conscious give water or milk to drink. Seek qualified medical attention immediately.

5. Eyes - Flush with water for at least 20 minutes while holding eyes open. Seek qualified medical attention immediately.

B. Personal Injury- (Supervisors are trained in First Aid and CPR)

1. Provide basic first aid proceedures as required; note time and circumstances of injuries. Follow these emergency action procedures:

a. Survey the scene.
(1) Is it safe to assist victim(s).

b. Conduct a Primary Survey
(1) Check for unresponsiveness and Airway, Breathing, and Circulation.

c. Phone 911 for ambulance if necessary.

d. Conduct a Secondary Survey.
(1) Interview victim
(2) Check vital signs
(3) Head to toe exam

e. Transport to nearest medical facility as appropriate. Notify SSO. See on-site map for the nearest hospital emergency room.

C. Fire and Explosion Potential

1. Evacuate the area immediately and conduct a head count of all personnel. Notify fire department. Do not attempt to fight the fire. A fire extinguisher will be present on-site for immediate response by on OSHA certified person.

XII. LIST OF APPROPRIATE REFERENCE LITERATURE

A. Title 29 CFR 1910 - OSHA General Industry Standard

B. Title 29 CFR 1926 - OSHA Construction Standard

C. Title 49 CFR 171-173 - DOT Regulations

APPENDIX A.

A. Potential Hazards

1. Exposure to Hazardous Chemicals

a. Hazardous / Toxic Materials

(1) Results of previous subsurface investigations indicate the presence of volatile hydrocarbons in the shallow soils.

b. Hazard Assessment

(1) Moderately toxic chemicals through inhalation, ingestion, absorption and skin contact, but possess good warning properties.

(2) Highly flammable and explosive when vapor concentrations range from 0.8 to 6% by volume.

2. Chemical Listing

a. Benzene

(1) Permissible exposure limit (PEL) = 10 ppm with a ceiling of 50 ppm for 10 minutes. (NIOSH)

(2) Action Level = 0.05 ppm

(3) Immediately Dangerous to Life or Health (IDLH) at 3,000 parts per million

(a) Carcinogenic

(4) Physical Properties

(a) Vapor pressure = 75 mm mercury
(b) Lower explosion limit (LEL) = 1.3%
(c) Upper explosion limit (UEL) = 7.9%
(d) Class 1B flammable liquid

(5) Target Organs

(a) Central Nervous System (CNA)
(b) Skin
(c) Blood
(d) Eyes
(e) Respiratory system
(f) Bone marrow

b. Toluene

(1) Permissible exposure limit (PEL) = 200 ppm with a maximum exposure of 500 ppm for 10 minute peak.

(2) Action Level = 50 ppm

(3) Immediately Dangerous to Life or Health (IDLH) at 2,000 parts per million

(4) Physical Properties

(a) Vapor pressure = 22 mm mercury
(b) Lower explosion limit (LEL) = 1.2%
(c) Upper explosion limit (UEL) = 7.1%
(d) Class 1B flammable liquid

(5) Target Organs

(a) Central Nervous System (CNA)
(b) Skin
(c) Liver
(d) Kidneys

c. Ethylbenzene

(1) Permissible exposure limit (PEL) = 100 ppm

(2) Action Level = 50 ppm

(3) Immediately Dangerous to Life or Health (IDLH) at 2,000 parts per million

(4) Physical Properties

(a) Vapor pressure = 10 mm mercury
(b) Lower explosion limit (LEL) = 1.0%
(c) Upper explosion limit (UEL) =6.7%
(d) Class 1B flammable liquid

(5) Target Organs

(a) Central Nervous System (CNA)
(b) Skin
(c) Upper respiratory system
(d) Eyes

d. Xylenes (ortho/meta/para isomers)

(1) Permissible exposure limit (PEL) = 100 ppm with maximum exposure of 200 ppm for 10 minutes.

(2) Action Level = 50 ppm

(3) Immediately Dangerous to Life or Health (IDLH) at 1,000 parts per million

(4) Physical Properties

(a) Vapor pressure = 7/9/9 mm mercury
(b) Lower explosion limit (LEL) = 1/1.0/1.1%
(c) Upper explosion limit (UEL) = 7/7/7%
(d) Class 1B flammable liquid - o xylene
(e) Class 1C flammable liquid - m,p xylenes

(5) Target Organs

(a) Central nervous system
(b) Eyes
(c) Liver
(d) Kidneys
(e) Skin
(f) Blood
(g) Gastro-intestinal tract