

Underground Storage Tank  
Replacement

**Site Specific  
Safety & Health Plan**

Contract No. V599C-505  
VA Medical Center  
Livermore, CA

January 3, 1995

Prepared For:

Ms. Marcie Bell  
Department of Veterans Affairs  
Medical Center  
4951 Arroyo Road  
Livermore, CA 94550

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# Site Specific Safety and Health Plan

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## **Attachments**

Organizational Chart

Medical and Training Certificates

Resumes of Safety and Health Personnel

Affirmation and Tailgate Safety Meeting Sheets

Hospital Map

MSDS Sheets

Accident Prevention Program

Excavation and Trenching Program

## **SECTION C SITE SPECIFIC SAFETY AND HEALTH PLAN**

### **C1.0 Introduction**

The Site Specific Safety and Health Plan is in accordance with the requirements of OSHA Standard 29 CFR 1910.120, Cal-OSHA Standard California Code of Regulations, Title 8, Section 5192, U.S. Army Corps of Engineers EM 385-1-1, and Alameda County Department of Environmental Health. The Site Specific Safety and Health Plan will apply to all Remedial Constructors, Inc., (RCI), personnel and it's subcontractors.

The purpose of this Site Specific Safety and Health Plan is to provide an understanding of the potential chemical and physical hazards that exist or may arise during the performance of this project. The plan establishes safety procedures that are designed to protect the health and safety of employees associated with the site project and operations.

The Site Specific Safety and Health Plan will be available for review and reference onsite at all times. The plan will also be read by all personnel prior to entering the project area.

### **C2.0 Organizational Structure**

The organizational structure for the work to be performed at VA Medical Center is shown on the attached Organizational Chart.

The lines of authority are shown on the diagram. A description of the individual's responsibilities can be found below. Each person assigned specific safety and health responsibilities shall have their qualifications and experience documented by resume. See attached.



### RCI Principal and Project Manager

Charles Bailey, President of RCI, will act as the project manager. Mr. Bailey has over 24 years of experience in general construction operations and hazardous waste management, including conducting complex underground construction, removal and installation of underground storage tanks, concrete remediation projects, projects involving specialty shoring and excavation, and heavy equipment operations.

The project manager will be responsible for all aspects of the project undertaken by RCI and its subcontractors. The project manager will report directly to the COR. The project manager will be responsible for ensuring that all tasks are completed as planned and scheduled, providing authority and resources to ensure that safety and health requirements can be implemented, ensuring that all persons on the site have read and signed the Site Specific Safety and Health Plan, and performance of all duties specified in the Emergency Response Plan.

### Site Superintendent

Herb Dobkins will be RCI's Site Superintendent. Mr. Dobkins has over 35 years experience in general construction, including over 5 years in the removal and installation of underground storage tank systems. He also has extensive experience in commercial and tilt-up buildings; shoring and excavation projects; underground construction and utility installation; repair and maintenance projects; projects involving specialty skills and trades; and demolition.

The site superintendent reports to the project manager. The site superintendent is responsible for performing the field construction activities and coordinating the transportation and disposal subcontractors and other field construction subcontractors as designated.

### Quality Control Manager

Mark Hallock is the Quality Control Manager for this project. Mr. Hallock has over 16 years of professional experience managing environmental and

construction projects throughout the world. The types of environmental projects includes site assessments, Superfund Projects, TSDf closures, refinery remediation and closures, all types of storage tank removal and replacements, PCB remediation, waste stabilization, bioremediation, soil and groundwater treatment, asbestos abatement, lead-based paint abatement, and emergency response projects. The construction projects includes construction of sewer treatment plants, storm and waste water pump stations, major pipeline projects, bridges and freeway overpasses, military housing and maintenance facilities, and government and commercial office buildings. Additional experience includes developing corporate health and safety programs, training programs, QA/QC programs, preparation and implementation of remedial action plans, site-specific health and safety plans, and standard operating procedures.

The Quality Control Manager is responsible for the quality control program for field activities, including inspections, testing, surveying, restoration, materials used, and submittals. The Quality Control Manager (QCM) will report to the principal-in-charge. Responsibilities of the QCM will include ensuring that needed information regarding QA/QC issues is supplied to the COR. The QCM will also check to ensure that proposed materials and submittals meet the requirements of the contract specifications before these items are submitted to the COR for review.

The QCM's responsibilities will include acting as a liaison between the suppliers and the project, ensuring that all materials, equipment, personnel and procedures are in compliance with the terms of the contract and in the event of a discrepancy, all matters are immediately corrected. All reports prepared by or reviewed by the Quality Control Inspector will be reviewed by the QCM prior to forwarding to the COR. The QCM is responsible for resolution of all conflicts and discrepancies.

#### Site Safety and Health Officer

Mr. Robert Castaneda will act as Site Safety Officer for this Project. Mr. Castaneda has over 16 years experience in the construction industry and over seven years experience in hazardous waste operations. Mr. Castaneda has performed as site safety officer on numerous hazardous waste projects for the

Corps of Engineers, NASA, CalTrans, and private industry. He has also been responsible for establishment, implementation and direct supervision of health and safety programs. In addition, Mr. Castaneda has extensive experience in the removal and installation of underground and aboveground storage tank systems; underground construction, including utilities, concrete vaults, and retaining walls; all types of poured in place concrete projects; projects which include specialty trades; and demolition.

Mr. Castaneda holds a current Hazardous Waste Operations Certificate, Asbestos Abatement Certificate, and First Aid and CPR Certificates. Mr. Castaneda is also a qualified instructor in Hazardous Waste Operations, Asbestos Abatement, First Aid and CPR.

The Site Safety and Health Officer (SHO) is responsible for monitoring the field personnel for compliance with the requirements of the Site-Specific Safety and Health Plan, conducting daily tailgate safety meetings, conducting accident investigations and completing all accident forms, monitoring personnel who enter and exit the site and all controlled access points, reporting any signs of fatigue, work-related stress, or chemical exposures to the PM immediately, routinely inspecting PPE and clothing to ensure that it is in good condition and is being stored and maintained properly, knowing emergency procedures, evacuation routes and the other emergency information, coordinating upgrading and downgrading of PPE, performing all air monitoring with approved instruments and equipment, inspecting and maintaining monitoring equipment including performing calibration checks and completing the required forms and documentation.

The SHO has the authority to stop work if site conditions differ dramatically from those anticipated in the Site-Specific Safety and Health Plan, if unsafe conditions are present, if safety equipment is inoperable, and for other violations or departures from the approved Site-Specific Safety and Health and Plan.

### C3.0 Site Background

#### C3.1 Site Description and Contaminant Characterization

The project is located at VA Medical Center, in Livermore, California. The VA Medical Center tank removals and installations will be performed at Buildings 6, 62, 64, 79, 88, and 90.

The purpose of this contract is: The removal and disposal of one 560 gallon diesel UST, two 750 gallon gasoline USTs, one 2,000 gallon diesel UST, one 2,000 gallon gasoline USTs, one 2,200 gallon diesel UST, and one 1,000 diesel UST. The closure in place of one 2,000 gallon diesel UST and one 5,000 gallon diesel UST. The ~~installation of one 500 gallon diesel AST, two 1,000 gallon diesel AST, one 1,000 gallon gasoline AST, two 4,000 gallon diesel AST, and one 10,000 gallon diesel AST.~~ Construct one 20' by 20' prefabricated metal building and site and surface restoration.

The EPA Identification number for VA Medical Center is CAC000880784.

#### C3.2 Permits and Inspections

Tank removal and installation permits will be obtained from Alameda County Department of Environmental Health and VA Medical Center Fire Department. Both agencies will be notified of project schedule and will be on site during the removal of the tanks and during the soil sampling. In addition, The Regional Water Quality Control Board and Bay Area Air Quality Control Board will be notified and may be on site as well.

### C4.0 Health/Risk Analysis

#### C4.1 Physical Hazards

Physical hazards are inherently present during field operations. Physical hazards present at the project site include the mechanical hazards associated with the operation of vehicles and equipment, slip-trip-fall hazards associated

with operations conducted in a field environment, musculo-skeletal injury hazards resulting from heavy work activities, and hazards due to weather conditions. The typical physical hazards present on the site and methods to prevent injury due to these hazards are described below.

#### C4.1.1 Vehicle/Equipment Operation

The safety hazards associated with the operation of equipment, including heavy equipment and trucks, can be effectively controlled by the work crew if a constant awareness of these hazards is maintained. Constant visual and/or verbal contact with the equipment operator will facilitate such awareness.

#### C4.1.2 Slip-Trip-Fall Hazards

While it is difficult to prevent slip-trip-fall hazards, risk of injury will be minimized by implementing proper site control measures such as daily safety meetings, proper footwear, and by keeping the work area free of obstructions.

#### C4.1.3 Lifting Hazards

Field operations often require that heavy physical labor tasks be performed. All employees will be instructed in proper lifting techniques (i.e. during daily tailgate safety meetings). Additionally, employees will be instructed not to attempt to lift large or heavy objects without assistance (i.e. > 75 lbs.).

#### C4.1.4 Tool and Equipment Hazards

Safety hazards associated with the use of tools and equipment are generally related to improper tool handling and inadequate maintenance. Management of these hazards involve proper tool selection, rigorous maintenance of tools and equipment and effective training of employees in the proper use of these tools.

#### C4.1.5 Weather

The weather condition is an important consideration in planning and conduction site operations. Extremely hot or cold weather can cause physical discomfort, loss of efficiency and personal injury. Of particular importance is heat stress, often resulting when protective clothing decreases the body's natural ventilation process.

Reduced work tolerance and the increased risk of excessive heat stress is directly influenced by the amount of work performed while wearing personal protective equipment and by the rate of work performed. Because the incidence of heat stress depends on a variety of factors, all workers will be monitored.

#### C4.1.6 Heat Stress

Hazards associated with heat stress include the following:

##### C4.1.6.1 Heat Rash

Heat rash may result from continuous exposure to heat or to humid air.

##### C4.1.6.2 Heat Cramps

Heat cramps are caused by heavy sweating with inadequate electrolyte replacement. Heat cramps can cause muscle spasms, and pain in the hands, feet, and abdomen.

##### C4.1.6.3 Heat Exhaustion

Heat exhaustion occurs from increased stress on various body organs including inadequate blood circulation due to cardiovascular insufficiency or dehydration. Heat exhaustion can cause cool , moist skin, heavy sweating, dizziness, and nausea and fainting.

#### C4.1.6.4 Heat Stroke

Heat stroke is the most serious form of heat stress. Temperature regulation fails and the body temperature rises to critical levels ( $>102^{\circ}$ ). Immediate action must be taken to cool the body before serious injury and death occur. Competent medical help must be obtained. Heat stroke can cause red, hot, unusually dry skin. Symptoms include lack of, or reduced perspiration, nausea, dizziness, confusion, and a strong rapid pulse and coma.

#### C4.1.6.5 Heat Stress Monitoring Procedures

During the day-to-day field work, the Project Manager, Site Safety and Health Officer, and workers will be alert for the signs and symptoms of heat stress. An increased risk of this hazard exists when individuals are required to work in warm temperatures while wearing protective equipment.

The Site Safety and Health Officer will monitor the ambient air temperature using a thermometer located in the support zone. Ambient temperatures will be checked three times daily; once in the morning and twice in the afternoon. Monitoring of all of the field crew members will be conducted when ambient temperatures exceed  $95^{\circ}$  F.

The field crew members working in chemical-resistant protective clothing will be observed for the following signs and symptoms of heat stress: dizziness and nausea, profuse sweating, skin color change, vision problems, fainting, weakness, fatigue, cramping, and hot, red, dry skin.

Any team member who exhibits these symptoms will be monitored for heat stress. Heat stress monitoring will consist of measuring heart rate and/or body temperature (alternative) to prevent the onset of heat stress illness. Field crew members will be encouraged to take breaks each hour, as needed.

Heart rate (HR) will be measured by the radial pulse of the wrist for thirty seconds as early as possible in the resting period. The HR at the beginning of the rest period should not exceed 100 beats per minute. If the HR is in excess of the above guideline, the next work period will be shortened by one-third,

while the length of the rest period stays the same. If the pulse rate is in excess of 110 beats per minute at the beginning of the next rest period, the following work cycle will be further shortened by one-third.

Body temperature (BT) will be measured with a temperature sensitive strip placed on the worker's forehead as early as possible in the resting period. Strip temperature should not exceed 99.7° F. If the forehead temperature is less than 99.7° F, the next work period stays the same. However, if the forehead temperature is in excess of 99.7° F at the beginning of the next rest period, the following work cycle will be further shortened by one-third. Forehead temperature will be measured again at the end of the rest period to assure that it has decreased to below 99.7° F. Under no circumstances will a worker be allowed to wear impermeable or semi-permeable garments if his/her temperature exceeds 100.6° F. Workers will be encouraged to consume electrolyte beverages during rest periods.

Workers experiencing heat stress that is not relieved by rest period/work period modifications will be removed immediately from field work and be required, if conscious, to consume two to four pints of electrolyte fluid or cool water every hour while resting in a shaded area. The individual should not return to work until symptoms are no longer recognizable. If the symptoms appear critical, persist or get worse, or if the individual's temperature is  $\geq 102^{\circ}$  F, immediate medical attention at a hospital will be sought.

#### C4.1.7 Cold Stress

During the day to day field work, the Project Manager, the Site Safety and Health Officer (SHO), and workers will be alert for signs and symptoms of cold stress (hypothermia). The most common cause is due to prolonged exposure to cold while wearing inadequate clothing. This may also occur when individuals are required to wear chemical resistant suits. There may not be adequate insulation under the suit or the worker may be required to undress in an unheated area.

The SHO will monitor the ambient air temperature using a thermometer in the support zone. At temperatures below 40° F, actual temperature or corrected for



wind chill, the most current published ACGIH cold stress standard will be followed.

The field crew members will be observed for the following signs and symptoms:

- pain in the extremities
- uncontrolled shivering
- reduced responsiveness

Any team member who exhibits these signs will be monitored for cold stress. Any individual with an oral temperature of less than 97° F will be taken immediately to a warming shelter.

A warming shelter will be provided on any job site where the ambient temperature is less than 40° F. Breaks will be taken in the shelter as needed according to ACGIH TLV for cold stress.

#### C4.2 Chemical Hazards

Chemical hazards arise from excessive airborne concentrations of mists, vapors, gases or solids in the form of dust or fumes. In addition to the hazard of inhalation, many of these materials may act as skin irritants and/or may be toxic by absorption through the skin. The typical chemical hazards present on the site and the methods to prevent illness/ injury due to these hazards are described below.

#### C4.3 Identified Site Contaminates

The primary health risk at the site is the potential for human exposure to gasoline and diesel. Gasoline and diesel are petroleum hydrocarbons. The potential effects of any exposure is dependent on several factors such as toxicity, time frame of exposure, concentration, general health and age of person exposed, and individual use of hazard reduction techniques.

#### C4.3.1 Gasoline

Gasoline is a complex mixture of hydrocarbons and additives. The most toxic additive is tetraethyl lead. Chronic exposure to a high concentration of gasoline vapor may cause unconsciousness, coma, and possibly death from respiratory failure. Exposure to low concentrations of gasoline vapors may produce flushing of the face, slurred speech, and mental confusion.

Gasoline constituents can be divided into five major groups: alkanes, alkenes, cycloalkenes, aromatics, and additives. The aromatics are the constituents generally regarded to be of the greatest concern. The major aromatics in gasoline are benzene, toluene, ethylbenzene, and xylene. Of these, benzene is considered to be the most serious. All of these chemicals can also irritate the skin if repeated or prolonged skin exposure occurs.

#### C4.3.2 Diesel and Fuel Oils

Diesel and related fuel oils are complex mixtures of paraffinic, olefinic, naphthenic, and aromatic hydrocarbons. These fuels are typically clear bright liquids with a mild petroleum odor. Inhalation of excessive concentrations of vapor or mist can be irritating to the respiratory passages and can cause the following symptoms: Headache, dizziness, nausea, vomiting, and loss of coordination. Prolonged or repeated skin contact may produce a rash or pimples, usually on the arms or legs.

#### C4.3.3 Benzene

Benzene can enter the body through inhalation, ingestion, or skin contact. Studies have noted that chronic exposure to benzene can produce neurotoxic and hemopoietic (blood system) effects. Other effects include headache, dizziness, nausea, convulsions, coma, and possible death if exposure is not reversed. The most significant chronic effect of benzene is bone marrow toxicity. Although the cause-effect relationship is not fully understood, it is believed that there may be a strong association between chronic exposures to benzene and the development of leukemia.

#### C4.3.4 Toluene

Inhalation exposure to toluene vapor can produce effects such as central nervous system depression. Depending on exposure factors, signs and symptoms can include headache, dizziness, fatigue, muscular weakness, lack of coordination, drowsiness, collapse, and possible coma. Studies have noted anemia could be a possible effect of chronic exposure to toluene. Toluene can be a skin and mucous membrane irritant and has been shown to cause liver and kidney damage when overexposure is significant.

#### C4.3.5 Ethylbenzene

Ethylbenzene is an eye, mucous membrane, respiratory tract, and skin irritant. High air levels can cause central nervous system depression, sense of chest constriction, headache, and dizziness. Skin contact may cause irritation, inflammation, and first or second degree burns.

#### C4.3.6 Xylene

Depending on exposure factors, inhalation of xylene vapor may produce central nervous system excitation followed by depression. Exposure to xylene vapor can produce dizziness, staggering, drowsiness, and unconsciousness. At very high concentrations, it may produce lung irritation, nausea, vomiting, and abdominal pain. Xylene is not known to possess the chronic bone marrow toxicity of benzene, but liver enlargement and nerve cell damage have been noted from chronic overexposure. Ingestion exposure to xylene can produce temporary liver damage and should be avoided.

#### C4.3.7 Organic Lead

Acute effects of organic lead over exposure include encephalopathy, vomiting, feeling of dullness, drowsiness, tremors, coma, convulsions, poor memory, disorientation, and even death. Chronic effects include loss of appetite, weakness, anxiety, constipation, nausea, pallor, excessive tiredness, a metallic taste in mouth, insomnia, numbness, kidney disease, and reproductive system damage.

#### C4.4 Exposure Limits

Some of the substances listed above are mixtures and as such exposure limits are not published. However, there are exposure limits for some of the more hazardous constituents of concern in these substances that may be found at the site. The primary constituent of concern is benzene. Health risks will be experienced through inhalation of vapors, direct contact with liquids, and direct contact with contaminated soils.

##### C4.4.1 Permissible Exposure Limits (PEL), Threshold Limit Values (TLV), and Short Term Exposure Limits (STEL)

Table C-1 contains the Permissible Exposure Limits (PEL), Threshold Limit Values (TLV), and Short Term Exposure Limits (STEL) for the chemicals of concern at this delivery order site. If work shifts are changed from an 8 hour day, the PEL will be calculated to reflect such a change.

**Table C-1**  
**Permissible Exposure Limits (PEL), Threshold Limit Values (TLV)**  
**and**  
**Short Term Exposure Limits (STEL)**

<b>Chemical</b>	<b>PEL</b>	<b>TLV</b>	<b>STEL</b>
Benzene	1 ppm	10 ppm	5 ppm
Toluene	100 ppm	100 ppm	150 ppm
Ethylbenzene	100 ppm	100 ppm	125 ppm
Xylenes	100 ppm	100 ppm	150 ppm
Gasoline	300 ppm	300 ppm	500 ppm
Tetraethyl Lead	0.075 mg/m <sup>3</sup>	0.1 mg/m <sup>3</sup>	None

#### C4.4.2 IDLH Concentration

Immediately Dangerous to Life or Health concentrations (IDLH) represent the maximum concentration from which, in the event of respirator failure, one could escape within 30 minutes without a respirator and without experiencing any escape impairing or irreversible health effects. The reference is outlined in the National Institute for Occupational Safety and Health's Pocket Guide to Chemical Hazards.

##### IDLH Concentration

Benzene	2000 ppm
Organic Lead	40 mg/m <sup>3</sup>

#### C4.4.3 Modes of Exposure

Benzene can enter the body by inhalation (breathing), ingestion (swallowing), and absorption through the skin.

Organic lead can enter the body by inhalation (breathing), ingestion (swallowing), and absorption through the skin.

#### C4.5 Other Non-Physical Hazards

##### C4.5.1 Radiation

No ionizing radiation or biological hazards are believed to exist at this site.

##### C4.5.2 Confined Space Entry

Confined space entry is not anticipated for completion of this project. However, should confined space entry be required, all personnel will follow the procedures outlined in the RCI's General Management Plan Confined Space Entry Procedures. RCI will submit Confined Space Entry procedures to the Contracting Officer prior to beginning any confined space operations.

## C4.6 Site Specific Hazards

### C4.6.1 Waste Types

#### C4.6.1.1 Solids

Solid waste generation will consist mainly of soils and debris remediated from the work site. Also, solid wastes generated will include personal protective equipment and related wastes generated during work activities. The primary health risks from solids handled will be the potential for human exposure to benzene due to direct contact with contaminated materials. Therefore, all individuals involved in the remediation of such waste will be required to comply with personnel protective equipment requirements specified in this document.

#### C4.6.1.2 Liquids

Liquid wastes will consist mainly of the liquid/product remaining in the tanks and pipelines. Also, liquid waste may be generated from wetting techniques used to control dust generation during work activities. The primary health risks associated with handling liquid wastes will be the potential for human exposure to lead and benzene. Therefore, individuals handling liquid wastes will comply with the personal protective equipment requirements specified in this document. Level D protection is anticipated at this time.

#### C4.6.1.3 Sludge

Sludge will consist mainly of the residual sludge remaining in the tanks and pipelines. The primary health risks associated with handling sludge wastes will be the potential for human exposure to benzene through direct contact with the waste. Therefore, individuals handling sludge waste will comply with personal protective equipment requirements specified in this document. Level D protection is anticipated at this time.

#### C4.6.1.4 Gaseous Wastes

It is not anticipated that gaseous wastes will be generated during execution of this project. Any detection of gaseous waste will be handled in accordance with established standards. Exposure to hazardous vapors may occur during degassing/inerting activities and if contaminated soil is encountered. Air monitoring will be conducted to determine the appropriate level of respiratory protection.

#### C4.6.2 Hazard Classification

##### C4.6.2.1 Heat/Cold Stress

The adverse stress to the body due to exposure to excess heat can greatly diminish the ability of the body to function properly. Therefore all personnel involved in work activities will be monitored for heat stress disorders in accordance with the guidelines specified in this document. Cold stress is not anticipated to be a problem.

##### C4.6.2.2 Corrosive

Corrosive wastes are not expected to be encountered on site. However, equipment maintenance, or related operations, may require the use of corrosive materials. Skin irritation and burns are typical results when the body contacts an acidic or basic material. Therefore, personnel involved in handling or using corrosives will follow stringent personal protective equipment requirements identified in this document. MSDS sheets on all materials and/or lubricants used on site will be kept on site in the MSDS binder.

##### C4.6.2.3 Ignitability/Explosibility

The wastes from remediation are not expected to be combustible or flammable. However, individuals involved in maintenance of work equipment may encounter combustible or flammable materials. Therefore, personnel will be made aware of proper handling and use of these materials. Additionally, the pipelines may constitute a combustible hazard. Potential hazard areas, such as

pipelines, vaults, etc. will be frequently tested with the LEL meter during daily work activities.

#### C4.6.2.4 Radioactive

Radioactive wastes are not expected, but if encountered will be handled in accordance with established standards and guidelines.

RCI company guidelines for encountering radioactive material is:

- Evacuate all personnel from the site.
- Seek immediate medical aid / medical evaluation for all project personnel.
- Notify all involved governmental agencies.

#### C4.6.2.5 Volatile

Volatile wastes are not expected to be on site. However, equipment maintenance, or related activities, may require the use of volatile materials. Therefore, personnel will be made aware of proper use and handling according to guideline established by the manufacturer.

#### C4.6.2.6 Toxic

Toxicity is dependent on several factor such as quantity, concentration, and physical or chemical characteristics. The toxicity of on site waste are defined in elsewhere in this document. Other chemicals used on site will be used in accordance with manufacturers guidelines and established governmental standards or guidelines to insure the safe handling and use of toxic materials.

#### C4.6.2.7 Reactive

A reactive material is one that can undergo a chemical reaction when influenced by an outside source such as heat, air or water, resulting in chemical changes. Also, the storage and use of chemicals that are chemically incompatible can have the same result. Wastes from the site are not expected to have any reactive properties. Personnel using materials for equipment



maintenance or related operations will insure safe handling, storage and use of these materials.

#### C4.6.2.8 Biological

There are a variety of biological hazards to which personnel may be exposed while performing work. These hazards may include animal bites, insect stings, contact with poisonous plants and exposure to pathogenic (disease producing) microorganisms. Serious and/or threatening chemicals and physical hazards frequently overshadow any potential exposure to biological hazards. However, specific biological hazards can cause injury and even death. Therefore, when appropriate, such hazards will be identified and evaluated in conjunction with all other actual or potential hazards associated with an operation and steps taken to control exposure.

#### C4.6.2.9 Chemical

Chemical compounds have specific properties which determine the type and degree of hazard they represent. Evaluating their potential hazard depends on understanding their properties and their relationship to the environment. Prior to the use of any chemical onsite, the chemical's Material Safety Data Sheet will be reviewed to insure safe handling, storage and use. Material Safety Data Sheets for any materials used will be available on site at all times for review.

### C4.6.3 Routes of Exposure

#### C4.6.3.1 Inhalation

The most common route of toxic material entry is the respiratory tract. The respiratory tract is divided into three regions. The upper airway (extends from nose to larynx), lower airway (trachea, bronchi and bronchioles that serve as a conducting airway between the nasopharyngeal region and alveoli), and alveoli (basic functional unit in the lung and the primary location of gas exchange). Therefore, when controlling occupational hazards, the primary objective is to prevent atmosphere contamination. This should be accomplished through the use of engineering controls whenever feasible. When effective engineering

controls are not feasible, or while they are being instituted, appropriate respirators should be used. Because of pumping and degassing activities, and the potential for soil contamination, it will be imperative that personnel utilize respiratory protection to minimize airborne hazards whenever identified by this document or directed by the Site Safety and Health Officer.

#### C4.6.3.2 Ingestion

Ingestion of toxic materials occurs through hand to mouth activity, i.e. contact with toxic materials on a persons hands, food, drink, cosmetics, or their cigarettes. Materials ingested pass through the stomach and may be absorbed into the blood stream. After absorption into the blood stream, the toxic material may move directly to the liver or other organs or tissues. It is imperative that personnel follow guideline established in this document for use of personal protective equipment and personal hygiene standards.

#### C4.6.3.3 Absorption

Absorption of toxic material occur through the penetration of the epidermis, sweat glands, sebaceous (oil) glands and hair follicles if skin. Personnel shall therefore utilize personal protective equipment in accordance with this document.

#### C4.7 Training Program

Comprehensive training and instruction is provided to employees on an initial and periodic basis. Training certificates for RCI personnel who will be working on this project are attached. Personnel listed are the planned crew at this time. If any other personnel are added to the work force, medical and training certificates will be submitted prior to them working on the site. Copies of training certificates will also be kept onsite. All persons onsite shall read the Site Specific Safety and Health Plan. Workers shall sign a statement stating that they have read and understood and agree to abide by the policies and procedures stated in this document. A copy of the affirmation is attached.

Employees will be required to attend daily safety meetings. A copy of the Daily Tailgate Safety Meeting is attached.

#### C4.8 Medical Surveillance

All RCI employees participate in a Medical Surveillance Program. The RCI Medical Surveillance Program is in full compliance with the requirements of OSHA Standard 29 CFR 1910.120 and Cal-OSHA Standard, CRC, Title 8, Section 5192. Certificates of participation in the Medical Surveillance Program for each employee is attached.

#### C4.9 Emergency Response and Contingency Plan

A list of the emergency response agencies and their telephone numbers is listed below. The hospital is located within the jobsite. A Hospital Map is attached. Hospital map and emergency number will be posted at RCI job trailer and at all project sites.

1. General Emergency: 911 or 6188
2. Fire Department: 911 or 6188
3. Police Department: 911
  
4. Hospital: VA Medical Center  
Building 62  
Peppertree Drive  
Livermore, California  
(510) 447-2560 Ext. 6188

Directions to Hospital from Jobsite:

Hospital is located onsite in Building 62 on Peppertree Drive.

5. Environmental Protection Agency: (415) 744-1500
6. National Spill Response Center: 1 800-424-8802

## C4.10 Accidents

All accident or incidents will be immediately reported the RCI's Project Manager. RCI's Project Manager shall access the situation and take appropriate safety actions. i.e.: Seeking medical aid, notifying emergency personnel, stopping operations, and securing area. RCI's Project Manager will notify the COR, collect witness statements, and conduct an RCI accident investigation. RCI Project Manager will also be responsible for completion of all required accident forms.

### C4.10.1 Accident Prevention Program

RCI has instituted an Accident Prevention Program that meets the requirements of USACE EM 385-1-1 and the State of California.

## C4.11 Personal Protective Equipment

The hazards anticipated to be present during the site activities require EPA Level D protection. EPA Level D protective clothing will be worn by all field personnel during onsite activities. If the site conditions warrant, the level of protection may be escalated to EPA Level C.

At 5 ppm total hydrocarbons ambient level (1 ppm benzene) corrected by zeroing to background in the support zone, the level of protection will be upgraded to Level C. At 5% of the LEL, site conditions should be reassessed. The Site Safety and Health Officer will be responsible for determining the appropriate level of personal protection to be used, based upon the present and historic knowledge of the site. However, no changes in PPE or any other changes to the approved Safety and Health Plan will be made without approval from the Certified Industrial Hygienist.

## C4.12 Spill and Discharge Control Plan

The Spill and Discharge Control Plan has been developed to prevent the contamination of soils, water, atmosphere, uncontaminated areas/surfaces, equipment or material by the uncontrolled release of hazardous waste and

materials to the tank removal operations involved in this project. This plan is instituted in conjunction with the Environmental Protection Plan which provides for the protection of the surrounding flora, fauna, personnel and ecosystems.

The following spill control equipment will be available in the event of a spill of liquid or solid waste:

- \* Sand or other appropriate spill absorbent material
- \* Front-end loader
- \* 55-gallon drums (DOT 17 E or 17H)
- \* Shovels
- \* Decontamination supplies and protective clothing
- \* Hand operated pump

Regardless of the type of spill (liquid or solid), the following measures will be taken to isolate the spilled material(s):

- \* Isolate and contain the hazardous spill area
- \* Restrict access of unauthorized personnel
- \* Prevent contact with the spilled material
- \* Relocate upwind and upgradient of the spilled material
- \* Take air, soil, or appropriate samples to determine if clean-up is complete

#### C4.12.1 Solid Materials Spills

In the event of a spill or release of a solid, RCI will remove and place contaminated materials except petroleum contaminated soils into a dry container with a cover. The container should be appropriately labeled and disposed of as soon as possible. Petroleum contaminated soils will be stockpiled with the petroleum contaminated soils resulting from the excavation of the tanks.

#### C4.12.2 Liquid Material Spills

Liquid spills should be adsorbed with sand or other appropriate absorbent material. The absorbent material will be handled and disposed of with the protective clothing and trash generated within the exclusion zone.

In the event of a discharge of liquid into the soil, RCI will immediately identify the location of the discharge and take appropriate remedial actions to eliminate further spillage. The discharged liquid material will be controlled and disposed of as described above. If a reported discharge of any materials stored in drums, baker tanks, vacuum trucks, etc. occurs, the following steps shall be followed:

- \* Notify the COR and the Regional Water Quality Control Board
- \* Contain and eliminate the discharge (if not prevented by safety considerations)
- \* Remove/retrieve any discharged liquids (if not prevented by safety considerations)
- \* Isolate the spill area restricting access to unauthorized personnel
- \* Decontaminate the spill area, if necessary
- \* Prepare a spill report

The Spill Report will contain the following:

Description of the material spilled including identity, quantity, and a copy of the waste manifest.

Whether amount spilled is EPA/State reportable and when and to whom it was reported.

Exact time and location of the spill, and a description of the area involved.

Receiving stream or wasters

Identify the cause of incident and equipment and personnel involved.

Identify injuries or property damage.

Containment procedures utilized.

A summary of the communications between RCI had with press, agencies, or Government officials other than the COR.

A description of the cleanup procedures employed or to be employed at the site, including disposal location of spill residue.

#### C4.13 Sanitation

Sanitation facilities for the site work force will be made available.

#### C4.14 First-Aid

Vehicles used for site work will be equipped with a first-aid kit and safety equipment including:

- \* fluorescent vests

- \* cones and barriers
- \* barricades
- \* fire extinguisher
- \* flashlight
- \* drinking water
- \* portable eye wash

#### C4.15 Site Control

##### C4.15.1 Boundaries

The creation of boundaries around work zones will be the responsibility of the Project Manager with input from the Site Safety and Health Officer and will be designated at each work location within the site. The work zones will be clearly marked with barricades/barricade tape (danger tape) and signs visible from all directions. Fencing will be installed around all excavations and stockpiles anytime the site is left unattended until the site is backfilled. Lighted barricades will also be placed around the fences. The barricades shall be operated during the time from dusk to dawn.

##### C4.15.2 Zones

###### C4.15.2.1 Exclusion Zone

An exclusion zone will be maintained around each work location by placement of signs, barricades and/or barricade tape as necessary. The size and shape of the exclusion zone will be determined by the conditions on the site, and will be large enough to encompass the potentially hazardous zone around the work site.



#### C4.15.2.2 Contamination Reduction Zone

The contamination reduction zone will contain:

1. A personnel decontamination station
2. Equipment decontamination station
3. Plastic sheeting on which to place and segregate reusable equipment
4. Wash basins, decontamination solutions, scrub brushes and a water source for the decontamination of reusable equipment;
5. Emergency response and first aid equipment, including portable eyewash showers, and fire extinguishers;
6. Clearly marked trash barrels or drums with plastic liners for the placement and disposal of expendable items such as gloves and protective clothing.

#### C4.15.2.3 Support Zone

The support zone will consist of the area outside of the contamination reduction zone. Eating, drinking and smoking will be allowed only in this zone. All non-essential personnel and persons not directly involved in site work activities shall remain in the support zone at all times.

#### C4.15.3 Entry-Exit Procedures

All personnel will enter and exit the exclusion zone through the contamination reduction zone.

Any item taken into the exclusion zone will be assumed to be contaminated, and must be decontaminated before the item leaves the area.

The implementation of work zones facilitates compliance with the remedial objectives. Therefore, exclusion, contamination reduction and support zones will be created at the work site. Movement of personnel and equipment between the zones will be controlled. This physical arrangement will keep the contaminants within the specified areas, reduce the potential for the contamination to spread, minimize potential contamination of workers and communicate the individual site control to all personnel at the site.

#### C4.15.4 Site Security

Site security and site control will be the responsibility of the Project Manager with assistance from all personnel that may notice any non-routine activities or notice individuals on the site that have not been identified as RCI employees or subcontractors.

#### C4.16 Decontamination

RCI will establish and maintain a comprehensive decontamination program throughout the project. The decontamination program will be designed for the employees and equipment of RCI, its subcontractors, and other authorized personnel within the work area. The goals of a decontamination program are to reduce or eliminate the possibility of contaminant exposure to personnel working within or living nearby the project boundaries and to reduce or eliminate the potential for offsite migration of contaminants. As part of the decontamination program, RCI will construct and operate equipment and personnel decontamination facilities at the worksite.

For this project, a temporary equipment decontamination station will be constructed by laying visqueen in the ground and over berming. The equipment will be cleaned using brooms and/or a 2000 psi pressure washer.

Personnel decontamination stations will be constructed by laying visqueen on the ground. The stations will be equipped with wash buckets and brushes for personnel and small equipment decontamination. A trash receptacle will also be available.

#### C4.17 Hearing Conservation Program

At this time no adverse noise impacts to workers or to the public are anticipated to result from site operations. At the discretion of the Site Safety and Health Officer, noise dosimetry monitoring may be implemented. Such monitoring will be introduced if noise conditions are greater than anticipated. Hearing conservation measures such as distribution of ear plugs may be implemented if it is deemed necessary by the Site Safety and Health Officer.

#### C4.18 Respiratory Protection Program

The use of respirators at the site is not anticipated at this time. However, should the site conditions warrant upgrade in the level of personal protective equipment, respiratory protection may be utilized.

#### C4.19 Excavation and Trenching

It is not anticipated that any shoring will be required for this project. At no time will RCI personnel be allowed to enter any excavation. All soil samples will be taken indirectly using the excavator/backhoe bucket. If any caving occurs then the recommended procedure will be to slope the side of the excavation in accordance with RCI standard excavation and trenching procedures. See attached.

#### C4.20 Exposure Monitoring

An initial site reconnaissance will be performed prior to commencement of each work day. Additionally, the site will be monitored under the supervision of the Site Safety Officer during the initial phases of work operations and when conditions at the site change. Direct reading instruments (DRI) will be used to detect the presence of organic vapors and explosive/oxygen deficient atmospheres during excavation operations. These DRI's will consist of an organic vapor monitoring instrument capable of detecting fuel-component hydrocarbon vapors (i.e. a photoionization or flame ionization monitoring instrument) and a combination explosivity/oxygen meter to detect flammability and/or oxygen deficiency hazards.

The DRI's will be used as work zone and breathing zone monitoring devices during intrusive excavation and will be used as general area monitors when intrusive operations are not being performed. The results of the DRI monitoring will be recorded in a log book and will be used to assess the adequacy of the level of personal protection and hazard management procedures listed in this plan. DRI readings will be compared to the action levels.

If monitoring results indicate that the organic vapor concentrations exceed action levels, appropriate measures will be taken by the Site Safety and Health Officer to ensure worker safety, public health, and regulatory compliance. Such measures may include, but are not limited to, modifications to the level of protection, additional medical monitoring and training, and implementation of further engineering controls.

It should be noted that freshly exposed soil and the lack of ventilation in the excavation may exacerbate the airborne concentrations of organic vapors by allowing fumes to concentrate. The Site Safety and Health Officer will take special care to monitor these conditions.

Care will be taken to avoid dusty conditions resulting from work activities. Presence and concentrations of dust, if any, will be monitored in accordance with the Site Health and Safety Plan. Fugitive dust will be monitored by all RCI personnel, and mitigated by correcting vehicle/machinery operation and/or by wetting exposed surfaces.

If required, prior to commencing excavation or removal and loading operations, soils and/or the stockpile surface will be thoroughly wetted with water to prevent potential off-site migration of dust. The process will be repeated as required to prevent the generation of dust. Water used to mitigate dust will be carefully applied by RCI personnel. Water use will be monitored at all times and at no time will water be allowed to run or pond on-site in excessive quantities that would create hazardous or dangerous conditions for personnel or equipment. Should excess water use be detected, the RCI Project Manager will be notified immediately and the situation will be immediately corrected.

Any offsite release or suspected offsite release of hazardous substances must be immediately reported to the Site Safety and Health Officer. Any suspected exposure to hazardous substances resulting from PPE failure, accident, or other reason must be reported to the Site Safety and Health Officer, in writing, within 24 hours.

The action levels for upgrading the level of personal protection are attached.

#### C4.21 Environmental Protection Plan

The purpose of this Plan is to make provisions for the prevention of environmental pollution and damage by the presence of "chemical, physical, or biological elements or agents which adversely affect human health or welfare; unfavorably alter ecological balances of importance to human life; affect other species of importance to man; or degrade the utility of the environment for aesthetic, cultural and/or historical purpose." Areas of consideration are air, water, soil, including land formations, biotic components of the remediation area, noise, solid waste and other pollutants.

C4.21.1 Site Location:  
VA Medical Center  
Livermore, California  
Alameda County

#### C4.12.2 Air Contaminants

Prior to the onset of project activities, the work area will be inspected. The site will be monitored under the supervision of the Site Safety and Health Officer during the initial phases of work operations and when conditions at the site change. Direct reading instruments (DRI) will be used to detect the presence of organic vapors and explosive/oxygen-deficient atmospheres during pumping and excavation operations. For complete details refer to the Site Monitoring Plan section of the Site-Specific Safety and Health Plan.

#### C4.21.2.1 Dust Abatement

The release of particulate matter may occur during excavation and backfilling operations. The amount of particulate matter generated is anticipated to be minimal. Care will be taken to avoid dusty conditions resulting from work activities. Motorized equipment will be operated at speeds that will not cause undue release of particulate matter. Water sprinkling of construction zones, along haul routes, in equipment parking areas, and in waste areas will be implemented if necessary. All disturbed excavation areas, upon completion of work, shall be sprayed with water for dust suppression at a rate sufficient to inhibit generation of airborne particulate matter.

#### C4.21.2.2 Exhaust

All vehicular exhaust will be controlled by standard engineering devices.

#### C4.21.2.3 Burning of Rubbish and Debris

Open burning of rubbish and debris will not be permitted on the site.

#### C4.21.3 Protection of Soil and Land Resources

##### C4.21.3.1 Land Resources

All land resources within the project boundaries will be preserved in their present condition or restored to a condition after completion of the project that will appear to be natural and not detract from the appearance of the site.

Prior to construction, RCI will identify all areas and land resources to be observed within the general work area(s). This includes, but is not limited to, the marking of utility lines, vegetation of environmental concern, land formations, nesting, hunting or otherwise inhabited areas of protected species. Marking methods will include flagging, fencing or other delineation in such a manner as to be identified as a protected source. Upon written approval of the COR, those land resources that will impede the construction required for soil remediation will be removed. Replacement of these resources will take place

upon completion of the project. All vehicle traffic is limited to the construction area and established roads.

#### C4.21.3.2 Vegetation

Existing trees and shrubs will not be used to anchor cables, ropes or guys. Vegetation that is damaged during construction and deemed salvageable will be treated as soon as possible in a manner that is botanically correct and approved by the COR. Vegetation, both woody and herbaceous, that is damaged during construction that is unsalvageable, will be replaced with nursery grown specimens that are of the same species, at the expense of RCI. Trees will be replaced by specimens that are also of equal size.

#### C4.21.3.3 Cultural and Historical

There are no known sites of historical or cultural significance in the work areas. In the event that skeletons or artifacts are found during construction activities, the contracting officer will be notified in writing, specifying location and nature of discovery. Work will not resume until authorized by the COR.

#### C4.21.4 Water Resources

##### C4.21.4.1 Run-off Contamination

All excavations will be covered and secured after work hours if rainy conditions are expected. Any cuts that are created for the purpose of the project will be graded to prevent unnecessary run-off water pollution. Stockpiles will be bermed to prevent the run-off or run-on of any water. The berm will be a minimum of twelve inches in height. The stockpile area shall have a 30 mil geomembrane liner as a base and a minimum 10 mil geomembrane covering placed over the soils. The stockpile area shall be sized to completely contain the quantity of contaminated soils generated placed a maximum of four feet high.

#### C4.21.4.2 Chemical Degradation

Fuels, oils, bitumens, calcium chloride, acids, bases and other methods of chemical degradation of surface and ground waters will be prevented by the storage and disposal of the above listed sources in a method that is approved by the EPA and the State of California at the expense of RCI. Water that is used in the decontamination process will be disposed of with liquids removed from the tanks.

#### C4.21.5 Waste Disposal

Waste materials generated by construction activities or construction personnel will be removed and disposed of properly. The site will be restored to conditions that existed prior to construction at the expense of RCI.

##### C4.21.5.1 Sewage Disposal

Raw sewage generated on site by construction activities will be disposed of through the use of an approved service contractor on a regular schedule that will provide for sanitary conditions.

##### C4.21.5.2 Municipal Waste

Municipal waste that is generated on site will be disposed of in accordance with regulations established by the EPA and State of California.

##### C4.21.5.3 Tanks and Tank Liquids

Tanks and liquids removed from the tanks will be disposed of by Erickson Inc. in accordance with EPA and State of California regulations.



#### C4.21.5.4 Personal Protective Equipment

The personal protective equipment, plastic sheeting and trash generated inside the exclusion zone will be removed to an approved offsite facility in accordance with EPA and State of California regulations.

#### C4.21.6 Traffic Control

Traffic in the VA Medical Center is limited to staff and patients and vendors. RCI will delineate each work area as described above. Unauthorized personnel will not be allowed to enter any work area. RCI will coordinate with the COR and VA Medical Center for delivery of materials or the off haul of tanks and contaminated soils.

##### C4.21.6.1 Work Areas

Excavations and the stockpiles will be enclosed by a chain link fence any time the site is left unattended by the Contractor until such time as the excavation hole is backfilled to the original surface elevation. In addition to installing fencing at all excavations, lighted barricades will be used at the fences within the active air operations areas. The barricades shall be operated from dusk to dawn.

Only authorized personnel will be allowed in the restricted area (contamination reduction zone and the exclusion zone). Personal vehicles will not be allowed in the restricted area. Only equipment required for the project will be allowed into the exclusion zone and will not be removed until that specific piece of equipment is no longer needed. Equipment and vehicles will be decontaminated prior to removal from the exclusion zone.

#### C4.21.7 Odor

Odor pollution will most likely result from sanitary concerns. Odor will be controlled by regular servicing of sewage sites and disposal of municipal refuse.

#### C4.21.8 Noise

Whenever feasible, engineering control will be implemented to maintain noise levels below 85 decibels. These controls will include isolation, enclosure and application of noise reduction materials. In the event that these methods are not feasible or effective, affected site personnel will be given personal hearing protection.

#### C4.21.9 Quality Control/Quality Assurance

Prior to construction activities, the Site Safety and Health Officer and Project Manager will inspect and monitor the remediation area for background air contamination levels, soils impacted by previous site activities, existing surface waters, areas that may pose erosion or water run-off difficulties and previously damaged vegetation. All items of note will be documented in the quality control log using qualitative and quantitative form of measurements, maps and other useful types of documentation. The Site Safety and Health Officer will continue monitoring all items during preliminary activities, construction activities, and will assist the Quality Control Manager and Project Manager during post construction activities to assure that the site meets all restoration standards and is not compromised ecologically or aesthetically.

#### C4.21.10 Inspections and Reports

Each day the Site Safety and Health Officer will conduct visual inspections of the work area. Inspections for fugitive releases of oil, fuel and hydraulic fluid from the equipment as well as any fugitive release from the sanitary facilities will be conducted in the morning. Inspection for vegetation damage and unapproved methods of waste disposal in or near the work area will be completed at the end of each work day. The date and time of the performance of any sanitary services received will be documented. Upon the discovery of any violation of the Environmental Protection Plan by the Site Safety and Health Officer, a notice of the violation will be given to the Quality Control Manager and Project Manager immediately. These violations will be recorded in the Daily Log. Upon conclusion of the remediation activities, the Site Safety and Health Officer will make a final assessment of the unscheduled impact on the

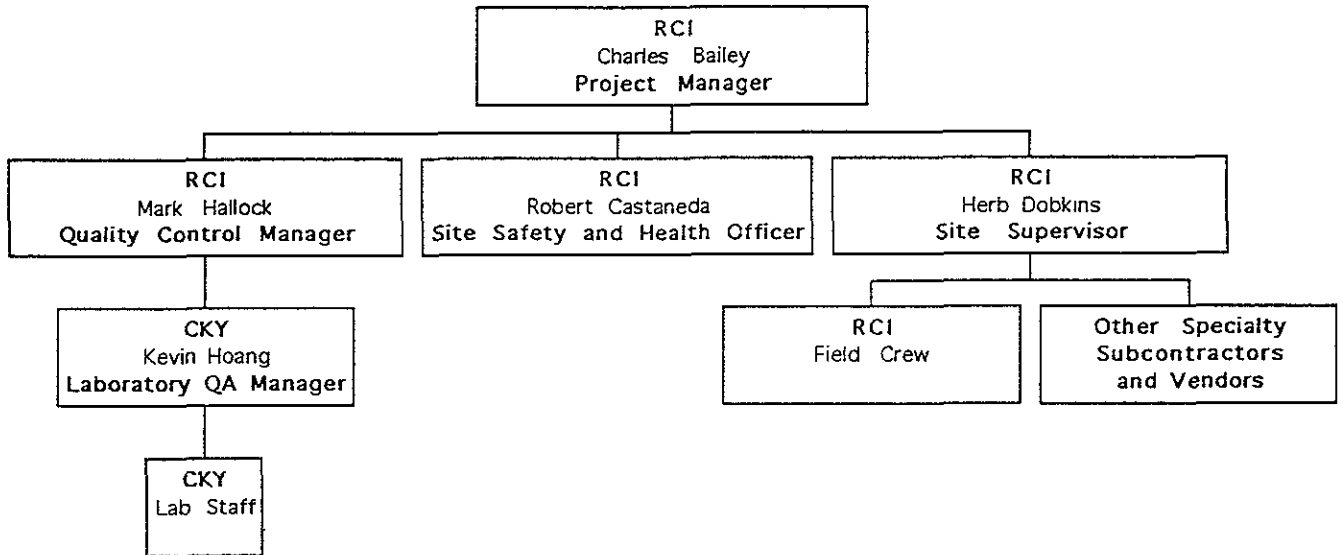
area by the construction activities, and will make a written report to the Quality Control Manager.

**ORGANIZATIONAL CHART  
of  
SAFETY & HEALTH  
PERSONNEL**

# Organizational Chart

Underground Storage Tank  
Replacements

Contract No. V599C-505



**MEDICAL & TRAINING  
CERTIFICATES**

# Certificate of

8 Hour Hazardous Waste Operations and Emergency  
Response Refresher Training

Charles E. Bailey  
has met the requirements under OSHA Standard,  
29CFR 1910.120

  
\_\_\_\_\_  
RCM Instructor

October 15, 1994

# Certificate of

8 Hour Hazardous Waste Operations and Emergency  
Response Refresher Training

Mark Hallock  
has met the requirements under OSHA Standard,  
29CFR 1910.120

  
\_\_\_\_\_  
ROM Instructor

October 15, 1994



# Certificate of

8 Hour Hazardous Waste Operations and Emergency  
Response Refresher Training

Robert Castaneda  
has met the requirements under OSHA Standard,  
29CFR 1910.120

  
\_\_\_\_\_  
RCI Instructor

October 15, 1994

# Certificate of

8 Hour Hazardous Waste Operations and Emergency  
Response Refresher Training

Herman R. Dobkins  
has met the requirements under OSHA Standard,  
29CFR 1910.120

  
\_\_\_\_\_  
ROI Instructor

October 15, 1994



Date:

Time In:

94 OCT - Date: 7:54  
Time Out:

**PRE-PLACEMENT REPORT**

Employee: Charles Bailey

Employer: Remedial Construction

Position Applying For: \_\_\_\_\_

QUALIFIED WITHOUT RESTRICTIONS

QUALIFIED WITH RESTRICTIONS

HOLD FOR FURTHER TESTING

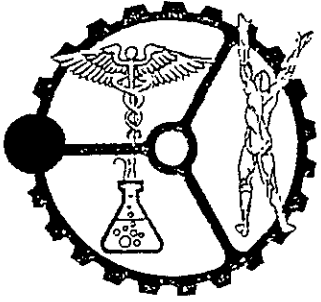
CANDIDATE RETURNED TO EMPLOYER — JOB DESCRIPTION NOT AVAILABLE

Phil [Signature]  
Physician

ReadiCare  
2101 Tenaya Drive  
Modesto, CA 95354  
(209) 527-0080

EZ: 8 d Center

Phone Number \_\_\_\_\_



SACRAMENTO OCCUPATIONAL MEDICAL GROUP

David E. Root, M.D., M.P.H.  
Medical Director

Mr. Stephen Boyle  
Health and Safety Officer  
ACCI/ASRC Contracting  
10293 Rockingham Dr., Ste. 101  
Sacramento, CA 95827

Dear Stephen:

The physical exam on Mark Hallock was performed on 4-26-93. The results are as follows:

P.E.: Slight obesity.

LAB: Chem panel: Slight elevation of liver enzymes; otherwise normal.  
CBC: Normal

Cholinesterase: Normal

Urine Heavy Metals: Normal

P.F.T.: Normal

Two view CXR: Normal

Audiogram: Slight decreased high frequency hearing loss right ear; otherwise normal.

E.K.G.: Normal

Very Sincerely,

*David E. Root, M.D.* for

David E. Root, M.D., M.H.P.  
Medical Director

*Rec'd 4-29-93  
HAR*

Reply to:

One Scripps Drive, Suite 205 • Sacramento, CA 95825 • 916/924-9263 • FAX 916/924-9083  
 One Scripps Drive, Suite 205 • Sacramento, CA 95825 • 916/924-9263 • FAX 916/924-9083



Date:

Time In:

Date:

Time Out:

'94 OCT 12 P5:05

PRE-PLACEMENT REPORT

Employee: Robert Castaneda

Employer: Remedial Contractors

Position Applying For:

QUALIFIED WITHOUT RESTRICTIONS

QUALIFIED WITH RESTRICTIONS

HOLD FOR FURTHER TESTING

CANDIDATE RETURNED TO EMPLOYER — JOB DESCRIPTION NOT AVAILABLE

Handwritten signature

Physician

Stamp: 70 OCT 12 P6:52

ReadiCare
2101 Tenaya Drive
Modesto, CA 95354
(209) 527-0080

Phone Number



Date:  
Time In:

94 Date: 20 PG: 52  
Time Out:

### PRE-PLACEMENT REPORT

Employee: Herman Okkin

Employer: Medical Constructors

Position Applying For: \_\_\_\_\_

QUALIFIED WITHOUT RESTRICTIONS

QUALIFIED WITH RESTRICTIONS

HOLD FOR FURTHER TESTING

CANDIDATE RETURNED TO EMPLOYER — JOB DESCRIPTION NOT AVAILABLE

Phil Madison  
Physician

Center: **READICARE**  
**2101 PENAYA DRIVE**  
**MODESTO, CA 95354**  
**(209) 527-0080**  
Phone Number

**RESUMES  
of  
SAFETY & HEALTH  
PERSONNEL**

Charles E. Bailey

## EXPERTISE

Project Management  
Quality Control Management  
Heavy Equipment Operations  
Site Safety Officer  
Project Estimating

UST & AST Removal and Installation  
Site Restoration  
General Construction  
Soil & Water Sample Collection  
Contract Negotiations

## PROFESSIONAL EXPERIENCE

Mr. Bailey has over 24 years experience in general construction operations and hazardous waste management, including conducting complex underground construction, removal and installation of both aboveground and underground storage tanks, concrete remediation projects, projects involving specialty shoring and excavation, and heavy equipment operations. Mr. Bailey has completed projects for The Corps of Engineers, The Department of the Army, The Department of the Navy, The Coast Guard and numerous other Federal and private owner clients. Mr. Bailey has shown his professionalism and expertise on each and every one of these projects.

## EDUCATION

St. Mike College, Santa Fe, NM - Biology Major

E5 Specialist / Medic, Bronze Star, Accommodation Medal, and The Purple Heart  
101st Airborne Division, Vietnam

## SPECIALIZED TRAINING

Hazardous Waste Operation Certificate per 29 CFR 1910.120

Red Cross First Aid Trained / CPR Trained

## LICENSES

CA class "A" General Engineering Contractors License

CA Registered Environmental Assessor



Charles E. Bailey Resume Cont.

**EMPLOYMENT HISTORY**

- 1992 - Present      **President and General Manager - Remedial Constructors, Inc.**  
Mr. Bailey has direct managerial responsibility for all aspects of remedial construction operations including bid preparation, subcontractor selection, contract negotiations, bonding and insurance, project staffing, project management, and health and safety oversight.
- 1991 - 1992      **Construction Operations Manager - Hess and Hess**  
Mr. Bailey was directly responsible for all aspects of construction operations including bid preparations, subcontractor selection and contract negotiations, project staffing and oversight, and health and safety management. He completed over 10 projects in one year generating gross revenues of \$3 million.
- 1989 - 1991      **Senior Project Manager - Martech, USA**  
As senior project manager Mr. Bailey was responsible for several West Coast remedial construction projects of this national environmental service company. He oversaw the work of five project managers, and over twenty equipment operators and laborers.
- 1974 - 1989      **Project Manager - Bob Smith Excavators**  
Conducted complex underground construction, removal and replacement of underground storage tanks, concrete demolition projects, and projects that required specialty shoring and excavation and heavy equipment operations.
- 1972 - 1974      **General Construction Contractor**
- 1969 - 1972      **Underground Foreman - Liton Construction, Inc.**

Mark Hallock

## EXPERTISE

Quality Control Management  
Health and Safety Officer  
Environmental Engineer  
UST Removal / Site Closure  
UST & AST Installation  
Hazardous Waste Site Remediation

Contaminated Soil Excavation  
Asbestos Removal  
PCB Removal  
Environmental Assessment  
Mechanical Design  
Bioremediation

## PROFESSIONAL EXPERIENCE

Mr. Hallock has over 16 years of professional experience managing environmental and construction projects throughout the world. The environmental projects include site assessments, Superfund Projects, TSDF closures, refinery remediation and closures, all types of storage tank removal and replacements, PCB remediation, soil and ground water treatment, asbestos and lead-based paint abatement and emergency response projects. The construction projects include roof removal / installation projects, sewer treatment plants, storm and waste water pump stations, major pipeline projects, bridges and freeway overpasses, military housing and maintenance facilities and government and commercial office buildings.

## EDUCATION

University of Santa Clara - BS. Mathematics

## LICENSES

New Mexico State Contractors License - Mechanical and Underground

Certified in Underground Storage Tank Decommissioning - International Fire Code Institute

Certified in Underground Storage Tank Installation / Retrofitting - International Fire Code Institute

## Mark Hallock Resume Cont.

### SPECIALIZED TRAINING

40 Hour Hazardous Waste and Emergency Response Training  
Hazardous Waste and Emergency Response Supervisor Training  
AHERA Asbestos Abatement Worker Training  
AHERA Asbestos Abatement Supervisor Training  
Red Cross First Aid / CPR Training

### Employment History

- 1993 - Present      **Vice President of Operations  
Remedial Constructors, Inc.,**  
Responsible for overall management of projects. Additional duties included establishment of Corporate Quality Assurance / Quality Control Programs and Health and Safety Programs, review of all submittals for compliance with regulations and plans and specifications, review of all Site Health and Safety Plans, project scheduling and Employee Training in 40 Hour Hazardous Materials Workers Training, 8 Hour Annual Refresher Training, and Hazardous Materials Supervisor Training,
- 1991 - 1993      **Operations Manager - Western Region -  
Martech USA, Inc.**  
Responsible for overall management of projects in the Western United States and Pacific Rim. Additional duties included establishment of Division Quality Assurance / Quality Control Programs and Health and Safety Programs, Employee Training in 40 Hour Hazardous Materials Workers Training, 8 Hour Annual Refresher Training, and Hazardous Materials Supervisor Training, review of all submittals for compliance with regulations and plans and specifications, project scheduling, and review of all project close-out submittals. Concurrently held the positions of Division QA/QC Officer and Health and Safety Manager. The types of projects included removal, remediation, and solidification of hazardous materials, UST and AST removals and installations, asbestos abatement, lead abatement, site investigations, site closures, emergency response, and heavy construction projects.

## Mark Hallock Resume Cont.

Average project size was \$1.5 Million. Partial client list includes U.S. Army Corps of Engineers, U.S. Department of the Navy, U.S. Department of the Air Force, U.S. Department of Forestry, U.S. Environmental Protection Agency Superfund Projects, General Services Administration, State of Oregon, State of California, Unocal, Chevron, and British Petroleum.

1990 - 1991

### **Operations Manager - European Division Martech USA, Inc.**

Responsible for startup activities of Martech's European Division, and management of subsequent projects. Opened offices in Budapest, Hungary; Prague, Czechoslovakia; and Warsaw, Poland. Additional duties included establishment of Division Quality Assurance / Quality Control Programs and Health and Safety Programs, hiring and training of local workers, including Hazardous Materials and Health and Safety Training, submission of site investigation reports, remedial action plans, project submittals, project status reports, and site closure reports. Projects included site investigations and remediation of various Soviet Military Bases, and industrial complexes. The industrial sites included oil refineries, manufacturing facilities, water treatment plants, and waste disposal sites. Client list included the governments of Hungary, Czechoslovakia, and Poland.

1986 - 1990

### **Field Supervisor - Field Services Division EnSCO Environmental Services, Inc.**

Responsible for management of multiple assigned projects. Duties included submission of project submittals, submission and oversight of Project Quality Assurance / Quality Control Plans and Site Health and Safety Plans, submission of project status reports and site closure reports. Was also responsible for conducting site specific health and safety meetings, and employee training in 40 hour Hazardous Materials Worker Training, Annual Refresher Training, and Hazardous Materials Supervisor Training. Concurrently held the positions of QA/QC Officer and/or Site Safety Officer. Types of projects included TSDf closures,

## Mark Hallock Resume Cont.

refinery remediation and closures, site assessments, UST and AST removal and installations, hazardous materials remediation, fixation, and stabilization, on site closures, building decons, emergency response projects, and indefinite quantity service contracts. Partial client list included State of California, Lockheed Missile and Space Corporation, Hewlett Packard, Apple Computers, Chevron, Shell Oil, and Quik Stop Markets.

1984 - 1986

### **Co-Owner - H & E Construction**

Operated a small construction company with a partner and ten employees. In addition to overall management of the company was also responsible for submission of all project submittals, status reports, close-out submittals, and inspection of materials and work in progress. Residential projects included custom built homes, additions, and remodels. Commercial projects included tenant improvements, restaurant construction, and insurance fire damage repairs.

1983 - 1984

### **Operations Manager - MTC Mechanical Contractors, Inc.**

Responsible for overall management of projects. Additional duties included submission of all project submittals, project status reports, close-out submittals and inspection of work in progress. Types of projects included installation of HVAC and sheet metal for new construction of residential tract homes, condominium and townhouse projects, and custom built homes. Commercial projects included multi-story office and manufacturing buildings and shopping malls.

1979 - 1983

### **Project Engineer / Superintendent Dan Caputo Company Inc.**

Responsible of management of assigned projects. Additional duties included submission of all project submittals, status reports, close out reports, inspection of all materials, and work in progress. Concurrently held position of Site Safety Officer. The types of projects included construction of sewer treatment plants, storm water and sewage pump stations, bridges and freeway overpasses, and installation of a city sewer system, (45 miles of pipeline plus pump stations). Projects ranged from \$100,000 to \$11 Million.

Mark Hallock Resume Cont.

1978 - 1979

**Mechanical Engineer - Gastech Inc.**

Responsible for design of gas detection systems and gas detection instruments. Duties included production of all manufacturing drawings, including PC board layout, machine shop and assembly drawings, and artwork.

# GUS L. BALLIS

Certified Industrial Hygienist

## EDUCATION

M.S. Industrial Hygiene  
B.S. Industrial Hygiene

## CERTIFICATIONS

1983/Certified Industrial Hygienist/ABIH  
1982/Registered Environmental Health Specialist/California  
1988/Registered Environmental Assessor/California

## PROJECT EXPERIENCE

Mr. Ballis has a broad background in health and safety including industrial hygiene, safety engineering and training. Mr. Ballis has extensive experience in the preparation and implementation of site-specific Health and Safety Plans. Additionally, Mr. Ballis provides services related to all aspects of industrial hygiene, medical surveillance and safety training programs. Selected past projects are outlined below:

- Health and Safety Officer for Lorentz Barrel and Drum, a major Superfund site in Northern California; This site had extensive surface and groundwater contamination.
- Health and Safety Officer for a contaminated site that was previously used as Chico U.S. Army Base. There was wide spread contamination of the drinking water aquifers
- Health and Safety Officer at the Rocky Mountain Arsenal. This U.S. Army facility has hundreds of acres that are contaminated with various types of chemicals, chemical weapons and explosive ordinance.
- Health and Safety Officer for a preliminary assessment/site inspection of the NASA Ames Research Center. This facility had numerous areas of various types of soil and groundwater contamination.
- Health and Safety Officer for a major asbestos remediation project at the NASA Johnson Space Center. Involved several buildings containing different types of asbestos which were tested, analyzed and subsequently remediated. Health and Safety Officer for a groundwater investigation project at the NASA Johnson Space Center. This project involved locating the source of contamination in the uppermost aquifer.
- Project Manager and Health and Safety Officer for an environmental assessment of a commercial property. This site was found to have subsurface soil contamination related to underground storage tanks that had been removed several years previously.
- Project Manager for numerous asbestos building inspections (over 500 buildings). Building blueprints and architect specifications were reviewed, a thorough visual inspection was conducted and bulk samples of suspected materials were obtained for analysis. Upon request, an O&M Plan was also prepared.
- Prepared Health and Safety Plan for a major soil remediation project for the Southern Pacific Railroad Yard in Sacramento. The primary contaminants were lead and organic solvents.

Robert Castaneda

## EXPERTISE

Site Superintendent  
Quality Control Management  
Underground Construction  
Site Safety Officer

UST & AST Removal and Installation  
Site Restoration  
General Construction  
Soil & Water Sample Collection

## PROFESSIONAL EXPERIENCE

Mr. Castaneda has over 16 years experience in the construction industry and over seven years in hazardous waste operations. Mr. Castaneda has extensive experience in the removal and installation of underground and aboveground storage tank systems; underground construction, including utilities, concrete vaults, and retaining walls; all types of poured in place concrete projects; projects which included specialty trades; and demolition. Mr. Castaneda has extensive experience working at hazardous waste sites where both EPA level B and C personal protective equipment was utilized. He has also been involved in projects where asbestos abatement was required and has demonstrated a working knowledge of asbestos air monitoring techniques.

## EDUCATION

San Jose State - Industrial Psychology Major

Diablo Valley College - Instructor in CPR & First Aid

## SPECIALIZED TRAINING

Hazardous Waste Operation Certificate per 29 CFR 1910.120

Asbestos Abatement Certificate

Qualified Instructor in Hazardous Waste Operations & Asbestos Abatement

Red Cross First Aid Trained

CPR Trained

Qualified Instructor in First Aid And CPR



Robert Castaneda Resume Cont.

EMPLOYMENT HISTORY

- 1993 - Present      **Health & Safety Officer / Quality Control Inspector- Remedial Constructors, Inc.**  
As Site Specific Safety and Health Officer and Site Specific Quality Control Inspector, Mr. Castaneda has a working knowledge of all applicable federal, state and local safety and health laws, regulations and guidelines. He has specialized training in personal respiratory safety equipment and in the proper use of air monitoring equipment, air sampling methods and interpretation of the results. Mr. Castaneda also is a heavy equipment operator involved in underground storage tank removal and installation. Mr. Castaneda has been the site specific safety and health officer and/or the site specific quality control inspector on over ten projects since he has joined RCI. Clients include the Corps of Engineers, NASA, Caltrans and numerous consulting firms and private industry projects.
- 1988 - 1993      **Instructor - Labor Training Center**  
Mr. Castaneda was responsible for instructing, testing and certifying all qualified individuals in Hazardous Material Handling and Asbestos in accordance with The State of California. While at the Labor Training Center, Mr. Castaneda was responsible for the establishment and direct supervision of health and safety procedures in accordance with Federal Regulations on numerous hazardous waste and / or asbestos projects. Clients included the State of California and numerous consulting and private industry firms.
- 1983 - 1988      **Installer- Operator - Teichert Construction**  
Mr. Castaneda's duties at Teichert included laying underground piping, heavy equipment operation, material assessment, and site restoration which included laying asphalt.
- 1980 -1983      **Safety Coordinator - Ledbetter & Sons**  
As safety coordinator Mr. Castaneda was responsible for all aspects of safety and health including implementing and enforcing site specific safety and health plans and insuring proper use of safety equipment and procedures.

Robert Castaneda Resume Cont.

1976 -1980

**Project Manager - FMC**

Mr. Castaneda was responsible for the asbestos abatement on site at FMC. He was directly responsible for air monitoring and sampling of asbestos dust to insure the health of all the employees on site.

Herman Dobkins

#### **EXPERTISE**

Project Management  
Quality Control Management  
Removal & Installation of Roofing Systems  
General Construction

#### **PROFESSIONAL EXPERIENCE**

Mr. Dobkins has 35 years experience in general construction including over 25 years in the removal and installation of roofing systems. He also has extensive experience in commercial and tilt-up buildings; repair and maintenance projects; projects involving specialty skills and trades; and demolition.

#### **EDUCATION**

High school graduate - Berkeley, MO - St. Louis County

#### **LICENSES**

California Class "B" General Contractors License

#### **SPECIALIZED TRAINING**

Hazardous Waste Operation Certificate per 29 CFR 1910.120

Red Cross First Aid Trained - Santa Clara County

Herman Dobkins Resume Cont.

**EMPLOYMENT HISTORY**

- 1993 - Present      **Senior Project Manager / Quality Control Manager - Remedial Constructors, Inc.**  
Responsible for overseeing all phases of construction on general construction and roofing projects including but not limited to; demolition, ordering supplies, coordinating deliveries, inspections of material and construction activities as well as supervising the new construction.
- 1990 - 1993      **Managing Partner - Dobkins Construction**  
Mr. Dobkins was responsible for overseeing the construction of commercial buildings, custom homes and the installation of modular homes including but not limited to, pouring the foundation, installation and hook-up of sewer and electrical service.
- 1987 - 1990      **Owner - Dobkins Commercial Building Repair**  
Responsibilities included coordinating with property managers to develop a general building maintenance plan, inspections of existing building conditions, roof inspections, earthquake inspections as well as the new work by other building contractors. Mr. Dobkins also oversaw a roof maintenance program for property owners and was on call to make any emergency roof repairs.
- 1976 - 1987      **T.J. Project Manager - S.K. Brown Construction Co.**  
Responsible for renovations to commercial buildings; ordering supplies, coordinating deliveries, as well as coordinating labor force and supervising the new construction.
- 1971 -1976      **Construction Foreman - R.L. Reeves Roofing**  
Supervise roof crews on commercial and public works roofing projects.
- 1968 - 1971      **Construction Supervisor - Haring Roofing**  
Supervise roof crews on commercial, public works and residential roofing projects.
- 1966 - 1968      **Foreman - R.C. Brown Roofing**  
Supervise small crew during composition roofing applications.

Kevin Hoang  
Quality Assurance/Quality Control Officer

EDUCATION:

M.S. Chemistry (In Progress), University of California, Los Angeles  
B.S. Biochemistry, 1984, University of California, Los Angeles

EMPLOYMENT HISTORY:

1992 - Present	QA/QC Officer, CKY Inc.
1990 - 1992	Organic Chemist, CKY Inc.
1984 - 1990	Research Assistant, University of California, L.A.

SUMMARY OF EXPERIENCE:

Mr. Hoang has nine years of laboratory/research experience that involved the use of various analytical instruments such as GC, GC/MS, NMR, IR and UV. He also has extensive experience in wet chemistry techniques. As a Research Assistant, his projects involved sample preparation, including extraction, sonification and digestion.

As an Organic Chemist at CKY, Mr. Hoang is responsible for sample preparation (extraction and clean-up) for GC/MS samples as well as analyzing samples by EPA Methods 8240/624 and 8270/625. He has two years experience in performing and reviewing data generated under EPA Contract Laboratory Program (CLP Protocol). He has been responsible for implementation of the QA/QC program since 1992.

Recently, Mr. Hoang's responsibilities expanded to include quality control management of laboratory procedures and data reporting. In this capacity he is responsible for overseeing the quality control measures guiding sample receiving, sample transfer, sample analysis and equipment control, data reporting and data archiving. He updates and analyzes all QA/QC data, noting any trends or aberrations and makes the necessary recommendations to correct the situation.

Mr. Hoang maintains up-to-date standard operating procedures and QA plans; coordinates system and performance audits to monitor completeness and effectiveness of the QA program. He also supports laboratory manager, supervisor, group leaders and analysts in addressing quality and/or training in their area of operation.

**AFFIRMATION & TAILGATE  
SAFETY MEETING  
SHEETS**

REMEDIAL  
CONSTRUCTORS,  
INC.

# Tailgate Safety Meeting

Job Name: \_\_\_\_\_

Meeting Date: \_\_\_\_\_

Job Number: \_\_\_\_\_

Accidents Since Last Meeting:

Hazards Discussed:

Main Topic of Discussion:

Supervisor: \_\_\_\_\_

Safety Rep: \_\_\_\_\_

Personnel in Attendance (Please Print Name)

_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

Note: Additional names and comments on reverse side.

Comments:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Number of Personnel Absent: \_\_\_\_\_

Project Manager/Supervisor Signature: \_\_\_\_\_





# HOSPITAL MAP

81 0

TANK 79-3  
2000 GAL GAS  
UGT TO BE REMOVED

TANK 79-2  
750 GAL GAS  
UGT TO BE REMOVED

TANK 79-1  
750 GAL GAS  
UGT TO BE REMOVED

T-12

T-10

T-16

B-63

TANK 77-1

EXISTING 20,000  
DIESEL ABOVE ( )  
TANKS TO REMA

TANK 77-2

TANK 6-1  
EXISTING 2,206 GA  
UST TO BE REMOV

PG  
6

B-74

B-30

EUCALYPTUS ROAD

Hospital  
Location

MAGNOLIA LANE

FG  
7

SWALLOW AVENUE

TANK 88-1  
1000 GALLON DIESEL  
UGT TO BE REMOVED

LAWN

PEPPERTREE DRIVE

B-88

TANK 62-1  
2,000 GALLON DIE  
TO BE CLOSED IN

TANK 62-2  
5,000 GALLON DIESEL  
TO BE CLOSED IN PLACE

TANK 64-1  
560 GAL UGT  
TO BE REMOVED

PG  
9

TANK 62-3  
INSTALL  
REMOTE FILL  
PORT

PG  
4

T34

B-64

B-62

T23

# **MSDS SHEETS**

GASOLINE

MATERIAL SAFETY DATA SHEET

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Prepared by Envirologic Data  
Portland, ME (207) 773-3020  
May 1985

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EMERGENCY TELEPHONE NUMBER: Massachusetts Poison Information Center  
Boston, MA 1-800-682-9211

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SECTION I. IDENTIFICATION

Material Name: Gasoline

Synonyms: Petrol, motor spirits, benzin.

CAS No.: 8006-61-9

Molecular Formula:  $C_5H_{12}$  to  $C_9H_{20}$

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SECTION II. FIRST AID PROCEDURES AND EMERGENCY TREATMENT

In all cases of poisoning, follow standard procedures for poison management, first aid, and cardiopulmonary resuscitation. Whenever transporting a poisoned person to a hospital, bring the container, label, or other information concerning the product (without delaying transport) to assist medical personnel with diagnosis and treatment. Four different routes of exposure and their respective first aid/poison managements are outlined below:

Ingestion:

- o Dilute the poison by offering and encouraging the person to drink one or two glassfuls of water or milk. Do not use carbonated fluids. Do not attempt to make the person vomit.
- o Call the Massachusetts Poison Information Center (1-800-682-9211). If you cannot reach the Poison Information Center, call or take the person to the nearest hospital emergency department.
- o Notify your supervisor or health and safety officer of this or any poison exposure.

Inhalation:

- o Stop exposure by moving person from contaminated area to clean air area.
- o Call the Massachusetts Poison Information Center (1-800-682-9211).
- o Have someone call a rescue unit or medical professional.
- o If necessary, transport person to an emergency medical facility promptly.

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Skin:

- o Wash off skin immediately with a large amount of water; use soap if available.
- o Remove any contaminated clothing and rewash skin.
- o Call the Massachusetts Poison Information Center (1-800-682-9211).
- o Transport person to a medical facility as necessary.

Eyes:

- o Gently rinse eye immediately, using large amounts of water, for fifteen minutes, if possible, with eyelids held open.
- o If possible, have person remove contact lenses if worn; never permit the eyes to be rubbed.
- o Call the Massachusetts Poison Information Center (1-800-682-9211).
- o Transport person to an emergency medical facility promptly as necessary.

SECTION III. ACUTE TOXICITYELD Rating:

(Oral Toxicity): 2

Toxic Effect Levels:Inhalation man LC<sub>50</sub> 900 ppm (for 1 h)Inhalation mammal LC<sub>50</sub> 30,000 ppm (for 5 min)Signs and Symptoms

Ingestion: Burning of mouth, throat and stomach, inebriation, vomiting, dizziness, fever, drowsiness, confusion. Aspiration during vomiting may cause accumulation of fluid in the lungs, rapid breathing or death.

Inhalation: Burning of nose and throat, drowsiness, dizziness, nausea, numbness, headache, inebriation, central nervous system depression.

Skin: Itching, burning, irritation, blistering.

Eyes: Irritation.

Exposure Limits

OSHA Standard(s): None

NIOSH Recommended Limit(s): None

ACGIH Recommended Limit(s): 300 ppm, 8-h TLV-TWA

500 ppm, STEL

SECTION IV. LONG-TERM ORGANISM THREAT POTENTIALCarcinogenicity

IARC, NTP/NCI, CAG, RTECS: No indication of carcinogenic effects was found in standard references.

Mutagenicity

IARC, RTECS: No indication of mutagenic effects was found in standard references.

Teratogenicity

IARC, RTECS: No indication of teratogenic effects was found in standard references.

Reproductive Effects

IARC, RTECS: No indication of reproductive effects was found in standard references.

SECTION V. CHRONIC TOXICITY

Repeated or prolonged exposure may cause drying, dermatitis, and allergic sensitivity.

SECTION VI. PHYSICAL DATA

Molecular weight: Not available

Boiling Point (at 760 mm Hg): 38-204°C (100-400°F)

Melting Point (at 760 mm Hg): Not available

Vapor Pressure (mm Hg) [at -12.6°C (9.32°F)]: 100

Vapor Density (Air=1): 3-4

Specific Gravity (water=1): 0.8

Percent Volatile By Volume: - 100

Evaporation Rate (butyl acetate =1): 1.1+

Solubility in Water: Insoluble

Solvent Solubility: Soluble in absolute alcohol, ether, chloroform, benzene.

Appearance and Odor: Clear volatile liquid with characteristic odor.

SECTION VII. FIRE AND EXPLOSION HAZARD DATA

Flash Point (Method Used): -43 to -38°C (-45 to -36°F) (Closed cup)

Extinguisher Media: Dry chemical, carbon dioxide, foam.

	Lower	Upper
<u>Flammable Limits in Air, percent by vol.:</u>	1.4	7.6

Autoignition Temperature: 280-456°C (536-853°F)

NFPA Fire Hazard: 3

Special Fire Fighting Procedures: Firefighters should wear self-contained breathing apparatus with full facepiece operated in positive pressure mode and full protective clothing.

Unusual Fire and Explosion Hazards: HIGHLY FLAMMABLE. Fumes may travel great distances to source of ignition and flash back.

SECTION VIII. REACTIVITY DATA

Stability: Stable in closed containers at room temperature under normal storage conditions.

MFPA Reactivity: 0

Incompatibilities (Materials to Avoid): Strong oxidizing agents.

Hazardous Decomposition Products: When heated to decomposition may release toxic vapors and gases of hydrocarbons, carbon monoxide, and carbon dioxide.

Hazardous Polymerization: Does not occur.

## SECTION IX. SPILL, LEAK OR DISPOSAL PROCEDURES

Actions To Take in Case of Spills or Leaks: Restrict from areas of spills or leaks persons not wearing protective equipment and clothing. Eliminate sources of ignition. Ventilate area. Inform supervisor or health and safety officer of any spill or leak. While protecting against eye and skin contact and inhalation of vapors, contain spill. Prevent leakage into confined spaces or sewer drains. Where feasible, absorb liquid with vermiculite, sand, or other non-combustible absorbent material. Collect in suitable container and cover.

Disposal Methods: Federal laws and regulations impose highly specific requirements for disposal of toxic and otherwise hazardous materials. Consult with your supervisor or health and safety officer regarding the proper, legal disposal procedures for this substance. Do not dispose of potentially toxic or otherwise hazardous substances without appropriate authorization. Prior to receiving institutional authorization, it may be necessary to store spilled materials. To do so safely, carefully label containers of materials, store in a cool, dry location, and maintain security of the storage area until official guidance is obtained.

## SECTION X. SPECIAL PROTECTION INFORMATION

Respiratory Protection: Only NIOSH or MSHA approved equipment should be used.

>300 ppm: Organic vapor canister gas mask or supplied air or self-contained respirator with full facepiece.

Ventilation: Provide adequate explosion-proof general ventilation and local exhaust ventilation to meet TLV recommendations.

Protective Clothing or Equipment:

- o To prevent repeated or prolonged skin contact with liquid chemicals, use impervious clothing, gloves, face shields (eight-inch minimum), splash-proof safety goggles, and other appropriate protective clothing.
- o Place clothing contaminated with liquids in closed containers for storage until clothing can be discarded or decontaminated. If the clothing is to be laundered or otherwise cleaned to remove the chemical, the person(s) performing the operation should be informed of the chemical's hazardous properties and of ways to minimize exposure.
- o A safety shower should be provided within the immediate work area for emergency use where liquids may contact the employee's body.
- o An eyewash fountain should be provided within the immediate work area for emergency use where liquids may contact the employee's eyes.

## SECTION XI. SPECIAL PROCEDURES AND PRECAUTIONS

Procedures and Precautions to be Taken in Handling and Storing: Store in closed containers in cool, dry, well-ventilated area away from heat,

sources of ignition, and oxidizing agents. Do not smoke in areas of handling and storage. Electrically bond and ground containers for transfers to prevent sparks.

Other Precautions: Wash hands before eating, smoking or using toilet facilities. Contact lenses should not be worn when working with this chemical.

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DISCLAIMER: This document is based upon information obtained from numerous sources. Every reasonable effort has been made to provide reliable data and information; however, Envirologic Data cannot assume responsibility for the quality or validity of laboratory studies or other data reported in the literature or for the consequences of their use.

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ENVIROLOGIC DATA



# MATERIAL SAFETY DATA SHEET

GENIUM PUBLISHING CORPORATION  
1145 CATALYN STREET  
SCHENECTADY, NY 12303-1836 USA  
(518) 377-8855



NO. 470

DIESEL FUEL OIL NO. 2-D

Date October 1981

## SECTION I. MATERIAL IDENTIFICATION

**MATERIAL NAME:** DIESEL FUEL OIL NO. 2-D  
**DESCRIPTION:** Mixture of petroleum hydrocarbons; a distillate oil of low sulfur content  
**OTHER DESIGNATIONS:** ASTM D975, CAS # 068 476 346  
**MANUFACTURER:** Available from many suppliers

## SECTION II. INGREDIENTS AND HAZARDS

	%	HAZARD DATA
Diesel Fuel Oil No. 2-D Complex mixture of paraffinic, olefinic, naphthenic and aromatic hydrocarbons** Sulfur content Benzene***	>95   <0.5 <100 ppm	8-hr TWA 5mg/m <sup>3</sup> * (mineral oil misc)
*Current OSHA standard and ACGIH (1981) TLV		
**Diesel fuels tend to be low in aromatics and high in paraffinics. A min. Cetane No. of 40 is required (ASTM D613).		
***A low benzene level reduces carcinogenic risk. Fuel oils can be exempted under the benzene standard (29 CFR 1910.1028)		

## SECTION III. PHYSICAL DATA

Boiling point range, deg F, ----- Ca 340-675 Specific gravity (H<sub>2</sub>O=1) ----- <0.86  
Solubility in water ----- negligible Cloud point (wax), deg C ----- Ca 0  
Viscosity at 40 C, cSt ----- 1.9-4.1

Appearance and Odor: Clear, bright liquid with a mild petroleum odor.

## SECTION IV. FIRE AND EXPLOSION DATA

Flash Point and Method	Autoignition Temp.	Flammability Limits In Air	
		% by volume	
125F min (PM)	>500F	0.6	7.5

**Extinguishing Media:** Dry chemical, carbon dioxide, foam, water spray. Use a water spray to cool fire exposed containers. Use a smothering technique for extinguishing fire of this combustible liquid. Do not use a forced water stream directly on oil fire as this will only scatter the fire. Material is a OSHA Class II combustible liquid. Firefighters should wear self-contained breathing apparatus and full protective clothing.

## SECTION V. REACTIVITY DATA

This is a stable material in closed containers at room temperature under normal storage and handling conditions. It does not undergo hazardous polymerization. Incompatible with strong oxidizing agents; heating greatly increases fire hazard. Thermal -oxidative degradation may yield various hydrocarbons and hydrocarbon derivatives (partial oxidation products), CO<sub>2</sub> and CO and SO<sub>2</sub>.

GENIUM PUBLISHING

**SECTION VI. HEALTH HAZARD INFORMATION** TLV 5 mg/m<sup>3</sup> oil (mist) (See Sect II)

Inhalation of excessive concentrations of vapor or mist can be irritating to the respiratory passages and can cause the following symptoms: headache, dizziness, nausea, vomiting, and loss of coordination. Prolonged or repeated skin contact may cause irritation of the hair follicles and block the sebaceous glands. This produces a rash of acne pimples and spots, usually on the arms and legs. (Good personal hygiene will prevent this).

Chemical pneumonitis may result when ingestion occurs and oil is aspirated in the lungs.

**FIRST AID:**

Eye Contact: Flush thoroughly with running water for 15 min. including under eyelids.

Skin Contact: Remove contaminated clothing. Wipe excess oil off with a dry cloth. Wash affected area well with soap and water.

Inhalation: Remove to fresh air. Restore and/or support breathing as required.

Ingestion: Do not induce vomiting.

Seek medical assistance for further treatment, observation and support.

**SECTION VII. SPILL, LEAK, AND DISPOSAL PROCEDURES**

Notify safety personnel of leaks or spills. Remove sources of heat or ignition. Provide adequate ventilation. Clean-up personnel to use protection against liquid contact and vapor or mist inhalation. Contain spill by diking. Small spills can be contained by using absorbents, such as rags, straw, polyurethane foam, activated carbon, and sand. Clean up spills promptly to reduce fire or vapor hazards.

**DISPOSAL:** May be disposed of by a licensed waste disposal company, or by controlled incineration or burial in an approved landfill.

Follow Federal, State and Local regulations. Report large oil spills.

**SECTION VIII. SPECIAL PROTECTION INFORMATION**

Provide adequate ventilation where operating conditions (heating or spraying) may create excessive vapors or mists. Use explosion-proof equipment. Provide approved respiratory apparatus for nonroutine or emergency use. Use an approved filter & vapor respirator when vapor/mist concentrations are high. Wear protective rubber gloves and chemical safety glasses where contact with liquid or high mist conc. may occur. Additional suitable protective clothing may be required depending on working conditions. An eye wash fountain and washing facilities to be readily available near handling and use areas.

Laundry soiled or contaminated clothing before reuse (at least weekly laundering of work clothes is recommended).

**SECTION IX. SPECIAL PRECAUTIONS AND COMMENTS**

Store in closed containers in a cool, dry, well-ventilated area away from sources of open flame, heat, strong oxidizing agents, and ignition. Protect containers from physical damage. Use non sparking tools and explosion-proof electrical equipment. Prevent static electric sparks.

Avoid prolonged skin contact and breathing of vapors or mists.

No smoking in areas of use. Follow good hygienic practice in the use of this material.

Do not wear oil contaminated clothing. Do not put oily rags into pockets. Wash exposed skin areas several times a day with soap and warm water when working with this material.

DOT Classification: COMBUSTIBLE LIQUID

DATA SOURCE(S) CODE: 1,6,7,12

APPROVALS: MIS  
CRD *J. M. Miller*

Industrial Hygiene  
and Safety *JW 10-12-81*

MEDICAL REVIEW: 21 October 1981

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MOBIL OIL CORP.  
CHEMICAL NAMES AND SYNONYMS:  
HYDROCARBONS AND ADDITIVES  
DESCRIPTION: FUEL OIL

PRODUCT IDENTIFICATION

DIESEL FUELS

HEALTH EMERGENCY TELEPHONE: (212)883-4411

TRANSPORT EMERGENCY TELEPHONE: (800)424-9300(CHEMTREC)

TYPICAL CHEMICAL AND PHYSICAL PROPERTIES

(FOR ADDITIONAL INFORMATION PLEASE CONTACT YOUR LOCAL MARKETING OFFICE.)

APPEARANCE: CLEAR LIQUID  
COLOR: HYDROCARBON  
RELATIVE DENSITY: 15/4C  
0.82-0.87  
VISCOSITY: AT 100 F, SUS AT 40 C, CST  
31.0-40.0 1.3-1.1  
BOILING RANGE: NO. 1 300-550F SOLUBILITY IN WATER: NEGLIGIBLE  
NO. 2 350-700F  
FLASH POINT: F (C) (ASTH D-93) VAPOR PRESSURE: MM HG 20C  
NO. 1: 100(40) NO. 2: 125(52) 1.0

INGREDIENTS

HAZARDOUS INGREDIENTS	WT PCT (APPROX)	EXPOSURE LIMIT (TWA):		EXPOSURE LIMIT
		MG/M3	PPM	SOURCE
PETROLEUM DISTILLATES	100	575	100	MOBIL RECOMMENDED

NOTE: EXPOSURE LIMITS SHOWN ARE FOR GUIDANCE ONLY. FOLLOW APPLICABLE REGULATIONS.

FLASH POINT: F(C) (ASTH D-93)  
NO. 1: 100(40) NO. 2: 125(-52)  
EXTINGUISHING MEDIA:  
CO2, FOAM, DRY CHEMICAL OR WATER FOG.  
SPECIAL FIRE FIGHTING PROCEDURES:  
FIREFIGHTERS MUST USE SELF-CONTAINED BREATHING APPARATUS.  
IMMEDIATE FIRE AND EXPLOSION HAZARDS:  
MATERIAL IS COMBUSTIBLE.

FLAMMABLE LIMITS:

LEL: NE UEL: NE

NFPA CODES:

HEALTH 0  
FLAMMABILITY 2  
REACTIVITY 0

HEALTH HAZARD SUMMARY

THRESHOLD LIMIT VALUE (IF ESTABLISHED): NO TLV ESTABLISHED. MOBIL RECOMMENDS A TWA EXPOSURE LIMIT OF 100 PPM.

EFFECTS OF OVEREXPOSURE: SLIGHT SKIN IRRITATION. RESPIRATORY IRRITATION, DIZZINESS, NAUSEA, LOSS OF CONSCIOUSNESS. THIS PRODUCT MAY CONTAIN TRACE QUANTITIES OF POLYCYCLIC AROMATIC HYDROCARBONS (PCAH). UNDER CONDITIONS OF POOR PERSONAL HYGIENE AND PROLONGED, REPEATED CONTACT, SOME PCAH HAVE BEEN SUSPECTED AS A CAUSE OF SKIN CANCER IN HUMANS.

EMERGENCY AND FIRST AID PROCEDURES

EYE CONTACT: FLUSH WITH WATER.  
SKIN CONTACT: WASH CONTACT AREAS WITH SOAP AND WATER.  
INHALATION: REMOVE FROM FURTHER EXPOSURE. IF UNCONSCIOUSNESS OCCURS, SEEK IMMEDIATE MEDICAL ASSISTANCE AND CALL A PHYSICIAN. IF BREATHING HAS STOPPED, USE MOUTH TO MOUTH RESUSCITATION.  
INGESTION: DO NOT INDUCE VOMITING. ADMINISTER VEGETABLE OIL. GET MEDICAL ASSISTANCE. (NOTE TO PHYSICIAN: MATERIAL IF ASPIRATED INTO THE LUNGS MAY CAUSE CHEMICAL PNEUMONITIS. TREAT APPROPRIATELY)

REACTIVITY DATA

STABILITY: STABLE CONDITIONS TO AVOID: HEAT, SPARKS, FLAME AND BUILD UP OF STATIC ELECTRICITY.  
INCOMPATIBILITY (MATERIALS TO AVOID): STRONG OXIDIZERS  
HAZARDOUS DECOMPOSITION PRODUCTS: CARBON MONOXIDE (CO) FROM INCOMPLETE COMBUSTION.  
HAZARDOUS POLYMERIZATION: WILL NOT OCCUR CONDITIONS TO AVOID: NA

INFORMATION GIVEN HEREIN IS OFFERED IN GOOD FAITH AS ACCURATE, BUT WITHOUT GUARANTEE. CONDITIONS OF USE AND SUITABILITY OF THE PRODUCT FOR PARTICULAR USES ARE BEYOND OUR CONTROL; ALL RISKS OF USE OF THE PRODUCT ARE THEREFORE ASSUMED BY THE USER AND WE EXPRESSLY DISCLAIM ALL WARRANTIES OF EVERY KIND AND NATURE, INCLUDING WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE IN RESPECT TO THE USE OR SUITABILITY OF THE PRODUCT. NOTHING IS INTENDED AS A RECOMMENDATION FOR USES WHICH INFRINGE VALID PATENTS OR AS EXTENDING LICENSE UNDER VALID PATENTS. APPROPRIATE WARNINGS AND SAFE HANDLING PROCEDURES SHOULD BE PROVIDED TO HANDLERS AND USERS.

## ENVIRONMENTAL IMPACT:

REPORT SPILLS AS REQUIRED TO APPROPRIATE AUTHORITIES. IN CASE OF ACCIDENT OR ROAD SPILL NOTIFY  
 EMERGENCY (800) 424-7300. U.S. COAST GUARD REGULATIONS REQUIRE IMMEDIATE REPORTING OF SPILLS THAT COULD  
 AFFECT ANY WATERWAY INCLUDING INTERMITTENT DRY CREEKS. COAST GUARD TOLL FREE NUMBER 800-424-2902.

IF MATERIAL IS RELEASED OR SPILLED:

USE SAND OR FIRE RETARDANT TREATED SAND/SLT, DIATOMACEOUS EARTH, ETC. SHOVEL UP AND DISPOSE OF AT AN  
 APPROPRIATE WASTE DISPOSAL FACILITY IN ACCORDANCE WITH CURRENT APPLICABLE LAWS AND REGULATIONS, AND PRODUCT  
 CHARACTERISTICS AT TIME OF DISPOSAL.

## SITE MANAGEMENT:

DISPOSE OF WASTE BY SUPERVISED INCINERATION IN COMPLIANCE WITH APPLICABLE LAWS AND REGULATIONS.

## SPECIAL PROTECTION INFORMATION

PROTECTION: NO SPECIAL EQUIPMENT REQUIRED.

SKIN PROTECTION: IF PROLONGED OR REPEATED SKIN CONTACT IS LIKELY, OIL IMPERVIOUS GLOVES SHOULD BE WORN.  
 GOOD PERSONAL HYGIENE PRACTICES SHOULD ALWAYS BE FOLLOWED.

RESPIRATORY PROTECTION: NO SPECIAL REQUIREMENTS UNDER ORDINARY CONDITIONS OF USE AND WITH ADEQUATE

VENTILATION.

VENTILATION: VENTILATION DESIRABLE AND EQUIPMENT SHOULD BE EXPLOSION PROOF. USE IN WELL VENTILATED AREA.

OTHER: NA

## SPECIAL PRECAUTIONS

STORED MATERIAL MUST BE LABELED AS: COMBUSTIBLE.

STORAGE: STORE IN A COOL AREA.

## TOXICOLOGICAL DATA

ACUTE

ORAL TOXICITY: (RATS)

SLIGHTLY TOXIC (ESTIMATED) -- BASED ON TESTING OF SIMILAR PRODUCTS AND/OR THE COMPONENTS.

DERMAL TOXICITY: (RABBITS)

NONTOXIC (ESTIMATED) -- BASED ON TESTING OF SIMILAR PRODUCTS AND/OR THE COMPONENTS.

INHALATION TOXICITY: (RATS)

SLIGHTLY TOXIC (ESTIMATED) -- BASED ON TESTING OF SIMILAR PRODUCTS AND/OR THE COMPONENTS.

IRRITATION: (RABBITS)

EXPECTED TO BE NON-IRRITATING -- BASED ON TESTING OF SIMILAR PRODUCTS AND/OR THE COMPONENTS.

SKIN IRRITATION: (RABBITS)

MAY CAUSE SLIGHT IRRITATION ON PROLONGED OR REPEATED CONTACT.

BASED ON TESTING OF SIMILAR PRODUCTS AND/OR THE COMPONENTS.

SUBACUTE AND MUTAGENICITY (SUMMARY)

NO INFORMATION AVAILABLE

CHRONIC OR SPECIALIZED (SUMMARY)

THIS PRODUCT MAY CONTAIN TRACE QUANTITIES OF POLYCYCLIC AROMATIC HYDROCARBONS, SOME OF WHICH HAVE  
 BEEN SHOWN TO CAUSE SKIN CANCER IN LABORATORY ANIMALS AFTER PROLONGED, REPEATED SKIN CONTACT.

OTHER DATA

NA

ENVIRONMENTAL AFFAIRS AND TOXICOLOGY DEPT.  
 MANAGER OF PRODUCT SAFETY INFORMATION, PHONE: 609-737-5596

REVISED:

9/1/84

BENZENE

MATERIAL SAFETY DATA SHEET

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Prepared by Envirologic Data  
Portland, ME (207) 773-3020  
September 1984

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EMERGENCY TELEPHONE NUMBER: Massachusetts Poison Information Center  
Boston, MA 1-800-682-9211

---

SECTION I. IDENTIFICATION

Material Name: Benzene

Synonyms: Benzol; phenyl hydride; cyclohexatriene

CAS No.: 71-43-2

Molecular Formula: C<sub>6</sub>H<sub>6</sub>

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SECTION II. FIRST AID PROCEDURES AND EMERGENCY TREATMENT

In all cases of poisoning, follow standard procedures for poison management, first aid, and cardiopulmonary resuscitation. Whenever transporting a poisoned person to a hospital, bring the container, label, or other information concerning the product (without delaying transport) to assist medical personnel with diagnosis and treatment. Four different routes of exposure and their respective first aid/poison managements are outlined below:

Ingestion:

- o Dilute the poison by offering and encouraging the person to drink one or two glassfuls of water or milk. Do not use carbonated fluids. Do not attempt to make the person vomit.
- o Call the Massachusetts Poison Information Center (1-800-682-9211). If you cannot reach the Poison Information Center, call or take the person to the nearest hospital emergency department.
- o Notify your supervisor or health and safety officer of this or any poison exposure.

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ENVIROLOGIC DATA

Inhalation:

- o Stop exposure by moving person from contaminated area to clean air area.
- o Call the Massachusetts Poison Information Center (1-800-682-9211).
- o Have someone call a rescue unit or medical professional.
- o If necessary, transport person to an emergency medical facility promptly.

Skin:

- o If material is a powder, brush away using a cloth.
- o Wash off skin immediately with a large amount of water; use soap if available.
- o Remove any contaminated clothing and rewash skin.
- o Call the Massachusetts Poison Information Center (1-800-682-9211).
- o Transport person to a medical facility as necessary.

Eyes:

- o Gently rinse eye immediately, using large amounts of water, for fifteen minutes, if possible, with eyelids held open.
- o If possible, have person remove contact lenses if worn; never permit the eyes to be rubbed.
- o Call the Massachusetts Poison Information Center (1-800-682-9211).
- o Transport person to an emergency medical facility promptly as necessary.

SECTION III. ACUTE TOXICITY

<u>ELD Rating</u>	Oral human TD <sub>LO</sub>	130 mg/kg
<u>(Oral Toxicity): 2</u>	Inhalation human LC <sub>LO</sub>	20,000 ppm for 5 min
	Inhalation human TC <sub>LO</sub>	100 ppm
	Unknown* man LD <sub>LO</sub>	194 mg/kg
	Oral rat LD <sub>50</sub>	4,894 mg/kg
	Oral mouse LD <sub>50</sub>	4,700 mg/kg

\*Exposure route not reported

Signs and Symptoms

Ingestion: Irritation of mouth, throat, and stomach. See inhalation for other symptoms.

Inhalation: Lethargy, headaches, decreased cell counts, bronchitis, pneumonia, and collapse.

Skin: Irritation

Eyes: Irritation

Exposure Limits

OSHA Standard(s): 10 ppm, 8-h TWA  
25 ppm, Ceiling  
50 ppm, Peak 10 min in any 8 h

NIOSH Recommended Limit(s): 10 ppm, Ceiling in 1 h

ACGIH Recommended Limit(s): 10 ppm, 8-h TLV-TWA  
25 ppm, STEL

SECTION IV. LONG-TERM ORGANISM THREAT POTENTIALCarcinogenicity

IARC: Limited evidence of carcinogenic effects in animals. Sufficient evidence of carcinogenic effects in humans.

NTP/NCI: NTP/NCI has reported carcinogenic effects.

CAG: CAG has reported carcinogenic effects.

RTECS: Carcinogenic by RTECS criteria based on cases of leukemia in humans and rats. Carcinogenic by RTECS criteria in mice.

Mutagenicity

IARC: Not mutagenic in bacteria, yeast, insects, or mouse lymphoma cells. Chromosomal anomalies in humans, rats, and mice were observed.

RTECS: Positive mutagenic responses in bacteria, mice, rats, and rabbits were observed. DNA damage and chromosomal breaks in humans were observed.

Teratogenicity

IARC: Tail abnormalities, cleft palate, and absence of the lower jaw were defects observed in mice. Brain and skeletal defects in rats were observed. Other studies did not show teratogenic effects.

RTECS: Abnormalities of the musculoskeletal system and other effects on the newborn were observed in rats and mice.

Reproductive Effects

IARC: Alteration of estrus cycles in rats was observed. Increased testicular weight and degeneration of the seminiferous tubules in rats, guinea pigs, and rabbits were observed. Fetotoxicity in rats and mice were observed.

RTECS: Fetotoxicity, post-implantation mortality, and extra embryonic structures in rats and mice were observed. Pre-implantation mortality, fetal death, and other fetal effects in mice were observed.

SECTION V. CHRONIC TOXICITY

Appetite loss, weight loss, fatigue, muscle weakness, headaches, dizziness, nervousness, irritability, anemia, irreversible blood changes, and damage to the heart and liver.

SECTION VI. PHYSICAL DATA

Molecular weight: 78.12

Boiling Point (at 760 mm Hg): 80°C (176°F)

Melting Point (at 760 mm Hg): 5.5°C (42°F)

Vapor Pressure (mm Hg) [at 20°C (68°F)]: 74.6

Vapor Density (Air=1): 2.77

Specific Gravity (water=1): 0.879

Percent Volatile By Volume: 100

Evaporation Rate (butyl acetate =1): 1

Solubility in Water: Soluble

Solvent Solubility: Miscible with alcohol, chloroform, ether, carbon disulfide, carbon tetrachloride, glacial acetic acid, acetone, oils.

Appearance and Odor: Clear, colorless, flammable liquid with an odor threshold of 5 ppm.

SECTION VII. FIRE AND EXPLOSION HAZARD DATA

Flash Point (Method Used): -11°C (12°F) (closed cup)

Extinguisher Media: Water fog, carbon dioxide, dry chemical, foam

Flammable Limits in Air, percent by vol.: 

	Lower	Upper
	1.3	7.1

Autoignition Temperature: 80°C (176°F)

NFPA Fire Hazard: 3

Special Fire Fighting Procedures: Use blanketing technique to smother fire. Water stream will scatter fire. Water spray may be used to cool fire-exposed containers. Firefighters should wear self-contained breathing apparatus and protective clothing.Unusual Fire and Explosion Hazards: Explosive and flammable mixtures with air may be formed at room temperature. In a fire situation it is a severe explosion hazard. Vapors may flow a distance along surfaces to ignition sources and flash back.SECTION VIII. REACTIVITY DATAStability: Stable under normal conditions of handling and storage.

NFPA Reactivity: 0

Incompatibilities (Materials to Avoid): Strong oxidizers such as ozone, permanganate, sulfuric or nitric acids, potassium peroxide, and sodium peroxide.Hazardous Decomposition Products: Oxides of carbon and nitrogenHazardous Polymerization: Does not occurSECTION IX. SPILL, LEAK OR DISPOSAL PROCEDURESActions To Take in Case of Spills or Leaks: Restrict from areas of spills or leaks persons not wearing protective equipment and clothing. Eliminate sources of ignition. Ventilate area. Inform supervisor or health and safety officer of any spill or leak. While protecting against eye and skin contact and inhalation of vapors, take the following steps:

- o Solid: Shovel or sweep solid into suitable container, and cover.
- o Liquid: Contain spill. Prevent leakage into confined spaces or sewer drains. Where feasible, absorb liquid with paper towels, vermiculite, sand, or other non-combustible absorbent material. Collect in suitable container and cover.
- o Gas: Ventilate area to keep gas concentration below flammability limit. Stop the gas flow. If leak cannot be stopped, move container to safe place in open air and allow to empty.

Disposal Methods: Federal laws and regulations impose highly specific requirements for disposal of toxic and otherwise hazardous materials. Consult with your supervisor or health and safety officer regarding the proper, legal disposal procedures for this substance. Do not dispose of potentially toxic or otherwise hazardous substances without appropriate



authorization. Prior to receiving institutional authorization, it may be necessary to store spilled materials. To do so safely, carefully label containers of materials, store in a cool, dry location, and maintain security of the storage area until official guidance is obtained.

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#### SECTION X. SPECIAL PROTECTION INFORMATION

Respiratory Protection: Only NIOSH or MSIA approved equipment should be used. Minimum respiratory equipment required for vapor:

≤50 ppm: For short periods, canister or cartridge type respirators with full facepiece.

For emergencies or when concentration is unknown, self-contained breathing apparatus should be used.

Ventilation: Provide general and local exhaust ventilation to comply with TLV requirements.

Protective Clothing or Equipment:

- o To prevent repeated or prolonged skin contact with liquid and solid chemicals, use impervious clothing, gloves, face shields (eight-inch minimum), splash-proof safety goggles, and other appropriate protective clothing.
  - o Place clothing contaminated with liquids or solids in closed containers for storage until clothing can be discarded or decontaminated. If the clothing is to be laundered or otherwise cleaned to remove the chemical, the person(s) performing the operation should be informed of the chemical's hazardous properties and of ways to minimize exposure.
  - o A safety shower should be provided within the immediate work area for emergency use where liquids may contact the employee's body.
  - o An eyewash fountain should be provided within the immediate work area for emergency use where liquids or solids may contact the employee's eyes.
- 

#### SECTION XI. SPECIAL PROCEDURES AND PRECAUTIONS

Procedures and Precautions to be Taken in Handling and Storing: Store in well-ventilated area away from oxidizing agents and sources of heat and ignition.

Other Precautions: Use extreme caution when handling this chemical. It has been shown to cause cancer in humans. Do not smoke in areas of use.

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DISCLAIMER: This document is based upon information obtained from numerous sources. Every reasonable effort has been made to provide reliable data and information; however, Envirologic Data cannot assume responsibility for the quality or validity of laboratory studies or other data reported in the literature or for the consequences of their use.

## TOLUENE

## MATERIAL SAFETY DATA SHEET

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Prepared by Envirologic Data  
Portland, ME (207) 773-3020  
Revised September 1986

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EMERGENCY TELEPHONE NUMBER: Pittsburgh Poison Information Center  
Children's Hospital of Pittsburgh  
Pittsburgh, PA (1-412--581-6669)

---

SECTION I: IDENTIFICATION

Material Name: Toluene

CAS No.: 108-88-3

Synonyms: Toluol; methylbenzene; methacide; phenylmethane; methylbenzol

Molecular Formula:  $C_6H_5CH_3$

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SECTION II. FIRST AID PROCEDURES AND EMERGENCY TREATMENT

In all cases of poisoning, follow standard procedures for poisoning, first aid, and cardiopulmonary resuscitation. Whenever transporting a poisoned person to a hospital, bring the container, label, or other information concerning the product (without delaying transport) to assist medical personnel with diagnosis and treatment. Four different routes of exposure and their respective first aid/poison managements are outlined below:

Ingestion:

- o Dilute the poison by offering and encouraging the person to drink one or two glassfuls of water or milk. Do not use carbonated fluids. Do not attempt to make the person vomit.
- o Call the Pittsburgh Poison Information Center (1-412-681-6669). If you cannot reach the Poison Information Center, call or take the person to the nearest hospital emergency department.
- o Notify your supervisor or health and safety officer of this or any poison exposure.

Inhalation:

- o Stop exposure by moving person from contaminated area to clean air area.

- o Call the Pittsburgh Poison Information Center (1-412-681-6669).
- o Have someone call a rescue unit or medical professional.
- o If necessary, transport person to an emergency medical facility promptly.

Skin:

- o Wash off skin immediately with a large amount of water; use soap if available.
- o Remove any contaminated clothing and rewash skin.
- o Call the Pittsburgh Poison Information Center (1-412-681-6669).
- o Transport person to a medical facility as necessary.

Eyes:

- o Gently rinse eye immediately, using large amounts of water, for fifteen minutes, if possible, with eyelids held open.
- o If possible, have person remove contact lenses if worn; never permit the eyes to be rubbed.
- o Call the Pittsburgh Poison Information Center (1-412-681-6669).
- o Transport person to an emergency medical facility promptly as necessary.

---

SECTION III. ACUTE TOXICITY

Exposure Routes: Primary routes of exposure are via inhalation of vapors and contact with liquid in skin and eyes.

Toxic Effect Levels:

Inhalation human TC <sub>LO</sub>	200 ppm
Inhalation human TC <sub>LO</sub>	100 ppm
Oral rat LD <sub>50</sub>	5,000 mg/kg
Inhalation rat LC <sub>LO</sub>	4,000 ppm (for 4 h)
Inhalation mouse LC <sub>50</sub>	5,320 ppm (for 8 h)

Signs and Symptoms:

Ingestion: Irritation of the digestive tract; central nervous system depression, headache, dizziness, fatigue, muscular weakness, incoordination, collapse and coma.

Inhalation: Headache and slight drowsiness at 100 ppm, fatigue, nausea and itching skin at 100-200 ppm, anesthetic effects and respiratory tract and eye irritation above 200 ppm.

Skin: Irritation.

Eyes: Irritation, reversible corneal burns.

Exposure Limits:

<u>OSHA standard(s):</u>	200 ppm, 8-h TWA
	300 ppm, Ceiling
	500 ppm, Peak for 10 min
<u>NIOSH recommended limit(s):</u>	100 ppm, TWA
	200 ppm, Ceiling for 10 min
<u>ACGIH recommended limit(s):</u>	100 ppm, 8-h TLV-TWA
	150 ppm, STEL

---

SECTION IV. LONG-TERM ORGANISM THREAT POTENTIAL

Carcinogenicity

IARC, NTP/NCI, CAG, RTECS: No indication of carcinogenicity was found in standard references.

Mutagenicity

IARC: IARC Monographs have not reported mutagenic effects.

RTECS: Positive mutagenic responses were observed in bacteria and in rat cells

Teratogenicity

IARC: IARC Monographs have not reported teratogenic effects.

RTECS: Developmental abnormalities in the musculoskeletal system of rats and in the craniofacial region of mice have been observed.

Reproductive Effects

IARC: IARC Monographs have not reported reproductive effects.

RTECS: Fetotoxicity was observed in rats and mice, and fetal death was observed in mice.

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SECTION V. CHRONIC TOXICITY

Possible dermatitis, drying, and cracking of the skin may result from repeated or prolonged skin contact. Liver and kidney injury may occur after prolonged exposure.

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SECTION VI. PHYSICAL DATA

Molecular weight: 92.1

Boiling Point (at 760 mm Hg): 110.6°C (231°F)

Melting Point (at 760 mm Hg): -95°C (-139°F)

Vapor Pressure (mm Hg) [at 20°C (68°F)]: 22

Vapor Density (Air=1): 3.14

Specific Gravity (water=1): 0.866

Percent Volatile By Volume: 100

Evaporation Rate (butyl acetate =1): 2.24

Solubility in Water: 0.05 g/100g of water, at 20°C (68°F)

Solvent Solubility: Soluble in acetone, miscible in absolute alcohol, ether, and chloroform.

Appearance and Odor: Water white liquid with a characteristic aromatic odor, whose recognition threshold (unfatigued) is 2-5 ppm (100 percent of test panel). Odor detection is unsatisfactory for safety because of fatigue.

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SECTION VII. FIRE AND EXPLOSION HAZARD DATA

Flash Point (Method Used): 4°C (40°F) (closed cup)

Extinguisher Media: CO<sub>2</sub>, dry chemical, foam, water fog.

Flammable Limits in Air, percent by vol.: 

	Lower	Upper
	1.27	7.1

Autoignition Temperature: 480°C (896°F)

NFPA Fire Hazard: 3

Special Fire Fighting Procedures: Self-contained breathing apparatus and eye protection should be worn.

Unusual Fire and Explosion Hazards: At room temperature toluene emits vapors that can form flammable mixtures with air. When exposed to heat and flame it is a dangerous fire hazard and a moderate explosion

hazard. Vapors can flow along surfaces to distant ignition sources, then flash back.

---

### SECTION VIII. REACTIVITY DATA

Stability: Stable under normal storage conditions and handling.

NFPA Reactivity: 0

Incompatibility (Materials to Avoid): Strong oxidizing agents, sparks or open flames. Nitric acid and toluene, especially when combined with sulfuric acid, will produce nitrated compounds which are dangerously explosive.

Hazardous Decomposition Products: Oxides of carbon and nitrogen.

Hazardous Polymerization: Does not occur.

---

### SECTION IX. SPILL, LEAK OR DISPOSAL PROCEDURES

#### Actions To Take in Case of Spills or Leaks:

Restrict from areas of spills or leaks persons not wearing protective equipment and clothing. Eliminate sources of ignition. Ventilate area. Inform supervisor or health and safety officer of any spill or leak. While protecting against eye and skin contact and inhalation of vapors, take the following steps:

- o Liquid: Contain spill. Prevent leakage into confined spaces or sewer drains. Where feasible, absorb liquid with vermiculite, sand, or other non-combustible absorbent material. Contaminated absorbent material should be stored away from sources of heat and ignition.
- o Vapor: Ventilate area to keep vapor concentration below lower flammability limit.

#### Disposal Methods:

- o Small quantities: dispose of absorbed material, i.e. vermiculite, dry sand, earth or a similar material in a secured sanitary landfill or atomize in a suitable combustion chamber.
  - o Large quantities: dispose via a licensed waste disposal company. Follow federal, state and local regulations.
- 

### SECTION X. SPECIAL PROTECTION INFORMATION

Respiratory Protection: Only NIOSH or MSHA approved equipment should be used. Minimum respiratory protection required for vapor:

>200 and ≤500 ppm: Chemical cartridge respirator with organic vapor cartridge(s); or supplied air respirator; or self-contained breathing apparatus.

≤1000 ppm: Chemical cartridge respirator with full face-piece and organic vapor cartridge(s).

≤2000 ppm: Gas mask with chin-style or front- or back-mounted organic vapor canister; or supplied-air respirator with full facepiece, helmet or hood; or self-contained breathing apparatus with full facepiece.

>2000 ppm or entry and escape from unknown concentrations: Self contained breathing apparatus with full facepiece operated in

pressure demand or other positive pressure mode; or combination respirator which includes Type C supplied-air respirator with full facepiece operated in pressure-demand or other positive pressure or continuous-flow mode and auxiliary self-contained breathing apparatus operated in pressure-demand or other positive pressure mode.

Ventilation: Provide general dilution or local exhaust ventilation to comply with OSHA Standards. Ventilation fans and other electrical service must be nonsparking and explosion proof. Exhaust hoods should have >100 LFM face velocity and be designed to capture heavy vapors.

Protective Clothing or Equipment:

- o To prevent repeated or prolonged skin contact with the liquid, use impervious clothing, gloves, face shields, (eight-inch minimum), splash-proof safety goggles, and other appropriate protective clothing.
- o Place clothing contaminated with the liquid in closed containers for storage until it can be discarded or until provision is made for the removal of the chemical from the clothing. If the clothing is to be laundered or otherwise cleaned to remove the chemical, the person performing the operation should be informed of the chemical's hazardous properties and ways to minimize exposure.
- o A safety shower should be provided within the immediate work area for emergency use where liquid may contact the employee's body.
- o An eyewash fountain should be provided within the immediate work area for emergency use where the liquid may contact the employee's eyes.

---

## SECTION XI. SPECIAL PROCEDURES AND PRECAUTIONS

Procedures and Precautions to be Taken in Handling and Storing: Store in cool, clean, well-ventilated area away from sources of heat and ignition and away from oxidizing agents. Use nonsparking tools and safety cans for handling small amounts. Use ground and bond metal containers for liquid transfers to prevent static sparks and protect containers from physical damage.

Other Precautions: Do not wear contact lenses or smoke in areas of storage or use. Avoid contact with skin and eyes. Alcohol use may aggravate the narcotic and blood effects.

---

DISCLAIMER: This document is based upon information obtained from numerous sources. Every reasonable effort has been made to provide reliable data and information; however, Envirologic Data cannot assume responsibility for the quality or validity of laboratory studies or other data reported in the literature or for the consequences of their use.

0066X

# MATERIAL SAFETY DATA SHEET

GENIUM PUBLISHING CORPORATION  
 1146 CATALAN STREET  
 SCHEFFERTOWN, NY 12097-1818 USA  
 (518) 377-8855



GENIUM PUBLISHING CORP.

ETHYL BENZENE

Date August 1975

## SECTION I. MATERIAL IDENTIFICATION

MATERIAL NAME: ETHYL BENZENE  
 OTHER DESIGNATIONS: Phenylethane, Ethylbenzol,  $C_2H_5C_6H_5$ , CAS# 600 109 414  
 MANUFACTURER: Available from several suppliers.

## SECTION II. INGREDIENTS AND HAZARDS

Ethyl Benzene

ca 100

HAZARD DATA

8-hr TWA 100 ppm<sup>\*</sup>  
  
 Human, Inhalation:  
 TClO 100 ppm for  
 8 hr (irritation)  
 Rat, Oral LD50  
 3500 mg/kg

\*Current OSHA permissible exposure level. A standard was proposed by OSHA in October 1975 which includes an action level of 50 ppm, and detailed requirements of monitoring, medical surveillance, employee training, etc.; when exposure exceeds 50 ppm. It has not yet issued as a legal requirement.

## SECTION III. PHYSICAL DATA

Boiling point at 1 atm, deg C	-- 136	Specific gravity 20/40	----- 0.867
Vapor pressure at 25.9 C, mm Hg	- 10	Volatiles, %	----- ca 100
Vapor density (Air=1)	----- 3.66	Evaporation rate (BuAc=1)	----- <1
Water solubility at 20 C Wt. %	- 0.014	Melting point, deg C	----- -35
		Molecular weight	----- 106.16

Appearance & Odor: Clear, colorless liquid with an aromatic hydrocarbon odor.

## SECTION IV. FIRE AND EXPLOSION DATA

LOWER UPPER

Flash Point and Method	Autoignition Temp.	Flammability Limits in Air	LOWER	UPPER
59 F (15 C) (closed cup)	810 F (432 C)	Volume %	1.0	6.7

Extinguishing media: Carbon dioxide, dry chemical or "alcohol" foam. A water spray may be ineffective to put out fire, but may be used to cool fire-exposed containers. A stream of water can spread fire of burning liquid. This is a flammable liquid (OSHA Class IB) which can readily form explosive mixtures with air, especially when heated. Heavier-than-air vapors can flow along surfaces to reach distant ignition sources, and then flash back. Firefighters should use self-contained breathing equipment and eye protection to fight fires in enclosed places.

## SECTION V. REACTIVITY DATA

This material is stable in storage in closed containers at room temperature. It does not polymerize. This flammable material should be kept separated from oxidizing agents, strong acids and bases and ammonia. Thermal-oxidative degradation can produce toxic products, including carbon monoxide.

**SECTION VI. HEALTH HAZARD INFORMATION**

TLV 100 ppm

Excessive exposure to vapors will irritate the eyes and mucous membranes of the upper respiratory tract. Sustained high levels can produce headache, depression of the central nervous system, narcosis and coma.  
 Liquid contact is irritating to the eyes and irritation and defacing to the skin, leading to dermatitis on prolonged or repeated exposures. Ingestion may lead to aspiration of liquid into the lungs. Small amounts of aspirated ethyl benzene cause extensive edema and hemorrhage of lung tissue. FIRST AID:

Eye contact: Wash eyes well with plenty of running water. Get medical help if irritation persists.

Skin contact: Wash exposed areas of skin. Promptly remove contaminated clothing.

Inhalation: Remove victim to fresh air. Restore breathing if necessary. Get medical help for serious exposure.

Ingestion: Get prompt medical help! (The danger of aspirating ethyl benzene into the lungs indicates medical direction before inducing vomiting.)

**SECTION VII. SPILL, LEAK, AND DISPOSAL PROCEDURES**

Personnel involved in leak or spill control and clean-up must use protective equipment to avoid inhalation of vapors and contact with liquid. Eliminate ignition sources. Provide maximum explosion-proof ventilation.

Pick-up spilled material for recovery or disposal. Absorb with sand, etc. for disposal in a sanitary landfill or use paper towels or cloths for burning. Water can be used to flush liquid away from sensitive areas to special catch basins or ground, but not to sewer or surface water.

DISPOSAL: Scrap material can be burned in approved incinerators in accordance with Federal, State and local regulations.

**SECTION VIII. SPECIAL PROTECTION INFORMATION**

Provide explosion-proof general and local exhaust ventilation to meet TLV requirements. Approved respirators must be available for non-routine or emergency use. A full face respirator with organic vapor cartridge can be used up to 1000 ppm; a gas mask with organic vapor canister can be used up to 5000 ppm; a self-contained respirator is needed for high and unknown concentrations of vapor.

Use impervious gloves and clothing and a face shield to prevent repeated or prolonged contact with the liquid. Where splashing is possible chemical goggles should be used. Clothing contaminated with ethyl benzene should be promptly removed and not reused until free of the contaminant.

Exposures above the action level, liquid contact, or working where fire and explosion hazards exist may require instituting employee training, medical surveillance, vapor concentration monitoring, record keeping, etc. when the proposed standard issues.

**SECTION IX. SPECIAL PRECAUTIONS AND COMMENTS**

Store this material in tightly closed containers in cool, well-ventilated areas, away from oxidizing agents, heat and sources of ignition. Use non-sparking tools around this material. Containers must be electrically bonded and grounded for transfers of liquid. Use safety cans for small amounts. No Smoking! where this material is stored or used.

Screen workers for history of kidney, liver, skin and lung problems which could give increased sensitivity and risk in ethyl benzene exposure.

Avoid breathing of vapors and contact with liquid. Do not ingest. Chronic properties are not fully known; use with care.

DATA SOURCE(S) CODE: 2-9, 11, 12

APPROVALS: MIS, CRD	<i>[Signature]</i>
Industrial Hygiene and Safety	<i>[Signature]</i>
Corporate Medical Staff	<i>[Signature]</i>



XYLENE

MATERIAL SAFETY DATA SHEET

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Prepared by Enviologic Data  
Portland, ME (207) 773-3020  
Revised January 1986

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EMERGENCY TELEPHONE NUMBER: Pittsburgh Poison Information Center  
Children's Hospital of Pittsburgh  
Pittsburgh, PA 1-412-681-6669

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SECTION I. IDENTIFICATION

Material Name: Xylene  
Synonyms: Dimethylbenzene; xylol  
CAS No.: 1330-20-7  
Molecular Formula:  $C_6H_4(CH_3)_2$

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SECTION II. FIRST AID PROCEDURES AND EMERGENCY TREATMENT

In all cases of poisoning, follow standard procedures for poison management, first aid, and cardiopulmonary resuscitation. Whenever transporting a poisoned person to a hospital, bring the container, label, or other information concerning the product (without delaying transport) to assist medical personnel with diagnosis and treatment. Four different routes of exposure and their respective first aid/poison managements are outlined below:

Ingestion:

- o Dilute the poison by offering and encouraging the person to drink one or two glassfuls of water or milk. Do not use carbonated fluids. Do not attempt to make the person vomit.
- o Call the Pittsburgh Poison Information Center (1-412-681-6669). If you cannot reach the Poison Information Center, call or take the person to the nearest hospital emergency department.
- o Notify your supervisor or health and safety officer of this or any poison exposure.

Inhalation:

- o Stop exposure by moving person from contaminated area to clean air area.
- o Call the Pittsburgh Poison Information Center (1-412-681-6669).
- o Have someone call a rescue unit or medical professional.
- o If necessary, transport person to an emergency medical facility promptly.

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Skin:

- o If material is a powder, brush away using a cloth.
- o Wash off skin immediately with a large amount of water: use soap if available.
- o Remove any contaminated clothing and rewash skin.
- o Call the Pittsburgh Poison Information Center (1-412-681-6669).
- o Transport person to a medical facility as necessary.

Eyes:

- o Gently rinse eye immediately, using large amounts of water, for fifteen minutes, if possible, with eyelids held open.
- o If possible, have person remove contact lenses if worn: never permit the eyes to be rubbed.
- o Call the Pittsburgh Poison Information Center (1-412-681-6669).
- o Transport person to an emergency medical facility promptly as necessary.

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SECTION III. ACUTE TOXICITY

Exposure Routes: The primary routes of exposure are inhalation of vapor and direct skin or eye contact with the liquid.

Toxic Effect Levels:

Inhalation human TC <sub>LO</sub>	200 ppm
Inhalation man LC <sub>LO</sub>	10,000 ppm (for 6 h)
Oral rat LC <sub>50</sub>	4,300 mg/kg
Inhalation rat LC <sub>50</sub>	5,000 ppm (for 4 h)

Signs and Symptoms

Ingestion: Burning sensation in the mouth and throat. Other symptoms are the same as those for inhalation (see below), except that lung congestion will not usually develop.

Inhalation: Irritation of the eyes, nose, and throat. At concentrations above 200 ppm nausea, vomiting, abdominal pain, dizziness, staggering, drowsiness, severe breathing difficulties, and unconsciousness may occur. Vapor levels above 200 ppm may have an anesthetic effect.

Skin: Irritation and defatting.

Eyes: Irritation at concentrations of 200 ppm.

Exposure Limits

<u>OSHA Standard(s):</u>	100 ppm, 8-h TWA (skin)*
<u>NIOSH Recommended Limit(s):</u>	100 ppm, 8-h TWA 200 ppm, Ceiling (for 10 min)
<u>ACGIH Recommended Limit(s):</u>	100 ppm, 8-h TLV-TWA 150 ppm, STEL

\*Skin absorption may contribute to overall exposure.

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SECTION IV. LONG-TERM ORGANISM THREAT POTENTIAL

Carcinogenicity

IARC, NTP/NCI, CAG, RTECS: No indication of carcinogenic effects was found in standard references.

Mutagenicity

IARC: IARC Monographs have not reported mutagenic effects.  
RTECS: Mutagenic response in yeast.

Teratogenicity

IARC: IARC Monographs have not reported teratogenic effects.  
RTECS: Teratogenic effects in mice and rats.

Reproductive Effects

IARC: IARC Monographs have not reported reproductive effects.  
RTECS: Reproductive effects in mice.

SECTION V. CHRONIC TOXICITY

Reversible damage to the kidneys and liver may occur from exposure to high concentrations.

SECTION VI. PHYSICAL DATA

Molecular weight: 106.2

Boiling Point (at 760 mm Hg): 144.4°C (292°F) (o)\*  
138.9°C (282°F) (m)\*  
138.3°C (281°F) (p)\*

Melting Point (at 760 mm Hg): -25°C (-12°F) (o)  
-48°C (-54°F) (m)  
13°C (55°F) (p)

Vapor Pressure (mm Hg) [at 20°C (68°F)]: 7(o), 9(m), 9(p)

Vapor Density (Air=1): 3.7

Specific Gravity (water=1): 0.88(o), 0.86(m), 0.86(p), mixture about 0.86

Percent Volatile By Volume: ~ 100

Evaporation Rate (butyl acetate =1): 0.7 (o, m, p)

Solubility in Water: 0.00003 g/100 g of H<sub>2</sub>O, at 20°C (68°F) (o, m, p).

Solvent Solubility: Miscible with absolute alcohol, ether, and other organic liquids.

Appearance and Odor: Colorless or light colored aromatic liquid with an unperfumed odor threshold of 0.3 ppm in air. Para-xylene may be a crystal at low temperatures.

\*o = ortho isomer, m = meta isomer, p = para isomer

SECTION VII. FIRE AND EXPLOSION HAZARD DATA

Flash Point (Method Used): 27.2 to 32°C (81 to 90°F) (closed cup)

Extinguisher Media: Foam, carbon dioxide, dry chemical.

	Lower	Upper
<u>Flammable Limits in Air, percent by vol.</u> : 1.0 to 1.1	6	7

Autoignition Temperature: 465 to 530°C (869 to 986°F)

NFPA Fire Hazard: 3

Special Fire Fighting Procedures: Firefighters should use self-contained breathing apparatus with a full facepiece operated in pressure-demand or positive-pressure mode.

Unusual Fire and Explosion Hazards: When exposed to heat or flame, xylene is a significant fire and explosion hazard. Vapors may travel a distance along surfaces to ignition sources and then flash back.

## SECTION VIII. REACTIVITY DATA

Stability: Stable in closed containers at room temperature.

NFPA Reactivity: 0

Incompatibilities (Materials to Avoid): Can form explosive mixtures with air. Xylene should be kept away from sources of heat and ignition and strong oxidizing agents.

Hazardous Decomposition Products: Degradation in air due to heat may yield toxic vapors and gases, including carbon monoxide and oxides of nitrogen.

Hazardous Polymerization: Does not occur.

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## SECTION IX. SPILL, LEAK OR DISPOSAL PROCEDURES

Actions To Take in Case of Spills or Leaks: Restrict from areas of spills or leaks persons not wearing protective equipment and clothing. Eliminate sources of ignition. Ventilate area. Inform supervisor or health and safety officer of any spill or leak. While protecting against eye and skin contact and inhalation of vapors, take the following steps:

- o Solid: Shovel or sweep solid into suitable container, and cover.
- o Liquid: Contain spill. Prevent leakage into confined spaces or sewer drains. Where feasible, absorb liquid with paper towels, vermiculite, sand, or other non-combustible absorbent material. Collect in suitable container and cover.

Disposal Methods: Federal laws and regulations impose highly specific requirements for disposal of toxic and otherwise hazardous materials. Consult with your supervisor or health and safety officer regarding the proper, legal disposal procedures for this substance. Do not dispose of potentially toxic or otherwise hazardous substances without appropriate authorization. Prior to receiving institutional authorization, it may be necessary to store spilled materials. To do so safely, carefully label containers of materials, store in a cool, dry location, and maintain security of the storage area until official guidance is obtained.

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## SECTION X. SPECIAL PROTECTION INFORMATION

Respiratory Protection: Only NIOSH or MSHA approved equipment should be used. Minimum respiratory equipment required for vapor:

>100 and ≤1,000 ppm: Chemical cartridge respirator with full facepiece and organic vapor cartridge(s).

≤5,000 ppm: Gas mask with chin-style or front- or back-mounted organic vapor canister; or supplied-air respirator with full facepiece, helmet, or hood; or self-contained breathing apparatus with full facepiece.

≤10,000 ppm: Type C supplied-air respirator with full facepiece operated in pressure-demand or other positive pressure mode or with full facepiece, helmet or hood operated in continuous-flow mode.

>10,000 ppm or entry and escape from unknown concentrations:  
Self-contained breathing apparatus with full facepiece operated in pressure-demand or other positive pressure mode; or combination respirator including Type C supplied-air respirator with full facepiece operated in pressure-demand or other positive pressure or continuous-flow mode and auxiliary self-contained breathing apparatus operated in pressure-demand or other positive pressure mode.

Ventilation: Provide general and local exhaust ventilation to comply with OSHA standards. For exhaust hood, use >100 fpm face velocity.

Protective Clothing or Equipment:

- o To prevent repeated or prolonged skin contact with liquid and solid chemicals, use impervious clothing, gloves, face shields (eight-inch minimum), splash-proof safety goggles, and other appropriate protective clothing.
- o Place clothing contaminated with liquids or solids in closed containers for storage until clothing can be discarded or decontaminated. If the clothing is to be laundered or otherwise cleaned to remove the chemical, the person(s) performing the operation should be informed of the chemical's hazardous properties and of ways to minimize exposure.
- o A safety shower should be provided within the immediate work area for emergency use where liquids may contact the employee's body.
- o An eyewash fountain should be provided within the immediate work area for emergency use where liquids or solids may contact the employee's eyes.

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SECTION XI. SPECIAL PROCEDURES AND PRECAUTIONS

Procedures and Precautions to be Taken in Handling and Storing: Store in a well-ventilated area in closed containers away from sources of heat and ignition and strong oxidizing agents. Protect containers from physical damage. Electrically ground metal containers when transferring liquid. Detached storage is preferable.

Other Precautions: Do not smoke in areas of use or storage. Wash hands before eating, smoking, or using toilet facilities.

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DISCLAIMER: This document is based upon information obtained from numerous sources. Every reasonable effort has been made to provide reliable data and information; however, Envirologic Data cannot assume responsibility for the quality or validity of laboratory studies or other data reported in the literature or for the consequences of their use.

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# **ACCIDENT PREVENTION PROGRAM**

**REMEDIAL CONSTRUCTORS, INC.**

**ACCIDENT PREVENTION PROGRAM**

COMPANY SAFETY INFORMATION SUPPLEMENTAL TO THIS PROGRAM:

US Army Corps of Engineers "Safety and Health Requirements Manual", EM 385-1-1, October 1992.

CAL OSHA "Construction Safety Orders" as published and updated by Building News, Inc., Los Angeles, and amendments as issued.

Remedial Constructors, Inc. CODE OF SAFE PRACTICES

**CODE OF SAFE PRACTICES**

A copy of the Remedial Constructors, Inc. Code of Safe Practices shall be posted in a conspicuous location at each job site/office, and be provided to each employee.

**SAFETY PROGRAM OBJECTIVES**

This Accident Prevention Program is established in order to exercise all available means of eliminating or controlling hazards and thus (a) minimize personal injuries and property loss; (b) achieve greater efficiency and; (c) reduce direct and indirect costs.

Effectiveness of the Accident Prevention Program will depend upon the active participation and wholehearted cooperation of supervisors and employees, and the coordination of their efforts in carrying out the following basic procedures:

Plan all work to minimize personal injury, property damage and loss to productive time.

Maintain a system of prompt detection and correction of unsafe practices and conditions.

Establish and conduct an educational program to stimulate and maintain interest and cooperation of all employees through:

1. Safety Meetings
2. Investigation of all accidents to determine cause and to take necessary corrective action.
3. Use of personal protective equipment and mechanical guards.

Require the contractor and each subcontractor's Superintendent and job foreman to be familiar with all applicable statutes and regulations pertaining to safety in the operations to be performed.

## **SAFETY COMMITTEE**

A Safety Committee shall be appointed to coordinate and implement the safety program which has been approved by management.

## **RESPONSIBILITY OF MANAGEMENT**

Has full responsibility for safety.

Holds executives responsible for the safety of all employees.

Authorizes necessary expenditures for safety.

Approves safety policies as formulated by Safety Committee and others.

Participates in the safety program as recommended by Safety Committee.



## MANAGEMENT SUPERVISORS

The effectiveness of any safety program rests in the hands and cooperation of the supervisors. Management expects all supervisors to support the safety program by:

Enforcing company safety policy in their work areas.

Cooperation with management and other supervisors in maintaining safe working conditions at all times.

Practicing safety personally, thus setting a good safety example.

Watching for unsafe conditions and acting immediately to correct any hazards.

Investigating all accidents to determine cause and to take necessary corrective action.

Complete accident and injury reports.

Conduct safety meetings prior to job starting, discussing particular hazards of their job and any accidents which have occurred. Participation of all employees is essential. Every effort should be made to promote employee interest and participation in the safety program.

Plan all work to minimize personal injury, property damage and production loss.

Inform General Superintendent, or other management personnel as appropriate, of safety problems.

Conduct a safety meeting with their foreman at least once each month to discuss safety problems and accidents that have occurred.

Correcting any deficiencies found by the equipment operators inspection.

Reports of all job safety meetings shall be forwarded to secretary of the Safety Committee.

## NEW EMPLOYEE SAFETY INDOCTRINATION

All new employees shall receive safety indoctrination pertaining to the particular hazards of their job assignment and to general safety hazards. New employees shall be given a copy of the Remedial Constructors, Inc. Code of Safe Practices to read and instructed to report all injuries, however slight, to their immediate supervisor. Supervisors shall follow up safety indoctrination with periodic safety checks.

### SUMMARY OF SAFETY MEETINGS

Location	Minimum Frequency	In Attendance	Conducted By
Job Site	Start of Job	All Employees	Supervisor/ Foreman

A report shall be made of all safety meetings. Copies of these reports shall be sent to the Secretary of the Safety Committee. Reports of all industrial accidents or injuries must be reported to an immediate supervisor on the day of the accident. Copies of all accident reports shall be forwarded to Secretary of the Safety Committee. The Secretary shall be notified as soon as possible of any serious accidents. Daily visual inspection of all equipment shall be made by the operator; he shall record any unsafe conditions and notify the foreman and job superintendent. These reports shall be sent to the supervisor who, in turn, will send copies to the Safety Committee.

Forms are required to be posted or available if needed immediately at each job site.

List of emergency telephone number, including names of doctors.

Code of Safe Practices

OSHA poster - Safety & Health Protection on the job.

Notice of compensation carrier.

Each job site shall have available:

1. Approved first aid kits regularly inspected
2. Trained first aid personnel
3. A letter basket
4. Fire Extinguishers

Job sites where posters cannot be hung, will be available in the main office. All emergency numbers, First Aid kits, Fire Extinguishers shall be carried by the Supervisor/Foreman at the job site.

# Code of Safe Practices

## REMEDIAL CONSTRUCTORS, INC.

### CODE OF SAFE PRACTICES

#### General Work Area / Site Precautions

1. Practice good housekeeping. Keep work site clean and free of debris. Ensure that spilled materials are cleaned up immediately. Maintain clear aisles and/or access to emergency exits and equipment.
2. Report any unsafe conditions/equipment to your supervisor immediately.
3. Report all accidents, incidents, work-related illness or injury, and near misses to your supervisor immediately. Seek medical attention as needed.
4. Maintain access to exits and emergency equipment.
5. Be aware of site specific chemicals. Review Site Specific Safety and Health Plans, and/or MSDS for effects, symptoms, proper PPE, etc.
6. Keep all cuts and abrasions clean, dry, and adequately covered. Skin abrasions must be thoroughly protected to prevent chemicals from penetrating the abrasion. Clean all puncture wounds immediately.
7. Do not wear contact lenses in contaminated atmospheres or in the field. Keep hands away from the face and minimize contacts with chemicals. Practice good personal hygiene.
8. Follow safe practices when performing any task that might result in the agitation or release of chemicals. Store chemicals and wastes according to compatibilities. Never store oxidizers with any other class of chemicals except themselves.

9. Employees shall not smoke during any operation within 50 feet of any work area in which petroleum products or solvents in free-floating, dissolved or vapor forms, or other flammable liquids may be present. No open flame or spark is allowed in any area containing petroleum products, or other flammable liquids.
10. Fire extinguishers with the appropriate extinguishing media shall be present on all sites in designated locations, and on all construction equipment.
11. Keep all potential ignition sources away from and explosive or flammable environment. Only tools and electrical equipment of the non-sparking, explosion-proof type shall be permitted on hazardous waste sites where fire/explosion hazards exist.
12. In the event of fire or other emergency, dial 911 to request specific on site or off site emergency assistance. If 911 services are not available, use site specific emergency notification methods. If evacuation is necessary, notify effected personnel by verbal command or by employee alarm system. Only trained/certified and properly equipped employees shall attempt to respond to fires or other emergencies.
13. Horseplay is not permitted on the site premises.
14. The use of or possession of alcohol, drugs, or other intoxicating substances, and employees under the influence thereof, are not permitted on the site premises. Unless specifically approved by a qualified physician, prescription drugs should not be taken by personnel assigned to hazardous waste operations.
15. Drinking and driving is prohibited at any time. Driving at excessive speeds is always prohibited.
16. Chewing gum or tobacco, drinking, eating, smoking, etc. are not allowed in the exclusion zone of any hazardous waste site. All employees shall wash their hands prior to eating, smoking, or other means of ingestion, and before leaving the exclusion zone at the close of shift.

17. Exercise caution during lifting, bending, twisting, or related activities. Practice safe lifting techniques. Use mechanical aids or get assistance for lifting heavy or awkward objects.
18. Do not enter areas of hazardous operations without knowledge of potential hazards involved, required protective equipment and prior authorization. Coordinate all maintenance jobs with the site supervisor.
19. Exercise caution while walking around equipment, supplies, etc. Identify and/or eliminate slippery site hazards. Correct and/or report all hazards to supervisor.
20. Comply with all procedures, warning and regulatory signs, tags, company policies, rules, and legal requirements.
21. Hazardous operations require the buddy system, i.e., a stand-by safety person.

### **Personal Protective Equipment**

1. Appropriate eye protection, ear protection, gloves, or appropriate chemical or other protective clothing may be required. Personal Protective Equipment (PPE) shall be worn in accordance with the Site Specific Safety and Health Plan or as appropriate.
2. Appropriate foot protection is required. A minimum of steel toe/shank construction boots is required, with boot covers as appropriate.
3. Hard hats are required for overhead hazard exposures.

## Job Task Precautions

1. A competent person shall be responsible for the inspection of all machinery and equipment before placed in use, daily, and during use, to ensure that it is in safe operating condition. Equipment deficiencies observed at any time that effect their safe operation shall be corrected before continuing operation.
2. Machinery or mechanized equipment shall be operated only by designated personnel. Machinery or equipment requiring and operator shall not be permitted to run unattended. Getting on or off any equipment while it is in motion is prohibited.
3. Machinery or equipment shall not be operated in a manner that will endanger persons or property, nor shall the safe operating speeds or loads be exceeded.
4. All machinery or equipment shall be shut down and positive means taken to prevent its operation while repairs or manual lubrications are being done. Exemption: Equipment designed to be serviced while running. All points requiring lubrication during operation shall have fittings so located or guarded to be accessible without hazardous exposure.
5. Bulldozers and scraper blades, end loader buckets, dump bodies, and similar equipment shall be either fully lowered or blocked when being repaired or not in use. All controls shall be in a neutral position, with engine stopped and brakes set, unless work being performed on the machine requires otherwise.
6. Equipment operated on the highway shall be equipped with turn signals visible from the front and rear. When necessary, all mobile equipment and the area in which they are operated shall be adequately illuminated while work is in progress.



7. Mobile type equipment, operating within an off-highway job site open to public, shall have a service brake system and a parking brake system capable of stopping and holding the equipment fully loaded on the grade of operation. The emergency brake system shall automatically stop the equipment upon failure of the service brake system. The system shall manually be operable from the driver's position.
8. Mechanized equipment shall be shut down prior to and during fueling operations. Closed systems, with automatic shutoff which will prevent spillage if connections are broken, may be used to fuel diesel powered equipment left running.
9. Personnel shall not work or pass under the buckets or brooms of loaders in operation.
10. Every bulldozer, scraper, dragline, crane, motor grader, front-end loader, mechanical shovel, backhoe, or similar equipment shall be equipped with at least one dry chemical or carbon dioxide fire extinguisher, having a minimum rating of 5-B:C.
11. All self propelled construction equipment, except light service trucks, panels, pickups, station wagons, crawler cranes, power shovels, and draglines, weather moving alone or in combination, shall be equipped with a reverse signal alarm. The alarm shall be audible and sufficiently distinct to be heard under prevailing conditions. Alarm shall operate automatically upon commencement of backward motion. The alarm shall be continuous or intermittent (not to exceed 3-second intervals) and shall operate during the entire backward movement.
12. A warning device or signal person shall be provided where there is danger to persons from moving equipment, swinging loads, buckets, booms, etc.
13. All belts, gears, shafts, pulleys, sprockets, drums, flywheels, chains, or other reciprocating, rotating or moving parts of equipment shall be guarded when exposed to contact by persons or otherwise create a hazard.

14. No guard, safety appliance, or device shall be removed from machinery or equipment, or made ineffective except for making immediate repairs, lubrications, or adjustments, and then, only after the power has been properly locked and tagged out.
15. Suitable protection against the elements, falling or flying objects, swinging loads, and similar hazards shall be provided for operators of all machinery or equipment. Glass used in windshields or cabs shall be safety glass. Broken glass shall be replaced as soon as possible.

**EXCAVATION  
AND  
TRENCHING PROGRAM**

## Excavation and Trenching Program

### D3.20 Excavation Safety

Excavation safety regulations present a significant challenge for operations within California. Prior to the 1990 Fed-OSHA revision, Cal-OSHA had some of the most stringent excavations standards in the nation. However, the new federal standard (29 CFR 1926.650) presented many discrepancies with the California standard (Title 8 Section 1540). The newly modified Cal-OSHA excavation standard can be found in Title 8 1540-1541.1. Refer to Table D-4 for a California Excavation Checklist.

#### D3.20.1 Definitions

TRENCH - is a narrow excavation made below the surface of the ground. In general, the depth is greater than the width at the bottom, but the width of a trench at the bottom is not greater than 15 ft.

EXCAVATION - A man-made cavity or depression in the earth's surface, including its' sides, walls, or faces formed by the removal of materials, and producing unsupported earth conditions by reason of such removal. If installed forms or similar structures reduce the depth-to-width relationship, the excavation may become a trench.

#### D3.20.2 Factors that influence excavation safety include:

- Traffic
- Nearness of structures and their condition
- Soil type
- Surface and groundwater
- Water table location
- Overhead and underground utilities
- Weather conditions
- Presence of hazardous waste/materials

These and other conditions can be determined by job site studies, observations, test borings for soil type and conditions, and consultations with local officials and utility companies.

Before any excavation begins, the contractor shall determine the estimated location of utilities (sewer, telephone, fuel, gas, electrical, water lines). In addition, the contractor must contact the utility companies, Digsafe, USA Alert, or similar, before excavating.

#### D3.20.3 On the Job Evaluations

The excavation/trenching standard requires that a competent person inspect, on a daily basis, excavations and the adjacent areas for possible cave-ins, failures of protective systems and equipment, hazardous atmospheres, or other hazardous conditions. If any of these conditions are encountered, the exposed employees must be removed from the hazardous area until the necessary safety precautions have been taken. Inspections are also required after natural (i.e. rain) or man-made events (i.e. blasting), that may increase the potential for hazards.

If employees or equipment are required or permitted to cross over an excavation, walkways or bridges with standard guard rails shall be provided.

#### D3.20.4 Cave-In and Protective Support Systems

Excavation workers are exposed to a wide variety of hazards, cave-ins being the chief danger. OSHA requires that in all excavations employees exposed to potential cave-ins must be protected by sloping or benching the sides of the excavation, supporting the sides of the excavation, or placing a shield between the side of the excavation and the work area.

Design of the protective system can be complex because of the number of factors involved. These might include soil classification, depth of cut, water content of the soil, changes due to weather and climate, or other operations in the vicinity. The new Federal standard provides several different methods and approaches (4 for sloping and 4 for shoring, including the use of shields) for

designing protective systems that can be used to provide the required level of protection against cave-ins. These alternatives or options include the following:

*Option 1 - Allowable configurations and slopes*

Excavations shall not be sloped at an angle greater than 1-1/2 horizontal to 1 vertical (34° measured from the horizontal). This 1-1/2:1 sloping requirement does not hold true if one of the other 3 options is utilized.

*Option 2 - Determination of slopes and configuration (using Appendices A & B included in the Federal excavation standard)*

The maximum allowable slope and the allowable configurations for sloping and benching systems, shall be determined in accordance with the conditions and requirements as stated in Appendix A & B. Appendix A involves classifying soils as Type A, B, or C, or a combination of the three. Appendix B involves specifications and configurations for sloping and benching systems.

*Option 3 - Design by using other tabulated data*

Sloping and benching systems can be designed by utilizing other tabulated data such as tables and charts. However, the tabulated data shall be in written form and include the following elements:

- identification of the parameters that affect the selection of a sloping or benching system drawn from the tabulated data;
- identification of the limits of use of the data, to include the magnitude and configuration of slopes determined to be safe;
- explanatory information as may be necessary to aid the user in making a correct selection of a protective system from the data;
- at least one copy of the tabulated data (which identifies the registered engineer who approved the data), shall be kept at the

jobsite during construction of the protective system. After that time the data may be stored off-site but available upon request of the inspector.

*Option 4 - Design by a registered professional engineer*

Sloping and benching systems which do not utilize Options 1, 2 or 3 shall be approved by a registered professional engineer. The design shall be in written form and shall contain at least the following:

- \* the magnitude of the slopes that were determined to be safe for the particular project;
- \* the configurations that were determined to be safe for the particular project;
- \* the identity of the registered professional engineer approving the design.

At least one copy of the engineer's plan must be kept at the work site during construction of the protective system. After that time the data may be stored off-site but will be available upon request of the inspector.

Employees who work within the excavation must be provided with protection systems such as sloping, benching, shoring, bracing, or underpinning to ensure the stability of adjacent structures such as buildings, walls, sidewalks, or pavement. Another form of protection known as a trench box or shield (also known as a welder's hut) can also be utilized as a form of protection. However, this method is known as an alternative protection system and thus, must be approved by a Registered Professional Engineer. In the State of California, that person must be a Registered Civil Engineer.

Excavation shall not be conducted below the level of the base or footing of any foundation or retaining wall unless (1) a support system such as underpinning is provided, (2) the excavation is in stable rock, or (3) a Registered Professional Engineer determines that the structure is sufficiently removed from the

excavation and that excavation will not pose a hazard to employees. Excavations under sidewalks and pavement is also prohibited unless an appropriately designed support system is provided or another effective method is used.

#### D3.20.5 Installation and Removal of Protective Systems

The following procedures are for the protection of employees during installation and removal of protective systems:

- \* Securely connect members of support systems,
- \* Safety install support systems,
- \* Never overload members of support systems, and
- \* Install other structural members to carry loads imposed on the support system when temporary removal of individual members is necessary.

As soon as work in the excavation is completed, the excavation should be backfilled as the protective system is dismantled. After the excavation has been cleared, workers should slowly remove the protective system from the bottom up, taking care to release the system slowly.

#### D3.20.6 Materials and Equipment

The employer is responsible for the safe condition of materials and equipment used for protective systems. Defective and damaged materials and equipment can result in the failure of a protective system and cause excavation hazards.

To avoid the possible failure of a protective system failure, the employer must ensure that (1) materials and equipment are free from damage or defects, (2) manufactured materials and equipment are used and maintained in a manner consistent with the recommendations of the manufacturer and in a way that will prevent employee exposure to hazards, and (3) while in operation, damaged



materials and equipment are examined by a competent person to determine if they are suitable for continued use. If materials and equipment are not safe for use, they must be removed from service. These materials cannot be returned to service without the evaluation and approval of a Registered Professional Engineer.

### D3.20.7 Other Hazards

#### D3.20.7.1 Falls and Equipment

In addition to cave-in hazards and secondary hazards related to cave-ins, there are other hazards from which workers must be protected during excavation-related work. These hazards include: exposure to falls, falling loads, and mobile equipment. To protect employees from these hazards, the employee must take the following precautions:

- \* Keep materials or equipment that might fall or roll into an excavation at least 2 feet from the edge of excavations, or have retaining devices, or both.
- \* Provide warning systems such as mobile equipment, barricades, hand or mechanical signals, or stop logs, to alert operators of the edge of an excavation.
- \* Provide scaling to remove loose rock or soil or install protective barricades and other equivalent protection to protect employees against falling rock, soil or materials.
- \* Prohibit employees from working on faces of sloped or benched excavation at levels above other employees unless employees at lower levels are adequately protected from the hazards of falling, rolling, or sliding material or equipment.
- \* Prohibit employees under loads that are handled by lifting or digging equipment. To avoid being struck by any spillage or falling materials, require employees to stand away from vehicles

being loaded or unloaded. If cabs of vehicles provide adequate protection from falling loads during loading and unloading operations, the operators may remain in them.

#### D3.20.7.2 Water Accumulation

Employees shall not work in excavations where water has accumulated or is accumulating unless adequate protection has been taken. If water removal equipment is used to control or prevent water from accumulating, the equipment and operations of the equipment must be monitored by a competent person to ensure proper use. Diversion ditches, dikes, or other suitable means shall be used to prevent surface water from entering into the excavation and to provide adequate drainage of the area adjacent to the excavation. Also, a competent person must inspect excavations subject to run-offs from heavy rains.

#### D3.20.7.3 Hazardous Atmospheres

A competent person must test excavations greater than 4 feet in depth as well as ones where oxygen deficiency or a hazardous atmosphere exists or could reasonably be expected to exist, before an employee enters the excavation. If hazardous conditions exist, controls such as proper respiratory protection or ventilation must be provided. Also, controls used to reduce atmospheric contaminants to acceptable levels must be tested regularly.

Where adverse atmospheric conditions may exist or develop in an excavation, the employer also must provide and ensure that emergency rescue equipment, (i.e. breathing apparatus, safety harness, lifeline, basket stretcher, etc.) is readily available. This equipment must be attended when used (refer to Confined Space Entry).

#### D3.20.7.4 Access and Egress

Employees working within an excavation must be provided with safe access and egress to all excavations. When an employee is within an excavation 4 feet or greater, adequate means of exit, such as ladders, steps, ramps, or other safe means of egress, must be provided and be within 25 feet of lateral travel. If

being loaded or unloaded. If cabs of vehicles provide adequate protection from falling loads during loading and unloading operations, the operators may remain in them.

#### D3.20.7.2 Water Accumulation

Employees shall not work in excavations where water has accumulated or is accumulating unless adequate protection has been taken. If water removal equipment is used to control or prevent water from accumulating, the equipment and operations of the equipment must be monitored by a competent person to ensure proper use. Diversion ditches, dikes, or other suitable means shall be used to prevent surface water from entering into the excavation and to provide adequate drainage of the area adjacent to the excavation. Also, a competent person must inspect excavations subject to run-offs from heavy rains.

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structural ramps are used as a means of access or egress, they must be designed by a competent person if used for employee access or egress, or a competent person qualified in structural design if used by vehicles.

TABLE D-4  
CALIFORNIA EXCAVATION CHECKLIST

- 1) Prior to beginning an excavation, the location of all underground utilities and other underground hazards shall be determined.
- 2) A hazard assessment shall be conducted by a qualified person to evaluate the potential exposure to employees who may work in or around the excavation.
- 3) The excavation shall also be inspected by a qualified person after each rain or other hazard-increasing event to evaluate the potential hazards from slides or cave-ins.
- 4) Anytime an employee enters an excavation 5 feet or greater in depth, that employee must be protected by a system of shoring, sloping, benching, or alternative means as per the 4 options outlined above.
- 5) The conditions in #4 above will also require the employer to obtain the necessary excavation permit from Cal-OSHA. Two types of permits are available; (1) \$50 per excavation type, (2) \$100 annual permit for entire state. In order to obtain either permit, the employer must fill out the application form, provide Cal-OSHA with the employer's Accident Prevention Program, and pay the fee. This must be conducted every time for the \$50 permit. The \$100 permit has a requirement that the employer contact the closest Regional Cal-OSHA office of the up-coming excavation, protection system utilized, date, located, etc.
- 6) Excavated materials shall be prevented from falling back into the excavation. Spoils should be placed no closer than 2 feet from the edge of the excavation.
- 7) Work which is conducted within the excavation should be under the direct supervision of a qualified person who is capable of modifying the shoring or sloping system.

- 8) A convenient and safe means of egress shall be provided for employees working within an excavation 4 feet deep or greater. This may consist of a stairway, ladder, or ramp located within 25 feet of lateral travel.
- 9) Any employee working in the vicinity of an excavator or other equipment shall not be in a position where that employee might fall into contact with the moving parts of that equipment. Employees shall also be wearing a reflective vest.
- 10) An adequate means of water drainage shall be implemented to reduce the likelihood of run-off entering the excavation. This shall hold true during the rainy season. If the accumulation of water could pose a hazard to employees, the situation should be controlled prior to resumption of operations.
- 11) All shoring systems shall incorporate the soil specification and conditions for that particular site.. The installation of shoring systems shall be conducted in such a way that the employee is properly protected from the potential of cave-ins. Additionally, the removal of the system shall follow the same requirement.
- 12) If the excavation exceeds 20 feet, or if an alternative shoring, sloping, or benching system is utilized, a registered professional engineer shall prepare detailed plans showing the materials and methods to be utilized.
- 13) The detailed plans in #12 above, shall be available for inspection at the site.
- 14) Shoring shall be installed in accordance with GISO 1541.1, Appendices C&D.
- 15) If protective shields, (i.e. trench box or shield) are to be utilized for the protection of employees within an excavation, a registered professional engineer must prepare the necessary calculations and designs prior to the use of such equipment.

## Site Health and Safety Plan

### EMERGENCY PROCEDURES

The following Emergency Response Plan will be implemented to handle unanticipated on-site emergencies prior to start up of hazardous waste operations. All emergency incidents will be dealt with in a manner that minimizes adverse health risks to workers.

#### A. Emergency First Aid Procedures:

Employee injury: When possible, remove the employee from the contaminated zone and conduct decontamination procedures, first aid, and preparation for transport at a safe distance from the work site.

Eye exposure: Wash eyes with large amounts of potable water for at least 15 minutes; lift the upper and lower lids occasionally. Obtain medical attention.

Skin Exposure: Flush the contaminated skin with water for at least 15 minutes. Remove contaminated clothing. Obtain medical attention immediately when exposed to concentrated solids or liquids.

If paramedic/rescue services are required, they will provide transportation to the hospital. For less serious circumstances, the CEC representative will provide transportation.

#### B. Emergency Telephone Numbers:

The emergency telephone numbers are given in the Site Specific Health and Safety Plan.

#### C. CEC will document the emergency situation.

It will include:

- o A description of the incident (including the date and time) that necessitated emergency response procedures and complete an accident/incident investigation or critique of the incident.
- o The date, time, and names of all persons/agencies that were notified and their responses.
- o The resolution of the incident (including its duration) and the method/corrective action involved.

### On-Site First Aid

All CERTIFIED personnel engaged in field activities will have available at the job site the necessary health and safety items. Depending upon the job requirements, these may include the following:.

- o First aid Kit
- o Half Mask respirator
- o Organic vapor or other appropriate cartridges
- o Hard Hat
- o Safety Glasses
- o Hearing protection devices
- o Protective gloves
- o Chemical resistant coveralls (coated Tyvek)



**SITE SPECIFIC  
HEALTH AND SAFETY PLAN  
FOR  
4951 ARROYO ROAD**

I. **Site:** Livermore VA Medical Center, 4951 Arroyo Road, Livermore, CA

II. **Key Personnel and Project Assignments**

<u>PROJECT ASSIGNMENT</u>	<u>NAME/AGENCY</u>	<u>PHONE</u>
Principal Investigator	Stanley L. Klemetson, P.E.	(510) 867-0322
Geologist	James H. Robbins	(707) 745-0171
Project Manager	Stanley L. Klemetson, P.E.	(510) 867-0322
Site Safety Officer	Michael T. Noble, C.I.H.	(510) 867-0322
Owner:	Livermore VA Med Center 4951 Arroyo Road Livermore, CA	(510) 447-2560

III. **Scope of Work**

The purpose of this investigation is to determine if the underground storage tanks behind Building 62 have leaked and contaminated the native soil. Soil borings at the ends of the tanks will be drilled through the sand backfill material and approximately 2 feet into native soil. One soil sample will be obtained from the bottom of each boring. It is not anticipated that groundwater will be reached. The samples will be tested for TPH(D). The goal is to close these two tanks in place without disturbing the electrical power conduits overlying the tanks.

There is no known soil contamination in the work area. There are electrical conduits in the area which have been marked by a locator service.

IV. **Level of Protection**

Level D - Level D is the basic work uniform.

V. Site Security

Only authorized personnel will be permitted within 10 feet of drilling equipment.

VI. EMERGENCY RESPONSE

A. Decontamination procedures for personnel injured or exposed in the work zone:

Assist the injured or exposed worker out of the sampling area when possible. If possible, carefully remove his PPE, and remove your own, according to standard decontamination procedures administer CPR/first aid as needed. Call for medical help immediately.

B. Emergency Response Plan

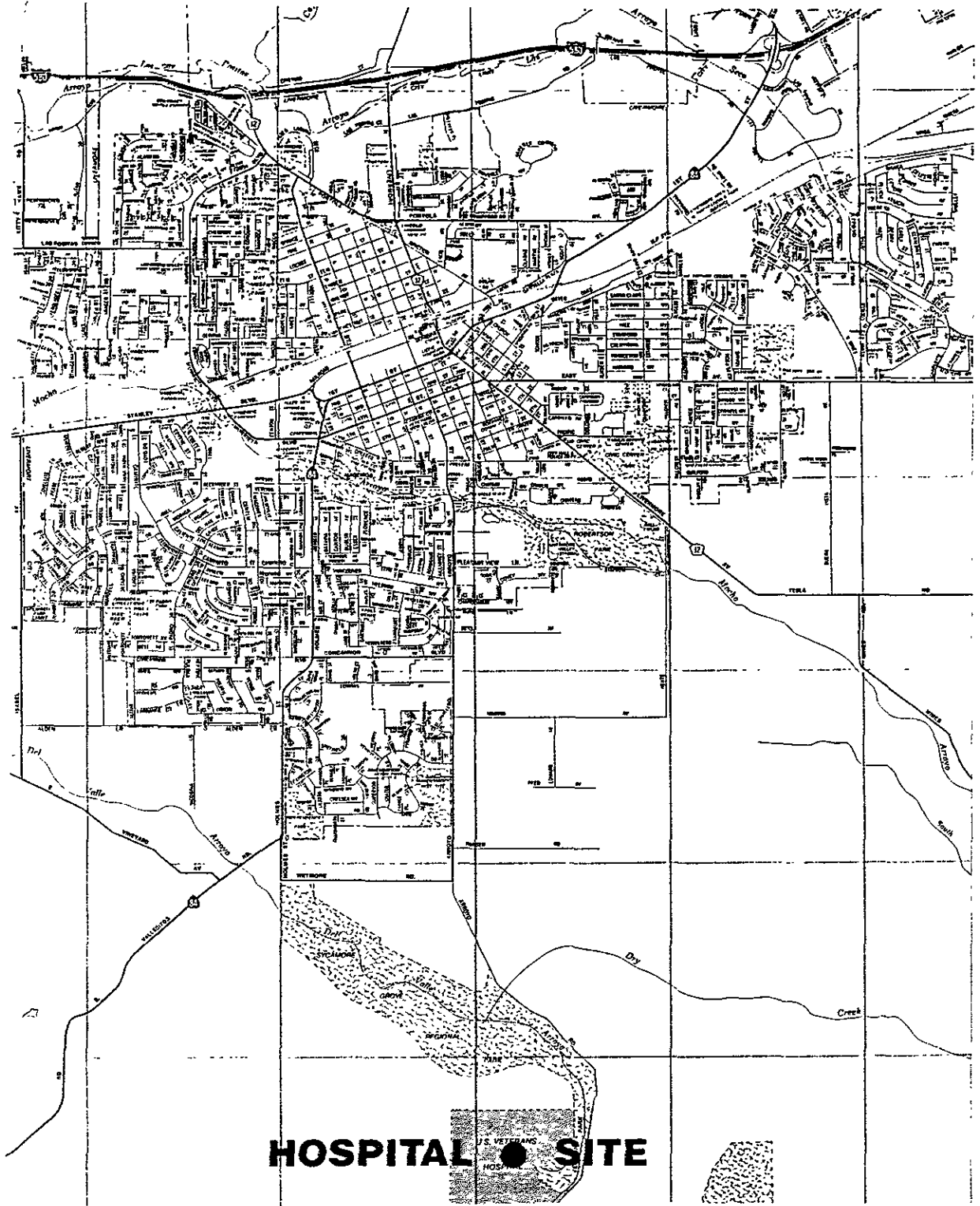
Personnel roles, lines of authority, communications. The on-site CEC representative will have final authority on site health and safety methods concerning sampling.

C. Telephone numbers of emergency agencies, key contractor and responsible party.

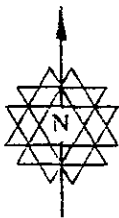
	<u>NAME/AGENCY</u>	<u>TELEPHONE</u>
Ambulance	Livermore	911
Hospital	Livermore VA Med Center 4951 Arroyo Road Livermore, CA	447-2560
Police Department	Livermore	911
Fire Department	Livermore	911
Project Geologist	James H. Robbins	(707) 745-0171 Office (707) 746-7661 Home (707) 423-5434 Pager
Project Manager	Stanley L. Klemetson, P.E.	(707) 745-0171 Office (707) 686-9279 Home (415) 279-6751 Pager
Health/Safety Coordinator	Michael T. Noble	(707) 745-0171

CA Dept. Health Services	DHS	(415) 540-2122
US EPA	Emergency Spills in California	(415) 974-8131
Federal OSHA	OSHA	(800) 648-1003
CHEMTREC	CHEMTREC	(800) 424-9300

(Attached is a map showing the site and the Hospital)



**HOSPITAL ● SITE**



**CERTIFIED**

**VA MED CENTER  
LIVERMORE CA  
SITE & HOSPITAL MAP**

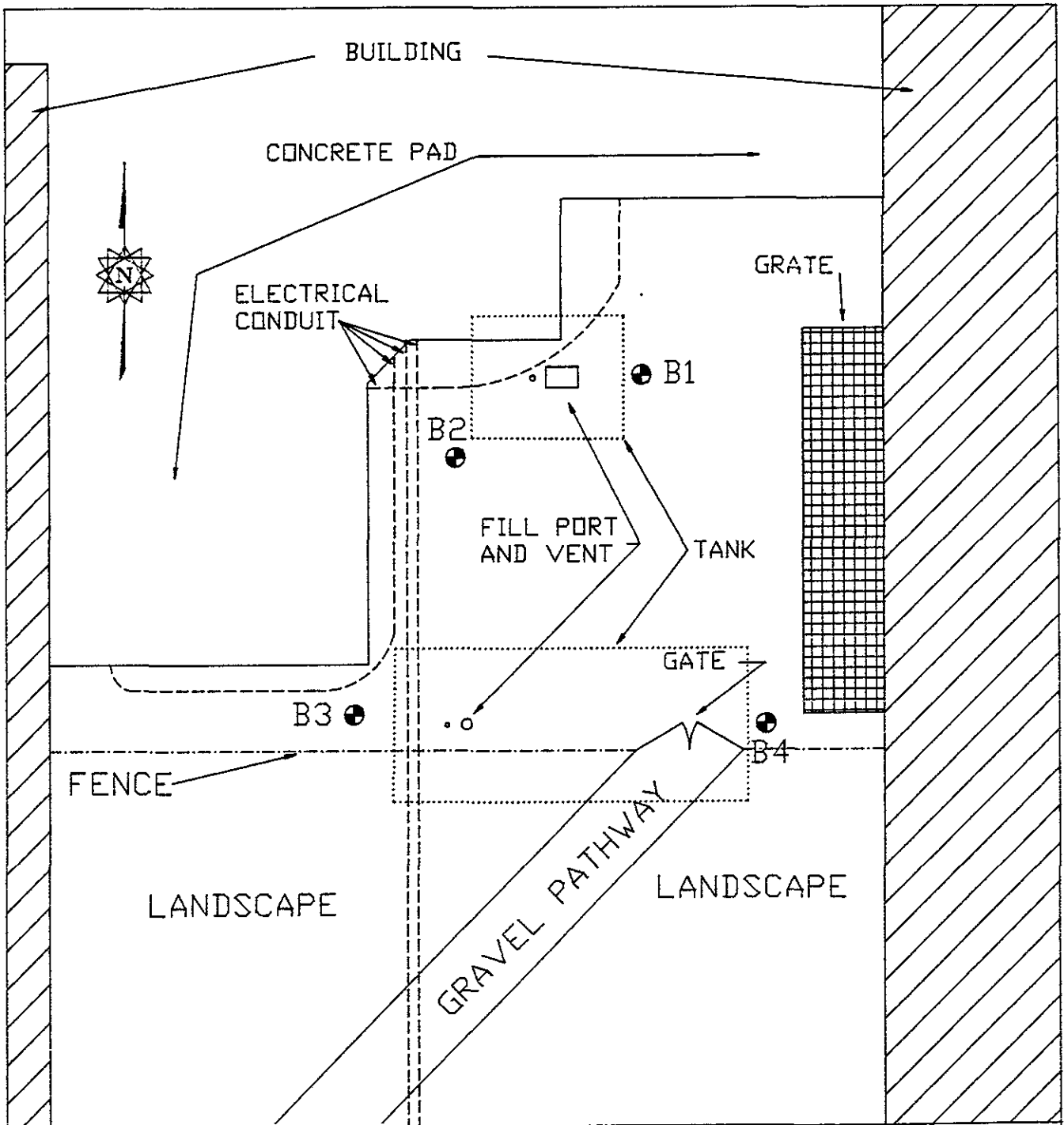


FIGURE 1  
 SITE AND SAMPLE LOCATION MAP  
 BLDG 62 TANKS AT VA LIVERMORE



**CERTIFIED ENVIRONMENTAL CONSULTING**

356 STONE ROAD, SUITE J, BENICIA, CA 94510  
 (707) 745-0171 / (800) 228-0171 / (707) 745-0163 FAX

LEGEND:

