KIRC
Health and Safety Plan

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ACRONYMS AND ABBREVIATIONS

µg/kg	microgram per kilogram
µg/L	microgram per liter
$\mu g/m^3$	microgram per cubic meter
cfm	cubic feet per minute
CFR	Code of Federal Regulations
CSIR-1	Contractors Significant Incident Report Form
CTO	Contract Task Order
°C	degrees Celsius
°F	degrees Fahrenheit
dBA	decibels (A-weighting scale)
DON	Department of the Navy
EPA	Environmental Protection Agency
H&S	Health and Safety
Operations Supervisor	Health and Safety Manager
H&SP	Health and Safety Professional
HAZCOM	Hazard Communications
HAZWOPER	Hazardous Waste Operations and Emergency Response
HSP	Health and Safety Plan
HSR	Health Status Report
HVAC	heating, ventilation, and air conditioning
IRP	Installation Restoration Program
LPM	liters per minute
mg/kg	milligram per kilogram
mg/L	milligram per liter
MSDS	Material Safety Data Sheet
NIOSH	National Institute of Occupational Safety and Health
NTR	Navy Technical Representative
PACDIV	Pacific Division
PACNAVFACENGCOM	Pacific Division, Naval Facilities Engineering Command
PAH	polynuclear aromatic hydrocarbon
PCB	polychlorinated biphenyl
PEL	permissible exposure limit
PMO	Project Management Office
PPE	personal protective equipment
SSO	Site Safety Officer
STEL	short-term exposure limit
SVOCs	semivolatile organic compounds
THA	Task Hazard Analysis
TLV	threshold limit value
U.S.	United States
VOC	volatile organic compounds

EXECUTIVE SUMMARY

The projects undertaken by staff on behalf of KIRC, will involve field operations on the island of Kaho‘olawe and in the surrounding waters. The work activities performed at these locations will subject personnel to hazards related to both site conditions and the nature of the operations. It is KIRC’s intent to ensure hazards are identified and properly controlled to minimize risk to KIRC and subcontractor employees, volunteers, and members of the general public. KIRC is committed to full compliance with all applicable federal, Department of the Navy (while access is controlled by the Navy), and local occupational safety and health regulations that may apply to work activities.

The KIRC Health and Safety Plan (HSP) presents elements of KIRC’s Health and Safety Program that apply generally for all field operations. Additionally, the HSP applies to all KIRC activities in the Maui Office and all other locations. The HSP is a reference source for task-specific, safe work procedures that can be applied to a variety of operational conditions. This HSP complies with the requirements of U.S. Army Corps of Engineers, U.S. Department of Labor Occupational Safety and Health Administration (OSHA), Hawaii Occupational Health & Safety Division (HIOSH), and U.S. Environmental Protection Agency (EPA) regulations. This HSP is applied in concert with the KIRC Access and Risk Management Plan (ARMP) to provide comprehensive access and safety control mechanisms. The scope and applicability of this HSP ranges to all KIRC employees, KIRC authorized contractors and subcontractors, KIRC volunteers, and all other personnel performing a function at the direction of the KIRC. Other agencies, not under the auspice of the KIRC, are responsible for developing their own safety plans and additional criteria as needed.

All KIRC plans, SOPs, and procedures may be waived at the express authority of the senior KIRC safety person and one member from senior management.

1. INTRODUCTION

The HSP specifies the requirements and safe work procedures that will be enforced during all KIRC field operations (work occurring outside of the office setting, including ocean).

This HSP meets the requirements and follows the guidelines established by regulatory agencies in the following documents:

- U.S. Army Corps of Engineers, Safety and Health Requirements Manual, EM-385-1-1
- Title 29 of the Code of Federal Regulations, Part 1910 (29 CFR 1910), Occupational Safety and Health Standards (OSHA), with special attention to Section 1910.120, Hazardous Waste Operations and Emergency Response (HAZWOPER)
- Title 29 of the Code of Federal Regulations, Part 1926 (29 CFR 1926), Safety and Health Regulations for Construction (OSHA)
- Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities, National Institute of Occupational Safety and Health (NIOSH) 85-115, 1985
- Standard Operating Safety Guides, U.S. EPA, November 1984
- U.S. Department of Transportation (DOT) Coast Guard Federal Maritime Regulations
- University of Hawaii Scientific Diving Program

2. HEALTH AND SAFETY MANAGEMENT

Management of health and safety requires that a management organization be established for each project. The organizational structure will be standardized for each KIRC project, and will consist of the following positions and responsibilities.

2.1 MANAGER

KIRC's Operations Manager is ultimately responsible for ensuring that all activities are completed in accordance with requirements set forth in this HSP.

Programmatic management and technical aspects of this responsibility are delegated to the KIRC staff performing the task. However, the Program Manager is responsible for ensuring that work activities are performed safely.

2.2 HEALTH AND SAFETY MANAGER

KIRC's Operations Supervisor oversees, as the Health and Safety Manager (HSM), the technical and programmatic aspects of KIRC's Health and Safety Programs. In addition, the Operations Supervisor provides specific health and safety support, developing and coordinating each project-specific task, as required. The Operations Supervisor is also the contact for regulatory agencies on matters of safety and health. Other Operations Supervisor related responsibilities include the following:

- General health and safety program administration
- Conducting project health and safety audits
- Developing site-specific employee and community emergency response plans, as required, based on expected project hazards
- Determining the level of personal protection required
- Updating equipment or procedures based on information obtained during site operations
- Implementing employee exposure procedure
- Determining medical monitoring as needed

2.2.1 Health and Safety Professionals

For each project the Operations Supervisor is not directly involved in, the Operations Supervisor will delegate operational authority for performance of H&S duties to an individual working on that project, who must be one of the KIRC staff. That individual will become the assigned Health and Safety Professional H&SP)

The H&SP will provide the project with all H&S-related technical services and support, and reports directly to the Operations Supervisor.

2.3 PROGRAM MANAGER

Each Program Manager is responsible for coordinating with subcontractors and volunteers to complete all projects in accordance with requirements set forth in the HSP. The Program Manager will confer with the Operations Supervisor on all matters affecting health and safety. Other responsibilities include the following:

- Ensuring that a H&SP has been assigned for the project.
- Reading and becoming familiar with the applicable portions of the HSP
- Maintaining compliance with the HSP and other safety regulations
- Approving in writing any addenda to the HSP
- Ensuring that site personnel have received the proper training and medical clearance (as designated in the HSP and/or other H&S documents) prior to entering the site
- Discussing potential health and safety hazards with the Operations Supervisor or designated H&SP
- Requiring a prompt and thorough investigation of all accidents, including completing *Supervisor's Report of Injury* and providing Operations Manager and Supervisor with original report and a copy within 24 hours of incident.

2.4 FIELD MANAGER

At each fieldwork site, a Field Manager (FM) will manage all KIRC, subcontractor, and volunteer activities at the site, and implement the specified H&S procedures. This includes communicating site requirements to all personnel; observing that field supervisors and subcontractors enforce all provisions of the HSP and other H&S documents; working with and consulting with the H&SP regarding any necessary changes to H&S requirements. Other responsibilities include the following:

- Reading and becoming familiar with the applicable portions of this HSP
- Enforcing the HSP and other safety regulations
- Maintaining the presence of at least two qualified first aid providers onsite at all times
- For HAZWOPER projects, the Field Manager will have completed an 8-hour Supervisor Training Course in accordance with 29 CFR 1910.120 (e)(4)

2.4.1 Site Safety Officer

The FM or designated alternate will serve as the Site Safety Officer (SSO) for each field location, and will be responsible for the execution of the routine onsite duties for health and safety. The SSO will receive assistance and direction from the designated H&SP. The responsibilities of the SSO include the following:

- Conducting periodic safety reviews of the project site and project documents
- Performing regular and frequent site inspections to identify hazards and observe employees at work
- Stopping work, as required, to maintain personal and environmental health and safety
- Determining emergency evacuation routes, identifying and posting local emergency telephone numbers, and arranging emergency transportation
- Ensuring that all site personnel and visitors have received the proper training and medical clearance prior to entering the site
- Establishing any necessary controlled work areas
- Presenting tailgate safety meetings, and maintaining attendance logs and records

- Discussing potential health and safety hazards with the Operations Supervisor or H&SP.

2.4.2 Work Location Coordinators

Where project sites consist of geographically separated work locations, the H&SP will appoint an individual at each location who will be responsible for H&S coordination.

2.5 SUBCONTRACTOR REQUIREMENTS

Each KIRC subcontractor is responsible for assigning specific work tasks to their employees, and for ensuring that their personnel are properly trained and participate in health and safety programs that fulfill the requirements specified in the HSP (e.g., hearing conservation). Each subcontractor's management will provide qualified employees and allocate sufficient time, materials, and equipment to safely complete assigned tasks. In particular, each subcontractor is responsible for equipping its personnel with any required personal protective equipment (PPE).

KIRC considers each subcontractor to be an expert in all aspects of the work they contracted to provide. Each subcontractor is responsible for compliance with regulatory requirements that pertain to their services. Each subcontractor is expected to perform its operations in accordance with its own unique safety policies and procedures to ensure that hazards associated with the performance of the work activities are properly controlled. Copies of any safety documents required for a subcontractor's work activities will be available for KIRC to review prior to the start of onsite activities. In the event that subcontractor procedures or requirements do not match requirements specified in the H&S documents, the more stringent guidance will be adopted.

Hazards not listed in any of KIRC's applicable H&S documents that are known to any subcontractor, or known to be associated with a subcontractor's services, must be identified and addressed to the KIRC Operations Supervisor or program manager prior to beginning work operations. The Operations Supervisor or authorized representative has the authority to halt any subcontractor operations and remove any subcontractor or subcontractor employee from the site for failure to comply with established health and safety procedures or for operating in an unsafe manner.

Appendix B provides KIRC's *General Safety Rules for Contractors*, which will be observed by all subcontractor organizations operating on a KIRC-controlled site.

Onsite subcontractors and their personnel are responsible for reading, understanding, and complying with all site H&S requirements. Subcontractors are required, at a minimum, to follow the guidelines established in KIRC's H&S documents (or their own equivalent documents, upon KIRC approval), EM 385-1-1 requirements, and OSHA regulations. In addition, subcontractors will develop safety guidance specific to work functions to supplement KIRC's guidance for the subcontractor's personnel. Each subcontractor will designate a safety coordinator, with the authority and responsibility to implement health and safety requirements for the subcontractor's employees. The safety coordinator will also serve as the subcontractor's point of contact with the Operations Supervisor concerning safety issues.

2.6 ONSITE PERSONNEL AND VOLUNTEERS

Each person (KIRC employee, subcontractor employee, or volunteer) is responsible for their own health and safety, for completing assigned tasks in a safe manner, and for reporting any unsafe acts or conditions to their supervisor or the Operations Supervisor. All personnel are responsible for continuous adherence to the specified health and safety procedures during the performance of their work. No person may work in a manner that conflicts with the letter or intent of safety and environmental precautions expressed in these procedures. After due warnings, KIRC will dismiss from the work site any person who violates safety procedures. KIRC employees are subject to progressive discipline and may be terminated for blatant or continued violations.

All personnel working for KIRC and its subcontractors are required to read and acknowledge their understanding of the HSP and any other applicable H&S documents. All visitors to controlled work areas of any project site must likewise read and acknowledge their understanding of the applicable H&S requirements. All personnel are expected to abide by all written H&S requirements and any supplementary instructions, and cooperate with supervisory personnel to ensure a safe and healthful work site.

All KIRC staff utilizing volunteers or subcontractors are responsible for ensuring that the KIRC volunteer packet with all the information and liability waivers completed and signed. All records must be filled out and filed in KIRC office prior to utilizing volunteers or subcontractors.

Site personnel are required to report any of the following to the Operations Supervisor immediately:

- Accidents and injuries, no matter how minor
- Unauthorized visitors (persons without proper paperwork filled out)
- Unexpected or uncontrolled releases of any hazardous substances
- Any sign of UXO
- Any unsafe or malfunctioning equipment
- Any changes in site conditions which may affect the health or safety of project personnel

3. UNIVERSAL SAFE WORK PROCEDURES

The following requirements will be observed during all KIRC-managed work activities, and apply equally for both KIRC and subcontractor personnel.

3.1 TRAINING

3.1.1 H&S Training

Due to the strenuous nature of work, extreme weather conditions, and remote location of Kaho'olawe all KIRC staff shall have completed and maintain HAZWOPER, American Red Cross, American Heart Association or equivalent CPR and first aid certifications . In addition some staff members (such as those responsible for volunteers) may be required to complete a higher level of safety training including US DOT First Responder.

3.1.2 Onsite Training/Briefings

The following training/briefings will be conducted on site as part of each project.

Initial Orientation Briefing. The SSO will conduct a site safety orientation for every person assigned to the project on the following occasions:

- Before field personnel begin work at the site
- When there are significant revisions or modifications to the HSP or other H&S documents
- When additional workers or subcontractors begin fieldwork
- When authorized visitors are required to enter any controlled work area(s)

The site safety orientation will be documented by personnel signing a signature page. Records from any additional meetings, including a list of attendees, will be maintained in the project H&S file. At a minimum, the following must be included in the orientation and training meeting agenda:

- A review of the HSP and site-specific safety guidance
- Verification of medical and safety training clearances
- Hazard awareness of UXO hazards that may be encountered on site
- Fire safety training, fire extinguishment, and evacuation procedures
- Distribution of the HSP and other site-specific safety guidance documents
- Attendee signatures to acknowledge receipt and understanding of the documents and an agreement to comply

3.1.3 Tailgate Safety Briefings

The SSO will conduct a tailgate safety briefing at the start of each workday to review and discuss the health and safety issues associated with the work, problems encountered, and modifications to existing procedures. These briefings will be documented with the tailgate safety briefing sign-in log, located in Appendix A. The Operations Supervisor maintains copies of the tailgate safety briefing sign-in logs in the project files. All field personnel

associated with each day's project activities are required to attend these meetings and sign the log.

3.1.4 Hazard Communication

Any organization wishing to bring a hazardous material onto any KIRC-controlled work site must first provide a copy of the item's Material Safety Data Sheet (MSDS) to the Operations Supervisor for approval and filing Copies of MSDSs will be maintained on site as well as in the KIRC office records.. All personnel will be briefed on the hazards of any chemical product they use, and will be aware of and have access to all MSDSs.

3.2 GENERAL SITE SAFETY RULES

The following general requirements apply to all onsite activities.

3.2.1 Smoking, Eating, and Drinking

Except where exempted by the Operations Supervisor, smoking, eating and drinking will not be permitted inside any controlled work area at any time. Field workers will wash hands and face immediately after handling any potentially contaminated materials and always prior to eating or drinking. Consumption of alcoholic beverages is prohibited at any KIRC site and anywhere on Kaho'olawe.

3.2.2 Contact with Hazardous Materials

Field personnel will avoid contact with potentially hazardous substances. They will not walk through and will avoid, whenever possible, tall grass, deep ravines, and unknown objects.

All field personnel will use their senses to alert them to potentially dangerous situations (e.g., presence of UXO).

3.2.3 Site Awareness

Field personnel will be familiar with the physical characteristics and requirements of the work site, including the following:

- Accessibility to equipment and vehicles
- Communication
- Hot zones (areas of known or suspected high concentrations of UXO hazards)
- Site access
- Emergency procedures and evacuation assembly points
- Location of protective and emergency equipment,
- Knowledge of first-aid procedures

The number of personnel and equipment in the hazardous area will be minimized, as appropriate for the task.

3.2.4 Housekeeping

During site activities, work areas will be continuously policed for identification of excess trash and unnecessary debris. Excess debris and trash will be collected and stored in an appropriate container (e.g., plastic trash bags, garbage can, roll-off bin) prior to disposal. At no time will debris or trash be intermingled with waste PPE or contaminated materials. Anyone observed throwing contaminated material or PPE away with municipal wastes will be removed from the site.

In accordance with EM 385-1-1 Section 2, the following requirements will also be observed:

Water Supply. A water supply meeting the following requirements will be utilized:

- Potable Water – An adequate supply of potable water will be available for field personnel consumption. Potable water can be provided in the form of water bottles, canteens, water coolers, or drinking fountains. Where drinking fountains are not available, individual use cups and disposal containers will be provided. Potable water containers will be properly identified in order to distinguish them from non-potable water sources.
- Non-Potable Water – Non-potable water may be used for hand washing and cleaning activities. Non-potable water will not be used for drinking purposes.

Toilet Facilities. A minimum of one toilet facility will be provided for each sex in a group of 20 employees or less. Where there are less than 5 employees, a toilet facility for each sex need not be provided. Exceptions to this requirement will apply to mobile crews where work activities and locations permit transportation to nearby toilet facilities.

Washing Facilities. Employees will be provided washing facilities (e.g., buckets with water and soap) at each work location.

3.2.5 Communications

Effective communication is essential to safe working conditions and the successful completion of field projects. External communication will be maintained by KIRC using hand held radios (SOP 100). Radios will be required during all activities to facilitate communications with Range Control and KIRC Base who will in turn notify emergency response units (e.g., medics, fire department, etc.).

Onsite, personnel will communicate between work locations using hand held radios. At any work site, communication will be performed using voice commands and hand signals. In the event of a catastrophic event at any work location, the notice to evacuate will be given verbally by the work task leader. A more complex evacuation system (e.g., use of horns) is not required if work areas will be quite small.

3.3 NOISE EXPOSURE

Exposure to excessive noise can damage hearing ability and cause permanent hearing loss. It is the intent of KIRC to prevent permanent hearing loss from noise exposures occurring on our field sites.

Workers will use appropriate hearing protection when noise levels exceed 85 decibels on the A-weighted scale (85 dBA). Data gathered by KIRC indicates that workers may be exposed to hazardous levels of noise when working within 25 feet of operating heavy equipment (boats, chainsaws, earthworking equipment, etc.) and riding in helicopters.

3.4 PERSONAL PROTECTIVE EQUIPMENT

Proper selection of personal protective equipment (PPE) depends upon a number of factors. All use of PPE will conform to the requirements as well as the specifications provided below.

3.4.1 Head Protection

Employees will wear hard hats on work sites with large equipment or overhead hazards, or as directed by the SSO. Where necessary, ear protection and face shields will be attached to hard hats.

All hardhats will meet the requirements set forth in American National Standards Institute (ANSI) Z89.1. Additional requirements (e.g., electrical or heat resistance) may be specified in other applicable H&S documents.

3.4.2 Eye Protection

Eye protection will be worn on work sites at all times unless otherwise specified or directed by the SSO. All selected eye protection will meet the following minimum requirements:

- Provide adequate protection against the particular hazards for which they are designed
- Provide reasonable comfort when worn under the designated conditions
- Fit snugly and not unduly interfere with the wearer's movements
- Be durable
- Be easily cleaned and disinfected

Where specified due to particular work conditions, eye protection must also meet the impact and durability standards set forth in ANSI Z87.1. However, where this is not specified, the use of commercial sunglasses will be permitted at work sites (due to the limited potential for high velocity impact hazards associated with most KIRC work activities).

Persons whose vision requires correction and are required to wear eye protection may wear goggles or spectacles of one of the following types:

- Spectacles with protective lenses that provide optical correction (Rx)
- Goggles that can be worn over corrective (Rx) spectacles without disturbing the adjustment of the spectacles
- Goggles that incorporate corrective (Rx) lenses mounted behind the protective lenses

3.4.3 Ear Protection

Appropriate hearing protection, including earplugs, canal caps, and ear muffs, will be provided when noise may be a problem, such as around helicopters, heavy machinery, boat, and impact tools.

3.4.4 Foot Protection

KIRC employees will wear sturdy boots of at least ankle height (as appropriate) while working on site. Sturdy boots with or without safety toes are appropriate for tasks where contact with hazardous materials or heavy equipment is expected to be slight or nonexistent. KIRC volunteers will be required to wear sturdy boots or shoes with boots of at least ankle height recommended. ***Lightweight thin-soled shoes are not considered appropriate footwear due to the nature of the site (kiawe thorns, rocks, etc.).***

When off-duty in base-camp or ocean work is being performed lightweight shoes, slippers, tabis, or surf booties can be worn as appropriate.

3.4.5 Hand Protection

Employees will use appropriate hand protection when exposed to hazards that could cause injury to the hands. Gloves must resist puncturing and tearing, and provide any necessary resistance to physical abrasion or chemicals.

3.4.6 Body Protection

Protective clothing and body protection is selected on the basis of the tasks to be performed and the physical hazards the worker may be exposed to. For all work areas other than ocean related areas, appropriate work clothing will be worn that at least covers from the ankle to shoulders. Tank- and halter-tops are never appropriate. Bathing suits, shorts, and cut-off pants are also not appropriate. Substantial pants and long sleeves are required at work locations where significant physical hazards are present.

3.5 ACCIDENT OR INCIDENT REPORTS

All accidents and incidents that occur on site during any field activity will be promptly reported to the Operations Supervisor. The Operations Supervisor will provide timely notification to the Program Manager. Reporting and documentation will conform to the following:

Personal Injury. The supervisor of the injured employee or work crew will initiate a written report, using the *Supervisor's Report of Incident* Form (found in Appendix A) within 24 hours of the incident.

Vehicle Accidents. Any motor vehicle incidents will be reported immediately to the Operations Manager. Supervisors will complete a *Supervisor's Report of Incident* for personnel that have been involved in a vehicle accident or incident that results in damages to equipment or vehicles in excess of $500.00. Supervisors will ensure that the employee completes a *Vehicle Accident Form* (found in Appendix A). Both forms will be submitted to the Operations Manager. Motor vehicle incidents that occur on public highways are normally investigated by the responsible law enforcement agency. Copies of these reports will be obtained by the driver and forwarded to the Operations Manager as soon as possible.

3.6 EMERGENCY PLANNING

Emergency response plans that identify potential emergency situations (based on anticipated fieldwork conditions) and provide the appropriate response actions will be developed and presented. Provisions will also be made to have appropriate emergency equipment available and in proper working condition. The following emergency response equipment will be available at every project work location, unless otherwise specified.

3.6.1 First Aid Kits

Each work site will have a first-aid kit meeting the following requirements:

1. First-aid supplies will be stored in weatherproof containers. The Operations Supervisor will verify the contents of each kit meets all regulatory requirements.
2. Whenever a new first-aid kit is assembled, a new Inventory List will be placed in the first-aid kit as part of its inventory.
3. First-aid kits will be available at the job site at all times.
4. Use of any item from the first-aid kit will necessitate completion of an Accident/Injury Report. The report will be submitted to the Operations Supervisor within one working day.
5. First-aid kits will be inspected and restocked monthly. An inventory of first-aid supplies sufficient to restock kits on a monthly basis will be maintained.~~use the stockage of the kit to determine.~~

3.6.2 Eyewash Units

Eyewash units meeting the requirements of ANSI Standard Z358.1-1990 will be utilized at the site. All units will be capable of supplying hands-free irrigation for both eyes for at least 15 minutes at a flow rate of at least 0.4 gallons per minute.

Fire Extinguisher

A fire extinguisher with a minimum rating of 1-A, 10B,C will be available for use at the site at all times. Site personnel will be readily aware of the location of the fire extinguisher at all times, in the event of an incident where a fire extinguisher may be utilized.

4. SAFE WORK PROCEDURES FOR HAZWOPER ACTIVITIES

In addition to the requirements specified in Section 3., all work operations that are subject to the requirements of 29 CFR 1910.120, Hazardous Waste Operations and Emergency Response (HAZWOPER), must meet the following requirements.

4.1 MEDICAL MONITORING

Medical monitoring programs will be required of KIRC staff and any subcontractor staff that are regularly exposed to any HAZWOPER activity, that will be required to wear a respirator, or that are involved in work related diving.

Field personnel performing work activities related to diving will conform with the requirements specified in the KIRC Diving Safety Manual.

4.2 TRAINING REQUIREMENTS

Field personnel and visitors involved with site activities will complete the necessary health and safety training courses prior to entering the controlled areas of any site.

4.2.1 HAZWOPER Site Specific Training

To comply with the provisions established in 29 CFR 1910.120 (e)(2) and (e)(3) and EM 385-1-1, Section 28.D [40-hour or 24-hour initial training], the basic training topics will include, but are not limited to the following:

- Occupational Safety and Health Act
  - 29 CFR 1910.120 HAZWOPER
  - 29CFR 1910.1200 HAZCOM
- RCRA, CERCLA, EPCRA, SARA Title III
- UXO hazard communications
- Environmental hazard awareness (locations of POL, UXO, Pits, etc.)
- Flammable atmospheres and ignition controls
- UXO recognition and safety precautions
- Contaminated soil exposure guidelines
- Helicopter safety
- Preventing heat related emergencies
- Protective clothing
- Respiratory protection
- Hearing conservation
- Heat stress
- Site Health and Safety Plan
  - Fire Prevention

  - Physical and Health Hazards
  - Lifting Techniques
- Routes of Exposure, Signs of Exposure, Exposure Prevention Methods
- Work Practices (SOPs, Admin Controls, Engineering Controls, etc.)
- Emergency Reponse Plan
- Emergency Equipment and Procedures
- Accident Reporting
- Medical Surveillance Program
- UXO and General Safety Lessons Learned
- Prevention of slip, trip, and fall hazards
- Safe lifting techniques and safe work practices

Field personnel will receive annual refresher training in accordance with 29 CFR 1910.120 (e)(8) and EM 385-1-1. Work supervisors will receive an additional 8 hours of training that addresses supervisor responsibilities and obligations in maintaining an effective health and safety program in accordance with 29 CFR 1910.120 (e)(4). All KIRC personnel will receive training to enable them to determine the applicability of requirements; e.g., appropriate levels of protective clothing, types of apparatus, etc.

4.2.2 On-Site Training

In accordance with EM 385-1-1 Section 28.D.03, all project personnel will be trained about potential hazards at the site, and exposure prevention or control measures. Field personnel will be

- Instructed on the contents of applicable portions of this HSP
- Made aware of task-specific physical hazards and other hazards that may be encountered at the site
- Made aware of fire prevention measures, fire extinguishment methods, and emergency and evacuation procedures

The on-site-training will be performed on a daily basis . The initial on-site training will be conducted by the Operations Supervisor or designated representative before work activities begin. Additional on-site training will be conducted by the SSO and will be documented on the Tailgate Safety Briefing Sign-in Log. A copy of the form is found in Appendix A.

4.3 SITE CONTROL

For all hazard operations, KIRC will manage site control in accordance with the following requirements.

4.3.1 Controlled Work Areas

Controlled work areas will be designated around each work location where there is the potential for encountering physical hazards related to any KIRC work activity. Only

personnel conforming to all requirements of this Section of the HSP, and any additional specified requirements, are permitted to access controlled work areas. Controlled work areas are those in which specific tasks are performed and associated hazards have been assessed as common for the activity to be conducted. These types of Controlled Work Areas are not to be confused with common Work Areas, in which multiple various activities may be conducted.

Additionally, all personnel will be alert to prevent unauthorized or accidental entrance into controlled-access areas. If such an entry occurs, the trespasser will be immediately escorted outside the area, or all work at that location must cease.

4.3.2 Buddy System

When working all personnel will operate using the two-person concept (buddy system). All personnel will operate in teams of two or more (single person entry into any controlled work area is prohibited) and will maintain visual contact with each other at all times. Personnel belonging to different organizations or volunteers can serve as “buddies” for each other.

4.3.3 Visitor Clearances

Visitors will not be allowed within any work area unless they can demonstrate a need for entry into the work area that is acceptable to the Operations Supervisor. All visitors (including Navy representatives or regulatory agency representatives) desiring to enter any work must meet the following requirements:

- The Operations Supervisor has received written confirmation that each of the visitors has received the proper training required by this plan. Verbal confirmation can be considered acceptable if confirmation is provided by an officer or other authorized representative of the visitor's organization and followed by follow-up FAX of documentation.
- The visitor has been briefed on the hazards associated with the site activities being performed, and has acknowledged receipt of this briefing by signing the appropriate tailgate safety briefing form

Until these requirements have been met entry will not be permitted.

4.4 PERSONAL PROTECTIVE EQUIPMENT

Often, personal protective equipment is required for protection from overexposure to environmental hazards. Common assemblies of PPE have evolved in the hazardous waste practice to address this need. The designated levels of protection are, in increasing complexity: D, C, B, and A. These ensembles provide a progressive increases in protection against chemical hazards, and are defined primarily by the level of respiratory protection provided and secondarily by the level of skin protection.

4.4.1 Level D

Level D protection is the lowest level of personal protection allowed on HAZWOPER sites. Respiratory protection is not required, since concentrations of airborne contaminants are expected to be below applicable action levels.

During HAZWOPER activities, Level D protection will be the primary level of protection worn during all operations where contact with hazardous materials is unlikely (e.g., restoration work). The Level D ensemble provides minimal levels of skin protection. Upgrades to greater levels of protection will be executed as required in the monitoring guidelines outlined in the HSP.

Typical Level D Equipment List

- Normal Work Uniform (see HSP Section 3.4)
- Hard hat (as required)
- Safety glasses/faceshield (as required)
- Safety-toe work boots (as required)
- Hearing protection (as required)

4.4.2 Modified Level D or Stricter

The need for the use of Modified level D or stricter protective equipment is highly unlikely at most KIRC field operations. Where analysis of site hazards indicates the potential for conditions that are beyond the capabilities of Level D to provide adequate protection, additional requirements will be specified by the Operations Supervisor.

For any ongoing work operation where on-site monitoring indicates that Level D PPE is inadequate, the Operations Supervisor will be contacted for further guidance. All work will be halted until the Operations Supervisor has prepared supplemental Health and Safety requirements.

5. TASK-SPECIFIC SAFE WORK PROCEDURES

The following procedures will be enforced for individual work tasks.

5.1 HELICOPTER SAFETY

Helicopter safety will comply with the applicable general rules for helicopter operations and practices.

The pilot is responsible for the safety of the aircraft at all times.

The following safety procedures apply to helicopter operations:

- Get the pilot's attention before approaching the aircraft and always approach in full view of the pilot. Never approach from the rear of the aircraft.
- Follow pilot's instructions at all times. Do not board or leave the helicopter without pilot permission.
- Always approach or depart a helicopter in a crouched position. Gusts of wind can cause the rotor blades to drop dangerously low to the ground.
- Safety helmets or hats must be held securely to prevent their being blown away or blown up into the helicopter rotors by the rotor blast. If an item is blown away do not attempt to retrieve it.
- Keep clear of the helicopter main and tail rotors at all times. Do not walk to the rear of the helicopter when entering or exiting.
- Stay at least 100 feet away from helicopters at all times unless you have a specific job that requires otherwise.

5.2 BOAT OPERATIONS

Boat safety will comply with the applicable general rules for boat operations and practices (see SOP OPS 110 KIRC Marine Vessel Operation Procedure).

5.3 RECREATIONAL SWIMMING

All recreational swimming activities by KIRC staff and KIRC volunteers will abide by the following rules.

KIRC Staff will be present for all swimming activities and will be responsible for ensuring that the following steps are completed:

- Conduct an initial, periodic, and final headcount.
- Setting up orange traffic safety cones approximately 100 feet apart that will delineate the swim area.
- Ensure that there is a two way radio with them and that they maintain radio contact.

- Ensure that rescue fins and board are present on the beach and designate a "rescue" person capable of using them.

- Minimum of two people are mandatory for any swimming activity. The buddy system will be strictly adhered to (every swimmer must partner up with at least one "buddy" and KIRC staff will confirm that all participants are "buddied" prior to entering the water).

- KIRC staff may act as a swim buddy for a small group (functioning as one team); otherwise KIRC staff will remain on the beach alert and watching for all groups of swimmers over 7 people.

- Swimmers will swim parallel to the beach and in water no deeper than chest high.

- Determine swim ability and physical fitness levels of participants and set up agreed upon depths based on abilities.

- No swimming unless CPR and First Aid certified person (or medics are on island) is available near by.

- Identify any unusual hazardous conditions likely to affect swimming, such as high surf, high or low tide, marine hazards, etc…

- All swimming activities shall cease if designated person in charge feels ocean conditions or actions of swimmers are unsafe.

5.4 DIVING

The KIRC Diving Safety Manual encompasses all areas related to diving and will be adhered to as KIRC policy.

5.5 VEHICLE OPERATIONS

Vehicle operations will conform to KIRC SOP 101.

5.6 SLIPS, TRIPS, FALLS, AND PROTRUDING OBJECTS

Hazards from protruding objects, careless movements, or placement of materials on paths or foot traffic areas present a problem with regard to slips, trips, falls, and puncture wounds. Personnel will use a reasonable amount of effort to prevent such injuries.

5.7 HAZARDOUS NOISE ENVIRONMENTS

Working around large equipment often creates excessive noise. The effects of noise can include physical damage to the ear, pain, and temporary or permanent hearing loss. Workers can also be startled, annoyed, or distracted by noise during critical activities.

KIRC has data that indicates working within 25 feet of operating heavy equipment (chainsaws, earthworking equipment, etc.) can result in exposure to hazardous levels of noise (levels greater than 90 dBA). Accordingly, all personnel are required to use hearing protection (ear plugs or ear muffs) within 25 feet to any operating heavy equipment.

5.8 HEAVY MACHINERY

The use of heavy machinery (drilling, trenching and digging equipment, cranes, etc.) in areas where unprotected personnel are operating warrants special attention on the part of all personnel. Operators will ensure that equipment is working properly and run in a safe manner, and will be aware of the location of unprotected personnel at all times while operating the machinery.

In order to assure that all equipment used on site presents no unwarranted safety hazards, the owner/operator of each piece of heavy equipment must perform a safety evaluation and certification, in accordance with the procedures and requirements found in Appendix D.

5.9 EXCAVATION SAFETY

All BIPs and excavation operations will be accomplished in accordance with this subsection. The following safe operating guidelines will apply to BIPS or excavations exceeding 4 feet in depth, in accordance with the requirements of 29 CFR 1926.650 and EM 385-1-1 Section 25.

5.9.1 Excavation Construction Guidelines

1. Excavated materials will be stored and retained at least two feet from the edge of the excavation (Note: this procedure will be observed even when excavation or trench entry will not occur)
2. Trees, boulders, and other surface encumbrances that create a hazard will be removed or made safe before excavation is begun.
3. Special precautions will be taken in sloping or shoring the sides of excavations adjacent to a previously backfilled excavation.
4. Except in hard rock, excavations below the level of the base of the footing of any foundation or retaining wall will not be permitted, unless the wall is underpinned and all other precautions have been taken to ensure the stability of the adjacent walls.
5. All ladders used in excavation operations will be in accordance with the requirements of 29 CFR 1926 Subpart L.
6. Excavations will be inspected daily, or more often as conditions warrant, by a competent person to ensure that changes in temperature, precipitation, shallow groundwater, overburden, nearby building weight, vibrations, or nearby equipment operation has not caused weakening of sides, faces, and flows.
7. Diversion ditches, dikes, or other suitable means will be used to prevent water from entering an excavation and for drainage of the excavation.
8. When mobile equipment is used or allowed adjacent to excavations, stop logs or barricades will be installed. The grade will always be away from the excavation.
9. Dust conditions during excavation will be kept to a minimum. Wetting agents will be used upon the direction of the Field Manager or SSO.
10. Field personnel will not enter excavations for any reason, except to rescue injured individuals who have fallen into an excavated area.

5.9.2 Trench Entry Requirements

KIRC and/or subcontractor personnel may be required to enter on-site excavations as part of work activities. The following requirements must be met before any personnel are permitted to enter any excavation.

1. Expected hazardous ground movement areas and banks more than 4 feet high will be shored, laid back to a stable slope, shielded, or equivalent.
2. Sides of trenches in unstable or soft material four feet or more in depth will be shored, sheeted, braced, sloped, or equivalent.
3. Sides of trenches in hard, compact soil, including embankments, are shored or otherwise supported when the trench is four feet or more in depth and eight feet or more in length.
4. Materials used for sheeting, sheet piling, bracing, shoring, and underpinning will be in good, serviceable condition.
5. A means of egress (ladder, etc.) will be accessible at any location inside the excavation, without requiring more than 25 feet of lateral travel distance.
6. Additional precautions (shoring and bracing) will be taken to prevent slides or cave-ins when excavations are subjected to vibrations.

Also, before an employee enters an excavation greater than four feet in depth, the atmosphere must tested to ensure that an oxygen deficient or hazardous atmosphere does not exist. Personnel will not be permitted to enter the excavation if the concentration of any airborne contaminant exceeds one-half its permissible exposure limit (PEL) or other applicable occupational exposure limit (OEL), the airborne oxygen concentration is less than 19.5 percent, or explosivity exceeds ten percent of the lower explosive limit (LEL).

5.10 BIP HAZARDS

Intrusive activities increase the potential for the accidental detection or detonation of UXO. Explosivity of detected UXO will be determined by the UXO Safety Coordinator.

All activities will cease if UXO are detected, and personnel will withdraw to a position out of the affected area

SMOKING IS PROHIBITED INSIDE THE WORK AREA

5.11 WELDING/CUTTING OPERATIONS

Where welding equipment is used for material cutting and removal, the following procedures will be observed:

- In accordance with 29 CFR 1910.252 (2)(iv), prior to the commencement of welding/cutting activities a "Hot Work" permit will be completed, as specified in Section 5.11.1
- All potential fire hazards within the vicinity of the work location (to a distance of 35 feet from the work location) will be removed

- If combustible/flammable materials cannot be removed within the minimum distance of 35 feet from the location of the cut/weld, a person will be designated by the SSO for exclusive fire watch duty. The fire watch will ensure that cuttings or slag do not ignite the materials in the surround area.
  - Each person assigned to fire watch duty will have no other duties whenever welding operations are in progress
  - The person assigned to fire watch duty will be equipped with Type 10A fire extinguisher and trained in its proper use. In the event of a minor fire, the person assigned to the fire watch will alert the welder, and attempt to extinguish the fire. The welder will cease operations and will assist the fire watch. If fire fighting efforts are ineffective, they will sound an alarm or alert others in order to provide assistance or begin evacuation of the area, fires will not be fought due to the hazards associated with UXO
- The Operations Supervisor will ensure safe procedures are in place for the safe handling of all welding/cutting equipment, as well as the welding/cutting procedure
- Subcontractor personnel, upon request, will be able to demonstrate to KIRC that they have been trained in the safe operation of their equipment and the process which they are performing
- Personnel directly involved in the actual cutting procedure will be required to wear, at a minimum, the following personal protective equipment (PPE):
  - Torch Operator: Welding goggles shade 3 or 4, coveralls or leathers, welding gloves
  - Fire Watch Personnel: Safety goggles shade 1 or darker

5.11.1 Hot Work Permits

Prior to any welding or torch cutting operations, the following procedure will be observed:

- The welder or work supervisor will complete a "Hot Work" permit form (see Appendix A). The permit will document the work operation(s) to be performed, the location of the work, and all safety procedures to be employed (e.g., fire watch)
- The permit will be approved by the Operations Supervisor
- The permit will be posted in the work area for the duration of all activities addressed by the permit
- At the completion of all work activities addressed by the permit, or at the end of the work shift, the permit will be returned to the Operations Supervisor for inclusion in the Safety files.

Each permit will be valid for a period not to exceed a single working shift. If work will continue into a new shift, or will be resumed on the next working day, a new permit will be required (including approval by the Operations Supervisor).

5.12 ELECTRICAL SAFETY

Electrical safety practices to prevent electrical injuries to employees and to protect KIRC property will be utilized at all times. This procedure is primarily concerned with electrical power service equipment, electrical distribution systems, and the testing and troubleshooting of electronic equipment.

The following procedures will be applied to all work activities where energized electrical equipment is exposed:

- Observe all equipment operating procedures as recommended by manufacturers
- Appropriately ground all electrical equipment
- Provide standard warning signs to identify the electrical hazards, their exact location, and actions necessary to avoid the hazard
- Observe good housekeeping practices at all times. Give attention to keeping work areas clear around switches, terminals, controls, etc.
- Identify circuit breakers and cut-off switches to indicate equipment controlled
- Do not perform work on electrical or electronic equipment unless adequately illuminated
- Use protective equipment, such as rubber mats, rubber gloves, and insulated tubing, wherever operations warrant
- Wear approved eye and face protection while working around high voltages

5.13 LOCK-OUT/TAG-OUT SAFETY

This section establishes the minimum requirements for lockout of energy sources that could cause injury to personnel due to unexpected energizing, start-up, or release of stored energy during the operation, repair, or maintenance of equipment.

Where complexity of the equipment or process requires a more comprehensive procedure, it will be developed and included as part of the site-specific safety guidance document.

Only authorized employees will perform the lockout procedure. All authorized employees will receive training in recognition of the applicable hazardous energy sources, and methods and means for their isolation.

Employees authorized to perform lockout will be certain which switch, valve, or other energy-isolating devices apply to the equipment being locked out. More than one energy source (electrical, mechanical, etc.) may be involved. Any questionable identification of sources will be cleared by the Operations Supervisor.

5.13.1 Instructions

The following lock-out procedures will be observed:

1. Notify all affected employees of the need and requirement for a lockout.
2. Shut down operating equipment by normal stopping procedures (depress stop button, open toggle switch, etc.).

3. Make sure power sources (electrical, mechanical, hydraulic, etc.) are disconnected or isolated from the equipment. Stored energy, such as that in capacitors, springs, elevated machine members, rotating flywheels, hydraulic systems, and air, gas, steam, or water pressure, etc., must also be dissipated or restrained by methods such as grounding, repositioning, blocking, bleeding down, etc.
4. Lockout the energy-isolating devices with an assigned individual lock. If the device(s) cannot accommodate a lock, contact the site safety officer to approve any alternate methods of protection or warning (e.g., tagout, barricade, etc.).
5. After ensuring that no personnel are exposed, and to ensure that all energy sources have been disconnected, operate the push button or other normal operating controls to make certain the equipment will not operate.

CAUTION: Return operating control to neutral position after the test

5.13.2 Restoring Equipment to Service

When the operation is complete and equipment is ready for testing or normal service, check the equipment area to see that no one is exposed. When the equipment is clear, remove all locks. The energy-isolating devices may be operated to restore energy to equipment.

SPECIAL CAUTION: When restoring pressurized air to an equipment/process keep all personnel clear of machine pinch points

5.13.3 Procedure Involving More than One Person

If more than one individual is required to lock out equipment, each individual involved will place his or her own personal lock on the energy isolating device(s). The Operations Supervisor may lock out equipment for all of the personnel. In such cases, it will be the responsibility of the Operations Supervisor to carry out all steps of the lockout practice, and inform the field personnel when it is safe to work on the equipment. Additionally, the Operations Supervisor will not remove any locks until it has been verified that all individuals are clear.

5.14 HAND AND PORTABLE POWER TOOL SAFETY

The use of hand and portable power tools during site activities is a potential source of accidents. A fundamental program of using the right tool in a correct manner together with proper maintenance and storage is necessary to prevent personal injury and property damage. The following procedures will be used when performing operations involving portable hand and power tools:

- Each type of portable hand or power tool will be operated using the manufacturer's recommended operating procedures. Where specific operating procedures have not been developed by the manufacturer, only personnel familiar with the safe operating procedures of that equipment will be permitted to operate it. Only personnel who have been appropriately trained in the use, operation, and proper handling of portable hand and power tools will be permitted to do so. The Operations Supervisor will ensure that only trained personnel perform work activities with portable hand and power tools

- Appropriate personal protective equipment will be used by personnel using safety features. Guards are not to be removed or rendered inoperative, unless written permission is obtained from the Operations Supervisor. Most portable hand and power tools present a significant eye hazard to operating personnel, as well as personnel in the immediate vicinity. The Operations Supervisorwill ensure that all personnel within the immediate area are provided with protective eyewear
- The Operations Supervisor will conduct periodic inspections of portable hand and power tools that are used at the site. Inspections will include both powered and non-powered equipment
- Any damaged, worn, or improper tool will be removed from service immediately, and will remain out of service until it is repaired or replaced

5.15 LIGHTING

At a minimum, all portions of any work location will be sufficiently lit so that all surfaces are illuminated at ten foot-candles or greater. It may be necessary to use of supplemental lighting at work locations where existing lighting is inadequate to meet these requirements.

Portable lighting may require the use of a portable generator to provide power. Care will be taken in the operation of this equipment. Only personnel trained in the operations and maintenance of generators will be permitted to operate the units. Electrical systems will meet the following safety requirements:

- **Grounding.** The noncurrent-carrying metal parts of fixed, portable, or plug-connected equipment will be grounded. Electrical connections will include a ground-fault interrupter system. Ground wires will be tested with an electrical resistance meter to verify conductivity as often as necessary to assure safety. Portable tools and appliances protected by an approved system of double insulation need not be grounded.
- **Extension Cords.** Extension Cords will be the three-wire type for grounded tools (two-wire is permissible for double-insulated tools) and will be protected from damage. Do not fasten extension cords with staples or extend across an aisle way or walkway. Worn or frayed cords will not be used. Cords will not be run through doorways where the door could cut or damage them.
- **Light Bulbs.** Exposed bulbs on temporary lights will be guarded to prevent accidental contact, except where bulbs are deeply recessed in the reflector. Temporary lights will not be suspended by their electric cords, unless designed for this use. Explosion-proof bulb covers will be used when contact with flammable vapors or gases is likely. Explosion-proof bulb covers will meet Class I, Division I requirements.
- **Electrical Receptacles.** Receptacles for attachment plugs will be the approved, dead-front, concealed-contact type. Where different voltages, frequencies, or types of current are supplied, receptacles will be of such design that attachment plugs are not interchangeable.
- **Wet Environments.** Work done in wet environments will require ground fault interrupters and watertight connectors.

If maintenance of electrical systems is required, the equipment will be de-energized and locked-out using an approved lock-out device. The lock will be removed only be the person performing the maintenance work.

5.16 HEAT STRESS PREVENTION

Heat stress can be a significant field site hazard, especially on Kaho'olawe and for workers wearing protective clothing. Depending on the ambient conditions and the work being performed, heat stress can occur very rapidly, within as little as 15 minutes. Site personnel will be instructed in the identification of a heat stress victim, the first-aid procedures, and the prevention of heat stress casualties.

Workers will be encouraged to immediately report any difficulties or heat-related problems that they experience or observe in fellow workers. Supervisors will use this information to alter the work-break schedule to accommodate such problems. During breaks, workers will be encouraged to drink plenty of water or other liquids to replace lost fluids and to help cool off. If any worker exhibits signs of severe heat distress (such as profuse sweating, extreme confusion and irritability, or pale, clammy skin) they will be relieved of all duties at once, and encouraged to rest in a cool location and drink plenty of water. Anyone exhibiting symptoms of heat stroke (red, dry skin, or unconsciousness) will be taken **immediately** to the nearest medical facility, taking steps to cool the person during transportation (clothing removal, wet the skin, air conditioning, etc.). Severe heat stress (heat stroke) is a life threatening condition that must be treated by competent medical authority.

5.16.1 Heat Stress Monitoring

Heat stress-related accidents and illnesses are best prevented by continuous observation of employees and routine heat stress awareness training activities. Heat stress monitoring can be accomplished using one of the techniques discussed below.

1. **Instrument Measurements.** Wet Bulb Globe Temperature (WBGT) can be used to determine the heat stress index, in accordance with the techniques specified in the most recent edition of the Threshold Limit Values and Biological Exposure Indices, published by the American Conference of Governmental Industrial Hygienists (ACGIH). WBGT results will be used in conjunction with the Threshold Limit Values and Corrections specified in the Heat Stress Section of the ACGIH document.
2. **Direct Observation.** In the absence of WBGT monitoring devices, heat stress observations and monitoring may be accomplished by implementing a series of field medical observations. Observation of sustained pulse rates is most commonly used . The ACGIH recommends that individuals under 35 years old whose sustained heart rate exceeds 160 beats per minute (bpm) and 140 bpm for those over 35 discontinue work activities until the observed heart rate returns to normal.

Any results obtained from monitoring techniques will be used as guidance only. To properly mitigate the effects of heat stress, it is necessary to establish a work routine that incorporates adequate rest periods to allow workers to remove protective clothing, drink fluids (vital when extreme sweating is occurring), rest, and recover. The frequency and length of work breaks must be determined by the individual work location supervisor based upon factors such as the ambient temperature, sunshine, the amount of physical labor being performed, the physical condition of the workers, and protective clothing being used. While heat stress measurement techniques provide guidance in optimizing this routine,

breaks must always be sufficient to prevent workers from manifesting symptoms of heat stress, regardless of monitoring results.

5.16.2 Heat-Related Illnesses

The following guidance can be used in the identification and treatment of heat related illness.

Heat Stress. This is the mildest form of heat-related illness. Victims exhibit irritability, lethargy, and significant sweating. The victim may complain of headache or nausea. This is the initial stage of overheating, and prompt action at this point may prevent more severe heat-related illness from occurring.

> First Aid: Provide the victim with a work break to relax, remove any excess protective clothing, and drink cool fluids. If available, an air-conditioned spot is an ideal break location. The victim may resume working once symptoms subside; however, the work pace will be moderated to prevent recurrence of the symptoms.

Heat Exhaustion. This usually begins with muscular weakness, dizziness, nausea, and a staggering gait. Vomiting is frequent. The bowels may move involuntarily. The victim is very pale, has clammy skin, and may perspire profusely. The pulse is weak and fast, and breathing is shallow. The victim may need to lie down to prevent fainting.

> First Aid: Immediately move the victim from the work area to a shady or cool area with good air circulation (avoid drafts or sudden chilling). Remove all protective outerwear. Call a physician. Treat the victim for shock. (Make the victim lie down, and raise feet 6-12 inches. Keep the victim warm, but loosen all clothing). If the victim is conscious, it may be helpful to provide sips of water. Transport victim to a medical facility as soon as possible.

Heat Stroke. This is the most serious of heat illness, and represents the collapse of the body's cooling mechanisms. As a result, body temperatures often rise to between 105° and 110°F. As the victim progresses toward heat stroke, symptoms such as headache, dizziness, and nausea, can be noted, and the skin is observed to be dry, red, and hot. Sudden collapse and loss of consciousness follows quickly, and death is imminent if exposure continues. Heat stroke can occur suddenly.

> First Aid: Immediately evacuate the victim to a cool and shady area. Remove all protective outerwear and all personal clothing. Lay the victim on the back, with the head and shoulders slightly elevated. Apply cold wet towels, ice bags, etc. to the head, armpits, and thighs. Sponge off the bare skin with cool water or rubbing alcohol, if available, or place the victim in a tub of cool water. The main objective is to cool without chilling the victim. Give no stimulants or hot drinks. Since heat stroke is a severe medical condition requiring professional medical attention, emergency medical help will be summoned immediately to provide on-site treatment of the victim and proper transport to a medical facility.

5.16.3 Skin Hazards

Sunburn and prickly heat are both symptoms of skin irritation and damage produced through exposure to sunlight and operating in hot work environments. Protect exposed skin

with an appropriate sunscreen. A sunscreen with a sun protection factor (SPF) of 15 or greater is recommended for a full day in the sun. Heat rash, also known as prickly heat, can be prevented by the application of a hydrophobic, water repellent barrier cream, such as Kerodex 71.

Appendix A
Health and Safety Forms

Supervisor's accident report pg1.pdf

Supervisor's accident report pg 2.pdf

Appendix B
General Safety Rules for Contractors

INTRODUCTION

The rules and requirements contained in this attachment have been written for the guidance of Contractors who are performing work under contract with KIRC. This booklet prescribes general requirements. Additional specific rules may be necessary to ensure the safety of workers on a particular job. The subcontractor, working in collaboration with the KIRC representative, will be expected to establish additional rules and procedures as necessary to conduct a safe operation and comply with all KIRC, regulatory, and insurance requirements.

The term subcontractor, as used in this attachment, will be understood to include any and all persons, sole proprietorships, partnerships, corporations, or other business ventures under contract, oral or written, to KIRC.

The KIRC is responsible for informing its subcontractors of these requirements, directing and supervising work of subcontractors, and assuring that its subcontractors adhere to the requirements herein. KIRC may request subcontractor to provide proof of its adherence to all rules and regulations, and will prohibit access to KIRC sites for those subcontractors not in compliance.

In order to assist subcontractors in following these instructions, a KIRC Representative will be assigned to the subcontractor to act as KIRC's agent in all matters relative to work activities at KIRC facilities or job sites. Under no circumstances will any work be started until the KIRC Representative has been contacted, a job orientation has been conducted by the KIRC Representative, and all permitting, insurance, KIRC, and regulatory pre-job requirements are met.

The KIRC Representative and the OPERATIONS SUPERVISOR are authorized to stop any work that they consider hazardous to KIRC personnel, equipment, or subcontractor personnel. This authority may be delegated to appropriate individuals.

GENERAL SAFETY RULES AND REQUIREMENTS

ACCIDENT REPORTING

All accidents (personal and property damage) will be reported orally to the KIRC Representative as soon as emergency conditions no longer exist. A written report will follow within 7 days after emergency conditions are resolved.

ALCOHOL, FIREARMS, AND ILLEGAL SUBSTANCES

Alcoholic beverages, illegal drugs or narcotics, or guns and ammunition are not permitted on KIRC job sites. Personnel under the influence of alcohol or drugs will not be allowed on KIRC job sites.

APPROVALS

The subcontractor will be required to obtain pertinent work permits or authorization and approval from the KIRC Representative before:

- Working on existing pipelines or equipment

- Entering tanks or closed vessels
- Entering any designated high-hazard areas
- Using torches, electrodes, electronic motors, forges, soldering irons, any open flames, or any device which could produce sparks or ignition source
- Closing walkways, roads, or restricting traffic
- Starting excavations
- Backfilling excavations
- Using utilities such as steam, water, compressed air, or electricity
- Sandblasting, spray painting, or guniting
- Storing flammable materials such as gasoline, oil, paints, oxygen cylinders, etc.
- Walking or working on roofs of buildings or equipment
- Drilling, boring, preparing test pits, or using geophysical equipment, or any other exploratory equipment, requiring penetration of surfaces
- Operating cranes or similar equipment near overhead power lines or pipelines
- Opening or cutting through firewalls or berms
- Fueling or repairing subcontractor equipment operating on KIRC job sites.

SECURITY

For security reasons, entrance to and exit of KIRC facilities and job sites is restricted to those areas designated as the subcontractor's work area.

SPEED LIMITS

All vehicles on KIRC job sites and facilities must observe a maximum speed limit of 20 miles per hour, unless otherwise posted.

VEHICLE SAFETY

All vehicles must be parked in authorized areas only.

There will be no passing of moving vehicles at job sites where there are narrow roads and short-sight distances.

Vehicles will only be operated by personnel with valid licenses and good driving records.

Vehicles will have all required inspection and operating permits.

Seat belts will be used.

SAFE WORK PRACTICES

COMMUNICATION

Communication and coordination is vital to prevent accidents on work sites. Every worker must be aware of equipment operating in his or her vicinity.

CONFINED SPACE ENTRY

Confined spaces include storage tanks, bins, sewers, in-ground vaults, degreasers, boilers, vessels, tunnels, manholes, and pits. Inadequate ventilation or the introduction of hazardous gases and vapors in these enclosures may present conditions that could produce asphyxiation or injury.

Before entering a confined space, Contractor must notify the KIRC Representative of intent to enter. The KIRC Representative will review the following safe entry requirements with the Contractor:

Removal of Contents. Before entering, confined spaces will be as clean and free of hazardous materials and chemicals as possible. Where appropriate, confined spaces may be purged by water or other suitable means. Purging with hazardous solvents will be avoided where possible.

Isolation. All input lines that discharge into the confined space will be disconnected and capped, or isolated. The use of a single in-line valve shut-off as the sole means of isolating the confined space from any input lines is prohibited. However, the use of a double in-line valve arrangement with a vent or drain in between the two valves is acceptable, if dangerous air contaminants are not introduced by venting. Isolation valves will be locked closed, vent or drain valves will be locked open, and the key will be kept by the person performing the job.

Electrical Lockout. Where electrical devices located within the confined space (motors, switches, etc.) are to be repaired or worked on, the line-disconnect switches supplying the power must be tagged and locked in the "OFF" position. The lock key is to be kept by the person performing the job, and only this person is authorized to unlock the switch and remove the tag upon completion of the job. Where more than one person is working on the line, each must place a lock on the switch and retain a key.

Where there are multiple sources of power to an electrical device that supplies power to the device through an automatic or manual bus transfer switch, lockout devices must be placed on the breaker nearest to the electrical device that is to be isolated, and an electrician will test the power supply lines to ensure that power has been secured.

Line-disconnect switches supplying power to any mechanical apparatus in the confined space (mixers, conveyors, etc.) must also be tagged and locked in the "OFF" position. This must be done for any entry, even though work will not be performed on the apparatus itself.

Securing of Covers. All manhole and clean out covers will be removed and the openings maintained clear of any obstructions. When hinged doors or lids are provided, they will be secured so they cannot close. See Excavations and Trenches for guarding requirements.

Testing Atmosphere. A qualified person (NIOSH Publication No. 80-106) using only equipment approved and tagged for Class 1, Division 1 locations will make appropriate tests of the atmosphere in the confined space, and place a record of the test results at the entrance to the confined space. Testing will ensure the following:

Combustible gas and vapor concentrations do not exceed 10 percent of the lower explosive limit

Oxygen content is no less than 20 percent and no greater than 25 percent

Appropriate respiratory protective equipment and other appropriate personal protective devices will be provided for all employees when concentrations of toxic materials exceed established threshold limit values (TLVs).

Continuous Monitoring. If the nature of the work to be performed introduces, or has the potential to introduce, harmful air contaminants, or the oxygen content drops below 20 percent, all personnel will evacuate the confined space immediately.

Ventilation. All confined spaces found to be unsafe must be ventilated by mechanical exhaust systems that are arranged to prevent recirculating contaminated air. The subcontractor must contact the KIRC Representative to obtain approval not to ventilate. Personnel will be evacuated immediately in the event of failure of the mechanical ventilation system. The confined space will be retested prior to reentry following ventilation system repair.

Buddy System. At least two workers will remain outside the confined space. One standby worker will be stationed just outside the access opening of the any confined space while such space is occupied. This person shall:

Maintain continuous awareness of the activities and well-being of the occupant in the confined space

Be able to maintain communication at all times

Be alert and fully capable of quickly summoning help

Be physically able and equipped to assist in the rescue of an occupant from a confined space under emergency conditions.

Safety Gear and Personal Protective Equipment. All Contractor employees must be instructed in accordance with OSHA regulations regarding safety gear and personal protective clothing, hard hats, respirators, lifelines, and harnesses. These instructions will be received and documented before entering any confined space.

COMPRESSED GAS CYLINDERS

Valve protection caps. Valve protection caps will be in place when compressed gas cylinders are transported, moved, or stored.

Cylinder valves. Cylinder valves will be closed when work is finished and when cylinders are empty or moved.

Compressed gas cylinders. Compressed gas cylinders will be secured against rolling or tipping (roped or chained) at all times, except when cylinders are actually being hoisted or carried.

Gas regulators. Gas regulators will be in proper working order while in use.

Leaks. If a leak develops in a gas cylinder, after donning appropriate safety equipment, immediately remove it to a safe location. If the leak cannot be corrected, report it to the KIRC Representative.

Identification of Contents. Cylinders will be permanently marked or stenciled to identify the type of gas in the cylinder.

Breathing Air. All compressed breathing air will meet OSHA specifications for breathing air quality. All compressed breathing air cylinders will have their contents checked at the job site for correct oxygen concentration. Compressed breathing air cylinders will be rejected if the oxygen concentration is not 20.7% ±0.2%.

Oil and oily rags. Oil and oily rags will be kept away from oxygen equipment.

CRANES, HOISTS, AND OTHER HEAVY EQUIPMENT

ROP. Roll over protection will be used when conditions or regulations call for such use.

CUTTING OR WELDING

Hot Work/Welding/Burning. "Hot Work" authorization must be obtained from the KIRC Representative before any welding, cutting, or other "hot work" is done. "Hot work" permits and results of tests are submitted to the KIRC Representative at the completion of the job or at the end of each workday.

Welding Flash. Noncombustible or flameproof shields or screens must be provided to protect welder or others who might be harmed by direct rays or arc.

Personal Protective Equipment. Goggles, gloves, aprons, and other personal protective equipment appropriate to the job will be used.

HIGH FIRE-HAZARD AREAS

Subcontractor personnel are responsible to see that a fire watch is maintained and all adjacent combustible materials are protected or removed as designated by the KIRC Representative.

Subcontractor will provide their own calibrated combustible gas meter or other instruments for checking areas before hot work.

Documentation of calibration will be submitted to the KIRC Representative for review by the KIRC OPERATIONS SUPERVISOR.

Subcontractor is responsible for all testing and monitoring required by applicable regulations and to assure work place safety.

KIRC will have the right, not the responsibility, to perform additional testing. KIRC testing will not be in lieu of subcontractor's requirements.

In the event of a bona fide emergency, such as emergency spill response work, and where the subcontractor warrants that they cannot conduct the required testing, KIRC may, upon written agreement, conduct all tests necessary to assure safety and regulatory compliance. The subcontractor will cosign the "hot work" permit form when tests are conducted by KIRC personnel.

Subcontractor will provide a fire extinguisher(s) for welding and cutting, as designated by the KIRC Representative.

ELECTRICAL SAFETY

Grounding. The noncurrent-carrying metal parts of fixed, portable, or plug-connected equipment will be grounded. Since ground wires can break, they will be tested with an electrical resistance meter to assure conductivity, as often as necessary to assure safety. Portable tools and appliances protected by an approved system of double insulation need not be grounded.

Extension Cords. Extension cords will be the three-wire type for grounded tools (two-wire is permissible for double-insulated tools) and will be protected from damage. Do not fasten with staples or extend across an aisle way or walkway. Worn or frayed cords will not be used. Cords will not be run through doorways where the door could cut or damage them.

Light Bulbs. Exposed bulbs on temporary lights will be guarded to prevent accidental contact, except where bulbs are deeply recessed in the reflector. Temporary lights will not be suspended by their electric cords unless designed for this use. Explosion-proof bulb covers will be used when contact with flammable vapors or gases is likely, and will meet Class I, Division I requirements.

Electrical Receptacles. Receptacles for attachment plugs will be of the approved, dead-front, concealed contact type. Where different voltages, frequencies, or types of current are supplied, receptacles will be of such design that attachment plugs are not interchangeable.

Wet Environments. Work done in wet environments will require ground fault interrupters and watertight connectors.

EMERGENCY EQUIPMENT

KIRC's fire equipment is not to be moved, relocated, or otherwise rendered inaccessible, unless specific permission is granted in each case by the KIRC Representative.

Self-contained breathing apparatus, first aid equipment, fire blankets, stretchers, eyewash fountains, and deluge showers are not to be moved, relocated, or blocked without the express permission of the KIRC Representative.

EXCAVATIONS AND TRENCHES

Permits. Before any excavation work begins, all required permits will be obtained.

"Dig-Alert". Before any excavation work begins, the existence and location of underground pipes, electrical conductors, etc., must be determined by the subcontractor, who will, in turn, notify the KIRC Representative.

Cave In Protection. The walls and spaces of all excavations and trenches (that will be entered by people) more than four feet deep will be guarded by shoring, sloping of the ground, or some other equivalent means, in accordance with Cal/OSHA regulations.

Daily Inspections. Contractor will inspect excavations daily. If there is evidence of possible cave-in or slide, all work in the excavation will cease until the necessary safeguards have been taken.

Egress. Trenches more than four feet deep will have ladders or steps arranged to require ten feet or less of lateral travel between means of access.

Backfill. All trenches will be backfilled as soon as practical after work is completed and all associated equipment is removed.

Housekeeping. All subcontractor equipment, such as pipe and rebar, will be kept out of traffic lanes and access ways. Equipment will be stored in a manner that ensures the safety of KIRC and subcontractor employees at all times.

Fall-In Protection. All trenches will be completely guarded on all sides. Standard guardrails are preferred. If wooden or metal barricades are used for trench guarding, they will be spaced no further than 20 feet apart and at least two feet from the edge of the trench. These barricades will be at least 36 inches high when erected.

Battery-lighted barricades will be used as follows:

1. A minimum of two battery-lighted barricades will be used at corners, one on each side of the barricade.
2. At least one battery-lighted barricade will be used where vehicular traffic approaches the trench at right angles.
3. Where trenches parallel roadway, distance between battery-lighted barricades will not exceed 40 feet, unless this requirement conflicts with Item (1), above, and additional units are required.
4. All battery-lighted units will be serviced as necessary to ensure equipment is operating.

Caution tape will be stretched securely between barricades. The caution tape will be at least 3/4-inch-wide, will be yellow or yellow and black, and may have the words "CAUTION - DO NOT ENTER."

Barricaded sections immediately adjacent to where pedestrians cross trenches will be arranged to direct pedestrians to the walkway or bridge.

Encroachment. Use of other trench excavating equipment, or storage of equipment or supplies within a distance equal to the depth of the trench, will not be permitted without approval by the KIRC Representative.

Bridges. All pedestrian bridges will be of sufficient strength to prevent vertical deflection greater than one-half inch when a 250-pound weight is applied to the center of the bridge.

Handrails will consist of intermediate and top rails on both sides of the bridge. The top rail will be between 42 and 45 inches above the walking surface, and capable of withstanding a lateral force of 200 pounds against the center of the top rail.

All surfaces that a person could reasonably contact will be sufficiently free of splinters, nails, or protrusions that may cause injury.

All bridges intended for vehicular traffic will be constructed to withstand twice the load of the heaviest vehicle anticipated.

EARTH GRADING ACTIVITY

Vest. All persons within an area where earthmoving equipment is operating will wear a safety vest or jacket at all times. Vests may be red, orange, or day-glo green in color; however, bright or fluorescent orange is preferred. Significantly faded or damaged vests must be replaced.

Communication. Anytime a test pit is to be excavated, the technician will notify the grading contractor's **authorized** representative for that area. That individual may be acting in the capacity as a dump man, operator, or supervisor from an independent vehicle. Advise that representative of the test pit location and request their cooperation to promote safety during the test period. This will include their advising those under their supervision of your presence in the grading area. Make a notation on your records of the name of the individual with whom you spoke so that the communication is documented.

Provide notice to the grading contractor.

Identify the location of the test pit.

Request the cooperation through the completion of the tests and document accordingly.

A flag must be affixed to any vehicle driving in an earth grading activity area and hazard warning lights will be operated.

Flags. Every over-the-road vehicle operating in the area of earthmoving equipment activity must carry a flag. The flag must be at least 300 square inches in area with no dimension less than 12 inches. Flags must be high visibility red, orange, or day-glo green, and mounted approximately 12 feet above grade level.

Hazard Warning Lights. Every over-the-road vehicle operating in the area of earthmoving equipment activity must operate the hazard warning flashers at all times.

Rotating or Flashing Beacon. All stationary vehicles in the grading area will use a rotating or flashing amber beacon or strobe light on the top of the cab of the vehicle during all field testing.

Orientation of Test Pits. The technician is responsible for selecting a test pit location. Of paramount concern is the technician's safety. The test pit will be located behind the established pattern of grading equipment and outside any existing patterns. The orientation of the pit will accommodate the use of the technician's vehicle as a barrier to potential oncoming traffic. The waste pile created from the excavation of the test pit will be opposite the vehicle so that the test pit is positioned between the vehicle and the waste pile. A flag will be placed immediately on top of the waste (spoil) pile, satisfying the same requirements as the vehicle flag (see Figures B-1 and B-2).

Zone of Non-Encroachment. The location of the test pit must be selected so that no earthmoving equipment will approach closer than 50 feet from the center of the test pit (see Figure B-1). This is not only for the technician's safety, but to ensure the integrity of the test. Excessive vibration from earthmoving equipment operating too closely may impair the accuracy or spoil the test results.

Completion of Tests. Immediately upon completion of tests, record the data, and withdraw flags and vehicles outside the grading area to record notes and do calculations.

FIRE PREVENTION

KIRC Representative, or their designee, is authorized to correct any condition which they may consider a fire hazard. In any emergency, the site personnel should evacuate the area until contact is made with the UXO Safety Coordinator.

FLOOR OPENINGS

Floor openings will be guarded by substantial barriers, railings, and/or covering materials strong enough to sustain twice the load of pedestrians or vehicular traffic. Barriers will be supplied by the Contractor.

Where a danger of falling exists for personnel, elevated floor areas must be provided with guardrails. In addition, toeboards will be provided when the possibility of falling objects striking personnel below exists.

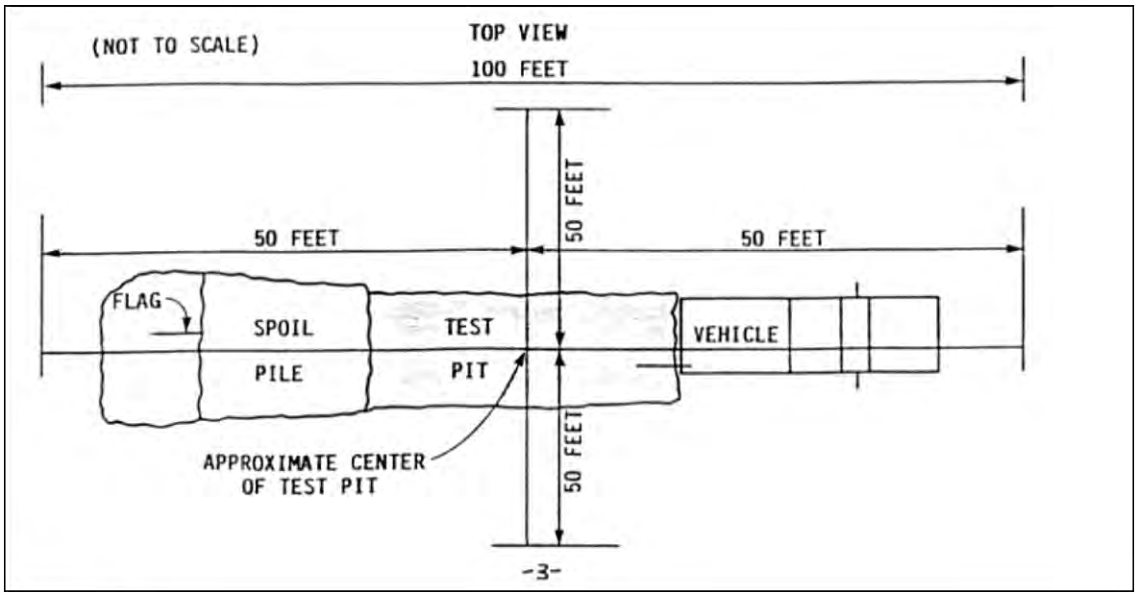

Figure B-1

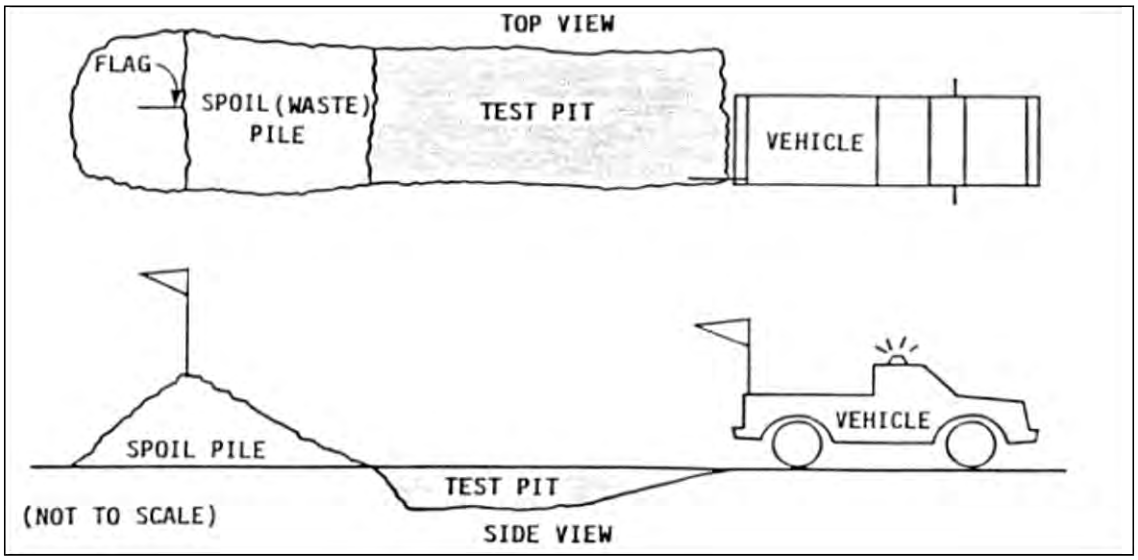

Figure B-2

HIGH-HAZARD AREAS

Although this list may not be all-inclusive, there are certain areas and operations at KIRC facilities and job sites where extra precautions must be taken because of the nature of the hazards. When starting up any operation, the subcontractor is required to check with the KIRC Representative for a review of the safety and health rules which apply before entering any of the following areas:

Confined spaces (tanks, manholes, vaults, pits, etc.)

UXO hazard

The contractor is also required to check with the KIRC Representative before any work is done on a flammable gas or solvent line; a tank or vessel that presently contains, or has contained, a flammable material; and before making an excavation anyplace on the site.

HOUSEKEEPING

Material should be carefully stacked and located so that it does not block aisles, doors, self-contained breathing apparatus, fire extinguishers, fire blankets, stretchers, emergency eyewash fountains, emergency safety showers, fixed ladders, stairways, or electrical breaker panels.

Nails protruding from boards must be removed or bent over.

All work areas shall be kept clear of form and scrap lumber and all other debris.

Combustible scrap, waste materials, and debris will be removed at regular and frequent intervals.

Containers will be provided for the collection and separation of refuse by type. Covers will be provided on containers used for flammable, combustible, or harmful substances.

Overhead storage of debris, tools, equipment, pipes, etc., is prohibited.

At the end of each work day, Contractor will provide for pick up of all debris such as paper, rags, empty cans and bottles, etc.

LADDERS

The use of ladders with broken or missing rungs or steps, broken or split handrails, or with other faulty or defective construction is prohibited.

Ladders must not be placed adjacent to a door unless the door is locked or guarded.

Metal ladders will not be used for electrical work.

Tie off top of ladder to structure.

MEDICAL SERVICE AND FIRST AID

Emergency Medical Service. Preplanned emergency medical service will be provided as designated by subcontractor and approved by the KIRC Representative.

First Aid Kit. Each subcontractor will provide an employee first aid kit that meets minimum OSHA requirements.

MOBILE CRANES

Mobile cranes, including portable crane derricks, power shovels, or similar equipment, will not be operated within ten feet of overhead electrical power lines.

OVERHEAD WORK

No overhead work will be performed when, as a result of that work, the possibility of a falling object striking any person exists. Do not work above any person at any time.

PERSONAL PROTECTIVE CLOTHING AND EQUIPMENT

In certain construction and maintenance operations, personal protective equipment, such as safety glasses, chemical goggles, respirators, hard hats, and protective clothing, is required. The type of protective equipment to be worn will be determined by the degree of exposure to the potential hazard. There will be very few occasions when hard hats and eye protection will not be required at KIRC job sites. When in doubt of the safety measures to be observed, subcontractor will contact the KIRC OPERATIONS SUPERVISOR. This will not; however, relieve subcontractor of the responsibilities to determine appropriate protection.

Eye protection is required when engaging in operations such as the following:

Drilling, chipping, grinding, wire brushing

Handling caustics and acids

Breaking bricks or concrete

Hammering chisels, drift pins, etc.

Burning or welding

Other situations that create a possible eye hazard, e.g., UXO hazards.

POWER TOOLS

Power and Air-Actuated Tools. Gasoline-powered, electric, or air-actuated tools are not to be used on KIRC job sites without prior approval of the OPERATIONS SUPERVISOR. To obtain approval, subcontractor must contact the KIRC Representative.

Explosive-Actuated Tools. Explosive-actuated (powder-actuated) fastening tools will meet the design requirements in "American National Standard Safety Requirements for Explosive-

Actuated Fastening Tools" (ANSI A10.3-1970). A tool that does not meet these design standards cannot be used.

Power tools will never be left unattended in a place where they would be available to unauthorized persons.

Power tools will not be used in explosive or flammable atmospheres.

FALL PROTECTION

Appropriate fall protection, such as a safety harness and lanyard, must be worn when workers are exposed to a potential fall of more than 6 feet. The lanyard or lifeline must be tied off to an appropriate structure capable of supporting five times the weight of the person (nominal 1000 pounds).

Appropriate fall protection, such as a safety harness and lanyard, must be worn when working above eight feet on straight or extension ladders if the work involves pushing, pulling, or action that may dislodge the person from the ladder.

Safety harnesses are also required on swinging or portable scaffolds when handrails and toeboards are not provided (eight feet or more above ground or floor level).

Safety harnesses and lifelines (including extraction devices for top entry spaces) are required for all work performed in confined spaces where an oxygen deficiency or toxic vapors may exist.

All lifelines will be safety secured to stable and adequate supports.

Safety harnesses and lifelines must be worn on rooftops where there are no guardrails and the work is within ten feet of the edge.

SALAMANDERS

"Hot work" authorization must be obtained from the KIRC Representative before using a salamander.

Salamanders must be a Factory Mutual or Underwriters Laboratories-approved type.

Position salamanders away from all combustible material to reduce the possibility of uncontrolled fire.

Guard salamanders from traffic to prevent them from being overturned.

SCAFFOLDS

All scaffolds, whether fabricated on site, purchased, or rented, will conform to the specifications found in ANSI A10.8, Safety Requirements for Scaffolding. Rolling scaffolds will maintain a three-to-one height-to-base ratio.

The footing or anchorage for a scaffold will be sound, rigid, and capable of carrying the maximum intended load without settling or displacement.

Unstable objects, such as barrels, boxes, loose bricks, or concrete blocks, will not be used to support scaffolds or planks.

No scaffold will be erected, moved, dismantled, or altered, except under the supervision of competent persons.

Scaffolds and their components will be capable of supporting at least four times the maximum intended load without failure.

Guardrails and toeboards will be installed on all open sides and ends of platforms more than 10 feet above the ground or floor.

Scaffolds measuring four to ten feet in height, and having a horizontal dimension of less than 45 inches, will have standard guardrails installed on all open sides and ends of the platform.

Wire, synthetic, or fiber rope used for suspended scaffolds will be capable of supporting at least six times the rated load.

No riveting, welding, burning, or open flame work will be performed on any staging suspended by means of fiber or synthetic rope.

Tested fiber or approved synthetic ropes will be used for or near any work involving the use of corrosive substances.

All scaffolds, boatswain's (bosun's) chairs, and other work access platforms will conform to the requirements set forth in the federal OSHA Regulations for Construction (29 CFR 1926.451), except where the specifications in ANSI A10.8 or state or local regulations are more rigorous.

SMOKING AND OPEN FLAMES

Smoking and the use of open flames are strictly prohibited in areas where flammable liquids, gases, or highly combustible materials are stored, handled, or processed. Obey "No Smoking" signs. Smoke only in designated areas.

SOLVENTS AND PAINTS

Adequate ventilation must be maintained at all times when paints or solvents are used.

Personnel will use proper respiratory protection and protective clothing when toxicity of the material requires such protection.

Flammable solvents and materials must be used with extreme caution when possible sources of ignition exist.

Flammable paints and solvents must be stored in an approved (Factory Mutual or Underwriters Laboratories) flammable-liquids storage cabinet, when storage is required inside the buildings. If an approved cabinet is not available, paints and solvents must be removed from the building when not in use.

Flammable liquids must be dispensed in safety cans with flash arresters bearing a Factory Mutual or Underwriters Laboratories approval. These containers must be clearly identified as to their contents.

Material Safety Data sheets, for materials used by the subcontractor, will be maintained by the subcontractor, and a copy provided to the KIRC Representative.

TARPAULINS

When tarpaulins are required for the detection of hot slag, dust, paint drippings, or as security barriers, they will be flame-resistant and in good condition.

TOOLS

Hand and power tools will be kept in safe operating condition. Mushroomed heads on cold chisels, star drills, etc., are unsafe and will not be used. Hammers will have handles that are not cracked, split, or broken.

Nonsparking tools may be necessary in certain areas where flammable materials are handled or where sparks could create an explosion.

TRANSPORTING MATERIAL AND EQUIPMENT

Extreme care must be taken while carrying sections of pipe, conduit, and other materials to assure safety to KIRC, subcontractor, and client personnel and property. This includes, but is not limited to, flagging and use of two people to carry pipe of lengths greater than 10 feet.

Tools, materials, and equipment must not be left unattended in access ways.

Tools, material, and equipment will not be removed from the job site without permission of the KIRC Technical Representative.

WALKING AND WORK SURFACES

Workroom floors will be clean and, to the extent possible, dry.

Drainage mats, platforms, or false floors will be used where wet processes are performed.

Floors will be free from protruding nails, splinters, holes, and loose boards or tiles.

Permanent aisles or passageways will be marked.

Floor holes will be protected by covers that leave no openings more than one inch wide.

Floor openings into which persons can accidentally walk will be guarded by standard railing and toeboards.

Open-sided floors, platforms, and runways higher than four feet will be guarded by standard railings.

Toeboards will be used wherever people can pass below, or where hazardous equipment or materials are located below.

WARNING SIGNS

All posted warning, safety, and security signs and barriers will be observed. Additionally, Contractor will provide warning signs, barriers, barricades, etc. wherever such protection is needed. Where signs and barricades do not provide adequate protection, particularly along a road, flagmen will be used.

Contractors are expected to brief their employees on these requirements and enforce these rules with their employees. KIRC management may stop or suspend work at any time the Contractor fails to comply with KIRC rules and regulations.

REGULATORY REFERENCES

(a) Standard Operating Safety Guides, USEPA, November 1984

(b) Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities, NIOSH 85-115, 1985

(c) Title 29 of the Code of Federal Regulations, Part 1910 (29 CFR 1910), Occupational Safety and Health Standards (USDOL/OSHA), with special attention to Section .120, Hazardous Waste Operations and Emergency Response

(d) Title 29 of the Code of Federal Regulations, Part 1926 (29 CFR 1926), Safety and Health Regulations for Construction (USDOL/OSHA)

(e) Title 8 of the California Code of Regulations, Chapter 4, Subchapter 7, (commencing with Section 3200) General Industry Safety Orders (Cal/OSHA), with special attention to Section 5192, Hazardous Waste Operations and Emergency Response

(f) Title 8 of the California Code of Regulations, Chapter 4, Subchapter 4, (commencing with Section 1500) Construction Safety Orders (Cal/OSHA)

(g) Title 22 of the California Code of Regulations, Division 4, Chapter 30 (commencing with Section 66000) Environmental Health Standards for the Management of Hazardous

Waste (California Environmental Protection Agency, Department of Toxic Substances Control)

(h) Title 22 of the California Code of Regulations, Division 2, Chapter 3, (commencing with Section 12000) Safe Drinking Water and Toxic Enforcement Act Regulations (California Health and Welfare Agency)

(i) National Oil and Hazardous Substances Contingency Plan

(j) HIOSH Standards

Appendix D
Safe Work Practices for Heavy Equipment Operations

1. PURPOSE

The purpose of this procedure is to present the minimum safety performance requirements for the operation of heavy equipment on KIRC projects. Program Managers are responsible for ensuring all equipment is certified.

2. GENERAL REQUIREMENTS

Subcontractor equipment will comply with all applicable requirements for motor vehicles and material handling heavy equipment contained in 29 CFR 1926 Subpart O, and the latest *U.S. Army Corps of Engineers Safety and Health Requirements Manual, EM 385-1-1, Section 16 - Machinery and Mechanized Equipment* (attached). Heavy equipment includes, but is not limited to, drill rigs, front end loaders, backhoes, trackhoes, bulldozers, forklifts, and similar equipment used for the implementation of the project Statement of Work.

2.1 EQUIPMENT SAFETY INSPECTIONS

The following presents general guidelines for certifying equipment is in safe operating condition before activities commence at the site and during site operations. The following guidelines are not meant to be all inclusive. Equipment on-site are subject to the requirements found in Section 16 of *U.S. Army Corps of Engineers Safety and Health Requirements Manual, EM 385-1-1* (see attached).

All machinery and mechanized equipment will be certified to be in safe operating condition by a competent individual seven days prior to onsite operation. The certification form (provided hereinafter) is valid for a period of one year, for the project specified. Submit the completed form through the Program Management Office.

Equipment will be inspected on a daily basis by the owner/operator and daily logs will be maintained. All discrepancies will be corrected prior to placing the equipment in service.

Inspections will include, but are not limited to: all hydraulic lines and fittings for wear and damage, all cable systems and pull ropes for damage and proper installation, exhaust systems, brake systems, and drill controls, etc.

Drill rigs and related support equipment and vehicles will be inspected by the driller in charge on a daily basis. These inspections will be recorded on the Daily Drill Rig Checklist (included within the Drill Rig Safety Guidelines in Appendix C); or on equivalent subcontractor forms. Appendix C contains KIRC's Drill Rig Safety Guidelines and will be used when the subcontractor does not have inspection procedures in place.

The Daily Drill Rig Inspection will be enforced by the on-site health and safety representative, Field Manager, or designee.

Exhaustive preventive maintenance will be conducted for all equipment according to manufacturer recommendations and/or the Subcontractor's internal policies, schedules, and equipment SOPs.

Machinery and mechanized equipment will be operated only by designated qualified persons, as per state and federal requirements.

Records of tests and inspections will be maintained at the site by the contractor, and will be made available upon request of the designated authority, and will become part of the official project file.

Equipment not found to be in safe operating condition, or when a deficiency which affects the safe operation of the equipment, will immediately be taken out of service and its use prohibited until safe conditions have been corrected.

All equipment will be kept in the exclusion zone until work or the shift has been completed. Equipment will be decontaminated within designated decontamination areas.

Equipment with an obstructed rear view must have an audible alarm that sounds when equipment is moving in reverse.