

GEO-ENVIRONMENTAL TECHNOLOGY

GENERAL WORK SITE SAFETY PLAN

INTRODUCTION

The general work site safety plan is to be read by all employees of Geo-Environmental Technology who will be working in the field. The safety procedures outlined in the plan are to be followed at all times while on the job site. Additionally, the safety procedures and precautions stated in the CAL/OSHA references listed at the end of this plan are to be implemented on all jobs.

WORK SITES: Underground tank removals and related remedial work and repairs, soil excavation, tank installations, and service station maintenance and rehabilitation.

SAFETY PLAN OBJECTIVES: To provide pertinent knowledge and accepted safe practice standards for working in the environment of underground storage tanks and related facilities.

HAZARDS

Potential hazards that pose an immediate danger to life and health are as follows. The combination of these conditions may not be immediately obvious or identifiable.

*Chemical Exposure: The following petroleum products and/or potentially hazardous materials are expected to be encountered at the job site: diesel fuel, gasoline fuel, various heating oils, and waste automotive oil. The likely route of exposure to this material is through skin contact and air/vapor inhalation. The overall hazard to chemical exposure is low, requiring EPA protection level equipment of D to C under normal situations.

*Fire and Explosion: Underground storage tanks and their related piping and facilities make a flammable and potentially explosive environment. Sparks from equipment or open flames are direct hazards. The purging of gasoline fumes from an underground tank is a hazardous procedure that demands careful safety precautions and monitoring of low lying areas.

*Oxygen Deficiency: Oxygen deficiency may result from the displacement of oxygen by another gas as during the purging of underground tanks. Confined places or low lying areas are particularly vulnerable to oxygen deficiency. At work sites, less than 19.5% oxygen is considered indicative of oxygen deficiency.

*Safety Hazards: Holes or ditches, sharp objects, slippery surfaces, steep grades, unstable surfaces, and precariously positioned objects can create safety hazards. Any excavation is an inherently hazardous area. The edge of excavations are particularly unstable and hazardous.

*Electrical hazards: Underground work potentially brings workers into the environment of underground electrical utilities. An

effort must be made to locate all underground electrical service prior to the start of work.

PROCEDURE

This general work site safety plan is company policy and shall be implemented on all job sites. Additionally, a specific site safety plan is commonly generated for many jobs. This site specific safety plan will be included in the field work folder. The safety plan is to be read prior to beginning work, with all safety procedures implemented. At the job site, but prior to the start of work, the project manager is to conduct a brief tailgate meeting to discuss the safety plan with all workers. At this time a work zone is established and barricaded as well as posted with signs. Normal protection level D equipment is required of all personnel entering the work area.

If site safety plan requires EPA protection level C equipment, then an exclusion zone is additionally established wherein no worker or personnel may enter without level C protection which includes a full face respirator. During the course of the job unexpected hazards or chemicals may be encountered. Work is to be halted until the hazard is identified and proper safety precautions are implemented, which may include an upgrading of the protection level equipment required.

INSTRUMENTATION: The following instrumentation will be at the site to monitor the air/vapor hazard exposure: A Gastector Hydrocarbon Surveyor; hand air pump with Dragertubes (benzene, toluene, and xylenes). The instrumentation is certified "intrinsically safe" by the manufactures against the initiation of explosion. The componets to be monitored may include: hydrocarbon vapors, LEL%, oxygen, benzene, ethylbenzene, toluene, and xylenes.

MONITORING PROCEDURES Air in and around the work site will be surveyed using the Gastector and SKC/Drager Tubes. Initial surveying of the air will commence prior to the removal of the surface materials to monitor for hydrocarbon vapors, using the Gastector. Additionally, the air is to be monitored upon the excavation of the surface materials, during the excavation of the tank, upon evidence of soil contamination in the excavation (via visual observations or by instrumentation readings), and when an increase in hydrocarbons odors in the work area is noticed, during any phase of the job.

The air is to be additionally monitored for benzene if ambient air hydrocarbon vapors exceed 50 ppm. Toluene, ethylbenzene, and xylenes may also need to be monitored. In addition to the monitoring of the ambient air, specific areas are to also be monitored: the bottom of the excavation or any other "low lying" areas where hydrocarbon vapors can accumulate.

ACTION LEVELS: PEL= permissible 8 hour exposure
hydrocarbon vapor > 300 ppm PEL
LEL > 10 %

ACTION LEVELS:

oxygen	>	19.5 %
benzene	>	10 ppm PEL, 50 ppm ceiling
toluene	>	100 ppm PEL, 500 ppm ceiling
ethylbenzene	>	100 ppm PEL, 150 ppm ceiling
xylenes	>	100 ppm PEL, 300 ppm ceiling

ACTION PROCEDURES: During the normal course of work, EPA protection level D equipment is to be worn. The following procedures are to be taken when PEL's are approached or exceeded: An exclusion zone is established. All personnel in the exclusion zone must wear a half-face respirator. Additionally, if Benzene levels exceed 10 ppm, a full-face respirator must be worn in place of the half-face respirator. If ceiling levels are exceeded, the EPA protection level C equipment is required. All respirators must be NIOSH approved, canister-equipped for all organic vapors up to 1000 ppm. The area is to be continuously monitored while wearing the respirators. If 1000 ppm levels are exceeded, work must stop and not commence until determined safe or EPA protection level B or A equipment is utilized.

Chemical-resistant clothing (coveralls and gloves) must also be worn if skin contact of these materials during the job is prevalent. Workers in the immediate work area must at all times wear cotton coveralls, work gloves and boots, and hard hats. Safety goggles are to be worn if there is a reasonable probability that eye exposure to product is likely. If LEL% is greater than 10 in or around the tank, work must not commence until determined safe and/or LEL% is less than 10. If oxygen levels in the immediate work area are less than 19.5%, work must stop and not commence until determined safe and/or levels are greater than 19.5%.

SYMPTOMS OF ACUTE OVEREXPOSURE: Gasoline and diesel fuel, various heating oils, waste automotive oil, and associated hydrocarbon vapors may be irritating to the skin, eyes, and respiratory tract. Fuel vapors may effect the central nervous system and may cause headaches and dizziness. Oxygen deficiency may cause dizziness.

FIRST AID PROCEDURES:

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

Skin contact: Wash thoroughly with soap and clean water.

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

Ingestion: Do not induce vomiting, call physician immediately.

Oxygen deficiency: Move out of oxygen deficient area into fresh air. Call physician and resuscitate immediately if breathing has stopped.

CANCER HAZARD

Although benzene as a virgin product is not encountered during the normal course of underground tank removal and related service, benzene is a major component of gasoline fuel. The American Conference of Government Industrial Hygienists (ACGIH) suspects benzene of having carcinogenic potential for man. The National Institute for Occupational Safety and Health has identified benzene as a chemical that should be treated as an occupational carcinogen.

SITE AWARENESS

Responsiveness to changing site conditions is essential to recognizing and maintaining proper safety procedures. It is impossible to write a safety plan that covers every possible situation that could be encountered during an underground tank removal. Site workers and supervisors must be continuously alert for new conditions that require increased safety protection.

ADDITIONAL SITE HAZARDS:

- * Explosive vapors can accumulate in isolated areas of the site and within the tank and excavation. Avoid striking the tank or piping at all times. Do not enter excavations greater than five feet in depth without shoring or sloping at any time.
- * Tank tops and plastic sheeting can be slippery; take care when working on top of the tank or plastic sheeting.
- * Use the proper tools and use tools properly. Use tools as to not create sparks.
- * Take care in working in and around the tank excavation; beware of tripping hazards. Keep spoil piles and tools greater than two feet away from the edges of excavations. Do not jump onto the top of exposed tanks.
- * Always look for unknown underground utilities during tank excavation. Use USA Underground Service to search for utilities prior to the start of the excavation.
- * Keep a safe distance from heavy equipment/objects during the excavation activities. Always wear a hard hat on the job site when within the work zone.
- * Be sure that you are in sight of equipment operators while working around heavy equipment. Conduct conversations or small talk outside of the work zone.
- * Limit exposure time to noisy equipment; such as backhoe, pavement breaker, compressor, etc.
- * Inspect soil stability hazards of the tank excavation. If soil stability appears unstable or if personnel must enter an excavation greater than five feet deep, stabilize the excavation by sloping the edge of the excavation to 1:1, shoring, or other

equivalent methods.

ADDITIONAL SAFETY PRECAUTIONS AND PROCEDURES:

* The work zone is to be barricaded and posted with "caution" and "no smoking" signs. G.E.T. project manager is to police area to exclude unauthorized personnel from work zone and to control traffic. Support personnel are to stay out of immediate work area or exclusion area and up wind of work area, and, if required, help to police the area for traffic and public control.

* Tank contents are to be pumped out with less than one inch of residual liquid remaining in the tank. The tank will be purged with sufficient dry ice to inert the tank to less than 10% LEL. During purging of the tank, monitoring of all adjacent low lying areas is to be performed. Fire extinguisher (20 BC rating) and first aid kits must be on site to clean up or contain spills of hazardous materials. In the event of a chemical release, all work must stop until the spill is under control, cleaned up, and/or determined safe to commence work.

* Keep product/contaminated materials from entering into sewer or waterways by constructing dikes. In the event of severe weather conditions (strong winds or rain) stop work and cover exposed excavation and soil with plastic tarp. On hot days, or while wearing chemical resistant clothing, beware of heat stress and drink plenty of liquids. Do not eat or smoke without thoroughly washing hands and face. Upon completion of work, thoroughly wash all exposed skin with soap and water and remove contaminated clothing. No smoking or eating in work area. At all times, try to stay up wing of excavation area and tank.

* If tank excavation is left open, fence or steel plate the excavation. Barricades are adequate temporarily only in an area of limited public access.

SAFETY/EMERGENCY EQUIPMENT LIST:

Site safety plan
Fire extinguisher(s), check if charged
Respirators, full and half face, check fit
Respirator canisters and spare canisters for organic vapors
Safety glasses/goggles
Chemical-resistant coveralls
Chemical-resistant rubber gloves
Chemical-resistant rubber boots
Hard hat
Steel toed boots
Gastechor Hydrocarbon Surveyor
SKC/Drager tube air sampler
First Aid Kit
Eye wash kit
Bush broom
Shovel
3 bags of absorbent
1 55-gallon drum with ring-lock lid
Plastic sheeting

SAFETY/EMERGENCY EQUIPMENT LIST:

Water hose
5-gallon bucket

SITE RESOURCES: To be made available at each job site is electrical power, water, and telephone.

EMERGENCY PHONE NUMBERS:

Fire Dept	911
Ambulance	911
Police	911
Poison control center	415-428-3248
Chem Trec	800-424-9300
EPA emergency response	415-974-7511
Office of Emergency Services	800-852-7550
Emergency Response (Erickson)	415-235-1393
Clean-up (H&H Ship Service)	415-543-4835

EMERGENCY CONTACTS:

GEO-Environmental Technology, Mary Kay	408-559-1220
Stuart Solomon, home phone	408-723-3833
Gary Della Vecchia	on site
Mark Youngkin	on site

REQUIRED REFERENCES TO BE READ BY ALL EMPLOYEES

- 1) United States Environmental Protection Agency (EPA), 1985 Protecting Health and Safety at Hazardous Waste Sites: An Overview, in reference area, read completely
- 2) California Occupational Safety and Health Program (Cal/OSHA), 1986, Cal/OSHA Guide for the Construction Industry, in reference area, read completely
- 3) National Institute for Occupational Safety and Health, 1985, NIOSH Pocket Guide to Chemical Hazards, in reference area, learn how to read required safety equipment and procedures for any chemical hazard