



# Final Site Health and Safety Plan

*Removal Actions at IRP Site 2 and Site 17*

*Marine Corps Air Station, El Toro*

*El Toro, California*

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# ***Section 1***

## ***Introduction***

OHM Remediation Services Corp. (OHM), a subsidiary of OHM Corporation, has developed this site Health and Safety Plan (SHSP) specifically for SWDIV RAC Contract N68711-93-D-1459, D.O. 0071. This SHSP addresses the Non-Time-Critical Removal Action (NTCRA) to install fencing at IRP site 2 and site 17 and realign and /or stabilize drainage channels at IAP site 2 and Site 17 and remove debris from active drainage channels at IRP site 2 and Site 17, and mitigate the erosion of landfill materials, at the MCAS El Toro, El Toro, California. The objective of the phase of work covered by this SHSP is to install fencing and provide support to the survey and engineering team. This SHSP will also address anticipated construction activities, however, the survey and engineering team may identify other activities that may need to be addressed as an addendum to this SHSP.

This SHSP establishes the policies and procedures which protect workers and the public from potential hazards posed by work at this site. OHM considers safety the highest priority during work at a site containing potentially hazardous materials and has established a policy of minimizing exposure which must be upheld on all projects. All project activities will be conducted in a manner that minimizes the probability of injury, accident or incident occurrence. All OHM employees, subcontractors, and visitors are required to read and sign the SHSP prior to site entry. The SHSP Acknowledgment form is included in Appendix A. This SHSP and all site activities will be in compliance with the following regulations and guidelines:

- United States Department of Labor, OSHA Standards, specifically:
  - 29 CFR 1910.134 -- Respiratory Protection
  - 29 CFR 1910.120 -- Hazardous Waste Operations and Emergency Response
  - 29 CFR 1910.1200 -- Hazard Communication
  - 29 CFR 1926 -- Safety and Health Regulations for Construction
- California Code of Regulations Title 8
- USEPA Standard Operating Safety Guides, July 1988
- NIOSH/OSHA/USCG/USEPA, Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities, October 1985
- United States Army Corps of Engineers (USACE), Safety and Health Requirements
- Manual, EM 385-1-1, October 1992
- Navy/Marine Corps Installation Restoration Manual, February 1992
- ANSI, Practice for Respiratory Protection, Z88.2
- OHM's Health and Safety Procedures Manual, April 1994 (available on site)

Although the SHSP focuses on the specific work activities planned for this site, it must remain flexible because of the nature of this work. Conditions may change and unforeseen situations may arise that require deviations from the original plan. This flexibility allows modification by the OHM Superintendents' and health and safety officials to take into account changing site

conditions such as new data on chemical hazards, weather, and deviations to scope of work. Changes to the SHSP must be approved by the Health and Safety Officer (HSO), Health and Safety Manager (HSM), and Project Manager or Project Superintendent and recorded on the Change Approval Form provided in Appendix B of this SHSP. The Navy Technical Representative (NTR) may acknowledge the change but is not required to sign the form. The Project HSM will forward a copy of the Change Approval Form to the Contracting Officer.

This SHSP takes into account the information currently available from discussions with the project management team and materials provided by the Department of the Navy. This SHSP is written in accordance with OSHA requirements contained in 29 CFR 1910.120.

## ***1.1 Site Description and Contaminant Characteristics***

The Marine Corps Air Station (MCAS), El Toro is located east of Interstate 5 via the Sand Canyon Avenue Exit. The station is just south of Sand Canyon on Trabuco Road, which is the entrance to the main gate. Figure 1-1 is the vicinity map and Figure 1-2 is the MCAS El Toro Station Map.

Site 2, the Magazine Road Landfill, occupies about 22 acres between Borrego Canyon Wash and one of its tributaries, in an area that was originally used as a gravel borrow pit. The Magazine Road Landfill was used from the late 1950s until about 1980. During the 1970s, all solid wastes from MCAS El Toro and some wastes from MCAS Tustin were disposed of at this landfill. Previous reports estimate that between 800,000 and 1,000,000 cubic yards of waste were placed in the landfill during its operational life, based on the assumed dimensions of the borrow pit. The remains of this pit are still visible as a depression at the upper end of a man-made drainage channel that bisects the site (see Figure 1-3).

Site 17 covers approximately 20 acres in a canyon west of the Magazine Road Landfill. The Communication Station Landfill is located in a small canyon and overflows out of the canyon mouth onto a flat, weed-covered field formerly used for agriculture. Steep foothills of the Santa Ana Mountains rise above the landfill. At its base, the landfill lies at an elevation of about 450 feet above mean sea level (MSL); at its upper end in the canyon, it lies at about 600 feet above MSL. The landfill itself is covered with sparse vegetation and varying amounts of fill. Refuse is visible at several locations. The former wash in the canyon has been largely obscured by refuse and as the result of excavation of an adjacent hill (see Figure 1-4).

The landfill was actively used from 1981 to 1983 as a station wide disposal facility. Aerial photographic evidence indicates land filling activities were under way as early as 1970 and continued through 1986. Suspected waste types disposed of at the site include domestic waste and rubble, cooking grease, oils and fuels from sumps, and empty drums. Reportedly, any waste generated at MCAS El Toro may have been disposed at the landfill.

## ***1.2 Scope of Work***

Fencing will be installed around IRP Sites 2 and 17. A survey and engineering team will investigate the actively eroding areas within the landfill sites. Following the survey construction activities will commence to relocate the landfill debris from the Site 2 landfill that is on county property and realign and/or stabilize the drainage channels at Sites 2 and 17.

The following tasks will be performed:

- access road repair and site restoration
- install fencing around Sites 2 and 17
- characterize soils to determine the methods and extent of cleaning, realigning or stabilizing drainage channels
- remove debris from storm channels
- excavate new drainage channels
- install rip-rap or other stabilization system
- transport excavated landfill debris back onto Site 2 landfill on MCAS property

These tasks are detailed in the Hazard Analyses found in Appendix C.

### *1.3 References*

This project requires work in areas that have had remedial investigations and ground water monitoring. There are also several specific safety procedures that are imposed by MCAS El Toro or tenant units. The HSO needs to be aware of these reports and procedures and insure that follow-up action is taken to incorporate these into the site health and safety program as necessary.

The references include but are not limited to:

- draft remedial investigation (RI) report - Site 2, Magazine Road landfill (Bechtel, March 1996)
- draft remedial investigation (RI) report - Site 17, Communication Station landfill (Bechtel, March 1996)
- draft quarterly groundwater monitoring report (CDM, April 1996)
- MCAS El Toro safety procedures
- Phase I Technical memorandum (JEG, 1993)
- OHM health and safety procedures

**Figure 1-1 Vicinity Map**

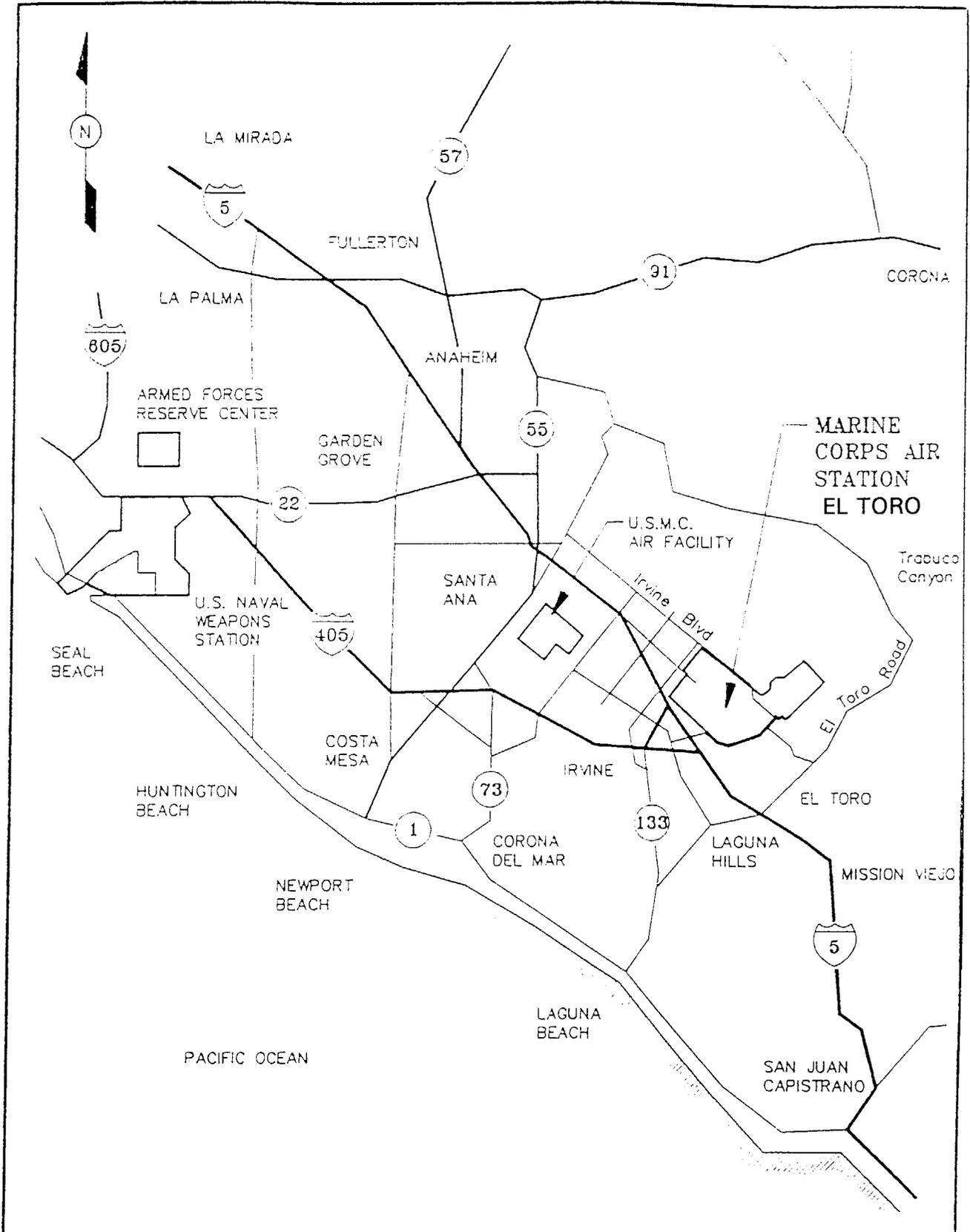


Figure 1-2: MCAS El Toro Station Map

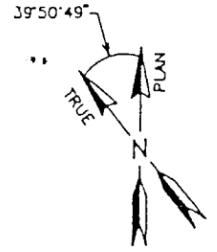
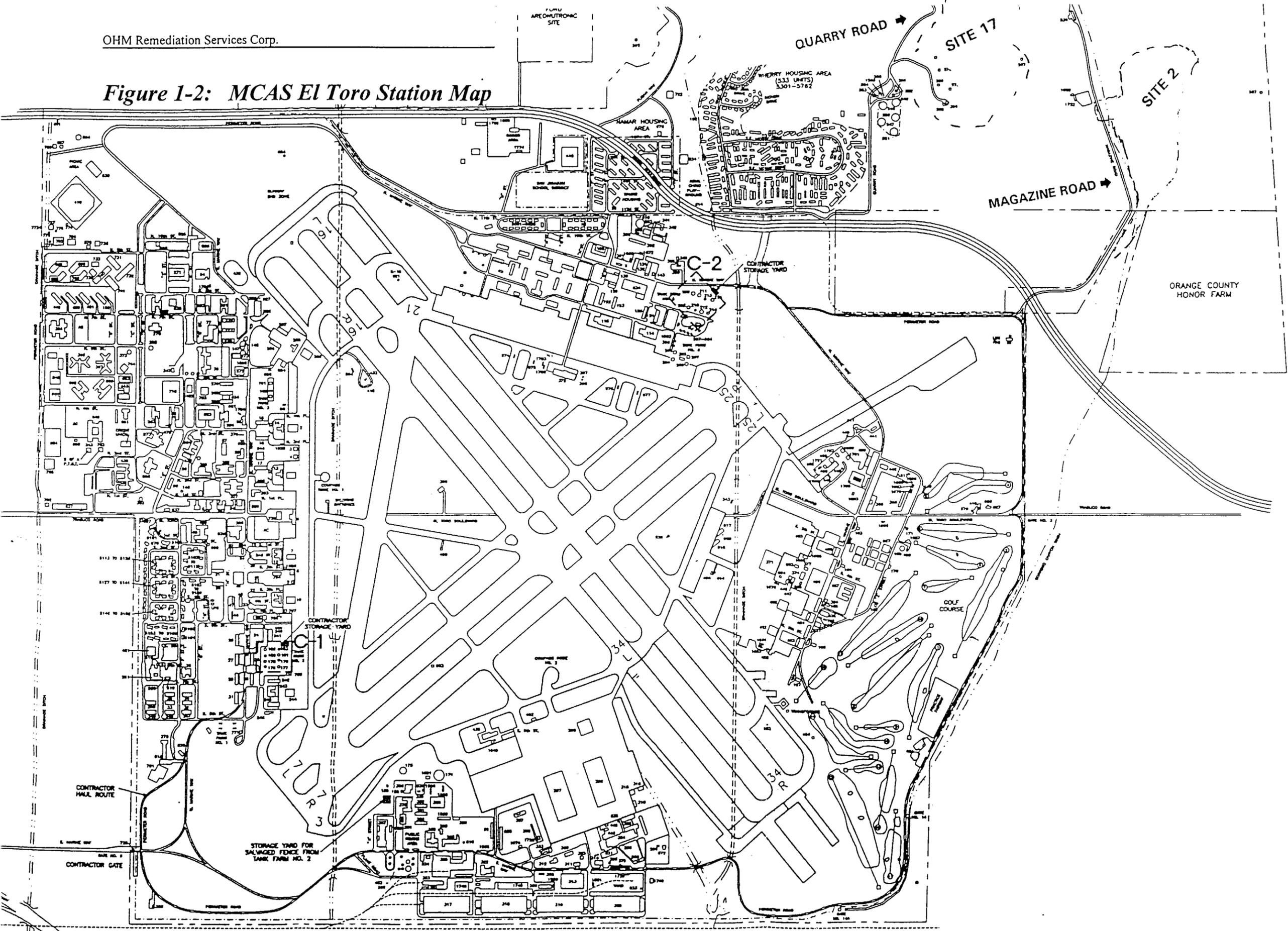


Figure 1-3 Site 2 Map

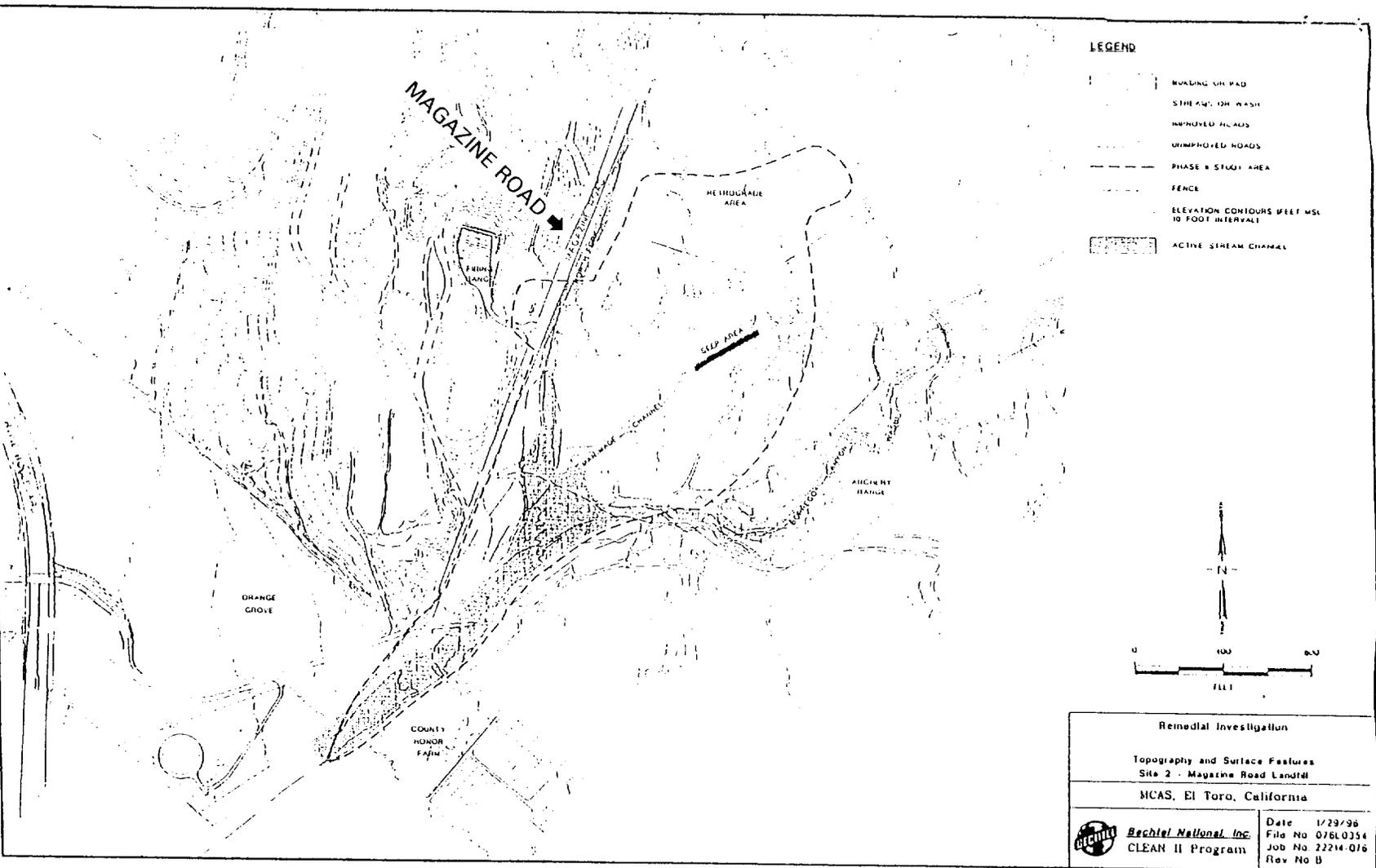
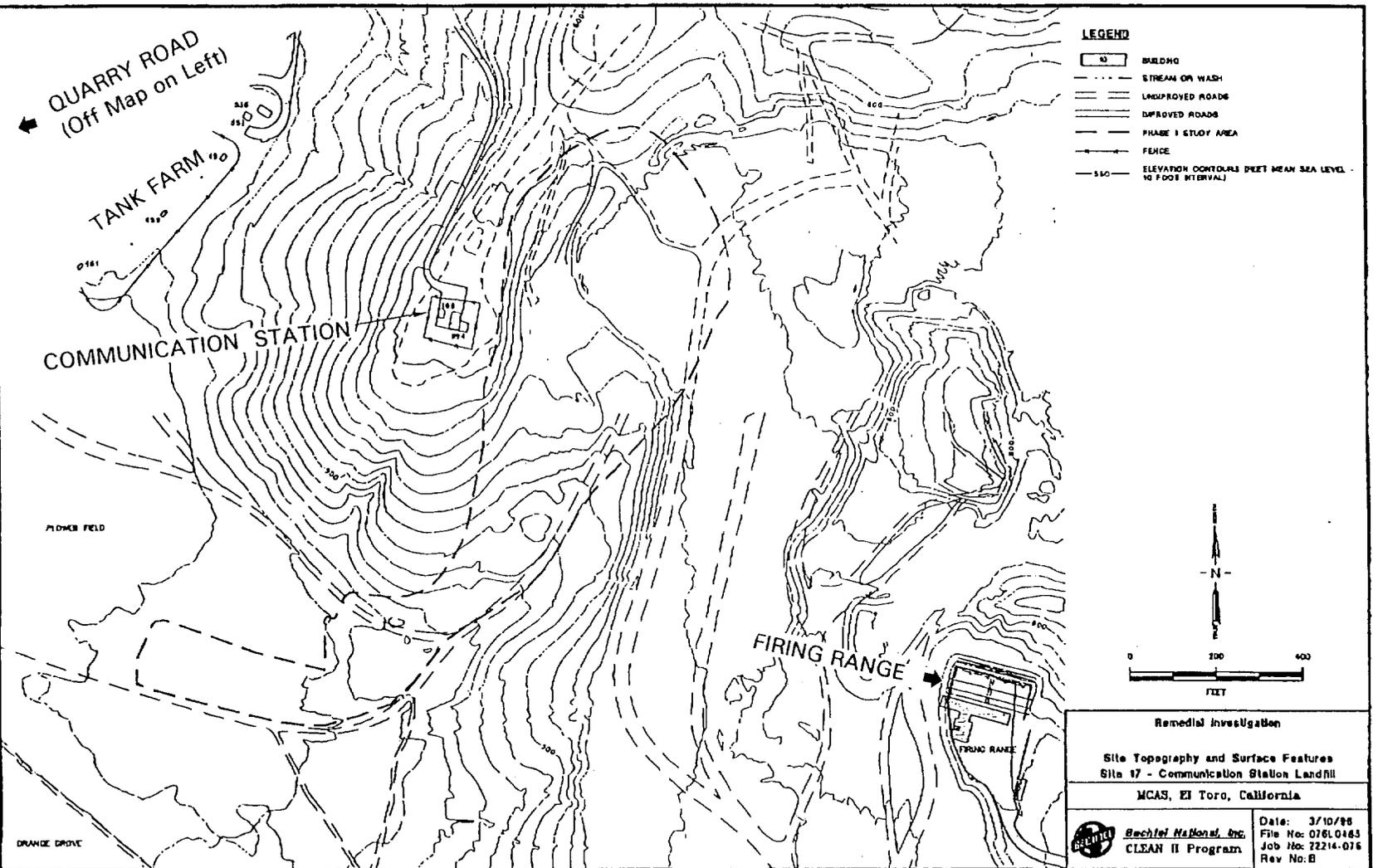


Figure 1-4 Site 17 Map



## ***Section 2***

# ***Key Personnel and Management***

OHM maintains a policy of providing its employees, subcontractors, and authorized visitors with information and procedures in order to protect them and the adjacent community from any adverse effects that might result from work at a job site involving potentially hazardous substances. All personnel involved with this project will follow the health and safety procedures set forth in this SHSP. Visitors will not be given entry unless they read and agree to comply with this plan. The SHSP acknowledgment will be signed by all who actively participate at this project.

### ***2.1 Project Manager***

The OHM Project Manager, Bill Sedlak, communicates directly with the NTR and will serve as the primary point of contact. The Project Manager's responsibilities include project scheduling, cost updating, overall project direction, and overseeing site safety. In addition, the Project Manager is responsible for determining the extent and level of input required for technical issues that arise during the tenure of the project. The Project Manager's direct subordinate will be the Project Superintendent for site activities.

### ***2.2 Project Health and Safety Manager***

The Project HSM for the site is Mr. Roger Margotto. Mr. Margotto is a Certified Industrial Hygienist (CIH), a Certified Safety Professional (CSP), and a Certified Hazardous Materials Manager (CHMM) with 14 years experience in the chemical and environmental remediation industries. Mr. Margotto will be responsible for review and approval of the SHSP, and will supervise and direct the activities of the Project Health and Safety Officer (HSO). He has the authority to stop unsafe operations, remove unqualified personnel from the work area, and approve changes to the SHSP.

The HSM is responsible for integrating all aspects of the SHSP, from development to implementation. His duties include assigning a HSO to implement the SHSP, advising the HSO on all related Health and Safety aspects, reviewing any Site Specific Plans for compliance and completeness, and establishing and monitoring all related Health and Safety procedures through site safety audits.

### ***2.3 Project Health and Safety Officer***

The HSO, John Heggie, implements and enforces the project safety program and procedures at the project site. The HSO will be certified in First Aid and CPR, and has over a year's experience with hazardous waste and personal protective systems.

The HSO will conduct the daily safety meetings and will interface as required with other site representatives. The HSO performs duties such as confirming personnel are fit for duty, coordinating emergency medical care, conducting a daily site safety inspection, and inspecting health and safety equipment. In addition, the HSO is responsible for maintaining safety equipment, posting daily air monitoring results, providing site orientation safety training for all personnel actively involved in site work, and other site safety documentation. The HSO takes

the following action(s) when appropriate:

- orders the immediate shut-down of site activities in the case of a medical emergency or unsafe practice
- ensures protective clothing and equipment are properly stored, used, and maintained
- ensures that the environmental and personnel monitoring operations are on-going and in compliance with SHSP
- verifies accordance with technical specifications and required procedures
- restricts visitors from areas of potential exposure to harmful substances

A safety log will be kept for all OHM activities. This log will include daily safety meeting topics, training given, air monitoring information, first aid administered, visits of all outside personnel and any incidents of a health and safety nature. The HSO and/or Project Superintendent will investigate all accidents and prepare an accident investigation report that will be forwarded to OHM's Regional Health and Safety Department and NTR. The HSO will also maintain the OSHA 200 Log. Project Safety Inspections will be conducted weekly by the Project Superintendent and/or HSO. The Project Safety Inspection forms are located in Appendix D.

The HSO is responsible for on-site implementation and enforcement of the site safety program and procedures. He will oversee any personnel monitoring and will decide when action levels have been reached which require more stringent personnel protection. The HSO establishes and enforces the protective equipment to be used for various site activities.

## ***2.4 Project Superintendent***

The Project Superintendent, Owen Clark, is responsible for all field activities and enforces safe work practices by all crew members. He watches for any effects on crew members, especially those symptoms possibly caused by heat stress or chemical exposure. The Superintendent oversees the safety of any visitors who enter the site. The Superintendent maintains communication with OHM Project Manager and the NTR. The Superintendent assumes the duties and responsibilities of the HSO when he is not on site.

## ***2.5 Equipment Operators***

Equipment operators will be responsible for the maintenance, inspection, and safe operation of their equipment. They will report any equipment malfunctions or necessary repairs to the Site Superintendent.

## ***2.6 Employee Safety Responsibility***

Although the employer is responsible for providing a safe and healthful work place, each employee is responsible for his own safety as well as the safety of those around him. The employee shall use all equipment provided in a safe and responsible manner as directed by his Superintendent. All OHM personnel will follow the policies set forth in this SHSP and in the OHM Health and Safety Procedures Manual. Each employee is responsible for reporting any injuries, incidents, and safety infractions to the Project Superintendent or the HSO so treatment

can be obtained and/or corrective action taken.

## ***2.7 Logs, Reports, and Record Keeping***

The following logs, reports, and records will be developed and maintained on site by the HSO.

- daily safety meetings
- activity hazard analysis forms
- training logs -- site specific and visitors
- safety inspection logs
- employee/visitor sign-in
- ambient and personal air monitoring results
- OSHA 200 log
- site health and safety plan
- safety plan change approval form

# ***Section 3***

## ***Job Hazard Analysis***

This section discusses chemical, physical, and environmental hazards to workers on the site. Table 3-1 discusses each contaminant and includes information such as exposure limits and signs and symptoms of exposure. Section 3.2 discusses physical hazards identified with this site including those associated with construction, use of heavy equipment, fire hazards, and electrical. Environmental hazards, discussed in Section 3.3 are associated with the physical location of the site and weather conditions such as heat stress, noise, and flora and fauna contact.

### ***3.1 Chemical Hazards***

The chemicals listed in Table 3-1, believed to be on site, are based on information in Field Sampling Plan Attachments B and Q Operable Unit 2 - Site 2 and Site 17, prepared by Bechtel National Inc. (August 1995). These contaminants were found during the landfill investigation, however, none was found at a level which would result in overexposure to personnel involved in the activities covered by this SHSP. Material Safety Data Sheets (MSDS) for any additional chemicals found on site or brought onto site will be acquired and reviewed with all personnel during daily safety meetings. Levels of protection and air monitoring requirements will be based initially on the data provided or obtained prior to remediation work. These requirements may change as site conditions are more fully evaluated when work is underway.

OHM's protective equipment requirements combined with the requirement to wash arms, face, and hands before eating or smoking should prevent exposure through these routes. In addition, the project HSO and Project Superintendent observe and warn the crew members to be aware of the initial symptoms of chemical exposure. The amount of exposure depends primarily on the specific activities undertaken and the care with which the activities are performed. Any crew member will be removed from the work site and medically evaluated if these initial symptoms persist and are unexplained by other causes (such as allergy, common cold, heat stress, etc.):

- dizziness or stupor
- nausea, headaches, or cramps
- irritation of the eyes, nose, or throat
- euphoria
- chest pains and coughing
- rashes or burns

**Table 3.1**  
**Chemical Hazards Assessment**

<b>Chemical Name</b>	<b>TLV/PEL</b>	<b>Route of Exposure</b>	<b>Signs and Symptoms of Exposure</b>
TPH gasoline	PEL - None TLV - 300 ppm	Inhalation Skin/eye contact Ingestion	Irritation of the eyes, skin and mucous membranes; dermatitis; headache, fatigue, blurred vision, dizziness, slurred speech, confusion, convulsions, chemical pneumonia upon aspiration, possible liver and kidney damage.
Diesel (Kerosene)	100 ppm (1)	Inhalation Ingestion Skin/eye contact	Central nervous systems, respiratory symptoms, skin, Irritation to eyes, skin, nose and throat; burning sensation in chest; headache nausea, weakness, restlessness, incoherence, confusion, drowsiness, vomiting, diarrhea; dermatitis; chemical pneumonitis (aspiration of liquid).
Asbestos	PEL = 0.1 f/cc	Inhalation Ingestion Skin contact	Long term high level exposure may aggravate any chronic lung or heart condition; asbestosis, lung cancer, mesothelioma typically develop decades after exposure. Symptoms include shortness of breath, pain in the walls of the chest, and/or abdominal pain.
Landfill Gas	TLV/PEL for Carbon Dioxide (a component of the gas) 5,000 ppm		Methane a major component of landfill gas is a simple asphyxiant. The major health hazard associated with landfill gas is the flammability of the gas.
Landfill Leachate	PEL/TLV None		Landfill leachate is composed of a large variety of low-level organic compounds in water. Health effects are related to the organic compounds at diluted or low concentrations. The characteristics of most leachates is that it has excellent warning property of odors at very low concentrations. The specific leachate would require analysis to determine if any organic compounds are at high enough concentrations to present a unique hazard. Most leachates are very low hazard risk which should be avoided to minimize employee exposure.

*TLV = Threshold Limit Value*

*PEL = Permissible Exposure Limit*

*Note: (1) National Institute for Occupational Safety and Health (NIOSH) Recommended Exposure Level (REL)*

### **3.1.1 Hazard Communication Program**

The purpose of a Hazard Communication or Employee Right-To-Know program is to ensure that the hazards of all chemicals located at this field project site are communicated according to 29 CFR 1926.59 to all OHM personnel and OHM subcontractors. A written hazard communication program has been established for OHM which includes the following:

- **Container Labeling** -- OHM personnel will ensure that all drums and containers are labeled according to contents. These drums and containers will include those from manufacturers and those produced on site by operations. All incoming and outgoing labels shall be checked for identity, hazard warning, and name and address of responsible party.
- **MSDSs** -- There will be an MSDS located on site for each hazardous chemical used or known to be on site.
- **Employee Information and Training** -- Training employees on chemical hazards is accomplished through formal safety training conducted annually and informal safety meetings.

Project specific chemical hazards are communicated to employees through an initial site orientation meeting and during daily safety meetings held at OHM field projects.

The written program is included in the Health and Safety Procedures Manual which will be available on site for review by all employees. At a minimum, OHM employees will be instructed on the following:

- chemicals and their hazards in the work area
- how to prevent exposure to these hazardous chemicals
- what the company has done to prevent workers' exposure to these chemicals
- procedures to follow if they are exposed to these chemicals
- how to read and interpret labels and MSDSs for hazardous substances found on OHM sites
- emergency spill procedures
- proper storage and labeling

When any new hazardous material is introduced or discovered on site, employees will be given information on this material at the daily safety meeting. The Project Superintendent will be responsible for seeing that the MSDS on the new chemical or material is available on site.

### **3.1.2 Asbestos**

The work in the landfill areas may require workers to move or remove asbestos containing materials (ACM) or potential asbestos containing materials (PACM). These ACM or PACM may be in the form of Transite (™) tiles, asbestos lining of brake shoes, and asbestos cement pipe. 29 CFR 1926.1101 describes work with asbestos.

Although this regulation primarily describes work expected to occur while working on or in buildings, the regulation describes two types of work with asbestos that may be part of the work at the landfill.

The project CIH has had several years of experience with landfill operations involving all forms of asbestos. Landfill exposure can arise if asbestos material is disturbed and the dust or fibers are allowed to escape into the air. However, in an outdoor environment, workers typically have a low probability of exposure to asbestos. Work which requires simple movement of ACM or PACM, is considered as Class IV work.

Workers who move ACM or PACM, require a two hour course as described in 40 CFR 763.92(a)(1). This course will be given to the workers by the project HSM or other qualified instructor. Workers who cut or break ACM or PACM, (in this case primarily so the pieces can be easily moved to another area) will have a 16-hour training course in Asbestos Operations and Maintenance as described by 40 CFR 763.92(a)(2). All asbestos work will be supervised by an Asbestos Supervisor (Certified Asbestos Supervisor).

Work procedures will be established to minimize damage or breakage of intact ACM or PACM. This will minimize release of fibers into the air. Work in the area will be conducted in a manner that minimizes the generation of dust. Wherever possible, ACM or PACM will be moved using equipment such as a loader. This will minimize personnel exposure. If ACM or PACM must be cut, workers will first wet the material with amended water and wrap the areas where the cut is to be made with a "glove bag" so that cutting can be done without generating fibers into the air. The pieces are then wrapped in plastic, before moving the pieces. The detailed work procedures are described in 29 CFR 1910.1101 and in the OHM Health and Safety Procedures Manual.

During any work with ACM or PACM, workers will wear a minimum of Tyvek coveralls, nitrile gloves, and a full face respirator with HEPA cartridges. Personal air sampling will be conducted on at least one person who is directly working with ACM or PACM during each shift as described in Section 7 "Monitoring Strategy".

## ***3.2 Physical Hazards***

There are numerous physical hazards associated with this project which, if not identified and addressed, could present accidents and personal injury to the work force, as well as operational problems. In order to minimize physical hazards, OHM has developed standard safety protocols, which will be followed at all times. Failure to follow safety protocols or continued negligence of these policies will result in discipline of the employee. All OHM personnel are familiar with the field activities which will be conducted at the site. They are trained to work safely under various field conditions. In addition, the Superintendent will observe the general work practices of each crew member and equipment operator, and enforce safe procedures to minimize physical hazards. Also, hard hats, safety glasses, and safety boots will be required in all areas of each site.

### ***3.2.1 Tripping, Slipping, and Falling Hazards***

OHM personnel and subcontractors will be reminded daily to maintain sure footing on all surfaces. Safety harnesses will be required by any personnel working six feet above any surface, including man lifts.

Use of hand rails when climbing stairs will be enforced. In order to minimize tripping hazards caused by debris, job supplies, and equipment, material will be removed daily from the work areas and stockpiled in their respective storage areas. This "housekeeping" effort will be enforced by the HSO throughout the day.

### ***3.2.2 Head and Back Injuries***

As minimum requirements, hard hats, and safety glasses will be donned prior to performing any site activities. Personnel are instructed in proper lifting techniques and will be reminded not to lift heavy items without assistance at the daily safety meeting.

### ***3.2.3 Falling Objects***

OHM believes that remediation procedures can be accomplished without any object, regardless of size, free falling to the ground. All items raised will be slowly lowered to the ground using a grapple and/or skip bucket. No personnel shall work under this equipment at any time. Also, the HSO will ensure that an adequate area is clear of personnel while the equipment is in operation.

### ***3.2.4 Heavy Equipment and Traffic***

The use of heavy equipment for debris removal, excavation, and lifting presents the greatest potential for injury to personnel. In order to minimize these hazards, designated routes will be established for mobilization through the facility and specific traffic patterns will be established. All trucks and heavy equipment will have spotters for backing maneuvers. Only qualified personnel will operate heavy equipment. Those crew members directly involved with spotting for the operator will be the only personnel allowed in the vicinity of the heavy equipment. All others will remain a safe distance away from these operations. Personnel needing to approach heavy equipment while operating will observe the following protocols:

- make eye contact with the operator (and spotter)
- signal the operator to cease heavy equipment activity
- approach the equipment and inform the operator of intentions

OHM will follow all local traffic rules. Company vehicles will yield to all bikes and pedestrians. No vehicles will be driven except during workday hours and in no case before dawn or after dusk. Flaggers may be required when moving landfill debris from part of Site 2. Flaggers will comply with Cal-OSHA regulations for flaggers. Personnel working in areas subject to vehicular traffic (i.e. streets, parking lots, etc.) will wear orange safety vests. Flashing light barricades will be used for all roads which are blocked due to equipment or excavation. Coordinate all traffic management issues with the ROICC and base security.

#### ***3.2.4.1 Site Pre-Inspection of Equipment***

OHM will only use heavy equipment that is in safe working order. To maintain this policy, all equipment brought onto the project site will be inspected for structural integrity, smooth operational performance, and proper functioning of all critical safety devices in accordance with the manufacturer's specifications. This inspection will be performed by OHM's Superintendent, HSO and the equipment operator.

All equipment not conforming to the operational and safety requirements set forth during this inspection will not be put into service until all necessary repairs are made to the satisfaction of the inspection group.

#### ***3.2.4.2 Operator Qualifications***

Only qualified operators familiar with the equipment to be used will be permitted to operate. Subcontractors will supply proof of its operator's capability and experience to operate the equipment in a safe manner. OHM reserves the right to remove from the project site any operator if there is question or doubt concerning the operator's capabilities.

#### ***3.2.5 Electrical Hazards***

In order to prevent accidents caused by electric shock, the project HSO will inspect all electrical connections on a daily basis. He will shutdown and lockout any equipment which is found to have frayed or loose connections until a qualified electrician can be contacted. The equipment will be de-energized and tested before any electrical work is done. All equipment will be properly grounded prior to and during all work. In addition, Ground Fault Circuit Interrupters (GFCI) will be installed for each circuit between the power source and tool. In the event that generators are used to supply power, these generators will contain GFCIs.

#### ***3.2.6 Confined Space Entry***

A Confined Space (CS) is any enclosed area having a limited means of egress where ventilation is not adequate to remove a toxic or flammable atmosphere or oxygen deficiency which may exist. Examples of confined spaces include, but are not limited to the following: tanks, boilers, vessels, bins, manholes, tunnels, pipelines, underground utility vaults, or any open top space more than four feet in depth such as pits, tubes, trenches, or vessels.

Procedure No. 24 in the OHM Health and Safety (H&S) Procedures Manual outlines OHM entry procedures in detail. No confined space entry is allowed per this plan. If a confined space requires entry, the plan will be modified and approved per the amendment procedure described in this plan.

#### ***3.2.7 Fire and Explosion Hazards***

Atmospheric testing with a combustible gas indicator must be performed to determine the potential for a flammable atmosphere. A hot work permit must be issued to control the presence of equipment or operations producing open flames or sparks. Hot work permits and procedures are found in OHM Health and Safety Procedure No. 26. Permits are issued both by the HSO and by the MCAS El Toro. (Ensure that a hot work permit is obtained from both). It is critical that all hot work in this area have a posted fire watch, since the grass and brush in this area may be very dry and easily ignited.

##### ***3.2.7.1 Wildfire Control***

Section 9K of the USACE EM385-1-1 requires all facilities and areas with potential exposure to wildfire to develop a wildfire prevention plan. Since the facility, MCAS El Toro, has this potential MCAS El Toro should have such a plan.

The Project Superintendent or HSO will obtain a copy of this plan so that we can assure that construction and remediation activities can be performed in compliance with the wild fire prevention plan.

### ***3.2.7.2 Wildland Fire Fighting***

Title 8, California Code of Regulations, 3410, specifies requirements for Wildland Fire Fighting. By OHM policy, no OHM employee will fight any fire beyond incipient stage. Section 3410 discusses a category of fire fighter as emergency pick up labor. OHM will provide personnel and equipment in support of wildland fire fighting effort at this project site. The work, however must be under the direction of trained, professional fire fighters. OHM workers will not actually fight the fire, but will provide such support services as grading or bulldozing firebreaks, providing water trucks and applying water to non-burning brush or grass.

### ***3.2.7.3 Control Measures***

Reasonable control measures will be implemented by OHM workers to minimize the potential for work activities to cause a fire and to assist in the fire protection plan. Among these control measures are:

- smoking in the landfill is prohibited
- smoking is permitted only in designated areas, where receptacles will be placed and used for the disposal of smoking materials
- all equipment will have brush guards and spark arresters to prevent or minimize ignition of dry brush or grass
- dust control and fire watch will be conducted at all times during earth moving operations
- heavy equipment will be staged in predesignated areas free of combustible and flammable materials when equipment is not in use
- each work area (Site 2 and 17) will have at least one water truck for dust control and incipient stage fire fighting
- at least one fire extinguisher (20 lb ABC, dry chemical) will be located with each work crew; each piece of heavy equipment will have a fire extinguisher
- prior to the end of each work shift, the areas will be inspected by the HSO and/or Project Superintendent

### ***3.2.8 Drilling***

Any drilling will be performed in accordance with EM 385-1-1, 16.M. A survey of the job site to identify overhead electrical hazards, potential ground hazards, and underground utilities must be performed before placement of the drilling equipment. MSDSs for drilling fluids must be provided to the HSO before the start of work. No drilling is anticipated for this project.

### ***3.2.9 Overhead Electrical Hazards***

Overhead power lines may present a hazard to equipment and personnel. To prevent equipment contact with power lines and to prevent arcing, adequate clearance must be maintained. For lines rated 50 KV or below, the minimum clearance between the lines and any part of the crane or load shall be 10 feet. For lines rated over 50 KV, the minimum clearance between the lines and any part of the crane or load shall be 10 feet plus 0.4 inches for each KV over 50 KV.

### ***3.2.10 Excavation***

Any excavation or trenching operation that is four feet or more in depth will be performed in accordance with EM 385-1-1 and Procedure 28 in the OHM Health and Safety Procedures Manual. An excavation permit must be completed by a competent person before excavation commences. This permit will require daily inspections of the operation and adjacent areas. Specific situations addressed in these inspections are: possible cave-in, indications of failure of protective systems (benching, sloping, or shoring), hazardous atmospheres and other hazardous conditions. If the competent person finds evidence of any of these situations, exposed employees shall be removed from the hazardous area until the necessary precautions have been taken to ensure their safety. In addition to the excavation permit, a Cal-OSHA Activity Notification Form for Holders of Annual Excavation permits must be filed with Cal-OSHA. OHM has an annual permit for excavations in the state of California. Also, Dig-Alert must be notified before any excavation work begins.

Some of the work requires work on steep slopes and on slopes that may have eroded from underneath. Workers on steep slopes will position their equipment to minimize the possibility of equipment sliding down a slope. Qualified operators should already be aware of these techniques. Workers on foot will not work on a slope beneath heavy equipment. Once the equipment is moved away from the edge of the slope (by at least 3 feet) and the equipment is not working on that slope, workers must use extreme caution when working on or walking on the slopes while on foot. Before work begins on any slope that is eroded or undermined from beneath, an excavator or backhoe will be used to knock down the portion that extends over the erosion. During this process it is essential that there are no workers on foot in the vicinity of this operation. The site engineer will determine whether it is safer for the equipment to knock down the overlay from the top or from the bottom of the slope.

Excavation of areas of the landfill can present another hazard that may be overlooked if it is not specifically addressed. There may be areas where there is inadequate compacting of fill or where the fill material has shifted. Initial work in an area should be preceded with an inspection of the area to be excavated. Personnel on foot need to be extremely cautious since they can actually fall into "pockets" between debris that has not compacted or which has shifted due to decomposition of the debris. For example, metal drums placed into the landfill may now be rusted. The drums may be buried only under a few inches of soil. If a person steps on this drum, they may step into the void of the drum through the rusted metal. To avoid this situation, wherever possible use a backhoe or dozer to drive over the area first. The basic warning is to survey the area first. The basic warning is to survey the area and anticipate potential shifting of soil and debris.

### ***3.2.11 Radiological Hazards***

Landfills which have been used for long periods of time and by military bases may have received materials with low-level radioactivity. Monitoring on the site has not shown any significant radiation above background. However, there have been some groundwater samples with increased alpha-radiation. As excavation work, or post hole work proceeds it is possible that radioactive material may be brought closer to the surface. Therefore, all work areas will be routinely monitored for radiation per Section 7.1.3.

### ***3.2.12 Hazardous Radio Transmissions***

Work in the vicinity of Magazine Road is near an area where the potential to detonate ordnance by use of radios or cellular telephones is increased. Arrangements have been made with the base. HERO to notify the OHM Project Superintendent whenever electronic sensitive ammunitions are hauled on Magazine Road. Upon notification all OHM personnel and subcontractors will stop use of all radios and telephones. These periods of radio silence are estimated to be no longer than 30 minutes. Radios and cellular phones will not be used until the official all clear is given by the Project Superintendent (project management has indicated that work projects will be altered during this period to enhance the security of radio transmission control).

Radio use is not permitted within 100' of the EOD fence line. The zone will be marked with barricade tape.

### ***3.2.13 Munitions***

Although the landfill was not used for military training exercises, it is possible that military munitions may be unearthed as excavation work proceeds. All project personnel will receive a short course in recognition of munitions. If a suspected item is discovered during the project all work in the area will stop and the EOD unit will be notified immediately. Work will not restart until clearance is given by the Project Superintendent or HSO.

### ***3.2.14 Pistol Range***

A small portion of the project requires work that is within the range clearance area of the pistol range. The pistol range operates Monday and Tuesday 0630 to 1500 and Wednesday 0630-1200. During these days and hours, work and personnel will not be allowed in this area. The area will be demarcated with barricade tape or warning signs so that all personnel clearly understand when they are not allowed in the area. Only the fence installation portion of this project is planned for this area. Project management intends to perform this work on the days that the pistol range is closed.

### ***3.2.15 Biomedical Waste***

Since the landfill was used for all types of waste disposal and since there were previous reports of encounters with medical wastes, it is possible that workers on this project may encounter medical wastes. These wastes may consist of needles, syringes, scalpels, plastics, and biological wastes.

There are two major hazards:

- sharp objects which can cut and puncture; these sharp objects may be contaminated with disease causing biological material
- biological waste which can cause illness to workers who may come in contact with the waste

Workers can be protected by avoiding contact with material on the ground, wearing steel shank boots, and wearing leather gloves. Workers should avoid grabbing objects without first probing the area with a tool or a stick to insure that there are no sharp objects present before grabbing any object. Most biological waste should be non-infective as most disease causing organisms will die, due to lack of proper growing conditions (temperature, moisture, nutrients); therefore, health hazards should be minimal. However, it is important for workers to follow good hygiene practices by avoiding hand to mouth motions and by washing hands before eating or smoking.

### ***3.3 Environmental Hazards***

Environmental hazards associated with this site will be discussed at the orientation meeting prior to start up of remediation activities. Personnel will be apprised of symptoms of exposure to certain biological hazards and heat stress.

#### ***3.3.1 Weather and Heat Stress***

With the possible combination of ambient factors such as high air temperature, high relative humidity, low air movement, high radiant heat, and protective clothing, the potential for heat stress is a concern. The potential exists for:

- heat rash
- heat cramps
- heat exhaustion
- heat stroke

An action level for heat stress has been established. At 75° of ambient temperature, the Superintendent will become aware of the effects of heat stress on the field crew, and will begin heat stress control measures.

Heat stroke, heat cramps, and heat exhaustion are covered in detail during our 40-Hour OSHA 29 CFR 1910.120 pre-employment course. In addition, this information is discussed during a safety "tailgate" meeting before each workday. Workers are encouraged to increase consumption of water and electrolyte-containing beverages such as Gatorade during warm weather. Water and electrolyte-containing beverages will be provided on-site and will be available for consumption during work breaks.

At a minimum, workers will break every two hours for 10 to 15 minute rest periods. In addition, workers are encouraged to take rests whenever they feel any adverse effects, especially those effects that may be heat-related. The frequency of breaks may need to be increased upon worker

recommendation or decision of the HSO and Superintendent.

OHM personnel are experienced hazardous material workers, and through their extensive field experience, have become acclimated to heat and protective equipment requirements as well as recognizing when heat stress presents a health concern. In addition, they have been trained to recognize the symptoms of heat stress. Even with this experience, OHM still emphasizes heat stress awareness. During the safety "tailgate" meetings, the HSO will talk about heat stress, its symptoms, and the factors which affect a person's ability to handle heat.

Procedure No. 22 in the OHM Safety Procedures Manual discusses the symptoms and causes of heat stress as well as prevention and treatment in further detail.

### ***3.3.2 Hearing Conservation Program***

On projects where noise levels may exceed a time weighted average (TWA) of 84 dBA (decibels, A-scale), hearing protection will be made available to all exposed employees. Additionally, sound level monitoring may be conducted on-site. All OHM personnel have annual audiograms and will be restricted from high noise exposure when a standard threshold shift is present. OHM's hearing conservation program is in compliance with OSHA regulations found at 29 CFR 1910.95.

### ***3.3.3 Biological Hazards***

The following biological hazards may be encountered on site although such encounters are not anticipated to pose a significant risk to site personnel:

- Animal bites and insect stings can cause localized swelling, itching, and minor pain that can be handled by first aid treatment. In sensitized individuals, however, effects can be more serious such as anaphylactic shock which can lead to severe reactions in the circulatory, respiratory, and central nervous system, and in some cases, even death. The HSO will attempt to identify personnel with a known reaction to bites and stings at the pre-job safety orientation meeting. Attempts should not be made to capture any wild or semi-wild animals such as cats or rats due to the possibility of a bite or parasitic infestation.
- Poison oak causes discomfort, irritation, and inflammation of the skin. Personnel will be warned to prevent contact with unknown plants. Protective clothing worn by site personnel should reduce the probability of such exposure. Cleaning the skin thoroughly with soap and water after contact will also reduce risk of severe symptoms.
- Animal and bird droppings often contain mold, fungus, or bacteria which represent a significant respiratory hazard including lung diseases and allergies. Personnel will be instructed not to touch visual droppings, and to wear gloves and Tyvek at a minimum.
- The hanta virus is sometimes transmitted by rodents found in the Southwestern United States, and causes respiratory distress, sometimes with fatal consequences. Transmission of the hanta virus occurs with exposure to rodent droppings. Good hygiene practices such as washing hands and face prior to eating and drinking will help to minimize the potential for exposure to the hanta virus. While work is in

progress, use of HEPA cartridges and work practices which minimize generation of dust and aerosols will help protect employees. Exposure to the hanta virus, for example, is minimized by avoiding areas where there are concentrations of mouse droppings. The virus can be inhaled in the dust from areas where mice have nested or left their droppings. Obviously, minimizing dust inhalation or avoiding these areas will lessen the risks of exposure. Any work in such areas should be done only with full Level C protection, including, at a minimum HEPA air-purifying respirator. Thorough washing of hands and face after removing the PPE will further minimize the potential for exposure.

- Snakes. Personnel must use extreme caution when walking through the area. If a snake is encountered, slowly and quietly back away from the snake and inform all personnel of its location. Do not attempt to move or kill a snake as certain snakes are protected under state and federal laws. In the event of a snakebite, do not try to move the affected individual. Wipe off the skin, as the venom will attack intact skin. Do not suck out the venom. Do not cut open the wound. Do not apply ice or ice packs. Do not use a tourniquet. Do not administer alcohol or medications. Call for emergency medical assistance. If the employee must be moved, move the employee slowly with a minimum of motion to the injured part of the body.

Additional information on environmental hazards may be found in Appendix G.

### ***3.3.4 Endangered Species***

There are at least two species that are endangered and protected that may be encountered on the sites. One bird species, the gnatcatcher and one plant, the coastal sage may be on the sites. The project has subcontracted a biologist to review and oversee the work areas before work proceeds. The biologist will review findings with the Project Superintendent. The biologist will mark all coastal sage plants (or areas where the plants are located). Habitat of the gnatcatcher will be similarly marked. Workers will be trained to avoid these areas. Where it is not possible to avoid these areas obtain further guidance through the NTR from the Station Environmental Office as to what course of action can be taken.

### ***3.3.5 Storm Protection***

If a warning of gale-force winds is issued, take precautions to minimize danger to persons, and protect the work and any nearby OHM and government property. Precautions shall include closing of all openings; removing loose materials, tools and equipment from exposed locations; and removing or securing scaffolding and other temporary work. Close all openings in the work site if storms of a lesser intensity pose a threat to OHM and government property. The HSO will ascertain predicted daily weather conditions by listening to daily weather forecasts on radio or television. If particularly ominous weather conditions are predicted, the HSO will monitor radio broadcasts regularly and if necessary follow-up with calls to the base weather station (usually associated with the control tower). During rain events, the Project Superintendent will initially investigate the area for potential flood threat. As the rain continues for more than an hour and depending on its intensity work may have to stop both for the concern for flash flooding as well as the inability to work with saturated ground. If flood warnings are given by weather personnel, all work will stop and all equipment will be moved to higher ground.

### ***3.4 Task Specific Risk Assessment***

The next section evaluates the risks and associated precautions for construction and remediation activities associated with this project. Hazard Analyses have been prepared for each of these tasks. If there are changes required due to changing conditions or requirements, this plan may be modified by using the change form attached to this safety plan and by obtaining the approval of the Project Superintendent, the Project HSO, and the Project HSM.

The HSM will discuss the risks and precautions associated with each task identified in the individual delivery orders and in the work plan. Daily "Tailgate" safety meetings are held at the start and end of each shift. Prior to the day's remediation activity the safety meeting discusses the potential chemical, physical, and environmental hazards and preventative safety measures. At the end of each day lessons learned and feedback regarding safety issues for the day are discussed. Attendance is mandatory for all employees.

An Activity Hazard Analysis has been developed for each planned activity and operation occurring in each major phase of work. This Hazard Analysis identifies the sequence of work, specific hazards anticipated, and the control measures to be implemented to minimize or eliminate each hazard. This Hazard Analysis will be used to augment daily safety meetings intended to heighten safety and hazard awareness on the job. This pre-task briefing will be documented and may be combined with the daily tailgate safety meeting.

- |                          |   |
|--------------------------|---|
| <b>Task:</b>             | Mobilization and Site Setup   |
| <b>Specific Hazards:</b> | Slips, trips, and falls; electrical; use of hand tools; back strain due to improper lifting; heavy equipment; ladders.  |
| <b>Precautions:</b>      | Maintain good housekeeping; use GFCIs; have qualified personnel perform electrical work; use proper lifting procedures and get help for heavy items; use leather or cotton work gloves with tools; only trained and experienced personnel will be allowed to operate heavy equipment  |
| <b>Task:</b>             | Installing Fence  |
| <b>Specific Hazards:</b> | Slips, trips and falls; heavy equipment, equipment operation; heavy lifting; sharp objects, striking underground debris.  |
| <b>Precautions:</b>      | Use mechanical means to lift fencing materials and to dig fence post holes when possible. Only personnel who are physically fit may conduct manual post hole digging of lifting or pulling fencing materials. Leather work gloves shall be worn when working with fencing materials. Steel toed leather work boots with adequate ankle support will be used when walking over the uneven terrain where the fence is to be installed. Check the surface where fence posts are to be installed for any evidence of buried obstructions. |

- TASK:** Site Survey
- Specific Hazards:** Slips, trips and falls; material handling; noise exposure; use of hand tools,; vehicle traffic; potential for electrical hazards.
- Precautions:** Maintain good housekeeping; use GFCI if electrical hand tools are used; wear appropriate PPE; use proper lifting techniques; use cotton/leather gloves; wear orange safety vests when working near traffic or heavy equipment.
- 
- TASK:** Remove debris from storm channels, excavate new drainage channels and install rip-rap.
- Specific Hazards:** Slips, trips and falls; suspended loads heavy equipment; back strain due to improper lifting; heavy equipment; noise exposure.
- Precautions:** Maintain good housekeeping; only trained and experienced personnel will be allowed to operate heavy equipment, employees will maintain a safe distance between themselves and equipment used to hoist the lift loads, tag lines will be used to maneuver suspended loads; use proper PPE.
- 
- TASK:** Excavate and transportation of excavated material back onto a landfill
- Specific Hazards:** Slips, trips and falls; back strain due to improper lifting; heavy equipment; noise exposure.
- Precautions:** Maintain good housekeeping; only trained and experienced personnel will be allowed to operate heavy equipment, employees will maintain a safe distance between themselves and equipment used to load trucks; use cotton/leather gloves; wear orange safety vests when working near traffic or heavy equipment; use hearing protection. Excavation of the landfill may expose chemical materials and other debris, worker must exercise precautions by wearing PPE and avoiding direct contact with the materials.
- 
- Task:** Site Restoration and Demobilization
- Specific Hazards:** Slips, trips and falls; heavy equipment, high pressure washer, moving vehicle activity, noise.
- Precautions:** Maintain good housekeeping, use proper PPE, only qualified personnel will be allowed to operate heavy equipment, ground personnel shall wear reflective vests, high pressure washer safety procedure must be followed, hand truck use shall be encouraged, all personnel shall work at a steady pace, only qualified electricians shall be allowed to hook up and disconnect electrical circuits, GFCIs shall be used on all outdoor 120 volt circuits, wear proper hearing protection when noise levels exceed 84 dBA.

### ***3.5 Accident Prevention***

This SHSP has been developed with accident prevention as the primary goal. Details are discussed throughout this SHSP. This section will outline the Accident Prevention Plan put in place for this project.

### ***3.5.1 Administrative Responsibilities***

The Project Manager is ultimately responsible for the safety and health of site personnel. The PM is to provide the materials and maintenance of equipment necessary to enhance and maintain safe site and work conditions.

The Project Superintendent has the responsibility and the authority to control the day to day remediation activities in the field. The Project Superintendent reports to the Project Manager. He is to watch employees for signs of heat stress, excessive fatigue, and obvious outward signs of chemical exposure. In addition, he is to ensure that equipment brought to the site is in proper working conditions and inspected regularly.

The HSO reports to the Project HSM and is responsible to point out unsafe conditions that may pose a hazard to personnel or the public. The HSO is required to conduct regular safety inspections. Accident investigation will be performed by the HSO, the Project Superintendent, or both.

### ***3.5.2 Site Specific Training***

All field employees have received at least 40 hours of OSHA Hazardous Waste Operations and Emergency Response training. Prior to working on site, all site personnel will undergo a safety and health orientation where the SHSP and site conditions are discussed. Prior to each shift, a daily safety meeting will be held discussing the previous day's and the current day's health and safety issues. A safety meeting is also held at the end of each shift per Navy requirements.

### ***3.5.3 Subcontractors***

All subcontractors are subject to the same training requirements as other field personnel. Subcontractors will be required to sign in daily and be required to attend a daily meeting discussing operations and safety issues. The subcontractor reports directly to the OHM Project Superintendent.

### ***3.5.4 Local Requirements***

OHM will comply with any applicable local requirements such as noise control and traffic rules. Traffic control will developed as needed as described above and in the work plan.

### ***3.5.5 Layout of Job Site***

Upon arrival the job site will be laid out as specified by the ROICC. Subcontractors are subject to the same controls as OHM personnel. See Section 4.0 of this SHSP.

### ***3.5.6 Temporary Site Amenities***

Temporary structures will be anchored to withstand winds and meet applicable state or local standards for anchoring mobile homes as specified in USACE Manual EM 385-1-1(04.A.03).

### ***3.5.7 Housekeeping***

The project site will be kept in a neat and orderly fashion to prevent common injuries due to slips, trips, and falls, accumulation of trash to keep insects away, and to maintain a professional work site. Personnel shall not leave a work area in a disorderly condition.

The Superintendent is responsible for maintaining continued job cleanup and safe access and egress.

### ***3.5.8 Emergency and Contingency Plan***

Fire extinguishers (ABC type) in ready condition and with a current inspection record are to be placed in every work area on the job site. OHM has developed an emergency contingency plan provided in Section 8.0 of this SHSP. A minimum 20-lb dry chemical fire extinguisher will be located at the entrance to the contamination reduction corridor in the Contamination Reduction Zone of the site. Each piece of heavy equipment will have a dry chemical fire extinguisher (either 2½ lb or 5 lb., mounted in easy reach .)

### ***3.5.9 Safety Inspections***

The HSO, Project Superintendent and/or his designee will perform regular safety inspections. A report including results of the inspection and any corrective actions taken will be filed in the project files, with a copy to both the NTR and OHM Project HSM. Identified safety and occupational health deficiencies and corrective measures shall be recorded in the "Contractors QC Report".

### ***3.5.10 Accident Investigation***

An injury that requires only minor first aid need only be recorded on a first aid treatment log which will be maintained on file and available for review. All other injuries or occupational illnesses must be investigated and the Accident/Injury Report Form must be completed.

In the case of an injury to an employee that requires medical treatment, the following steps will be followed:

- procure medical treatment for employee as described in Section 8.0 of this SHSP
- the HSO and Project Superintendent will investigate the incident and fill out the Accident/Injury Report Form. This form is faxed to the region health and safety department within 24 hours of incident occurrence
- the region health and safety department will complete the Employer's Report of Injury and send it to the Worker's Compensation Insurance company within 48 hours of an injury or within 24 hours of a lost time injury or death; a claim for worker's compensation benefits will also be submitted
- notify the NTR within 24 hours of the injury
- OSHA 200 Log will be updated if the injury is recordable under 29 CFR 1904
- a report must be obtained from the physician clearing the employee to resume regular duties, describing modified work acceptable, or removing the employee from work duty; in the case of a fatal injury or where three or more persons are admitted to the hospital for an overnight stay, Cal-OSHA and other appropriate agencies will be notified and an in-depth accident investigation will be conducted in addition to the steps identified above

***Post-Accident Testing.*** Alcohol and drug testing is required of employees immediately after accidents as detailed in OHM policy HR6.01 XIII B. Reportable accidents which require testing include:

- death of any person
- bodily harm to any person resulting in one or more of the following:
  - loss of consciousness
  - necessity to carry the person from the scene
  - necessity for medical treatment (beyond first aid or visit to emergency room)
- disability which prevents the discharge of normal duties or the pursuit of normal activities beyond the day of the accident
- explosion or fire not intentionally set
- estimated property damage to the property of the company, property of others, or both, exceeding \$500
- any event that is significantly serious in the judgment of the company to require testing

# ***Section 4***

## ***Work and Support Areas***

To prevent migration of contamination caused through tracking by personnel or equipment, work areas and personal protective equipment are clearly specified prior to beginning operations. OHM has designated work areas or zones as suggested by the NIOSH/OSHA/USCG/EPA's document titled, "Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities."

There are two sites which require installation of a surrounding fence and construction work to install better drainage systems for rainwater runoff. During the first phase of the work, a chain link fence is to be installed at each of the two sites to surround the entire areas that comprise each of the two sites. Typically, work at project sites requires the set up of three zones to control the work areas. These three zones are called the exclusion zone, the contamination reduction zone, and the support zone. During the first phase of the project, the installation of the fence, no zones will be established since work will not take place in the area where materials would be expected to be encountered. There is one exception. A portion of the site 2 landfill may require removal and hauling back into the interior of the site 2 area. Work in that area will require the set up of an exclusion zone and a contamination reduction zone before the perimeter fence is installed. During the fence installation, fence workers will be observed in the performance of their work by the HSO, the superintendent or a foreman. If the fence installers come in contact with landfill materials, they will stop work, the area will be investigated by the HSO and a determination will be made whether work can continue or whether work must stop and OHM personnel must remediate the area by removing the debris. If personnel must remove debris, an exclusion zone and contamination reduction zone will be set up.

During the second phase of the project, work will be performed in areas where contact with landfill materials is possible. It is envisioned that as the work zone moves so will the exclusion and contamination reduction zone. Once the area has been excavated and "cleared" and it is apparent that debris and contaminants are not present, the exclusion zone can be moved to the next area. There will be separate exclusion zones and contamination reduction zones if more than one area of work is in progress at the same time.

### ***4.1 Exclusion Zone***

The exclusion zone (EZ) will consist of areas where inhalation, oral contact, or dermal contact with contaminants will be possible. This zone will be established at each site where debris removal and landfill material excavation takes place. The zone, where possible will extend 20 feet beyond in all directions from the area where the wells and equipment are placed. The EZ perimeter may be indicated with barricade tape, usually red in color or the entire area may be fenced to restrict entry to the area to those individuals with the proper training, medical certification, and personal protective equipment.

### ***4.2 Contamination-Reduction Zone***

The CRZ or transition zone will be established between the exclusion zone and support zone. In this area, personnel will begin the sequential decontamination process required to exit the exclusion zone. To prevent off-site migration of contamination and for personal accountability,

all personnel will enter and exit the exclusion zone through a corridor in the CRZ. The corridor is called the Contamination Reduction Corridor (CRC).

In the CRC both personnel and equipment decontamination will be performed. During the activities of this work order, it is unlikely that personnel will require decontamination other than hand washing. Tools and materials used for debris removal and landfill material excavation will be washed off in the area of the excavation or moved to a station set up for decontamination. The station will consist of a pad where decontamination fluids (e.g. water) can be collected. The station will be set up on each site. The location will likely be near an exit gate from the fenced site area.

### ***4.3 Support Zone***

The support zone will consist of a clearly marked area where the support equipment, and sanitation facilities (toilets, drinking and washing water) are staged. Smoking, drinking, and eating will be allowed only in designated areas in the support zone. Emergency eye washes will be staged in this area.

### ***4.4 Access Controls***

The HSO and the Superintendent shall establish the physical boundaries of each zone and shall instruct all workers and visitors on the limits of the restricted areas. No one shall be allowed to enter the restricted area without the required protective equipment for that area. The Superintendent shall ensure compliance with all restricted area entry and exit procedures. The Superintendent shall also designate a decontamination point for personnel to exit from the contaminated area and enter into the clean area where personnel may rest and drink.

### ***4.5 Visitor Access***

Visitors must check in immediately upon arrival at the OHM site office. Only authorized visitors will be allowed access to the contaminated areas. All visitors and subcontractors with access to contaminated areas must submit proof of 40 Hour OSHA "HAZWOPER" Training and current medical certification to OHM staff. Each visitor will be required to provide and wear the necessary protective equipment for use during the visits and shall be escorted by OHM personnel. All visitors, subcontractors and personnel will be required to sign a safety plan acknowledgment sheet to certify that they have read, understand, and will comply with the SHSP.

Failure to comply with this site entry procedure will result in denied entry to the exclusion zone or contamination reduction zone of the site. A visitor's log will be kept by the Superintendent or his designee.

## ***4.6 Buddy System***

A "Buddy System" will be implemented when conditions represent a risk to personnel which can be either physical or chemical. A buddy system requires that two or three people work as a team, each looking out for the other. "Buddies" must always be in each other's line of sight and should maintain a verbal or visual communication. No one is allowed into the EZ alone because hazards may exist that could render the employee helpless and require rescue.

# ***Section 5***

## ***Protective Equipment***

This section describes the personal protective equipment and respiratory protection required for each type of task for this project. All personnel must wear appropriate protective equipment when activities involve exposure to hazards which cannot be adequately or feasibly controlled by engineering or administrative controls. Respiratory protection, skin, hand, and foot protection are required when activities are known or suspected to result in chemical hazards such as atmospheric contamination in excess of action levels in the form of dusts, mists, fumes, vapors, gases, when direct contact with them may be a health hazard. The ensuing list briefly describes the EPA Level categories:

- Level A :*** Used when the greatest level of skin, eye, and respiratory protection is needed and consists of a totally encapsulated suit with supplied breathing air.
- Level B:*** Used when the highest level of respiratory protection is needed but a lesser level (than Level A encapsulated suit) of skin protection is required.
- Level C:*** Used when criteria for using air purifying respirators are met and a lesser level of skin protection is required.
- Level D:*** Used only as a work uniform and in an area without respiratory hazards.

### ***5.1 Reassessment of Personal Protection Equipment***

The level of protection listed in this section shall be upgraded or downgraded based on action levels from direct reading instruments, a change in site conditions, or findings from investigation. Changes in protection levels requires the completion of the Site Safety Plan Change Form, available in Appendix B, which must be approved and signed by the following site personnel:

- Health and Safety Officer
- Health and Safety Manager
- Project Manager or Project Superintendent

If the level of protection is to be downgraded, then personnel will continue to work in the original level of protection until the Health and Safety Officer and the Project Manager or Project Superintendent have discussed air monitoring results and rationale for downgrade. After an agreement has been reached and the change is recorded on the Site Safety Plan Change Form, PPE may be modified. Level of protection for any task may be upgraded at any time and documented.

The following list defines the required personal protective equipment for each work zone:

## 5.2 Exclusion Zone

**TASK:** Install fence

**EPA Level:** D

**Respiratory Protection:** None, unless air monitoring warrants upgrade to Level C per readings cited in Section 7.1.1

**Head:** Hard hat

**Hand:** Leather work gloves

**Suit:** None, unless Tyvek coveralls are worn to keep clean

**Boots:** Steel toed boots

**Face:** N/A

**Eye:** Safety glasses

**Hearing:** Ear plugs when operating equipment

**TASK:** Debris removal, channel clearing and rip rap installation

**EPA Level:** D

**Respiratory Protection:** None, unless air monitoring warrants upgrade to Level C per reading cited in Section 7.1.1

**Head:** Hard hat

**Hand:** Leather work gloves

**Suit:** None, unless Tyvek coveralls are worn to keep clean

**Boots:** Steel toed boots or tingley rubber boots over steel boots

**Face:** N/A

**Eye:** Safety glasses

**Hearing:** Ear plugs when operating equipment

**TASK:** Excavation and transportation of landfill material

**EPA Level:** D

**Respiratory Protection:** None, unless air monitoring warrants upgrade to Level C per readings cited in Section 7.1.1

<b>Head:</b>	Hard hat
<b>Hand:</b>	Cotton or leather work gloves
<b>Suit:</b>	Tyvek to keep clean, otherwise standard work uniform. If liquids are anticipated or encountered wear a PVC apron or Polytyvek for splash protection.
<b>Boots:</b>	Leather steel toed boots
<b>Face:</b>	N/A
<b>Eye:</b>	Safety glasses or goggles
<b>Hearing:</b>	In high noise areas (84 dBA or greater), ear plugs required

### ***5.3 Contamination Zone***

<b>TASK:</b>	Equipment Decontamination
<b>EPA Level:</b>	D (unless air monitoring indicated need for upgrade)
<b>Respiratory Protection:</b>	N/A
<b>Head:</b>	Hard hat
<b>Hand:</b>	N-dex nitrile gloves
<b>Suit:</b>	Tyvek with hood/rainsuit or poly-coated tyvek to protect personnel from splashing
<b>Boots:</b>	Tingley or rubber steel toed boots
<b>Face:</b>	Face shield
<b>Eye:</b>	Safety glasses or goggles
<b>Hearing:</b>	In high noise areas (84 dBA or greater), ear plugs required

### ***5.4 Support Zone***

Personnel working in the support zone will use the following Level "D" protective gear:

- safety glasses
- steel toe work shoes
- hard hat
- long sleeve shirts

## ***5.5 Air-Purifying Respirators***

OHM's air-purifying respirators (APR) for this project will be the full face MSA "Ultra Twin" or other full-face APR for which the wearer has been fit-tested.

## ***5.6 Respirator Cartridges***

The crew members working in Level "C" will wear respirators equipped with MSA GMC-H air purifying cartridges. Other brands of respirators will be equipped with equivalent cartridges which are NIOSH approved. These cartridges hold approval for:

- Organic vapors <1,000 ppm
- Chlorine gas <10 ppm
- Hydrogen chloride <50 ppm
- Sulfur dioxide <50 ppm
- Dusts, fumes and mists with a TLV <0.05 mg/m<sup>3</sup>
- Asbestos containing dusts and mists
- Radon daughters
- Radionuclides
- Pesticides

### ***5.6.1 Cartridge Changes***

All cartridges will be changed a minimum of once daily. However, water saturation of the HEPA filter or dusty conditions may necessitate more frequent changes. Changes will occur when personnel begin to experience increased inhalation resistance, or breakthrough of a chemical warning property.

## ***5.7 OHM Respiratory Protection Program***

The OHM respiratory protection program is included as Procedure 18 in the updated OHM Safety Procedures Manual. Refer to OHM's Health and Safety Procedure Manual (on site) for further discussion.

# ***Section 6***

## ***Decontamination Procedures***

This section describes the procedures necessary to ensure that both personnel and equipment are free from contamination when they leave the work site. A step-by-step description of decontamination procedures for EPA Levels "D" and "C" has been delineated below. Air monitoring instruments may be wrapped while using them in the exclusion zone to avoid contamination in very messy conditions. Where conditions are relatively clean, instruments may be wiped down with a damp cloth in the transition zone.

### ***6.1 Personnel Decontamination***

Decontamination of personnel shall be accomplished to ensure that any material which personnel may have contacted in the hot zone, is removed in the contamination-reduction zone. Decontamination of personnel exiting the exclusion zone will utilize the following steps as appropriate to the specific work area:

#### **LEVEL "D"**

- Step 1: Scrub the outer boots with a detergent-water solution. Remove and stack boots for drying. Alternatively, leather boots, where allowed by the PPE matrix described in Section 5, may be brushed off.
- Step 2: Remove outer gloves and suit (if used)
- Step 3: Remove the hard hat and wipe clean

#### **LEVEL "C "**

- Step 1: Scrub the outer boots with a detergent-water solution. Remove and stack boots for drying
- Step 2: Scrub and remove outer gloves
- Step 3: Remove the hard hat and wipe clean
- Step 4: Remove and discard outer suit
- Step 5: Remove and discard inner booties into lined 55-gallon trash drum
- Step 6: Remove and discard inner suit (when used)
- Step 7: Remove respirators and suitably store while on breaks and during lunch. At the end of shift, discard the cartridges and then clean, disinfect, rinse and air dry the respirator.
- Step 8: Discard inner gloves into lined 55-gallon trash drum
- Step 9: Depart transition zone in work clothes and boots

Step 10: Wash hands, face and neck before breaks and lunch

## ***6.2 Suspected Contamination***

Any employee suspected of sustaining skin contact, beyond incidental contact, with landfill leachate will first use the emergency shower. Following a thorough drenching, the worker will proceed to the nearest shower facility where the worker will remove clothing, shower, don clean clothing, and immediately be taken to the First Aid Station.

## ***6.3 Personal Hygiene***

Before any eating, smoking, or drinking, personnel will wash hands, arms, neck and face. Washing facilities with soap will be available in the support zone.

## ***6.4 Equipment Decontamination***

All equipment that has come into contact with landfill material or leachate will be water washed or pressure washed in a designated decontamination area prior to leaving the site and before exiting a defined exclusion zone. Each site, Site 2 and Site 17 will have its own decontamination area established. Whatever part of the equipment that comes in contact with contaminated soil will be decontaminated in a designated area. The area will usually consist of a "pad" or covered bermed area where water and other cleaning agents (usually trisodium phosphate or detergent) are collected after being used to clean the equipment. Tools and other small equipment will be water washed prior to leaving the exclusion zone. (A detergent or other cleaning agent may be used to aid in the decontamination process.) The cleaning liquids will be collected into drums or a tank. Decontamination liquids will be collected and managed as needed.

## ***6.5 Waste Handling***

All liquids will be treated as contaminated waste and will be treated at IRP Site 2 or 17, or will be disposed off-site if the on-site treatment units are unable to remove all contaminants. Any debris, soils, or landfill material accumulated during Removal Action activities will be placed back into the landfill. Contaminated clothing will be placed in a drum lined with a polyethylene bag. Temporary waste storage areas will be set up by each exclusion zone during the work day. This waste will then be moved to the main storage area. The Project Superintendent will coordinate storage of any collected waste, liquid or solid, with the NTR and the station environmental office. The RPM has requested that this area will not be near the biocell. All waste containers will be properly labeled and stored consistent with regulatory requirements.

OHM will determine regulatory permitted disposal methods for contaminated PPE per contract requirements. In no case will accumulation be allowed to exceed 90 days from the date that the accumulation started.

# *Section 7*

## *Air Monitoring*

Ambient air monitoring will be conducted during landfill material excavation in order to determine airborne contamination levels. This ensures that respiratory protection is adequate to protect personnel against the chemicals that are encountered, insuring against flammable level of landfill gas, and assuring that harmful levels of airborne contaminants are not leaving the site. Since contaminants are fairly low in concentration or toxicity, personal air sampling is not planned for this project, except for testing required while working with asbestos containing materials.

### *7.1 Direct Reading Instruments*

Direct reading instrumentation provides immediate values of specified contaminants. These techniques are useful screening methods for evaluating the proper level of personal protection and assistance in the determination of response action in emergency situations. Direct reading instruments and action levels to be used on this project are as follows:

#### *7.1.1 Photoionization Detector (PID)*

An HNU Model PI-101 PID or equivalent will be utilized to determine the presence and concentration of organic vapors.

**Instrument:** Photoionization Detector 10.2 eV probe  
**Action Level:** 10 ppm in breathing zone  
**Action:** Level C respiratory protection, notify HSM

#### *7.1.2 Explosimeter (LEL/O2)*

A Gastech Model 1314 or MSA Model 260 explosimeter or equivalent may be used to screen for the presence of flammable vapors, oxygen deficient, and oxygen enriched atmospheres. If flammable vapors are 10 percent LEL or greater, work will cease and the area allowed to vent. If oxygen levels below 19.5% or above 22% are encountered, personnel will leave the area and the area will be ventilated.

**Instrument:** Gastech Model 1314 or MSA Model 260  
**Action Level:** 10% LEL/<20.8 O2 or >22% O2  
**Action:** Stop work, allow area to ventilate. Notify HSM

### **7.1.3 Radiation Monitoring**

Since alpha radiation has been detected in the groundwater, potential radiation in the soil where excavation or post hole digging occurs is possible. Alpha radiation is high energy radiation which travels a very short distance and will not penetrate a sheet of paper. However, alpha radiation causes extensive destruction to cellular tissue. Alpha radiation is difficult to detect unless special detectors are used. The major health concern is the possibility that alpha contaminated dust and particulates are inhaled or ingested. If this happens, the health hazard is significant. The radiation source in the landfill areas may be Radium 226 which was used in the past to paint aircraft dials so they would "glow" in the dark. Another concern is potential encounters with gamma radiation buried in the soil. Therefore, two different types of instruments will be required.

**Instrument:** Victoreen 470 or equivalent 1x1 sodium iodide scintillation detector.

**Action Level:** 1.5 time background

**Action:** Stop work in area. Radioactive source will require separate removal following the action plan for radioactive material Appendix F.

**Instrument:** Any radiation rate meter equipped with zinc sulfide detector and designed for detection of alpha particles. (Program Safety Manager will approve instrument used).

**Action Level:** 1 ½ times background.

**Action:** Stop work in area radioactive material will require separate removal. Follow action plan for radioactive material removal in Appendix F.

## **7.2 Monitoring Strategy**

During fence installation in landfill areas, the HSO will monitor the area for ACM or PACM. If encountered, the HSO will stop work at that specific installation (e.g. post hole) and require subcontractor employees to leave. OHM employees asbestos trained per the requirements of this plan will remove the ACM or PACM material. The HSO will monitor the soil of the area where each post hole is planned using both of the radioactive detectors. As the hole is dug the soil will be checked a second time with the zinc sulfide detector. If radiation 1.5 times above background is found, the work will be stopped and the HSO will require the subcontractor employees to leave the area.

Radioactive contaminated soil or debris will be removed per the action plan. During surveyor work, the general area where the survey crew works will be checked for radiation with the zinc sulfide detector.

During excavation work, the area of the work will be checked using both radiation detectors, following protocol described above. Due to the unknown nature of work in a landfill, excavation equipment engaged in excavation of landfill material or debris will be equipped with a CGI and PID meter to allow continuous air monitoring to ensure that work is stopped if toxic or

flammable gases are released due to disturbing a pocket of gas in the landfill material. Work area perimeter monitoring will also be conducted continuously during active excavation near the housing area at site 17.

### ***7.3 Quality Assurance/Quality Control (QA/QC)***

Adherence to a proper QA/QC plan is essential for a meaningful air sampling effort. The major concerns of a QA/QC plan are calibration of equipment, and document control.

#### ***7.3.1 Calibration and Maintenance Procedures***

All direct reading instruments will be calibrated daily or before each use. Records detailing date, time, span gas, or other standard and the name of the person performing the calibration will be maintained. The calibration gas for the PID is usually isobutylene. The calibration gas for the LEL is usually a methane/air or a hexane/air mixture. Oxygen is calibrated against normal air in a clean environment. A low oxygen calibration gas can be used for calibrating the response of the oxygen sensor. Often 100% nitrogen is used to "zero" the oxygen sensor. For purposes of this plan, calibration of the explosimeter means a daily field check with known calibration gases. The reading on the instrument must be within 3% of the stated value of the gas. If it is not, then formal calibration of the instrument must follow manufacturers' calibration procedure. The HSO will charge batteries each night and verify that instruments are fully charged before use each day. The HSO will clean the exterior of the instrument, clean the filters, and insure the sample train is clear each day. The HSO will check the function of the batteries of each radiation detector and the function of each radiation detector will be verified by use of a check source. Each instrument will be calibrated by the vendor or factory and will be within six months of date of last calibration.

#### ***7.3.2 Documentation***

Strict adherence to document and data control procedures is essential for good QA/QC. Data and calibration records must be accounted for and retrievable at all times. Types of documents which are essential include:

- notes
- maps
- logbooks
- data sheets
- reports

# ***Section 8***

## ***Emergency Response***

This section states the specific site emergency response plan.

### ***8.1 Emergency Services***

Upon arrival at the site, the project superintendent will ensure that all personnel know the system for communication of emergency situations. This section provides concise and clear directions for local emergency services. Use a radio or nearby phone to summon emergency assistance. A vehicle must be available to transport personnel to safe locations or to hospitals. All personnel on this project will know how to use a portable fire extinguisher.

The following emergency equipment will be brought onto the site or will be stationed near each work area:

- fire extinguisher, minimum one 20 lb dry chemical ABC type at each excavation site in the Contamination Reduction Corridor (CRC) at the edge of exclusion zone
- industrial first aid kit, in the CRC, at the edge of the Support Zone
- portable eye wash, capable of supplying 15 minutes of water and protected from direct sunlight in each support area, at the edge of the Support Zone
- air horn at each support area, at the edge of the Support Zone
- spill control material consisting of either absorbent pillows or absorbent material and shovels, in the Support Zone by the CRC entrance

The following equipment will be available at the support trailer for use in an emergency situation:

- industrial first aid kit
- blanket
- ice packs or other cooling devices to include air-conditioning (if possible)

### ***8.2 Site Communications***

Personnel shall maintain verbal communication with each other. The following communications systems will be available during site activities:

- cellular telephone or access to a land phone for emergency purposes
- hand held radios
- compressed air horn (signals emergency evacuation only) at each site
- hand signals will be as specified in EM 385-1-1, figure 8-8
- a posted route to the nearest hospital for the project site
- posted emergency phone numbers at each site (office trailer and work area)

## ***8.3 Medical Emergency Procedures***

The following procedures should be observed if an accident occurs:

### 1. Minor Injury

- contact Task Foreman or "buddy"
- have qualified first aid personnel treat injury
- record injury and include name of injured person, nature of injury, and treatment given.

2. Medical Emergency. In the event of a medical emergency when actual or suspected serious injury occurs, the following procedures shall be implemented:

- survey scene and evaluate whether the area is safe for entry.
- remove the exposed or injured person(s) from immediate danger.
- render first aid if necessary. Decontaminate affected personnel after critical first aid is given.
- obtain paramedic services or ambulance transport to local hospital. This procedure shall be followed even if there is no visible injury.
  - call 911 (prefix not needed from cellular phone)
  - identify location by number of nearest building, request medical assistance, provide name and telephone number
  - request assistance from emergency medical service and/or additional assistance
  - life-threatening emergencies will be routed to an on-base medical facility for treatment
- other personnel in the work area shall be evacuated to a safe distance until the Project Superintendent determines that it is safe for work to resume; if there is any doubt regarding the condition of the area, work shall not commence until all hazard control issues are resolved
- notify NTR of incident and fill out accident reporting forms and associated documents

3. Fatal Injury. If a fatal injury occurs, the following additional steps will be followed:

- notify immediate Superintendent
- notify Project HSM and OHM Corporate Health and Safety Dept. who will initiate contact with cal-OSHA and other appropriate agencies
- notify NTR
- all work activities on the project must be stopped on the project for 24 hours
- assist Cal-OSHA as directed

Any personnel requiring emergency medical attention shall be evacuated immediately from exclusion and contamination-reduction zones. Personnel shall not enter the area to attempt a rescue if their own lives would be threatened. The decision whether or not to decontaminate a victim prior to evacuation is based on the type and severity of the illness or injury and the nature of the contaminant.

For some emergency victims, immediate decontamination may be an essential part of life saving first aid. For others, decontamination may aggravate the injury or delay life saving treatment. If decontamination does not interfere with essential treatment, it should be performed.

If decontamination can be performed:

- wash external clothing and cut it away
- wrap victim in clean blanket or towel if necessary

If decontamination cannot be performed:

- wrap the victim in blankets or plastic to reduce contamination of other personnel
- alert emergency and off-site medical personnel to potential contamination; instruct them about specific decontamination procedures
- send along site personnel familiar with the incident

***First Aid.*** Only qualified personnel shall provide first aid and stabilize an individual needing assistance. Life support techniques such as CPR and treatment of life threatening problems such as airway obstruction and shock will be given top priority. At least one person certified in First Aid techniques and CPR will be on each work site at all times; the OHM Health and Safety Procedure No. 52, Blood borne Pathogens, will be followed when first aid/CPR are administered. The HSO will be current in First Aid and CPR. Professional medical assistance shall be obtained at the earliest possible opportunity.

## ***8.4 Spill Response Procedures***

OHM anticipates some potential risk of leaks of hazardous materials. If such spills did occur, it is believed, based on site investigations and analytical data that only small amounts of these materials would be at risk. However, because there is a potential for a spill to occur, the appropriate spill response materials will be available. Very little free liquid is anticipated. Spills of contaminated soil or debris can simply be scooped up and placed with other contaminated soil.

In the case of a spill of contaminated or hazardous materials, the following procedures shall be followed:

- determine a spill has occurred
- notify the Project Superintendent
- identify protective clothing or equipment required to respond
- contain the spill

- neutralize and/or solidify any product
- transfer material into 55 gallon drums
- document incident
- notify NTR

#### ***8.4.1 Release Prevention And Minimization Measures***

In addition to training, the following procedures will be implemented to prevent and minimize releases of hazardous materials.

- do not conduct hazardous materials operation when the weather could cause significant risk to surrounding area if a spill should occur
- transfer all materials in or over a bermed or "protected" area; a protected area is one which is covered with an impermeable material, such as polyethylene
- dike temporary storage tanks containing hazardous wastes or potentially hazardous wastes to contain potential releases
- maintain a supply of basic spill response materials and protective equipment on site to include:
  - absorbent sheets, pillows, booms or absorbent material
  - open top 55-gallon drums or other containers with lids
  - booms, shovels and other tools, such as squeegees

#### ***8.4.2 Emergency Coordinator***

The project superintendent is the primary emergency coordinator for all spills on this project.

### ***8.5 Earthquake Response***

If an earthquake should occur during the course of site activities, take the following steps:

- stop working
- remain calm and do not panic
- do not use or do anything that might be a source of ignition, i.e., smoking, cutting, or welding
- avoid power lines, power poles, and windows
- if in a vehicle, stay in the vehicle until the earthquake is over

After the earthquake is over:

- prepare for after shocks. Stay out of severely damaged buildings
- meet for a head count at a location designated by the Superintendent

- check for injuries; do not move seriously injured personnel unless remaining where they are would create danger of further injury
- check vehicles, equipment, and buildings for any obvious damage
- check utility lines for damage; switch off power, water and gas until a utility official has inspected the building and determined it is safe
- if driving, watch carefully for hazards created by the earthquake, i.e., undermined roads, weak bridges or overpasses, etc.

## ***8.6 Fire or Explosion Response***

In the event of a fire or explosion, summon the Fire Department immediately, take a head count and implement evacuation. Establish the primary and secondary meeting area on a site-specific basis during the morning safety meeting. The Project Superintendent will initiate a head count and give further directions or response discussions as the nature of the emergency requires.

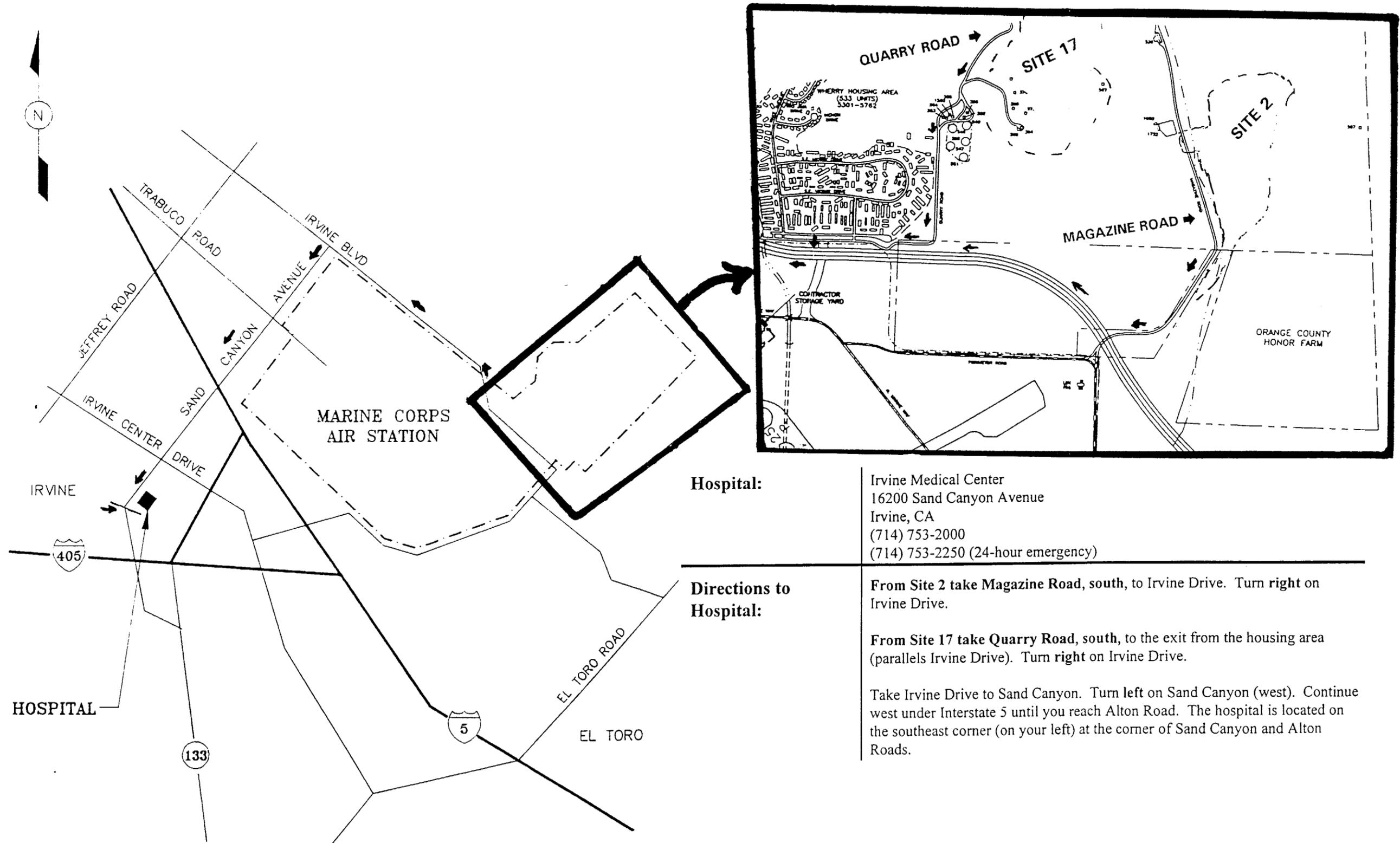
## ***8.7 Emergency and Hospital Information***

The emergency information contained in Table 8-1 will be reviewed with site personnel and posted on site.

**Table 8-1**  
**Emergency Information**

<b>Hospital:</b>	Irvine Medical Center 16200 Sand Canyon Avenue Irvine, CA (714) 753-2000 (714) 753-2250 (24-hour emergency)
<b>Directions to Hospital:</b>	<p>From Site 2 take Magazine Road, south, to Irvine Drive. Turn right on Irvine Drive.</p> <p>From Site 17 take Quarry Road, south, to the exit from the housing area (parallels Irvine Drive). Turn right on Irvine Drive.</p> <p>Take Irvine Drive to Sand Canyon. Turn left on Sand Canyon (west). Continue west under Interstate 5 until you reach Alton Road. The hospital is located on the southeast corner (on your left) at the corner of Sand Canyon and Alton Roads.</p>
<b>Fire/Police/EMS:</b>	9-911 (on base) or 911 if using pay/office/cellular phone
<b>OHM Contact:</b>	William Sedlak, P.E. Project Manager (714) 263-1146X403 (800) 263-1146 (pager)
<b>Navy RPM:</b>	Lynn Marie Hornecker (619)532-3737
<b>Regional Poison Center:</b>	(800) 764-7661
<b>CHEMTREC:</b>	(800) 424-9300
<b>National Response Center:</b>	(800) 424-8802
<b>RCRA Hotline:</b>	(800) 424-9346
<b>NTR:</b>	Scott Kehe (714) 726-2506
<b>EOD/HERO:</b>	Capt. Conquest (714) 726-3678 or 726-3015
<b>Pistol Range:</b>	Sgt. Van Auren (714) 726-3115

**Figure 8-1: Map to Hospital**



**Hospital:**

Irvine Medical Center  
 16200 Sand Canyon Avenue  
 Irvine, CA  
 (714) 753-2000  
 (714) 753-2250 (24-hour emergency)

**Directions to Hospital:**

**From Site 2** take Magazine Road, south, to Irvine Drive. Turn right on Irvine Drive.

**From Site 17** take Quarry Road, south, to the exit from the housing area (parallels Irvine Drive). Turn right on Irvine Drive.

Take Irvine Drive to Sand Canyon. Turn left on Sand Canyon (west). Continue west under Interstate 5 until you reach Alton Road. The hospital is located on the southeast corner (on your left) at the corner of Sand Canyon and Alton Roads.

## ***Section 9***

# ***Training Requirements***

This section states the specific training requirements for the project consistent with 29 CFR 1910.120(e) and EM 385-1-1, Section 28. The site specific training will include the following:

- names of personnel and alternates responsible for site safety and health
- safety, health and other hazards present on the site
- use of personal protective equipment, specific for this site
- work practices by which the employee can minimize the risks from hazards
- safe use of engineering controls and equipment on the site
- medical surveillance requirements including recognition of symptoms and signs which might indicate overexposure to hazards
- decontamination procedures
- emergency response plan
- confined space entry procedures
- spill containment program

All personnel on this site will receive this training prior to working on the site.

### ***9.1 Training Prerequisites***

29 CFR 1910.120 states that personnel who enter an area covered under the regulation have a minimum of 40 hours training and three days supervised field experience. Personnel will have had eight hour annual refresher training to maintain currency in Hazardous Waste Operations as proscribed by this regulation. Furthermore, all supervisors will have had an eight hour Supervisors Health and Safety Management Course. Either the HSO or the Project Superintendent will provide copies of personnel training certifications to the Navy upon request.

### ***9.2 Daily Safety Meetings***

Daily "Tailgate" safety meetings are held at the start of each shift, prior to the day's remediation activity, in which potential chemical, physical, and environmental hazards and preventative safety measures are discussed, and at the end of the work shift to review newly identified hazards and "lessons learned" during the work day. "Phase Safety" briefings are held prior to the commencement of a new task where task specific risks and precautions are discussed. Attendance is mandatory for all employees and is documented.

# ***Section 10***

## ***Medical Surveillance***

This section states the specific medical surveillance required for this project. Refer to the OHM Health and Safety Procedures Manual (on site) for further discussion.

### ***10.1 Specific Requirements***

No unique medical surveillance is anticipated during this project. All employees have had physical examinations in accordance with 29 CFR 1910.120. If employees experience symptoms consistent with exposure to chemicals, employees will immediately report to the Superintendent or HSO. The Superintendent or HSO will immediately arrange for an examination with a local medical provider. Refer to Section 8 for the emergency phone numbers and contacts.

*Appendix A*  
*SHSP Acknowledgment*



***Appendix B***  
***SHSP Change Approval Form***

SITE SAFETY PLAN CHANGE APPROVAL FORM

Date: \_\_\_\_\_ Amendment Number: \_\_\_\_\_

Project Name: \_\_\_\_\_ Project Number: \_\_\_\_\_

Section of SHSP: \_\_\_\_\_ Page Number: \_\_\_\_\_

Change to read \_\_\_\_\_

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Reason for change \_\_\_\_\_

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Approvals:

\_\_\_\_\_  
Project Superintendent

\_\_\_\_\_  
Health and Safety Officer

\_\_\_\_\_  
OHM Health & Safety Manager (CIH)

Acknowledgment: (Non-Mandatory)

\_\_\_\_\_  
Navy Technical Representative

*Appendix C*  
*Hazard Analysis Forms*



## HAZARD ANALYSIS #1

ACTIVITY Mobilization and Site Setup

ANALYZED BY / DATE \_\_\_\_\_

REVIEWED BY / DATE Jim Bushnell/ 3-15-96

PRINCIPAL STEPS	POTENTIAL HAZARDS	RECOMMENDED CONTROLS
<p>Siting equipment and trailers; installation of fences, barriers and traffic control measures</p>	<p>Injury from vehicular traffic</p> <p>Strains from manually moving materials and equipment</p> <p>Slips, trips, and falls from various agents</p> <p>Strains from use of tools such as shovels</p> <p>Injury from use of power and hand tools</p>	<ul style="list-style-type: none"> <li>● All personnel shall wear appropriate blaze orange safety vests when working on any roadway.</li> <li>● All vehicles will have spotters when backing up or maneuvering in restricted clearance areas.</li> <li>● Direct personnel to use proper lifting techniques such as keeping back straight, lifting with legs, limiting twisting, and getting help in moving bulky/heavy materials and equipment.</li> <li>● Use mechanical equipment whenever possible.</li> <li>● Visually inspect work areas and mark, barricade, or eliminate pre-existing slip, trip, and fall hazards as necessary.</li> <li>● Keep work areas neat and in an orderly state.</li> <li>● Maintain proper illumination in work areas.</li> <li>● Personnel shall maintain steady pace when using tools and take adequate rest periods.</li> <li>● Tools shall be appropriate for the task and maintained in good condition.</li> <li>● Inspect all power and hand tools before each use</li> <li>● Train personnel in the use of all power equipment.</li> <li>● Personnel shall maintain appropriate work/rest cycles to minimize fatigue.</li> <li>● Keep electric cords tangle-free and out of the way of rotating tools.</li> <li>● Use pneumatic or double insulated Power tools when possible.</li> <li>● Protect electric tools with ground fault circuit interrupters (GFCI).</li> </ul>

## HAZARD ANALYSIS #1

ACTIVITY Mobilization and Site Setup

ANALYZED BY / DATE \_\_\_\_\_

REVIEWED BY / DATE Jim Bushnell/ 3-15-96

PRINCIPAL STEPS	POTENTIAL HAZARDS	RECOMMENDED CONTROLS
Siting equipment and trailers; installation of fences, barriers and traffic control measures (continued)	Falls from ladders	<ul style="list-style-type: none"> <li>● Inspect all ladders before each use.</li> <li>● Tie off ladders at all times.</li> <li>● Personnel shall work facing the ladder, and shall not exceed loading capacity of ladder.</li> </ul>
Clearing and Grubbing	Contact Dermatitis	<ul style="list-style-type: none"> <li>● Wear PPE to avoid skin contact with-contaminated soil, plants, or other skin irritants.</li> <li>● Identify and review poisonous plants with workers.</li> </ul>
	High Noise Levels	<ul style="list-style-type: none"> <li>● Use hearing protection when exposed to excessive noise levels (greater than 84 dbA over an eight-hour period)</li> </ul>
	High/Low Ambient Temperature	<ul style="list-style-type: none"> <li>● Monitor for heat/cold stress in accordance with OHM H&amp;S Procedure #22 and #23 "Heat Stress" and "Cold Stress".</li> </ul>
Equipment/Facility Setup	Slips, trips and falls	<ul style="list-style-type: none"> <li>● Clear walkways of equipment, vegetation, excavated material; maintain good housekeeping and follow OHM H&amp;S Procedure #34 "Slip, Trip and Fall Prevention".</li> <li>● Mark, identify, or barricade other obstructions.</li> </ul>
	Handling heavy objects	<ul style="list-style-type: none"> <li>● Observe proper lifting techniques.</li> <li>● Obey sensible lifting limits (60lb individual lifting maximum)</li> <li>● Use mechanical lifting equipment to move large, awkward loads.</li> </ul>
	Sharp Objects	<ul style="list-style-type: none"> <li>● Wear cut-resistant work gloves when the possibility of lacerations or other injury may be caused by sharp edges or other objects.</li> <li>● Maintain all hand and power tools in a safe condition.</li> <li>● Keep guards in place during use.</li> </ul>
	High Noise Levels	<ul style="list-style-type: none"> <li>● Use hearing protection when exposed to excessive noise levels (greater than 84 dbA over an eight-hour period)</li> </ul>

### HAZARD ANALYSIS #1

ACTIVITY Mobilization and Site Setup ANALYZED BY / DATE \_\_\_\_\_ REVIEWED BY / DATE Jim Bushnell/ 3-15-96

PRINCIPAL STEPS	POTENTIAL HAZARDS	RECOMMENDED CONTROLS
Equipment/Facility Setup (continued)	High/Low Ambient Temperature	<ul style="list-style-type: none"><li>• Monitor for heat/cold stress in accordance with OHM H&amp;S Procedure #22 and #23 "Heat Stress" and "Cold Stress".</li></ul>





## HAZARD ANALYSIS #2

ACTIVITY Fence Installation

ANALYZED BY / DATE \_\_\_\_\_

REVIEWED BY / DATE Jim Bushnell / 3-15-96

PRINCIPAL STEPS	POTENTIAL HAZARDS	RECOMMENDED CONTROLS
	<p>Sharp Objects</p> <p>Insect/Snake bites</p> <p>Contact Dermatitis</p> <p>High Noise Levels</p> <p>High/Low Ambient Temperature</p>	<ul style="list-style-type: none"> <li>● Wear cut-resistant work gloves when the possibility of lacerations or other injury may be caused by sharp edges or other objects.</li> <li>● Maintain all hand and power tools in a safe condition.</li> <li>● Keep guards in place during use.</li> <li>● Wear chaps when using a chain saw.</li> <li>● Review injury potential and types of snakes with workers.</li> <li>● Avoid insect nest areas, likely habitats of snakes outside work areas.</li> <li>● Emphasize the buddy system where such injury potential exists.</li> <li>● Use insect repellent and wear PPE to protect against sting/bite injuries.</li> <li>● Wear PPE to avoid skin contact with-contaminated soil, plants, or other skin irritants.</li> <li>● Identify and review poisonous plants with workers.</li> <li>● Use hearing protection when exposed to excessive noise levels (greater than 84 dbA over an eight-hour period)</li> <li>● Monitor for heat/cold stress in accordance with OHM H&amp;S Procedure #22 and #23 "Heat Stress" and "Cold Stress".</li> </ul>

### HAZARD ANALYSIS #3

**ACTIVITY**    Excavation of Landfill Material/ Remove Debris/  
 Realign or Stabalize Channels/ Install RipRap

**ANALYZED BY / DATE** \_\_\_\_\_

**REVIEWED BY / DATE** \_\_\_\_\_

Jim Bushnell / 3-15-96

PRINCIPAL STEPS	POTENTIAL HAZARDS	RECOMMENDED CONTROLS
Excavation Activities	Contact with underground utilities  Struck by or against heavy equipment  Exposure to airborne contaminants  Excavation hazards	<ul style="list-style-type: none"> <li>● Physically verify the location and depth of existing utilities prior to starting excavation through geophysical and utility survey.</li> <li>● Scan the excavation area with electromagnetic and sonic equipment and mark ground where existing underground utilities are discovered.</li> <li>● Protect all existing utilities during excavation.</li> <li>● Perform excavation within one foot of existing utilities by hand.</li> <li>● Wear reflective warning vests when exposed to vehicular traffic.</li> <li>● Avoid equipment swing areas.</li> <li>● Make eye contact with operators before approaching equipment.</li> <li>● Understand and review posted hand signals.</li> <li>● Conduct continuous air monitoring for contaminants as excavation activities proceed.</li> <li>● Take appropriate response actions if assigned action levels are reached.</li> <li>● Use proper personal protective clothing and respiratory protection.</li> <li>● Personnel shall follow excavation safety procedures.</li> <li>● Use diversion ditches, dikes, or other means to prevent surface water from entering an excavation and to provide good drainage of the area adjacent to the excavation.</li> <li>● Maintain barricades and warning lights from sunset to sunup and at all excavations in non-remote areas.</li> </ul>



### HAZARD ANALYSIS #3

**ACTIVITY** Excavation of Landfill Material/ Remove Debris/ Realign or Stabalize Channels/ Install RipRap
     
 **ANALYZED BY / DATE** \_\_\_\_\_
     
 **REVIEWED BY / DATE** Jim Bushnell / 3-15-96

PRINCIPAL STEPS	POTENTIAL HAZARDS	RECOMMENDED CONTROLS
Excavation (continued)	Heavy equipment hazards	<ul style="list-style-type: none"> <li>• Equip all heavy equipment on this project with rollover protection systems and back-up alarms.</li> <li>• Instruct personnel to stay clear of moving equipment unless necessary.</li> <li>• Inspect all equipment daily before use to ensure proper maintenance is being performed.</li> <li>• Instruct equipment operators to give ground personnel right-of -way.</li> <li>• Prior to operating heavy equipment on the runway, consult the client for specific requirements.</li> </ul>

## HAZARD ANALYSIS #4

**ACTIVITY** Demobilization and Site Restoration

**ANALYZED BY / DATE** J. Bushnell / 2-10-96

**REVIEWED BY / DATE** Jim Bushnell / 3-15-96

PRINCIPAL STEPS	POTENTIAL HAZARDS	RECOMMENDED CONTROLS
Demobilization	<p>Potential contact hazards from landfill leachate and landfill gas</p> <p>Strains from manually moving materials and equipment</p> <p>Slips, trips, and falls from physical objects</p> <p>Electrocution</p> <p>Material Handling</p>	<ul style="list-style-type: none"> <li>● Decontaminate all equipment prior to moving it to the next location.</li> <li>● Use PPE as required.</li> <li>● Store all general site chemical and decontamination solutions in the appropriate containers and designated areas.</li> <li>● Direct personnel to use proper lifting techniques such as keeping back straight, lifting with legs, limiting twisting, getting help in moving bulky/heavy loads, and using mechanical equipment to move material and equipment.</li> <li>● Encourage hand truck use.</li> <li>● Personnel shall work at a steady pace.</li> <li>● Visually inspect work areas and mark, barricade, or eliminate slip, trip, and fall hazards as necessary.</li> <li>● Work areas shall be kept neat and in an orderly state.</li> <li>● Maintain proper illumination in work areas.</li> <li>● Only allow qualified electricians to disconnect electrical circuits.</li> <li>● Inspect all extension cords daily for structural integrity, ground continuity, and damaged areas.</li> <li>● Use ground fault circuit interrupters (GFCI) on all outdoor 120 volt circuits.</li> <li>● Identify and avoid pinch points.</li> <li>● Maintain communication with others involved in material handling.</li> <li>● Use appropriate PPE.</li> </ul>



*Appendix D*  
*Project Safety Checklist*

## PROJECT SAFETY CHECKLIST

Project Name \_\_\_\_\_ Project No. \_\_\_\_\_ Date \_\_\_\_\_

The following safety checklist must be completed on a weekly basis by the Project Supervisor or his designee. Records of this weekly site safety inspection must be kept in the project files and available for review.

N/A	Yes	No	
_____	_____	_____	OSHA Posters, Site Safety Plan, Hazard Communication Program, OSHA 200 Log, Health and Safety Procedures Manual, Weekly Safety Checklist
_____	_____	_____	Site Safety Plan signed by all personnel
_____	_____	_____	First aid kit, eye wash, safety shower
_____	_____	_____	Fresh water available for drinking and washing
_____	_____	_____	Material Safety Data Sheets for chemicals brought onto site
_____	_____	_____	All chemical containers properly stored and labeled
_____	_____	_____	Good housekeeping with a tidy, orderly appearance
_____	_____	_____	Work zones clearly defined and established
_____	_____	_____	Decontamination line set up in transition zone
_____	_____	_____	PPE appropriate for task
_____	_____	_____	Hard hat, safety glasses, steel toe shoes for all personnel
_____	_____	_____	Fire extinguishers present with current inspection record
_____	_____	_____	Generators and fuel tanks grounded
_____	_____	_____	Appropriate air monitoring equipment on site properly used and maintained
_____	_____	_____	Compressed gas cylinders stored upright and secured
_____	_____	_____	Defective equipment tagged and removed from service

Explanation of "no" checks and other comments

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***Appendix E***  
***Material Safety Data Sheets***



Genium Publishing Corporation

1145 Catalyn Street  
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Material Safety Data Sheets Collection:

Sheet No. 467  
Automotive Gasoline, Lead-free

Issued: 10/81 Revision: A, 9/91

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**Section 1. Material Identification**

**Automotive Gasoline, Lead-free, Description:** A mixture of volatile hydrocarbons composed mainly of branched-chain paraffins, cycloparaffins, olefins, naphthenes, and aromatics. In general, gasoline is produced from petroleum, shale oil, Athabasca tar sands, and coal. Motor gasolines are made chiefly by cracking processes, which convert heavier petroleum fractions into more volatile fractions by thermal or catalytic decomposition. Widely used as fuel in internal combustion engines of the spark-ignited, reciprocating type. Automotive gasoline has an octane number of approximately 90. A high content of aromatic hydrocarbons and a consequent high toxicity are also associated with a high octane rating. Some gasolines sold in the US contain a minor proportion of tetraethyllead, which is added in concentrations not exceeding 3 ml per gallon to prevent engine "knock." However, methyl-tert-butyl ether (MTBE) has almost completely replaced tetraethyllead.

**Other Designations:** CAS No. 8006-61-9, benzin, gasoline, gasolene, motor spirits, natural gasoline, petrol.  
**Manufacturer:** Contact your supplier or distributor. Consult latest *Chemical Week Buyers' Guide*<sup>(TM)</sup> for a suppliers list.

R 1	NFPA
I 2	
S 2*	
K 4	
* Skin absorption	
	HMIS
	H 2
	F 3
	R 1
	PPG†
	† Sec. 8

**Cautions:** Inhalation of automotive gasoline vapors can cause intense burning in throat and lungs, central nervous system (CNS) depression, and possible fatal pulmonary edema. Gasoline is a dangerous fire and explosion hazard when exposed to heat and flames.

**Section 2. Ingredients and Occupational Exposure Limits**

Automotive gasoline, lead-free\*

1990 OSHA PELs

8-hr TWA: 300 ppm, 900 mg/m<sup>3</sup>

15-min STEL: 500 ppm, 1500 mg/m<sup>3</sup>

1990-91 ACGIH TLVs

TWA: 300 ppm, 890 mg/m<sup>3</sup>

STEL: 500 ppm, 1480 mg/m<sup>3</sup>

1990 NIOSH REL

None established

1985-86 Toxicity Data\*

Man, inhalation, TC<sub>50</sub>: 900 ppm/1 hr; toxic effects include sense organs and special senses (conjunctiva irritation), behavioral (hallucinations, distorted perceptions), lungs, thorax, or respiration (cough)

Human, eye: 140 ppm/8 hr; toxic effects include mild irritation

Rat, inhalation, LC<sub>50</sub>: 300 g/m<sup>3</sup>/5 min

\* A typical modern gasoline composition is 80% paraffins, 14% aromatics, and 6% olefins. The mean benzene content is approximately 1%. Other additives include sulfur, phosphorus, and MTBE.

† See NIOSH, RTECS (LX3300000), for additional toxicity data.

**Section 3. Physical Data**

**Boiling Point:** Initially, 102 °F (39 °C); after 10% distilled, 140 °F (60 °C); after 50% distilled, 230 °F (110 °C); after 90% distilled, 338 °F (170 °C); final boiling point, 399 °F (204 °C)

**Vapor Density (air = 1):** 3.0 to 4.0

**Density/Specific Gravity:** 0.72 to 0.76 at 60 °F (15.6 °C)

**Water Solubility:** Insoluble

**Appearance and Odor:** A clear (gasoline may be colored with dye), mobile liquid with a characteristic odor recognizable at about 10 ppm in air.

**Section 4. Fire and Explosion Data**

**Flash Point:** -45 °F (-43 °C)

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

**LEL:** 1.3% v/v

**UEL:** 6.0% v/v

**Extinguishing Media:** Use dry chemical, carbon dioxide, or alcohol foam as extinguishing media. Use of water may be ineffective to extinguish fire, but use water spray to knock down vapors and to cool fire-exposed drums and tanks to prevent pressure rupture. Do not use a solid stream of water since it may spread the fuel.

**Unusual Fire or Explosion Hazards:** Automobile gasoline is an OSHA Class IB flammable liquid and a dangerous fire and explosion hazard when exposed to heat and flames. Vapors can flow to an ignition source and flash back. Automobile gasoline can also react violently with oxidizing agents.

**Special Fire-fighting Procedures:** Isolate hazard area and deny entry. Since fire may produce toxic fumes, wear a self-contained breathing apparatus (SCBA) with a full facepiece operated in pressure-demand or positive-pressure mode, and full protective clothing. When the fire is extinguished, use nonsparking tools for cleanup. Be aware of runoff from fire control methods. Do not release to sewers or waterways.

**Section 5. Reactivity Data**

**Stability/Polymerization:** Automotive gasoline is stable at room temperature in closed containers under normal storage and handling conditions. Hazardous polymerization cannot occur.

**Chemical Incompatibilities:** Automotive gasoline can react with oxidizing materials such as peroxides, nitric acid, and perchlorates.

**Conditions to Avoid:** Avoid heat and ignition sources.

**Hazardous Products of Decomposition:** Thermal oxidative decomposition of automotive gasoline can produce oxides of carbon and partially oxidized hydrocarbons.

**Section 6. Health Hazard Data**

**Carcinogenicity:** In 1990 reports, the IARC list gasoline as a possible human carcinogen (Group 2B). Although the IARC has assigned an overall evaluation to gasoline, it has not assigned an overall evaluation to specific substances within this group (inadequate human evidence).

**Summary of Risks:** Gasoline vapors are considered moderately poisonous. Vapor inhalation can cause central nervous system (CNS) depression and mucous membrane and respiratory tract irritation. Brief inhalations of high concentrations can cause a fatal pulmonary edema. Reported responses to gasoline vapor concentrations are: 160 to 270 ppm causes eye and throat irritation in several hours; 500 to 900 ppm causes eye, nose, and throat irritation, and dizziness in 1 hr; and 2000 ppm produces mild anesthesia in 30 min. Higher concentrations are intoxicating in 4 to 10 minutes. If large areas of skin are exposed to gasoline, toxic amounts may be absorbed. Repeated or prolonged skin exposure causes dermatitis. Certain individuals may develop hypersensitivity. Ingestion can cause CNS depression. Pulmonary aspiration after ingestion can cause severe pneumonitis. In adults, ingestion of 20 to 50 g gasoline may produce severe symptoms of poisoning.

**Medical Conditions Aggravated by Long-Term Exposure:** None reported.

**Target Organs:** Skin, eye, respiratory and central nervous systems.

**Primary Entry Routes:** Inhalation, ingestion, skin contact.

**Acute Effects:** Acute inhalation produces intense nose, throat, and lung irritation; headaches; blurred vision; conjunctivitis; flushing of the face; mental confusion; staggering gait; slurred speech; and unconsciousness, sometimes with convulsions. Ingestion causes inebriation (drunkenness), vomiting, dizziness, fever, drowsiness, confusion, and cyanosis (a blue to dark purplish coloration of skin and mucous membrane caused by lack of oxygen). Aspiration causes choking, cough, shortness of breath, increased rate of respiration, excessively rapid heartbeat, fever, bronchitis, and pneumonitis. Other symptoms following acute exposure include acute hemorrhage of the pancreas, fatty degeneration of the liver and kidneys, and passive congestion of spleen.

**Chronic Effects:** Chronic inhalation results in appetite loss, nausea, weight loss, insomnia, and unusual sensitivity (hyperesthesia) of the distal extremities followed by motor weakness, muscular degeneration, and diminished tendon reflexes and coordination. Repeated skin exposure can cause blistering, drying, and lesions.

**FIRST AID**

**Eyes:** Gently lift the eyelids and flush immediately and continuously with flooding amounts of water until transported to an emergency medical facility. Consult a physician immediately.

**Skin:** Quickly remove contaminated clothing. Rinse with flooding amounts of water for at least 15 min. For reddened or blistered skin, consult a physician. Wash affected area with soap and water.

**Inhalation:** Remove exposed person to fresh air and support breathing as needed.

**Ingestion:** Never give anything by mouth to an unconscious or convulsing person. If ingested, do not induce vomiting due to aspiration hazard.

Give conscious victim a mixture of 2 tablespoons of activated charcoal mixed in 8 oz of water to drink. Consult a physician immediately.

After first aid, get appropriate in-plant, paramedic, or community medical support.

**Section 7. Spill, Leak, and Disposal Procedures**

**Spill/Leak:** Notify safety personnel, evacuate all unnecessary personnel, remove heat and ignition sources, and provide maximum explosion-proof ventilation. Cleanup personnel should protect against vapor inhalation and liquid contact. Use nonsparking tools. Take up small spills with sand or other noncombustible adsorbent. Dike storage areas to control leaks and spills. Follow applicable OSHA regulations (29 CFR 1910.120).

**Aquatic Toxicity:** Bluegill, freshwater, LC<sub>50</sub>, 8 ppm/96 hr.

**Disposal:** Contact your supplier or a licensed contractor for detailed recommendations. Follow applicable Federal, state, and local regulations.

**EPA Designations**

RCRA Hazardous Waste (40 CFR 261.21): Characteristic of ignitability

CERCLA Hazardous Substance (40 CFR 302.4): Not listed

SARA Extremely Hazardous Substance (40 CFR 355): Not listed

SARA Toxic Chemical (40 CFR 372.65): Not listed

**OSHA Designations**

Listed as an Air Contaminant (29 CFR 1910.1000, Table Z-1-A)

**Section 8. Special Protection Data**

**Goggles:** Wear protective eyeglasses or chemical safety goggles, per OSHA eye- and face-protection regulations (29 CFR 1910.133). Since contact lens use in industry is controversial, establish your own policy.

**Respirator:** Seek professional advice prior to respirator selection and use. Follow OSHA respirator regulations (29 CFR 1910.134) and, if necessary, wear a NIOSH-approved respirator. There are no specific NIOSH recommendations. However, for vapor concentrations not immediately dangerous to life or health, use chemical cartridge respirator equipped with organic vapor cartridge(s), or a supplied-air respirator. For emergency or nonroutine operations (cleaning spills, reactor vessels, or storage tanks), wear an SCBA. *Warning! Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.*

**Other:** Wear impervious gloves, boots, aprons, and gauntlets to prevent prolonged or repeated skin contact. Materials such as neoprene or polyvinyl alcohol provide excellent/good resistance for protective clothing. Note: Resistance of specific materials can vary from product to product.

**Ventilation:** Provide general and local explosion-proof exhaust ventilation systems to maintain airborne concentrations below the OSHA PELs (Sec. 2). Local exhaust ventilation is preferred since it prevents contaminant dispersion into the work area by controlling it at its source.<sup>(10)</sup>

**Safety Stations:** Make available in the work area emergency eyewash stations, safety/quick-drench showers, and washing facilities.

**Contaminated Equipment:** Remove this material from your shoes and equipment. Launder contaminated clothing before wearing.

**Comments:** Never eat, drink, or smoke in work areas. Practice good personal hygiene after using this material, especially before eating, drinking, smoking, using the toilet, or applying cosmetics.

**Section 9. Special Precautions and Comments**

**Storage Requirements:** Store in closed containers in a cool, dry, well-ventilated area away from heat and ignition sources and strong oxidizing agents. Protect containers from physical damage. Avoid direct sunlight. Storage must meet requirements of OSHA Class IB liquid. Outside or detached storage preferred.

**Engineering Controls:** Avoid vapor inhalation and skin or eye contact. Consider a respiratory protection program that includes regular training, maintenance, inspection, and evaluation. Indoor use of this material requires explosion-proof exhaust ventilation to remove vapors. Only use gasoline as a fuel source due to its volatility and flammable/explosive nature. Practice good personal hygiene and housekeeping procedures. Wear clean work clothing daily.

**Transportation Data (49 CFR 172.101, .102)**

DOT Shipping Name: Gasoline (including casing-head and natural)

DOT Hazard Class: Flammable liquid

ID No.: UN1203

DOT Label: Flammable liquid

DOT Packaging Exceptions: 173.118

DOT Packaging Requirements: 173.119

IMO Shipping Name: Gasoline

IMO Hazard Class: 3.1

ID No.: UN1203

IMO Label: Flammable liquid

IMDG Packaging Group: II

**MSDS Collection References:** 26, 73, 89, 100, 101, 103, 124, 126, 127, 132, 133, 136, 138, 140, 143, 146, 153, 159

**Prepared by:** M Allison, BS; **Industrial Hygiene Review:** DJ Wilson, CIH; **Medical Review:** W Silverman, MD; **Edited by:** JR Stuart, MS



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Material Safety Data Sheets Collection:

Sheet No. 470  
Diesel Fuel Oil No. 2-D

Issued: 10/81

Revision: A, 11/90

Section 1. Material Identification

33

Diesel Fuel Oil No. 2-D Description: Diesel fuel is obtained from the middle distillate in petroleum separation; a distillate oil of low sulfur content. It is composed chiefly of unbranched paraffins. Diesel fuel is available in various grades, one of which is synonymous with fuel oil No. 2-D. This diesel fuel oil requires a minimum Cetane No. (efficiency rating for diesel fuel comparable to octane number ratings for gasoline) of 40 (ASTM D613). Used as a fuel for trucks, ships, and other automotive engines; as mosquito control (coating on breeding waters); and for drilling muds.

Other Designations: CAS No. 68334-30-5, diesel fuel.

Manufacturer: Contact your supplier or distributor. Consult the latest *Chemicalweek Buyers' Guide*<sup>(73)</sup> for a suppliers list.

Cautions: Diesel fuel oil No. 2-D is a skin irritant and central nervous depressant with high mist concentrations. It is an environmental hazard and moderate fire risk.

R	1	NFPA
I	-	
S	2	
K	2	
HMIS		
H	0	
F	2	
R	0	
PPG*		
		* Sec. 8

Section 2. Ingredients and Occupational Exposure Limits

Diesel fuel oil No. 2-D\*

1989 OSHA PEL	1990-91 ACGIH TLV	1988 NIOSH REL	1985-86 Toxicity Data†
None established	Mineral Oil Mist TWA: 5 mg/m <sup>3</sup> † STEL: 10 mg/m <sup>3</sup>	None established	Rat, oral, LD <sub>50</sub> : 9 g/kg produces gastrointestinal (hypomotility, diarrhea) effects

\* Diesel fuel No. 2-D tends to be low in aromatics and high in paraffinics. This fuel oil is complex mixture of: 1) >95% paraffinic, olefinic, naphthenic, and aromatic hydrocarbons, 2) sulfur (<0.5%), and 3) benzene (<100 ppm). [A low benzene level reduces carcinogenic risk. Fuel oils can be exempted under the benzene standard (29 CFR 1910.1028)]. Although low in the fuel itself, benzene concentrations are likely to be much higher in processing areas.

† As sampled by nonvapor-collecting method.

‡ Monitor NIOSH, RTECS (HZ1800000), for future toxicity data.

Section 3. Physical Data

Boiling Point Range: 340 to 675 °F (171 to 358 °C)      Specific Gravity: <0.86  
 Viscosity: 1.9 to 4.1 centistoke at 104 °F (40 °C)      Water Solubility: insoluble  
 Appearance and Odor: Brown, slightly viscous liquid.

Section 4. Fire and Explosion Data

Flash Point: 125 °F (52 °C) min.	Autoignition Temperature: >500 °F (932 °C)	LEL: 0.6% v/v	UEL: 7.5% v/v
----------------------------------	--	---------------	---------------

Extinguishing Media: Use dry chemical, carbon dioxide, or foam to fight fire. Use a water spray to cool fire exposed containers. Do not use a forced water spray directly on burning oil since this will scatter the fire. Use a smothering technique for extinguishing fire.

Unusual Fire or Explosion Hazards: Diesel fuel oil No. 2-D is a OSHA Class II combustible liquid. Its volatility is similar to that of gas oil. Vapors may travel to a source of ignition and flash back.

Special Fire-fighting Procedures: Isolate hazard area and deny entry. Since fire may produce toxic fumes, wear a self-contained breathing apparatus (SCBA) with a full facepiece operated in the pressure-demand or positive-pressure mode and full protective clothing. If feasible, remove containers from fire. Be aware of runoff from fire control methods. Do not release to sewers or waterways due to pollution and fire or explosion hazard.

Section 5. Reactivity Data

Stability/Polymerization: Diesel fuel oil No. 2-D is stable at room temperature in closed containers under normal storage and handling conditions. Hazardous polymerization cannot occur.

Chemical Incompatibilities: It is incompatible with strong oxidizing agents; heating greatly increases the fire hazard.

Conditions to Avoid: Avoid heat and ignition sources.

Hazardous Products of Decomposition: Thermal oxidative decomposition of diesel fuel oil No. 2-D can produce various hydrocarbons and hydrocarbon derivatives, and other partial oxidation products such as carbon dioxide, carbon monoxide, and sulfur dioxide.

**Section 6. Health Hazard Data**

**Carcinogenicity:** Although the IARC has not assigned an overall evaluation to diesel fuels as a group, it has evaluated occupational exposures in petroleum refining as an IARC probable human carcinogen (Group 2A). It has evaluated distillate (light) diesel oils as not classifiable as human carcinogens (Group 3).

**Summary of Risks:** Although diesel fuel's toxicologic effects should resemble kerosine's, they are somewhat more pronounced due to additives such as sulfurized esters. Excessive inhalation of aerosol or mist can cause respiratory tract irritation, headache, dizziness, nausea, vomiting, and loss of coordination, depending on concentration and exposure time. When removed from exposure area, affected persons usually recover completely. If vomiting occurs after ingestion and if oil is aspirated into the lungs, hemorrhaging and pulmonary edema, progressing to renal involvement and chemical pneumonitis, may result. A comparative ratio of oral to aspirated lethal doses may be 1 pt vs. 5 ml. Aspiration may also result in transient CNS depression or excitement. Secondary effects may include hypoxia (insufficient oxygen in body cells), infection, pneumatocele formation, and chronic lung dysfunction. Inhalation may result in euphoria, cardiac dysrhythmias, respiratory arrest, and CNS toxicity. Prolonged or repeated skin contact may irritate hair follicles and block sebaceous glands, producing a rash of acne pimples and spots, usually on arms and legs.

**Medical Conditions Aggravated by Long-Term Exposure:** None reported.

**Target Organs:** Central nervous system, skin, and mucous membranes.

**Primary Entry Routes:** Inhalation, ingestion.

**Acute Effects:** Systemic effects from ingestion include gastrointestinal irritation, vomiting, diarrhea, and in severe cases central nervous system depression, progressing to coma or death. Inhalation of aerosols or mists may result in increased rate of respiration, tachycardia (excessively rapid heart beat), and cyanosis (dark purplish discoloration of the skin and mucous membranes caused by deficient blood oxygenation).

**Chronic Effects:** Repeated contact with the skin causes dermatitis.

**FIRST AID**

**Eyes:** Gently lift the eyelids and flush immediately and continuously with flooding amounts of water until transported to an emergency medical facility. Consult a physician immediately.

**Skin:** Quickly remove contaminated clothing. Rinse with flooding amounts of water for at least 15 min. If large areas of the body have been exposed or if irritation persists, get medical help immediately. Wash affected area with soap and water.

**Inhalation:** Remove exposed person to fresh air and support breathing as needed.

**Ingestion:** Never give anything by mouth to an unconscious or convulsing person. If ingested, do not induce vomiting due to aspiration hazard.

Contact a physician immediately. Position to avoid aspiration.

After first aid, get appropriate in-plant, paramedic, or community medical support.

**Note to Physicians:** Gastric lavage is contraindicated due to aspiration hazard. Preferred antidotes are charcoal and milk. In cases of severe aspiration pneumonitis, consider monitoring arterial blood gases to ensure adequate ventilation. Observe the patient for 6 hr. If vital signs become abnormal or symptoms develop, obtain a chest x-ray.

**Section 7. Spill, Leak, and Disposal Procedures**

**Spill/Leak:** Notify safety personnel, evacuate area for large spills, remove all heat and ignition sources, and provide maximum explosion-proof ventilation. Cleanup personnel should protect against vapor inhalation and liquid contact. Clean up spills promptly to reduce fire or vapor hazards. Use a noncombustible absorbent material to pick up small spills or residues. For large spills, dike far ahead to contain. Pick up liquid for reclamation or disposal. Do not release to sewers or waterways due to health and fire and/or explosion hazard. Follow applicable OSHA regulations (29 CFR 1910.120). Diesel fuel oil No. 2-D spills may be environmental hazards. Report large spills.

**Disposal:** Contact your supplier or a licensed contractor for detailed recommendations. Follow applicable Federal, state, and local regulations.

**EPA Designations**

RCRA Hazardous Waste (40 CFR 261.21): Ignitable waste

CERCLA Hazardous Substance (40 CFR 302.4): Not listed

SARA Extremely Hazardous Substance (40 CFR 355): Not listed

SARA Toxic Chemical (40 CFR 372.65): Not listed

**OSHA Designations**

Air Contaminant (29 CFR 1910.1000, Subpart Z): Not listed

**Section 8. Special Protection Data**

**Goggles:** Wear protective eyeglasses or chemical safety goggles, per OSHA eye- and face-protection regulations (29 CFR 1910.133).

**Respirator:** Seek professional advice prior to respirator selection and use. Follow OSHA respirator regulations (29 CFR 1910.134) and, if necessary, use a NIOSH-approved respirator with a mist filter and organic vapor cartridge. For emergency or nonroutine operations (cleaning spills, reactor vessels, or storage tanks), wear an SCBA. *Warning! Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.*

**Other:** Wear impervious gloves, boots, aprons, and gauntlets to prevent skin contact.

**Ventilation:** Provide general and local explosion-proof ventilation systems to maintain airborne concentrations that promote worker safety and productivity. Local exhaust ventilation is preferred since it prevents contaminant dispersion into the work area by controlling it at its source.<sup>(10)</sup>

**Safety Stations:** Make available in the work area emergency eyewash stations, safety/quick-drench showers, and washing facilities.

**Contaminated Equipment:** Never wear contact lenses in the work area; soft lenses may absorb, and all lenses concentrate, irritants. Remove this material from your shoes and equipment. Launder contaminated clothing before wearing.

**Comments:** Never eat, drink, or smoke in work areas. Practice good personal hygiene after using this material, especially before eating, drinking, smoking, using the toilet, or applying cosmetics.

**Section 9. Special Precautions and Comments**

**Storage Requirements:** Use and storage conditions should be suitable for a OSHA Class II combustible liquid. Store in closed containers in a well-ventilated area away from heat and ignition sources and strong oxidizing agents. Protect containers from physical damage. To prevent static sparks, electrically ground and bond all containers and equipment used in shipping, receiving, or transferring operations. Use nonsparking tools and explosion-proof electrical equipment. No smoking in storage or use areas.

**Engineering Controls:** Avoid vapor or mist inhalation and prolonged skin contact. Wear protective rubber gloves and chemical safety glasses where contact with liquid or high mist concentration may occur. Additional suitable protective clothing may be required depending on working conditions. Institute a respiratory protection program that includes regular training, maintenance, inspection, and evaluation. Practice good personal hygiene and housekeeping procedures. Do not wear oil contaminated clothing. At least weekly laundering of work clothes is recommended. Do not put oily rags in pockets. When working with this material, wear gloves or use barrier cream.

**Transportation Data (49 CFR 172.101)**

DOT Shipping Name: Fuel oil

DOT Hazard Class: Combustible liquid

ID No.: NA1993

DOT Label: None

DOT Packaging Exceptions: 173.118a

DOT Packaging Requirements: None

**MSDS Collection References:** 1, 6, 7, 12, 73, 84, 101, 103, 126, 127, 132, 133, 136, 143, 146

**Prepared by:** MJ Allison, BS; **Industrial Hygiene Review:** DJ Wilson, CIH; **Medical Review:** AC Darlington, MD; **Edited by:** JR Stuart, MS



## MATERIAL SAFETY DATA SHEET (MSDS)

### SECTION I - IDENTIFICATION

TRADE NAME: LANDFILL GAS  
 CHEMICAL NAME AND SYNONYMS: NA - MIXTURE  
 LANDFILL NAME:  
 ADDRESS:  
 CITY: STATE: ZIP CODE:  
 EMERGENCY TELEPHONE NUMBER: (800) 424-9300  
 INFORMATION TELEPHONE NUMBER: (708) 572-3088  
 TELEPHONE NUMBER:

### SECTION II - HAZARDOUS INGREDIENTS

	% (VOL)	TLV	PEL	UNITS
METHANE (METHYL HYDRIDE) CAS# 74-82-8	45-65	A*	NE	NA
CARBON DIOXIDE CAS# 124-38-9	35-50	5,000	5,000	PPM
NITROGEN CAS# 7727-37-0	0-23	NE	NE	NA
OXYGEN CAS# 7782-44-7	0-6	NE	NE	NA
ETHANE (METHYL METHANE) CAS# 74-84-0	<0.18	A*	NE	NA
HYDROGEN SULFIDE (SULFURETTED HYDROGEN) CAS# 7783-06-4	TRACE	10	20**	PPM

\*CLASSIFIED AS A "SIMPLE ASPHYXIANT" \*\*CEILING CONCENTRATION  
 LANDFILL GAS MAY ALSO CONTAIN TRACE QUANTITIES (<0.1%) OF VARIOUS ORGANIC GASES NOT LISTED ABOVE. ABSOLUTE CONCENTRATIONS VARY BY SITE.

### SECTION III - PHYSICAL DATA

BOILING POINT (°F): NA  
 VAPOR PRESSURE (mm/Hg): NE  
 VAPOR DENSITY (AIR = 1): 0.98  
 SOLUBILITY IN WATER: APPRECIABLE  
 APPEARANCE AND ODOR: COLORLESS GAS;  
 CHARACTERISTIC ODOR  
 SPECIFIC GRAVITY (WATER = 1): NA  
 PERCENT VOLATILE BY VOLUME (%): 100  
 pH: NA  
 EVAPORATION RATE: NA

### SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (°F): < 0 DEGREES  
 EXTINGUISHING MEDIA: CARBON DIOXIDE OR DRY CHEMICAL  
 SPECIAL FIRE FIGHTING PROCEDURES: USE WATER SPRAY OR FOG TO COOL FIRE-EXPOSED CONTAINERS  
 UNUSUAL FIRE & EXPLOSION HAZARDS: MAY RE-IGNITE EXPLOSIVELY IF FIRE IS EXTINGUISHED BEFORE STOPPING LEAK  
 FLAMMABLE LIMITS (AS METHANE): LEL 5% UEL 15%  
 NA - NOT APPLICABLE NE - NOT ESTABLISHED UN - UNAVAILABLE



## SECTION V - HEALTH HAZARD INFORMATION

THE MIXTURE IS A SIMPLE ASPHYXIAN, DEPENDING ON THE CONCENTRATION. SYMPTOMS MAY RANGE FROM AIR HUNGER TO COMA, WITH NO KNOWN CHRONIC EFFECTS.

### METHANE

SIMPLE ASPHYXIAN - EFFECTS SIMILAR TO ABOVE.

### CARBON DIOXIDE

SIMPLE ASPHYXIAN - EFFECTS SIMILAR TO ABOVE.

### ETHANE

SIMPLE ASPHYXIAN - EFFECTS SIMILAR TO ABOVE. IN ADDITION, ETHANE IS AN IRRITANT AT HIGH CONCENTRATIONS AND MAY BE A DEPRESSANT OF THE CENTRAL NERVOUS SYSTEM. WHEN MIXED WITH OXYGEN, ETHANE MAY SLIGHTLY INCREASE THE SENSITIVITY OF HEART MUSCLE TO EPINIPHERINE.

### OXYGEN

NO ADVERSE EFFECTS.

### HYDROGEN SULFIDE

INHALATION OF HYDROGEN SULFIDE MAY RESULT IN UPPER AIRWAY IRRITATION AT CONCENTRATIONS ABOVE 5 PPM. EXPOSURE TO 50 PPM HIGHER MAY CAUSE PULMONARY EDEMA. 300 PPM IS IMMEDIATELY DANGEROUS TO LIFE. IN ADDITION, CARDIAC EFFECTS INCLUDING BRADYCARDIA MYOCARDITIS AND CONDUCTION DEFECTS HAVE BEEN REPORTED. AMNESIA, DELIRIUM AND HALLUCINATIONS MAY ALSO OCCUR AFTER EXPOSURE TO HIGH LEVELS. SKIN CONTACT WITH HYDROGEN SULFIDE RESULTS IN IRRITATIVE SYMPTOMS.

EYE CONTACT - AT CONCENTRATIONS ABOVE 50 PPM CAN CAUSE CONJUNCTIVITIS WITH PAIN AND VISION DISTURBANCE. EROSION OF THE CORNEA MAY OCCUR WITH VERY HIGH EXPOSURES BUT THIS IS USUALLY REVERSIBLE.

CHRONIC EFFECTS - REPEATED EXPOSURES TO THE MIXTURE MAY REDUCE THE THRESHOLD OF EXPOSURE AT WHICH SYMPTOMS OCCUR. NEUROLOGIC EFFECTS SUCH AS HEADACHE AND INSOMNIA HAVE BEEN REPORTED.

CONDITIONS WHICH MAY BE WORSENER BY THE MIXTURE CONSIST OF CONJUNCTIVITIS, ALLERGIC RHINITIS AND ANGINA WITH INHALATION OF HIGH CONCENTRATIONS.

### EMERGENCY FIRST-AID PROCEDURES

INHALATION: REMOVE TO FRESH AIR. PERFORM CARDIO-PULMONARY RESUSCITATION (CPR) IF PATIENT IS NOT BREATHING OR IF THERE IS NO PULSE. ADMINISTER OXYGEN IF POSSIBLE BY TRAINED PERSONNEL. SEEK MEDICAL ATTENTION IF PATIENT IS HAS BEEN UNCONSCIOUS OR EXPERIENCES DIFFICULTY IN BREATHING.

SKIN CONTACT: AFTER REMOVING ANY CONTAMINATED CLOTHING, WASH EFFECTED AREA THOROUGHLY WITH SOAP AND WATER. SEEK MEDICAL ATTENTION IF IRRITATION DEVELOPS OR PERSISTS.

EYE CONTACT: FLUSH EYES AND EYELIDS THOROUGHLY UNDER GENTLY RUNNING WATER FOR AT LEAST 15 MINUTES. SEEK MEDICAL ATTENTION IF IRRITATION DEVELOPS OR PERSISTS.

INGESTION: NOT APPLICABLE.

## SECTION VI - REACTIVITY DATA

STABILITY: NORMALLY STABLE. AVOID HEAT, SPARKS AND OPEN FLAME.

INCOMPATIBLE MATERIALS: OXIDIZERS

HAZARDOUS DECOMPOSITION PRODUCTS: COMBUSTION MAY PRODUCE CARBON MONOXIDE, CARBON DIOXIDE, ETHYLENE, AND ACETYLENE.



**SECTION VII - SPIEL OR LEAK PROCEDURES**

PROCEDURES: REMOVE ALL IGNITION SOURCES AND STOP LEAK IF YOU CAN DO SO WITHOUT RISK. PROVIDE FORCED VENTILATION TO KEEP CONCENTRATION OF GAS BELOW THE EXPLOSIVE RANGE. EVACUATE AREA IF GAS CONCENTRATION EXCEEDS 10% OF THE LEL. IF AREA MUST BE ENTERED WHEN THE GAS CONCENTRATION IS BETWEEN 10% AND 25% OF THE LEL, WEAR A NIOSH/MSHA APPROVED SELF-CONTAINED BREATHING APPARATUS (SCBA). DO NOT ENTER AREAS IF METHANE CONCENTRATION EQUALS OR EXCEEDS 25% OF THE LEL.

WASTE DISPOSAL METHOD: BURN THROUGH A FLARE STACK IN ACCORDANCE WITH FEDERAL, STATE AND LOCAL REGULATIONS.

**SECTION VIII - SPECIAL PROTECTION INFORMATION**

RESPIRATORY: WEAR A NIOSH/MSHA APPROVED SELF-CONTAINED BREATHING APPARATUS (SCBA) IN OXYGEN DEFICIENT ATMOSPHERES OR WHERE CONCENTRATIONS EXCEED THE TLV/PEL FOR THE INDICATED COMPOUNDS OR WHEN WORKING IN UNKNOWN ATMOSPHERES.

EYEWEAR: NOT NORMALLY REQUIRED. SAFETY GLASSES MAY BE REQUIRED BY SITE POLICY.

CLOTHING/GLOVES: NA

VENTILATION: LOCAL EXHAUST MAY BE NECESSARY UNDER SOME HANDLING/USE CONDITIONS. SPECIFIC NEEDS SHOULD BE ADDRESSED BY SUPERVISORY OR HEALTH/SAFETY PERSONNEL.

**SECTION IX - SPECIAL PRECAUTIONS**

FLAMMABLE GAS. GROUND ALL LINES AND EQUIPMENT USED WITH GAS TO PREVENT STATIC SPARKS. DO NOT SMOKE WHERE GAS IS USED OR STORED. A 19.5% OXYGEN CONCENTRATION IN AIR IS THE MINIMUM RECOMMENDED FOR WORKING WITHOUT SPECIAL BREATHING EQUIPMENT. THIS PRODUCT DOES NOT CONTAIN ANY CARCINOGENS (AT 0.1% OR GREATER) AS DEFINED BY IARC, NTP OR OSHA.

APPROVAL: \_\_\_\_\_

NAME	TITLE	DATE
_____	_____	_____

THE INFORMATION CONTAINED HEREIN HAS BEEN DEVELOPED BASED UPON CURRENT AVAILABLE SCIENTIFIC DATA. NEW INFORMATION MAY BE DEVELOPED FROM TIME TO TIME WHICH MAY RENDER THE CONCLUSIONS OF THIS REPORT OBSOLETE. THEREFORE, NO WARRANTY IS EXTENDED AS TO THE APPLICABILITY OF THIS INFORMATION TO THE USER'S INTENDED PURPOSE OR FOR THE CONSEQUENCES OF ITS USE OR MISUSE.



## MATERIAL SAFETY DATA SHEET (MSDS)

### SECTION I

TRADE NAME: LANDFILL LEACHATE	EMERGENCY TELEPHONE NUMBER: (800) 424-9300
CHEMICAL NAME AND SYNONYMS: N/A - MIXTURE	INFORMATION TELEPHONE NUMBER: (708) 572-3088
LANDFILL NAME:	TELEPHONE NUMBER:
ADDRESS:	
CITY:	STATE: ZIP CODE:

### SECTION II - HAZARDOUS INGREDIENTS

	% (WT)	TLV	PEL	UNITS
ACETONE (2-PROPANONE) CAS# 67-64-1	<0.01	750	750	PPM
METHYL ETHYL KETONE (2-BUTANONE, MEK) CAS# 78-93-3	<0.01	200	200	PPM
ISOBUTYL ALCOHOL (ISOBUTANOL) CAS# 78-83-1	<0.01	100	100	PPM
2-PROPANOL (ISOPROPYL ALCOHOL) CAS# 67-63-0	<0.01	400	400	NA
WATER CAS# 7732-18-5	BALANCE	NE	NE	

LANDFILL LEACHATE MAY ALSO CONTAIN TRACT QUANTITIES (<0.1%) OF OTHER COMPOUNDS NOT LISTED ABOVE. THOSE SUBSTANCES IDENTIFIED CHARACTERIZE THE COMPOUNDS MOST COMMONLY FOUND IN LEACHATE AT CONCENTRATIONS APPROACHING THE OSHA REPORTING LIMIT OF 0.1%. ABSOLUTE CONCENTRATIONS VARY BY SITE.

### SECTION III - PHYSICAL DATA

BOILING POINT (F):	212 DEGREES (AS WATER)	SPECIFIC GRAVITY (WATER = 1):	APPROXIMATELY 1
VAPOR PRESSURE (mm/Hg):	760 AT 212 DEGREE F.	PERCENT VOLATILE BY VOLUME (%):	NE
VAPOR DENSITY (AIR = 1):	NE	pH:	5.5 - 8.3
SOLUBILITY IN WATER:	100%	EVAPORATION RATE:	NE
APPEARANCE AND ODOR:	CLEAR TO BLACK LIQUID - ODOR VARIES FROM NONE TO A CHARACTERISTIC ODOR		

### SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (F):	NA
EXTINGUISHING MEDIA:	NA
SPECIAL FIRE FIGHTING PROCEDURES:	NA
UNUSUAL FIRE & EXPLOSION HAZARDS:	NONE
FLAMMABLE LIMITS:	LEL NA UEL NA
	NA - NOT APPLICABLE NE - NOT ESTABLISHED UN - UNAVAILABLE



## **SECTION V - HEALTH HAZARD INFORMATION**

LANDFILL LEACHATE IS A MIXTURE OF WATER WITH VERY LOW CONCENTRATIONS OF ORGANIC MATERIALS. HEALTH EFFECTS OF THIS MATERIAL MAY BE RELATED TO THE EFFECTS OF THESE COMPOUNDS AT DILUTED OR LOW CONCENTRATIONS.

### **ACETONE**

INHALATION OF VAPOR CONCENTRATIONS ABOVE 1,000 PPM RESULT IN TEMPORARY UPPER RESPIRATORY TRACT IRRITATION WHICH IS TOTALLY REVERSIBLE UPON REMOVAL FROM EXPOSURE. EXPOSURE TO CONCENTRATIONS ABOVE 12,000 PPM MAY CAUSE CENTRAL NERVOUS SYSTEM (CNS) DEPRESSION SYMPTOMS INCLUDING HEADACHE AND DROWSINESS.

IN CASES OF SEVERE EXPOSURE, A COMA MAY RESULT. BLOOD CHEMISTRY ABNORMALITIES MAY INCLUDE ELEVATION OF LIVER FUNCTION ENZYME AND SEVERE HYPERGLYCEMIA WITH KETOSIS.

PRE-EXISTING MEDICAL CONDITIONS WORSENER BY EXPOSURE ARE CONJUNCTIVITIS, DERMATITIS AND ALLERGIC RHINITIS.

### **METHYL ETHYL KETONE**

DERMATITIS MAY RESULT FROM CONTACT WITH LIQUID OR VAPOR. EXPOSURE TO LEVELS ABOVE 100 PPM MAY CAUSE NOSE AND THROAT IRRITATION. SHORTNESS OF BREATH, AND SYMPTOMS OF CNS DEPRESSION (HEADACHE, DIZZINESS, DISRUPTION IN COORDINATION) MAY RESULT FROM HIGHER EXPOSURE TO VAPOR. CONCENTRATIONS ABOVE 3,000 PPM MAY CAUSE DEATH.

SKIN EXPOSURE MAY RESULT IN DERMATITIS. EXPOSURE OF THE EYES TO LEVELS ABOVE 200 PPM MAY CAUSE IRRITATIVE SYMPTOMS WITH HIGHER EXPOSURES RESULTING IN REVERSIBLE CORNEAL DAMAGE.

CHRONIC EXPOSURES (INHALATION OR SKIN) MAY RESULT IN PERIPHERAL NEUROPATHY OR OPTIC NEURITIS. ANIMAL STUDIES SUGGEST THAT THIS IS NOT THE RESULT OF MEK ALONE, BUT RATHER A POTENTIATION OF THE EFFECTS OF OTHER SUBSTANCES, I.E. N-HEXANE AND METHYL-N-BUTYL KETONE.

PRE-EXISTING MEDICAL CONDITIONS POTENTIALLY WORSENER BY EXPOSURE ARE DERMATITIS, CONJUNCTIVITIS, ALLERGIC RHINITIS, PERIPHERAL NEUROPATHY.

### **ISOPROPYL ALCOHOL**

INHALATION OF 400 PPM MAY RESULT IN MILD IRRITATIVE SYMPTOMS. CNS DEPRESSION MAY RESULT FROM INHALATION EXTREMELY HIGH CONCENTRATIONS. LEVELS ABOVE 2,000 PPM ARE IMMEDIATELY DANGEROUS TO LIFE.

ISOPROPYL ALCOHOL IS AN IRRITANT WHEN APPLIED TO THE SKIN. SKIN ABSORPTION IS NOTED TO OCCUR. DERMATITIS HAS ALSO BEEN REPORTED.

EYE CONTACT MAY CAUSE IRRITATION, IRITIS AND CORNEAL OPACITIES.

CHRONIC EXPOSURES MAY RESULT IN DERMATITIS AND CONJUNCTIVITIS. REVERSIBLE FATTY CHANGES OF THE LIVER HAVE BEEN SEEN IN ANIMALS EXPOSED TO EXTREMELY HIGH LEVELS. SUCH HIGH EXPOSURE HAS ALSO RESULTED IN KIDNEY DAMAGE.

PRE-EXISTING MEDICAL CONDITIONS POTENTIALLY AGGRAVATED BY EXPOSURE ARE DERMATITIS, CONJUNCTIVITIS AND ALLERGIC RHINITIS. IN PATIENTS WITH ABNORMAL LIVER FUNCTION TRANSIENT FURTHER ELEVATIONS IN SERUM LIVER FUNCTION ENZYMES MAY OCCUR.

### **ISOBUTYL ALCOHOL**

INHALATION OF HIGH CONCENTRATIONS OF ISOBUTYL ALCOHOL MAY RESULT IN UPPER AIRWAY IRRITATION AND SHORTNESS OF BREATH. CNS DEPRESSION MAY RESULT FROM EXTREMELY HIGH CONCENTRATIONS. 8,000 PPM IS DANGEROUS TO LIFE.

SKIN CONTACT MAY CAUSE IRRITATION AND ERYTHEMA. EYE CONTACT MAY CAUSE IRRITATION BUT NO PERMANENT DAMAGE.

CHRONIC EXPOSURE TO ISOBUTYL ALCOHOL VIA INHALATION HAS BEEN REPORTED TO CAUSE DAMAGE TO THE 8TH NERVE (AFFECTING HEARING AND VESTIBULAR SYSTEMS).

HIGH EXPOSURES HAVE ALSO BEEN REPORTED TO CAUSE MILD ELEVATIONS OF LIVER AND KIDNEY ENZYMES IN ANIMALS.

PRE-EXISTING MEDICAL CONDITIONS POTENTIALLY AGGRAVATED BY EXPOSURE DERMATITIS, CONJUNCTIVITIS, ALLERGIC RHINITIS, MENIERE'S DISEASE, LABRYNTHITIS AND SENSORINEURAL HEARING LOSS.

### **EMERGENCY FIRST-AID PROCEDURES**

INHALATION: REMOVE TO FRESH AIR. PERFORM CARDIO-PULMONARY RESUSCITATION (CPR) IF PATIENT IS NOT BREATHING OR IF THERE IS NO PULSE. SEEK MEDICAL ATTENTION IF PATIENT IS/HAS BEEN UNCONSCIOUS OR EXPERIENCES DIFFICULTY IN BREATHING.

SKIN CONTACT: AFTER REMOVING ANY CONTAMINATED CLOTHING, WASH EFFECTED AREA THOROUGHLY WITH SOAP AND WATER. SEEK MEDICAL ATTENTION IF IRRITATION DEVELOPS OR PERSISTS.



*Appendix F*  
*Radioactive Material Removal*

## Appendix F

### Management of Radioactive Material Discovered in Landfill Areas

This appendix describes the action plan for handling low level radioactive contaminated soil or debris which may be uncovered at the landfills of Site 2 and Site 17 at MCAS El Toro. This plan assumes that the material is low level radiation. Based on previous site investigations high level radiation is not anticipated. To insure safety is considered first in all activities, any measurement by either of the two survey meters that is in excess of ten times the background count requires that all work in the area of the reading will stop and that the Project Health and Safety Manager is contacted.

If the reading is less than 10 times background but more than 1.5 times background, the following procedures apply to the handling of the contaminated soil or debris:

1. Determine if soil or debris must be removed due to project requirement. Is the soil or debris in the way of a construction activity? How does the station want to manage the radioactive material?
2. If the soil or debris must be removed, use a shovel or piece of heavy equipment (e.g. a backhoe) to remove the soil or debris. Never handle the material directly. Wear the following PPE: Tyvek coveralls, nitrile gloves (11-mil), nitrile glove liners, boot covers (any type of material), full face respirator with HEPA cartridges. Avoid generating any dust.
3. If material is small enough, place material in a labeled drum for future disposal or disposition. Or remove the material to an area designated by the station to place the material until further disposition can be determined.
4. Verify that the area where the soil or debris is removed is less than 1.5 times background.
5. Follow stringent decontamination procedures for both manpower and equipment to insure that no radioactive material leaves the zone unless it has been contained and is specifically placed in an area for storage. All personnel and equipment leaving the zone will be survey using the zinc sulfide detector. This is a slow process and requires that the procedure be performed properly.
6. The HSO will be trained by the Project Health and Safety Manager before any of these procedures are performed. The HSO will be specifically trained in the decontamination methods and survey procedures.

*Appendix G*  
*Environmental Hazards Additional*  
*Information*

# **Appendix G**

## **Environmental Hazards Additional Information**

### **Snakes**

Reference: *Snakes and other Reptiles of the Southwest; Erik B. Stoops and Annette Wright Golden West Publishers; Phoenix, AZ 1992*

Snakes are various sizes, some are harmless and some are extremely dangerous. All are useful to us in some way, and should be left undisturbed in their natural environment. Killing any snake, venomous or not, in its natural environment will not only disrupt nature's balance, but is usually unnecessary. Snakes need to defend themselves if they are unable to escape or are cornered. To avoid injury give a snake every opportunity to escape. Never pick up a snake -- alive or dead. Watch where you put your feet and hands, look at the ground first before stepping.

Venom is a chemical compound that snakes use to capture and digest prey. Venom, depending on potency, can cause paralysis or death in a short period of time and begins the process of digestion before the prey is swallowed. Snakes in the Southwest do not purposely hunt and attack humans for an obvious reason. Humans are not in the snake food chain. The snake bite is defensive. For this reason, not all snake bites of humans are venomous.

#### **Prevention of Snakebite Injuries:**

1. Watch where you sit or walk. Don't step over rocks, logs, debris or other objects. If you can, step on top of a log, rock, or STABLE debris so that you can see clearly what is on the other side.
2. Wear high-topped boots with loose fitting long pants with cuffs over the tops of the shoes. Loose fitting Tyvek coveralls are excellent as an additional protection. If a snake does bite, it may get caught on the material without inflicting a skin wound.
3. If you hear a snake hiss or rattle, STAND STILL, allow the snake the choice or opportunity to move away without threatening it.
4. Wear heavy gloves.

#### **Symptoms of Snake Bite:**

1. The skin will be broken and fang marks will be present.
2. Pain and swelling at the bite may develop rapidly and there may be a purple discoloration of the skin, bleeding at the site, nausea and vomiting.

## **Appendix G**

### **Environmental Hazards Additional Information**

#### **Symptoms of Snake Bite (continued):**

(The Mohave Rattlesnake has no swelling, pain or discoloration at the bite since its venom attacks the nervous system. This snake should not be on this project site, since this snake is usually found in the desert.)

3. If injury is severe, dizziness, shock, cramps, blindness, or convulsions may also occur.

**First Aid Treatment:** The only treatment for snakebite is antivenom administered at a hospital. Over the years various treatment methods have been taught. The current Red Cross First Aid treatment states that the injured person should be kept calm and resting. If the person must be moved, do so slowly with limited movement of the injury site, if possible. Get medical help immediately. Follow instructions if given any by the medical personnel. Be prepared to give CPR. Never give the injured person any medication or alcohol.

Always assume a snakebite to be venomous, so always get medical help. Don't try to capture the snake. Treatment is based on symptoms experienced and not on the species of snake. Therefore, it is not essential to know the species of the snake.

#### **Spiders, Scorpions, Bees, Hornets, Wasps, Mosquitoes, Ticks**

##### **Poisonous Spiders:**

Reference: *Poisonous Spiders In the United States; Spiders and their Kin; Herbert and Lorna Levi; Golden Press, Racine, WI, 1990*

In the United States (U.S.) there are very few spiders that are dangerous to man. Deaths from wasp and bee stings far out number those from spider bites and scorpion stings. Few spiders will bite even when coaxed, and the bites of most of those large enough to penetrate the skin produce no harm at all. Knowledge about spider venoms is limited. Even if the bites causes illness, the spider may not be positively identified.

In the U.S., the dangerous spiders include the widows and brown spiders. Bites of, *Chieracanthium*, small whitish spiders found in most parts of the world may produce a slight fever and destroy tissues around the bite. No first aid treatment is available for any spider bite. Always get medical attention.

**Black widows or web spiders.** The sedentary females may bite if molested. Males move a lot and do not bite. The bite may go unnoticed and may not hurt. Subsequent severe abdominal pain resembles appendicitis. There is pain in muscles and the soles of the feet. Usually there is no swelling of the bite site. The bite victim sweats profusely. The eyelids are swollen.

## **Appendix G**

### **Environmental Hazards Additional Information**

#### **Poisonous Spiders (continued):**

The injured person usually recovers after several days of agony. Physicians can relieve the severe pain by injection of calcium gluconate. Antivenom is available. A black widow spider usually measures about ½ inch in length, with a huge abdomen with a distinctive orange or red “hour glass”.

**Brown recluse.** The brown recluse spider usually measures about ½ inch in length. The spider commonly lives in houses on the floor or behind furniture. Bites occur when a spider rests in clothing or on a towel. There may be no harm at all. In severe cases, a red zone appears around the bite, a crust forms and falls off. The wound goes deeper and does not heal for several months. Always go to a doctor after a bite.

#### **Scorpions:**

Scorpions have pincers and a long tail with a stinger at its tip. Scorpions sting in self-defense. Most stings are not serious. One species of scorpion in Arizona has poison that affects the nerves, causing severe pain. Although it is usually not necessary to go to a doctor, if a bite occurs on the job site, the worker will be accompanied by an OHM employee to the occupational doctor’s office that OHM uses.

#### **Tarantulas:**

Tarantulas are large spiders called hair Mygalomorphs. Most spiders in this group are not poisonous to man. The Southern California tarantula, *Aphonopelina eutylenumhalio*, can be very large (2 to 3 inches, with a 7 - 8 inch leg span). Most of these spiders live on the ground. Cornered, the spider may purr or rear up on the back legs. The “hairs” of the abdomen, easily shed or rubbed off by the legs are very irritating to human skin.

#### **Ticks:**

Ticks are the largest of the mites. Most drop off their host after feeding. They usually wait on the tips of leaves ready to attach to any animal brushing past. The bite of some ticks may cause mild paralysis to man, many ticks transmit disease (Lyme’s Disease, Hanta Virus, Rocky Mountain Spotted Fever, for example). Ticks attach themselves to the host only with their mouthparts and feed on blood. In removing a tick, take care not the leave mouthparts behind. Since it takes several days to a week for a disease to manifest itself, it is important that if you get a disease or illness, after being bit by a tick, to let the doctor know that you removed a tick recently. This will help the doctor in recognizing what type of illness you have. This way the doctor can prescribe medications that will help you recover sooner.

## **Appendix G**

### **Environmental Hazards Additional Information**

#### **Centipedes:**

Centipedes hide in litter under loose bark, stones, leaves and debris. Some dig into soil. They avoid extremely wet or dry places. All have poison glands operating through their jaws. The bite of even a small centipede, if it succeeds in breaking the skin, can produce pain. Treatment is the same as other biting insects.

#### **Bees, Wasps and Hornets:**

Great care should be taken to identify nests and hives before work begins. For those nests and hives in the path of the planned work, schedule for their removal or extermination. Employees subject to sting allergies should inform the HSO prior to the start of work. This way, if bitten, the HSO can arrange for immediate first aid treatment. Many of these employees already have personal bee sting kits.

#### **Mosquitos and Other Biting Insects:**

If there are numerous biting insects in the area, employees, will be provided with an insect repellent.