

**HEALTH AND SAFETY PLAN**

**FOR**

**ENADI METAL WORKS**

**976 23<sup>rd</sup> Avenue**

**Oakland, CA 94606**

**PREPARED BY:**

**CONSOLIDATED TECHNOLOGIES**

**1777 Saratoga Avenue, Ste. 100**

**San Jose, CA 95129**

**April 1992**

REVIEWED AND APPROVED BY:

Project Manager

Site Safety Officer

NAME

DATE

<u><i>[Signature]</i></u>	<u>4-6/92</u>
<u><i>[Signature]</i></u>	<u>4-6-92</u>



- \* To assure all members of its crew attend the safety training program.
- \* To make certain all equipment and other machines are properly inspected and maintained and are in compliance with applicable sections of the California Health and Safety Code.
- \* To supply and maintain safety related protective equipment such as hard hats, safety boots, protective coveralls gloves, safety eye wear, respirators, etc., as specified in this plan.
- \* To assure each employee working at this site will read and comply with this Health and Safety Plan.
- \* To enforce corrective action under the direction of the Site Safety Officer.

**Field Team Member Responsibilities:**

- \* To read, understand and follow this plan.
- \* To perform work safely.
- \* To cooperate with key personnel.
- \* To report any unsafe conditions to the Site Safety Officer.
- \* To be aware and alert for signs and symptoms of potential exposure to site contaminants and heat stress.

**HAZARD CRITERIA**

**Hazard Evaluation**

As air, water, soil and chemical substance monitoring data become available for all site work, the information will be evaluated by the site safety officer. Appropriate action in the of Health and Safety Modifications will be initiated by the Safety officer if necessary. The anticipated activities of this project include:

- \* Earth moving using heavy machinery.
- \* Collection of soil samples,
- \* Monitoring of ambient hydrocarbon concentrations during project activities.

The general types of hazards associated with this project are:

- \* Mechanical hazards: swinging objects, machinery, etc.
- \* Electrical hazards: buried cables, overhead power lines.
- \* Chemical hazards: gasoline, diesel, waste oil.
- \* Fire hazards: natural gas and product lines, flammable petroleum hydrocarbons, and motor driven equipment.
- \* Thermal hazards: heat stress.
- \* Acoustical hazards: excessive noise created by machinery.

Job hazard analyses associated with each major work activity are presented in the following sections.

#### **Chemical hazards:**

A number of products containing hazardous chemicals may be encountered at UST sites. The chemicals of primary concern will be those associated with petroleum hydrocarbons. These compounds include gasoline, diesel, oil and grease, chlorinated hydrocarbons, benzene, ethylbenzene, toluene, and xylenes. These compounds may be present as both liquids and vapors.

#### **Hydrocarbon Vapors**

Hydrocarbon vapors expected to be encountered consist of gasoline and BTEX. Exposure to elevated levels of hydrocarbon vapors presents potential health risks that need to be properly controlled. Work practices and methods will be instituted to limit exposures. Where elevated exposures persist, respiratory protection will be the primary control method to protect personnel from inhalation of hydrocarbon vapors. The hydrocarbon vapors expected to be encountered during project activities are composed of a variety of volatile refined petroleum compounds. The majority of these have limited toxicity requiring minimal controls at the concentrations expected.

Petroleum fuel consists of hundreds of chemical compounds. There are certain compounds such as Benzene that present significant hazards and must be properly controlled. To do so, a working limit of 100 ppm total hydrocarbon is proposed as the maximum acceptable level of exposure without respiratory protection. In a typical situation with 1% of the hydrocarbon vapors being benzene, a 100 ppmv concentration of total hydrocarbon will result in a breathing zone of less than 1 ppmv benzene. This level is one tenth of the current occupational Permissible Exposure Limit (PEL) for an 8 hour exposure to benzene.

### Action Levels Of Hydrocarbon Components in Petroleum Fuel:

Gasoline	>300ppm	PEL	LEL > 10%
Benzene	> 1ppm	"	Oxygen <19.5%
Toluene	>100ppm	"	
Xylene	>100ppm	"	
Ethyl Benzene	>100ppm	"	

A hydrocarbon vapor analyzer will be used to measure real time breathing zone concentration for comparison with the 100 ppmv working limit. When a persistent level of 100 ppmv is observed, appropriate respirators will be donned and other vapor measurements will be made. If hydrocarbon vapors exceed 1000 ppmv or 10 ppm benzene, work will be stopped. The field crew will be instructed to stay up wind and methods will be applied to subdue fugitive vapor emissions such as sprinkling soil with water, or the use of copus blower.

The site Safety Officer will make such determinations.

If LEL is >10% in or around the tank, work must stop and not commence until determined safe and/or LEL% <10%.

If oxygen levels in the immediate work area are < 19.5%, work must stop until determined safe and/or levels are >19.5%.

If one of the following conditions develop:

#### Symptoms Of Acute Overexposure:

Although proper monitoring for the presence of chemicals will be routinely conducted and appropriate protective equipment used, the possibility of exposure to hazardous chemicals may exist. The symptoms of exposure to hazardous chemicals include; behavioral changes, breathing difficulties, changes in skin color, coughing, dizziness, fatigue, respiratory irritation, headache, nausea, or light-headedness. If these symptoms are present in any on-site personnel, they will be removed from the site; if the problem persists or is severe, they will be taken to the nearest medical facility.

#### Symptoms of Oxygen Deficiency:

May cause dizziness.

## Physical Hazards:

Physical hazards may arise due to the following elements:

- \* operating machinery
- \* falling objects
- \* exposure to outside temperature extremes.

## Explosion

Gasoline vapors can be highly explosive, having a flash point of about -40 F, and are considered to be a fire hazard.

## Heat Stress

A hazard exists when individuals are required to work in warm temperatures, particularly while wearing impervious protective clothing. When the ambient air temperature exceeds 65 degrees, heat stress may become a problem. Monitoring of personnel wearing personal protective clothing should commence when the ambient temperature exceeds 65 degrees. Monitoring frequency should increase as the ambient temperature increases or as slow recovery rates are observed. If these conditions are encountered, the following precautions on the next will be taken:

- \* During day-to-day field work, the on-site supervisor will be alert for the signs and symptoms of heat stress.

Field workers will be observed for the following signs and symptoms of heat stress.

- \* profuse sweating, or complete lack of sweating
- \* skin color change
- \* increased heart rate
- \* body temperatures in excess of 100 degrees as measured by thermometers
- \* vision problems
- \* confusion, dizziness, or nausea

These symptoms may lead to impaired functional ability, putting a worker and his co-workers at risk. Continued heat stress may lead to heat stroke and possibly death. Avoiding overprotection, careful training and frequent monitoring of personnel who wear protective clothing, judicious scheduling of work and rest periods, and frequent replacement of fluids can protect against the threat of suffering heat stress.

Any team member who exhibits any of these signs or symptoms will be removed immediately from field work and be requested to consume electrolyte fluid or cool water while resting in a shaded area. The individual will be instructed to rest until the symptoms are not recognizable. If the symptoms appear critical, persist or get worse, immediate medical attention will be sought.

**Fire, Electrical and Noise Hazards:**

- \* underground gas and product lines
- \* excessive machinery noise.

Due to the nature of excavation, there is a risk for electrical shock from over head and underground electrical lines. There is also a risk of physical injury from moving machinery and heavy drilling equipment. Explosive hazards exist w h e n f u e l concentrations in the bore hole reach explosive levels; > 10% LEL.

When working around mechanical equipment the potential exists for exposure to excessive noise. To deal with the health hazards of excessive noise, ear plugs will be provided.

**PERSONAL PROTECTIVE EQUIPMENT REQUIREMENTS**

This section specifies personal protective equipment required for the various tasks of this project.

**Sampling**

**Respiratory Protection:** All field personnel will be required to have available an air purifying respirator with organic vapor cartridges. The respirators will be required based o n criteria presented in this safety plan. All respirators must be NIOSH approved, canister-equipped for all organic vapors up to 1000 ppm.

**Protective Clothing:** All field personnel who handle contaminated soil or liquid will wear impervious coveralls (Tyvex) and butyl rubber gloves. Impervious coveralls will not be required if soil or water is not visibly contaminated, or if vapor measurements are below 500 ppmv. Level "D" protective clothing and equipment will be worn at all times on the job site. All employees will have level "C" protective equipment available at all times. The site safety officer will monitor air borne contaminate levels for determination of when to don level "C" equipment.

**Head Protection:** Field personnel will wear non-metallic safety helmets.

**Foot Protection:** Field Personnel will wear neoprene rubber boots with steel toes. Under non-liquid exposure conditions, leather boots with steel toes and shanks are permissible.

**Ear Protection:** Field Personnel, based on noise levels, may be required to wear earplugs during soil excavation.

**Eye Protection:** Field Personnel will wear chemical-resistant safety glasses with attached side shield where splashes of potentially hazardous liquid or particles are likely.

## **Work Zones**

During soil excavation operations, a work zone around the immediate vicinity of the project will be established and taped off. Only authorized personnel will be permitted to enter the work zone. Authorized personnel will include those who have duties requiring their presence in the work zone and have read this site safety plan. The establishment of the work zones will help ensure that: personnel are properly protected against the hazards present where they are working; work activities and contamination are confined to the appropriate areas; and, personnel can be located and evacuated in an emergency. The following describes the zones to be established:

**Exclusion Zone:** A 75 foot around the work area will be defined before work starts. The area inside the circle will constitute the "Exclusion Zone". The Exclusion Zone constitutes the area where the potentially hazardous air borne contaminants and physical hazards to the workers exist. Full personal protection must be available to all personnel in this area. The size of the Exclusion Zone may be changed to accommodate site conditions and to assure contaminate containment. All personnel within the exclusions zone will be required to use the specified level of protection. No food, drink, or smoking will be allowed in the exclusion or decontamination zones.

**Contamination Reduction Zone:** A formal decontamination zone should not be required during the underground storage tank removal. However, an area will be designated in the event extreme gasoline contamination is encountered. The decontamination zone will be an area where personnel can clean protective equipment. A waste container will be placed outside of the exclusion zone so contaminated equipment can be placed inside and covered. Personnel and equipment in the exclusion zone must pass through this zone before entering the support zone.

**Support Zone:** A Support Zone, the outermost zone, must be defined for each field activity. Support equipment is located in this uncontaminated or clean area. Normal work clothes are appropriate within this zone. The location of this zone depends on factors such as accessibility, wind direction (it should be up wind of excavation), and resources (e.g. roads, utilities, shelter). No equipment or personnel will be permitted to enter the clean zone from the exclusion zone without passing through the personnel or equipment decontamination station. Eating, smoking, and drinking will be allowed only in this area.

### **Decontamination Procedures**

Petroleum hydrocarbon liquids and vapors are anticipated. Due to the volatile nature of hydrocarbons that may be encountered during the initial excavation and sampling operations, decontamination of equipment and vehicles will be of minimal importance since the volatile hydrocarbons will rapidly vaporize. Therefore, no formal decontamination procedure will be followed with the exception of general cleaning. No eating, drinking or smoking will be permitted in the exclusion zone. All personnel involved in work activities will be instructed to wash their hands, face, neck and forearms at the end of the work day. Soap, water and towels will be provided at the site for this purpose. The field personnel will also be instructed to shower at home at the end of each work day.

As work progresses, the nature of materials handled and the extent of contamination may possibly require formal decontamination procedures and delineated work/clean zones. However, we do not expect that such formal procedures will be necessary at this site and will only proceed at the Safety Officer discretion. In the event extreme contamination is encountered, decontamination of personnel, equipment and vehicles will be important to insure that contamination dose not spread to unsuspecting people and property. Personal decontamination mainly involves personal hygiene. Contamination should not be present on the skin if the proper protective methods specified in this plan are used. However all field personnel will be instructed to follow these guidelines to insure that contamination dose not remain on equipment, sample containers or in contact with their bodies.

The field team should remove their personal protective clothing in the following sequence:

- Step 1: Move out of the exclusion zone and into the decontamination zone. Do not remove personal protective equipment.

Step 2: Decontaminate the spades, shovels and other equipment by brushing them off.

Step 3: Remove outer gloves and coveralls and place them inside a garbage bag. Keep the air purifying respirator on.

Step 4: Move to the support zone and remove the respirator.

In the event that Level C protection is required at the site, more rigorous decontamination will be necessary. The following OSHA-specified procedures included steps necessary for complete decontamination prior to entry into the support zone, and steps necessary if a worker only needs to change a respirator or respirator canister.

Modification can be made to the twelve station decontamination process depending on the extent of contamination.

#### **Station 1: Segregated Equipment Drop**

Deposit equipment used on site (tools, sampling devices and containers, monitoring instruments, clipboards, etc.) on plastic drop cloths or in different containers with plastic liners. Each will be contaminated to a different degree. Segregation at the drop reduces the probability of cross-contamination.

#### **Station 2: Suit/Safety Boot and Outer Glove Wash**

Thoroughly wash safety boots and outer gloves. Scrub with a long-handled, soft bristle scrub brush and copious amounts ofalconox/water solution.

Necessary equipment includes:

- \* Wash tub (30 gallon or large enough for person to stand in)
- \* Alconox/water solution
- \* Long-handled soft bristle scrub brushes

#### **Station 3: Suit/Safety Boot and Outer Glove Rinse**

Rinse offalconox/water solution using copious amounts of water. Repeat as many times as necessary.

Necessary equipment includes:

- \* Wash tub (30 gallon or large enough for person to stand in)
- \* Spray unit
- \* Water
- \* Long-handled, soft bristle scrub brushes

## MONITORING PROGRAM

Personal exposure to ambient airborne hazards will be monitored to assure that personnel exposures do not exceed acceptable limits and that appropriate selection of protective equipment items is made. Airborne hydrocarbon vapor concentrations will be measured primarily by the use of a hydrocarbon vapor meter. If concentrations approach criteria levels, all personnel will be notified of possible site safety changes. Audits will be conducted by the Safety Officer to insure compliance with the Safety Plan and to provide additional support as required.

### **Ambient Vapor Reading**

A hydrocarbon vapor detector will be used during excavation activities. This instrument will be used to measure both excavation and breathing zone concentration of hydrocarbon vapors. The instrument will be calibrated on a regular schedule using known calibrated gases.

Readings will be taken in the area where the field team members are working and surrounding down-wind areas. Measurements will be taken every 30 minutes where hydrocarbon vapors indicate levels above 30 ppmv. All readings will be recorded in a field notebook.

Emergency Procedures listed in this plan are designed to give the field team instruction on how to handle medical emergencies and fires and explosions. The emergency procedures will be carefully reviewed with the field team during the health and safety training session.

## EMERGENCY RESPONSE PLAN

In the event of any situation or unplanned occurrence requiring assistance, the appropriate contact(s) should be made from the list below. For emergency situations, contact should first be made with the field team leader (or designee), who will notify emergency personnel, who will then contact the appropriate response teams. The emergency contacts list must be kept in an easily assessable location at the site.

Contingency Contacts	Phone Number
Nearest phone located on-site	(510) 532-8311
Fire Department	911
Police	911
County Sheriff	911
Poison Control	911

### Medical Emergency

Hospital Name	Highland General
Hospital Phone No.	(510) 534-8055
Hospital Address	1441 E. 31 <sup>st</sup> St. Oakland

Travel Time from Site	10 minutes
Map to Hospital (see next page)	
Ambulance Service	911

Route to Hospital: Go north on 23rd Avenue approximately 1-1/4 miles. Turn left on 30th St for approximately 1/4 mile to arrive at the hospital.

Poison Control Center	(415) 428-3248
Chem Trec	(800) 424-9300
EPA Emergency Response	(415) 974-7500
State Office of Emergency Services	(800) 852-7550
Emergency Response/ (H & H)	(510) 543-4835
Clean-up (H & H)	(415) 543-4835

\* Note: Prior to starting work, note the nearest location of functional telephone - See Main office.

## **Emergency First Aid Procedures:**

### **Injuries**

Medical problems occurring on site will be handled quickly. Emergency telephone numbers will be written down and posted in the passenger compartments of the field vehicles.

**Eye Contact:** Flush with clear water for 15 minutes or until irritation subsides. See a physician.

**Skin Contact:** Wash thoroughly with soap and water.

**Inhalation:** Remove from area away from vapor/exposure. Call physician and start resuscitation IMMEDIATELY if breathing has stopped.

**Ingestion:** DO NOT INDUCE VOMITING; call a physician immediately.

**Oxygen Deficiency:** Move out of oxygen deficient area into fresh air. Call physician IMMEDIATELY and induce resuscitation if breathing has stopped.

The field team will be instructed to seek immediate professional medical attention for all serious injuries. A first aid kit will be present at the work site in case of minor injuries. If anyone receives a splash or particle in the eye the field team will be instructed to irrigate the eye for 15 minutes. Instruction will also be provided to wash any skin areas with soap and water if direct contact with contaminates has occurred.

### **Fire and Explosion Hazards**

Fires on site are of particular concern during soil excavation and sampling activities, it is a possibility of encountering flammable petroleum hydrocarbon liquids or vapors. During these activities the site safety officer will be present and equipped with an explosive vapor monitor for area monitoring and a multipurpose (A, B, C) fire extinguisher.

Flammable materials will be cleared away from the site prior to the start of work. If a fire does occur, the local fire dept. will be contacted immediately.

## **Operation Shutdown**

Under extreme circumstances the on-site supervisor, safety officer, or project manager may request that operations be temporarily suspended while the underlying hazard is corrected or controlled. If vapor measurements with the explosive vapor monitor show levels approaching explosive limits, operations will be stopped while the area is controlled. During this activity, all personnel will be required to stand up wind to prevent exposure to fugitive vapor emissions. The safety officer will have ultimate authority for operation shutdown.

## **Community Protection**

To assure the community is protected from health and fire hazards, up wind and down wind vapor monitoring will be performed if the general work area has hydrocarbon levels exceeding 100 ppmv. If down wind monitoring indicates persistent levels of 30 ppmv at the perimeter of the work area, work will be shutdown and vapor control efforts will be instituted until measurements indicate levels have dropped below 30 ppmv. An alternative approach of expanding the taped off area zone may be used to provide additional community protection.

EXPLANATION FOR TABLE #2: MINIMUM VERIFICATION ANALYSIS

1. OTHER METHODOLOGIES are continually being developed and as methods are accepted by EPA or DHS, they also can be used.
2. For DRINKING WATER SOURCES, EPA recommends that the 500 series for volatile organics be used in preference to the 600 series because the detection limits are lower and the QA/QC is better.
3. APPROPRIATE STANDARDS for the materials stored in the tank are to be used for all analyses on Table #2. For instance, seasonally, there may be five different jet fuel mixtures to be considered.
4. To AVOID FALSE POSITIVE detection of benzene, benzene-free solvents are to be used.
5. TOTAL PETROLEUM HYDROCARBONS (TPH) as gasoline (G) and diesel (D) ranges (volatile and extractible, respectively) are to be analyzed and characterized by GCFID with a fused capillary column and prepared by EPA method 5030 (purge and trap) for volatile hydrocarbons, or extracted by sonication using 3550 methodology for extractable hydrocarbons. Fused capillary columns are preferred to packed columns; a packed column may be used as a "first cut" with "dirty" samples or once the hydrocarbons have been characterized and proper QA/QC is followed.
6. TETRAETHYL LEAD (TEL) analysis may be required if total lead is detected unless the determination is made that the total lead concentration is geogenic (naturally occurring).
7. CHLORINATED HYDROCARBONS (CL HC) AND BENZENE, TOLUENE, XYLENE AND ETHYLBENZENE (BTX&E) are analyzed in soil by EPA methods 8010 and 8020 respectively, (or 8240) and in water, 601 and 602, respectively (or 624).
8. OIL AND GREASE (O & G) may be used when heavy, straight chain hydrocarbons may be present. Infrared analysis by method 418.1 may also be acceptable for O & G if proper standards are used. **Standard Methods" 17th Edition, 1989, has changed the 503 series to 5520.**
9. PRACTICAL QUANTITATION REPORTING LIMITS are influenced by matrix problems and laboratory QA/QC procedures. Following are the Practical Quantitation Reporting Limits:

	<u>SOIL PPM</u>	<u>WATER PPB</u>
TPH G	1.0	50.0
TPH D	1.0	50.0
BTX&E	0.005	0.5
O & G	50.0	5,000.0