March 5, 1992
SCI 727.001

Ms. Susan Hugo
Hazardous Materials Specialist
Alameda County Health Care Services Agency
80 Swan Way, Suite 200
Oakland, California

Work Plan
Diesel Fuel Tank
Soil and Groundwater Investigation
and Soil Remediation
Coulter Steel Plant
722 Folger Avenue
Berkeley, California

Dear Ms. Hugo:

Presented herein is a Work Plan developed by Subsurface Consultants, Inc. (SCI) to provide environmental engineering services for the referenced fuel leak site. These services will be conducted in accordance with the requirements of the Alameda County Health Care Services Agency (ACHCSA) and Regional Water Quality Control Board (RWQCB).

A 10000 gallon underground diesel tank was removed from the site by the Scott Company in December 1991. The tank was located as shown on the attached Site Plan. Two samples, S1 and S4, were obtained of the soils situated beneath the tank. The samples contained elevated concentrations of diesel, 630 and 670 mg/kg. In an effort to remove significantly contaminated soil, the excavation was widened and deepened. The excavated soil was stockpiled adjacent to the excavation. Seven samples, CS-1 through CS-7, were obtained and analyzed from the excavation limits. The analytical results are summarized in the following table.

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Sample	Location	Depth (feet)	Diesel mg/kg	BTEX mg/kg
S1	Sidewall	10.0	630	--
S4	Sidewall	10.0	670	--
CS-1	Bottom	14.5	680	<0.005
CS-2	Bottom	14.0	280	<0.005
CS-3	Bottom	15.5	110	<0.005
CS-4	Sidewall	7.0	1700	<0.05
CS-5	Sidewall	7.0	1500	<0.05
CS-6	Sidewall	7.0	2900	<0.05
CS-7	Sidewall	7.0	2000	<0.05

We understand that the ACHCSA is requiring that the lateral and vertical extent of soil contamination be investigated and the impacts to groundwater be determined. In addition, it is proposed to bioremediate the excavated soil and place successfully remediated soil back into the existing excavation as compacted fill. In this regard, SCI proposes to perform the following tasks:

Task 1: Investigate the lateral and vertical extent of soil contamination.

Task 2: Evaluate impacts to groundwater.

Task 3: Observe bioremediation, overexcavation and backfill placement.

Task 4: Perform quarterly groundwater monitoring.

Task 5: Report the results of these services to the appropriate agencies.

Details of each task are summarized below.

Task 1 - Investigate the Extent of Soil Contamination

A. Drilling and Sampling

The extent of soil contamination will be evaluated by drilling six (6) test borings in the area of the former tank as shown on the Site Plan. The borings will be advanced to depths of about 20 to 30 feet with a truck-mounted drill rig, equipped with hollow-stem augers.

Our field engineer/geologist will observe drilling operations and prepare logs of the conditions encountered. Soil samples will be obtained at 5-foot intervals or at significant lithologic changes using a California Drive sampler. Soil from each sampling interval will be field tested for organic vapor content using a photoionization detector (PID). Drilling and sampling equipment will be steam-cleaned prior to each use.

Three of the boreholes will be completed as groundwater monitoring wells as described in Task 2. The other borings will be backfilled with cement grout and sealed to match existing conditions. Soil cuttings generated during drilling will be added to the existing stockpile for later biotreatment as described in Task 3.

Soil samples for environmental testing will be retained in 2-inch diameter brass liners. Teflon sheeting will be placed over the liner ends prior to capping and sealing them with duct tape. The samples will be refrigerated on-site in an ice-filled cooler.

B. Analytical Testing

Selected soil samples will be submitted to a State of California Department of Health Services analytical laboratory for testing. Sample handling will be recorded using Chain-of-Custody documents. The number of analytical tests performed will depend upon the results of the field OVM readings. However, we judge that 2 to 3 samples from each boring will be analytically tested. The testing program will include:

1. Total extractable hydrocarbons (TEH, as diesel), sample preparation and analysis using EPA Methods 3550 (purge and trap) and 8015 (gas chromatograph coupled to a flame ionization detector), and

2. Benzene, toluene, ethylbenzene, xylene (BTEX), sample preparation and analysis using EPA Methods 5030 (purge and trap) and 8020/602 (gas chromatograph coupled to a photo ionization detector).

Task 2 - Evaluate Impacts to Groundwater

Groundwater monitoring wells will be installed in three of the six boreholes drilled during Task 1. Permits will be obtained from the Alameda County Flood Control and Water Conservation District and the Public Works Department, as appropriate, prior to installing the wells.

In general, the wells will consist of 2-inch-diameter Schedule 40 PVC well casing. The lower 15 feet of each well will consist of slotted well screen. The upper portion will consist of blank casing. The wellheads will be set below grade in utility boxes. The casing sections will be connected with threaded flush joints; no PVC cement will be used. The annular space around the slotted portion of the wells will be backfilled with No. 3 washed sand. A one-foot-thick bentonite seal will be placed above the sand pack. The upper portion of the annular space will be backfilled with a cement grout. The wellheads will be provided with locking caps.

The wells will be developed by removing water until the water is relatively clear. Well development water will be stored on-site in 55 gallon drums. Appropriate disposal methods will be evaluated after the analytical test results are received. If the water does not contain contaminates at concentrations above detection limits, the water will be put into the sanitary sewer system. However, if the water is contaminated, facilities appropriately permitted to handle the material will be contacted and disposal will be arranged. SCI will observe the material being removed.

B. Well Sampling

Once the wells recover to within 80% of their initial volume, they will be sampled. Water samples will be retained in containers pre-cleaned by the supplier according to EPA protocol. Water samples will remain under refrigeration until delivery to the analytical laboratory. The samples will be analyzed for TEH as diesel and BTEX. Sample handling will be recorded using Chain-of-Custody documents. All well development and sampling equipment will be steam-cleaned prior to each use.

C. Level Survey

After well installation, a level survey of the tops of the casings will be performed using an assumed elevation datum. Periodically the groundwater elevation in the wells will be measured and based on the data, the gradient of groundwater flow at the site will be determined.

Task 3 - Observe Bioremediation, Overexcavation and Backfilling

A. Bioremediation

As discussed with you and Mr. Rich Heitt of the RWQCB, the ACHCSA and RWQCB allow the reuse of treated petroleum contaminated soils as on-site fill as long as the treated soil contains non-detectable concentrations of contaminants. The existing

contaminated soil stockpile and any additionally excavated contaminated soil will be treated using bioremediation techniques. The contaminated soils will be mixed with a bacterial enriched compost at a ratio of about 1/4 to 1/5 part compost to 1 part soil. Once thoroughly mixed, the material will be placed in windrows approximately 12 feet wide and 3 feet high and covered. The mixture will be periodically turned and moisture conditioned to enhance microbial activity.

The progress of remediation will be checked using a PID and by analyzing random samples. Once it appears that treatment is completed, discrete samples of the soil will be obtained and analyzed to document concentrations of TEH and BTXE following remediation. The rate of testing will be determined using a statistical analysis, yet will not be less than 1 discrete sample for every 50 cubic yards of soil treated. If the test results indicate that contaminate concentrations in the soils have been reduced to non-detectable levels, (i.e. TEH <10 mg/kg, BTEX <5 ug/kg) the ACHCSA will be petitioned to allow the soils to be replaced in the excavation.

B. Overexcavation

If based on the results of the investigation outlined in Task 1, it appears that soil contamination is localized, overexcavation activities will be implemented to remove significantly contaminated soils. The extent of overexcavation is dependent on several factors including contaminate concentrations, utility locations and existing improvements. A plan showing the proposed extent will be submitted prior to performing site work.

The depth and width of overexcavation will be based on organic vapor readings obtained using a PID. Clean and contaminated soil will be segregated in the field. Contaminated soils will be added to those soils being bioremediated. Apparently clean soils will be analyzed for TEH and BTEX at a rate of one sample per 50 cubic yards. If the test results are non-detectable, the ACHCSA will be petitioned to place the clean soils into the excavation. 1/20 cu yds for redisposal

Soil samples from the excavation limits will be obtained and analyzed to document concentrations left in place. The samples will be analyzed for TEH and BTEX. Soil samples will be obtained at a rate of one sample per 20 feet of excavation perimeter, and one sample per 400 square feet of excavation bottom.

C. **Backfill Placement**

Once the ACHCSA approves the reuse of remediated and apparently clean soil, the excavation will be backfilled. Fill materials will be placed and compacted in layers not exceeding 12 inches in loose thickness. SCI will intermittently observe backfill placement.

Task 4 - Quarterly Groundwater Monitoring

In accordance with ACHCSA requirements, a groundwater monitoring program will be implemented. The program will involve sampling and analyzing groundwater from the three new wells for a period of one year (initial event plus 3 subsequent events).

Prior to sampling the depth to groundwater will be measured below each top of casing and the groundwater gradient will be determined. The wells will then be checked for free floating product using a steel tape and petroleum product sensitive paste. The wells will then be purged of at least 3 well volumes of water. Measurements of water pH, conductivity and temperature will be made during purging. Once the wells recharge to within 80 percent of their initial volume, they will be sampled. Well purge water will be stored in 55 gallon drums which will be left on-site for later disposal by others. Appropriate disposal alternative(s) will be evaluated based on the results of analytical tests as discussed in Task 2.

Samples will be retained in containers precleaned by the supplier and refrigerated until delivery to the analytical laboratory. The samples will be analyzed for TEH and BTEX.

The results of each monitoring event will be summarized in a letter report. The reports will include a discussion of field services, analytical test reports, well sampling forms, and Chain-of-Custody documents.

Task 5 - Reporting

Based on the results of Tasks 1 and 2, we will develop conclusions and recommendations regarding:

1. Subsurface conditions;

2. Groundwater gradient and flow direction;

3. The presence of TEH and BTEX in the samples tested;

4. The significance of contaminant levels with respect to local and state criteria;

5. Preliminary evaluation of remediation alternatives; and

6. The scope of future investigation, if necessary.

We will submit our conclusions and recommendations in a written report. The report will include borings logs, analytical test data, and Chain-of-Custody Documents.

Letter reports will also be written to document and/or clarify as necessary, significant findings and test results revealed during the investigation, well installation, bioremediation, over excavation and backfilling.

If you have any questions regarding this Work Plan, please call. We have also attached a Site Safety Plan which outlines minimum health and safety standards to be followed during site activities.

Yours very truly,

Subsurface Consultants, Inc.

Jeriann N. Alexander
Project Manager

R. William Rudolph
Vice President

JNA:RWR:sld

Attachments: Site Plan
Site Safety Plan

cc: Mr. Dante Sambajon
Coulter Steel & Forge Company
1494 - 67th Street
Emeryville, California 94662-0901

SITE SAFETY PLAN
SOIL AND GROUNDWATER INVESTIGATION
AND INTERIM SOIL REMEDIATION
722 FOLGER AVENUE
BERKELEY, CALIFORNIA
SCI 727.001

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February 27, 1992

I INTRODUCTION

This Site Safety Plan has been prepared to outline minimum health and safety standards which should be implemented during site activities. This plan outlines a personnel and work site safety program to minimize the risks of endangering personnel and/or property. This plan should be followed by SCI's personnel as well as other subcontractors during the project. Site activities will involve (1) drilling and sampling test borings, (2) installing monitoring wells, (3) performing quarterly groundwater sampling events, (4) bioremediating contaminated soils, (5) over excavating contaminated soils and (6) backfilling the existing excavation.

II HEALTH AND SAFETY CONSIDERATIONS

A. Health and Safety Officer

The Health and Safety Officer will be SCI's field geologist/engineer who will be on-site during site activities. He/she will be responsible for planning, implementing and auditing the health and safety program for the project.

B. Hazardous Substances Description and Distribution

Petroleum hydrocarbons as diesel were detected in the soil surrounding the tank. The tank was removed and limited overexcavation of contaminated soil has been performed. Contaminated soil remains at the excavation limits. Diesel concentrations vary from 110 to 680 mg/kg at the excavation bottom

and from 1500 to 2900 mg/kg along the sidewalls at a depth of 7.0 feet.

C. Chemical and Physical Hazards

Potential chemical hazards include skin and eye contact, and inhalation or exposure to potentially toxic concentrations of organic vapors. Physical hazards may include physical injuries due to the proximity of workers to (1) engine-driven equipment and tools and (2) the open excavation. Heavy equipment used during site activities will include a drill rig, front end loader, tractor steam cleaner, and generator. Safety apparel required around heavy equipment will include a hard hat and steel toed boots. Only trained personnel will operate machines, tools, and equipment, all of which will be kept clean and in good repair.

III WORK AREA PROTOCOLS

A. Level of Protection

Regular surveys of the site and knowledge of the anticipated hazards will determine the level of protection and the safety procedures to be employed. The workers coming into contact with contaminated materials will at a minimum wear steel-toed boots, disposable latex gloves, and hard hat.

The level of protection for personnel working in the area will be upgraded if organic vapor levels exceed 0.5 ppm above background levels continuously for more than 5 minutes. In this event, personnel protective equipment will include double cartridge

respirators for organic vapors and dusts, Tyvek coveralls, gloves, and hard hat with safety shield or safety glasses.

B. Combustible Gas and Organic Vapor Monitoring

The Health and Safety Officer will monitor ambient levels of combustible gas vapors using a Gastech hydrocarbon Supersurveyor. and a portable Photoionization Detector (PID). The investigation will cease, the equipment will be shut down, and personnel will be withdrawn from the area if the organic vapor concentration in the operators' breathing zone exceeds 200 ppm. The Health and Safety Officer will determine when personnel may return to the work area.

C. Site Entry Procedures

All personnel entering the work zone will be qualified field personnel wearing the proper level of protection. Eating, drinking, smoking and any other practices which increase the probability of hand-to-mouth transfer will be prohibited in the work zone. A first aid kit and a 20-pound ABC fire extinguisher and potable water will be available at the site.

D. Decontamination Procedures

All disposable protective clothing will be put into plastic bags and disposed of in a garbage receptacle. In the event of a medical emergency, the injured party will be taken through decontamination procedures, if possible. However, the procedures will be omitted when it may aggravate or cause more harm to the injured party. A member of the work team will accompany the injured party to the medical facility to advise on matters concerning chemical exposure.

IV EMERGENCY PROCEDURES

A. Response to Emergency

In case of an injury, the Health and Safety Officer will employ the appropriate first aid and contact off-site medical help, if appropriate. The Health and Safety Officer will also notify the Project Manager at 510-268-0461.

If medical evacuation is required, the route to the hospital shown on Plate 2 will be followed.

B. Emergency Contacts & Telephone Numbers

Ambulance, Fire Police:	911
Hospital:	Alta Bates Hospital 3001 Colby Plaza Berkeley, California 1 (510) 540-0337
Chemical Spills:	National Response Center (24 hours) 1 (800) 424-8802
Poison Control Center:	(24 hours) 1 (800) 523-2222
Cal-OSHA District Office:	Occupational Injuries 1 (510) 568-8602
Regional Water Quality Control Board (RWQCB):	1 (510) 464-1255

C. Acute Exposure Symptoms and First Aid

Exposure Route	Symptoms	First Aid
Skin	Dermatitis	Wash Immediately with soap and water, contact ambulance if evacuation is necessary.

Eye	Irritated eyes	Flush eyes with water, transport directly to emergency room, if necessary.
Inhalation	Vertigo, tremor	Move person to fresh air, cover source of chemicals.
Ingestion	Nausea, vomiting	Call Poison Control Center, arrange transport to emergency medical facility.

D. Contingency Plan

The following procedures will be used in case of an unpredictable event.

Fire: Use fire extinguisher if localized and call the fire department if uncontrolled.

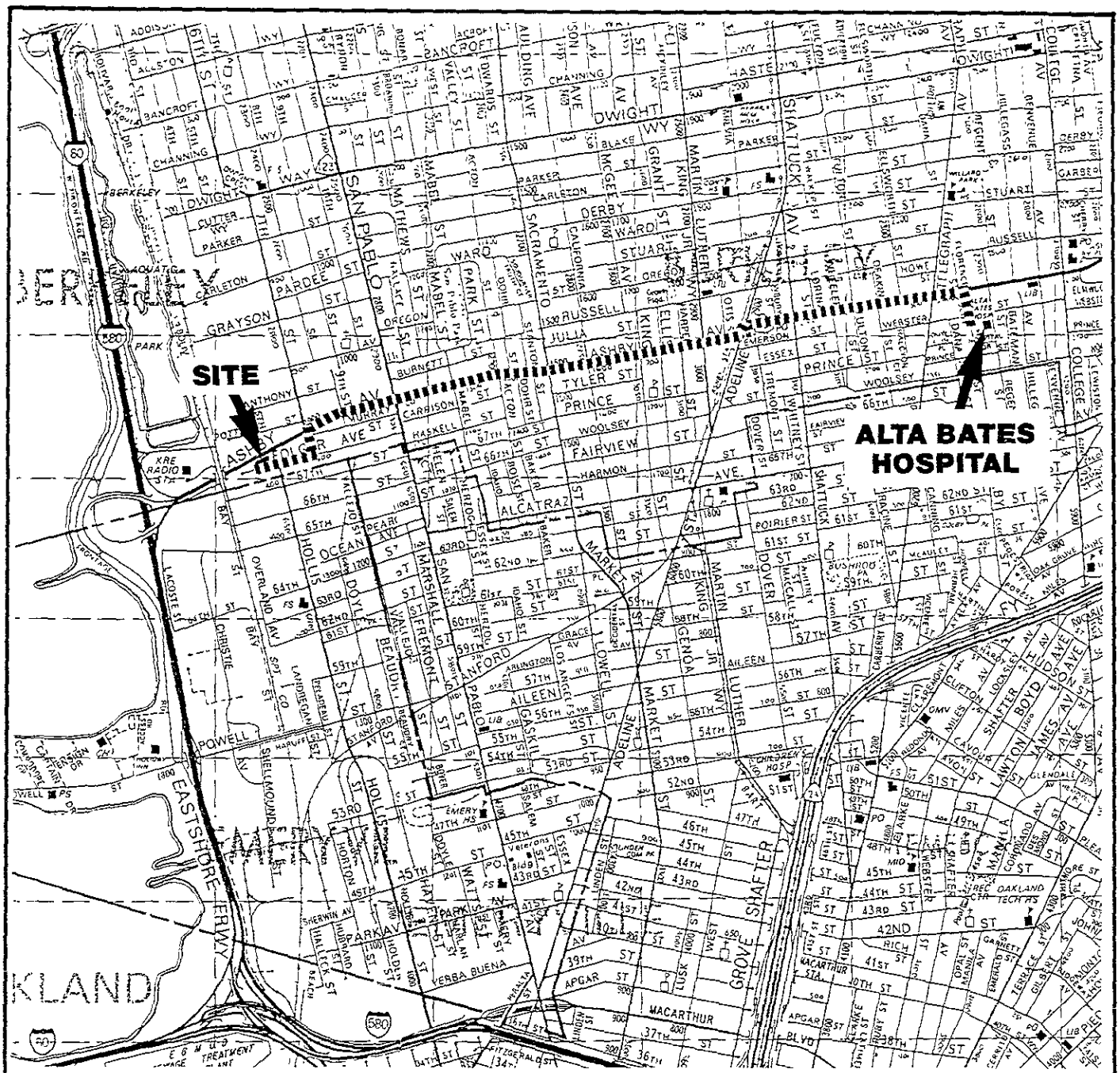
Chemical Exposure: Follow first aid treatment specified previously.

Physical Injury: Provide first aid treatment and contact ambulance for evacuation, if appropriate.

List of Attached Plates:

Plate 1 - Hospital Route

JNA:RWR:sld



HOSPITAL ROUTE

Subsurface Consultants

722 FOLGER AVENUE – BERKELEY, CA

JOB NUMBER	DATE	APPROVED
727.001	2/27/92	

PLATE 1