

SEMCO

HEALTH & SAFETY

PLAN

HEALTH MONITORING AND SAFETY PROGRAM

To assure the health and safety of employees involved in hazardous waste operations, Semco Inc. has developed and implemented a Health and Safety Program.

This plan is based on Standard Operating Safety Guides (USEPA) and The Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities (NIOSH/OSHA/USGC/EPA).

Semco inc. employees must receive health and safety training prior to commencing work at sites where hazardous materials may be present and will be provided with periodic follow-up training as appropriate. Health and Safety training will include;

- * Health Monitoring Program
- * Review of General Chemical & Mechanical Dangers
- * Emergency Response
- * Decontamination
- * Documentation and Record Keeping
- * Updating of Health and Safety Plan
- * Reference Guides for Hazardous Materials

When appropriate, a site-specific safety plan will be implemented and will include the following:

- * Site history
- * Inventory of known chemicals (updated as possible)
- * Project organization
- * Work Plan review
- * Project documentation
- * Review of site safety rules (site safety rules will be updated as new information is available or after an accident of implementation of contingency plan)
- * Review of decontamination procedures
- * Proper use and care of personal protective equipment
- * Proper calibration and use of monitoring equipment
- * Emergency response procedures

1.0 HEALTH MONITORING PROGRAM

All drilling personnel and field staff must be enrolled in the Semco Inc. Health Monitoring Program, developed in conjunction with Industrial Medical Clinics of Anaheim, CA. This program consists of an initial medical examination to establish the employee's general health profile and provides important baseline laboratory data for comparative study. The scope of the initial comprehensive physical examination and laboratory testing routine is detailed in Table 1-0. Follow-up examinations are completed for all personnel enrolled in the health monitoring program on a semi annual basis, or more frequently if project assignments warrant testing following specific field activities. The level of potential exposure that Semco personnel are subjected to in carrying out hazardous waste work assignments are recorded by the individual and reviewed weekly by the site supervisor. The California Poison Control Center maintains a comprehensive reference library containing the current information concerning the carcinogenic, mutagenic, teratogenic and toxic characteristics of hazardous wastes.

1.1 REVIEW OF EXPOSURE SYMPTOMS

Symptoms of exposure to hazardous materials for each site will be reviewed in order to indicate to personnel the recognized signs of possible exposure to those materials. This information will be supplemented with a discussion of the need for objecting in the personal health assessment to account for normal reaction to stressful situations. The Site Safety Officer (the lead driller) will be watchful for outward evidence of changes in worker health. These outward symptoms may include skin irritations, skin discoloration, eye irritability, reduced libido, intolerance to heat or cold, or loss of appetite. Employees will routinely be asked to assess their general state of health during individual projects. At the end of each week, employees will briefly describe minor injuries and chemical experience (exposure potential at each job site). This description will be turned in with time records, reviewed by the corporate safety officer and filed in the employees medical file.

TABLE 1-0

HEALTH MONITORING PROGRAM INITIAL EXAMINATION

Physical Examination

- * medical history survey
- * medical examination
- * vision; near and distance vision, color vision
- * hearing; audiometry
- * radiologic: PA;LAT
- * electrocardiogram: 12 lead
- * spirometry

Lab Studies

- | | | |
|----------------------|-------------------|--------------------|
| * hematology | * blood chemistry | |
| - red blood count | - SMA 17 | - urinalysis |
| - white blood count | - electrolytes | - Papanicolaou |
| - hemoglobin | - creatinine | - cholinesterase |
| - hematocrit | - SGPT | level |
| - platelet | - carbon dioxide | - thyroid function |
| - indices | - cholesterol | test T3/T4 |
| - sedimentation rate | - serum iron | |

2.0 REVIEW OF GENERAL CHEMICAL AND MECHANICAL DANGER

A set of standard onsite safety practices will be enforced during site activities to reduce the risks associated with handling contaminated materials and dangers inherent with working near heavy machinery. These safety practices are divided into three categories: personal precautions, rig safety and general procedures and operations.

2.1 PERSONAL PRECAUTIONS

- 2.1.1 Any practice which increases the probability of hand-to-mouth transfer and ingestion of contaminated material will be prohibited in any area designated contaminated. Prohibited activities include eating, drinking, chewing gum or tobacco and smoking.
- 2.1.2 Hands and face will be thoroughly washed upon leaving the work area and before eating, drinking or any other activities.
- 2.1.3 Any excess facial hair which interferes with proper fit of the mask to face seal will be prohibited on personnel required to wear respirator protection. (while respirators are not typically required, work will be prepared to upgrade to Level "C" protection requiring the use of respirators.)
- 2.1.4 Unnecessary contact with contaminated or suspected contaminated surfaces will be avoided. Workers will be instructed to avoid walking through puddles, mud, or other discolored surfaces: kneeling on the ground; and leaning, sitting, or placing equipment on drums, containers, vehicles or the ground.
- 2.1.5 Medicine and alcohol can increase adverse effect from exposure to toxic chemicals. Therefore, prescribed medication will not be taken by personnel during field activities. Also, alcoholic beverage intake will not be tolerated immediately before or during field work.
- 2.1.6 The effects of heat stress in all personnel will be monitored by the Health and Safety Officer. Appropriate measures will be taken to remove any potential victim of heat stress from the work area, provide cooling to the body and provide plenty of liquids to replace body fluids.

2.2 RIG SAFETY

Semco, Inc. has incorporated the National Drilling Federation's (NDF/DCDMA/NDCA) "Drilling Safety Guide" as our mechanical hazards and rig safety guide. This booklet is required reading for all field personnel.

2.3 GENERAL PROCEDURES AND OPERATIONS

2.3.1 Entrance and exit to the site will be planned and emergency escape routes will be determined. Before drilling begins a working phone will be located and the most expeditious route to a hospital established. Site Specific Hazards will be discussed and the clients safety requirements will be adopted. Personnel will practice any unfamiliar procedures prior to performing them in the field. The number of personnel and pieces of equipment in the work area will be minimized to the extent that it compromises the effectiveness of site operations. Procedures for leaving a contaminated work area will be established prior to going onsite. Work areas and decontamination procedures will be established based on site conditions.

2.3.2 LEVELS OF PROTECTION

The level of personnel protective equipment required shall be determined by the type and levels of waste or spill material present at the site where project personnel may be exposed. In situations where the types of waste or spill material on-site are unknown or the hazards are not clearly established or the situation changes during onsite activities, the Site Safety Officer must make a reasonable determination of the level of protection that will assure the safety of drilling personnel until the potential hazards have been determined precisely through monitoring, sampling, informational assessment, or other reliable methods. Once the hazards have been determined, protective levels commensurate with the hazards shall be employed. Protection levels will be continuously evaluated to reflect any new information acquired.

The levels of protection utilized by SEMCO INC. are presented below:

Level A - Level A protection must be selected when the Site Safety Officer makes a reasonable determination that the highest available level of both respiratory and skin and eye contact protection is needed. It should be noted that while Level A provides maximum available protection, it does not protect against all possible hazards. Consideration of the heat stress that can arise from wearing Level A protection should also enter into the subtask leaders decision. (Comfort is not a decision factor, but heat stress will influence work rate, scheduling, and other work practices.)

Level B - The Site Safety Officer must select Level B protection when the highest level of respiratory protection is needed, but hazardous material exposure to the few unprotected areas of the body (i.e. the back of the neck) is unlikely.

Level C - The Site Safety Officer may select Level C when the required level of respiratory protection is known, or reasonably assumed to be, not greater than the level of protection afforded by full face air purifying respirators; and hazardous materials exposure to the few unprotected areas of the body. Level C requires carrying an emergency escape respirator.

Level D - Level D is the basic work uniform. Investigators and response personnel must not be permitted to work in civilian clothes. An emergency escape respirator may be required

Respiratory protection criteria and suitable protection gear are summarized in Table 2-1. Fit testing of safety equipment will be an important part of establishing adequate respiratory and dermal protection. Fit testing will be accomplished prior to site explorations and each individual will be assigned a fitted respirator for the duration of the project. These will be tagged for identification.

It should be recognized that most situations require a different combination of respiratory and dermal protective gear, e.g., where no splash protection is required but a high respiratory hazard is present. The site Safety Officer may elect a modification of the above.

TABLE 2-1
 PROTECTIVE GEAR
 (AIR QUALITY LEVELS IN PPM)

	Level D	Level C	Level B	Level A
Air Quality Above Background	0	0-5	5-500	500-1000
Respirator Type*	Escape	Full Face + Escape	SCBA	SCBA
Clothing				
o Boots	*	*	*	*
o Safety glasses or equivalent	*	*	*	
o Hard hat	*	*	*	
o Gloves, inner and outer	*	*	*	*
o Booties		*	*	*
o Coveralls	*	*	*	
o Chemical protective coveralls		*	*	
o Totally encapsulated suit				*

* Use of a respirator is allowed only where identification or organic vapor constituents has occurred and appropriate respirator cartridges have been obtained.

3.0 EMERGENCY RESPONSE

3.1 ON-SITE FIRST AID

All of Semco, Inc.'s Drill Rigs will be equipped with the following items at all times:

- an industrial first aid kit
- 2 ELSA 10 minute supplied Air Escape Mask
- 3 Half Mask respirators
- 3 Full Face respirators
- 10 pair Cartridges TC-21C-287 (organic vapors)
- 10 pair Cartridges TC-23C-450 (organic vapors, acid gases)
- 3 hard hats
- 5 safety glasses
- 30 pair disposable gloves
- 10 pair butyl rubber gloves
- 10 chem resist coveralls (coated Tyvek)
- 3 pair rubber boots with steel toes
- 2 fire extinguishers (co 2)
- 1 eye wash station (portable)

3.1.1 At least one person qualified to perform first aid will be present onsite at all times during work activity. This person will have earned a certificate in first aid training from the American Red Cross or will have received equivalent training.

3.1.2 Transportation to Emergency Treatment

A vehicle will be available at all times for use in transporting personnel to the hospital. Hospital routes shall be discussed prior to onsite activity.

3.1.3 Contingency Planning

Prior to commencement of onsite activities, field personnel will review safety considerations with the Site Safety Officer. The Site safety Officer is responsible for adherence to the designated safety precautions and for adherence to the designated safety precautions and assumes the role of SEMCO, INC'S on site coordinator with the client in an emergency response situation.

3.2 POTENTIAL HAZARDS

The potential hazards associated with hazardous waste site investigation included 1) accidents; 2) contact, inhalation or ingestion of hazardous materials; 3) explosion; and 4) fire.

3.2.1 Accidents

Accidents must be handled on a case by case basis. Minor cuts, bruises, muscle pulls, etc., will still allow the injured person to undergo reasonable normal decontamination procedures prior to receiving direct first aid. More serious injuries may not permit complete decontamination procedures to be undertaken, particularly if the nature of the injury is such that the victim should not be moved. The nature and degree of surface contamination at a site is generally low enough that emergency vehicles could reach the victim on site without undue hazard.

3.2.2 Contact and/or Ingestion of Hazardous Materials

Properly prescribed and maintained protective clothing and adherence to established safety procedures are designed to minimize these hazards. However, it is still a possibility that contact or ingestion of materials may occur. One possibility for contamination is the puncture of a buried drum of liquid during drilling operations which might cause the random distribution of the drum contents. Standard first aid procedures should be followed. The drilling rig will have a tank of water which may be useful in some circumstances, particularly to flush off any exposed skin areas. Eye wash bottles will also be maintained at the site in case of emergencies. In cases of ingestion or other than minor contact with known substances, the Poison Control Center and local hospital should be contacted and the victim brought there immediately for further treatment and observation.

3.2.3 Explosion

The drilling crew should be keenly aware of combustible gas meter readings and withdraw at an indication of imminently hazardous conditions. The detection of such conditions shall be reported to local agencies for potential execution of the evacuation plan should the situation be assessed as warranting such response.

3.2.4 Fire

The combustible gas meter will also warn of imminent fire hazards at borings. The greatest fire hazard at the site should be recognized as handling the methanol used for decontamination. No smoking or open flames are allowed in this area. Carbon Dioxide fire extinguishers will be kept at the drilling rig, and the decontamination area/field office. The Fire Department, previously informed of site activities, will be called as needed.

3.3 EVACUATION RESPONSE LEVELS

Evacuation responses will occur at three levels: (1) withdraw from immediate work area (100+ feet upwind); (2) site evacuation; (3) evacuation of surrounding area. Anticipated conditions which might require these responses are described below:

Withdrawal up-Wind (100 or more feet)

- o Sensing ambient air conditions as containing greater contaminant concentrations than guidelines allow for the type of respiratory protection being worn. The work party may return upon donning greater respiratory protection and/or assessing the situation as transient or past.
- o Breach in protective clothing or minor accident. The party may return when tear or other malfunction is repaired and first aid or decontamination has been administered.

3.5.1 Site Evacuation:

Upon determination of conditions warranting site evacuation, the work party will proceed upwind of the borehole and notify the security force, Site Safety Officer and the field office of site conditions. If the decontamination area is upwind and greater than 500 feet from the borehole, the crew will pass quickly through decontamination to remove contaminated outer suits. If the hazard is toxic gas, respirators will be retained. The crew will proceed to the field office to assess the situation. There the respirators may be removed (if the PI meter indicates an acceptable condition). As more facts are determined from the field crew, these will be relayed to the appropriate agencies.

3.5.2 Evacuation of Surrounding Area

When the Site Manager determines that conditions warrant evacuation of downwind residences and commercial operations, the local agencies will be notified and assistance requested. Designated onsite personnel will initiate evacuation of the immediate off site area without delay.

3.6 TRAINING

The attached matrix (Figure 3-1) indicated training received by on site personnel. All personnel should become familiar with this matrix to minimize response times.

4.0 DECONTAMINATION

4.1 PERSONNEL DECONTAMINATION PROCEDURE

A decontamination procedure will be carried out by all personnel leaving hazardous waste sites. Under no circumstances (except emergency evacuation) will personnel be allowed to leave the site prior to decontamination. Procedures for removal of protective clothing are as follows:

- o Drop tools, monitors, samples and trash at designated drop stations. These will be plastic containers or drop sheets.
- o Step into designated shuffle pit area and scuff feet to remove gross amounts of dirt from outer boots. If necessary, wash boots down with clear water in designated wash pit area.
- o Remove tape from boots and remove boots. Discard in drum container.
- o Remove outer gloves and place in container.
- o Remove hard hat and respirator and hang in the designated area.
- o Remove coveralls and discard in container.
- o Remove inner gloves and discard in container.
- o If the site required utilization of a decontamination trailer, all personnel would also shower before leaving the site at the end of the work day.

Note: Disposable items (coverall, inner gloves, and overboots) will be changed on a daily basis unless there is reason for changing sooner. Dual respirator canisters will be changed weekly unless more frequent changes are deemed appropriate by site surveillance data or personnel assessment.

A water hose and/or designated wash area will be available for wash down and cleaning purposes.

A schematic of a typical decontamination area is shown in Figure 4-1.

4.2 EQUIPMENT DECONTAMINATION

Equipment to be decontaminated during the project may include: (1) drilling rig and tools; (2) sample containers; (3) monitoring equipment; and (4) respirators.

All decontamination will be done by personnel in protective gear appropriate for the level of decontamination, determined by the Site Safety Officer. The decontamination work tasks will be split or rotated among support and work crews. Decontamination procedures within the trailer (if used) should take place only after other personnel have cleared the "hot area", moved to the clean area and the door between the two areas closed.

Miscellaneous tools and samplers will be dropped into a plastic pail, tub or other container. They will be brushed off and rinsed (outside, if possible) and transferred into a second pail to be carried to further decontamination stations. They will be washed with a trisodium phosphate or detergent solution, rinsed with acetone or methanol, rinsed with a trisodium phosphate or detergent solution and finally rinsed with clean water.

4.2.1 Drilling Rig and Tools

It is possible that the drill rigs will be contaminated during test pit/borehole activities. They will be cleaned with high pressure water or portable high pressure steam followed by soap and water wash and rinse. Loose material will be removed by brush.

4.2.2 Sample Containers

Exterior surfaces of sample bottles will be decontaminated prior to packing for transportation to the analytical laboratory. Sample containers will be wiped clean and placed in individual Zip-Loc bags at the sample site. It will be difficult to keep the sample containers completely clean. The samples will be further cleaned if necessary and transferred to a clean carrier and the sample identifies noted and checked off against the chain-of-custody record. The samples, now in a clean carrier, will be stored in a secure area prior to shipment.

4.2.3 Monitoring Equipment

Monitoring equipment will be protected as much as possible from contamination by draping, masking or otherwise covering as much of the instruments as possible with plastic without hindering the operation of the unit. The HNU meter, for example, can be placed in a clear plastic bag which allows reading of the scale and operation of the knobs. The HNU sensor can be partially wrapped, keeping the sensor tip and discharge port clear.

The contaminated equipment will be taken from the drop area and the protective coverings removed and disposed of in the appropriate containers. Any dirt or obvious contamination will be brushed or wiped with a disposable paper wipe and the used wipers discarded. The units will then be taken inside in a clean plastic tub, wiped off with damp disposable wipes and dried. The units will be checked, standardized and recharged as necessary for the next day's operation. They will then be covered with new protective coverings.

4.2.4 Respirators

Respirators will be decontaminated daily. Taken from the drop area, the masks will be disassembled, the cartridges set aside and the rest placed in a cleansing solution. (Parts will be precoded, e.g., #1 on all parts of mask #1). After an appropriate time within the solution, the parts will be removed and rinsed off with tap water. The old cartridges will be marked to indicate length of usage and will be discarded into the contaminated trash container for disposal when considered spent. In the morning the masks will be re-assembled and new cartridges installed if appropriate. Personnel will inspect their own masks to be sure of proper readjustment of straps for proper fit.

5.0 DOCUMENTATION AND RECORD KEEPING

Samples of field activity documentation forms are attached. Minimum documentation consists of:

- o daily field record kept by individuals
- o hazardous site surveillance record kept by Site Safety Officer
- o chain-of-custody records and lab results of samples collected
- o personal hazardous material exposure record

The Site Safety Officer is also responsible for immediate notification of SEMCO Inc's Health and Safety Coordinator in the event of personal injury.

6.0 UPDATING OF HEALTH AND SAFETY PLAN

Each individual involved in field operations is responsible for maintaining weekly safety sheets. If any deficiency is encountered in the Health and Safety Plan, a report will be prepared and forwarded to the Health and Safety Coordinator. The Site Safety Officer will immediately initiate necessary changes to improve protection of field staff.