SITE SPECIFIC
HEALTH AND SAFETY PLAN

FOR:

Former Mom's Cleaners Site
Site # 1-52-184
556 Union Boulevard
West Islip, NY 11795

November 5, 2010

PREPARED FOR:

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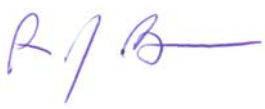

REVIEWED BY: Richard Baldwin
TITLE: Project Manager

APEX PROJECT NO.: 85130.001

The information contained in this HASP is provided for the protection of the health and safety of Apex Companies, LLC personnel and subcontractors working under the direct supervision and control of Apex Companies, LLC on projects involving hazardous waste operations. The information included in this document is designed to identify, evaluate and control safety and health hazards, and provide for emergency response for site activities. This HASP will remain on the project site for reference by workers during each phase of the project. Apex Companies, LLC assumes no liability for, or responsibility to, any other parties for the accuracy or completeness of information included in the HASP or reliance upon this HASP by any other party.

HEALTH AND SAFETY PLAN ACKNOWLEDGEMENT

This form is to be signed by each Apex employee and contractor/subcontractor who will be present during this project. This Health and Safety Plan Acknowledgement must be signed prior to the person commencing work at the project site.

By signing this form, personnel acknowledge that they have read and understand the contents of this Site Specific Health and Safety Plan (HASP) and the hazards associated with the project, the control measures and procedures to follow to protect site personnel, property and the community during the course of this project.

Personnel also understand that on a daily basis, mandatory safety meetings will be held prior to starting the day's activities and attended by all on-site project personnel. Project personnel also acknowledge that they agree to perform all activities in a safe manner in accordance with the HASP. The purpose of the daily tailgate safety meetings is to discuss potential hazards, control measures and other pertinent information needed for communicating potential project hazards of daily activities at the site.

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1.0 INTRODUCTION

This comprehensive Site Specific Health and Safety Plan (HASP) is required for the following types of operations in which employee exposures to safety or health hazards are anticipated as part of Site Characterization (SC) and other related activities to be conducted at the Former Mom's Cleaners Site (hereinafter referred to as the "Subject Property") located at 556 Union Boulevard in West Islip, New York (see ***Figure 1-1***: Site Location Map):

1. Clean-up operations required by a governmental body, which involves hazardous substances that are conducted at uncontrolled hazardous waste sites, including, but not limited to, the EPA's National Priority Site List (NPL), state priority site lists, sites recommended for the EPA NPL, and initial investigations of government identified sites which are conducted before the presence or absence of hazardous substances has been ascertained;
2. Corrective actions involving clean-up operations at sites covered by the Resource Conservation and Recovery Act (RCRA) of 1976;
3. Voluntary clean-up operations at sites recognized by federal, state, local or other governmental bodies as uncontrolled hazardous waste sites;
4. Operations involving hazardous wastes that are conducted at treatment, storage and disposal (TSD) facilities regulated by 40 CFR Parts 264 and 265 pursuant to RCRA, or by agencies under agreement with the USEPA to implement RCRA regulations; and,
5. Emergency response operations for releases of, or substantial threats of releases of, hazardous substances, without regard to the location of the hazard.

2.0 SITE HISTORY AND DESCRIPTION

2.1 Historical Information on Hazardous Material Usage/Disposal at the Site

Apex Companies, LLC (Apex) was retained by Moritt Hock Hamroff & Horowitz, LLP on behalf of Delilah Realty to provide environmental consulting services for the Subject Property located at t 556 Union Boulevard in West Islip, New York. The Subject Property represents a former tenant space on the eastern portion of a strip-mall shopping center known as the Captree Village Shopping Center. According to a New York State Department of Environmental Conservation (NYSDEC) Order on Consent and Administrative Settlement (Order), the Subject Property is currently listed as Site # 1-51-184 in the New York State Registry of Inactive Hazardous Waste Sites. The Subject Property is currently listed as a Class 4 site by the NYSDEC.

It is understood that the NYSDEC is requesting completion of SC activities at the Subject Property based upon the following:

- Groundwater samples collected and analyzed in November of 2009 from two (2) on-site monitoring wells (i.e., MW-6 and MW-9) contained tetrachloroethene (PCE) in exceedance of its New York State Class GA groundwater quality standard of 5.0 micrograms per liter (ug/l); and,

- Due to the presence of shallow groundwater impacted by halogenated volatile organic compounds (VOCs) in the vicinity of the on-site building, there is the potential for soil vapor intrusion (SVI) into the overlying occupied structures.

The Subject Property is currently occupied by several medical facilities on the eastern portion of a multi-tenant, shopping center, but was formerly the location of the Mom's Cleaner's facility (see ***Figure 1-2***). A former on-site facility, known as Charlene Service Station, Inc., doing business as (dba) Louis's Service Center was located upgradient of the Mom's Cleaners facility. Louis's Service Center had documented, historic soil and groundwater contamination related to former tank operations associated with dispensing of gasoline but has achieved regulatory closure with the NYSDEC.

Louis's Service Center and Mom's Cleaners historically operated at the Subject Property. Based upon the results of a gasoline spill investigation conducted at Louis's Service Center, additional contamination in the vicinity of the former Mom's Cleaners site was also detected. Although remediation at the Louis's Service Center has been completed and the work was approved by the NYSDEC, the NYSDEC determined that chlorinated solvent contamination downgradient of Louis's Service Center in the vicinity of Mom's Cleaners resulted from the disposal and / or spillage of PCE at the former dry cleaning unit and the associated septic tank at the Former Mom's Cleaners Site.

In August 1997, soils sampled proximate to Mom's Cleaners and the associated septic tank demonstrated elevated concentrations of PCE at 1,000 micrograms per kilogram (ug/kg) and 670 ug/kg, respectively. Areas of soil contamination were subsequently remediated by the property owner in September and October 1997. However, soil borings conducted in October 1998 indicated that residual PCE was present in soils at a concentration of 215 ug/kg.
A site groundwater investigation was also completed in March 1997, EnviroComp, Inc. (EC) installed a series of groundwater monitoring wells on and near the former dry cleaning unit. The

wells were monitored routinely through May 2000. The results of the final sampling event conducted by EC in May 2000 indicated that groundwater samples collected from two (2) wells identified as MW-6 and MW-9 contained 50 ug/l and 39 ug/l of PCE, respectively.
More recent groundwater sampling by Apex in November of 2009 indicated the presence of PCE in MW-6 and MW-9 groundwater samples at 34 ug/l and 47 ug/l, respectively.

A preliminary SVI screening survey was conducted circa September 8, 2008 by Long Island Analytical Laboratories (LIAL). Three (3) SVI samples were collected using Summa canisters; two (2) of the three (3) samples were collected within 24 inches of MW-6 and MW-9 at a depth of approximately one (1) foot above the water table (about seven (7) to eight (8) feet below grade surface [bgs]). The remaining sample was collected as an upwind, ambient air sample. The results of the LIAL SVI screening event reportedly indicated the following:

- Cis-1, 2-dichloroethene (cis-1,2-DCE) at 510 micrograms per cubic meter [ug/m^3]), trichloroethene (TCE) at 280 µg/m^3 and PCE at 800 µg/m^3 were detected in the SV1 sample (immediately adjacent to MW-6), all of which exceed their respective 95th percentile of the United States Environmental Protection Agency (USEPA) Building Assessment and Survey Evaluation (BASE) thresholds; and,

- Acetone (180 µg/m^3), c-1,2-DCE (3,800 µg/m^3), TCE (3,500 µg/m^3) and PCE (19,000 µg/m^3) also exceeded their respective 95th percentile of the USEPA BASE thresholds in the SV2 sample (immediately adjacent to MW-9).

It should be noted that as the LIAL soil vapor data were not collected below structure slabs and no corresponding indoor air quality samples were collected (all of which are required by prevailing NYSDOH protocols), the resulting data were only used to determine that a more formal SVI Investigation was warranted.

In November of 2009, Apex conducted a SVI investigation in accordance with the applicable NYSDOH guidance document entitled "*Final Guidance for Evaluating Soil Vapor Intrusion in the State of New York*," dated October 2006, as amended (hereinafter referred to as the "Guidance Document"). The investigation included the collection and analyses of five (5) collocated sub-slab and indoor air samples and one (1) outdoor ambient air sample (see ***Figure 1-3***). Based upon the analyses of the samples for VOCs by EPA Method TO-15 by a NYSDOH Environmental Laboratory Accreditation Program (ELAP)-certified laboratory, Apex concluded:

- None of the VOCs assigned specific thresholds by the NYSDOH (i.e., carbon tetrachloride [CT], vinyl chloride [VC], 1,1-dichloroethene [1,1-DCE], PCE, TCE and TCA) were present exceeding concentrations of concern in the indoor air quality samples collected from within the Good Samaritan, South Bay and Rite Aid tenant spaces;

- Elevated concentrations of petroleum- and halogenated solvent-related VOCs were present in the sub-slab soil vapor samples underlying the aforementioned buildings The types of chemicals detected were consistent with former site operations (i.e., the former gasoline service station and the former dry cleaner);

- The highest VOC concentrations within the sub-slab soil vapor samples were detected in the Good Samaritan tenant space (2,800 ug/m^3 of PCE) and the South Bay tenant space (7,400 ug/m^3 of PCE and 1,000 ug/m^3 of TCE in one

sample). Lower concentrations of VOCs were present in the soil vapor samples collected from underlying the Rite Aid building (i.e., toluene at 300 ug/m^3); and,

- Isopropyl alcohol (IPA) and ethyl acetate were the only VOCs detected in exceedence of a NYSDOH guidance threshold for indoor air quality. IPA was confirmed to be in use at the Good Samaritan building for sanitization purposes, including instrument sterilization and hand sanitization; therefore, IPA is not considered to be associated with a soil vapor concern. Ethyl acetate is a common ingredient in towelettes and other products commonly used and / or sold at Rite Aid. Neither of these compounds was believed to be related to soil vapor concerns or historic subsurface contamination.

Work conducted circa November of 2009 indicated that the following contaminants have been identified at the Subject Property:

CONTAMINANTS ANTICIPATED TO BE ENCOUNTERED AT THE SUBJECT PROPERTY:

CONTAMINANT	MEDIA	CONCENTRATION RANGE OF CONTAMINANT	COMMENTS
PCE	Groundwater and Soil Vapor	34 – 47 ug/l 6.6 – 7,400 ug/m^3	Above NYSDEC and NYSDOH thresholds of concern
TCA	Groundwater	5 – 6 ug/l	Above NYSDEC threshold of concern
cis-1,2-DCE	Groundwater and Soil Vapor	7 ug/l ND – 780 ug/m^3	Above NYSDEC and NYSDOH thresholds of concern
TCE	Soil Vapor	ND – 1,000 ug/m^3	Above NYSDOH threshold of concern

These contaminants have the following associated exposure limits established by the Occupational Safety and Health Administration (OSHA), American Conference of Governmental Industrial Hygienists (ACGIH) or the National Institute of Occupational Safety and Health (NIOSH):

OCCUPATIONAL EXPOSURE LIMITS FOR CONTAMINANTS

CONTAMINANT	OSHA LIMIT PEL/STEL/C	ACGIH LIMIT TLV/STEL/C	NIOSH LIMIT REL/STEL/C
PCE	100 ppm PEL	25 ppm TLV 100 ppm STEL	Minimize Exposure
1,1,1-TCA	350 ppm PEL	350 ppm TLV 450 ppm STEL	350 ppm REL
TCE	100 ppm PEL	50 ppm TLV 100 ppm STEL	25-ppm RELA
Cis-1,2-DCE	200 ppm PEL	200 ppm TLV	200 ppm REL

PEL = Permissible Exposure Limit
STEL = Short Term Exposure Limit
C = Ceiling Value
TLV = Threshold Limit Value
REL = Recommended Exposure Limit

The source of the contamination is likely associated with the former on-site dry cleaning activities. Generic material safety data sheets for PCE, TCA, cis-1,2-DCE and TCE including safety and health information have been provided as a reference in **Appendix H.**

2.2 Facility Description and any Known or Anticipated Hazardous Areas

As shown in ***Figure 1-2***, the Subject Property represents a former tenant space on the eastern portion of a strip-mall shopping center known as the Captree Village Shopping Center and is located at 556 Union Boulevard in West Islip, New York. If any impacted source materials are still presents, they are likely associated with the former Mom's Cleaners tenant space.

This HASP has been prepared for Apex personnel and associates to use as guidance in conducting work activities at the site is a safe manner. Known or anticipated hazardous areas or conditions for the site are listed below.

Known or Anticipated Hazardous Areas or Conditions

- Groundwater sampling by Apex in November of 2009 indicated the presence of PCE in MW-6 and MW-9 groundwater samples at 34 ug/l and 47 ug/l, respectively.
- PCE and TCE were detected in soil vapor samples collected from beneath the building slab at concentrations exceeding New York State Department of Health (NYSDOH) thresholds.

3.0 SC WORK PLAN ELEMENTS

The work plan tasks and task objectives for this project are tabulated below.

POTENTIAL PROJECT TASKS AND OBJECTIVES

TASK ID	DESCRIPTION	OBJECTIVE
Geophysical Survey	Mark out utilities.	To identify subsurface utilities/ features.
Monitoring Well Installation and Sampling	Installation of two wells, and sampling of two new wells and two existing wells.	Evaluate inferred groundwater flow directions throughout the unconsolidated aquifer materials. Allow for periodic sampling and analyses of on-site groundwater, if warranted.
Surveying	Survey in well locations and top-of-casing elevations	To evaluate site hydrogeologic conditions.
Soil Vapor Sampling and Analyses	Collection and analyses of soil vapor, indoor and outdoor air samples.	To conduct a NYSDOH-compliant SVI investigation.

4.0 HAZARD ANALYSIS AND CONTROL MEASURES

A variety of potential hazards are believed to be associated with the project's scope of work. The following table can be used to identify anticipated hazards for the project based on the project scope of work and site conditions. The identified hazards have been checked for the project tasks. This hazards checklist has been provided as a guide for developing control measures to be implemented to protect worker health and safety.

HAZARD ANALYSIS MATRIX

HAZARD	GEOPHYSICAL SURVEY / SURVEYING	WELL INSTALL / SAMPLING	SOIL VAPOR SAMPLE
CHEMICAL		X	X
BIOHAZARD	X	X	X
RADIATION			
MECHANICAL		X	X
ELECTRICAL		X	X
HEAT STRESS		X	X
COLD STRESS		X	X
BIOMECHANICAL (ERGONOMIC)		X	X
ANIMAL/SNAKE/ INSECT BITES	X	X	X
POISONOUS PLANTS			
WATER DROWNING			
NOISE		X	X
CONFINED SPACES			
UNDERGROUND UTILITIES		X	X
OVERHEAD UTILITIES		X	
VEHICULAR TRAFFIC	X	X	
CONSTRUCTION			
LANDFILL or SEWER GASES			
RADON or OTHER GASES			
SLIPS/FALLS	X	X	X
INCLEMENT WEATHER	X	X	
DRUM HANDLING			
PHYSICAL/BACK INJURY	X	X	X
HIGH CRIME AREA			
FLAMMABLE MATERIALS			
STATIC			

ELECTRICITY			
WELDING, CUTTING or BRAZING			
HIGH PRESSURE STEAM, WATER, or AIR			
DUSTY CONDITION		**X**	**X**

NA – Not applicable for this project.

4.1 Control Measures for Anticipated Work Activities Hazards

TASK	HAZARD	CONTROL MEASURE
Drilling	Mechanical	Proper implementation of PPE including hard hats, steel toe boots and reflective work vests if necessary. Make sure everybody in the work zone is aware of all operations taking place.
Excavating	Mechanical	Proper implementation of PPE including hard hats, steel toe boots and reflective work vests if necessary. Make sure everybody in the work zone is aware of all operations taking place.
Well Installation	Electrical	Implementation of Lock-out Tag-out procedures if warranted; Keep electric equipment dry and away from water. Make sure that personnel using electric equipment are properly trained. Keep electric equipment stored safely when not in use.
All Indoor and Outdoor Activities	Heat Stress	Know signs and symptoms of heat stress-related illnesses. Block out direct sunlight or other heat sources. Use cooling fans/air-conditioners if needed. Drink lots of water. Wear lightweight, light colored loose-fitting clothes. Avoid alcohol, caffeinated drinks or heavy meals.
All Indoor and Outdoor Activities	Cold Stress	Know signs and symptoms of cold stress-related illnesses. Make sure all personnel are properly dressed with hat, gloves, boots etc. Provide a warm and dry area on site to relieve any person showing signs of cold stress. Provide warm and sweet drinks to those showing signs of cold stress.
Well Installation/ Sampling	Biomechanical	Do not lift objects heavier than you can feasibly lift. Ask for help if you cannot move an object yourself. Use your legs to lift heavy objects and keep the objects close to your torso.
All Indoor and Outdoor Activities	Animal/Snake Bites	Wear full length pants and long sleeved shirts in light colors in order to visually detect any insects on your body. Tuck your pant legs into your sox. Keep a cold pack and a means of washing any wounds resulting from animal bites. Educate workers on signs and symptoms of animal bites as well as emergency response.
All Outdoor Activities	Poisonous Plants	Wear long sleeved shirts and pants tucked into boots. Wear cloth or leather gloves. Apply barrier creams to exposed skin. Educate workers on identification of poisonous plants. Educate workers on signs and symptoms of poisonous plant contact.
Drilling, Excavation	Noise	Provide all workers with a means of reducing noise exposures including earplugs and headsets. Keep the source of noise to a minimum. Do not warrant the length of high decibel noise exposure to last long enough to affect the hearing of any employees.
Drilling, Excavation, Sampling	Underground Utilities	All areas where any intrusive activities are initiated should be marked out using ground penetrating radar technology prior to subsurface aggravation. Proceed with caution when entering all depths. See **Appendix K**
Survey	Vehicle Traffic	Keep a worker on full-time watch for traffic while workers are working in any driveways or roads. Wear bright-colored clothing. Use traffic cones up-traffic to warn vehicles of your presence.
Drilling, Excavation	Construction	Make sure that all workers are aware of construction activities in their work zone. Workers will use radio/eye contact when entering work zones. Bright colored clothing should be worn in conjunction with hard hats and steel-toe boots.

Surveying, Sampling, Drilling, Excavating	Slips/Falls	Wear appropriate foot-wear. Do not stand closely to banks of excavated areas. Evaluate the area ahead of you before entering unknown areas. See **Appendix M**
All Outdoor Activities	Inclement Weather	All workers will be prepared for all types of weather anticipated. Should be prepared with a dry set of clothes, rain-jackets, dress in layers in order to adjust to changes in weather.

4.2 Control Measures for Anticipated Contamination Hazards

TASK	HAZARD	CONTROL MEASURE
Well Installation	Chemical	Properly worn PPE during the handling of any hazardous substances or any unknown materials during well installation.
Soil / Groundwater and Soil Vapor Sampling	Chemical	Properly worn PPE during sampling for any unknown contaminants including nitrile gloves, safety glasses used in conjunction with properly implemented sampling techniques.

4.3 Wildlife Hazard Identification, Prevention and Control Measures

4.3.1 Biting / Stinging Insects

Personnel should be familiar with hazard identification, prevention and control as it relates to biting / stinging insects. Depending on what region of the country the project is located in, there are a variety of biting/stinging insect that may be encounter at project sites as listed below and described in the following subsections.

- Ticks
- Mosquitoes
- Wasps, bees and yellow jackets
- Scorpions
- Spiders
- Mites/chiggers

4.3.1.1 Ticks

Ticks can transmit serious illnesses to humans including Lyme disease, Rocky Mountain Spotted fever, babesiosis and ehrlichiosis. Individuals who work outdoors in heavily wooded or grassy areas have an increased risk for exposure to tick-borne illnesses. Be sure to check yourself and your co-workers for ticks when leaving the field. As a preventive measure, clear vegetation or hire a contractor to clear vegetation in areas where you will be spending a lot of time such as pump test locations, near field trailers and support zones, etc. You should also spray clothing and skin with repellants just before going into the field. Use Permethrin for the clothes and DEET for the skin. Tyvek suits or light-colored clothing are also helpful to spot ticks before they become attached to the body. You should also wear a hat. Wash clothes in high temperatures after working outdoors

If a tick has attached itself to your body, carefully grasp the tick as close to the skin as possible and pull straight out, without twisting. Place the tick in a closed container and save it just in case an infection results. A health care professional or local health department may want to examine the tick. Wash the bite area with soap and water.

Lyme Disease

Lyme disease is the most recognized of the tick-borne illnesses. The disease is transmitted by ticks who have fed on certain deer and mice. These ticks are found throughout the United States. The peak tick season is May through September. The areas of highest risk are the Northeast, Great Lakes Region, and an area in Northern California. Current scientific estimates indicate that the disease is transmitted after the tick has attached to the individual for 6 to 24 hours. Between 15 and 30 percent of the ticks are infected. The longer the tick is attached, the greater the probability of infection.

Later signs and symptoms of Lyme disease (six to nine months after tick bite) may include: weak facial muscles, stiff neck, irregular heartbeat, numbness, chills, loss of appetite, dizziness, persistent fatigue (feeling tired), and double vision.

Early Signs and Symptoms:
(3 to 32 days after tick bite)

- *Characteristic "bulls-eye" (red, circular) rash at the site of the tick bite. Most common sites are scalp, groin, and armpits.*
- *Fever*
- *Headache*
- *Fatigue (feeling tired)*
- *Muscle and joint pain*
- *Swollen glands*

Babesiosis

Babesiosis is transmitted by ticks that typically have been infected by rodents, cattle, or wild animals. These ticks are most commonly found in the Northeastern, Pacific Coast, and Upper Midwestern portions of the United States. Signs and Symptoms of Babesiosis: (begin one to nine weeks after tick bite) and include:

Signs and Symptoms:

- *Fever*
- *Chills*
- *Sweating (profuse)*
- *Fatigue (feeling tired)*
- *Dark-colored urine*
- *Nausea*
- *Abdominal pain*
- *Low blood count*
- *Enlarged spleen*

Ehrlichiosis

Ehrlichiosis is transmitted by deer ticks and the Lone Star tick. Peak cases are from May to July and October to December. The first known cases were described in 1987. Reported incidences have occurred in individuals over 40 years old. The most prevalent areas of the country are the Southern and Northeastern areas of the United States.

Individuals can become very sick, with up to 54 percent hospitalized.

Early Signs and Symptoms:
(5-11 days after bite)

- *Rapid onset fever*
- *Acute headache*
- *Non-specific rash (lower part of body)*
- *Shaking chills*
- *Generalized tired feeling*
- *Muscle and joint pain*
- *Cough*
- *Vomiting*

Rocky Mountain Spotted Fever

Another tick-borne illness transmitted by the American dog tick and the Rocky Mountain wood tick. The states with the highest incidence of the illness are North Carolina and Oklahoma. Fifty percent of the infections occur in the South-Atlantic region of the United States. The Pacific and West-South Central regions also have cases. More than 90 percent

Early Signs and Symptoms:
(3-4 days after bite)

- *Fever*
- *Nausea*
- *Severe headache*
- *Muscle pain*
- *Lack of appetite*

of the patients with Rocky Mountain Spotted Fever are infected between April and September.

Later signs and symptoms of Rocky Mountain Spotted Fever may include rash on wrist, forearms and ankles, abdominal pain, join pain, and diarrhea.

Source: <http://www.osha.gov/SLTC/etools/sawmills/tick_borne.html#>, June 12, 2003

4.3.1.2 Mosquitoes

Mosquitoes are found all over the world, except in Antarctica. In the US, mosquitoes are mostly an annoyance but are responsible for West Nile Virus, The West Nile Virus is primarily a disease of birds. It is commonly found in Africa, West Asia, and the Middle East, but has also caused outbreaks in Europe. In humans, it can cause encephalitis, an infection of the brain. West Nile Virus is similar to the virus that causes St. Louis encephalitis, which for years has been found in the United States. West Nile had not been found in the United States before the late summer of 1999.

Symptoms of West Nile Virus

The incubation period, the time between an infectious bite and the onset of symptoms, is usually 5-15 days. Most people infected by the West Nile Virus have no symptoms at all, or experience something that feels like flu. Symptoms of “West Nile fever” may include fever, headache, achy muscles, and extreme tiredness, perhaps with skin rash and swollen lymph glands. In a fraction of cases, the fever leads to encephalitis, which is fatal in some cases or may cause neurologic after-effects.

Transmission of West Nile Virus

Humans get the West Nile Virus largely from the bite of mosquitoes. Although some 150 species of mosquitoes are found in the United States, the primary transmitter of West Nile is Culex pipiens. The female mosquito catches the virus when it bites an infected bird, and can then pass it along if it later bites a human. Humans do not get it from other humans or animals.
Prevention Strategies

- Empty standing water in buckets, plastic covers, or any other container where "wrigglers" and "tumblers" live.
- Use mosquito repellents when necessary and follow label directions and precautions closely.
- Use head nets, long sleeves and long pants if you venture into areas with high mosquito populations, such as salt marshes.
- If there is a mosquito-borne disease warning in effect, stay inside during the evening when mosquitoes are most active.

http://www.nsc.org/library/facts/westnile.htm

4.3.1.3 Wasps, Bees, Hornets and Yellow Jackets

Wasps, bees, hornets and yellow jackets are venomous insects whose stings produce a variety of symptoms ranging from minor pain and swelling to fatal allergic reactions. Honey bees have barbed stingers that usually remain in the sting. Honey bees can only sting once. Wasps do not have barbed stingers and can sting repeatedly. In general, wasps are more aggressive than

honey bees. Africanized honey bees resemble our familiar European honey bees but are much more aggressive. Africanized bees are dangerous because their victims may be stung by thousands of bees sent out in defense of the hive. Africanized bees are NOT more poisonous than European bees and their stings are treated the same way as are the stings of European bees. To the naked eye, Africanized bees are indistinguishable from European bees.

Avoiding Stings: People are often stung by these insects while walking barefoot. Stepping on a bee results in a painful sting. Wasps and bees often fly into soft drink cans unnoticed resulting in painful stings of the lips, tongue and mouth. Bees are attracted to flowering plants caution should be used when working near flowering plants. Certain colors also appear to attract bees and wasps. Blue clothing in particular seems to be associated with more unprovoked stings. Threatening a hive by approaching too closely or by making loud noises or vibrations often results in multiple stings.

Special Precautions for Africanized bees: Africanized bees are much more aggressive in defending their hives than are European bees. When an Africanized bee stings, it marks its victim with a chemical marker that attracts other bees from the hive. Thus, if one threatens a hive of Africanized bees one can expect to be pursued by thousands of bees. These bees have been known to pursue people for long distances. It does not take much to make an Africanized bee feel threatened. Approaching too close to the hive or operating machinery that transmits vibration to the hive will provoke an attack. Africanized bees move their hives and produce new hives more frequently than do European bees, and they will start a hive in unusual sites: a park bench, a culvert, under a truck. A swarm of thousands of bees can start a hive in a new location in minutes.

The best defense against Africanized bees is caution. Be alert for signs that a hive has been started in your area. Increased bee activity may be a sign that there is a hive nearby. If you work with heavy equipment remember that the equipment's vibration may provoke an attack. If attacked, cover your face with your arms and run away from the hive or away from the direction from which the bees are attacking. The bees do not fly fast and most people can outrun them. If you were working with heavy machinery and the cabin of the vehicle is sealed then stay inside and drive out of the area. Don't drive toward unprotected co-workers. If the vehicle is unsealed, turn off the vehicle and run for indoor shelter. A car will also provide good shelter. Put the air conditioner in the car on high as cold air will slow the bees that will have pursued you into the car. If you see someone being attacked call 911. Direct the victim toward shelter, but don't approach them. Running into a swarm of Africanized bees is as dangerous as running into a burning building. Anyone who suffered a large number of stings needs to be seen by a physician immediately. Anyone who has 50 or more stings should receive treatment in an emergency room, as must anyone with severe symptoms such as difficulty breathing or loss of consciousness.

Effects of stings: Bee and wasp stings produce similar effects. There are three patterns of symptoms seen following stings.

1. Local Effects: These symptoms begin immediately after the sting. Typically, the area around the sting is pale and is surrounded by redness. The stinger may still be present. It looks like a little thorn or splinter. The pale area may quickly turn into a red welt. The sting is usually painful, but the pain usually improves in minutes. There may be a great deal of swelling. Swelling may be delayed for five or six hours after the sting. Usually hands and feet swell more than stings to the chest or abdomen. Local swelling, even dramatic swelling, is normal and not a sign of allergy. Swelling often takes 3-4 days to

resolve. Bruising and itching often are associated with this swelling. Bee and wasp stings can become infected and therefore, all sting sites should be washed with soap and water. Signs of infection include a red streak running up the extremity, fever or any discharge from the sting. Infection requires prompt medical attention.

2. Allergic Reactions: Bee sting allergy produces sudden severe symptoms that usually occur within minutes following a sting. Signs of a severe reaction include flushing and anxiety which are almost always present. Facial swelling, especially around the lips and eyelids may be present. The victim may have difficulty breathing, feel as if the throat is closing, or may lose consciousness. These symptoms require emergency action. Telephone 911 to summon paramedics and help the victim to use a bee sting kit if one is available.

3. Toxic Reactions: Multiple bee stings can cause the above reactions, but also additional, unique problems. Shock may occur if the victim has suffered hundreds of stings. Delayed symptoms are common and range from nausea and vomiting, common after even a few stings, to destruction of red blood cells and kidney failure which occurs with large numbers of stings. Anyone who has suffered more than five stings should consult their doctor. Anyone who has suffered more than 50 stings needs emergency room care.

FIRST AID FOR STINGS: Many remedies recommended in the past have been shown to be useless, or to actually be dangerous.

DOs:

- DO remove the stinger if present. Scrape it out with a credit card or finger nail.
- DO wash stings with soap and water.
- DO apply an ice pack for five to fifteen minutes. Be careful not to freeze the skin.
- DO telephone 911 to summon paramedics if the victim is having an allergic reaction and use a bee sting kit as prescribed.
- DO treat swelling by elevating the swollen body part above the heart.

DO NOTs:

- DO NOT squeeze the sting, or rub mud into it. This increases the risk of infection.
- DO NOT apply meat tenderizer or baking soda. These don't help and can actually cause problems.
- DO NOT administer electrical shocks or drugs not prescribed for the patient.

http://health.ucsd.edu/poison/stinging.asp

4.3.1.4 Scorpions

Scorpions are commonly thought of as desert animals, but in fact, they occur in many other habitats as well, including grasslands and savannahs, deciduous forests, mountain pine forests, rain forests, and caves.

4.3.1.5 Spiders

Brown Recluse Spiders:

The brown recluse spider is one of six poisonous kinds of spiders in the United States. It is part of the arachnid family, which includes not just spiders, but ticks, mites, and scorpions, too. It has

long, skinny legs and is about one-half inch long overall. Its entire body is brown, except for a dark mark in the shape of a violin on its head. Its poisonous relatives may be gray, orange, reddish-brown, or pale brown.

Brown recluse spiders are most commonly found in Midwestern and Southern states of the U.S., and they usually hang out in dark places. When they are outside, they like to spend time in piles of rocks, wood, or leaves. If they come inside, brown recluse spiders will go to dark closets, attics, or basements. They are non-aggressive and bite only when disturbed. A person who gets bitten by a brown recluse spider may not notice anything at first or only feel a little sting at first. After about four to eight hours, the sting will start to hurt a little more. It might look like a bruise or might form a blister surrounded by a bluish-purple area that turns black or brown and becomes crusty after a few days.

Black Widow Spiders:

The black widow spider is one of six poisonous kinds of spiders in the United States. It is part of the arachnid family, which includes not just spiders, but ticks, mites, and scorpions, too. Its body is about one-half inch long (smaller than a dime), and it has long legs. The black widow spider is shiny and black with a red-orange or yellow mark in the shape of an hourglass on its stomach.

Black widow spiders and their relatives can be found almost anywhere in the Western hemisphere of the world in damp and dark places. Their favorite places are wood piles, tree stumps, trash piles, storage sheds, fruit and vegetable gardens, in stone walls, and under rocks. If they come inside, they will go to dark places like corners of closets, garages, or behind furniture. They are shy by nature and bite only when trapped, sat on, or accidentally touched

A person who gets bitten by a black widow spider might not know it right away, since the bite can sometimes feel like a little pinprick. After 30 to 40 minutes, though, the area of the bite will swell and hurt a lot.

What You Should Do if Bitten By a Spider:

If you ever think that you've been bitten by a brown recluse or black widow spider, tell an adult immediately. It's important to get medical attention as soon as you can because the bites can make you extremely sick. With an adult's help, wash the bite well with soap and water. Then apply an ice pack to the bite to slow down the spread of the spider's venom. Try to elevate the area and keep it still to help prevent the spread of venom.

Signs and Symptoms:

- *Bite mark*
- *Swelling*
- *Pain*
- *Nausea and vomiting*
- *Difficulty breathing or swallowing*

If it's possible, catch and bring the spider to the doctor's office with you. Even though it's usually easy to identify brown recluse or black widows, you'll want to make sure of what kind of spider bit you. The spider can be killed first before you bring it with you; just be sure not to squish it so much that no one can tell what it is.

Treatment:

- Wash wound
- Apply a cold pack
- Get medical care to receive antivenin
- Call an Ambulance, dial 999 / 112 or your local emergency number, if necessary

Source: <http://firstaid.eire.org/Bites.htm>, June 12, 2003

4.1.1.6 Mites/chiggers

Chiggers are the larvae of harvest mites and belong to the family Trombiculidae. Chiggers feed on low vegetation, but they need animals as a source of protein. Chiggers do not burrow into the skin; instead they attach themselves to the opening of a hair shaft and inject saliva into the skin. When on a person, chiggers go to areas where the skin is thin and moist: the ankles, wrists, thighs, groin or waist. The mite stays in this area until feeding is complete. This time span can be anywhere from one to four days. After feeding, the larvae drop back to the ground to complete their development. In some people, the initial bite can trigger an allergic response and a rash may appear on surrounding areas of skin. If you walk through a wooded or grassy area, it is possible to be attacked by chiggers. People get chiggers simply by the mites jumping onto the skin.

Methods of Prevention:

- If possible, avoid walking through low brush or woody areas.
- If you have to go into an area infested with chiggers, make sure all of your skin is covered with clothing.

Apply an insect repellent containing the substance dimethyl phthalate to areas of the body that are not covered by clothing. Also apply the repellent to areas where clothing overlaps such as the ankles. A tick repellent named Duranon is an effective method for keeping chiggers off of you. It should only be applied to your clothing. Avoid contact with your skin.

Methods of Treatment:

Some people have found that dog shampoo helps to dry up the lesions. The doctor can prescribe ointments for you to apply to the irritated skin. These ointments can dry up and heal the lesions that are present, but will not prevent new lesions from occurring.

For more information see also:

- <http://edis.ifas.ufl.edu/scripts/htmlgen.exe?DOCUMENT_IG085>
- <http://www.ag.ohio-state.edu/~ohioline/hyg-fact/2000/2100.html>
- <http://www.uky.edu/Agriculture/Entomology/entfacts/struct/ef630.htm>

4.2.1 Snakes and Other Animals

4.2.1.1 Snakes

Depending on what part of the country the project site is located in, there are a variety of snakes and other animals that can present a hazard. Some snakes are poisonous and can inject potentially lethal venom when they bite. Poisonous snakes in the United States include:

- Rattle snakes
- Copperheads
- Coral snakes and
- Cottonmouths (also known as water moccasins).

All poisonous snakes have two (2) large fangs which are located in the upper front portion of the mouth. If the victim is bitten and the snake escapes before the identification can be made, the following signs should be noted:

- One to two punctures made by the hollow fangs.
- Pain following within 5 to 10 minutes accompanied by swelling and discoloration around the bite area. These symptoms will progress up the victim's extremity. If the fang enters a vein or artery, these symptoms may not be present.

Seek medical attention IMMEDIATELY for any snake bites.

4.1.2 Other Animals

Hazards from other animals include bites from domesticated dogs, wild or stray dogs, raccoon, skunks, coyotes and others. Be especially aware of animal that are acting erratic or are frothing at the mouth as this can be a sign that animal has rabies. In some parts of the county, bears have been known to attack humans.

4.1.3 Poisonous Plants

Poisonous plants include poison ivy, western poison oak and poison sumac. Approximately 85 percent of the general population will develop an allergy if exposed to these plants. The sensitivity to the sap usually develops after several encounters with poison ivy, oak, or sumac. Poison ivy, western poison oak and poison sumac have poisonous sap (urushiol) in their roots, stems, leaves and fruits. The sap is released when the plant is bruised, making it easier to contact Rhus- dermatitis in the early spring and summer when the leaves are tender. Therefore, brushing against an intact plant will not cause a reaction. However, these plants are very fragile. Stems or leaves can be damaged by the wind, animals or insects. The sap (urushiol) may be deposited on the skin by direct contact with the plant or by contact with contaminated objects, such as clothing, shoes, tools, and animals.

Symptoms of exposure to poisonous plants include:

- Itching
- Redness
- Burning sensation
- Swelling
- Blisters
- Rash which may take up to 10 days to heal.

Prevention/Control of exposure to poisonous plants include

- Wear long-sleeved shirts and long pants, tucked into boots. Wear cloth or leather gloves.
- Apply barrier creams to exposed skin.
- Educate workers on the identification of poison ivy, oak, and sumac plants.
- Educate workers on signs and symptoms of contact with poisonous ivy, oak, and sumac.
- Keep rubbing alcohol accessible. It removes the oily resin up to 30 minutes after exposure.

4.1.3.1 Poison Ivy

Poison ivy grows everywhere in United States except Hawaii and Alaska. In the East, Midwest, and the South, it grows as a vine. In the Northern and Western United States, it grows as a shrub. Each leaf has three leaflets. Leaves are green in the summer and red in the fall. In the late summer and fall, white berries may grow from the stems.

4.1.3.2 Poison Oak

Oak-like fuzzy leaves in clusters of three. It has two distinct kinds: Eastern poison oak (New Jersey to Texas) grows as a low shrub. Western poison oak (Pacific Coast) grows to six-foot-tall clumps or vines up to 30 feet long. It may have clusters of yellow berries.

4.1.3.3 Poison Sumac

Grows in standing water in peat bogs in the Northeast and Midwest and in swampy areas in parts of the Southeast. Each leaf has clusters of seven to 13 smooth-edged leaflets. The plants can grow up to 15 feet tall. The leaves are orange in spring, green in summer and red, and orange or yellow in fall. There may be clumps of pale yellow or cream-colored berries

5.0 PROJECT STANDARD OPERATING PROCEDURES AND PRACTICES

All site personnel must adhere to the following standard operating procedures and practices.

1. All safety equipment and protective clothing is to be kept clean and well maintained.
2. All prescription eyeglasses in use will be safety glasses and will be compatible with respirators. Contact lenses should not be worn in areas where there is a potential for injury to the eye due to particulate, fume, vapors, gases or other air contaminant.
3. The Safety Officer will approve all disposable or reusable gloves worn on the site.
4. During periods of prolonged air-purifying respirator usage in contaminated areas, respirator filters will be changed according to the change-out schedule for the project, or sooner, if breakthrough is indicated. At a minimum, respirator cartridge filters will be changed on a daily basis.
5. Footwear used on site will be covered by rubber over boots when entering or working in the "hot zone" or "contamination reduction zone". Boots will be washed with water and detergent to remove dirt and contaminated sediment before leaving these work zones.
6. All personal protective equipment (PPE) used on site will be decontaminated or disposed of at the end of the workday. The Safety Officer will be responsible for ensuring decontamination of personal protective equipment before reuse.
7. All respirators will be individually assigned and not interchanged between workers without cleaning and sanitizing.
8. Any site personnel unable to pass a fit test as a result of facial hair or facial configuration shall not enter or work in an area that requires respiratory protection.
9. All project personnel shall have a vision or corrected vision to at least 20/40 in one eye.
10. On-site personnel found to be disregarding any provisions of the HASP or SOP will, at the request of the Safety Officer, be barred from the project.
11. Used disposable outerwear will be removed upon leaving the hot zone and will be placed inside disposable containers provided for that purpose. These containers will be stored at the site at the designated staging area and the Contractor will be responsible for proper disposal of these materials at the completion of the project.
12. Tyvek™ suits, or other outer garments, which become torn or badly soiled will be replaced immediately.
13. Eating, drinking, chewing gum or tobacco, smoking, etc., will be prohibited in the hot and contamination reduction zones.
14. All personnel will thoroughly cleanse their hands, face, forearms and other exposed areas prior to eating smoking, drinking, or using the toilet facilities.
15. Showers at the end of the shift are required for personnel who have worked in the hot zone.
16. No alcohol or drugs (without prescription) will be allowed on-site at any time. Firearms are only allowed for security purposes, if allowed by the local law enforcement agency.
17. All personnel who are on medication should report it to the Safety Officer who will make a determination whether or not the individual be allowed to work and in what capacity. The Safety Officer may require a letter from the individual's personal physician stating what limitations, if any, the medication may impose on the individual.
18. At least one copy of these work practices shall be available for review at the job work site.

19. Legible and understandable precautionary labels shall be affixed prominently to containers of contaminated scrap, waste, debris and clothing.
20. Removal of contaminated soil from protective clothing or equipment by blowing, shaking or any other means that disperse contaminants into the air is prohibited.
21. Transportation and disposal of contaminated materials shall comply with all applicable local, state, and federal regulations. The transporter and disposer will address these items.
22. Drummed contaminated materials shall be stored in tightly closed containers in well-ventilated areas.
23. Containers shall be moved only with the proper equipment and shall be secured to prevent dropping or loss of control during transport.
24. All trenching, shoring and excavation work must comply with all federal OSHA rules.
25. Portable or fixed emergency shower/eyewash stations shall be located near work activities and routinely checked to ensure that the equipment is functioning.
26. Before daily site operations begin, a tailgate safety meeting will be held to review the HASP concerns for the work activities and emergency response procedures. The Daily Tailgate Safety Meeting Logs will be maintained as part of the HASP. The Daily Tailgate Safety Meeting Form and Topics Guide are located in **Appendix C**
27. Smoking is not permitted in the site's hot or contamination reduction zones.
28. A change in level of protection will be based on air monitoring equipment readings taken in the breathing zone.
29. Field personnel will use air monitoring equipment and not their nose to determine site contamination (i.e., sniffing sampled soils or water in jars, confined spaces, open bore holes or trenches, etc.). Odors detected during the course of standard operating procedures, however, should be noted in the daily log.
30. Field personnel should not stand with their head directly over a container of hazardous material or well when it is being opened.
31. Events surrounding accidents/injuries will be recorded in the daily log. Document the incident on Apex's Incident Report and submit copies within 24 hours to the Corporate Human Resources Representative and Corporate Health and Safety Officer.
32. First aid kit(s) and fire extinguisher(s) will be available in all company vehicles and on project sites for responding to emergency situations.
33. Workers will not stand on drums.
34. Lockout-tag out procedures will be followed prior to performing any work on equipment for controlling hazardous energy.
35. Only authorized entrants, attendants and supervisors trained in confined space entry procedures will be permitted to enter and conduct work in confined spaces. OSHA confined space entry standard requirements must be complied with.
36. Use of a "buddy system" will be used in hazardous areas.
37. Engineering controls and work practices shall be instituted to reduce and maintain employee exposure to, or below, the permissible exposure limits (PEL) for substances regulated by OSHA, except to the extent that such controls and practices are not feasible.
38. Where feasible, engineering controls should include the use of pressurized cabs or control booths on equipment, and/or the use of remotely operated material handling equipment.

39. Work practices should be implemented, where feasible, such as removing all non-essential employees from potential exposure during opening of drums, wetting down dusty operations and locating employees upwind of possible hazards.

5.1 Toolbox Safety Meetings

Toolbox safety meetings are an important element of Apex's Safety Program. They are an effective training aid and an essential means of increasing an employee's hazard awareness and improving job performance. Daily Toolbox Safety Meeting shall include, as a minimum, the following:

- Review of all Safety Bulletins and other important topics that relate to the work;
- Instructions in the safe and efficient planning and performance of their work;
- Review of project accidents, injuries, illnesses, near misses, hazards and unsafe acts; and
- Discuss other suggestions and comments relating to safety.

All project employees will attend the daily Toolbox Safety Meetings. The subject material shall be pertinent to the work being performed or to be performed in the near future. Records of all Toolbox Meetings will be maintained at the site.

5.2 Training and Briefing Topics

The following items will be discussed by the SSHO or his designee at the site pre-entry briefing(s) and daily Toolbox safety meetings as deemed appropriate. Refresher training shall be conducted as necessary for clarification or reiteration as determined by the SSHO whenever new hazards are recognized and if addenda are added to this HASP.

Site-specific training will include information needed to ensure that the personnel working at the site are able to respond effectively to emergencies. This segment of the training will include a description of the communications systems to be used and the procedures for responding to fires and other emergencies. Briefings will be provided prior to site entry and, as required, each morning before work begins and after each day's field activities have been completed. The SSHO will document topics addressed in these briefings and those in attendance. The SSHO will hold and document supervisory safety meetings to assess work performance.

5.3 Equipment Operators

All operators of heavy equipment, (e.g., backhoe operators, welders, and explosive-actuated tool operators), must be qualified and experienced. Equipment operators can demonstrate qualifications through specific training, experience, field demonstration or a combination of all. These qualifications must be presented to the SSHO or PM. Only those operators qualified to operate a particular type of machinery may operate that type of machinery.

5.4 Documentation

For each day that on-site health and safety monitoring is performed, daily reports will be prepared which record air monitoring results (if applicable), daily site activities, and health and safety action items. Reports will be submitted to the appropriate personnel as necessary. All personal and environmental monitoring will be made part of the permanent project record. All safety inspections will be conducted by the SSHO on a daily basis as needed.

Training and medical records for personnel shall be made available for inspection by the SSHO prior to job start. Also, subcontractors are required to make training and medical records available for inspection, as required.

6.0 VIOLATIONS OF THE HASP

Apex will not tolerate violations of the HASP including standard operating procedures. Apex has the right to remove any individual who violates safety practices. Disciplinary measures are at the discretion of the Safety Officer and will be commensurate with the severity of the infraction. It is the responsibility of each individual to understand and comply with safety procedures and request clarification as needed. Supervisors carry additional oversight and enforcement responsibilities and, consequently, disciplinary measures will be more severe. The following guidelines apply for minor infractions for Apex employees and Apex contract employees:

- First infraction: verbal warning with no further action if individual corrects infraction immediately and acknowledges the infraction.
- Second infraction: written warning and possible time off site without pay to review safety procedures.
- Third infraction: individual banned from the site.

For serious or imminent hazards, safety violations will result in temporary or permanent banishment from the site.

7.0 ENVIRONMENTAL, SAFETY AND HEALTH ROLES AND RESPONSIBILITIES OF PROJECT PERSONNEL

The following table summarizes personnel responsibilities at the job site. This information should be reviewed with all project personnel prior to commencing site activities.

ROLES AND RESPONSIBILITIES OF PROJECT PERSONNEL

PERSONNEL	ROLES AND RESPONSIBILITIES
Program Managers	• Provides direction, management and resources to achieve goals and objectives of project • Responsible for developing and implementing systems to ensure employees follow the HASP • Responsible for general safety performance of employees and implementing a phased disciplinary program for employees violating health and safety programs • Assigns and communicates safety and health responsibility to subordinates and holds subordinates accountable for their performance
Project Managers	• Ensures that specific work tasks are properly prioritized, planned and conducted in a safe manner • Verifies all site workers meet OSHA regulatory requirements • Provides resources and equipment necessary to conduct and execute assigned tasks in a safe manner • Designates an adequate number of health and safety specialists with the necessary authority and responsibility to develop and implement the HASP and to verify its effectiveness • Provides periodic health and safety program reviews/audits to ensure program effectiveness and quality
Health and Safety Specialists	• Provides technical expertise necessary to carry out requirements and support work activities • Provides training on the HASP, Hazard Communication, and other project specific health and safety training • Implements and enforces HASP requirements, with project personnel assigned to work under their jurisdiction • Conducts initial site safety review and conducts exposure and environmental monitoring • Ensures that adequate safety controls are maintained • Obtains related information on suspect hazardous materials to facilitate preparation of hazardous material abatement • Ensures that appropriate health and safety-related project documentation is maintained for the project
Site Laborers	• Conduct work in a safe manner in accordance with the HASP, other applicable safe work procedures and controls specified in permits • such as hot work or confined space entry permits • Appropriately uses assigned personal protective equipment • Observes their work area surroundings for potential safety issues • Reports unsafe work conditions or practices to the health and safety specialist/site safety and health officer • Initiates feasible personal action to eliminate/mitigate unsafe conditions
Visitors	• Remain outside designated work zones unless authorized by Project Manager to enter hot or contamination reduction zones wearing appropriate PPE • Comply with all site specific HASP requirements including safe practices and levels of PPE • Comply with training, medical surveillance and other requirements of the HASP, if access is permitted on the site

8.0 TRAINING REQUIREMENTS

Site workers must have completed the following training programs:

- Field personnel must complete 40 hours of hazardous waste activity instruction (OSHA 29 CFR 1910.120/1926.65);
- Field personnel must complete 24 hours of supervised field instruction (29 CFR 1910.120/1926.65);
- Field personnel must complete 8 hours of refresher training each year (29 CFR 1910.120/1926.65);
- On-site supervisors/managers directly responsible for employees engaged in hazardous waste operations must have an additional 8 hours of supervisory training (29 CFR 1010.120/1926.65);
- Field personnel assigned to provide first aid assistance at the site must be trained in first aid/cardio-pulmonary resuscitation (CPR) and bloodborne pathogens training (1926.50)
- All site personnel must attend and participate in "Daily Safety Tailgate Meeting and document attendance (29 CFR 1910.120);
- Competent person training (29 CFR 1926, Subpart P) for on-site managers and supervisors (subcontractor) directly responsible for employees engaged in excavation/trenching operations;
- Hazard communication training on any hazardous substance's chemical and physical properties (29 CFR 1910.1200);
- Personal protective equipment training for personnel required to wear protective clothing (29 CFR 1910.132 and 134);
- Personnel performing air monitoring must be trained in the calibration, and operation of instrumentation used at the site (29 CFR 1910.120);
- Personnel required to extinguish small fires on site are required to be trained in the proper use of a fire extinguisher (29 CFR 1910.156/1926.150);
- All site personnel must review this HASP and be able to obtain emergency information, if needed. They must also be familiar with established emergency response and evacuation procedures for the site. This information is to be reviewed with all project personnel prior to commencement of field activities (29 CFR 1910.120);
- Workers required to enter confined spaces must be trained in the requirements of confined space entry (29 CFR 1910.146);
- Workers required to provide first aid must be trained in the hazards of blood borne pathogens (29 CFR 1910.1030);
- Other training, as required, to comply with OSHA health and safety standards.

9.0 MEDICALSURVEILLANCE

Medical surveillance consisting of a baseline, annual and termination examination are required of all Apex employees and subcontractors, whose job may require working in environments with potential exposure to health hazards such as hazardous waste, petroleum products, materials, noise, lead and crystalline silica. Examination criteria and frequency will be determined by Apex's and subcontractor occupational physicians based upon guidance and regulatory requirements provided in the applicable OSHA Hazardous Waste Operation and Emergency Response Regulation (29 CFR 1910.120 or 29 CFR 1926.65). More frequent examinations may be performed at the recommendation of a qualified occupational physician.

Apex and subcontractors are also required to retain and provide employee access to medical and exposure monitoring records in compliance with OSHA 29 CFR 1910.1020 or 1926.33, Access to Employee Exposure and Medical Records.

9.1 Heat Stress Evaluation

Heat stress is anticipated to be a significant health and safety issue associated with this project due to the nature of the hazards anticipated to be encountered or because of the time of the year the work is being conducted. The four forms of heat stress include heat rash, heat cramps, heat exhaustion and heat stroke. It is very important to be able to recognize symptoms associated with the various forms of heat stress and to know first aid measures. A table listing forms and symptoms of heat stress is located below. More specific information on heat stress from Occupational Safety and Health Administration (OSHA) is located in **Appendix J** as a reference. This information should be reviewed with employees prior to commencing the project.

FORMS AND SYMPTOMS OF HEAT STRESS

FORM	SYMPTOMS	FIRST AID MEASURES
Heat Rash	• Prickly heat • Slight to extensive skin irritation could occur	• Keep skin clean and dry for at least 12 hours per day • Change wet clothing
Heat Cramps	• Skin is sweaty • Painful muscle spasms • Body temperature is normal	• Provide fluids • Gently massage cramped muscles
Heat Exhaustion	• Clammy or pale skin • Weakness and fatigue • Profuse sweating • Nausea, vomiting • Disorientation • Headache • Normal or slightly elevated body temperature	• Remove from heat • Loosen clothing • Sponge skin with cool water • Fan victim; stop if victim shivers or develops goose bumps • Give fluids; give victim a drink solution of one pint water and one teaspoon salt every 30 minutes until recovers • Obtain medical help if victim does not improve
Heat Stroke	• Unconsciousness or mental confusion • Dizziness • Staggered walk	• Get emergency medical aid immediately • Remove victim from heat • Remove clothing, place victim in a cool bath, or apply cool compresses

	• Appears to be agitated • Hot, dry skin • Extremely high body temperature; could reach 105° F	• Do not give any fluids • Do not leave victim alone • Do not allow victim to become so cold that victim shivers • Do not give aspirin or other medication in an attempt to lower fever

9.2 Cold Stress Evaluation

The stress of working in a cold environment can cause a variety of strains on the body including constriction of blood vessels of the skin, shivering, localized frostbite or frostnip, and generalized hypothermia. The frequency of accidents may be higher in cold environments. Nerve impulses are slowed, exposed workers react sluggishly, fumble with their hands and become clumsy. There are also safety problems common to cold environments. They include ice, snow blindness, reflection from snow and the possibility of burns from contact with cold metal surfaces.

Thermal injury due to cold exposure can become a problem for project field personnel. Systemic cold exposure is known as hypothermia. Localized cold exposure is generally considered to be categorized as frostbite.

Hypothermia is caused by a decrease in core body temperature below 96ºF. The central (brain and spinal cord) and peripheral (skin and muscle) activity normally maintains the body temperature. Interference with any of these mechanisms can result in hypothermia, even in the absence of what is usually considered a "cold" ambient temperature. Symptoms of hypothermia include shivering, apathy, listlessness, sleepiness, and unconsciousness.

Frostbite is both a general and medical term given to areas of local cold injury. Unlike systemic hypothermia, frostbite rarely occurs unless the ambient temperature drops below freezing and usually less than 2ºF. Symptoms of frostbite include a sudden blanching or whitening of the skin. The skin has a waxy or white appearance and is firm to the touch. Affected tissues are cold, pale and solid.

Prevention of cold-related illness can be aided by educating workers on recognizing the symptoms of frostbite and hypothermia and by identifying and limiting known risk factors. The workers should be provided with enclosed, heated shelters on, or adjacent to, the worksite, dry changes of clothing and warm drinks. When working in extremely cold climates, frequent work breaks should be encouraged.

To monitor site personnel for cold-related illnesses, commence oral temperature recordings at the job site:

- At the supervisor's discretion when suspicion is based on changes in a worker's performance or mental status;
- When a worker requests monitoring;
- As a screening measure, at least twice per shift, under extremely hazardous climatic conditions (for example, when the wind-chill is less than 20ºF, or wind-chill is less than 30ºF with precipitation); and
- As a screen measure whenever any person develops hypothermia.
- Workers developing moderate hypothermia, in which the core temperature drops to 92ºF, should not return to work for at least 48 hours, if adverse weather conditions continue.

The following table provides symptoms associated with a drop in core body temperature.

PROGRESSIVE CLINICAL SYMPTOMS OF HYPOTHERMIA

CORE BODY TEMPERATURE (ºF)	SYMPTOMS
99.6	Normal core body temperature
96.8	Metabolic rate increases
95.0	Maximum shivering
93.2	Victim conscious and responsive
91.4	Severe hypothermia
89.6-87.8	Consciousness clouded, blood pressure difficult to obtain, pupils dilated but react to light, shivering ceases
86.0-84.2	Progressive loss of consciousness, muscular rigidity increases, pulse and blood pressure difficult to get, respiratory rate decreases
78.8	Victim is seldom conscious
64.4	Lowest accidental hypothermia victim to recover

Apex employees must be trained to minimize the risk of the hazards of working in cold environments and periodically reinforced in the recognition of the physiologic responses of the body to cold stress. The use of insulated work clothing, warm shelters and work/warming regimens should be used to minimize the potential hazards of cold stress. Also, special attention should be given to equipment warm-up time and freeze protection for vessels, piping, equipment, tools, and walking/working surfaces. The American Conference of Governmental Industrial Hygienists (ACGIH) TLVs for cold stress should be used as a guideline.

Control measures to prevent cold related symptoms include:

- Prevent continuous exposure of skin when the wind-chill factor results in an equivalent temperature of -32□C (-26□F). Workers exposed to air temperatures of 2□C (35.6□F) or lower who become immersed in water or whose clothing gets wet should change into dry clothing immediately and be treated for hypothermia.
- Use heated warming shelters such as tents and cabins when work is performed continuously in an equivalent chill temperature o f -7□C (20□F) or below.
- Ensure frequent intake of warm, sweet, caffeine-free, non-alcoholic drinks or soup.
- Minimize sitting still or standing for long periods of time.
- Ensure use of appropriate PPE.

The correct clothing depends on the specific cold stress situation. It is important to preserve the air space between your body and the outer layer of clothing in order to retain body heat. The more air pockets each layer of clothing has, the better the insulation. However, the insulating effect is negated if the clothing interferes with the evaporation of sweat, or if the skin or clothing is wet.

10.0 RECORD KEEPING REQUIREMENTS

At a minimum, the following records should be maintained at the project site in Apex's possession: (select only those items that are appropriate for the project)

- The Health and Safety Plan including emergency response, contingency, evacuation plans and Acknowledgement page
- Environmental monitoring data
- Equipment calibration records
- Visitor log
- Daily Tailgate Safety Meeting logs and summaries of meetings
- Copies of HAZWOPER, first aid and other training records
- Copies of medical clearances
- OSHA 200 Injury and Illness Log and injury/illness/incident reports
- OSHA citations, if any, must be posted in conspicuous location for specified time
- Right-to-Know poster and other mandatory federal and state posters
- An Assured Equipment Grounding Conductor Program, if applicable
- A Confined Space Entry Program, if applicable
- Lockout-Tag-out Program, if applicable
- Respiratory Protection Program and fit testing records, if applicable
- Blood-borne Pathogens Exposure Control Plan, if applicable
- Material Safety Data Sheets or other references for hazardous materials on the project site
- Hearing Conservation Program, if applicable
- Hazard Assessment for PPE (usually part of HASP)
- Fall Protection Plan for Construction
- Hazardous Waste Manifests
- Hazard Communication Program
- OSHA Job Safety and Health Poster-Form 2203
- Emergency phone numbers (in HASP)
- Wage and Hour Division: Family and Medical Leave Act posting
- Equal Employment Opportunity Commission: Americans with Disabilities Act posting

11.0 PERSONAL PROTECTIVE EQUIPMENT (PPE) AND CLOTHING

The minimum level of PPE to be worn for this project is Level D. All work activities will commence in Level D PPE. Air monitoring results will determine whether PPE will need to be upgraded to Level C or Level B. Whenever high pressure water rinsing is conducted, workers in the immediate area of the washer must wear a face shield in addition to Level D PPE.

CATEGORIES OF PPE

LEVEL OF PPE	PERSONAL PROTECTIVE EQUIPMENT
A	• Positive pressure full face-piece self-contained breathing apparatus (SCBA), or positive pressure supplied air respirator with escape SCBA (NIOSH approved) • Totally encapsulating chemical –protective suit • Coveralls[1] • Long underwear[1] • Gloves, outer, chemical-resistant • Gloves, inner, chemical-resistant • Boots, chemical-resistant, steel toe and shank • Hard hat (under suit)[1] • Disposable protective suit, gloves and boots (depending on suit construction, may be worn over totally-encapsulating suit)
B	• Positive pressure, full-face piece self-contained breathing apparatus (SCBA), or positive pressure supplied air respirator with escape SCBA (NIOSH approved) • Hooded chemical-resistant clothing (overalls and long-sleeved jacket; coveralls; one or two-piece chemical-splash suit; disposable chemical-resistant overalls) • Coveralls[1] • Gloves, outer, chemical-resistant • Gloves, inner, chemical-resistant • Boots, outer, chemical-resistant, steel toe and shank • Boot-covers, outer, chemical-resistant (disposable)[1] • Face shield[1] • Hard hat[1]
C	• Full-face or half-mask, air purifying respirators (NIOSH approved) • Hooded chemical-resistant clothing (overalls; two-piece chemical-splash suit; disposable chemical-resistant overalls) • Coveralls[1] • Gloves, outer, chemical-resistant • Gloves, inner, chemical-resistant • Boots, outer, chemical-resistant steel toe and shank[1] • Boot-covers, outer, chemical-resistant (disposable)[1] • Hard hat[1] • Escape mask[1] • Face shield[1]
D	• Coveralls • Gloves[1] • Boots/shoes, chemical-resistant steel toe and shank • Boots, outer, chemical-resistant (disposable) [1] • Safety glasses with side shields, or chemical splash goggles • Hard hat • Escape mask[1] • Face shield[1] • Traffic vest[1] • Cooling vest[1]

[1] optional, as applicable

TYPES OF HAZARDS FOR WHICH LEVEL A, B, C AND D PPE ARE APPROPRIATE

PPE LEVEL	WHEN TO USE
A	• The hazardous substance has been identified and requires the highest level of protection for skin, eyes, and the respiratory system based on either the measured, or potential for, high concentration of atmospheric vapors, gases, or particulates of materials that are harmful to skin; • The site operation and work functions involve a high potential for splash, immersion, or exposure to unexpected vapors, gases, or particulates of materials that are harmful to skin or capable of being absorbed through the skin; • Substances with a high degree of hazard to the skin are known or suspected to be present, and skin contact is possible; or, • Operations are being conducted in confined, poorly ventilated areas, and the absence of conditions requiring Level A has not yet been determined.
B	• The type and atmospheric concentration of substances have been identified and require a high level of respiratory protection, but less skin protection; • The atmosphere contains less than 19.5% oxygen; or, • The presence of incompletely identified vapors or gases is indicated by a direct-reading organic vapor detection instrument, but vapors and gases are not suspected of containing high levels of chemicals harmful to skin or capable of being absorbed through the skin. • Use of Level B involves atmospheres with IDLH concentrations of specific substances that present severe inhalation hazards and that do not represent a severe skin hazard, or do not meet the criteria for use of air-purifying respirators.
C	• The atmospheric contaminants, liquid splashes, or other direct contact will not adversely affect or be absorbed through any exposed skin; • The types of air contaminants have been identified, concentrations measured, and an air-purifying respirator is available that can remove the contaminants; and, • All criteria for the use of air-purifying respirators are met.
D	• The atmosphere contains no known hazard; and, • Work functions preclude splashes, immersion, or the potential for unexpected inhalation of, or contact with hazardous levels of any chemicals.

Combinations of personal protective equipment other than those described for Levels A, B, C, and D protection may be more appropriate and may be used to provide the proper level of protection.

The table below lists the minimum initial level of personal protective equipment required for each task of the project scope of work.

MINIMUM PPE LEVEL FOR EACH TASK

TASK	LEVEL OF PPE	COMMENTS
Geophysical Survey	Level D	
Surveying	Level D	
Monitoring Well Installation and Sampling	Level D	Utilize hearing protection when equipment is operating
Soil Vapor Sampling	Level D	Utilize hearing protection when equipment is operating

Decontamination equipment-includes distilled water, Alconox™ soap, brushes, plastic sheeting, tables, steam cleaner, tap water, methanol, hexane and acetone solvents (if needed), washtubs (at least 3), plastic bags, DOT approved 55-gallon open top drums for solid waste disposal, closed top drums for rinse water disposal, or discharge of spent decontaminated liquids to the ground surface and / or shower (if warranted per work scope).

Air monitoring instrumentation-includes a photo-ionization detector (PID) with a 10.6 eV or greater lamp (check ionization potentials of volatile air contaminants in the NIOSH Pocket Guide to Chemical Hazards), flame ionization detector (FID), Oxygen/LEL Meter, hand pump with colorimetric indicator tubes, sound level meter and / or other field instrumentation for the project (specify air monitoring instrumentation for the project). Readings will be taken periodically and documented in an air-monitoring log.

11.1 Respiratory Protection Program

To control the incidence of occupational diseases, OSHA requires that hazardous air contaminant levels at Apex project sites be reduced to the lowest possible levels by instituting engineering controls and work practices designed to prevent atmospheric contamination. However, when such controls are not feasible or while they are in the process of being instituted, respirators may be used as a means of controlling employee exposure to hazardous air contaminants. The policies and procedures found in Apex's Respiratory Protection Program (Section 11.0 of the Corporate Safety, Health and Environmental Control Plan) are to be followed whenever respirators are used to control personal exposures to hazardous airborne substances.

All site workers required to wear respiratory protection must be included in a medical surveillance program. No worker on the project site is permitted to wear a respirator unless that individual has been medically qualified and has been found to be physically fit to wear respiratory protection, has had appropriate training on the use and limitations of the respirator and is knowledgeable of the requirements of the employer's Respiratory Protection Program.

12.0 EMERGENCY RESPONSE/PLANNING

12.1 Emergency Telephone Numbers/Directions to Hospital

The following telephone numbers and directions to the hospital from the site are provided to expedite emergency assistance if needed at the site.

Nearest Hospital:	Good Samaritan Hospital Medical Center 1000 Montauk Highway West Islip, NY 11795 General Tel. No.: (631) 376-4444 non-emergency
	See **Appendix B** for map and directions to hospital.
Fire Department:	911 or (631) 661-6440 for West Islip Fire Department
Police Department:	911 or (631) 854-8300 for Suffolk County Police Department 3rd Precinct
Ambulance:	911 or (631) 661-6440 for West Islip Fire Department
CHEMTREC (Chemical Transportation Emergency Center) 2501 M Street, NW Washington, D. C. 20037 Tel. No.: (800) 424-9300	
Poison Control Center:	(800) 336-6997
Project Manager:	Richard J. Baldwin – (631) 567-1777 ext. 106 work (631) 987-6710 – cell
Client Contact:	David H. Cohen (516) 873-2000
Corporate Health and Safety:	Harold Heckman, CHMM (610) 722-9050, ext. 216 (484) 429-5104 – cell
Project Director:	Daniel J. Smith (631) 567-1777, ext. 102 (914) 319-5104 - cell

12.2 Evacuation Procedures

If evacuation from the site is required due to an emergency such as a fire or explosion, the following action should be taken:

- First person recognizing need for evacuation will immediately notify all on-site personnel via voice, air horn or other means.
- Leave the area and report to a designated rally point established by the Site Health and Safety representative. This evacuation point may vary daily based upon site activities and weather conditions and location should be discussed at the Daily Tailgate Safety Meeting.
- Notify emergency medical services, if appropriate at 911.
- Account for all site personnel.
- Contact the Apex project manager and health and safety representative, and Client contact as soon as practical.
- Establish site security and control measures for the neighborhood safety until emergency responders arrive and take control.

12.3 Medical Emergency

Response to a medical emergency:

- Initially survey the situation; do not enter an area that could jeopardize your safety.
- Establish the level of consciousness and then call for help, informing the Emergency Medical Service (EMS) of the patient's condition.
- If the person is unconscious, perform a primary assessment by checking for arousal, airway, breathing and circulation. (only trained First Aid/CPR personnel should perform these tasks; state that you are medically trained).
- Conduct a secondary assessment to the conscious patient by checking for bleeding (control with direct pressure) and monitoring for vital signs.
- Do not move the person unless the location is hazardous.
- Provide First Aid to the level trained.
- Contact the project manager and health and safety representative as soon as practical and document the incident in a report to the health and safety representative.
- See **Appendix A**, Emergency First Aid Procedures for additional response measures.

12.4 Fire Emergency

Response to a fire emergency:

- Evacuate the area immediately and notify EMS.
- Extinguish small fires with an all-purpose fire extinguisher and provided that you have had training in the use of an extinguisher.
- Contact the project manager and health and safety representative and document the incident; document for the project file and send a copy to the health and safety representative.

12.5 Spill/Release of Hazardous Material

Response to a spill or release of hazardous material:

- Wear appropriate PPE and stay upwind of the incident.

- Turn off all sources of ignition and shut down pumps and valves to equipment in the immediate area; if possible, plug leaks and collect drippings in a container.
- Place absorbent around the incident site to soak up hazardous material.
- Call the fire department if potential for a fire exists.
- Determine if the client wants to repair the damage and whether a contractor has to be used.
- Advise the client of any release notification requirements for state or federal agencies and determine who is to complete and submit forms. Submit or report to regulatory agencies only if authorized to do so by client. Completely document interaction with client and regulatory agency. The project manager must contact the client or generator of the spill/release.
- Do not approve for transport, or transport contaminated environmental media until appropriate manifest or shipping paper have been completed and approved. Do not sign any manifest as a generator of waste. Discuss waste transportation issue with Corporate and Division representative prior to resolution for disposal.
- Notification must be made by the client, or by Apex, with permission from the client, to the proper governmental agencies. Spills/releases entering waterways must be reported to the Coast Guard and the National Response Center at 800-424-8802.

13.0 ENVIRONMENTAL MONITORING PROGRAM

13.1 Air Monitoring

Air monitoring will be conducted on a routine basis according to the work being performed using a PID instrument for total organic compound vapor determination. Immediately dangerous to life or health (IDLH) conditions or development of flammable atmospheres will require more frequent monitoring and possibly continuous monitoring until the atmospheric condition improves. IDLH conditions should not occur with the services being provided and the configuration of the work areas.

In general, when conducting monitoring, expect possible rises in exposures associated with the following conditions:

- When work begins on a different area of the property or at the start of new operations;
- When handling hazardous materials other than those identified (e.g., gasoline for portable power tools in enclosed areas);
- When visible dust results from cleaning operations;
- When odors or symptoms of exposure are noted;
- When handling containers that are leaking; and,
- When working in obvious contaminated areas (e.g., product layer on standing water in pans or trenches).

13.2 Noise Monitoring Program

Unprotected exposure to high levels of continuous or impulse noise can cause permanent hearing loss. The greater the intensity, the higher the frequency, and/or the longer the exposure, the more damaging is the effect on the auditory mechanism and the loss of hearing. OSHA requires a hearing conservation program if noise levels exceed a time weighted average of 85 dBA. Noise levels in excess of 85 dBA are possible at worksites given the nature of the work activities.

OSHA's permissible exposures levels are presented in the table below.

Permissible Noise Exposures

DURATION PER DAY (hours)	SOUND LEVEL SLOW RESPONSE (dBA*)
8	90
6	92
4	95
3	97
2	100
1.5	102
1	105
0.5	110
0.25	115**
** Decibels A-weighted.* *** Maximum exposure of 115 dBA for 15 minutes or less.* *Impact (impulsive) noise limited to a maximum of 140 dBA (peak);* *Various combinations of duration and intensity are permissible; and* *Exposure limits for various durations, pursuant to Table G-16 of 29 CFR 1910.95.*	

When workers are subjected to noise exceeding the above levels, feasible engineering or administrative controls should be used. If such controls fail to reduce the noise to the specified levels, hearing protectors must be provided. Employing administrative controls, (i.e., rotating employees or limiting their duration of exposure) for compliance purposes instead of engineering controls is acceptable.

Hearing protectors (e.g., plugs, muffs) will be made available at no cost to all personnel whose exposures equal or exceed 85 dBA TWA. Employees will be given the opportunity to select hearing protection from a variety of hearing protectors. Employees will be trained in the use and care of hearing protectors. Supervisors will ensure that hearing protection is worn, where required. All personnel, including those in a hearing protection environment, must be able to hear essential communications and/or emergency alarms. Selected hearing protectors will be capable of reducing the worker noise exposure level to a TWA of 85 dBA. Where noise levels exceed 100 dBA, dual hearing protection (i.e., ear plugs and muffs) should be worn.

13.3 Weather Monitoring

Weather conditions shall be monitored and considered prior to scheduling on-site activities. No site activities shall be performed during moderate to severe inclement weather conditions for this project.

13.4 Maintenance and Calibration Requirements for Monitoring Instrumentation

All environmental monitoring equipment shall be calibrated prior to field use and/or as required by the manufactures' guidelines.

14.0 WORK ZONES/SITE CONTROL

Work zones at the site will be established by the project manager (PM) and site health and safety representative to delineate high-traffic and hazardous locations and to contain contamination generated from field activities to the smallest area possible. Workers entering these work zones must wear appropriate PPE for that area. Work and support zones will be established from air monitoring data, required security measures and other conditions at the site.

Three primary work zones are to be demarcated. These include the Exclusion Zone (EZ), Contamination Reduction Zone (CRZ) and the Support Zone (SZ). Each zone will be established by the PM or SHSO prior to commencing daily activities. These zones can be marked on the attached map included in the HASP appendix and delineated on-site by fencing, cones, warning tape or other means deemed appropriate by the SHSO.

The EZ will contain areas where construction equipment is operating, where concrete is being cut, where contaminated soils are being excavated, moved or stored, and other locations where potential for exposure to organic vapors and contaminated dust exist on the property. At a minimum, Modified Level D PPE is required to be worn in these areas. Air monitoring will be conducted routinely in the EZ and documented. Use a minimum distance of ten (10) feet surrounding the EZ for the demarcation line. This will vary depending upon location to workers, public and traffic.

The CRZ will be an established corridor leading from the contaminated area (EZ) to the support zone. In some circumstances, the back end of the company pick-up truck may be used. The corridor will be identified by tape, cones, fencing or other barricades. Decontamination of personnel and equipment will occur in this zone. Vehicles and other larger pieces of equipment that may become contaminated can be decontaminated in a separate CRZ, which has ground containment to collect contaminated rinse-water.

The SZ will include all areas outside the EZ or CRZ where breaks will be taken, food and beverage may be consumed and general support for workers will be provided from this area.

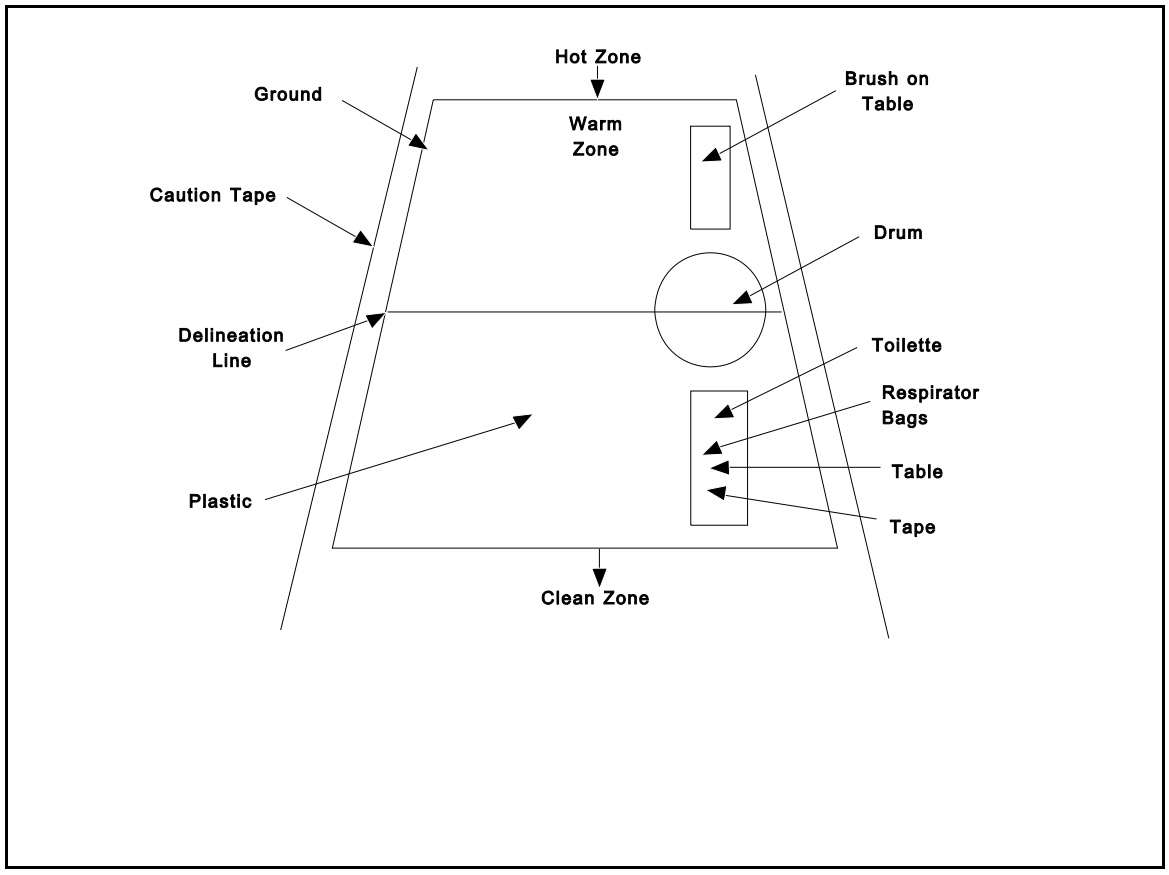
When working in, or near a street, traffic vests and hardhat must be worn where vehicle hazards exist. Caution tape, flag-mounted cones, and other highly visible barriers must be used to alert traffic to the work being conducted. Where possible, a parked vehicle should protect the work area and strobe lights must be used. If needed, establish a traffic patternization plan for high traffic conditions. This should include a flag person, flashing arrow signs and “Men Working” signs. A lane-closing permit will be required and police details should be used, when appropriate.

15.0 DECONTAMINATION PROCEDURES

Field equipment and personal protective equipment may become contaminated with residual fuel oil during the site activities. It is important to halt the spread of contamination to vehicles, personnel and support areas by using appropriate decontamination procedures. Work clothing and Level D PPE must not be brought to workers' residences and left either at the site or in the company vehicle. Any laundering of contaminated clothing must be done by an approved laundering service and not at the workers home. The decontamination procedures discussed for workers and the area previously can be used and can be supplemented by the following procedures.

All water/detergent used in decontamination procedures should be stored in portable containers until sufficient quantities are stockpiled to facilitate disposal treatment. All disposable PPE and sampling equipment must be placed in plastic bags and temporarily stored in designed open-top drums. These drums will be disposed of in accordance to MA DEP guidelines, if required.

Typically, decontamination should occur in a corridor configuration with caution tape or other comparable methods used to delineate the corridor. An example decontamination corridor is inserted below.



The corridor should have plastic sheeting protecting the ground or floor. As workers exit the Exclusion Zone into the Contamination Reduction Zone, a table can be set up to hold brushes, which can be used to remove coarse contaminated debris from the PPE. Several plastic "kiddy" pools can be used to rinse rubber boots, and a drum used to collect contaminated materials or tools. Showers and toilette facilities should be located toward the end of the corridor. A table should also be available to store respirators and protective storage bags, monitoring equipment and other disposable supplies. Set up the decontamination corridor so that it is divided into a front and rear section. In the front section the following activities should occur:

- Gross contamination is removed with the brushes supplied on the table.
- Outer boot covers are removed and disposed of in the drum.
- The Tyvek suit is removed and disposed of in the drum.
- The outer gloves are removed and disposed of in the drum.

Workers should proceed to the rear portion of the corridor next and perform the following decontamination tasks:

- Remove respirator after it is rinsed of dust and contaminants.
- Remove the cartridges and dispose of in a second drum.
- Thoroughly clean the respirator and insert in the protective plastic bag.
- Inner gloves are removed and disposed of in the drum.
- Hands should be wiped clean with a toilette and disposed of in the drum.
- Showers may be taken, if warranted at this site in this section of the CRZ and personnel clothing changed.
- Worker exits the decon corridor.

The following decontamination procedures can be used:

Field Equipment: Equipment such as interface probes, bailers, hand tools, drill augers, sampling equipment and other items can be decontaminated with a solution of detergent and water. Equipment should be rinsed with clean water prior to leaving the site. Protect clean materials from exposure by covering with disposable covers such as plastic to minimize required decontamination activities. For example, a small plastic bag can be taped around not-critical portions of air monitoring instrumentation, to protect from damaging electronics by water.

Disposable PPE: PPE including Tyvex suits, respirator cartridges and latex inner gloves can be disposed of according to state, federal and client requirements. Respirator cartridges must be changed out on a daily basis and a cartridge should not be used more than 8 hours. Cartridges can be disposed of in the drum of other contaminated field equipment and supplies.

Nondisposable PPE: Respirators should be wiped clean with a disinfecting alcohol pad prior to donning. Respirators should be decontaminated at the end of each day, if worn. Decontamination includes disassembly and cleaning, rinsing, sanitizing and drying all parts with approved cleaning and sanitizing agents. Reusable boots and gloves should be decontaminated on the outside with a solution of detergent and water and should be rinsed with clean water prior to leaving the site. As a general rule, boots and gloves that have been heavily contaminated should not be used for more than four weeks; after that time it is advisable to use new items.

16.0 CONFINED SPACES

There are no confined space entries anticipated for this project. A confined space has the following characteristics:

- It is a space or work area large enough to physically enter to perform assigned work;
- It is a space or work area not designed or intended for continuous human occupancy;
- It is a space or work area having limited means of access and egress; and
- It is a space or work area that generally has poor natural ventilation.

In order for a confined space to be defined as a permit-required confined space, one or more of the following characteristics must be true:

- The space contains or has a potential to contain a hazardous atmosphere;
- The space contains a material that has the potential for engulfing an entrant;
- The space has an internal configuration such that an entrant could be trapped or asphyxiated by inwardly converging walls or by a floor which slopes downward and tapers to a smaller cross-section; or
- The space contains any other recognized serious safety or health hazard.

Should confined spaces be identified during the project and work personnel be required to enter to perform needed tasks, no Apex Companies, LLC or Apex subcontractors shall enter such an area without having training that meets OSHA requirements in 29 CFR 1910.146. Rescue arrangement will need to be arranged in advance of such activities and all involved personnel will be trained in the OSHA requirements for entrants, attendants and supervisors. A permit will be required for such work and will be posted at the entrance to the confined space.

No Apex employee or subcontractor shall enter an area identified as a confined space without using the CSE procedures. The purpose of the CSE procedure is to protect employees from potentially hazardous environments and to facilitate immediate rescue in an emergency situation. A CSE Permit must be posted at the entrance to each confined space.

17.0 SPILL CONTAINMENT PROGRAM

While it is not anticipated there is the potential spill or release of diesel, gasoline, or hydraulic oil as the result of mechanical problems with heavy equipment. Appropriate absorbent materials will be available on-site in the event such a release or spill should occur.

18.0 EXCAVATION ACTIVITIES

It is the responsibility of each supervisor to implement and maintain the procedures and steps set forth in this program. All employees working in and around the excavation must be trained in the recognition of hazards associated with trenching and excavating. Each employee involved with excavation and trenching work is responsible to comply with all applicable safety procedures and requirements of this program. The competent person assigned to any excavation/trenching activities provides oversight and collects data to determine the effectiveness of protective systems, PPE, and personnel safety. The competent person must be trained in accordance with the most recent version of the OSHA Excavation Standard, and all other programs that may apply and must demonstrate a thorough understanding and knowledge of the programs and the hazards associated.

All other employees working in and around the excavation must be trained in the recognition of hazards associated with trenching and excavating.

General Requirements

Before any work is performed and before any employees enter the excavation, a number of items must be checked and insured:

- Underground utility locations must be determined. Verification of utility locations will be conducted by the competent person. This can be accomplished by contacting local utility companies.
- All overhead hazards (surface encumbrances) that create a hazard to employees must be removed or supported to eliminate the hazard;
- A competent person will inspect all excavations and trenches daily, prior to employee exposure or entry, and after any rainfall, soil change, or any other time needed during the shift. All inspections will be documented on the **Daily Excavation Inspection and Entry Form** and kept on file in the jobsite safety files and forwarded to the Project Manager weekly. The competent person must take prompt measures to eliminate any and all hazards;
- Excavations and trenches that have the potential for toxic substances or hazardous atmospheres will be tested at least daily by the competent person. A log of the test results must be kept at the work site;
- Adequate protective systems will be utilized to protect employees. This can be accomplished through sloping, shoring, or shielding;
- If a trench or excavation is four feet or deeper, stairways, ramps, or ladders will be used as a safe means of access and egress. For trenches, the employee must not have to travel any more than 25 feet of lateral travel to reach the stairway, ramp, or ladder;
- Walkways shall be provided where employees or equipment are required or permitted to cross over excavations. Guardrails, which comply with 1926.502(b), shall be provided where walkways are six feet or more above lower levels;
- Workers must be supplied with and wear any PPE deemed necessary to assure their protection;
- Employees shall not work in excavations in which there is accumulated water, or in excavations, in which water is accumulating, unless adequate precautions have been taken to protect employees against the hazards posed by water accumulation. The precautions could include special support or shield systems to protect from cave-ins,

water removal to control the level of accumulating water, or use of a safety harness and lifeline.

- If water is controlled or prevented from accumulating by the use of water removal equipment, a competent person must ensure proper operation and shall monitor the water removal equipment and operations.
- All spoil piles will be stored a minimum of two (2) feet from the sides of the excavation. The spoil pile must not block the safe means of egress.
- No personnel shall be permitted underneath loads handled by lifting or digging equipment. Workers shall be required to stand away from any vehicle being loaded or unloaded to avoid being struck by any falling materials.

References

- OSHA 29 CFR 1926.650, Subpart P Health and Safety Regulations for Construction—Excavations
- OSHA Construction eTool, Trenching and Excavation: http://www.osha.gov/SLTC/etools/construction/trenching/protective_systems.html#Additional%20Examples

19.0 UNDERGROUND UTILITIES

The importance of safe excavation practices cannot be overstated. In addition to the safety hazards encountered when excavating around buried utilities, there are serious potential service outages that could occur if a utility is damaged or severed. There are hundreds of thousands of miles of underground utilities. Many of these are potentially dangerous or even deadly to the excavator that might hit them accidentally when excavating. This includes danger to professional excavators, homeowners, and others.

One-Call Facility Locate Request (Utility Markout)

Project Personnel should request the location of underground utilities at each site by notifying the utility owner/operator through the one-call system at least two working days and no more than ten working days prior to beginning excavation.

Provide all the necessary information during the one-call:

- Nearest intersection and/or closest street
- Type of work being performed (i.e. drilling, trenching)
- Extent of excavation
- Date work is scheduled

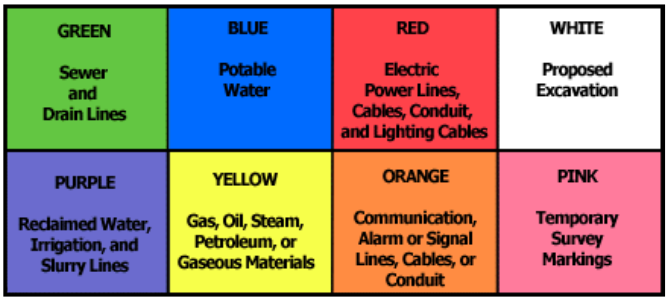
The more information available about the site and the job to be performed the better.

Additional resources for obtaining site specific information:

- Request onsite meeting with the property owner;
- Request as-built schematics;
- Request plans for repairs, upgrades or modifications; and
- Retain independent utility contractor.

When the excavation site cannot be clearly and adequately identified on the locate ticket, onsite personnel should designate the route and/or area to be excavated using white pre-marking prior to the arrival of the locator. The route of the excavation should be marked with white paint, flags, stakes, or a combination of these to outline the dig site prior to notifying the one-call and before the locator arrives on the job.

When the request to the one-call center is made, he/she is told which utility owners/operators will be notified. Project personnel should log these on his/her job sheet so that he/she can identify which utility owners/operators have responded by marking and which ones have cleared the area. On the flip side, when a utility owner/operator does not respond by marking or clearing, this could signal that the utility owner/operator did not receive a locate notice.



Project personnel should call the one-call center to refresh the ticket when excavation continues past the life of the ticket (sometimes, but not always, defined by state law). If not currently defined in state law, ticket life would best be 10 working days but not to exceed 20 working days.

Many utility owners/operators do not perform their own locates and utilize the services of a contracted facility locator. These contracted facility locators may not be aware of work planned in the near future. By excavators refreshing the locate ticket, the contract locator has another opportunity to identify newly placed utilities. This practice also gives the utility owner/operator another chance to identify the location of their utilities and to avoid a possible damage and disruption of service should something have been marked incorrectly or missed on a previous locate.

Locate Reference Number

Personnel should receive and maintain a reference number from the one-call center that verifies the located requested. The number is proof of notification to the members. The computer generated request identifies the date, time, and sequence number of the locate request. Each locate request ticket (notification) is assigned a unique number with that one-call center, the requestor and the utility owner/operator. This number separates this ticket from all other tickets so that it can be archived and recalled upon request with the details of that request only.

Separate Locate Requests

Every contractor on the job should have a separate one-call reference number before excavating. Often, there are several excavators on a job site performing work. The construction schedule may dictate different types of work requiring excavation from different specialty contractors simultaneously. In these situations it is imperative for each excavator to obtain a one-call reference number before excavation to ensure that the specific areas have been appropriately marked by any affected underground utility owner/operator.

Pre-Excavation Meeting

When practical, personnel should request a meeting with the utility locator at the job site prior to the actual marking of utility locations. The meeting will facilitate communications, coordinate the marking with actual excavation, and assure identification of high priority facilities. An on-site pre-excavation meeting between on-site Company personnel, the utility owners/operators and locators (where applicable) is recommended on major or large projects. This includes projects such as road, sewer, water, or other projects that cover a large area, progress from one area to the next, or that are located near critical or high priority utilities.

Such utilities include, but are not limited to;

- High-pressure gas, high voltage electric,
- Fiber optic communication, and
- Major pipe or water lines.

Utility Owner/Operator Response

The utility owner/operator is required to mark its underground facilities with stakes, paint or flags or notify the excavator that the facility owner/operator has no underground facilities in the area of excavation.

In addition, the party making the notification to the one-call center should be notified by the utility owner/operator of the tolerance zone of the underground utility by marking, flagging, or other acceptable methods at the work site, or is notified that a no conflict situation exists. If a utility owner/operator determines that the excavation or demolition is not near any of its existing underground utilities, it notifies the excavator that no conflict exists and that the excavation or demolition area is "clear."

This notification may be provided by:

Face-to-face communications;
Phone or phone message
Facsimile or other electronic means;
Posting at the excavation of demolition area;
Marking the excavation or demolition area.

If an excavator has knowledge of the existence of an underground facility and has received an "all clear," personnel must attempt to communicate that a conflict does indeed exist and the locator should make marking these utilities a priority before excavation begins.

If the utility owner/operator fails to respond or if the utility owner/operator communicates that the underground utility cannot be marked within the time frame and a mutually agreeable date for marking cannot be arrived at, personnel should re-call the one-call center.

The utility owner/operator and the excavator should partner together to ensure facilities are marked in an acceptable time frame to allow for underground utility protection. Prior to excavation, excavators verify they are at the correct location and verify locate markings and, to the best of their ability, check for unmarked utilities.

Excavation/Construction

Upon arrival at the excavation site prior to beginning the excavation, personnel should:

- **Verify** that the dig site matches the one-call request that all utilities have been marked, reviewing color codes if in doubt, and all service feeds from buildings and homes.
- **Check** for any visible signs of underground utilities, such as pedestals, risers, meters, and new trench lines and for any utilities that are not members of the one-call.
- **Review** the location of underground utilities with site personnel.

Marking Preservation

Project personnel should protect and preserve the staking, marking, or other designations for underground utilities until no longer required for proper and safe excavation. They should stop excavating and notify the one-call center for re-marks if any facility mark is removed or no longer visible.

During long complex projects, the marks for underground facilities may need to be in place far longer than the locating method is durable. Paint, staking and other marking techniques last only as long as the weather and other variables allow. When a mark is no longer visible, but work continues around the utility, request a re-mark to ensure the protection of the utility.

Excavation Observer

Project personnel should have an observer to assist the equipment operator when operating excavation equipment around known underground utilities. The observer is a worker who is watching the excavation activity to warn the equipment operator while excavating around a utility to prevent damaging that buried utility.

Excavation Tolerance Zones

Project personnel will observe a tolerance zone which is comprised of the width of the utility plus 18" on either side of the outside edge of the underground utility on a horizontal plane.

- Methods to consider, based on certain climate or geographical conditions, include:
- Hand digging when practical (pot holing),
- Soft digging,
- Vacuum excavation methods,
- Pneumatic hand tools, and
- Other mechanical methods with the approval of the utility owner/operator, or other technical methods that may be developed.

When excavation is to take place within the specified tolerance zone, personnel will exercise such reasonable care as may be necessary for the protection of any underground utility in or near the excavation area.

Mis-Marked Facilities

Project personnel should notify the utility owner/operator directly or through the one-call system if an underground utility is not found where one has been marked or if an unmarked underground utility is found.

If an unmarked or inaccurately marked utility is found, excavation should stop in the vicinity of the facility and perform notification. If excavation continues, plan the excavation to avoid damage and interference with other utilities and protect utilities from damage.

Exposed Utility Protection

Project personnel should support and protect exposed underground utilities from damage. Protection of exposed underground utilities is as important as preventing damage to the utility when digging around it. Protecting exposed underground utilities helps to insure that the utility is not damaged and at the same time protect employees working in the vicinity of the exposed utility.

Exposed utilities can shift, separate, or be damaged when they are no longer supported or protected by the soil around them. Personnel should support or brace exposed utilities and protect them from moving or shifting which could result in damage. This can be accomplished in different ways, for example, by shoring the facility from below or by providing a timber support

with hangers across the top of an excavation to insure that the utility does not move or bend. In addition, workers should be instructed not to climb on, strike, or attempt to move exposed utilities which could damage protective coatings, bend conduit, separate pipe joints, damage cable insulation, damage fiber optics, or in some way affect the integrity of the utility.

Facility Damage Notification

Project Personnel discovering or causing damage to underground utilities should notify the utility owner/operator and the one-call center. All breaks, leaks, nicks, dents, gouges, groves, or other damages to utility lines, conduits, coatings or cathodic protection should be reported.

The possibility of utility failure or endangerment of the surrounding population dramatically increases when a facility has been damaged. While the utility may not immediately fail, the underground utility owner/operator should have the opportunity to inspect the damage and make appropriate repairs.

Notification of Emergency Personnel

If the protective covering of an electrical line is penetrated or gases or liquids are escaping from a broken line which endangers life, health or property, project personnel should immediately contact local emergency personnel or call "911" to report the damage location. This practice minimizes the danger to life, health or property by notifying the proper authorities to handle the emergency situation. In these situations, local authorities are able to evacuate as appropriate and command substantial resources unavailable to personnel or underground utility owner/operator.

Emergency Excavation

When an emergency excavation, maintenance, or repair is required, initiation may be immediately performed, provided that the excavator notifies the one-call center and utility owner/operator as soon as reasonably possible. This includes situations that involve danger to life, health, or property, or that require immediate correction in order to continue the operation of or to assure the continuity of public utility service or public transportation.

References

OSHA 29 CFR 1926.651 (b) (4) – Specific Excavation Requirements
OSHA 29 CFR 1910.269 – Electric Power Generation, Transmission, and Distribution
U.S. Department of Labor Website: www.dol.gov
American Public Works Association: www.apwa.net
National Institute for Occupational Safety and Health - NIOSH: www.cdc.gov/niosh

20.0 OVERHEAD POWER LINES

If work is to be performed near overhead lines, the lines should be de-energized and grounded, or other protective measures shall be provided before work is started. (This activity would normally be performed by Utility Company workers.) If protective measures are provided, such as guarding, isolating, or insulating, these precautions shall prevent employees from bodily contacting such lines directly or indirectly.

Never operate any crane near electrical power lines. Auto crane companies recommend that a crane, rigging and load being lifted never be moved any closer to a power line (including telephone lines) than 20 feet at any point.

If it is necessary that the crane or equipment being lifted would come closer than 20 feet to any power line in order to complete the job, then the electrical company which owns or controls the power line shall be notified and the power line will be de-energized or disconnected for the duration of the lift.

Unauthorized personnel working near overhead lines, whether in an elevated position or on the ground, will not approach a conductive object (an unguarded, energized line) closer than the following distances:

VOLTAGE RANGE (Kilovolts, kV)	MINIMUM SEPARATION DISTANCE
50 kV or less	10 feet
More than 50 kV	10 feet plus four (4) inches for every 10 kV over 50 kV

When **authorized personnel** are working near overhead lines, whether in an elevated position or on the ground, they will not approach or take any conductive object, without an approved insulated handle, closer to exposed energized parts than the following distances:

VOLTAGE RANGE (Volts, V; Kilovolts, kV)	MINIMUM SEPARATION DISTANCE
Less than or equal to 300 V	Avoid contact
Greater than 300 V but less than 750 V	12 inches
Greater than 750 V but less than 2 kV	18 inches
Greater than 2 kV but less than 15 kV	2 feet
Greater than 15 kV but less than 37 kV	3 feet
Greater than 37 kV but less than 87.5 kV	3.5 feet
Greater than 87.5 kV but less than 121 kV	4 feet
Greater than 121 kV but less than 140 kV	4.5 feet

Vehicular and Mechanical Equipment

Any vehicle or mechanized equipment (for example, man-lift) capable of having part of its structure elevated near energized overhead lines shall be operated so that a clearance of 10 feet is maintained. If the voltage is higher than 50kV, the clearance shall be increased four inches for every 10kV over that voltage.

Whenever using mechanical equipment (drill rigs, back hoes, excavators, etc.) near overhead utilities, a dedicated spotter must be assigned. Requirements for spotters include:

1. Only one present
2. Identified by a high-visibility traffic vest
3. Not assigned any other duties during the times the equipment is near the limits of approach
4. Both signaler and operator know all crane and hoist signals.

Bodily Contact with Conductive Materials

Any conductive materials or equipment that is in contact with any part of an employee's body shall be handled in a manner that will prevent them from contacting exposed energized conductors or circuit parts. If long dimensional conductive objects (pipes, rods, ducts) must be handled around exposed live parts, work practices to include guarding, insulating or safe material handling techniques will be used to minimize the hazard.

Portable Ladder Use

Any portable ladder used by an employee that could contact exposed energized parts shall have non-conductive side-rails (wood, fiberglass).

21.0 Community Air Monitoring Plan

All of the ground-intrusive intrusive field activities (e.g., direct-push sampling, monitoring well installation, etc.) will be conducted in accordance with NYSDOH generic CAMP program included in the Draft DER-10 Technical Guidance for Site Investigation and Remediation, dated December 25, 2002 (see **Attachment N**).

The following CAMP activities will be conducted:

- All monitoring activities will be conducted on a continuous basis during periods when any of the aforementioned activities are being conducted;
- The portion of the subject property where these activities are being conducted will be delineated by traffic-exclusion devices and designated as an exclusion zone;
- The presence of VOCs will be monitored continuously utilizing a photoionization detector ("PID") along the downwind perimeter of the exclusion zone;
- The presence of respirable particulates (i.e., less than 10 micrometers in size [PM-10]) will be monitored utilizing an appropriate field screening instrument both upwind and downwind of the exclusion zone. Further, the presence of visible dust leaving the exclusion zone will be continuously monitored. It is expected that sprayed water will be required as a dust-suppression technique.

A matrix which includes the air monitoring requirements and action to be taken based upon the resultant readings is included in **Table 21-1**.

Table 20-1
CAMP Decision Matrix

Monitoring Type	Monitoring Equipment	Monitoring Location/Frequency		Action Levels	Required Response	
		Downwind	Upwind			
VOCs	PID	Continuous	Start of Day and Periodically	< 5.0 ppm above background	No actions required	
				>5.0 ppm background and <25 ppm background	Halt activities, evaluate source and implement VOC suppression techniques	If resultant PID readings are <5.0 ppm above background 200 feet downwind of the exclusion zone, or half the distance to the nearest receptor, recommence work with continued monitoring
				> 25 ppm above background	Halt all activities and re-assess	
PM-10 Particulates	Dust Meter and visually	Continuous	Continuous	<100 ug/m^3 above background and no visible dust	No actions required	
				>100 ug/m^3 above background or visible dust	Implement dust suppression techniques	
				<150 ug/m^3 above background	Continue work w/ continued dust suppression	
				>150 ug/m^3 above background	Halt work and initiate more aggressive dust suppression techniques	

Notes:
All PID and particulate meter readings will be for a 15-minute average.
All meter readings will be recorded in an on-site notebook and be available for NYSDEC and NYSDOH personnel.

Figure 1-1
Former Mom's Cleaners Site
Site Location Map

Client:	Delilah Realty
Project No.:	85130.003
Project Location:	West Islip, NY
Date:	November 2010

Apex Companies, LLC

Figure 1-2
Former Mom's Cleaners Site
Site Map

Client:	Delilah Realty
Project No.:	85130.003
Project Location:	West Islip, NY
Date:	November 2010

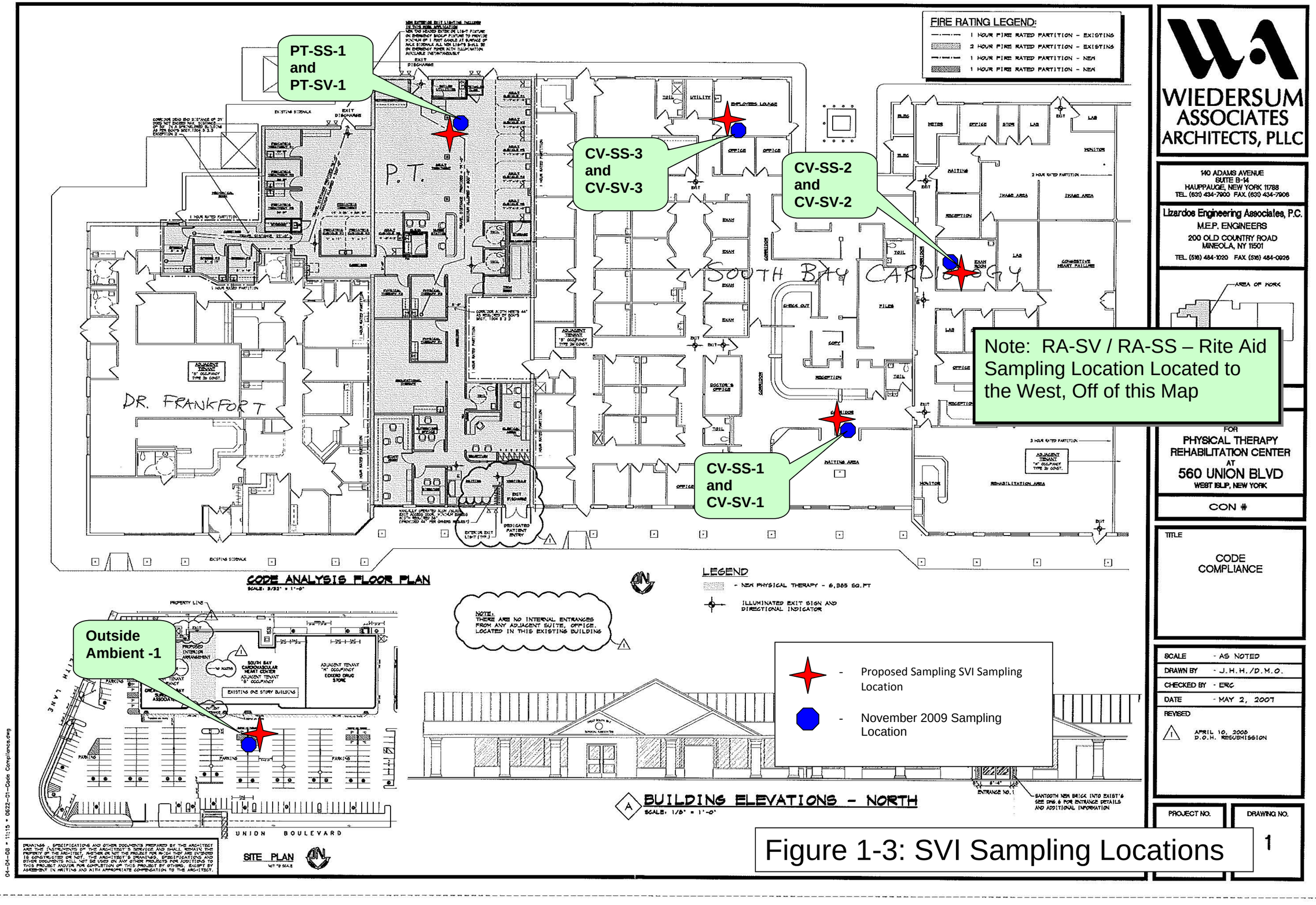


Figure 1-3: SVI Sampling Locations

APPENDICES

Appendix A

Emergency First Aid Procedures

First Aid

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Notices and Disclaimers

Please note that this text is still in the early stages of development

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The contributions to this document reflect the best knowledge and intentions of the many and often anonymous authors contributing to the textbook. Many parts of first aid involve the use of detailed knowledge, motor skills and attitudes which can only be developed through proper training and practice. The practice of first aid is very serious business and *prior training by a person trained in first aid instruction is strongly recommended*.

No person or organization, including Wikipedia and Wikibooks, can assume any liability or take any responsibility for the content of this document. As is always true, any actions that might be taken in performing first aid are the sole responsibility of the first aider.

Persons in need of medical help should always obtain authoritative medical advice, support and care from trained professionals. First aid is a limited set of techniques and procedures for:

- care for minor injuries not requiring a doctor's care, such as small cuts, minor bruises, and blisters
- use in the interval between the recognition of a medical emergency and the arrival of professional help
- use in austere settings such as developing countries, wilderness or the battlefield where professional help is delayed or unavailable

First aiders should know their limits and seek professional medical advice, support and care when it is available.

Laws regarding first aid vary around the world. Follow local laws. If providing advanced first aid or wilderness first aid, consistently following the guidelines in your training is your best defense from legal consequences.

This textbook was prepared by persons with training in various first aid curriculas from around the world, including copyrighted curricula prepared by various organizations including the American Red Cross (http://www.redcross.org/) and Medic First Aid (http://www.medicfirstaid.us/). The mention of these organizations is not intended to and *does not* imply support, endorsement, or involvement in the preparation of this Wikibook text. Any accidental use of copyrighted training suggestions and curricula is unintentional and will be removed on request from an authorized member of any such organization(s).

First Aid - Table of Contents

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Contents

Chapter One - Introduction

The following are basic guidelines for how to perform first aid.

The most important rule is not to panic. Many people learn first aid and are then too frightened to use it when it becomes necessary, or use it inaccurately; they tend to feel an urge to act, resulting in precipitated and possibly dangerous actions for the patient (for instance, a conscious victim ran over by a car in a quiet street would be moved by untrained helpers) or for themselves (what wounded one is likely to produce the same effect on another person). It is important to take the level of competence into account (Note that a doctor or a qualified nurse are usually *less* qualified for field emergency care than trained paramedics).

STOP (Stop, Think, Observe and Plan) is a helpful acronym that can be easily used to start first aid. It is important that the first aider calmly takes in what he or she sees and forms a plan based on the available information. Do not hesitate to take a two-second break to evaluate the situation; time seems to run very quickly during an emergency, but thinking for two seconds is unlikely to kill even the victim of a massive heart failure, while taking an inaccurate action can induce stress to the patient, the witnesses and yourself, delay proper care administration, and even harm the patient.

Most importantly, the first aider must check for possible dangers so as not to increase the number of victims.

Eventually, bringing a feeling of comfort and safety is often the most valuable thing that first aid offers to conscious patient.

Chapter Two - Providing Care

Consent

If the patient is conscious, it is important to ask for permission before proceeding. Touching another person without that person's permission is considered assault in most jurisdictions. Consent for treatment is implied if the patient is:

- Unconscious
- Intoxicated

- Irrational (i.e. delusional, insane or confused due to the injuries)
- Not an adult (parent or guardian must give consent if present and able, otherwise consent is implied)

Since the victim will likely be frightened, explaining your actions and talking in a calm, reassuring voice will have a beneficial effect in reducing stress and increasing the probability of survival.

Protective Precautions

It is necessary for the first aider to protect themselves against various diseases which can be transmitted through blood and other bodily fluids. In the United States, OSHA has established a Bloodborne Pathogens requirement for training those who are required in their job to perform first aid.

The best protection is to avoid contact with blood and bodily fluids. The next best protection, often very effective, is to use barrier methods such as gloves, masks and gowns. When performing CPR and/or rescue breathing, breathing barriers should be used if available.

Legal Liability

Good Samaritan laws in many countries protect people who give first aid without seeking financial compensation. Acting beyond or outside your training may have civil or criminal consequences. On the other hand, some countries prosecute people for not providing needed help. In any case, you are the person on the spot and you will need to make the best decision you can given the circumstances.

Laws regarding first aid vary around the world. Follow local laws. If providing advanced first aid or wilderness first aid, consistently following the guidelines in your training is your best defense from legal consequences.

Diagnosis and First Aid

If the patient is breathing and has a pulse with no severe bleeding, the next step is to decide what the injury or illness is and form a plan of treatment. The "nature of illness" or "method of injury" is determined. Even if the first aider cannot help in the field, the collection of this information is invaluable to proper transport and treatment of the patient by emergency medical technicians and doctors.

In some cases such as abdominal pain it is difficult to determine the seriousness of an injury. Only advanced training and expert advice can help in these cases, and any error should be on the side of caution.

A person trained in advanced first aid may conduct a survey, which is a careful head to toe examination of the injured person for possible additional injuries and symptoms. Often a survey will reveal serious injuries which appear minor but are life-threatening, such as entry and exit wounds from gunshots, a flail chest or collapsed ribcage, or injuries consistent with internal bleeding. A survey at the first-aid level should not involve unnecessary touching of the patient or the removal of clothing unless trained in how to do so safely and with respect for the patient.

One advanced first aid diagnostic technique is to check for perfusion by depressing the fingernail and observing capillary refill. The tissue under a person's fingernail is normally full of blood and refills within 2 seconds after being pressed. In a person with serious blood loss (whether internal or external), the tissue under the fingernail remains white and bloodless. Such a person needs advanced medical care immediately.

First Aid and Mental Status

Sometimes an ille or injured person is disoriented or incoherent, which may mask serious medical conditions or injuries. A level of mental responsiveness can be determined by asking three questions:

- What is your name?
- Where are you?
- What day of the week is it? (note: stressed patients, even totally coherent, tend to respond that it is the day during which they last woke up)

Patients' mental coherence will fall into one of four categories (the AVPU system)

- A = alert, responds correctly to all three questions above
- V = responds to verbal stimuli inappropriately
- P = responds to painful stimuli only (such as rubbing the sternum)
- U = unresponsive to any stimuli

A person with an altered mental status who does not recover quickly requires advanced medical care and should be carefully watched. Suspect concussion or other head injury if trauma is among the mechanisms of injury.

Chapter Three - "ABCD" Basic Life Support

A for Airway

An unconscious person's airway may be blocked when their tongue relaxes and falls across the airway. A technique used to open the airway is called the "head-tilt chin-lift" technique. The patient is lying on their back. With one hand on the forehead and the other hand under the chin, the victim's head is lifted to put the airway back into anatomical position. This simple procedure opens the airway and has saved many lives.

If a neck injury is suspected then the "jaw thrust" technique should be used. Place your fingers behind the victims jaw bones, on both sides, just below the ear. Then push forward.

If the victim is choking on a foreign object lodged in the airway, the object must be removed. The Heimlich maneuver is the standard method for conscious victims. If the victim is unconscious, the object may be removed by reaching in the mouth (using the head-tilt-chin-lift technique from CPR), or with a modified form of the Heimlich maneuver. If the airway is cleared and breathing is not restored, rescue breathing should be applied.

B for Breathing

If a person has stopped breathing but still has a pulse, it is possible for someone else to breathe for them. In artificial respiration, the rescuer alternates breaths taken for his own benefit with breaths into and out of the victim's mouth.

Proper check of the patient's respiration : the helper listens to the breath, tries to feel the air flowing on her cheek, the chest going up and down, and see the movements of the chest.

C for Circulation

(also known as cardiac arrest)

Cardiopulmonary resuscitation (CPR) is a manual method used to induce artificial breathing and heartbeat in a victim who has suffered cardiac arrest. CPR may spontaneously restore natural breathing and heartbeat; if it does not, it may keep the victim alive until professional medical personnel arrive and administer more appropriate treatment. CPR is a manual skill that must be taught with the assistance of a training "dummy" or simulator.

Checking the carotidian pulse

Correct position for CPR. The arms are fully extended and the thrusts are given fom the hips.

Positionning the hand before giving the CPR. The hand must be placed two fingers away from the solar plexus.

Circulation can also include the consideration of severe bleeding, which can cause shock and even stop the heart.

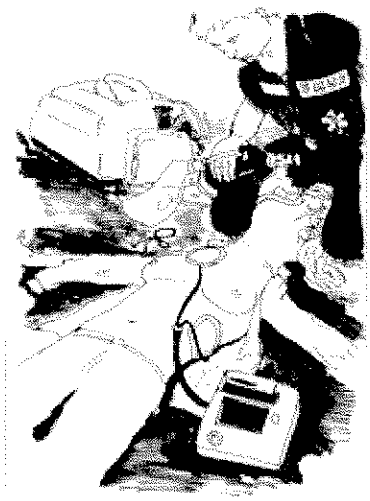
D for Defibrillation

Defibrillation is an electric shock which re-initialises the cells of the heart and allows cardiac nervous pulsations to re-take control of the heart and restart normal heart beats. Modern semi-automatic defibrillators can monitor a patient's heart and decide wether a shock is recommended or not. They can be used over a pace-maker. The system begin very safe, it can be used by trained non-professional personel. Defibrillation is an essential part of the CPR : survival chances of a fibrillating patient start at 90% if defibrillated immidiately, and decrease by 10% every minute. Protocols differ by location. Consult your local EMS for more information.

Defribrillation operations start by removing all metallic parts of the patient (jewelery, nipple piercings, etc.), shaving the chest of exceptionally hairy patients, and placing defibrillation patches : one on the left side, under the heart, and the other over the right breast. When the defibrillator is turned on it will start monitoring the patient to determine wether a shock is appropriate. Most automated external defibulators loudly announce their instructions, follow the steps provided by your system.

CPR must be stopped for the examination. In all cases, defibrillation has a priority on CPR.

If the defibrillator advises a shock, the operator will shout "Warning, shocking ! Clear !" while waving his hand all over the patient. **Touching the patient is dangerous** when the shock is aministrated. If all is clear, the shock is administered by pressing the appropriate button.



Typical view of the defibrillator operator. The leader is at the head of the patient, administrating oxygen. Note how the head of the patient in secured between the leader's knees. The defibrilation patches are on.

Do not shock if

- The patient is close to explosive or inflammable material.
- The patient is wet.
- The patient is on a conductive surface.
- There is running oxygen.

If necessary, protect the patient from water and dry him, or displace the patient a few meters between each CPR cycle until the area is safe for defibrillation.

Defibrillators can also be used for monitoring and recording purpose only; a different set of patches is availlable (two or three small round patches). Should fibrillation occure when the monitoring patches are on, the defibrillator will ask the operator to change patches.

Chapter Four - Bleeding

Bleeding is the most common reason for the application of first aid measures. Minor bleeding can be stopped with direct pressure over the wound, as the blood will naturally clot. In order to prevent infection, a sterile or clean bandage should be used.

Bleeding can be stopped with the following steps. In order, they are

- Direct pressure on the wound
- Elevation of the wound above the heart (depending on the location of the wound)
- Pressure point (pressing down on an artery above the wound to keep blood from flowing to the wound)

Life Threatening Bleeding

The key element in treating severe bleeding is the application of firm, direct pressure to the wound, using a surgical glove or other infection barrier if available. The wound may be elevated above the heart to reduce blood pressure, though this should not be done if there is a risk of disturbing fractures. Pressure may also be applied to *pressure point*s where blood vessels run close to the surface upstream from the wound.

The use of a tourniquet is rarely taught in first aid because it is rarely required to control severe bleeding and poses life-threatening risks. Even wounds from amputated limbs can be controlled with direct pressure, pressure points and elevation.

Chapter Five - Shock

Internal Injuries and Trauma

Seriously injured persons often suffer hypovolemic shock which can be caused either by external or internal bleeding. Symptoms include rapid breathing (a normal adult rate is 12-20 respirations per minute) and cold, clammy skin. The patient should be kept warm and the patient's feet should be elevated approximately six inches off the ground (unless spinal or other injures preclude this). The object is to raise the blood pressure to their inner organs to prevent oxygen starvation of major tissues.

Persons with internal injuries or who have suffered traumatic injuries often require immediate surgery to save their lives. The most important way a first-aider can help these victims is to arrange for immediate rapid transport to a trauma center or other equipped facility for immediate transfusion and surgery. The best way to do it is to call for help and let the professionals decide where best to transport the victim.

Anaphylactic shock

Anaphylaxis is a life-threatening medical emergency because of rapid constriction of the airway, often within minutes of onset. It can be triggered by insect bites as well as exposure to allergens in some people. Call for help immediately. First aid for anaphylaxis consists of obtaining advanced medical care at once; rescue breathing (a skill that is part of CPR is likely to be ineffective but should be attempted if the victim stops breathing. Look to see if a device such as an Epi-pen is available for administration of epinephrine by a layperson.

Blast Injuries

Blast injuries are caused by explosions and are most often seen in industrial accidents or through effects of military weapons such as grenades, explosives, and antipersonnel mines. Blast injuries may also be the result of bombings by terrorists. Great caution should be taken by the first aider to avoid becoming a casualty themselves, particularly in the event of a secondary blast or in a possible ambush.

Internal injuries are likely in direct proportion to the size of the blast and the distance from the victim. Whether or not the victim was shielded by any nearby object should be considered.

Chapter Six - Soft Tissue Injuries

Soft tissues include skin and muscles.

Cuts, Scrapes and Bruises

Cuts, scrapes and bruises should be washed with soap and water. Any foreign objects or dirt should be removed to avoid infection. Apply a clean dressing; it is worth the time to locate a sterile dressing for this purpose.

Any long cut or laceration may require stitches to heal properly, especially on the face and scalp. See medical attention in these cases. Most wounds should be sutured within 6 hours of the injury, although facial and scalp wounds can go as long as 12 hours. Clean tap water can be used to clean a laceration, and should be done as soon as possible.

Avulsions and Amputations

An avulsion is a piece of skin or flesh which is separated from the person, for example a torn-off earlobe. An amputation is a body part that has been separated from the person.

Apply normal care for bleeding. Find the separated part and take it with the injured person to the hospital. Surgical reattachment is often possible if performed promptly. Do not ice the part.

Burns

First cool the burn with large quantities of water. Do not use ice. Then cover the burn with sterile or clean dressings. Then seek help for serious burns or burns that impair breathing, cause shock, or are caused by unusual means (radiation, chemicals, electricity).

Do *not* lance burn blisters.

Bandages and Dressings

A dressing is something used to cover a wound, typically a sterile or clean piece of cloth or gauze. A bandage is used to hold the covering over the wound, such as adhesive tape or wrapped cloth, gauze or elastic.

The skill of bandaging and dressing an injury is part of the performance of first aid.

Chapter Seven - Bones, Joints, and Muscles

Bone Injuries

A bone injury can be internal or external. Even internal bone injuries that do not break the skin can cause major bleeding and shock.

The primary first aid technique for bone injuries is splinting. Proper splinting can reduce pain and discomfort, especially if the victim must be moved, but should not be attempted if advanced medical help is on the way.

Joint Injuries

Joint injuries include strains and sprains. Some joint injuries occur when a joint is over-stressed. Sports trainers recommend following the acronym RICE for

- Rest, which is essential to allow healing
- Ice, intermittently applied
- Compression, with an elastic bandage

- Elevation, above the heart

Muscle Injuries

As with joint injuries, muscle injuries are often treated using RICE.

Chapter Eight - Environmental Injuries

Heat Injuries

Heat cramps. Heat exhaustion. Heat stroke.

Cold Injuries

Frostbite. Hypothermia.

Patients should be kept in a reasonably warm place. The stress of excessive heat or cold can stress an injured or ill body further, increasing the danger. Temperatures as low as 55 F (about 13 C) or as high as 95 F (35 C) can injure by exposure for an hour -- this is a major hazard in longer term care.

Pulmonary and cardio-vascular functions of hypothermia patients might cease. Such patients can only be pronounced dead when appropriately brought to normal temperature ; first aid procedures can therefore continue until professional help is available.

CPR

NOTE: The content below has been moved from Wikipedia, and should be merged with the above:

- First Aid/CPR
- First Aid/CPR summary

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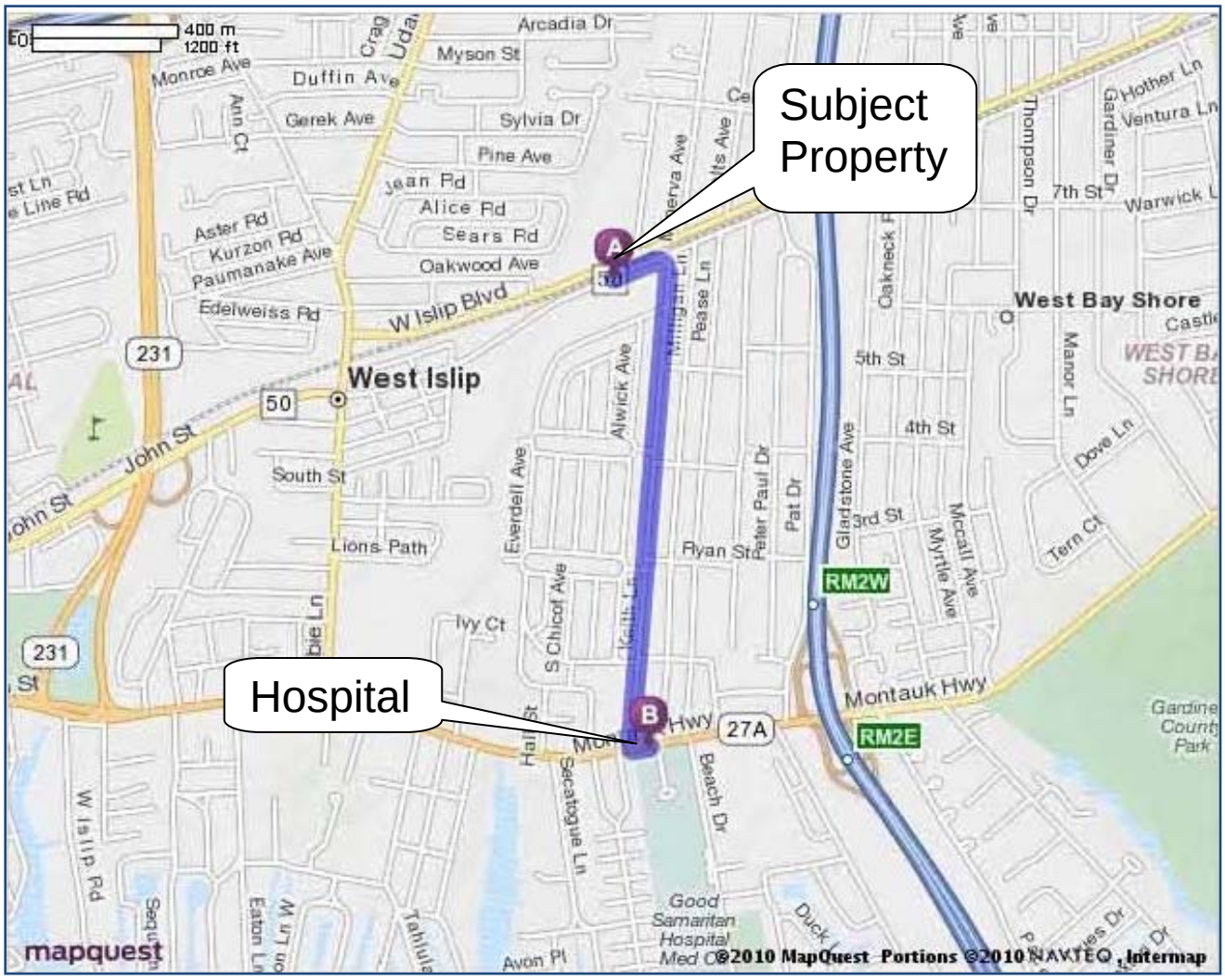
Science

Retrieved from "http://en.wikibooks.org/wiki/First_Aid"

Appendix B

Directions to Hospital



A 556 Union Blvd, West Islip, NY 11795-3105

START	1. Start out going **NORTHEAST** on **UNION BLVD / CR-50**.	go 0.0 mi
	2. Turn **SLIGHT RIGHT** onto **KEITH LN**.	go 1.0 mi
27A	3. Turn **LEFT** onto **MONTAUK HWY / RT-27A**.	go 0.0 mi
END	4. **1000 MONTAUK HWY** is on the **RIGHT**.	go 0.0 mi

B Good Samaritan Hospital Medical Center - (631) 376-4444
1000 Montauk Hwy, West Islip, NY 11795

Total Travel Estimate : 1.15 miles - about 3 minutes

Appendix C

Daily Tailgate Safety Meeting Forms

DAILY TAILGATE SAFETY MEETING FORM

Instructions:

- **Conduct a Daily Tailgate Safety Meeting with site personnel prior to commencing daily activities. Safety topics can be selected from the attached table.**
- **Address potential hazards and controls for tasks that will be conducted.**
- **Discuss air monitoring, training, PPE and other appropriate requirements.**
- **Follow-up on noted items and document the resolution of any action items.**

Date: _____

Meeting conducted by: _____

Project/Site: _____

Safety topics/information reviewed: _____

Follow-up action items/comments: _____

Attendance:

NAME	SIGNATURE	COMPANY/AGENCY/OTHER ORG.

DAILY TAILGATE SAFETY MEETING TOPICS GUIDE

1. ACCIDENT REPORTING
2. AIR MONITORING
3. AIR MONITORING AND ACTION LEVELS
4. ALCOHOL CONSUMPTION AND WORKSITE SAFETY
5. COLD STRESS
6. CONFINE SPACE ENTRY
7. CRANE SAFETY
8. DAILY WORK TASK HAZARDS
9. DECONTAMINATION
10. DISCIPLINARY POLICY FOR NOT FOLLOWING SAFETY RULES/SAFE WORK PRACTICES
11. DRILL RIG SAFETY
12. ELECTRICAL SAFETY
13. EMERGENCY RESPONSE
14. ERGONOMICS
15. EXCAVATION/TRENCHING HAZARDS
16. EYE WASH STATION LOCATION (S)
17. FALL PROTECTION
18. FIRE SAFETY/BONDING-GROUNDING TECHNIQUES
19. FIRST AID/CPR
20. FUGITIVE DUST CONTROL
21. GENERAL SITE SAFETY RULES
22. HAND TOOL HAZARDS
23. HAZARD COMMUNICATION/LOCATION OF MSDS/REVIEW OF HAZMAT PROPERTIES
24. HEALTH AND SAFETY PLAN
25. HEARING PROTECTION
26. HEAT STRESS
27. HEAVY MACHINERY
28. HOSPITAL DIRECTIONS
29. HOUSEKEEPING
30. MATERIAL HANDLING
31. MECHANICAL HAZARDS/GUARDING/LOTO
32. OVERHEAD HAZARDS
33. PERSONAL PROTECTIVE EQUIPMENT
34. RESPIRATORY PROTECTION AND FILTER CHANGE-OUT SCHEDULE
35. ROLES AND RESPONSIBILITIES
36. SITE SECURITY
37. SMOKING AND BREAK AREAS
38. TANK REMOVAL SAFETY
39. UNDERGROUND UTILITIES
40. USE OF “BUDDY SYSTEM”
41. VAPOR CONTROL
42. WATER HAZARDS
43. WELDING SAFETY
44. WORK STOPPAGE

Appendix D

Safe Work Permit

SAFE WORK PERMIT

DATE ISSUED _____TIME ISSUED _____

EXPIRATION DATE _____(Permit not valid for any date other than date issued)

LOCATION OF WORK / DISTANCE FROM APEX OFFICE
_____

PROJECT MANAGER/PHONE #
_____

CONTRACTOR/PHONE #
_____

The location where this work will take place will be examined before the start of field operations and all the appropriate precautions (**including any that exceed those outlined below**) will be taken.

Signature of Field Personnel conducting work _____
Date _____

Signature of Project Manager _____
Date _____

FIELD SAFETY PRECAUTIONS

BEFORE THE WORK - All of the following precautions must be taken:

Person(s) doing field work and the project manager must initial next to each line below:

☐	☐	All tasks to be conducted have been identified and appropriate task specific PPE (i.e., face shield, anti-vibration work gloves etc.) has been identified (if needed).
☐	☐	Distance of the site and tasks to be conducted by field personnel have been evaluated to determine if potential fatigue hazards exist due to long hours.
☐	☐	Means of contacting emergency help and the office area available at the site.

☐	☐	Evaluation of whether the buddy system should be employed has been made.
☐	☐	Provisions have been made for breaks and/or rotating especially repetitive motion tasks are involved.
☐	☐	Health and Safety Plan has been reviewed and signed off on.
☐	☐	All field personnel using power tools and equipment have been properly trained and evaluated.

Where applicable, the following precautions will also be taken before the work begins:

Person(s) doing field work must initial next to each line below:

☐	☐	Field personnel will check in with the Apex office and will appropriate site personnel
☐	☐	Work area marked with caution tape.
☐	☐	Inspected all equipment and tools prior to using.

DURING / AFTER THE WORK - The following precautions will be taken:

Person(s) doing field work must initial next to each line below:

☐	☐	Verify that appropriate PPE is being worn by all field personnel.
☐	☐	Verify breaks as needed and / or tasks are rotated to avoid potential ergonomic / repetitive motion disorders (i.e., weed whacking).
☐	☐	Breaks are taken as necessary dependent upon the weather conditions to avoid potential heat or cold stress.
☐	☐	All potential hazards and concerns have been reported to the project manager and/or the Regional or Corporate Health and Safety Manager. All near-miss incidents should be reported.

Appendix E

Industrial Hygiene Sampling Form

Industrial Hygiene Sampling Form

Project Name		**Project Number**
Building/Area	**Plant Location**	**Date**
Employee (name and SS#)		**Weather Conditions**
Job Title		**Pump Checks & Adjustments**
PPE (type issued and type worn)		

Pump ID				
Sample Number				
Contaminant				
Sample Media				
Start Time (1)				
Stop Time (1)				
Start Time (2)				
Stop Time (2)				
Total Sample Time (min.)				
Flow Rate (liters/min.)				
Volume (liters)				
Blanks				

Notes & Observations

Notes	Sketch

Calibration Records		
	Pre-Calibration (liters/minute)	***Post-Calibration (liters/minute)***
1		
2		
3		
Total		
Average		
Date and Time		
Calibration Method		

Calculations

Appendix F

Apex Incident Report Form

APEX INCIDENT REPORT FORM (AIR FORM)

INCIDENT ID NO. (ASSIGNED BY CORPORATE)

Instructions: this Apex Incident Report (AIR) Form is to be completed by the Apex employee experiencing any of the incident types listed below. The AIR Form can also be completed with support from the employee's Supervisor, or Office Central Safety Committee. This form is to be completed for motor vehicle accidents/incidents, near miss incidents, environmental incidents, first aid/minor injury incidents, fires, property damage, thefts, community complaints and other incidents deemed important for review by Apex employees. The AIR Form must be answered completely and submitted to Apex's Corporate Human Resources Office in Rockville, Maryland within 72 hours of the incident.

Type of Incident:	☐	Motor Vehicle	☐	Near Miss
	☐	Environmental	☐	First Aid/Minor Injury
	☐	Fire	☐	Property Damage
	☐	Theft	☐	Community Complaint
	☐	Other		

Report prepared by_____ Job title_____

Address_____ Phone_____

Employee ID No._____ Home office_____

Date and time of incident_____

Description of incident_____

Witness(es) _____ Phone _____

Witness(es) Statement(s) Attached?_____ If not, please provide a summary of the information provided by witness(es):_____

Work task at time of incident_____

_____

Description of incident_____

_____

_____

_____

Describe the unsafe act or condition contributing to the incident_____

_____

_____

_____

Corrective measures taken or recommended to prevent a similar incident_____

_____

_____

_____

Supervisor Printed Name _____Signature _____

Date_____

If similar incidents have occurred in the office or on projects, please discuss_____

_____

_____

_____

Corporate Health and Safety and Human Resources Representatives Review:

Agree with action taken? Human Resources: ☐ Yes ☐ No

Health & Safety: ☐ Yes ☐ No

Human Resources comments_____

_____

_____

Health and Safety comments_____

_____

_____

Human Resources Representative:

Signature_____

Printed_____

Date_____

Health and Safety Officer:

Signature_____

Printed_____

Date_____

MONTHLY INJURY/EXPOSURE REPORT

Name: _____

Social Security Number: _____

Firm/Region: _____

During (month/year): _____ to the best of my knowledge, I have/have not (circle one) received reportable exposure or been injured on the job. I have been on the following sites:

Site Name	Site Number

If have was circled above, or if you wish to report any occurrences with respect to health and safety, please fill out the applicable sections of the remainder of this form.

Signed: _____

If the employee has received a reportable exposure, or if any injury has occurred as indicated by circling have previously, an Injury/Exposure Report must be submitted to the Site Safety and Health Supervisor (SSHO).

If you wish to report any occurrences with respect to health and safety, please answer the following:

	Yes	No
Any occurrences with respect to health and safety?		
Any violations of health and safety rules observed?		
Any physical difficulties while on assignment?		
Any exposure or injury?		
Was an Injury/Exposure Report submitted?		
Date Injury/Exposure Report submitted:		

Comments or suggestions:

_____

_____

_____

_____

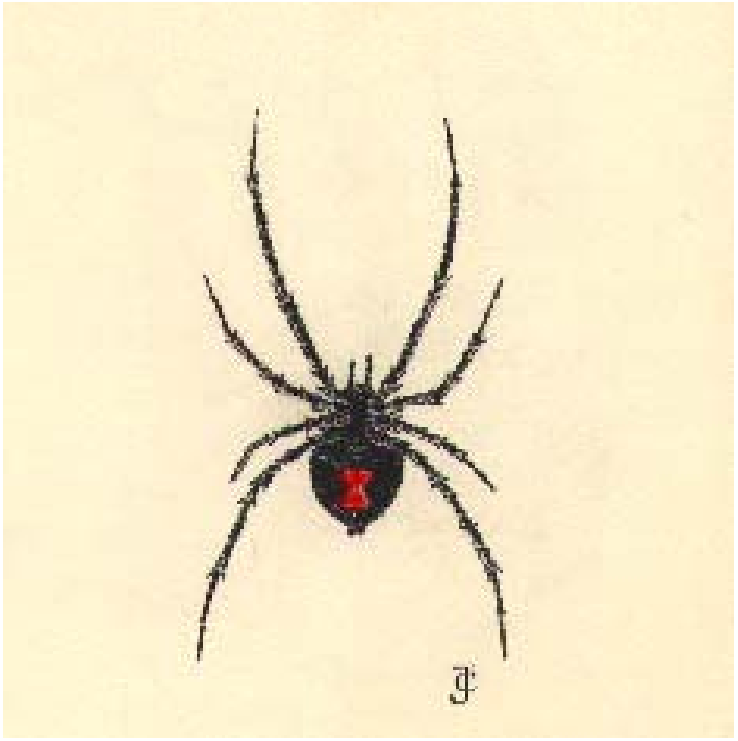
_____

Appendix G

Poisonous Plants and Animals

Spiders

Black Widow



Brown Recluse

First Aid - Spiders

- Wash wound
- Apply a cold pack
- Get medical care to receive antivenin
- Call an Ambulance, dial 911 or your local emergency number, if necessary

Stinging Insects

Killer bees and honey bees

Killer Bees are slightly smaller than the European honey bee, but only an expert can tell them apart

Wasps

Stinging Insects (cont'd)

Hornets

Yellow Jackets

First Aid – Stinging Insects

DOs:

- DO remove the stinger if present. Scrape it out with a credit card or finger nail.
- DO wash stings with soap and water.
- DO apply an ice pack for five to fifteen minutes. Be careful not to freeze the skin.
- DO telephone 911 to summon paramedics if the victim is having an allergic reaction and use a bee sting kit as prescribed.
- DO treat swelling by elevating the swollen body part above the heart.

DO NOTs:

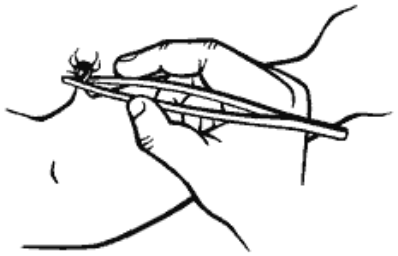
- DO NOT squeeze the sting, or rub mud into it. This increases the risk of infection.
- DO NOT apply meat tenderizer or baking soda. These don’t help and can actually cause problems.
- DO NOT administer electrical shocks or drugs not prescribed for the patient.

Ticks

Lyme Disease Symptoms:

- Arthritis
- Muscle pain
- Brain and nerve disorders that are severe, chronic and disabling
- Flu-like ailments
- Migrating joint aches
- Lymph node swelling
- Neck and headaches
- Malaise
- Fever
- Muscle aches

•Characteristic bulls-eye rash around bite site



First Aid – Ticks

- Avoid handling ticks with uncovered fingers; use tweezers or commercial tools designed for removal. If index finger and thumb must be used, protect them with rubber gloves, plastic or even a paper towel.
- Place the tips of tweezers or edges of other removal devices around the area where the mouthparts enter the skin.
- With a steady slow motion, pull the tick away from the skin or slide the removal device along the skin. Do not jerk, crush, squeeze or puncture the tick.
- After removal, place the tick directly into a sealable container. Disinfect the area around the bite site using standard procedures.
- Medical professionals advise keeping the tick alive for a month in case symptoms of a tick-borne disease develop. Place it in a labeled, sealed bag or vial with lightly moistened paper towel then store at refrigerator temperature.

Poisonous Snakes

Rattle snake

Copper head

Poisonous Snakes

Water Moccasin

(Cottonmouth)

Coral Snake

First Aid – Poisonous Snakes

- Remain calm – Don’t move
- Allow bite to bleed freely for 15 – 30 Seconds
- Wash wound
- Keep bitten part still, and lower than the heart
- Call an Ambulance, dial 911 or your local emergency number

Poisonous Plants

Poison Ivy

Poison Sumac

Poison Oak

First Aid – Poisonous Plants

- Wear long-sleeved shirts and long pants, tucked into boots. Wear cloth or leather gloves.
- Apply barrier creams to exposed skin.
- Educate workers on the identification of poison ivy, oak, and sumac plants.
- Educate workers on signs and symptoms of contact with poisonous ivy, oak, and sumac
- Cleansing with an ordinary soap within 6 hours after the initial exposure has proven to be effective. Repeat the cleaning with the soap 3 times. There are also alcohol-based wipes that help remove the oils. Wash all clothes and shoes also because the oils can remain on these.

First Aid – Poisonous Plants (cont'd)

- For the itching, your physician may recommend over-the-counter creams, such as calamine lotion or bathing in Aveeno bath. Sometimes, your physician will prescribe a medication by mouth for the itching.
- If the blisters and rash are on the face, near the genitals, or all over the body, your physician should be notified. After a thorough history and physical, your physician may prescribe a steroid cream or injection to help with the swelling and itching.

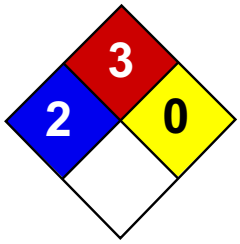
Resources

- Apex Human Resources (301) 417-0200
- Apex Health and Safety Officer (484) 256-6960
- Poison Control Hotline (800) 222-1222
- USEPA Hotline (800) 424-9346

  All Regions Search: http://www.epa.gov/epahome/aboutepa.htm#regiontext
- Centers for Disease Control (CDC) (800) 311-3435
- Emergency Snake Hotline (718) 430-6494
- U.S. Public Health Service http://www.hhs.gov
- U.S. Fish & Wildlife http://offices.fws.gov/phone.html
- U.S. Army Corps of Engineers http://www.usace.army.mil
- OSHA – All Regions http://www.osha.gov/html/RAmap.html

Appendix H

Materials Safety Data Sheets for Anticipated Contaminants



Material Safety Data Sheet
1,2-Dichloroethane MSDS

Section 1: Chemical Product and Company Identification

Product Name: 1,2-Dichloroethane

Catalog Codes: SLD2521, SLD3721

CAS#: 107-06-2

RTECS: KH9800000

TSCA: TSCA 8(b) inventory: 1,2-Dichloroethane

CI#: Not available.

Synonym: Ethylene dichloride

Chemical Formula: C2H4CL2

Contact Information:

Sciencelab.com, Inc.
14025 Smith Rd.
Houston, Texas 77396

US Sales: **1-800-901-7247**
International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call: 1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
{1,2-}Dichloroethane	107-06-2	100

Toxicological Data on Ingredients: 1,2-Dichloroethane: ORAL (LD50): Acute: 670 mg/kg [Rat]. 413 mg/kg [Mouse]. DERMAL (LD50): Acute: 2800 mg/kg [Rabbit]. VAPOR (LC50): Acute: 1414.2 ppm 4 hour(s) [Rat].

Section 3: Hazards Identification

Potential Acute Health Effects:
Extremely hazardous in case of ingestion. Very hazardous in case of eye contact (irritant), of inhalation. Hazardous in case of skin contact (irritant). Corrosive to skin and eyes on contact. Liquid or spray mist may produce tissue damage particularly on mucous membranes of eyes, mouth and respiratory tract. Skin contact may produce burns. Inhalation of the spray mist may produce severe irritation of respiratory tract, characterized by coughing, choking, or shortness of breath. Inflammation of the eye is characterized by redness, watering, and itching.

Potential Chronic Health Effects:
Very hazardous in case of ingestion, of inhalation. CARCINOGENIC EFFECTS: Classified + (PROVEN) by OSHA. Classified 2B (Possible for human.) by IARC. Classified 2 (Reasonably anticipated.) by NTP. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance is toxic to lungs, the nervous system, liver, mucous membranes. Repeated or prolonged exposure to the substance can produce target organs damage. Repeated or prolonged contact with spray mist may produce chronic eye irritation and severe skin irritation. Repeated or prolonged exposure to spray mist may produce respiratory tract irritation leading to frequent attacks of bronchial infection.

Section 4: First Aid Measures

Eye Contact:
Check for and remove any contact lenses. Immediately flush eyes with running water for at least 15 minutes, keeping eyelids open. Cold water may be used. Do not use an eye ointment. Seek medical attention.

Skin Contact:
If the chemical got onto the clothed portion of the body, remove the contaminated clothes as quickly as possible, protecting your own hands and body. Place the victim under a deluge shower. If the chemical got on the victim's exposed skin, such as the hands : Gently and thoroughly wash the contaminated skin with running water and non-abrasive soap. Be particularly careful to clean folds, crevices, creases and groin. If irritation persists, seek medical attention. Wash contaminated clothing before reusing.

Serious Skin Contact:
Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek immediate medical attention.

Inhalation: Allow the victim to rest in a well ventilated area. Seek immediate medical attention.

Serious Inhalation:
Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. WARNING: It may be hazardous to the person providing aid to give mouth-to-mouth resuscitation when the inhaled material is toxic, infectious or corrosive. Seek immediate medical attention.

Ingestion:
Do not induce vomiting. Examine the lips and mouth to ascertain whether the tissues are damaged, a possible indication that the toxic material was ingested; the absence of such signs, however, is not conclusive. Loosen tight clothing such as a collar, tie, belt or waistband. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek immediate medical attention.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Flammable.

Auto-Ignition Temperature: 413°C (775.4°F)

Flash Points: CLOSED CUP: 13°C (55.4°F). OPEN CUP: 18°C (64.4°F).

Flammable Limits: LOWER: 6.2% UPPER: 15.6%

Products of Combustion: These products are carbon oxides (CO, CO2).

Fire Hazards in Presence of Various Substances:
Flammable in presence of open flames and sparks. Slightly flammable to flammable in presence of oxidizing materials.

Explosion Hazards in Presence of Various Substances:
Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available. Slightly explosive to explosive in presence of oxidizing materials.

Fire Fighting Media and Instructions:
Flammable liquid, soluble or dispersed in water. SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use alcohol foam, water spray or fog.

Special Remarks on Fire Hazards: Not available.

Special Remarks on Explosion Hazards: Not available.

Section 6: Accidental Release Measures

Small Spill: Absorb with an inert material and put the spilled material in an appropriate waste disposal.

Large Spill:
Flammable liquid. Corrosive liquid. Keep away from heat. Keep away from sources of ignition. Stop leak if without risk. Absorb with DRY earth, sand or other non-combustible material. Do not get water inside container. Do not touch spilled material. Use water spray curtain to divert vapor drift. Prevent entry into sewers, basements or confined areas; dike if needed. Eliminate all ignition sources. Call for assistance on disposal. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:
Keep locked up Keep container dry. Keep away from heat. Keep away from sources of ignition. Ground all equipment containing material. Do not ingest. Do not breathe gas/fumes/ vapour/spray. Never add water to this product In case of insufficient ventilation, wear suitable respiratory equipment If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes

Storage:
Flammable materials should be stored in a separate safety storage cabinet or room. Keep away from heat. Keep away from sources of ignition. Keep container tightly closed. Keep in a cool, well-ventilated place. Ground all equipment containing material. A refrigerated room would be preferable for materials with a flash point lower than 37.8°C (100°F).

Section 8: Exposure Controls/Personal Protection

Engineering Controls:
Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash stations and safety showers are proximal to the work-station location.

Personal Protection:
Splash goggles. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:
Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:
TWA: 10 CEIL: 75 (ppm) from ACGIH (TLV) TWA: 40 CEIL: 300 (mg/m3) from ACGIHConsult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Liquid.

Odor: Not available.

Taste: Not available.

Molecular Weight: 98.96 g/mole

Color: Not available.

pH (1% soln/water): Not available.

Boiling Point: 83.5°C (182.3°F)

Melting Point: -35.3°C (-31.5°F)

Critical Temperature: Not available.

Specific Gravity: 1.2351 (Water = 1)

Vapor Pressure: 61 mm of Hg (@ 20°C)

Vapor Density: 3.42 (Air = 1)

Volatility: Not available.

Odor Threshold: 26 ppm

Water/Oil Dist. Coeff.: The product is equally soluble in oil and water; log(oil/water) = 0

Ionicity (in Water): Not available.

Dispersion Properties: See solubility in water, methanol, diethyl ether, n-octanol, acetone.

Solubility:
Easily soluble in methanol, diethyl ether, n-octanol, acetone. Very slightly soluble in cold water.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Not available.

Incompatibility with various substances: Not available.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity: Not available.

Special Remarks on Corrosivity: Not available.

Polymerization: No.

Section 11: Toxicological Information

Routes of Entry: Eye contact. Inhalation. Ingestion.

Toxicity to Animals:
WARNING: THE LC50 VALUES HEREUNDER ARE ESTIMATED ON THE BASIS OF A 4-HOUR EXPOSURE. Acute oral toxicity (LD50): 413 mg/kg [Mouse]. Acute dermal toxicity (LD50): 2800 mg/kg [Rabbit]. Acute toxicity of the vapor (LC50): 1414.2 ppm 4 hour(s) [Rat].

Chronic Effects on Humans:
CARCINOGENIC EFFECTS: Classified + (PROVEN) by OSHA. Classified 2B (Possible for human.) by IARC. Classified 2 (Reasonably anticipated.) by NTP. The substance is toxic to lungs, the nervous system, liver, mucous membranes.

Other Toxic Effects on Humans:
Extremely hazardous in case of ingestion. Very hazardous in case of inhalation. Hazardous in case of skin contact (irritant).

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans: Passes through the placental barrier in animal. Excreted in maternal milk in human.

Special Remarks on other Toxic Effects on Humans: Not available.

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:
Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are more toxic.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:

Section 14: Transport Information

DOT Classification: Class 3: Flammable liquid.

Identification: : Ethylene dichloride : UN1184 PG: II

Special Provisions for Transport: Marine Pollutant

Section 15: Other Regulatory Information

Federal and State Regulations:
California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer, birth defects or other reproductive harm, which would require a warning under the statute: 1,2-Dichloroethane California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer which would require a warning under the statute: 1,2-Dichloroethane Pennsylvania RTK: 1,2-Dichloroethane Massachusetts RTK: 1,2-Dichloroethane TSCA 8(b) inventory: 1,2-Dichloroethane CERCLA: Hazardous substances.: 1,2-Dichloroethane

Other Regulations: OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200).

Other Classifications:

WHMIS (Canada):
CLASS B-2: Flammable liquid with a flash point lower than 37.8°C (100°F). CLASS D-1A: Material causing immediate and serious toxic effects (VERY TOXIC). CLASS D-2A: Material causing other toxic effects (VERY TOXIC). CLASS E: Corrosive liquid.

DSCL (EEC):
R11- Highly flammable. R20/22- Harmful by inhalation and if swallowed. R38- Irritating to skin. R41- Risk of serious damage to eyes. R45- May cause cancer.

HMIS (U.S.A.):

Health Hazard: 2

Fire Hazard: 3

Reactivity: 0

Personal Protection: h

National Fire Protection Association (U.S.A.):

Health: 2

Flammability: 3

Reactivity: 0

Specific hazard:

Protective Equipment:

Gloves. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Splash goggles.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

Created: 10/10/2005 08:17 PM

Last Updated: 11/06/2008 12:00 PM

The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall ScienceLab.com be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if ScienceLab.com has been advised of the possibility of such damages.

MSDS: TETRACHLOROETHYLENE

SECTION 1 CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

TELECHEM INTERNATIONAL, INC
524 E. WEDDELL
Sunnyvale, CA 94089
1-408-744-1331
www.arrayit.com
EMERGENCY TELEPHONE NUMBER: 1-800-424-9300 (NORTH AMERICA)

SUBSTANCE: TETRACHLOROETHYLENE

TRADE NAMES/SYNONYMS:

ETHENE, TETRACHLORO-; ETHYLENE, TETRACHLORO-; ANKILOSTIN; DIDAKEN; NEMA;

ETHYLENE TETRACHLORIDE; PERCHLOROETHYLENE; PERC; PERCHLOROETHENE; PERCLENE;

1,1,2,2-TETRACHLOROETHYLENE; TETRACAP; TETRACHLOROETHENE; PCE; RCRA U210;

NCI-C04580; ENT 1,860; STCC 4940355; UN 1897; C2CL4; OHS22900; RTECS KX3850000

CHEMICAL FAMILY: halogenated, aliphatic

CREATION DATE: Oct 25 1984

REVISION DATE: Dec 01 2000

SECTION 2 COMPOSITION, INFORMATION ON INGREDIENTS

COMPONENT: TETRACHLOROETHYLENE

CAS NUMBER: 127-18-4

EC NUMBER (EINECS): 204-825-9

EC INDEX NUMBER: 602-028-00-4

PERCENTAGE: 100.0

SECTION 3 HAZARDS IDENTIFICATION

NFPA RATINGS (SCALE 0-4): HEALTH=2 FIRE=0 REACTIVITY=0

EC CLASSIFICATION (ASSIGNED):

N Dangerous for the Environment

Carcinogen Category 3

R 40-51/53

EC Classification may be inconsistent with independently-researched data.

EMERGENCY OVERVIEW:

COLOR: colorless

PHYSICAL FORM: volatile liquid

ODOR: sweet odor

MAJOR HEALTH HAZARDS: respiratory tract irritation, skin irritation, eye irritation, central nervous system depression, cancer hazard (in humans)

POTENTIAL HEALTH EFFECTS:

INHALATION:

SHORT TERM EXPOSURE: irritation, metallic taste, ringing in the ears, nausea, vomiting, chest pain, difficulty breathing, irregular heartbeat, headache, drowsiness, symptoms of drunkenness, blurred vision, lung congestion

LONG TERM EXPOSURE: asthma, menstrual disorders, reproductive effects, cancer

SKIN CONTACT:

SHORT TERM EXPOSURE: irritation (possibly severe), symptoms of drunkenness

LONG TERM EXPOSURE: same as effects reported in short term exposure

EYE CONTACT:

SHORT TERM EXPOSURE: irritation, tearing

LONG TERM EXPOSURE: same as effects reported in short term exposure

INGESTION:

SHORT TERM EXPOSURE: vomiting, digestive disorders, headache, symptoms of drunkenness

LONG TERM EXPOSURE: kidney damage, liver damage, cancer

CARCINOGEN STATUS:

OSHA: N

NTP: Y

IARC: Y

SECTION 4 FIRST AID MEASURES

INHALATION: If adverse effects occur, remove to uncontaminated area. Give artificial respiration if not breathing. If breathing is difficult, oxygen should be administered by qualified personnel. Get immediate medical attention.

SKIN CONTACT: Wash skin with soap and water for at least 15 minutes while removing contaminated clothing and shoes. Get medical attention, if needed. Thoroughly clean and dry contaminated clothing and shoes before reuse.

EYE CONTACT: Flush eyes with plenty of water for at least 15 minutes. Then get immediate medical attention.

INGESTION: Contact local poison control center or physician immediately. Never make an unconscious person vomit or drink fluids. When vomiting occurs, keep head lower than hips to help prevent aspiration. If person is unconscious, turn head to side. Get medical attention immediately.

NOTE TO PHYSICIAN: For inhalation, consider oxygen. For ingestion, consider gastric lavage and catharsis.

SECTION 5 FIRE FIGHTING MEASURES

FIRE AND EXPLOSION HAZARDS: Negligible fire hazard.

EXTINGUISHING MEDIA: carbon dioxide, regular dry chemical

Large fires: Use regular foam or flood with fine water spray.

FIRE FIGHTING: Cool containers with water spray until well after the fire is out. Stay away from the ends of tanks. For tank, rail car or tank truck, evacuation radius: 800 meters (1/2 mile).

FLASH POINT: No data available.

SECTION 6 ACCIDENTAL RELEASE MEASURES

AIR RELEASE:

Reduce vapors with water spray. Collect runoff for disposal as potential hazardous waste.

SOIL RELEASE:

Trap spilled material at bottom in deep water pockets, excavated holding areas or within sand bag barriers. Dike for later disposal. Absorb with sand or other non-combustible material.

WATER RELEASE:

Absorb with activated carbon. Remove trapped material with suction hoses. Subject to California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65). Keep out of water supplies and sewers.

OCCUPATIONAL RELEASE:

Avoid heat, flames, sparks and other sources of ignition. Stop leak if possible without personal risk. Small liquid spills: Absorb with sand or other non-combustible material. Large spills: Dike for later disposal. Remove

sources of ignition. Keep unnecessary people away, isolate hazard area and deny entry. Notify Local Emergency Planning Committee and State Emergency Response Commission for release greater than or equal to RQ (U.S. SARA Section 304). If release occurs in the U.S. and is reportable under CERCLA Section 103, notify the National Response Center at (800)424-8802 (USA) or (202)426-2675 (USA).

SECTION 7 HANDLING AND STORAGE

Store and handle in accordance with all current regulations and standards. Store in a cool, dry place. Store in a well-ventilated area. Avoid heat, flames, sparks and other sources of ignition. Keep separated from incompatible substances.

SECTION 8 EXPOSURE CONTROLS, PERSONAL PROTECTION

EXPOSURE LIMITS:

TETRACHLOROETHYLENE:

TETRACHLOROETHYLENE (PERCHLOROETHYLENE):

100 ppm OSHA TWA

200 ppm OSHA ceiling

300 ppm OSHA peak 5 minute(s)/3 hour(s)

25 ppm (170 mg/m3) OSHA TWA (vacated by 58 FR 35338, June 30, 1993)

25 ppm ACGIH TWA

100 ppm ACGIH STEL

50 ppm (345 mg/m3) UK OES TWA

100 ppm (689 mg/m3) UK OES STEL

MEASUREMENT METHOD: Charcoal tube; Carbon disulfide; Gas chromatography with flame ionization detection; NIOSH IV # 1003, Halogenated Hydrocarbons

VENTILATION: Provide local exhaust or process enclosure ventilation system. Ensure compliance with applicable exposure limits.

EYE PROTECTION: Wear splash resistant safety goggles. Provide an emergency eye wash fountain and quick drench shower in the immediate work area.

CLOTHING: Wear appropriate chemical resistant clothing.

GLOVES: Wear appropriate chemical resistant gloves.

RESPIRATOR: The following respirators and maximum use concentrations are drawn from NIOSH and/or OSHA.

At any detectable concentration -

Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode.

Any supplied-air respirator with full facepiece and operated in a pressure-demand or other positive-pressure mode in combination with a separate escape supply.

Escape -

Any air-purifying respirator with a full facepiece and an organic vapor canister.

Any appropriate escape-type, self-contained breathing apparatus.

For Unknown Concentrations or Immediately Dangerous to Life or Health -

Any supplied-air respirator with full facepiece and operated in a pressure-demand or other positive-pressure mode in combination with a separate escape supply.

Any self-contained breathing apparatus with a full facepiece.

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL STATE: liquid

APPEARANCE: clear

COLOR: colorless

PHYSICAL FORM: volatile liquid

ODOR: sweet odor

MOLECULAR WEIGHT: 165.83

MOLECULAR FORMULA: CL2-C-C-CL2

BOILING POINT: 250 F (121 C)

FREEZING POINT: -2 F (-19 C)

VAPOR PRESSURE: 14 mmHg @ 20 C

VAPOR DENSITY (air=1): 5.83

SPECIFIC GRAVITY (water=1): 1.6227

WATER SOLUBILITY: 0.015%

PH: Not available

VOLATILITY: 100%

ODOR THRESHOLD: 50 ppm

EVAPORATION RATE: 2.8 (butyl acetate=1)

COEFFICIENT OF WATER/OIL DISTRIBUTION: Not available

SOLVENT SOLUBILITY:

Soluble: alcohol, ether, benzene, chloroform, oils, hexane

SECTION 10 STABILITY AND REACTIVITY

REACTIVITY: Stable at normal temperatures and pressure.

CONDITIONS TO AVOID: Avoid heat, flames, sparks and other sources of ignition. Containers may rupture or explode if exposed to heat.

INCOMPATIBILITIES: acids, metals, bases, oxidizing materials, combustible materials

TETRACHLOROETYLENE (PERCHLOROETHYLENE):

ACIDS (STRONG): Incompatible.

ALUMINUM: May form explosive mixture.

BARIUM: Forms a detonable mixture.

BASES: May form explosive mixture.

BERYLLIUM: Possible explosive mixture.

DINITROGEN TETRAOXIDE: Explosive when subjected to extreme shock.

METALS (LIGHT): Violent reaction.

OXIDIZERS: Incompatible.

OXYGEN (LIQUID): Incompatible.

PLASTICS, RUBBER, AND COATINGS: May be attacked.

POTASSIUM HYDROXIDE: May form explosive mixture.

SODIUM HYDROXIDE: May form explosive mixture.

HAZARDOUS DECOMPOSITION:

Thermal decomposition products: phosgene, halogenated compounds, oxides of carbon

POLYMERIZATION: Will not polymerize.

SECTION 11 TOXICOLOGICAL INFORMATION

TETRACHLOROETHYLENE:

IRRITATION DATA:

810 mg/24 hour(s) skin-rabbit severe; 500 mg/24 hour(s) skin-rabbit mild; 162 mg eyes-rabbit mild; 500 mg/24 hour(s) eyes-rabbit mild

TOXICITY DATA:

>10000 mg/kg skin-rabbit LD50 (Dow); 96 ppm/7 hour(s) inhalation-human TCLo; 545 mg/kg oral-child TDLo; 600 ppm/10 minute(s) inhalation-man TCLo; 2629 mg/kg oral-rat LD50; 34200 mg/m3/8 hour(s) inhalation-rat LC50; 4678 mg/kg intraperitoneal-rat LD50; 450 mg/kg intratracheal-rat LDLo; 8100 mg/kg oral-mouse LD50; 5200 ppm/4 hour(s) inhalation-mouse LC50; >500 mg/kg intraperitoneal-mouse LD; 65 gm/kg subcutaneous-mouse LD50; 4 gm/kg oral-dog LDLo; 2100 mg/kg intraperitoneal-dog LD50; 85 mg/kg intravenous-dog LDLo; 4 gm/kg oral-cat LDLo; 5 gm/kg oral-rabbit LDLo; >3228 mg/kg skin-rabbit LD; 2200 mg/kg subcutaneous-rabbit LDLo; 14 gm/kg/4 week(s) intermittent oral-rat TDLo; 36 gm/kg/90 day(s) continuous oral-rat TDLo; 3 gm/kg/6 week(s) intermittent oral-rat TDLo; 1750 ppm/6 hour(s)-14 day(s) intermittent inhalation-rat TCLo; 19300 mg/m3/24 hour(s)-94 day(s)

continuous inhalation-rat TCLo; 200 ppm/4 week(s) continuous inhalation-rat TCLo; 7000 ppm/8 hour(s)-50 day(s) intermittent inhalation-rat TCLo; 49750 ug/kg/3 day(s) intermittent intraperitoneal-rat TDLo; 23215 mg/kg/8 week(s) intermittent oral-mouse TDLo; 200 ppm/4 hour(s)-8 week(s) intermittent inhalation-mouse TCLo; 1750 ppm/6 hour(s)-14 day(s) intermittent inhalation-mouse TCLo; 1600 ppm/6 hour(s)-13 week(s) intermittent inhalation-mouse TCLo; 2500 ppm/7 hour(s)-39 day(s) intermittent inhalation-rabbit TCLo; 200 ppm/7 hour(s)-32 week(s) intermittent inhalation-guinea pig TCLo; 120 ppm/24 hour(s)-1 year(s) continuous inhalation-gerbil TCLo

CARCINOGEN STATUS: NTP: Anticipated Human Carcinogen; IARC: Human Limited Evidence, Animal Sufficient Evidence, Group 2A; ACGIH: A3 -Animal Carcinogen; EC: Category 2; TRGS 905: K 3

In mice, oral administration and inhalation produced hepatocellular carcinomas in both sexes. Exposure of rats by inhalation produced an increased incidence of mononuclear cell leukemia in both sexes.

LOCAL EFFECTS:

Irritant: inhalation, skin, eye

ACUTE TOXICITY LEVEL:

Moderately Toxic: ingestion

Slightly Toxic: inhalation

TARGET ORGANS: central nervous system

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: eye disorders, heart or cardiovascular disorders, kidney disorders, liver disorders, nervous system disorders, skin disorders and allergies

TUMORIGENIC DATA:

200 ppm inhalation-rat TCLo/6 hour(s)-2 year(s) intermittent; 195 gm/kg oral-mouse TDLo/50 week(s) intermittent; 100 ppm inhalation-mouse TCLo/6 hour(s)-2 year(s) intermittent; 240 gm/kg oral-mouse TD/62 week(s) intermittent; 200 ppm inhalation-rat TC/6 hour(s)-2 year(s) intermittent; 100 ppm inhalation-mouse TC/6 hour(s)-2 year(s) intermittent

MUTAGENIC DATA:

mutation in microorganisms - Salmonella typhimurium 50 uL/plate (+S9); mutation in microorganisms - Salmonella typhimurium 200 uL/plate (-S9); unscheduled DNA synthesis - human lung 100 mg/L; morphological transformation - rat embryo 97 umol/L; cytogenetic analysis - rat inhalation 500 ppm; DNA damage - mouse intraperitoneal 4 mmol/kg; other mutation test systems - mouse oral 1 gm/kg; host-mediated assay - mouse Salmonella typhimurium 100 ppm; sperm - mouse inhalation 500 ppm; sex chromosone loss and non disjunction - hamster lung 190 umol/L

REPRODUCTIVE EFFECTS DATA:

1000 ppm inhalation-rat TCLo/24 hour(s) 14 day(s) pre pregnancy/1-22 day(s) pregnant female continuous; 1000 ppm inhalation-rat TCLo/24 hour(s) 1-22 day(s) pregnant female continuous; 900 ppm inhalation-rat TCLo/7 hour(s) 7-13 day(s) pregnant female continuous; 300 ppm inhalation-rat TCLo/7

hour(s) 6-15 day(s) pregnant female continuous; 300 ppm inhalation-mouse TCLo/7 hour(s) 6-15 day(s) pregnant female continuous; 500 ppm inhalation-mouse TCLo/7 hour(s) 5 day(s) male

ADDITIONAL DATA: May be excreted in breast milk. Alcohol may enhance the toxic effects. Stimulants such as epinephrine may induce ventricular fibrillation.

One study shows an increased risk of leukemia for children whose fathers had occupational exposure to chlorinated solvents after the birth of the child.

A significant excess of bladder cancer mortality and elevated digestive tract cancer mortality, as well as, excess esophageal cancer has been associated with tetrachloroethylene use in the dry-cleaning industry.

HEALTH EFFECTS:

INHALATION:

ACUTE EXPOSURE:

TETRACHLOROETHYLENE (PERCHLOROETHYLENE): Vapor concentrations from 100-400 ppm may cause irritation of the nose, throat and mucous membranes, flushed face and neck, sinus congestion, nasal discharge, headache, dizziness, lightheadedness, drowsiness, thick tongue, tightness around the mouth, slurred speech, confusion, incoordination, nausea, and reversible liver and kidney changes; 400-600 ppm may cause salivation, metallic taste, perspiration of the hands, and loss of inhibitions; 1000-2000 ppm may cause marked upper respiratory irritation, anesthesia of the lips and nose, congested eustachian tubes, aching facial muscles, inebriation,

exhilaration, mental sluggishness, lassitude, gagging, faintness, tinnitus, dyspnea upon exertion, narcosis, and liver and kidney damage. Other reported symptoms include weakness, ataxia, coughing, chest pains, rapid, weak pulse, blurred vision, irritability, anorexia, vomiting, hallucinations, distorted perceptions, acidosis, latent jaundice and abnormal liver function tests, albuminuria, hematuria, anuria, and premature ventricular beats. Massive exposures may cause pulmonary edema, unconsciousness, coma and death from anesthesia or respiratory arrest. In one fatal case, pathologic findings included central fatty necrosis and fatty infiltration of the liver and moderate cloudy swelling of the renal tubular epithelium. Epinephrine-induced cardiac arrhythmias have occurred with some hydrocarbons, but testing of tetrachloroethylene in dogs has been negative.

CHRONIC EXPOSURE:

TETRACHLOROETHYLENE (PERCHLOROETHYLENE): Workers exposed to 1-40 ppm over 7.5 years showed altered electrodiagnostic and neurological rating scores; 4 0f 16 exposed to 60-450 ppm for 2-20 years had abnormal EEG's. Repeated exposure may also cause respiratory tract irritation, central nervous system depression without narcosis, confusion, headache, fatigue, dizziness, inebriation, insomnia, nausea, anorexia, abdominal pain, constipation, blurred vision, multiple premature ventricular beats, and

peripheral neuropathy with numbness in the fingers, trembling, neuritis, and memory defects. Hepatic damage may occur and be persistent. Exposure to levels around 250 ppm for 4 months has been reported to have caused hemoptysis, coughing, sweating attacks, jaundice, oliguria, hematemesis, cardiovascular failure and death. Occasional idiosyncratic reactions have been reported including pulmonary edema, bronchial asthma, dependency, and hypersensitivity. Chronic studies in rats have produced liver and kidney damage. In studies of women working in the dry cleaning industry, one study showed higher incidences of menstrual disorders, indicating an effect on the hormone system. Another study revealed an association between exposure during early pregnancy and a significantly increased incidence of spontaneous abortions. Reproductive effects have also been reported in animals. Inhalation studies indicate an increased incidence of liver carcinomas in mice and mononuclear cell leukemia in rats.

SKIN CONTACT:

ACUTE EXPOSURE:

TETRACHLOROETHYLENE (PERCHLOROETHYLENE): Brief immersion of the hands in the liquid usually causes only mild irritation. However, the liquid on the skin for 40 minutes resulted in a progressively severe burning sensation, beginning within 5-10 minutes, and marked erythema, which subsided after 1-2 hours. Severe exposures may result in vesiculation and possibly burns. Absorption may occur but is probably not a significant route of exposure.

CHRONIC EXPOSURE:

TETRACHLOROETHYLENE (PERCHLOROETHYLENE): Repeated or prolonged skin

contact may produce dermatitis with dry, scaly, fissured skin.

EYE CONTACT:

ACUTE EXPOSURE:

TETRACHLOROETYLENE (PERCHLOROETHYLENE): Vapor concentrations from 100-200

may cause mild irritation. Higher levels or direct contact may cause pain,

lacrimation, and burning, but serious injury is unlikely. At 1500 pmm, the

irritation is almost intolerable. Two studies of direct application to

rabbit eyes resulted in conjunctivitis and effects on the corneal

epithelium; recovery was complete in 2 days to 2 weeks.

CHRONIC EXPOSURE:

TETRACHLOROETYLENE (PERCHLOROETHYLENE): Repeated or prolonged exposure may

cause conjunctivitis. One study has reported an increased incidence of

lacrimal duct disease in exposed workers.

INGESTION:

ACUTE EXPOSURE:

TETRACHLOROETHYLENE (PERCHLOROETHYLENE): May cause severe gastrointestinal

irritation with nausea, vomiting, abdominal cramps and diarrhea, possibly

with bloody stools. Narcotic effects may include headache, dizziness,

exhilaration, inebriation and other effects as in acute inhalation. A dose

of 500 mg/kg was ingested and survived. Dogs given lethal doses exhibited

cardiac and respiratory depression; autopsy revealed fatty infiltration of

the heart and liver and marked inflammation and shriveling of the small

intestine.

CHRONIC EXPOSURE:

TETRACHLOROETHYLENE (PERCHLOROETHYLENE): Long-term ingestion of 50 mg/kg

produced liver and kidney damage in mice. Chronic ingestion has produced

hepatocellular carcinomas in mice.

SECTION 12 ECOLOGICAL INFORMATION

ECOTOXICITY DATA:

FISH TOXICITY: 8430 ug/L 96 hour(s) LC50 (Mortality) Flagfish (Jordanella floridae)

INVERTEBRATE TOXICITY: 7500 ug/L 48 hour(s) EC50 (Immobilization) Water flea (Daphnia magna)

ALGAL TOXICITY: 509000 ug/L 96 hour(s) EC50 (Photosynthesis) Diatom (Skeletonema costatum)

FATE AND TRANSPORT:

BIOCONCENTRATION: 49 ug/L 1-21 hour(s) BCF (Residue) Bluegill (Lepomis macrochirus) 3.43 ug/L

SECTION 13 DISPOSAL CONSIDERATIONS

Subject to disposal regulations: U.S. EPA 40 CFR 262. Hazardous Waste Number(s): U210. Hazardous Waste Number(s): D039. Dispose of in accordance with U.S. EPA 40 CFR 262 for concentrations at or above the Regulatory level. Regulatory level- 0.7 mg/L. Dispose in accordance with all applicable regulations.

SECTION 14 TRANSPORT INFORMATION

U.S. DOT 49 CFR 172.101 SHIPPING NAME-UN NUMBER:

Tetrachloroethylene-UN1897

U.S. DOT 49 CFR 172.101 HAZARD CLASS OR DIVISION:

6.1

U.S. DOT 49 CFR 172.101 PACKING GROUP:

III

U.S. DOT 49 CFR 172.101 AND SUBPART E LABELING REQUIREMENTS:

Poison

U.S. DOT 49 CFR 172.101 PACKAGING AUTHORIZATIONS:

EXCEPTIONS: 49 CFR 173.153

NON-BULK PACKAGING: 49 CFR 173.203

BULK PACKAGING: 49 CFR 173.241

U.S. DOT 49 CFR 172.101 QUANTITY LIMITATIONS:

PASSENGER AIRCRAFT OR RAILCAR: 60 L

CARGO AIRCRAFT ONLY: 220 L

LAND TRANSPORT ADR/RID:

SUBSTANCE NAME: Tetrachloroethylene

UN NUMBER: UN1897

ADR/RID CLASS: 6.1

ITEM NUMBER: 15(c)

WARNING SIGN/LABEL: 6.1

HAZARD ID NUMBER: 60

AIR TRANSPORT IATA/ICAO:

CORRECT TECHNICAL NAME: Tetrachloroethylene

UN/ID NUMBER: UN1897

IATA/ICAO CLASS: 6.1

PACKAGING GROUP: III

LABEL: Toxic/Poison

MARITIME TRANSPORT IMDG:

CORRECT TECHNICAL NAME: Perchloroethylene

UN/ID NUMBER: UN1897

IMDG CLASS: 6.1

PACKAGING GROUP: III

EmS No.: 6.1-02

MFAG Table No.: 340

MARINE POLLUTANT: Y

SECTION 15 REGULATORY INFORMATION

U.S. REGULATIONS:

TSCA INVENTORY STATUS: Y

TSCA 12(b) EXPORT NOTIFICATION: Not listed.

CERCLA SECTION 103 (40CFR302.4): Y

TETRACHLOROETHYLENE (PERCHLOROETHYLENE): 100 LBS RQ

SARA SECTION 302 (40CFR355.30): N

SARA SECTION 304 (40CFR355.40): N

SARA SECTION 313 (40CFR372.65): Y

TETRACHLOROETHYLENE (PERCHLOROETHYLENE)

SARA HAZARD CATEGORIES, SARA SECTIONS 311/312 (40CFR370.21):

ACUTE: Y

CHRONIC: Y

FIRE: N

REACTIVE: N

SUDDEN RELEASE: N

OSHA PROCESS SAFETY (29CFR1910.119): N

STATE REGULATIONS:

California Proposition 65: Y

Known to the state of California to cause the following:

TETRACHLOROETHYLENE (PERCHLOROETHYLENE)

Cancer (Apr 01, 1988)

EUROPEAN REGULATIONS:

EC NUMBER (EINECS): 204-825-9

EC RISK AND SAFETY PHRASES:

R 40 Possible risks of irreversible effects.

R 51/53 Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

S 2 Keep out of reach of children.

S 23 Do not breathe gas, fumes, vapour, or spray.

S 36/37 Wear suitable protective clothing and gloves.

S 61 Avoid release to the environment. Refer to special instructions/Safety data sheets.

CONCENTRATION LIMITS:

C>=1% Xn R 40

GERMAN REGULATIONS:

WATER HAZARD CLASS (WGK): 3 (Official German Classification)

SECTION 16 OTHER INFORMATION
MSDS SUMMARY OF CHANGES
SECTION 8 EXPOSURE CONTROLS, PERSONAL PROTECTION
SECTION 11 TOXICOLOGICAL INFORMATION

MSDS

Trichloracetic Acid (TCA) 5 - 100%

Section 1: Identification

Product Name: Trichloracetic Acid
Product Catalog No: 400550, 400551, 400552, 400553, 400554, 400555, 400557, 400558, 400559, 400560 400561, 400562, 400563, 400564, 400565 400566, 400567, 400568, 400569, 400572, 400573, 400577

Emergency Phone at Infotrac: (800) 535-5053
Date Prepared: 05/08/02

Section 2: Composition

Hazardous Component(s):	CAS Number	OSHA PEL, ACGIH TLV/STEL (PPM)		NFPA	
				Health	3
Trichloroacetic Acid 5 to 100%	108-95-2	1 ppm	1/NA	Flammability	0
Note: Vapors are very corrosive!				Reactivity	0

Section 3: Physical Data

Boiling Point:	~ 200 ^{0}F	*Specific Gravity (H_20 = 1):*	~1 to 1.6 (100%)
Vapor Pressure mm Hg/20^{0}C:	1.3	*Percent Volatile by Vol:*	NE
Vapor Density (Air 1:1)	5.6	*Evaporation Rate (ether = 1):*	NE
Solubility in H20:	Complete	*Appearance & Odor:*	Clear liquid, phenolic odor (pungent)

Section 4: Fire and Explosion Hazard

Flash Point: NA *Flammable Limits:* LEL: NA UEL: NA

Extinguishing Media: Water spray, dry chemical, CO_2 and foam

Special Firefighting Procedures: Wear protective clothing with NIOSH approved breathing apparatus. Products of combustion may be harmful in a fire situation. Do not use direct water stream

Unusual Fire & Explosion Hazards: None known (10 to 100% concentrations are very corrosive)

Section 5: Reactivity

Stability: Stable *Material to Avoid:* Strong bases - acidic solutions can react with metals to liberate hydrogen gas

Hazardous Decomposition or Byproducts: Oxides of carbon, chloroform and hydrogen chloride

Hazardous Polymerization: Does not occur *Conditions to Avoid:* Excessive heat

Section 6: Health Hazards

NOTE: Solutions are very corrosive!

Routes of Entry: Inhalation, skin and ingestion *Acute:* Vapors may cause eyes, skin and respiratory irritation

Chronic: Repeated exposure may cause general deterioration of health by accumulation.

Carcinogenicity: Not classified as a human carcinogen

Signs/Symptoms of Exposure: Eyes, skin and respiratory irritation.

MSDS

Trichloracetic Acid (TCA) 5-100%

Section 6: Health Hazards cont'd

Emergency First Aid:

Skin: Remove contaminated clothing and wash affected area with soap and water.

Eyes: Thoroughly flush eyes with water. Contact a physician if irritation persists.

Ingestion: Rinse mouth with water, drink large quantities of water or milk provided person is conscious. Contact a physician immediately.

Inhalation: Remove person to fresh air. If not breathing, give artificial respiration and contact a physician.

Section 7: Safe Handling

Chemical Release or Spill: Wear respiratory protection. Ventilate area. Isolate the spill area with sand or other absorbent material. Neutralize with sodium bicarbonate. Place all contaminated material in closed container for proper disposal.

Waste Disposal Method: All liquid and/or contaminated material should be disposed of in DOT approved waste containers. Incineration for liquids is the suggested method of disposal. Comply with all Federal, State and Local regulations for disposal.

Precautions for Handling and Storage: Normal handling and storage for liquids. Avoid excess heat.

Section 8: Control Measures

Respiratory Protection: Not normally required. If used in a poorly ventilated area, use under an approved fume hood or NIOSH approved respirator.

Ventilation: Mechanical or general exhaust is sufficient.

Protective Gloves: Chemical resistant. *Eye Protection:* Safety glasses.

Other Protective Clothing or Equipment: Normal laboratory apparel suggested by Good Laboratory Practices.

Work/Hygienic Practices: Wash thoroughly with soap and water after handling.

The information listed here is believed to be correct and does not purport to be all-inclusive and shall be used only as a guide. HealthLink shall not be held liable for any damage resulting from handling or contact with this product.

HealthLink
3611 St. Johns Bluff Rd. So. Ste. 1
Jacksonville, FL 32224

For Technical Service Call 800-638-2625

MATERIAL SAFETY DATA SHEET

Revised: 09/05/00
TRICHLOROETHYLENE Replaces: None
CAROLINA BIOLOGICAL Printed: 21/06/06

PRODUCT IDENTIFICATION

PRODUCT NAME: TRICHLOROETHYLENE
COMMON SYNONYMS: TRICHLOROETHENE; ETHINYL TRICHLORIDE; ACETYLENE TRICHLORIDE; TCE
CHEMICAL FAMILY: CHLORINATED HYDROCARBONS
FORMULA: C2HCL3
FORMULA WT.: 131.40
CAS NO.: 79-01-6
NIOSH/RTECS NO.: KX4550000
PRODUCT USE: LABORATORY REAGENT
PRODUCT CODES: 9474,9458,9455,5376,9473,9464,9454

CHEMTREC # (800) 424-9300 NATIONAL RESPONSE CENTER # (800) 424-8802 J.T.BAKER INC. 222 RED SCHOOL LANE PHILLIPSBURG, NJ 08865 24-HOUR EMERGENCY TELEPHONE -- (201) 859-2151

EFFECTIVE: 01/04/94 ISSUED: 04/08/95
REVISION #05

PRECAUTIONARY LABELING

BAKER SAF-T-DATA* SYSTEM

HEALTH	-	3	SEVERE (CANCER CAUSING)
FLAMMABILITY	-	1	SLIGHT
REACTIVITY	-	2	MODERATE
CONTACT	-	2	MODERATE

LABORATORY PROTECTIVE EQUIPMENT

GOGGLES & SHIELD; LAB COAT & APRON; VENT HOOD; PROPER GLOVES

U.S. PRECAUTIONARY LABELING

WARNING

CAUSES IRRITATION. HARMFUL IF SWALLOWED OR INHALED. HEAT MAY CAUSE DECOMPOSITION AND GENERATE CORROSIVE VAPORS. NOTE: REPORTED AS CAUSING CANCER
IN LABORATORY ANIMALS. EXERCISE DUE CARE.
DO NOT GET IN EYES, ON SKIN, ON CLOTHING. DO NOT BREATHE VAPOR. KEEP IN TIGHTLY CLOSED CONTAINER. USE WITH ADEQUATE VENTILATION. WASH THOROUGHLY
AFTER HANDLING. IN CASE OF SPILL, SOAK UP WITH SAND OR EARTH.

INTERNATIONAL LABELING

HARMFUL BY INHALATION AND IF SWALLOWED. POSSIBLE RISKS OF IRREVERSIBLE EFFECTS.

PRECAUTIONARY LABELING (CONTINUED)

KEEP OUT OF REACH OF CHILDREN. AVOID CONTACT WITH EYES.

SAF-T-DATA* STORAGE COLOR CODE: BLUE (HEALTH)

COMPONENTS

COMPONENT	CAS NO.	WEIGHT %	OSHA/PEL	ACGIH/TLV
TRICHLOROETHYLENE	79-01-6	99-100	50 PPM	50 PPM

PHYSICAL DATA

BOILING POINT: 87 C (188 F) (AT 760 MM HG)

VAPOR PRESSURE (MMHG): 58 (20 C)

MELTING POINT: -73 C (-99 F) (AT 760 MM HG)

VAPOR DENSITY (AIR=1): 4.53

SPECIFIC GRAVITY: 1.46 (H2O=1)

EVAPORATION RATE: N/A

SOLUBILITY(H20): SLIGHT (0.1-1%)

% VOLATILES BY VOLUME: 100 (21 C)

PH: N/A

ODOR THRESHOLD (P.P.M.): N/A

PHYSICAL STATE: LIQUID

COEFFICIENT WATER/OIL DISTRIBUTION: N/A

APPEARANCE & ODOR: CLEAR, COLORLESS LIQUID. CHLOROFORM-LIKE ODOR.

FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (CLOSED CUP): N/A

NFPA 704M RATING: 2-1-0

AUTOIGNITION TEMPERATURE: N/A

FLAMMABLE LIMITS: UPPER - 10.5 % LOWER - 8.0 %

FIRE EXTINQUISHING MEDIA
USE EXTINGUISHING MEDIA APPROPRIATE FOR SURROUNDING FIRE.

SPECIAL FIRE-FIGHTING PROCEDURES
FIREFIGHTERS SHOULD WEAR PROPER PROTECTIVE EQUIPMENT AND SELF-CONTAINED
BREATHING APPARATUS WITH FULL FACEPIECE OPERATED IN POSITIVE PRESSURE
MODE. MOVE CONTAINERS FROM FIRE AREA IF IT CAN BE DONE WITHOUT RISK. USE
WATER TO KEEP FIRE-EXPOSED CONTAINERS COOL.

UNUSUAL FIRE & EXPLOSION HAZARDS
GIVES OFF FLAMMABLE VAPORS. VAPORS MAY FORM EXPLOSIVE MIXTURE WITH AIR.
CLOSED CONTAINERS EXPOSED TO HEAT MAY EXPLODE. CONTACT WITH STRONG OXIDIZERS MAY CAUSE FIRE. CONCENTRATED VAPORS CAN BE IGNITED BY HIGH INTENSITY HEAT SOURCE.

TOXIC GASES PRODUCED

HYDROGEN CHLORIDE, PHOSGENE, CARBON MONOXIDE, CARBON DIOXIDE

EXPLOSION DATA-SENSITIVITY TO MECHANICAL IMPACT
NONE IDENTIFIED.

EXPLOSION DATA-SENSITIVITY TO STATIC DISCHARGE
NONE IDENTIFIED.

HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE (TLV/TWA): 270 MG/M (50 PPM)

SHORT-TERM EXPOSURE LIMIT (STEL): 1080 MG/M (200 PPM)

PERMISSIBLE EXPOSURE LIMIT (PEL): (100 PPM)

TOXICITY OF COMPONENTS

ORAL RAT LD50 FOR TRICHLOROETHYLENE 3670 MG/KG
INTRAPERITONEAL MOUSE LD50 FOR TRICHLOROETHYLENE 1831 MG/KG
INTRAVENOUS MOUSE LD50 FOR TRICHLOROETHYLENE 34 MG/KG

INHALATION-4HR MOUSE LC50 FOR TRICHLOROETHYLENE 8450 PPM
CARCINOGENICITY: NTP: NO IARC: NO Z LIST: NO OSHA REG: NO

CARCINOGENICITY
TESTS ON LABORATORY ANIMALS INDICATE MATERIAL MAY BE CARCINOGENIC.

REPRODUCTIVE EFFECTS
TESTS ON LABORATORY ANIMALS INDICATE MATERIAL MAY BE MUTAGENIC.

EFFECTS OF OVEREXPOSURE

INHALATION: HEADACHE, NAUSEA, VOMITING, DIZZINESS, NARCOSIS, WEAKNESS, FATIGUE, IRRITATION OF UPPER RESPIRATORY TRACT, NUMBNESS OF LIMBS, CENTRAL NERVOUS SYSTEM DEPRESSION, PULMONARY EDEMA, UNCONSCIOUSNESS

SKIN CONTACT: IRRITATION, PROLONGED CONTACT MAY CAUSE DERMATITIS

EYE CONTACT: IRRITATION

SKIN ABSORPTION: NONE IDENTIFIED

INGESTION: NAUSEA, HEADACHES, DIZZINESS, CONFUSION, JAUNDICE, GASTROINTESTINAL IRRITATION, CENTRAL NERVOUS SYSTEM DEPRESSION, UNCONSCIOUSNESS

CHRONIC EFFECTS: DAMAGE TO LIVER, KIDNEYS, BLOOD, AND CENTRAL NERVOUS SYSTEM DEPRESSION

TARGET ORGANS
RESPIRATORY SYSTEM, LUNGS, KIDNEYS, LIVER, BLOOD, HEART, CENTRAL NERVOUS SYSTEM, SKIN

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE
LIVER OR KIDNEY DISORDERS, LUNG DISEASE, CENTRAL NERVOUS SYSTEM DISORDERS

PRIMARY ROUTES OF ENTRY
INHALATION, INGESTION, EYE CONTACT, SKIN CONTACT

EMERGENCY AND FIRST AID PROCEDURES

INGESTION: CALL A PHYSICIAN. IF SWALLOWED, DO NOT INDUCE VOMITING. IF CONSCIOUS, GIVE LARGE AMOUNTS OF WATER.

INHALATION: IF INHALED, REMOVE TO FRESH AIR. IF NOT BREATHING, GIVE ARTIFICIAL RESPIRATION. IF BREATHING IS DIFFICULT, GIVE OXYGEN. PROMPT ACTION IS ESSENTIAL.

SKIN CONTACT: IN CASE OF CONTACT, IMMEDIATELY FLUSH SKIN WITH PLENTY OF WATER FOR AT LEAST 15 MINUTES WHILE REMOVING CONTAMINATED CLOTHING AND SHOES. WASH CLOTHING BEFORE RE-USE.

EYE CONTACT: IN CASE OF EYE CONTACT, IMMEDIATELY FLUSH WITH PLENTY OF WATER FOR AT LEAST 15 MINUTES.

SARA/TITLE III HAZARD CATEGORIES AND LISTS

ACUTE: YES CHRONIC: YES FLAMMABILITY: NO PRESSURE: NO REACTIVITY: NO

EXTREMELY HAZARDOUS SUBSTANCE: NO
CERCLA HAZARDOUS SUBSTANCE: YES CONTAINS TRICHLOROETHYLENE (RQ = 1000 LBS)
SARA 313 TOXIC CHEMICALS: YES CONTAINS TRICHLOROETHYLENE
GENERIC CLASS: GENERIC CLASS REMOVED FROM CFR: 7/1/91
TSCA INVENTORY: YES
STATE LISTS: FOR PRODUCTS SOLD IN THE STATE OF CALIFORNIA, THE STATE REQUIRES
THAT WE PROVIDE TO USERS AND THEIR EMPLOYEES THE FOLLOWING MESSAGE:
WARNING:

THIS PRODUCT IS A CHEMICAL KNOWN TO THE STATE OF CALIFORNIA TO CAUSE CANCER.

REACTIVITY DATA

STABILITY: STABLE HAZARDOUS POLYMERIZATION: MAY OCCUR

CONDITIONS TO AVOID: HEAT, FLAME, OTHER SOURCES OF IGNITION, LIGHT

INCOMPATIBLES: CHEMICALLY ACTIVE METALS, STRONG BASES, STRONG OXIDIZING AGENTS, POWDERED METALS

DECOMPOSITION PRODUCTS: HYDROGEN CHLORIDE, PHOSGENE, CARBON MONOXIDE, CARBON DIOXIDE

SPILL & DISPOSAL PROCEDURES

STEPS TO BE TAKEN IN THE EVENT OF A SPILL OR DISCHARGE
WEAR SELF-CONTAINED BREATHING APPARATUS AND FULL PROTECTIVE CLOTHING. STOP
LEAK IF YOU CAN DO SO WITHOUT RISK. USE WATER SPRAY TO REDUCE VAPORS.
TAKE UP WITH SAND OR OTHER NON-COMBUSTIBLE ABSORBENT MATERIAL AND PLACE
INTO CONTAINER FOR LATER DISPOSAL. FLUSH SPILL AREA WITH WATER.

DISPOSAL PROCEDURE
DISPOSE IN ACCORDANCE WITH ALL APPLICABLE FEDERAL, STATE, AND LOCAL ENVIRONMENTAL REGULATIONS.

EPA HAZARDOUS WASTE NUMBER: U228 (TOXIC WASTE)

INDUSTRIAL PROTECTIVE EQUIPMENT

VENTILATION: USE GENERAL OR LOCAL EXHAUST VENTILATION TO MEET TLV REQUIREMENTS.

RESPIRATORY PROTECTION: RESPIRATORY PROTECTION REQUIRED IF AIRBORNE CONCENTRATION EXCEEDS TLV. AT CONCENTRATIONS ABOVE 50 PPM, A SELF-CONTAINED BREATHING APPARATUS IS ADVISED.

EYE/SKIN PROTECTION: SAFETY GOGGLES AND FACE SHIELD, UNIFORM,PROTECTIVE SUIT, NEOPRENE GLOVES ARE RECOMMENDED.

STORAGE AND HANDLING PRECAUTIONS

SAF-T-DATA* STORAGE COLOR CODE: BLUE (HEALTH)

STORAGE REQUIREMENTS
KEEP CONTAINER TIGHTLY CLOSED. STORE IN SECURE POISON AREA. STORE IN A
COOL, DRY, WELL-VENTILATED AREA. ISOLATE FROM INCOMPATIBLE MATERIALS.

TRANSPORTATION DATA AND ADDITIONAL INFORMATION

DOMESTIC (D.O.T.)

PROPER SHIPPING NAME: TRICHLOROETHYLENE
HAZARD CLASS: 6.1
UN/NA: UN1710 REPORTABLE QUANTITY: 100 LBS. PACKAGING GROUP: III
LABELS: 6 KEEP AWAY FROM FOOD
REGULATORY REFERENCES: 49CFR 172.101

INTERNATIONAL (I.M.O.)

PROPER SHIPPING NAME: TRICHLOROETHYLENE
HAZARD CLASS: 6.1 I.M.O. PAGE: 6273
UN: UN1710 MARINE POLLUTANTS: YES PACKAGING GROUP: III
LABELS: 6 TOXIC
REGULATORY REFERENCES: 49CFR PART 176; IMDG CODE

AIR (I.C.A.O.)

PROPER SHIPPING NAME: TRICHLOROETHYLENE
HAZARD CLASS: 6.1
UN: UN1710 PACKAGING GROUP: III
LABELS: 6 TOXIC
REGULATORY REFERENCES: 49CFR PART 175; ICAO=== WE BELIEVE THE TRANSPORTATION DATA AND REFERENCES CONTAINED HEREIN TO BE FACTUAL AND THE OPINION OF QUALIFIED EXPERTS. THE DATA IS MEANT AS A GUIDE TO THE OVERALL CLASSIFICATION OF THE PRODUCT AND IS NOT PACKAGE SIZE SPECIFIC, NOR SHOULD IT BE TAKEN AS A WARRANTY OR REPRESENTATION FOR WHICH THE COMPANY ASSUMES LEGAL RESPONSIBILITY.=== THE INFORMATION IS OFFERED SOLELY FOR YOUR CONSIDERATION, INVESTIGATION, AND VERIFICATION. ANY USE OF THE INFORMATION MUST BE DETERMINED BY THE USER TO BE IN ACCORDANCE WITH APPLICABLE FEDERAL, STATE, AND LOCAL LAWS AND REGULATIONS. SEE SHIPPER REQUIREMENTS 49CFR 171.2, CERTIFICATION 172.204, AND EMPLOYEE TRAINING 49 CFR 173.1(B).

U.S. CUSTOMS HARMONIZATION NUMBER: 29032200008

NOTE: WHEN HANDLING LIQUID PRODUCTS, SECONDARY PROTECTIVE CONTAINERS MUST BE USED FOR CARRYING. N/A = NOT APPLICABLE, OR NOT AVAILABLE N/E = NOT ESTABLISHED. THE INFORMATION IN THIS MATERIAL SAFETY DATA SHEET

MEETS THE REQUIREMENTS O THE UNITED STATES OCCUPATIONAL SAFETY AND HEALTH ACT AND REGULATIONS PROMULGATED THEREUNDER (29 CFR 1910.1200 ET. SEQ.) AND THE CANADIAN WORKPLACE HAZARDOUS MATERIALS INFORMATION SYSTEM. THIS DOCUMENT IS INTENDED ONLY AS A GUIDE TO THE APPROPRIATE PRECAUTIONARY HANDLING OF THE MATERIAL BY A PERSON TRAINED IN, OR SUPERVISED BY A PERSON TRAINED IN, CHEMICAL HANDLING. THE USE IS RESPONSIBLE FOR DETERMINING THE PRECAUTIONS AND DANGERS OF THIS CHEMICAL FOR HIS OR HER PARTICULAR APPLICATION. DEPENDING ON USAGE, PROTECTIVE CLOTHIN INCLUDING EYE AND FACE GUARDS AND RESPIRATORS MUST BE USED TO AVOID CONTACT WITH MATERIAL OR BREATHING CHEMICAL VAPORS/FUMES. EXPOSURE TO THIS PRODUCT MAY HAVE SERIOUS ADVERSE HEALTH EFFECTS. THIS CHEMICAL MAY INTERACT WITH OTHER SUBSTANCES. SINCE THE POTENTIAL USES ARE SO VARIED, BAKER CANNOT WARN OF ALL OF THE POTENTIAL DANGERS OF USE OR INTERACTION WITH OTHER CHEMICALS OR MATERIALS. BAKER WARRANTS THAT THE CHEMICAL MEETS THE SPECIFICATIONS SET FORTH ON THE LABEL. BAKER DISCLAIMS ANY OTHER WARRANTIES, EXPRESSED OR IMPLIED, WITH REGARD TO THE PRODUCT SUPPLIED HEREUNDER, ITS MERCHANTABILITY OR ITS FITNESS FOR A PARTICULAR PURPOSE. THE USER SHOULD RECOGNIZE THAT THIS PRODUCT CAN CAUSE SEVERE INJURY AND EVE DEATH, ESPECIALLY IF IMPROPERLY HANDLED OR THE KNOWN DANGERS OF USE ARE NOT HEEDED. READ ALL PRECAUTIONARY INFORMATION. AS NEW DOCUMENTED GENERAL SAFETY INFORMATION BECOMES AVAILABLE, BAKER WILL PERIODICALLY REVISE THIS MATERIAL SAFETY DATA SHEET. NOTE: CHEMTREC, CANUTEC, AND NATIONAL RESPONSE CENTER EMERGENCY TELEPHONE NUMBERS ARE TO BE USED ONLY IN THE EVENT OF CHEMICAL EMERGENCIES INVOLVING A SPILL, LEAK, FIRE, EXPOSURE, OR ACCIDENT INVOLVING CHEMICALS. ALL NON-EMERGENCY QUESTIONS SHOULD BE DIRECTED TO CUSTOMER SERVICE (1-800-JTBAKER ASSISTANCE. APPROVED BY QUALITY ASSURANCE DEPARTMENT.

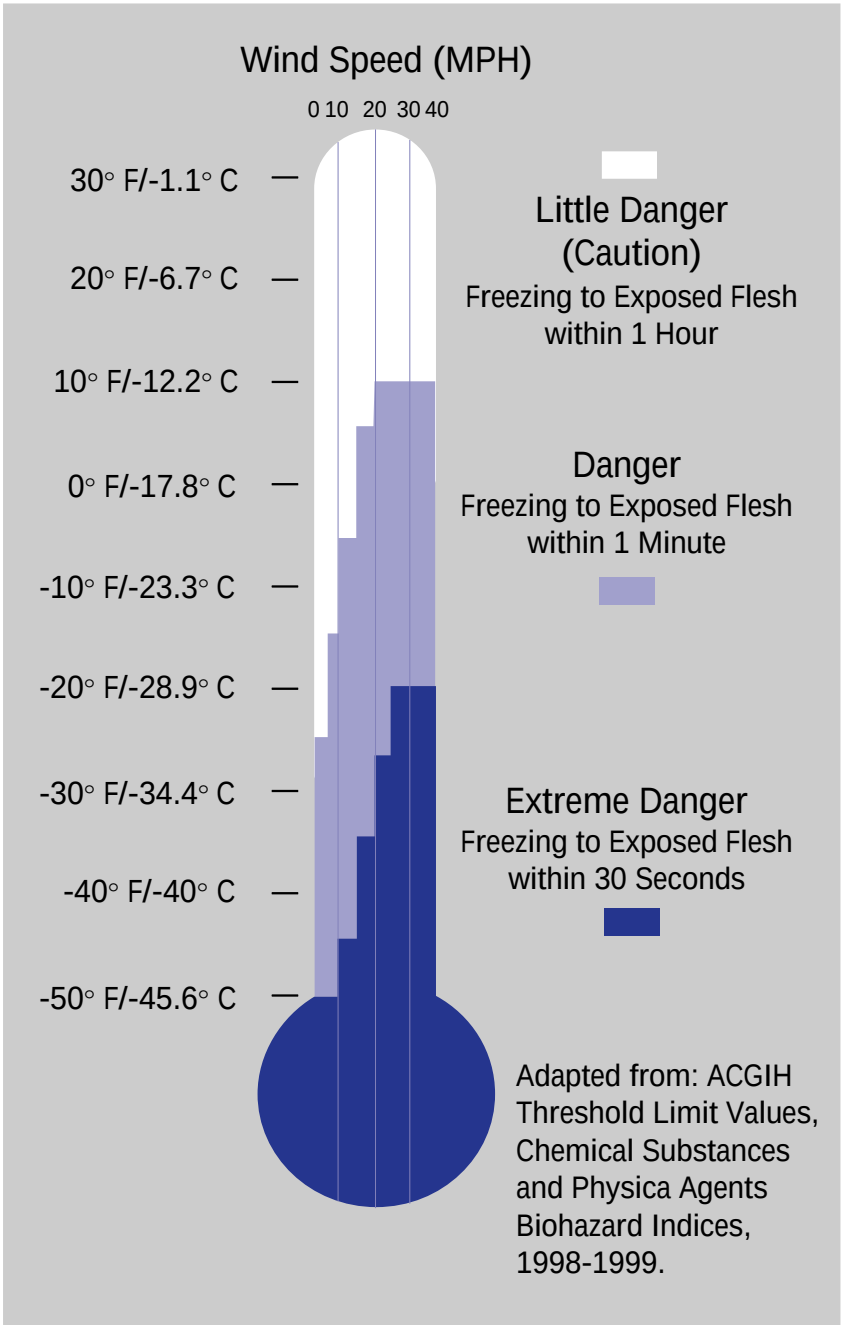
Appendix I

Cold Stress Guidelines

THE COLD STRESS EQUATION

LOW TEMPERATURE + WIND SPEED + WETNESS = INJURIES & ILLNESS

When the body is unable to warm itself, serious cold-related illnesses and injuries may occur, and permanent tissue damage and death may result. **Hypothermia** can occur when *land temperatures* are **above** freezing or *water temperatures* are below 98.6°F/ 37°C. Cold-related illnesses can slowly overcome a person who has been chilled by low temperatures, brisk winds, or wet clothing.



U.S. Department of Labor
Occupational Safety and Health Administration

OSHA 3156
1998

FROST BITE

What Happens to the Body:

FREEZING IN DEEP LAYERS OF SKIN AND TISSUE; PALE, WAXY-WHITE SKIN COLOR; SKIN BECOMES HARD and NUMB; USUALLY AFFECTS THE FINGERS, HANDS, TOES, FEET, EARS, and NOSE.

What Should Be Done: (land temperatures)

- Move the person to a warm dry area. Don't leave the person alone.
- Remove any wet or tight clothing that may cut off blood flow to the affected area.
- **DO NOT** rub the affected area, because rubbing causes damage to the skin and tissue.
- **Gently** place the affected area in a warm (105°F) water bath and monitor the water temperature to **slowly** warm the tissue. Don't pour warm water directly on the affected area because it will warm the tissue too fast causing tissue damage. Warming takes about 25-40 minutes.
- After the affected area has been warmed, it may become puffy and blister. The affected area may have a burning feeling or numbness. When normal feeling, movement, and skin color have returned, the affected area should be dried and wrapped to keep it warm. **NOTE:** If there is a chance the affected area may get cold again, do not warm the skin. If the skin is warmed and then becomes cold again, it will cause severe tissue damage.
- Seek medical attention as soon as possible.

HYPOTHERMIA - (Medical Emergency)

What Happens to the Body:

NORMAL BODY TEMPERATURE (98.6° F/37°C) DROPS TO OR BELOW 95°F (35^0 C); FATIGUE OR DROWSINESS; UNCONTROLLED SHIVERING; COOL BLUISH SKIN; SLURRED SPEECH; CLUMSY MOVEMENTS; IRRITABLE, IRRATIONAL OR CONFUSED BEHAVIOR.

What Should Be Done: (land temperatures)

- Call for emergency help (i.e., Ambulance or Call 911).
- Move the person to a warm, dry area. Don't leave the person alone. Remove any wet clothing and replace with warm, dry clothing or wrap the person in blankets.
- Have the person drink warm, sweet drinks (sugar water or sports-type drinks) if they are alert. **Avoid drinks with caffeine** (coffee, tea, or hot chocolate) or alcohol.
- Have the person move their arms and legs to create muscle heat. If they are unable to do this, place warm bottles or hot packs in the arm pits, groin, neck, and head areas. **DO NOT** rub the person's body or place them in warm water bath. This may stop their heart.

What Should Be Done: (water temperatures)

- Call for emergency help (Ambulance or Call 911). Body heat is lost up to 25 times faster in water.
- **DO NOT** remove any clothing. Button, buckle, zip, and tighten any collars, cuffs, shoes, and hoods because the layer of trapped water closest to the body provides a layer of insulation that slows the loss of heat. Keep the head out of the water and put on a hat or hood.
- Get out of the water as quickly as possible or climb on anything floating. **DO NOT** attempt to swim unless a floating object or another person can be reached because swimming or other physical activity uses the body's heat and reduces survival time by about 50 percent.
- If getting out of the water is not possible, wait quietly and conserve body heat by folding arms across the chest, keeping thighs together, bending knees, and crossing ankles. If another person is in the water, huddle together with chests held closely.

How to Protect Workers

- Recognize the environmental and workplace conditions that lead to potential cold-induced illnesses and injuries.
- Learn the signs and symptoms of cold-induced illnesses/injuries and what to do to help the worker.
- Train the workforce about cold-induced illnesses and injuries.
- Select proper clothing for cold, wet, and windy conditions. Layer clothing to adjust to changing environmental temperatures. Wear a hat and gloves, in addition to underwear that will keep water away from the skin (polypropylene).
- Take frequent short breaks in warm dry shelters to allow the body to warm up.
- Perform work during the warmest part of the day.
- Avoid exhaustion or fatigue because energy is needed to keep muscles warm.
- Use the buddy system (work in pairs).
- Drink warm, sweet beverages (sugar water, sports-type drinks). Avoid drinks with caffeine (coffee, tea, or hot chocolate) or alcohol.
- Eat warm, high-calorie foods like hot pasta dishes.

Workers Are at Increased Risk When…

- They have predisposing health conditions such as cardiovascular disease, diabetes, and hypertension.
- They take certain medication (check with your doctor, nurse, or pharmacy and ask if any medicines you are taking affect you while working in cold environments).
- They are in poor physical condition, have a poor diet, or are older.

Appendix J

Heat Stress Guidelines

OSHA QUICK CARD™

Protect Yourself

Heat Stress

When the body is unable to cool itself by sweating, several heat-induced illnesses such as heat stress or heat exhaustion and the more severe heat stroke can occur, and can result in death.

Factors Leading to Heat Stress

High temperature and humidity; direct sun or heat; limited air movement; physical exertion; poor physical condition; some medicines; and inadequate tolerance for hot workplaces.

Symptoms of Heat Exhaustion

- Headaches, dizziness, lightheadedness or fainting.
- Weakness and moist skin.
- Mood changes such as irritability or confusion.
- Upset stomach or vomiting.

Symptoms of Heat Stroke

- Dry, hot skin with no sweating.
- Mental confusion or losing consciousness.
- Seizures or convulsions.

Preventing Heat Stress

- Know signs/symptoms of heat-related illnesses; monitor yourself and coworkers.
- Block out direct sun or other heat sources.
- Use cooling fans/air-conditioning; rest regularly.
- Drink lots of water; about 1 cup every 15 minutes.
- Wear lightweight, light colored, loose-fitting clothes.
- Avoid alcohol, caffeinated drinks, or heavy meals.

What to Do for Heat-Related Illness

- Call 911 (or local emergency number) at once.

While waiting for help to arrive:

- Move the worker to a cool, shaded area.
- Loosen or remove heavy clothing.
- Provide cool drinking water.
- Fan and mist the person with water.

For more complete information:

OSHA Occupational Safety and Health Administration
U.S. Department of Labor
www.osha.gov (800) 321-OSHA

OSHA 3154-07R-06

Appendix K

Utility Markout Guidelines

Safety Bulletin 14 – Utility Markout Guidelines

This Safety Bulletin summarizes OSHA's requirements and the American Public Works Association's (APWA's) guidelines regarding the temporary marking of subsurface utilities to prevent accidental damage or service interruption by contractors or others working near subsurface utilities. This Safety Bulletin was prepared in response to recent utility interruptions during Apex and subcontractor excavation activities in Pennsylvania and Virginia.

Prior to any excavation, trenching, drilling, Geoprobe work, or other intrusive activities, you must notify the "One Call Center" for the state in which you are working (see below for phone numbers). In addition, it is recommend that prior to contacting the One Call Center, you use white spray paint or flags to delineate the area of proposed excavation or other intrusive work.

OSHA Requirements

- The estimated location of utility installations, such as sewer, telephone, fuel, electric, water lines, or any other underground installations that reasonably may be expected to be encountered during excavation work, shall be determined prior to opening an excavation. (Note--in addition to contacting the One Call Center, you may also need to use utility detection equipment and/or hire private utility locator companies to locate utilities on private property. It may also be necessary to meet with the utility representatives and property owner/client on-site to pinpoint the location of the utility and to explore options to temporarily deenergize or re-route the utility. Also be sure to review as-builts from the property owner/client to assist with location of utilities).Utility companies or the One Call Center must be contacted within established or customary response times (usually at least 72-hours notice), advised of the proposed work, and asked to establish the location of the utility underground installations prior to the start of actual excavation. (Document and retain all correspondence).

- When excavation operations approach the estimated location of underground installations, the exact location of the installations shall be determined by safe and acceptable means. (Note--the use of non-conductive, non-powered hand tools to manually dig to expose a utility may be acceptable but "soft dig" techniques such as air-knifing, hydro jetting, vacuum excavation or other techniques that prevent damage to the utility are preferred over hand digging).

- For more information on OSHA requirements, see:
  http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=10775

APWA Guidelines

- The One Call Center will use color-coded surface marks (paint or similar coating) to indicate the location route of buried lines. To increase visibility, color-coded vertical markers (temporary stakes or flags) should supplement surface marks.

- All marks and markers should indicate the name, initials or logo of the company that owns or operates the line and the width of the facility if it is greater than 50 mm (2").

- If the surface over the buried line is to be removed, supplemental offset markings may be used. Offset markings should be on a uniform alignment and must clearly indicate that the actual facility is a specified distance away.

- The APWA encourages public agencies, utilities, contractors, other associations, manufacturers and others involved in excavation to adopt the Uniform Color Code (ULCC) using ANSI standard Z53.1 Safety Colors.

    - White – Proposed Excavation
    - Pink – Temporary Survey Markings
    - Red – Electric Power Lines, Cables, Conduit and Lighting Cables
    - Yellow – Gas, Oil, Steam, Petroleum or Gaseous Materials
    - Orange – Communication, Alarm or Signal Lines, Cables or Conduit
    - Blue –Potable Water, Irrigation and Slurry Lines
    - Purple – Reclaimed Water, Irrigation and Slurry Lines
    - Green – Sewers and Drain Lines

Location of Tolerance Zone:

Any excavation within the tolerance zone may be performed with non-powered, non-conductive hand tools until the marked facility is exposed (Again, the use of non-conductive hand tools to manually dig to expose a utility may be acceptable but "soft dig" techniques such as air-knifing, hydro jetting, vacuum excavation or other techniques that prevent damage to the utility are preferred over hand digging). The width of the tolerance zone may be specified in law or code. If not, **AT LEAST** 500 mm (18") is required from each side of the facility. The tolerance zone includes the width of the facility and 500 mm (18") measured horizontally from each side of the facility. The width of the facility can vary and may be as wide as 60" or more for large pipe(s) or multiple ducts

One Call Centers:

New York Metro Area – Dig Safe
(800) 272-4480
Washington D.C. – Miss Utility
1-800-257-7777
Pennsylvania – PA One-call
1-800-242-1776
New Jersey – New Jersey One-call
1-800-272-1000
Delaware – Miss Utility of Delaware
1-800-282-8555
Ohio – Ohio Utilities Protection Service
1-800-362-2764
Maryland – Miss Utility
1-800-257-7777
Virginia – Miss Utility of Virginia
1-800-552-7001
Miss Utility (Northern Virginia)
1-800-257-7777

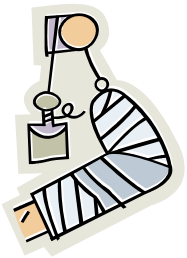
For a complete list of One Call Centers in the US, refer to:
http://www.pubworks.org/Documents/About/PET/One-Call/condensed_directory.pdf.

Appendix L

Accident Prevention

SAFETY BULLETIN 21

Accident Prevention



Is one of your workers an accident waiting to happen? Certain unsafe behaviors and attitudes are signs someone might be headed toward an accident. Look out for these warning signs of an accident-prone worker:

- The worker is in a hurry - acting faster than s/he is thinking.
- The employee is running on emotion rather than thinking about what s/he is doing. S/he is angry, frustrated or even elated.
- Fatigue is making the worker inattentive.
- The worker is distracted by stress concerning problems at work or off the job.
- Distractions from other activities in the work area or interruptions by co-workers are interfering with performing safety routines.
- Getting too comfortable and casual with a repeated task causes the worker to become careless.
- Being overly confident or showing off can cause a worker to take chances.
- The worker takes shortcuts, such as adjusting machinery while it is in motion or under power.
- S/he uses equipment without waiting for training or authorization - jumping onto a forklift to quickly move something or borrowing a powered tool for a task.
- The worker resists rules about Personal Protective Equipment by using it incorrectly or removing it when you are not looking.
- The curious worker tries something - such as a chemical combination - just to see what happens.

Watch for the warnings of an accident waiting to happen. When you observe them, step in and get the worker back on track. Contact your Site Safety Officer, Project Manager, Regional Health and Safety Manager or Apex's Director, Corporate Health and Safety to address your concerns**.**

Appendix M

Slip, Trips and Falls

Safety Bulletin 25 - Slips, Trips, and Falls

Injuries while walking are common to all organizations and facilities. The walking areas (i.e., hallways, restrooms, lobbies, warehouses, cafeterias, parking lots) become problems in a variety of ways. The end result of allowing the hazards to exist is usually the same - an injured employee. Most of these accidents, which result in pain and suffering, can be prevented if all employees follow a few single precautions.

Listed below are some of the common causes for slips, trips, and falls and recommended corrective action:

- ✓ Icy Walkways (snow, freezing rain, packed ice).
  - o *Corrective action*: Keep a stock of commercially sold de-icers such as rock salt and liquid ice melt for immediate treatment of slippery walkways and stairs and add sand to improve traction. Always have a snow shovel on hand as well.

    - Do not shovel snow if you have a history of heart problems. While shoveling, push snow in front of you. If you have to lift it, pick up small amounts and lift with your legs, not your back. Do not toss snow over your shoulder or to the side.

- ✓ Wet floors (spilled drinks, oily substances).
  - o *Corrective action*: Clean up spills immediately.

- ✓ Debris on floors (paper, candy wrappers, paper clips, rubber bands, paper).
  - o *Corrective Action*: Pick up loose material and dispose of in proper container.
- ✓ Construction materials/equipment in halls.
  - o *Corrective action*: Avoid construction areas; obey warning signs.

- ✓ Loose/damaged flooring (tiles, carpet, edge strips).
  - o *Corrective action*: Call in a service request.
- ✓ Objects in path (power cords, furniture, equipment, and pallets).
  - o *Corrective action*: Avoid, remove where possible, notify supervision.
- ✓ Slippery shoe material (leather, plastic).
  - o *Corrective action*: Wear substantial, non-slippery sole and heel shoes.
- ✓ Ladders
  - o *Corrective action*: When using ladders, make sure the ladder is long enough for the job, and don't overreach.
- ✓ Slip and fall while ascending and descending stairs.
  - o *Corrective action*: Always use the hand rail and never carry items that require the use of both hands.

Even though each employee is responsible for wiping up liquids that he or she spills and keeping tools, boxes, cables, and other items out of the walkways, some of these hazards continue to exist. One should not blindly assume that walkways will be clear of hazards. To avoid slips, trips and falls, always be on the lookout for hazards that may be present in the walkway that you are using.

Appendix N

NYSDOH Generic
Community Air Monitoring Plan

New York State Department of Health
Generic Community Air Monitoring Plan

A Community Air Monitoring Plan (CAMP) requires real-time monitoring for volatile organic compounds (VOCs) and particulates (i.e., dust) at the downwind perimeter of each designated work area when certain activities are in progress at contaminated sites. The CAMP is not intended for use in establishing action levels for worker respiratory protection. Rather, its intent is to provide a measure of protection for the downwind community (i.e., off-site receptors including residences and businesses and on-site workers not directly involved with the subject work activities) from potential airborne contaminant releases as a direct result of investigative and remedial work activities. The action levels specified herein require increased monitoring, corrective actions to abate emissions, and/or work shutdown. Additionally, the CAMP helps to confirm that work activities did not spread contamination off-site through the air.

The generic CAMP presented below will be sufficient to cover many, if not most, sites. Specific requirements should be reviewed for each situation in consultation with NYSDOH to ensure proper applicability. In some cases, a separate site-specific CAMP or supplement may be required. Depending upon the nature of contamination, chemical-specific monitoring with appropriately-sensitive methods may be required. Depending upon the proximity of potentially exposed individuals, more stringent monitoring or response levels than those presented below may be required. Special requirements will be necessary for work within 20 feet of potentially exposed individuals or structures and for indoor work with co-located residences or facilities. These requirements should be determined in consultation with NYSDOH.

Reliance on the CAMP should not preclude simple, common-sense measures to keep VOCs, dust, and odors at a minimum around the work areas.

Community Air Monitoring Plan

Depending upon the nature of known or potential contaminants at each site, real-time air monitoring for volatile organic compounds (VOCs) and/or particulate levels at the perimeter of the exclusion zone or work area will be necessary. Most sites will involve VOC and particulate monitoring; sites known to be contaminated with heavy metals alone may only require particulate monitoring. If radiological contamination is a concern, additional monitoring requirements may be necessary per consultation with appropriate NYSDEC/NYSDOH staff.

Continuous monitoring will be required for all ground intrusive activities and during the demolition of contaminated or potentially contaminated structures. Ground intrusive activities include, but are not limited to, soil/waste excavation and handling, test pitting or trenching, and the installation of soil borings or monitoring wells.

Periodic monitoring for VOCs will be required during non-intrusive activities such as the collection of soil and sediment samples or the collection of groundwater samples from existing monitoring wells. "Periodic" monitoring during sample collection might reasonably consist of taking a reading upon arrival at a sample location, monitoring while opening a well cap or overturning soil, monitoring during well bailing/purging, and taking a reading prior to leaving a sample location. In some instances, depending upon the proximity of potentially exposed individuals, continuous monitoring may be required during sampling activities. Examples of such situations include groundwater sampling at wells on the curb of a busy urban street, in the midst of a public park, or adjacent to a school or residence.

VOC Monitoring, Response Levels, and Actions

Volatile organic compounds (VOCs) must be monitored at the downwind perimeter of the immediate work area (i.e., the exclusion zone) on a **continuous** basis or as otherwise specified. Upwind concentrations should be measured at the start of each workday and periodically thereafter to establish background conditions. The monitoring work should be performed using equipment appropriate to measure the types of contaminants known or suspected to be present. The equipment should be calibrated at least daily for the contaminant(s) of concern or for an appropriate surrogate. The equipment should be capable of calculating 15-minute running average concentrations, which will be compared to the levels specified below.

- If the ambient air concentration of total organic vapors at the downwind perimeter of the work area or exclusion zone exceeds 5 parts per million (ppm) above background for the 15-minute average, work activities must be temporarily halted and monitoring continued. If the total organic vapor level readily decreases (per instantaneous readings) below 5 ppm over background, work activities can resume with continued monitoring.

- If total organic vapor levels at the downwind perimeter of the work area or exclusion zone persist at levels in excess of 5 ppm over background but less than 25 ppm, work activities must be halted, the source of vapors identified, corrective actions taken to abate emissions, and monitoring continued. After these steps, work activities can resume provided that the total organic vapor level 200 feet downwind of the exclusion zone or half the distance to the nearest potential receptor or residential/commercial structure, whichever is less - but in no case less than 20 feet, is below 5 ppm over background for the 15-minute average.

- If the organic vapor level is above 25 ppm at the perimeter of the work area, activities must be shutdown.

All 15-minute readings must be recorded and be available for State (DEC and DOH) personnel to review. Instantaneous readings, if any, used for decision purposes should also be recorded.

Particulate Monitoring, Response Levels, and Actions

Particulate concentrations should be monitored **continuously** at the upwind and downwind perimeters of the exclusion zone at temporary particulate monitoring stations. The particulate monitoring should be performed using real-time monitoring equipment capable of measuring particulate matter less than 10 micrometers in size (PM-10) and capable of integrating over a period of 15 minutes (or less) for comparison to the airborne particulate action level. The equipment must be equipped with an audible alarm to indicate exceedance of the action level. In addition, fugitive dust migration should be visually assessed during all work activities.

- If the downwind PM-10 particulate level is 100 micrograms per cubic meter (mcg/m^3) greater than background (upwind perimeter) for the 15-minute period or if airborne dust is observed leaving the work area, then dust suppression techniques must be employed. Work may continue with dust suppression techniques provided that downwind PM-10 particulate levels do not exceed 150 mcg/m^3 above the upwind level and provided that no visible dust is migrating from the work area.

- If, after implementation of dust suppression techniques, downwind PM-10 particulate levels are greater than 150 mcg/m^3 above the upwind level, work must be stopped and a re-evaluation of activities initiated. Work can resume provided that dust suppression measures and other controls are successful in reducing the downwind PM-10 particulate concentration to within 150 mcg/m^3 of the upwind level and in preventing visible dust migration.

All readings must be recorded and be available for State (DEC and DOH) personnel to review.

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