Texas Custodial Trust
Former ASARCO
El Paso
Final Site Health and Safety Plan (SHASP)

April 14, 2011

Report Prepared for Project Navigator, LTD (Trustee) By:

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## Document Revisions

<table>
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<td>March/April 2011</td>
<td>Added in additional chemicals of concern: organic solvents, PCBs, hydrazine. Added Section 4.16: Pressurized Vessels. Update Project Contacts in Section 9.</td>
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1. Introduction

1.1. Objective

This document serves as the overall Site Health and Safety Plan (SHASP) that will be used for the Texas Custodial Trust project to clean up the former American Smelting and Refining Company (ASARCO) plant in El Paso, Texas (Site). This SHASP has been prepared by Malcolm Pirnie, Inc. for Project Navigator, Ltd., the Site Trustee, to provide minimum requirements to which all prime contractors, subcontractors, visitors, regulators, and anyone else entering and performing activities at the Site will comply. All prime contractors will submit a site-specific HASP that applies to their assigned scopes of work that meets the requirements of this plan.

1.2. Site Location and Operational History

The Site is located just north and west of the downtown area of the City of El Paso in an area of mixed residential, recreational, commercial, and industrial land use (Figure 1-1). The immediately adjacent land uses are:

- North: Industrial and residential land;
- East: Vacant industrial property, railroad, interstate freeway;
- South: Vacant industrial property, railroad, interstate freeway and roadway;
- West: Vacant land, highway, Rio Grande River and diversion canal, Mexico.

1.2.1. The Site Was Operated as a Primary Smelter

The site began operations as a lead smelter in 1887. It was owned by Consolidated Kansas Smelting and Refining Company, which later merged with ASARCO. The ASARCO plant started producing copper in 1910, operated a Godfrey roaster for cadmium oxide productions in the 1930s, and constructed a slag fuming plant for zinc recovery in 1948. ASARCO added an antimony plant in 1970. The zinc plant was closed in 1982, the lead plant closed in 1985, the antimony plant shut down in 1986, and the cadmium plant was shut down in 1992. Copper smelting was ceased in 1999. A summary of smelting operations at the Site is provided below:

<table>
<thead>
<tr>
<th>Summary of Smelting Timeframes</th>
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<tr>
<td>Lead (Pb):</td>
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<td>Copper (Cu):</td>
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<td>Cadmium (Cd):</td>
<td>1930s-1992</td>
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<td>Zinc (Zn):</td>
<td>1948-1982</td>
</tr>
<tr>
<td>Antimony (Sb):</td>
<td>1970-1986</td>
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</table>
In 1990 and 1994, two separate diesel tank releases were discovered (Nos. 1 and 2 respectively) by ASARCO. Release No. 1 was located between Paisano Drive and the American Canal near Cell 1. Release was cleaned up and closed in 2000. Release No. 2 is located east of the former acid plant and extends to the Rio Grande flood plain. This release continues to be cleaned up via an existing recovery system.

In April 1999, the U.S. Environmental Protection Agency (EPA) and the State of Texas filed a civil enforcement action in federal district court that alleged ASARCO violated the Resource Conservation and Recovery Act (RCRA) by failing to properly manage hazardous waste and engaging in unlawful recycling practices. The El Paso smelter took 46,486 tons of regulated material from Encycle Texas, Inc. from 1992-1997. This action resulted in an April 1999 Consent Decree (H-99-1136) being entered in federal district court. In addition to addressing other ASARCO sites, the Consent Decree directed ASARCO to complete the corrective action work at the El Paso site under the 1996 State of Texas Agreed Order. The Consent Decree was subsequently modified in 2004.

Most recently, in February 2009, the state air permit for the copper smelter was voided by the Texas Commission on Environmental Quality (TCEQ) at ASARCO’s request. The main potential chemicals of concern (PCOCs) are: lead, arsenic, antimony, cadmium, chromium, copper, iron, selenium, zinc. Additional PCOCs and poly-aromatic hydrocarbons (PAHs) where the diesel spills occurred and acid/base inspected materials where the acid plant Nos. 1 and 2 are located. The media of concern is slag, dust, soil and groundwater.

Remaining buildings, equipment and materials on the site range in age and condition. The larger process buildings housing the receiving, storage and smelting facilities are steel frame, tin roof and siding construction. Other buildings are concrete, brick, wood frame and adobe.

Most process-related equipment was cleaned prior to ASARCO leaving the site and there are no ores, concentrates or refined products remaining in the process stream except for residues in the acid plant and materials in the reverberatory furnace, Contop and convertors. Wastes removed from previous demolition and removal actions are contained on site in engineered waste cells on the main plant site. Slag piles remain on the site north and east of the property.

Operational facilities remaining on the site include 3 storm water retention ponds, a storm water treatment facility and a diesel fuel recovery plant. All remaining facilities at the plant are idle.
1.3. **Scope of Work Covered by SHASP**

This SHASP was developed to inform personnel, including visitors, regulators and contractors of the potential hazards at the Site and to provide specific work practices and procedures for reducing and/or controlling these hazards. The guidelines and requirements contained herein are based on a review of available information and an evaluation of the potential hazards. This document presents health and safety procedures and equipment necessary to minimize safety hazards and chemical exposure potentials and risks for personnel and contractors selected to perform Site activities:

- Site tours;
- General Site maintenance;
- Installation of additional security measures, maintenance and inspections of the entire security system, ongoing security activities;
- Surface water control;
- Diesel recovery plant operations;
- Stormwater management and sampling;
- Groundwater monitoring and sampling;
- Electrical service maintenance;
- Dust control;
- Oversight of Demolition Operations;
- Soil borings and other investigation activities;
- Soil or waste removal operations;
- Landfill or containment facility construction and filling;
- Soil and/or asphalt paving placement and compaction; and
- Other remediation construction activities.

Should unexpected hazards be encountered during operations at the Site, or Site activities performed by Site Personnel change significantly, work shall halt temporarily so that new hazard potentials can be evaluated and appropriate additional precautions can be implemented. Addendums to this SHASP will be prepared as necessary to document significant changes to work approach or health and safety requirements.

1.4. **Trust Contractors and their Subcontractors**

A copy of this SHASP is to be provided to all contractors and associated subcontractors prior to the start of work to assure workers are informed of the hazards at the site. While this SHASP provides minimum health and safety requirements for the work completed at
the Site, each separate Texas Custodial Trust contractor and their subcontractors, are expected to perform their operations in accordance with their own Trust approved site-specific HASP policies and procedures unique to the contractor/subcontractor’s work to ensure that hazards associated with the performance of the work activities are properly controlled. Copies of any required safety documentation for a contractor/subcontractor's work activities will be provided to the Trust for approval and record keeping.

In the event that the contractor/subcontractor’s procedures/requirements conflict with requirements specified in this SHASP, appropriate procedures will be adopted after discussion and agreement between the contractor and/or subcontractor and the Site Health and Safety Team (See Chapter 2). Hazards not listed in this SHASP but known to the contractor/subcontractor or known to be associated with the contractor/subcontractor's services, must be identified and addressed in their site-specific HASP prior to beginning work operations, so that the information can be distributed to other affected contractors at the Site.

Contractor/subcontractors are responsible for the health and safety of their employees at all times, and have the authority to halt work if unsafe conditions arise.

1.5. Policy Statement

The policy of Texas Custodial Trust is to provide a safe and healthful work environment. No aspect of operations is of greater importance than injury and illness prevention. A fundamental principle of safety management is that all injuries, illnesses, and incidents are preventable. The Trust will take every reasonable step to eliminate or control hazards in order to minimize the possibility of injury, illness, or incident.

This SHASP prescribes the procedures that must be followed during activities at the site. Operational changes that could affect the health and safety of personnel, the community, or the environment will not be made without the prior approval of the Trust. This document will be reviewed periodically to assure that it is current and technically correct. Any changes in site conditions and/or the scope of work will require a review and modification to this SHASP. Such changes will be completed in the form of an addendum or a revision to the plan.

The provisions of this SHASP are mandatory for all Trust personnel, contractors and subcontractors, assigned to the project. Contractors/subcontractors must prepare their own site-specific HASPs that meet the minimum requirements of this SHASP. All visitors to work areas at the site must abide by the requirements of this site-wide plan or a more stringent site-specific HASP.
1.6. **References**

This SHASP complies with applicable Occupational Safety and Health Administration (OSHA) regulations, USEPA regulations, and Industry Standard health and safety policies and procedures. This plan follows the guidelines established in the following:

- *Title 29 of the CFR*, Part 1926.
- *Trust or Contractor/Subcontractor Specific Policies, as Applicable*  

1.7. **Definitions**

The following definitions (listed alphabetically) are applicable to this SHASP:

- *Contamination Reduction Zone (CRZ)* - Area between the exclusion zone and support zone that provides a transition between contaminated and clean areas. Decontamination stations are located in this zone.
- *Exclusion Zone (EZ)* - Any portions of the site where hazardous substances are, or are reasonably suspected to be present, and pose an exposure hazard to on-site personnel.
- *Incident* - All losses, including first aid cases, injuries, illnesses, near misses, spills/leaks, equipment and property damage, motor vehicle accidents, regulatory violations, fires, and business interruptions.
- *Near Miss* - An incident in which no injury, illness, motor vehicle accident, equipment or property damage, etc., occurred, but under slightly different circumstances, could have occurred.
- *On-Site Personnel* - All Trust personnel, contractor, and associated subcontractor personnel involved with the project.
- *Project* - All on-site work performed under the scope of work.
- *Site* - The area described in Section 1.2, Site and Facility Description, where the work is to be performed.
Section 1
Introduction

- **Support Zone (SZ)** - All areas of the site, except the EZ and CRZ. The SZ surrounds the CRZ and EZ. Support equipment and break areas are located in this zone.

- **Subcontractor** - Includes contractor personnel hired by any Trust contractors.

- **Visitor** - All other personnel, except the On-Site Personnel.

- **Work Area** - The portion of the site where work activities are actively being performed. This area may change daily as work progresses and includes the SZ, CRZ, and EZ. If the work area is located in an area on the site that is not contaminated, or suspected of being contaminated, the entire work area may be a SZ.

### 1.8. Acronyms

The following acronyms (listed alphabetically) are applicable to this SHASP:

- **ACGIH** - American Conference of Governmental Industrial Hygienists
- **ANSI** – American National Standards Institute
- **As** – Arsenic
- **BBS** – Behavior Based Safety
- **CCZ** – Contamination Control Zones
- **Cd** – Cadmium
- **CDC** – Centers for Disease Control
- **CFR** – Code of Federal Regulations
- **COC** - Constituent(s) of Concern
- **CPR** – Cardiopulmonary Resuscitation
- **Cr** – Chromium
- **Cu** - Copper
- **CRZ** - Contamination Reduction Zone
- **dBA** – A-weighted Decibels
- **DEET** - Diethyltoluamide
- **DHHS** – Department of Health and Human Services
- **EMS** – Emergency Medical Services
- **EPA** – Environmental Protection Agency
- **EpiPen** – Epinephrine Auto Injector
- **EZ** - Exclusion Zone
• **Fe** – Iron
• **FM** – Factory Mutual Engineering Corporation
• **FSO** – Field Safety Officer
• **GFCI** - Ground Fault Circuit Interrupter
• **HASP** - Health and Safety Plan
• **HAZWOPER** – Hazardous Waste Operations and Emergency Response
• **HSO** - Health and Safety Officer
• **HSPM** – Health and Safety Program Manager
• **II** - Incident Investigation
• **kV** - Kilovolts
• **LEL** - Lower Explosive Limit
• **mph** – Miles per hour
• **MSDS** - Material Safety Data Sheet
• **NEC** – National Electric Code
• **NESC** – National Electrical Safety Code
• **NIOSH** – National Institute for Occupational Safety and Health
• **NRR** – Noise Reduction Rating
• **OSHA** - Occupational Safety and Health Administration
• **Pb** – Lead
• **PCB** – Polychlorinated Biphenyl
• **PCOCs** – Potential Chemicals of Concern
• **PEL** - Permissible Exposure Limit
• **PFD** - Personal Floatation Device
• **PHS** – Public Health Service
• **PID** - Photoionization Detector
• **PM** - Project Manager
• **PNL** – Project Navigator Limited
• **PO** - Project Officer
• **PPE** - Personal Protective Equipment
• **PVC** – Polyvinyl Chloride
• **RCRA** – Resource Conservation and Recovery Act
• **RMSF** – Rocky Mountain Spotted Fever
• **Se** - Selenium
• **SHASP** – Site Health and Safety Plan
• **SZ** - Support Zone
• **TCEQ** – Texas Commission on Environmental Quality
• **TLV** - Threshold Limit Value
• **TNRCC** – Texas Natural Resource Conservation Commission
• **UL** – Underwriters Laboratories
• **USCG** - United States Coast Guard
• **USEPA** - United States Environmental Protection Agency
• **VOC** - Volatile Organic Compound
• **WNV** – West Nile Virus
• **Zn** - Zinc
2. Roles and Responsibilities

2.1. Texas Custodial Trust Health and Safety Officer

Project Navigator Limited (PNL) is the Site Manager and Trustee. PNL has designated a Health and Safety Officer (HSO) for the ASARCO Cleanup Project as shown in the Health and Safety Organization chart (Figure 2-1). Key personnel are listed in Table 2-1. The HSO will consult with the Health and Safety Team (described below) and have final authority on all questions concerning health and safety at the site.

2.1.1. Health and Safety Team

During the initial activities on the site including asset recovery, building and facility decontamination and demolition¹ and Site remediation², the HSO, Health and Safety Program Managers (HSPMs) from ERM, PIRNIE, contractors and subcontractors will form a Health and Safety Team to address health and safety issues. Each company will also have Field Safety Officers (FSOs) that will be on-site and an integral part of the team. Contractors (with associated subcontractors) will be utilized to perform work at the Site. Each of these companies will implement their own health and safety programs, but also be responsible to provide input to the team to promote daily communication of hazards, good practices and stewardship. Regular meetings will be held to promote teamwork and communications.

2.2. All Personnel

All Site Personnel including contractor and subcontractor personnel, other separate entities hired by the Trust, visitors and regulators must adhere to the procedures outlined in this SHASP and their site-specific HASP. Each person is responsible for completing tasks safely, and reporting any unsafe acts or conditions to their supervisor. No person may work in a manner that conflicts with approved procedures. After due warnings, contractors or subcontractors will dismiss from the site any employee or subcontractor employee who violates safety procedures. If needed, The Trust HSO will direct contractors to remove employees or subcontractors employees for violation of health and safety procedures.

¹ Demolition or Scoping investigations, assessments, engineering, design and field supervisors will be conducted by ERM and associated subcontractors. Demolition will be performed by specialty contractors and associated subcontractors.

² Site remediation scoping, investigation, assessments, engineering, design and field supervision will be conducted by PIRNIE and associated subcontractors. Remedy construction activities will be performed by specialty contractors and associated subcontractors.
Section 2
Roles and Responsibilities

Figure 2-1
Health and Safety Team

TCEQ

Project Navigator
Roberto Puga – Trustee
Elizabeth Schell – Project Manager
Walter Boyle – On-site Manager and TCT Site H&S Officer

Site Security

Site Health and Safety Program Managers
Marc Gunter  Richard Ecord
(Remediation)  (Demolition)

Malcolm Pirnie (Remediation)
Hector del Campo

Remediation Contractors
Landfill
Soil Removal
Paving/Cover
Surface Water
Groundwater

GeoSynthetic Consultants
Parkhill Smith and Cooper

FRM (Demolition)
Mike Casbon

Demolition Contractors
Asset Recovery
Decontamination
Demolition

(1)

(f) Will be identified as needed
Table 2-1:  
Key Personnel (1)  
(see other Trust approved HASP for their Key Personnel)

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<th>Title/Role</th>
<th>Name</th>
<th>Mailing Address</th>
<th>Phone</th>
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<tr>
<td>Texas Custodial Trust Trustee</td>
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<td>Health and Safety Program Manager (HSPM)</td>
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</tbody>
</table>

| Regulatory Agency Personnel         |                       |                                              |                  |
| TCEQ                                | Jim Sher              | TCEQ, 2800 S. I-35 #100 Austin, TX 78704-5700 | O: 512-239-2444  |
| OSHA, Assistant Area Director       | Diego Alvarado        | 4849 N. Mesa, Suite 200 El Paso, TX 79912    | O: 915-534-6251  |
|                                     |                       |                                              | Ext. 24          |

Notes:  
TCEQ = Texas Commission on Environmental Quality  
(1) Key Personnel contact information for associate subcontractors will be provided to the HSO and provided to the Health and Safety Team
All Site Personnel must be trained in accordance with applicable regulations, and be familiar with the requirements and procedures contained in this SHASP and approved site-specific HASP prior to initiating site activities. In addition, all Site Personnel will attend an initial hazard briefing/site orientation meeting prior to beginning work at the site. Each Contractor and Subcontractor is required to furnish the Trust with employee training records, certifications and licenses (for equipment operators) who are working on the site. There is potential at this site for exposure to hazardous wastes, therefore all Site Personnel less visitors, security staff, and short duration/incidental personnel (drivers loading or unloading non-hazardous materials) must have a current HAZWOPER 40 hour training certificate unless an area is specifically cleared where this requirement is waived. An area may be waived of this requirement if the Site Health and Safety Team has evaluated that operations will not disturb, uncover, expose or otherwise come in contact with hazardous wastes or media.

2.3. All On-Site Personnel

All Site Personnel must read and acknowledge their understanding of this SHASP and their company’s site-specific HASP before commencing work, and abide by the requirements of the plan. All on-site personnel shall sign the SHASP Acknowledgement Form following their review of this SHASP.

All Trust contractors and their subcontractor personnel are required by the Trust to ensure their personnel receive training in accordance with applicable regulations, and be familiar with the requirements and procedures contained in this SHASP prior to initiating site activities. In addition, all on-site personnel will attend an initial hazard briefing prior to beginning work at the site and hold daily safety meetings. An example safety meeting form is included in Appendix A.

All Site Personnel should perform a basic safety assessment prior to beginning each work activity. In addition, a safety assessment must be performed after any near miss or other incident in order to determine if it is safe to proceed. Site Personnel will immediately report the following to a member of the Health and Safety Team, who in turn must immediately inform the HSO:

- Personal injuries and illnesses no matter how minor;
- Unexpected or uncontrolled release of chemical substances;
- Symptoms of chemical exposure;
- Unsafe or hazardous situations;
- Unsafe or malfunctioning equipment;
- Changes in site conditions that may affect the health and safety of project personnel;
- Damage to equipment or property;
- Situations or activities for which they are not properly trained; and
- Near misses.

2.4. **Regulators**

Government regulators who come on-site to conduct their official duties will abide by their Agency HASP. Regulators will be given a safety briefing to assure they are aware of the Site-specific hazards.

2.5. **Visitors**

All visitors to the Site must check in with the Trust Site Manager or his designee. Visitors given a safety briefing to assure they are aware of the Site-specific hazards. All visitors must be escorted by authorized Site Personnel.

Visitors requesting to observe work at the site must provide and don appropriate personal protective equipment (PPE) prior to entry to the work area and must have the appropriate training and medical clearances to do so. If respiratory protective devices are necessary, visitors who wish to enter the work area must have been respirator-trained and fit tested for a respirator within the past 12 months. Used PPE must be properly disposed of in on-site containers.
3. Project Hazards and Control Measures

3.1. Scope of Work

The Texas Custodial Trust is charged by the Federal Bankruptcy Court to secure the Site, demolish the buildings on the Site, and cleanup/remediate to State of Texas Industrial/Commercial Standards. The soil, surface and groundwater on the site that have been impacted by former operations and activities of ASARCO. In general, the Trust will perform the following activities:

- Mobilization;
- Establish and maintain Site security;
- Decontamination and demolition of site structures;
- Soil removal, capping and paving;
- Groundwater monitoring and remediation;
- Site restoration and drainage;
- Decontamination of equipment as necessary; and
- Demobilization.

3.2. Site Activities, Hazards, and Control Procedures

The job safety analyses (JSAs) presented in this section identify potential health, safety, and environmental hazards associated with anticipated field activities. Additional JSAs will be prepared, as needed in Site-specific HASPs as contractors are engaged to perform various work activities. Because of the changing nature of field projects, members of the Health and Safety team will inspect the site to identify hazards that may affect on-site personnel, the community, or the environment. The FSOs must be aware of these changing conditions and discuss them with PMs whenever these changes impact employee health, safety, the environment, or performance of the project. The FSOs will keep on-site personnel informed of the changing conditions, and the PMs will issue and/or approve addenda or revisions to this SHASP as necessary.

3.2.1. Mobilization/Area Reconnaissance

Site mobilization and area reconnaissance will include establishing specific work activity locations, determining the location of utilities and other installations, and establishing work areas. Mobilization may also include setting up equipment and establishing a temporary site office. A break area will be set up outside of regulated work areas.
Mobilization may involve clearing areas for the SZ and CRZ. During this initial phase, project personnel will walk the site to confirm the existence of anticipated hazards, and identify safety and health issues that may have arisen since the writing of this plan.

The hazards of this phase of activity are associated with heavy equipment operation, manual materials handling, installation of temporary on-site facilities, and manual site preparation.

Manual materials handling and manual site preparation may cause blisters, sore muscles, and joint and skeletal injuries; and may present eye, contusion, and laceration hazards. Installation of temporary field office and support facilities may expose personnel to electrical hazards, underground and overhead utilities, and physical injury due to the manual lifting and moving of materials. The work area presents slip, trip, and fall hazards from scattered debris and irregular walking surfaces. Rainy weather may cause wet, muddy, slick walking surfaces, and unstable soil. Freezing weather hazards include frozen, slick, and irregular walking surfaces.

Environmental hazards include plants, such as poison ivy and poison oak; aggressive fauna, such as ticks, fleas, mosquitoes, wasps, spiders, and snakes; weather, such as sunburn, lightning, rain, and heat- or cold-related illnesses; and pathogens, such as rabies, and blood-borne pathogens.

Control procedures for these hazards are discussed in Section 4, General Safety Practices.

### 3.2.2. Demolition

The decontamination and demolition of major structures on the Site will be controlled by ERM for the Trust and will be governed by their work plans. This section covers minor and incidental demolition activities that may be conducted on site. Demolition activities involve a potential for exposure to many physical and health hazards. Hazards may be associated with the materials used in construction, equipment utilized, or the demolition and site restoration activities themselves. All contractors/subcontractors must address all physical and health hazards presented by the demolition, construction, and site restoration activities in accordance with 29 CFR 1926. Companies may use their own standard safe operating procedures for demolition and construction activities as long as the minimum requirements of this SHASP and 29 CFR 1926 are met.

**Hazards:** The physical hazards involved with construction/demolition relate to the work done with heavy equipment, hand and power tools, and the construction/demolition environment itself. During construction/demolition related activities there exists a potential for incidents involving personnel being struck by or against equipment or materials, which may result in fractures, lacerations, punctures, and abrasions. Walking and working surfaces during construction activities may present slip, trip, or fall hazards. Slippery surfaces can increase the likelihood of slips and falls in addition to back and
overexertion injuries. Hot work activities such as cutting and welding may present the risk of a fire or explosion hazard. Overhead hazards such as power lines may be present due to elevated work.

Demolition activities pose the potential for personnel being struck by debris and objects associated with the demolition activities and the equipment being used. Improper planning and procedures may place employees in unsafe situations that may result in serious injury or death.

Operations on elevated surfaces (roofs, catwalks, mezzanines, etc.) may expose workers to falls if not utilizing the proper fall protection system. Work from ladders, scaffolding, and aerial lifts also exposes employees to fall hazards and injuries should the equipment be used improperly or employees are not trained in the equipment’s safe use.

Electricity may pose a hazard to employees during the use of portable electrical equipment and lead cords. Sources of energy that are not locked out and/or tagged out expose personnel to various forms of energy (electrical, mechanical, high pressure, etc.) that could be hazardous during the performance of site tasks. Additionally, employees installing temporary and permanent wiring are exposed to electrical hazards if proper precautions and procedures are not followed, or inexperienced or unqualified personnel conduct the work.

Improper operation of heavy equipment (forklifts, front end loaders, aerial lifts, cranes, etc.) may result in personnel being struck by the equipment or loads being handled, resulting in contusions, fractures, and lacerations. Personnel may be injured and equipment damaged if it is not used for the purpose intended, overloaded, or used improperly by inexperienced or unauthorized individuals. Loads being lifted by cranes may shift causing them to fall and strike personnel causing serious injury or death.

Due to the type of work involved in many construction activities, the primary health hazards involve repetitive motion diseases, and lifting and other ergonomic disorders. Noise may also present a hazard to employees exposed to high decibel levels. Operation of heavy equipment, power tools, pneumatic tools, and powder actuated tools often result in high noise levels. Exposure to construction materials that may release harmful vapors during their use and curing periods are also possible.

**Control**: Prior to initiating any field activity, the site conditions will be discussed with all employees (including subcontractors). Hazards will be identified and protective measures will be explained. Equipment will be inspected prior to usage and be in proper working condition. Employees will receive training in the use and care of equipment that they will be expected to operate. Tasks should be scheduled in a manner that reduces the likelihood of performing a repetitive task for prolonged periods. Proper lifting techniques should be employed and mechanical means should be used for heavy lifting tasks. Hearing
protection is required for use when exposed to noise levels exceeding 85 dBA, or a level that commonly results in difficult conversation.

Control procedures for general electrical hazards are discussed in Section 4.12, Electrical Safety. Control procedures for hot work are discussed in Section 4.15, Hot Work Safety Program. Safety during elevated work will conform to the requirements of 29 CFR 1926 Subpart M Fall Protection. Safety procedures governing the use of scaffolding and aerial lifts and the use of ladders shall conform to the requirements of 29 CFR 1926 Subpart L Scaffolds and Subpart X Stairways and Ladders respectively.

Lockout/tagout procedures as specified in 29 CFR 1910.147 shall be followed by personnel that may be exposed to hazardous energy sources. Contractor-developed safety procedures governing the use of scaffolding and aerial lifts and the use of ladders shall conform to the requirements of 29 CFR 1926 Subpart L, Scaffolds and Subpart X, Stairways and Ladders respectively.

All demolition work shall conform to the requirements of 29 CFR 1926 Subpart T, Demolition. All tasks requiring the use of a crane or rigging will be done in accordance with 29 CFR 1926 Subpart N. Removal of hazardous substances and waste materials and cleaning/decontamination of equipment shall be in compliance with 29 CFR 1910.120 Hazardous Waste Operations and Emergency Response (HAZWOPER).

### 3.2.3. Building Decommissioning

This section only covers minor decommissioning activities that may be performed outside of the general decommissioning covered in documents by ERM. Equipment dismantlement and building decommissioning activities involve a potential for exposure to many physical and health hazards. In addition to equipment dismantlement and removal activities, construction and installation of temporary facilities and selective demolition of building components may be conducted.

**Hazard**s - Hazards may be associated with the materials used in construction, equipment utilized, or the dismantlement and removal activities themselves. All contractors/subcontractors must address all physical and health hazards presented by the dismantlement, removal, demolition, and construction activities (hereafter collectively known as construction activities) in accordance with 29 CFR 1926. Contractors/subcontractors may utilize their company’s standard safe operating procedures for construction activities as long as the minimum requirements of this SHASP and 29 CFR 1926 are met.

The physical hazards involved with working in an old or abandoned building may include the following:

- Limited lighting and warning signs
- Inadequate or missing guards, handrails and other protective devices
- Potential exposure to asbestos and flaking lead based paint
- Presence of rodents, insects or other animals within the premises
- Obstructed exit routes and doors
- Unstable structures and equipment, especially roofs and elevated surfaces
- Lack of fire extinguishers and fire alarms
- Lack of communication within the structure

**Control** - Prior to initiating any field activity, the site conditions will be discussed with all employees (including subcontractors). Hazards will be identified and protective measures will be explained. Specific control measures for working within abandoned buildings include the following:

- Provide adequate portable lighting and keep all active work areas well lit.
- Be cautious around equipment, open pits, trenches or other hazardous areas
- Avoid contact with and moving building materials
- Avoid any wild animals, if it is expected that dogs, raccoons or other large animals may be present have a animal control office inspect the premises prior to the site visit
- Maintain knowledge of clear exit route, keep doors clear and open
- Do not walk on roofs or elevated structures unless an engineering survey by a competent person has been performed
- Always utilize the buddy system and have some form of communication (cell phone, radio) available

Equipment will be inspected prior to usage and be in proper working condition. Employees will receive training in the use and care of equipment that they will be expected to operate. Tasks should be scheduled in a manner that reduces the likelihood of performing a repetitive task for prolonged periods. Proper lifting techniques should be employed and mechanical means should be used for heavy lifting tasks. Hearing protection is required for use when exposed to noise levels exceeding 85 dBA, or a level that commonly results in difficult conversation.

Control procedures for general electrical hazards are discussed in Section 4.12, Electrical Safety. Control procedures for hot work are discussed in Section 4.15, Hot Work Safety Program. Safety during elevated work will conform to the requirements of 29 CFR 1926 Subpart M Fall Protection. Safety procedures governing the use of scaffolding and aerial lifts and the use of ladders shall conform to the requirements of 29 CFR 1926 Subpart L Scaffolds and Subpart X Stairways and Ladders, respectively.

Lockout/tagout procedures as specified in 29 CFR 1910.147 shall be followed by personnel that may be exposed to hazardous energy sources. Line breaking activities shall follow all required procedures and regulations (lockout/tagout), and be performed under the supervision of a competent person. If required by the Site Manager, line-breaking
activities shall not be conducted until the appropriate facility personnel have been consulted.

Demolition work shall conform to the requirements of 29 CFR 1926 Subpart T, Demolition. A pre-demolition survey as required by 29 CFR 1926.850(a) shall be completed by the contractor prior to demolition activities. This survey must be documented and reviewed with all affected personnel and contractors. All tasks requiring the use of a crane or rigging will be done in accordance with 29 CFR 1926 Subpart N. Removal of hazardous substances and waste materials and cleaning/decontamination of equipment shall be in compliance with 29 CFR 1910.120 HAZWOPER. Asbestos abatement shall be done in strict accordance with Code Rule 56 and associated federal regulations. Lead work (removal, encapsulation, hot work) will be done in accordance with 29 CFR 1926.62, Lead.

3.2.3.1. Demolition Safety

Prior to permitting anyone to start demolition operations, an engineering survey of the structure shall be made by a competent person to determine the condition of the framing, floors, walls, and the possibility of an unplanned collapse of any portion of the structure. Any adjacent structure where employees may be exposed shall also be similarly checked.

When personnel are required to work within a structure, which has been damaged by fire, flood, explosion, or other cause, the walls, and floor shall be braced or shored. All electric, gas, water, steam, sewer, and other service lines shall be shut off, capped or otherwise controlled outside the building before demolition work is started. In each case, any utility company that is involved shall be notified in advance.

If it is necessary to maintain any power, water, or other utilities during demolition, such lines shall be temporarily relocated as necessary and protected. It shall also be determined if any type of hazardous chemicals, gases, flammable materials, or similarly dangerous substances have been used in any pipes, tanks, or other equipment on the site. When the presence of any such substances is apparent or suspected, testing and purging shall be performed and the hazard eliminated before demolition is started.

Where the hazard exists from the fragmentation of glass, such hazards shall be removed. Where a hazard exists to employees from falling through wall openings, the opening shall be protected to a height of 42 inches. When debris is dropped through holes in the floor without the use of chutes, the area onto which the material is dropped shall be completely enclosed with barricades which are not less than 42 inches high and not less 6 feet back from the edge of the opening above. Signs, warning of the hazard of falling materials shall be posted at level. Removal shall not be allowed in this lower level until debris handling ceases above.
All floor openings not used as material drops shall be covered with a material substantial enough to support the weight of any load that may be imposed. Such material shall be properly secured to prevent its accidental movement. Except for the cutting of small holes in floors for chutes, material drops, and similar necessary preparatory work, the demolition of exterior walls and floor construction shall begin at the top of the structure and proceed downward. Each story of exterior wall and floor construction shall be removed and dropped into the storage area before commencing the removal of exterior walls and floors in the story below.

3.2.3.1.1 Mechanical Demolition
Personnel shall not be permitted in any area that can be adversely affected by mechanical demolition operations. Only those workers necessary for the performance of the operations shall be permitted in the area. The area shall be barricaded as necessary to prevent unauthorized personnel or anyone not associated with the demolition operation from entering area.

When pulling over walls or portions thereof, all steel members affected shall have been previously cut free. All roof cornices or other ornamental stonework shall be removed prior to pulling the walls over.

During demolition, continuing inspections by a competent person shall be made as the work progresses to detect hazards resulting from the weakened or deteriorated floors, walls, or loosened material. No employee shall be permitted to work where such hazards exist until they are corrected by shoring, bracing, or other effective means.

3.2.3.2 Elevated Work
During the course of this project personnel may be exposed to the hazards of working at heights (ladders, scaffolding, roofing work, etc.). The following sections of 29 CFR 1926 are applicable to the elevated work on this project:

- Subpart L, Scaffolds;
- Subpart M, Fall Protection; and
- Subpart X Stairways and Ladders.

All elevated work will be performed in a safe manner and in compliance with all regulations governing such work, and the requirements of this SHASP. All personnel exposed to fall hazards shall be trained regarding the nature of the hazards of elevated work prior to assignment.

3.2.3.2.1 Fall Protection
All personnel exposed to fall hazards greater than 6 feet shall be protected from the hazard by a fall protection system.
Fall protection systems shall comply with the guidelines established in 29 CFR 1926 Subpart M, Fall Protection.

All personnel exposed to fall hazards shall be trained by a competent person in the following areas:

- The nature of fall hazards in the work area;
- The correct procedures for erecting, maintaining, disassembling, and inspecting the fall protection systems to be used and the employees roles and responsibilities associated with the systems;
- The use and operation of the fall protection systems to be used;
- The correct procedures for the handling and storage of materials and equipment and the erection of overhead protection; and
- The fall protection standards contained in 29 CFR 1926 Subpart M, Fall Protection.

Written certification of fall protection training for personnel exposed to fall hazards shall be maintained by each contractor, and must be made available to the Trust upon request.

3.2.3.2.2 Aerial Lifts

Only trained and authorized personnel shall operate aerial platforms.

The operator shall be trained on the same model of aerial platform as the one to be used during actual work site operations. Under the direction of a qualified person, the trainee shall operate the aerial platform for a sufficient period of time to demonstrate proficiency and knowledge.

Personnel working on aerial lifts shall be trained in the following subject areas at a minimum:

- The nature of fall hazards, electrical hazards, and falling object hazards in the work area;
- The correct procedures for dealing with electrical hazards, and for erecting, dismantling, and maintaining the fall protection and overhead protection systems to be used;
- The proper use of the aerial lift and the handling of material and equipment on the aerial lift;
- The load capacities of the aerial lift; and
- Applicable sections of 29 CFR 1926 Subpart L, Scaffolds.

Aerial lifts shall be inspected at least daily prior to operation. The inspection should include, but not be limited to, the following:
- Operating and emergency controls;
- Safety devices;
- Personal protective devices, including fall protection;
- Air, hydraulic, and fuel systems for leaks;
- Cables and wiring harness;
- Loose or missing parts;
- Tires, and wheels;
- Placards, warnings, control markings; and operating and safety manual(s);
- Outriggers, stabilizers, extendable axles and other structures;
- Guardrail system; and
- Other items specified by the manufacturer.

Only trained personnel shall make repairs to aerial lifts.

Personnel working from boom type lifts shall be protected from falling by the use of a safety harness and lanyard properly attached to a manufacturer approved tie off point.

Before the aerial lift is used, the operator shall check the work area for possible hazards such as, but not limited to: holes, bumps or obstacles, debris, overhead obstructions, inadequate surface and support (soft soils), and wind and weather conditions.

Prior to each lift, the operator shall ensure the following:

- Outriggers or extendible axles, if so equipped, are used as required by the manufacturer.
- Guardrails are installed and the access gate is closed.
- The load and the distribution of the load are in accordance with manufacturer’s recommendations.
- There is adequate clearance from overhead obstructions.
- If aerial platform is used in the vicinity of overhead power lines, the lines must be de-energized, or the equipment must be positioned such that no part of the aerial platform or personnel on the platform can come within the minimum clearances as follows:

<table>
<thead>
<tr>
<th>Nominal System Voltage</th>
<th>Minimum Required Clearance</th>
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</thead>
<tbody>
<tr>
<td>0-50kV</td>
<td>10 feet</td>
</tr>
<tr>
<td>51kV-200kV</td>
<td>15 feet</td>
</tr>
<tr>
<td>201kV-300kV</td>
<td>20 feet</td>
</tr>
<tr>
<td>301kV-500kV</td>
<td>25 feet</td>
</tr>
<tr>
<td>501kV-750kV</td>
<td>35 feet</td>
</tr>
<tr>
<td>751-1000kV</td>
<td>45 feet</td>
</tr>
</tbody>
</table>
- All personnel in the platform are wearing the required fall protection equipment and are secured to manufacture’s approved tie off locations.

All personnel shall maintain a firm footing on the platform floor. Personnel shall not climb on the guardrails of the aerial platform to gain additional height or reach. Additionally, the use of ladders, planks, buckets, and other makeshift devices to gain additional height or reach is prohibited.

Aerial platforms shall not be driven in an elevated position unless designed to do so.

### 3.2.3.2.3 Scaffolds

Scaffolds shall only be erected, moved, or dismantled under the direction and supervision of a competent person who is experienced in scaffold erection, dismantling, or moving. Only trained and experienced personnel selected by the competent person shall perform such work.

Scaffolds shall be inspected prior to use each day and frequently throughout the work shift by a competent person.

Guard rails and toe boards shall be installed on all open sides and ends of scaffold platforms that are greater than 6 feet in height.

Footing for scaffolding shall be sound and capable of withstanding the load imposed.

All frame-type scaffolds shall rest on base plates and mudsills.

Blocks, barrels, buckets, boxes and other unstable items shall not be used to support scaffolds.

Scaffold platforms shall be fully planked, and the planks shall overlap a minimum of 12 inches or be secured to prevent movement.

An access ladder is required for all scaffolds. Climbing of cross braces is prohibited.

Personnel working on scaffolds shall be trained in the following subject areas at a minimum:

- The nature of fall hazards, electrical hazards, and falling object hazards in the work area;
- The correct procedures for dealing with electrical hazards, and for erecting, dismantling, and maintaining the fall protection and overhead protection systems to be used;
• The proper use of the scaffold and the handling of material and equipment on the scaffold;

• The load capacities of the scaffold; and

• Applicable sections of 29 CFR 1926 Subpart L, Scaffolds.

In addition to the above training, all personnel involved in the erection, moving, and dismantling of scaffolds must be trained by a competent person in the following areas:

• The correct procedures for erecting, dismantling, moving, operating, inspecting, and maintaining the scaffold being used; and

• The design criteria, maximum load carrying capacity, and intended use of the scaffold.

3.2.3.2.4 Ladders

• Ladders and stairways shall comply with 29 CFR 1926 Subpart X.

• Ladders shall be used for only the purpose for which they were designed.

• Straight and extension ladders shall be set up properly, secured to prevent movement, and extended 3 feet above the landing surface.

• Stepladders shall be used only in the open position with the spreaders locked.

• Personnel shall not stand on the top step or the top of a stepladder.

• Stepladders shall not be moved while in use (walked).

• Personnel shall not overreach while using ladders.

• Users shall inspect ladders prior to use.

• Ladders shall be inspected frequently by a competent person. Ladders found to be damaged or defective shall be removed from service immediately and tagged “DO NOT USE”.

• The areas around the top and bottom of a ladder shall be kept clear.

• Ladders shall be free from any defects.

• Ladders shall be kept free from oil, solvents, or other materials that present a slipping hazard.

• Personnel shall face the ladder when ascending and descending, and maintain at least three-point contact.
• Personnel shall not carry loads up ladders that may cause them to lose their balance or maintain less than three-point contact with the ladder.

3.2.4. **Excavation Hazards and Control Procedures**

This task involves contractors/subcontractors excavating at specified locations to remove impacted or clean soils and/or debris. Excavation activities will be conducted in accordance with this section and all applicable OSHA regulations. The physical hazards involved in the excavation of soils are related to the excavation itself and the operation of heavy equipment. The presence of overhead utilities such as power lines requires careful positioning of the excavating equipment in order to maintain a safe distance between the lines and the closest part of the equipment. The presence of underground utilities such as gas lines, power lines, water lines, and sewer pipes must be determined prior to beginning the excavation.

Excavations pose significant hazards to employees if they are not carefully controlled. There exists a chance for the excavation to collapse if it is not dug properly, sloped, benched, or shored as required by 29 CFR 1926 Subpart P. Protective systems, as required by 29 CFR 1926 Subpart P, must be utilized if the potential for hazardous cave-ins exist. The excavation also is a fall hazard, and employees must pay careful attention to what they are doing or they risk a fall into the excavation. Fall protection, as required by 29 CFR 1926 Subpart M, will be required.

Only authorized trained personnel are permitted to enter excavations (see Section 3.2.5.1 hereinafter). All activities shall be done remotely, without entering the excavation if possible. Trench safety measures in accordance with OSHA 29 CFR 1926.65 will be used for excavations deeper than five feet below ground surface.

Noise also may present a hazard. Heavy equipment operation frequently results in noise levels exceeding 85 dBA, requiring the use of hearing protection.

At the end of each workday, open test pit excavations will be backfilled and equipment will be moved to a location away from high-voltage electrical equipment and away from routes necessary to access high-voltage electrical equipment.

If impacted soils are excavated, airborne concentrations of COC in the site soil and the dust from the excavation procedure pose the potential for inhalation exposure. PPE for this phase is described in Section 5, Personal Protective Equipment. Airborne particulate generation will be controlled during site excavations (see Section 6 Air Monitoring). Dry, dusty soil will be wetted with a water spray from a potable water source to control the generation of dust. Soil will not be wetted to a degree that will cause runoff or erosion.

Before excavation activities commence, the existence and location of underground pipe, electrical equipment, and gas lines shall be determined. This will be done, if possible, by
contacting the appropriate client representative to mark the location of the lines. If the client’s knowledge of the area is incomplete, an appropriate device, such as a magnetometer, will be used to locate the line. A Utility Clearance shall be completed and used to document that nearby utilities have been marked on the ground, and that the excavation and drilling areas have been cleared. The completed checklist will be in the possession of the FSO prior to commencement of any intrusive investigation.

All excavation activities shall be conducted in accordance with 29 CFR 1926 Subpart P. If excavation operations are located near underground installations, the exact location of the installations must be determined by safe and acceptable means. While the excavation is open, underground installations must be protected, supported, or removed as necessary to safeguard employees.

3.2.4.1. Inspections by a Competent Person

Daily inspections of excavations, the adjacent areas, and protective systems must be made by a competent person for evidence of a situation that could result in possible cave-ins, indications of failure of protective systems, hazardous atmospheres, or other hazardous conditions. An inspection must be conducted by the competent person prior to the start of work and as needed throughout the shift.

Inspections also must be made after every rainstorm or other hazard-increasing occurrence. These inspections are only required when employee exposure can be reasonably anticipated. Where the competent person finds evidence of a situation that could result in a possible cave-in, indications of failure of protective systems, hazardous atmospheres, or other hazardous conditions, exposed employees must be removed from the hazardous area until the necessary precautions have been taken to ensure their safety.

Walkways must be provided where employees or equipment are required or permitted to cross over excavations. Guardrails which comply with 1926.502(b) must be provided. Adequate barrier protection must be provided at all remotely located excavations. All wells, pits, shafts, etc., must be barricaded or covered. Upon completion of exploration and other similar operations, temporary wells, pits, shafts, etc., must be backfilled.

3.2.4.2. Soil Classification

29 CFR 1926 Subpart P, Appendix A describes methods of classifying soil and rock deposits based on site and environmental conditions and on the structure and composition of the earth deposits. The appendix contains definitions, sets forth requirements, and describes acceptable visual and manual tests for use in classifying soils. This appendix applies when a sloping or benching system is designed in accordance with the requirements set forth in 1926.652(b)(2) as a method of protection for employees from cave-ins. This appendix also applies when timber shoring for excavations is designed as a method of protection from cave-ins in accordance with Appendix C to Subpart P of Part
1926, and when aluminum hydraulic shoring is designed in accordance with 29 CFR Subpart P Appendix D. This appendix also applies if other protective systems are designed and selected for use from data prepared in accordance with the requirements set forth in 1926.652(c), and the use of the data are predicated on the use of the soil classification system set forth in Appendix A of 29 CFR 1926.

Maximum allowable slope means the steepest incline of an excavation face that is acceptable for the most favorable site conditions as protection against cave-ins, and is expressed as the ratio of horizontal distance to vertical rise (H: V). Short-term exposure means a period of time less than or equal to 24 hours that an excavation is open. Soil and rock deposits must be classified in accordance with Appendix A to Subpart P of Part 1926. The maximum allowable slope for a soil or rock deposit must be determined from Table 3-1. The actual slope must not be steeper than the maximum allowable slope. The actual slope must be less steep than the maximum allowable slope, when there are signs of distress. If that situation occurs, the slope must be cut back to an actual slope which is at least one-half horizontal to one vertical (1/2H: 1V) less steep than the maximum allowable slope. When surcharge loads from stored material or equipment, operating equipment, or traffic are present, a competent person must determine the degree to which the actual slope must be reduced below the maximum allowable slope, and must assure that such reduction is achieved. Surcharge loads from adjacent structures must be evaluated in accordance with 1926.651(I). Configurations of sloping and benching systems must be in accordance with 29 CFR 1926 Subpart P Appendix B.
Table 3-1
29 CFR 1926 Subpart P Appendix B
Maximum Allowable Slopes

<table>
<thead>
<tr>
<th>Soil or Rock Type</th>
<th>Maximum Allowable Slopes (H:V)(^1) for Excavations Less Than 20 Feet Deep(^2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stable Rock</td>
<td>Vertical (90 degrees)</td>
</tr>
<tr>
<td>Type A</td>
<td>¾:1 (53 degrees)</td>
</tr>
<tr>
<td>Type B</td>
<td>1:1 (45 degrees)</td>
</tr>
<tr>
<td>Type C</td>
<td>1:½ (34 degrees)</td>
</tr>
</tbody>
</table>

1. Numbers shown in parentheses next to maximum allowable slopes are angles expressed in degrees from the horizontal. Angles have been rounded off.
2. Sloping or benching for excavations greater than 20 feet deep must be designed by a registered professional engineer.
3. A short-term maximum allowable slope of 1/2H:1V (63 degrees) is allowed in excavations in Type A soil that are 12 feet (3.67 m) or less in depth. Short-term maximum allowable slopes for excavations greater than 12 feet (3.67 m) in depth must be 3/4H:1V (53 degrees).

3.2.5. Overhead Electrical Clearances

If excavation activities are conducted in the vicinity of overhead power lines, the power to the lines must be de-energized, tested de-energized, marked up/guaranteed, and grounded or the equipment must be positioned such that no part, including excavation boom, can come within the minimum clearances as follows:

<table>
<thead>
<tr>
<th>Nominal System Voltage</th>
<th>Minimum Required Clearance</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-50kV</td>
<td>10 feet</td>
</tr>
<tr>
<td>51-100kV</td>
<td>12 feet</td>
</tr>
<tr>
<td>101-200kV</td>
<td>15 feet</td>
</tr>
<tr>
<td>201-300kV</td>
<td>20 feet</td>
</tr>
<tr>
<td>301-500kV</td>
<td>25 feet</td>
</tr>
<tr>
<td>501-750kV</td>
<td>35 feet</td>
</tr>
<tr>
<td>751-1,000kV</td>
<td>45 feet</td>
</tr>
</tbody>
</table>

3.2.5.1. Excavation Entry Procedure

All persons entering an excavation must do so under controlled conditions. The excavation must be properly sloped, benched, or shored, and ladders or ramps must be available every 25 feet laterally in the excavation. Each entry shall have an attendant who observes the entrant(s) and is prepared to render assistance.

Duties of Workers Entering an Excavation

- Know the hazards that may be faced during entry, including information on the mode, signs or symptoms, and consequences of exposure to site contaminants;
- Communicate with the attendant as necessary to enable the attendant to monitor entrant status and to enable the attendant to alert entrants of the need to evacuate the space;
• Alert the attendant whenever:
  - The entrant recognizes any warning sign or symptom of exposure to a dangerous situation; or
  - The entrant detects a prohibited condition;
• Exit from the excavation as quickly as possible whenever:
  - An order to evacuate is given by the attendant or the supervisor;
  - The entrant recognizes any warning sign or symptom of exposure to a dangerous situation; or
  - The entrant detects a prohibited condition.

**Duties of Attendants**

• Know the hazards that may be faced during entry, including information on the mode, signs or symptoms, and consequences of exposure to site contaminants;
• Continuously maintains a count of entrants in the excavation;
• Remains outside the excavation during entry operations until relieved by another attendant;
• Communicates with authorized entrants as necessary to monitor entrant status to alert entrants of the need to evacuate the excavation under any of the following conditions:
  - If the attendant detects a prohibited condition;
  - If the attendant detects the behavioral effects of hazard exposure in an entrant;
  - If the attendant detects a situation outside the excavation that could endanger the entrants; or
  - If the attendant cannot effectively and safely perform his duties;
• Summon rescue and other emergency services if the attendant determines that entrants may need assistance to evacuate the excavation.

### 3.2.6. Drum Handling Procedure

Collection and handling of waste drums on the site may be required. These drums will be removed for disposal to an off-site facility.

**Physical Hazards** - The physical hazards involved with drum handling relate to work done with powered equipment, hand tools, or a drum truck. There exists a potential for incidents involving personnel struck by or struck against powered equipment, a drum truck, and drums resulting in fractures, cuts, punctures, or abrasions. To minimize the potential of these types of injuries, any drum weighing more than 40 pounds will be handled using a drum truck or powered equipment.
Powered Equipment Operations - Site workers are exposed to serious hazards during drum moving when using powered equipment. Workers may be struck by the machinery or by the drums carried by the machinery. Workers will remain in view of the machine operator and will remain outside of the swing area. Drums carried by heavy machinery will be secured in the machine’s bucket by using a rope or other means.

Drum Handling - The most common type of accident that occurs in drum handling operations is the “caught between” situation when a load is being handled and a finger or toe gets caught between two objects. Extreme care must be taken when loading and unloading drums. Proper lifting technique must be employed, and mechanical means must be used to lift drums whenever possible. To minimize the potential of injuries, drums weighing more than 40 pounds will be handled using a drum truck or powered equipment.

Health Hazards - Due to the type of work involved in drum handling activities, the primary health hazards involve repetitive motion disorders, lifting, and other ergonomic stressors.

Control - Prior to initiating material handling activities, the operation will be explained to all employees. Hazards will be identified and protective measures will be explained. Equipment will be inspected and in proper working condition. Employees should receive training to address the equipment, its operations, and care. Personnel should be scheduled in a manner to reduce the likelihood of performing repetitive tasks for prolonged periods. Mechanical means of lifting and moving material should be substituted for manual movement of material whenever possible.

3.2.7. Clearing and Site Restoration

Site clearing and restoration activities involve a potential for exposure to numerous physical and health hazards. The hazards are primarily associated with the equipment used and the debris being removed.

Physical Hazards - The physical hazards involved with clearing and construction relate to work done with heavy equipment, hand tools, and the environment itself. There exists a potential for incidents involving personnel struck by or struck against powered equipment, timber, or materials, resulting in fractures, cuts, punctures, or abrasions. Walking and working surfaces during construction activities may involve slip, trip, and fall hazards. Working at elevations may create a fall hazard.

Environmental Hazards – Overgrown areas present hazards of uneven walking surfaces, soft terrain, and biological hazards such as insects and snakes.

Working Surfaces - Uneven terrain and slippery work surfaces can increase the likelihood of back injuries, overexertion injuries, and slips and falls. All personnel
should frequently inspect the area in which they are working, and keep the area as clear as possible.

**Powered Equipment Operations** - Site workers are exposed to serious hazards during clearing when using powered equipment. Workers may be struck by blades or by material thrown by powered equipment.

**Materials Handling** - The most common type of accident that occurs in material handling operations is the “caught between” situation when a load is being handled and a finger or toe gets caught between two objects. Extreme care must be taken when loading and unloading material. Proper lifting technique must be employed, and mechanical means must be used to lift objects whenever possible.

**Health Hazards** - Due to the type of work involved in clearing and construction activities, the primary health hazards involve repetitive motion disorders, lifting, and other ergonomic stressors. Noise may also present a hazard. Operation of heavy equipment and power actuated and pneumatic hand tools frequently results in high noise levels.

**Control** - Prior to initiating clearing and construction activities, the operation will be explained to all employees. Hazards will be identified and protective measures will be explained. Equipment will be inspected and in proper working condition. Employees should receive training to address the equipment, its operations, and care. Personnel should be scheduled in a manner to reduce the likelihood of performing repetitive tasks for prolonged periods. Technical assistance should be provided for large lifting tasks. Hearing protection is required for use when exposed to noise levels exceeding 85 dBA, or a level that commonly results in difficult conversation.

### 3.2.8. Equipment Decontamination

Specific decontamination techniques will be established based on site conditions. Techniques will be described in the Site-specific HASPs. Decontamination procedures will be reviewed with all Site Personnel. The Trust anticipates constructing a decontamination pad on a suitable surface with polyethylene sheeting or other appropriate containment system. Pressure washing with manual scrub brushing as needed will be used to decontaminate equipment. COC impacted equipment will be determined “clean” by using visual inspection of all equipment.

The decontamination facility will be inspected on a daily basis for evidence of leaks or loss of integrity to the containment system. Decontamination water that is generated on-site will be contained in the decontamination system or portable tank(s) for characterization and subsequent disposal per the project requirements.
The primary hazards associated with this task include potential exposure to Site COCs during the decontamination activities, and use of high-pressure equipment. Personnel involved in decontamination activities may be exposed to contaminated materials (primarily via skin contact) and chemicals brought to the site as part of the project work.

**Controls** - Prior to initiating decontamination activities, the operation will be reviewed with all employees. Hazards will be identified and protective measures will be explained including the appropriate level of PPE. Personnel involved in decontamination activities must wear PPE that is one level below the level worn by personnel working in the EZ (modified Level D at a minimum). Face shield or other means of splash protection must be worn at all times when there is a potential for splashing of liquids (i.e., during high-pressure water spray operations). The pressure washer and decontamination containment facility will be inspected prior to use. A clear line of sight and/or a means of communication will be maintained between personnel in the decontamination area and the equipment operator at all times. Employees will receive training to address the equipment, its operations, and care.

### 3.2.9. Demobilization

Demobilization involves the removal of all tools, equipment, supplies, and vehicles brought to the site. The hazards of this phase of activity are associated with heavy equipment operation and manual materials handling.

Manual materials handling may cause blisters, sore muscles, and joint and skeletal injuries; and may present eye, contusion, and laceration hazards. Heavy equipment operation presents noise and vibration hazards, and hot surfaces, to operators. Personnel in the vicinity of heavy equipment operation may be exposed to physical hazards resulting in fractures, contusions, and lacerations and may be exposed to high noise levels. The work area presents slip, trip, and fall hazards from scattered debris and irregular walking surfaces. Rainy weather may cause wet, muddy, slick walking surfaces, and unstable soil. Freezing weather hazards include frozen, slick, and irregular walking surfaces.

Environmental hazards include plants, such as poison ivy and poison oak; aggressive fauna, such as ticks, fleas, mosquitoes, wasps, spiders, scorpions and snakes; bird and animal droppings, weather, such as sunburn, lightning, rain, and heat- or cold-related illnesses; and pathogens, such as rabies, Lyme disease, and blood-borne pathogens.

Control procedures for these hazards are discussed in Section 4, General Safety Practices.

### 3.3. Chemical Hazards

The chemical hazards associated with site operations are related to potential inhalation, ingestion, and skin exposure to site COCs. Concentrations of airborne COCs during site
tasks may be measurable, and will require air monitoring during certain operations. Air monitoring requirements for site tasks are outlined in Section 6.

Site COCs may include elevated levels of lead, arsenic and other metals. Various VOCs, Organic Solvents, Polychlorinated Biphenyl (PCBs), or other industrial chemicals may also be present. Low pH residues and acids are present in process tanks, lines and in the Acid Plants and potentially on the surface below the Acid Plants. There is also possible that potential high pH (alkali) materials may be present.

The potential for inhalation of site COCs is moderate for most tasks. The potential for dermal contact with building materials, soils and groundwater containing site COCs during excavation, drilling, and sampling operations is moderate. Table 3-2 lists the chemical, physical, and toxicological properties of the known site COCs. Material Safety Data Sheets (MSDS) for the primary COCs are included in Appendix B.

### Table 3-2

<table>
<thead>
<tr>
<th>COC</th>
<th>Chemical</th>
<th>Physical</th>
<th>Toxicological</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>All Areas</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Airborne Particulate Matter</td>
<td>Solid mineral mixed with liquid droplets (metal or non-metal bearing)</td>
<td>Includes soil and dust particles between 2.5 and 10 micrometers in diameter or smoke and haze particles less than 2.5 micrometers in diameter.</td>
<td>Increased respiratory symptoms, such as irritation of the airways, coughing, or difficulty breathing, decreased lung function, aggravated asthma, development of chronic bronchitis, irregular heartbeat, nonfatal heart attacks; and premature death in people with heart or lung disease.</td>
</tr>
<tr>
<td>Silica</td>
<td>Solid mineral</td>
<td>Transparent to grey with no odor</td>
<td>Irritating to eyes, and respiratory tract.</td>
</tr>
<tr>
<td>Polychlorinated Biphenyl (PCBs)</td>
<td>Liquid, Solid Particles</td>
<td>Liquids, Solids-Including Soil / Dust Particles, May be released by excavation or other soil disturbance</td>
<td>Respiratory irritation; Heart Disease</td>
</tr>
<tr>
<td>Organic Solvents</td>
<td>Liquids</td>
<td>Liquid, varying in appearance depending on source &amp; chemical composition; Vapor (Colorless, may be odorless); May be released by excavation or other soil disturbance</td>
<td>Irritating to eyes, and respiratory tract.</td>
</tr>
<tr>
<td>Cadmium</td>
<td>Solid metal</td>
<td>Heating can result in the release of Cadmium oxide causing metal fume fever</td>
<td>Irritation, headache, nausea, vomiting, chest pain, CNS affect. Experimental carcinogen and teratogen.</td>
</tr>
</tbody>
</table>
### Section 3

**Project Hazards and Control Measures**

<table>
<thead>
<tr>
<th>COC</th>
<th>Chemical</th>
<th>Physical</th>
<th>Toxicological</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chromium</td>
<td>Solid metal</td>
<td>Steel grey lustrous metal color.</td>
<td>Irritating to eyes, skin and respiratory tract. Chronic: damage to lungs and decreased function</td>
</tr>
<tr>
<td>Copper</td>
<td>Solid metal</td>
<td>Red brown colored metal</td>
<td>Irritating, can cause skin discoloration, ingestion, nausea, vomiting, abdominal pain</td>
</tr>
<tr>
<td>Iron</td>
<td>Solid metal</td>
<td>Black grey powder, or rust colored</td>
<td>Irritating to eyes and respiratory tract.</td>
</tr>
<tr>
<td>Lead</td>
<td>Solid metal</td>
<td>Bluish white, silver or grey metal</td>
<td>Cumulative poison, repeated low exposure can cause severe neurological effects, reproductive hazard, possible carcinogen, damage to fetus.</td>
</tr>
<tr>
<td>Selenium</td>
<td>Solid metal</td>
<td>Red or black solid or crystals, garlic like odor</td>
<td>Irritating to eyes, skin and respiratory tract. CNS possible psychological effects</td>
</tr>
<tr>
<td>Zinc</td>
<td>Solid metal</td>
<td>Bluish white, lustrous metal</td>
<td>Relatively non-toxic, impurities or zinc oxide can cause metal fume fever</td>
</tr>
<tr>
<td><strong>Diesel Spill Areas 1 and 2</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Benzene</td>
<td>Liquid</td>
<td>Colorless liquid, sweet odor Flammable</td>
<td>Headache dizziness, Chronic leukemia and blood effects, cancer</td>
</tr>
<tr>
<td>Ethyl-Benzene</td>
<td>Liquid</td>
<td>Colorless liquid, pungent odor Flammable</td>
<td>Irritating, vertigo, chest constriction, Chronic fatigue, blood disorders</td>
</tr>
<tr>
<td>Toluene</td>
<td>Liquid</td>
<td>Colorless liquid, sweet odor Flammable</td>
<td>Irritating, weakness, headache, confusion Chronic liver/kidney damage</td>
</tr>
<tr>
<td>Xylene</td>
<td>Liquid</td>
<td>Colorless liquid, sweet odor Flammable</td>
<td>Irritating, weakness, headache, confusion Chronic dermatitis liver/kidney damage</td>
</tr>
<tr>
<td>Total Petroleum Hydrocarbons</td>
<td>Liquid</td>
<td>Colorless or colored liquids derived from crude oil</td>
<td>Irritating, headaches, dizziness, CNS, blood, immune system, skin, eye, Cancer</td>
</tr>
<tr>
<td><strong>Acid Plant Areas</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sulfuric Acid</td>
<td>Low pH solids and liquids</td>
<td>Stained soils and white to yellow powder</td>
<td>Irritating to eyes and respiratory tract. Severe skin burns.</td>
</tr>
</tbody>
</table>
## Project Hazards and Control Measures

<table>
<thead>
<tr>
<th>COC</th>
<th>Chemical</th>
<th>Physical</th>
<th>Toxicological</th>
</tr>
</thead>
<tbody>
<tr>
<td>Caustic Soda (alkaline solids and liquids)</td>
<td>High pH solids and liquids</td>
<td>Stained soils and white to yellow solids</td>
<td>Irritating to eyes and respiratory tract. Severe skin burns.</td>
</tr>
<tr>
<td>Hydrazine</td>
<td>Liquid, Solid particles</td>
<td>Liquids, Solids-Including Soil / Dust Particles, May be released by excavation or other soil disturbance</td>
<td>Extremely Reactive hydrazine is a lung carcinogen</td>
</tr>
</tbody>
</table>
4. General Safety Practices

4.1. General Safety Rules and Behavior Based Safety

General safety rules for site activities include, but are not limited to, the following:

- At least one copy of this SHASP will be located at the Trust Site so that it is readily available to Site Personnel. All Site Personnel shall review the plan prior to starting work.

- Consume or use food, beverages, chewing gum, and smokeless tobacco products only in the SZ or other designated area outside the EZ and CRZ. Cosmetics shall not be applied in the EZ or CRZ.

- Wash hands before eating, drinking, or using toilet facilities.

- Wear all PPE as required, and stop work and replace damaged PPE immediately.

- Secure disposable coveralls, boots, and gloves at the wrists and legs and ensure closure of the suit around the neck.

- Upon skin contact with materials that may be impacted by COC, remove contaminated clothing and wash the affected area immediately. Contaminated clothing must be changed. Any skin contact with materials potentially impacted by COC must be reported to the Health and Safety Team immediately. If needed, medical attention should be sought.

- Practice contamination avoidance. Avoid contact with surfaces either suspected or known to be impacted by COC, such as standing water, mud, or discolored soil. Equipment must be stored on elevated or protected surfaces to reduce the potential for incidental contamination.

- Remove PPE as required in the CRZ (Section 5.4.2 and 7.2.1) to limit the spread of COC-containing materials.

- At the end of each shift or as required, dispose of all single-use coveralls, soiled gloves, and respirator cartridges in designated receptacles designated for this purpose.

- Removing soil containing site COC from protective clothing or equipment with compressed air, shaking, or any other means that disperses contaminants into the air is prohibited.

- Inspect all non-disposable PPE for contamination in the CRZ. Any PPE found to be contaminated must be decontaminated or disposed of appropriately.

- Recognize emergency signals used for evacuation, injury, fire, etc.
Site Personnel must report all injuries, illnesses, near misses, and unsafe conditions or work practices to their safety resource or a member of the Health and Safety Team.

Use the “buddy system” during all operations requiring Level C PPE, and when appropriate, during Modified Level D operations.

Obey all warning signs, tags, and barriers. Do not remove any warnings unless authorized to do so.

Use, adjust, alter, and repair equipment only if trained and authorized to do so, and in accordance with the manufacturer’s directions.

Personnel are to perform only tasks for which they have been properly trained and will advise their supervisor if they have been assigned a task for which they are not trained.

The presence or consumption of alcoholic beverages or illicit drugs on the project is strictly prohibited. Do not take prescription or over-the-counter drugs when assigned to tasks with the potential for absorption, inhalation, or ingestion of hazardous substances, unless given written approval by an appropriate health care professional.

Remain upwind during site activities whenever possible.

4.2. **Behavior Based Safety (BBS)**

“Behavior based” safety practices will be implemented on this Site. Behavior based methods have been shown to be highly effective in improving safe work practices. All Trust contractors shall use a BBS to manage their safety program unless otherwise approved. Site-specific HASPs prepared by contractors/subcontractors shall include a section on how their BBS program is implemented.

4.2.1. **Along with Behavior Based Safety, Stop Work Authority will be used on Site.**

All Site Personnel are empowered, expected, and have the responsibility to stop their own work or the work of another co-worker if the working conditions or behaviors are considered unsafe.

4.3. **Buddy System**

Site Personnel shall use the buddy system as required by operations. Use of the “buddy system” is required during all operations requiring Level C to Level A PPE, and when appropriate, during Level D operations. Crewmembers must observe each other for signs of chemical exposure, and heat or cold stress. Indications of adverse effects include, but are not limited to:

- Changes in complexion and skin coloration;
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General Safety Practices

- Changes in coordination;
- Changes in demeanor;
- Excessive salivation and pupillary response; and
- Changes in speech pattern.

Crewmembers must also be aware of the potential exposure to possible safety hazards, unsafe acts, or non-compliance with safety procedures.

Field personnel must inform their partners or fellow crewmembers of non-visible effects of exposure to toxic materials that they may be experiencing. The symptoms of such exposure may include, but are not limited to:

- Headaches;
- Dizziness;
- Nausea;
- Blurred vision;
- Cramps; and
- Irritation of eyes, skin, or respiratory tract.

If protective equipment or noise levels impair communications, prearranged hand signals must be used for communication. Personnel must stay within line of sight of another team member.

4.4. **Heat Stress**

Heat stress is caused by a number of interacting factors, including environmental conditions, clothing, workload, etc., as well as the physical and conditioning characteristics of the individual. Since heat stress is one of the most common illnesses associated with heavy outdoor work conducted with direct solar load and, in particular, because wearing PPE can increase the risk of developing heat stress, workers must be capable of recognizing the signs and symptoms of heat-related illnesses. Personnel must be aware of the types and causes of heat-related illnesses and be able to recognize the signs and symptoms of these illnesses in both themselves and their co-workers.

**Heat rashes** are one of the most common problems in hot work environments. Commonly known as prickly heat, a heat rash is manifested as red papules and usually appears in areas where the clothing is restrictive. As sweating increases, these papules give rise to a prickling sensation. Prickly heat occurs in skin that is persistently wetted by unevaporated sweat, and heat rash papules may become infected if they are not treated. In most cases, heat rashes will disappear when the affected individual returns to a cool environment.
**Heat cramps** are usually caused by performing hard physical labor in a hot environment. These cramps have been attributed to an electrolyte imbalance caused by sweating. It is important to understand that cramps can be caused both by too much or too little salt.

Cramps appear to be caused by the lack of water replenishment. Because sweat is a hypotonic solution (plus or minus 0.3% NaCl), excess salt can build up in the body if the water lost through sweating is not replaced. Thirst cannot be relied on as a guide to the need for water; instead, water must be taken every 15 to 20 minutes in hot environments.

Under extreme conditions, such as working for 6 to 8 hours in heavy protective gear, a loss of sodium may occur. Drinking commercially available carbohydrate electrolyte replacement liquids is effective in minimizing physiological disturbances during recovery.

**Heat exhaustion** occurs from increased stress on various body organs due to inadequate blood circulation, cardiovascular insufficiency, or dehydration. Signs and symptoms include pale, cool, moist skin; heavy sweating; dizziness; nausea; headache, vertigo, weakness, thirst, and giddiness. Fortunately, this condition responds readily to prompt treatment.

Heat exhaustion should not be dismissed lightly, however, for several reasons. One is that the fainting associated with heat exhaustion can be dangerous because the victim may be operating machinery or controlling an operation that should not be left unattended; moreover, the victim may be injured when he or she faints. Also, the signs and symptoms seen in heat exhaustion are similar to those of heat stroke, which is a medical emergency.

Workers suffering from heat exhaustion should be removed from the hot environment, be given fluid replacement, and be encouraged to get adequate rest.

**Heat stroke** is the most serious form of heat stress. Heat stroke occurs when the body’s system of temperature regulation fails and the body’s temperature rises to critical levels. This condition is caused by a combination of highly variable factors, and its occurrence is difficult to predict.

Heat stroke is a medical emergency. The primary signs and symptoms of heat stroke are confusion; irrational behavior; loss of consciousness; convulsions; a lack of sweating (usually); hot, dry skin; and an abnormally high body temperature, e.g., a rectal temperature of 41°C (105.8°F). If body temperature is too high, it causes death. The elevated metabolic temperatures caused by a combination of workload and environmental heat load, both of which contribute to heat stroke, are also highly variable and difficult to predict.
If a worker shows signs of possible heat stroke, professional medical treatment should be obtained immediately. The worker should be placed in a shady area and the outer clothing should be removed. The worker’s skin should be wetted and air movement around the worker should be increased to improve evaporative cooling until professional methods of cooling are initiated and the seriousness of the condition can be assessed. Fluids should be replaced as soon as possible. The medical outcome of an episode of heat stroke depends on the victim’s physical fitness and the timing and effectiveness of first aid treatment.

Regardless of the worker’s protestations, no employee suspected of being ill from heat stroke should be sent home or left unattended unless a physician has specifically approved such an order.

Proper training and preventive measures will help avert serious illness and loss of work productivity. Preventing heat stress is particularly important because once someone suffers from heat stroke or exhaustion, that person may be predisposed to additional heat injuries.

**Heat Stress Safety Precautions**

Heat stress monitoring and work rest cycle implementation should commence when the ambient adjusted temperature exceeds 72°F. A minimum work rest regimen and procedures for calculating ambient adjusted temperature are described in Table 4-1.

<table>
<thead>
<tr>
<th>Adjusted Temperature</th>
<th>Work/Rest Regimen Normal Work Ensemble</th>
<th>Work/Rest Regimen Impermeable Ensemble</th>
</tr>
</thead>
<tbody>
<tr>
<td>90°F (32.2°C) or above</td>
<td>After each 45 minutes of work</td>
<td>After each 15 minutes of work</td>
</tr>
<tr>
<td>87.5°F - 90°F (30.8°C - 32.2°C)</td>
<td>After each 60 minutes of work</td>
<td>After each 30 minutes of work</td>
</tr>
<tr>
<td>82.5°F - 87.5°F (28.1°C - 30.8°C)</td>
<td>After each 90 minutes of work</td>
<td>After each 60 minutes of work</td>
</tr>
<tr>
<td>77.5°F - 82.5°F (25.3°C - 28.1°C)</td>
<td>After each 120 minutes of work</td>
<td>After each 90 minutes of work</td>
</tr>
<tr>
<td>72.5°F - 77.5°F (30.8°C - 32.2°C)</td>
<td>After each 150 minutes of work</td>
<td>After each 120 minutes of work</td>
</tr>
</tbody>
</table>

a. For work levels of 250 kilocalories/hour (Light-Moderate Type of Work)
b. Calculate the adjusted air temperature ($ta_{adj}$) by using this equation: $ta_{adj} \text{ °F} = ta \text{ °F} + (13 \times \% \text{ sunshine})$.
   Measure air temperature ($ta$) with a standard mercury-in-glass thermometer, with the bulb shielded from radiant heat. Estimate percent sunshine by judging what percent time the sun is not covered by clouds that are thick enough to produce a shadow. (100 percent sunshine = no cloud cover and a sharp, distinct shadow; 0 percent sunshine = no shadows.)
c. A normal work ensemble consists of cotton coveralls or other cotton clothing with long sleeves and pants.
d. The information presented above was generated using the information provided in the American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Values (TLV) Handbook.

In order to determine if the work rest cycles are adequate for the personnel and specific site conditions, additional monitoring of individual heart rates will be conducted during the rest cycle. To check the heart rate, count the radial pulse for 30 seconds at the...
beginning of the rest period. If the heart rate exceeds 110 beats per minute, shorten the next work period by one third and maintain the same rest period.

Additionally, one or more of the following control measures can be used to help control heat stress and are mandatory if any site worker has a heart rate (measure immediately prior to rest period) exceeding 115 beats per minute:

- Site workers will be encouraged to drink plenty of water and electrolyte replacement fluids throughout the day.
- On-site drinking water will be kept cool (50 to 60°F).
- A work regimen that will provide adequate rest periods for cooling down will be established, as required.
- All personnel will be advised of the dangers and symptoms of heat stroke, heat exhaustion, and heat cramps.
- Cooling devices, such as vortex tubes or cooling vests, should be used when personnel must wear impermeable clothing in conditions of extreme heat.
- Employees should be instructed to monitor themselves and co-workers for signs of heat stress and to take additional breaks as necessary.
- A shaded rest area must be provided. All breaks should take place in the shaded rest area.
- Employees must not be assigned to other tasks during breaks.
- Employees must remove impermeable garments during rest periods. This includes white Tyvek-type garments.

All employees must be informed of the importance of adequate rest, acclimation, and proper diet in the prevention of heat stress disorders.

### 4.5. Cold Stress

Cold stress normally occurs in temperatures at or below freezing, or under certain circumstances, in temperatures of 40°F. Extreme cold for a short time may cause severe injury to exposed body surfaces or result in profound generalized cooling, causing death. Areas of the body that have high surface area-to-volume ratio, such as fingers, toes, and ears, are the most susceptible. Two factors influence the development of a cold weather injury: ambient temperature and the velocity of the wind. For instance, 10°F with a wind of 15 miles per hour (mph) is equivalent in chilling effect to still air at -18°F. An equivalent chill temperature chart relating the actual dry bulb temperature and wind velocity is presented in Table 4-2.
Table 4-2:  
Chill Temperature Chart

<table>
<thead>
<tr>
<th>Estimated Wind Speed (in mph)</th>
<th>Actual Temperature Reading (°F)</th>
<th>Equivalent Chill Temperature (°F)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calm</td>
<td>50 40 30 20 10 0 -10 -20 -30 -40 -50 -60</td>
<td>5 48 37 27 16 6 -5 -15 -26 -36 -47 -57 -68</td>
</tr>
<tr>
<td>5</td>
<td>48 37 27 16 6 -5 -15 -26 -36 -47 -57 -68</td>
<td>46 -83</td>
</tr>
<tr>
<td>10</td>
<td>40 28 16 4 -9 -24 -33 -46 -58 -70 -83 -95</td>
<td>36 -83</td>
</tr>
<tr>
<td>20</td>
<td>32 18 4 -10 -25 -39 -53 -67 -82 -96 -110 -121</td>
<td>20 -83</td>
</tr>
<tr>
<td>35</td>
<td>27 11 -4 -20 -35 -51 -67 -82 -98 -113 -129 -145</td>
<td>1 -83</td>
</tr>
</tbody>
</table>

(Wind speeds greater than 40 mph have little additional effect.)

- **LITTLE DANGER**
  - Maximum danger of false sense of security.

- **INCREASING DANGER**
  - Danger from freezing of exposed flesh within one minute.

- **GREAT DANGER**
  - Flesh may freeze within 30 seconds.

Trench foot and immersion foot may occur at any point on this chart.

[This chart was developed by the U.S. Army Research Institute of Environmental Medicine, Natick, MA (Source: ACGIH Threshold Limit Values for Chemical Substances and Physical Agents)].

Local injury resulting from cold is included in the generic term frostbite. There are several degrees of tissue damage associated with frostbite. Frostbite of the extremities can be categorized into:

- **Frost Nip or Incipient Frostbite** - characterized by sudden blanching or whitening of skin.

- **Superficial Frostbite** - skin has a waxy or white appearance and is firm to the touch, but tissue beneath is resilient.

- **Deep Frostbite** - tissues are cold, pale, and solid; extremely serious injury.

Systemic hypothermia is caused by exposure to freezing or rapidly dropping temperature. It can be fatal. Its symptoms are usually exhibited in five stages: 1) shivering; 2) apathy, listlessness, sleepiness, and (sometimes) rapid cooling of the body to less than 95°F; 3) unconsciousness, glassy stare, slow pulse, and slow respiratory rate; 4) freezing of the extremities; and 5) death. Trauma sustained in freezing or sub-zero conditions requires special attention because an injured worker is predisposed to secondary cold injury. Special provisions must be made to prevent hypothermia and secondary freezing of damaged tissues in addition to providing for first aid treatment. To avoid cold stress, site personnel must wear protective clothing appropriate for the level of cold and physical activity. In addition to protective clothing, preventive safe work practices, additional training, and warming regimens may be utilized to prevent cold stress.

**Safety Precautions for Cold Stress Prevention**

For air temperature of 0°F or less, mittens should be used to protect the hands. For exposed skin, continuous exposure should not be permitted when air speed and temperature results in a wind chill temperature of -25°F.
At air temperatures of 36°F or less, field personnel who become immersed in water or whose clothing becomes wet must be immediately provided with a change of clothing and be treated for hypothermia.

If work is done at normal temperature or in a hot environment before entering the cold, the field personnel must ensure that their clothing is not wet as a consequence of sweating. If work clothes get wet, the field personnel should change into dry clothes prior to entering cold area.

If the available clothing does not give adequate protection to prevent hypothermia or frostbite, work must be modified or suspended until adequate clothing is made available or until weather conditions improve.

Field personnel handling evaporative liquid (e.g., gasoline, alcohol, or cleaning fluids) at air temperatures below 40°F must take special precaution to avoid soaking of clothing or gloves with the liquids because of the added danger of cold injury due to evaporative cooling.

**Safe Work Practices during cold weather operations**

Direct contact between bare skin and cold surfaces (< 20°F) should be avoided. Metal tool handles and/or equipment controls should be covered by thermal insulating material.

For work performed in a wind chill temperature at or below 10°F, workers should be under constant protective observation (buddy system). The work rate should be established to prevent heavy sweating that will result in wet clothing. For heavy work, rest periods must be taken in heated shelters and workers should be provided with an opportunity to change into dry clothing if needed.

Field personnel should be provided the opportunity to become accustomed to cold-weather working conditions and required protective clothing.

Work should be arranged in such a way that sitting or standing still for long periods is minimized.

During the warming regimen (rest period), field personnel should be encouraged to remove outer clothing to permit sweat evaporation or to change into dry work clothing. Dehydration, or loss of body fluids, occurs insidiously in the cold environment and may increase susceptibility to cold injury due to a significant change in blood flow to the extremities. Fluid replacement with warm, sweet drinks and soups is recommended. The intake of coffee should be limited because of diuretic and circulatory effects.
4.6. Biological Hazards

Biological hazards may include poison ivy, snakes, coyotes, wild dogs, ground squirrels, mice (with Hantavirus) thorny bushes and trees, mosquitoes, scorpions, and other pests.

4.6.1. Poisonous Plants

Poisonous plants may be present in the work area. Personnel should be alerted to its presence, and instructed on methods to prevent exposure.

**Control:** The main control is to avoid contact with the plant, cover arms and hands, and frequently wash potentially exposed skin. Particular attention must be given to avoiding skin contact with objects or protective clothing that have touched the plants. Treat every surface that may have touched the plant as contaminated, and practice contamination avoidance. If skin contact is made, the area should be washed immediately with soap and water, and observed for signs of reddening.

4.6.2. Snakes

The possibility of encountering snakes exists, specifically for personnel working in wooded/vegetated areas. Snake venoms are complex and include proteins, some of which have enzymatic activity. The effects produced by venoms include neurotoxic effects with sensory, motor, cardiac, and respiratory difficulties; cytotoxic effects on red blood cells, blood vessels, heart muscle, kidneys, and lungs; defects in coagulation; and effects from local release of substances by enzymatic actions. Other noticeable effects of venomous snakebites include swelling, edema, and pain around the bite, and the development of ecchymosis (the escape of blood into tissues from ruptured blood vessels).

**Control:** To minimize the threat of snakebites, all personnel walking through vegetated areas must be aware of the potential for encountering snakes, and the need to avoid actions potentiating encounters, such as turning over logs, etc. If a snake bite occurs, an attempt should be made to safely kill the snake for identification. The victim must be transported to the nearest hospital within 30 minutes; first aid consists of applying a constriction band, and washing the area around the wound to remove any unabsorbed venom.

4.6.3. Spiders

Personnel may encounter spiders during work activities.

Two spiders are of concern, the black widow and the brown recluse. Both have been found on the project site. Both prefer dark sheltered areas such as basements, equipment sheds and enclosures, and around woodpiles or other scattered debris. The black widow is shiny black, approximately one inch long, and found throughout the United States. There is a distinctive red hourglass marking on the underside of the black widows body. The bite of a black widow is seldom fatal to healthy adults, but effects include respiratory
distress, nausea, vomiting, and muscle spasms. The brown recluse is smaller than the black widow and gets its name from its brown coloring and behavior. The brown recluse is more prevalent in the southern United States. The brown recluse has a distinctive violin shape on the top of its body. The bite of the brown recluse is painful and the bite site ulcerates and takes many weeks to heal completely.

**Control:** To minimize the threat of spider bites, all personnel walking through vegetated areas must be aware of the potential for encountering these arachnids. Personnel need to avoid actions that may result in encounters, such as turning over logs, and placing hands in dark places such as behind equipment or in corners of equipment sheds or enclosures. If a spider bite occurs, the victim must be transported to the nearest hospital as soon as possible; first aid consists of applying ice packs and washing the area around the wound to remove any unabsorbed venom.

### 4.6.4. Scorpions

Workers may encounter scorpions during work activities. Scorpions usually hide during the day and are active at night. They may be hiding under rocks, wood, or anything else lying on the ground. Some species may also burrow into the ground.

Symptoms of a scorpion sting may include:

- A stinging or burning sensation at the injection site (very little swelling or inflammation)
- Positive "tap test" (i.e., extreme pain when the sting site is tapped with a finger)
- Restlessness
- Convulsions
- Roving eyes
- Staggering gait
- Thick tongue sensation
- Slurred speech
- Drooling
- Muscle twitches
- Abdominal pain and cramps
- Respiratory depression

These symptoms usually subside within 48 hours, although stings from a bark scorpion can be life-threatening.

**Control -** Workers should take the following steps to prevent scorpion stings:

- Wear long sleeves and pants.
- Wear leather gloves.
- Shake out clothing or shoes before putting them on.
- Workers with a history of severe allergic reactions to insect bites or stings should consider carrying an epinephrine auto injector (EpiPen) and should wear a medical identification bracelet or necklace stating their allergy.

**First Aid** - Workers should take the following steps if they are stung by a scorpion:

- Contact a qualified health care provider or poison control center for advice and medical instructions.
- Ice may be applied directly to the sting site (never submerge the affected limb in ice water).
- Remain relaxed and calm.
- Do not take any sedatives.
- Capture the scorpion for identification if it is possible to do so safely.

### 4.6.5. Bird and Other animal droppings

Some of the buildings on the site have been vacant from several months to several years, and as a result, bats or birds may live in the buildings. Contact with birds and bats should be avoided. Any bites from birds or bats should be reported immediately, and a medical evaluation must be sought. The most common hazards when dealing with birds and bats is with their excrement. Bird and bat excrement contains the fungus *Histoplasma capsulatum*. Any dust generated during site activities involving bird excrement should be evaluated prior to the start of the activity, remediation of the bird droppings may be necessary.

The primary illness caused by inhaling these spores is histoplasmosis which is an infectious disease. Histoplasmosis is not contagious; it cannot be transmitted from an infected person or animal to someone else.

Histoplasmosis primarily affects a person's lungs, and its symptoms vary greatly. The vast majority of infected people are asymptomatic (have no apparent ill effects), or they experience symptoms so mild they do not seek medical attention and may not even realize that their illness was histoplasmosis. If symptoms do occur, they will usually start within 3 to 17 days after exposure, with an average of 10 days. Histoplasmosis can appear as a mild, flu-like respiratory illness and has a combination of symptoms, including malaise (a general ill feeling), fever, chest pain, dry or nonproductive cough, headache, loss of appetite, shortness of breath, joint and muscle pains, chills and hoarseness. This is a serious illness and requires a medical evaluation.

### 4.6.6. West Nile Virus

West Nile virus (WNV) is an infectious disease that first appeared in the United States in 1999. Infected mosquitoes spread the virus that causes it. People who contract WNV usually have no symptoms or mild symptoms. Those with symptoms may have a fever, headache, body aches, skin rash or swollen lymph glands.
If West Nile virus enters the brain, however, it can be deadly. It may cause inflammation of the brain, called **encephalitis**, or inflammation of the tissue that surrounds the brain and spinal cord, called **meningitis**.

Older people are most at risk. There are no specific vaccines or treatments for human WNV disease. The easiest and best way to avoid WNV is to prevent **mosquito bites**:

- Use insect repellent with DEET
- Get rid of mosquito breeding sites by emptying standing water from flower pots, buckets or barrels
- Stay indoors between dusk and dawn, when mosquitoes are most active
- Use screens on windows to keep mosquitoes out

### 4.6.7. Coyotes, Wild Dogs & Ground Squirrels

Coyotes and/or wild dogs are rare but possible in work areas and elsewhere on the facility. Ground squirrels are possible on ASARCO property east of I-10. To minimize the possibility of a coyote, dog, squirrel bites, food or garbage containing food is not be left in work areas after break times. Garbage is to be bagged and either placed in a vehicle or in appropriate trash collection areas at the facility. Animals should not be fed and contact should always be avoided.

If bitten by a coyote, dog, or squirrel, the possibility exists for contracting rabies. Rabies is an acute, fatal encephalomyelitis caused by neurotropic viruses in the family Rhabdoviridae, genus Lyssavirus. Rabies is almost always transmitted by an animal bite that inoculates the virus into wounds. On rare occasions rabies has been transmitted by non-bite exposures that introduce the virus into open wounds or mucous membranes. The disease progresses from a nonspecific prodromal phase to paresis or paralysis; spasms of swallowing muscles can be stimulated by the sight, sound, or perception of water (hydrophobia); delirium and convulsions can develop, followed by coma and death. All mammals are believed to be susceptible, but reservoirs consist of carnivores and bats. Although dogs are the main reservoir in developing countries, the epidemiology of the disease differs sufficiently from one region or country to another to warrant the medical evaluation of all mammal bites, including rodents. The incubation between the exposure and the onset of symptoms are approximately 10-14 days however it is possible to get infected up to a year after exposure, depending on where the bite occurs.

Treatment for rabies includes the injection of rabies virus (human diploid cell vaccine, rabies vaccine absorbed and purified chick embryo cell culture). The vaccine must be administered within 24 to 48 hours after the bite. Immediate medical attention must be sought after a bite.
4.7. Noise

Exposure to noise over the OSHA action level can cause temporary impairment of hearing; prolonged and repeated exposure can cause permanent damage to hearing. The risk and severity of hearing loss increases with the intensity and duration of exposure to noise. In addition to damaging hearing, noise can impair voice communication, thereby increasing the risk of accidents on site.

**Control:** All personnel must wear hearing protection, with a Noise Reduction Rating (NRR) of at least 20, when noise levels exceed 85 dBA. When it is difficult to hear a co-worker at normal conversation distance, the noise level is approaching or exceeding 85 dBA, and hearing protection is necessary. All Site Personnel who may be exposed to noise must also receive baseline and annual audiograms and training as to the causes and prevention of hearing loss. Noise monitoring is discussed in Section 6.2, Noise Monitoring.

Whenever possible, equipment that does not generate excessive noise levels will be selected for this project. If the use of noisy equipment is unavoidable, barriers or increased distance will be used to minimize worker exposure to noise, if feasible.

4.8. Spill Control

All personnel must take every precaution to minimize the potential for spills during site operations. All on-site personnel shall immediately report any discharge, no matter how small.

Spill control equipment and materials will be located on the site at locations that present the potential for discharge. All sorbent materials used for the cleanup of spills will be containerized and labeled appropriately. In the event of a spill the Health and Safety Team will follow the provisions in Section 9, Emergency Procedures, to contain and control released materials and to prevent their spread to off-site areas.

4.9. Sanitation

Site sanitation will be maintained according to OSHA requirements. Adequate latrines and wash areas will be provided and readily accessible based on the number of Site Personnel.

4.9.1. Break Area

Breaks must be taken in the SZ, away from the active work area after Site Personnel go through decontamination procedures. There will be no, eating, drinking, or chewing gum or tobacco in any area other than the SZ. Smoking is prohibited on the site at all times.
4.9.2. **Potable Water**

The following rules apply to all field operations:

- An adequate supply of potable water will be provided at each project site. Potable water must be kept away from hazardous materials or media, and contaminated clothing or equipment.
- Portable containers used to dispense drinking water must be capable of being tightly closed, and must be equipped with a tap dispenser. Water must not be consumed directly from the container (drinking from the tap is prohibited) nor may it be removed from the container by dipping.
- Containers used for drinking water must be clearly marked and shall not be used for any other purpose.
- Disposable drinking cups must be provided. A sanitary container for dispensing cups and a receptacle for disposing of used cups is required.

4.9.3. **Sanitary Facilities**

Access to facilities for washing before eating, drinking, or alternate methods appropriate to COC exposure (such as waterless hand-cleaner) and paper towels will be provided.

4.9.4. **Lavatory**

If permanent toilet facilities are not available, an appropriate number of portable chemical toilets will be provided.

This requirement does not apply to mobile crews or to normally unattended site locations so long as employees at these locations have transportation immediately available to nearby toilet facilities.

4.10. **Emergency Equipment**

Adequate emergency equipment for the activities being conducted on site and as required by applicable sections of 29 CFR 1910 and 29 CFR 1926 will be on site prior to the commencement of project activities. Available emergency equipment should include, but is not limited to, the following:

- Fire extinguishers of adequate size, class, number, and location as required by applicable sections of 29 CFR 1910 and 1926;
- Industrial first aid kits of adequate size for the number of personnel on site; and
- Emergency eyewash and/or shower if required by operations being conducted on site.
4.11. Lockout/Tagout Procedures

Only fully qualified and trained personnel will perform maintenance procedures. Before maintenance begins, lockout/tagout procedures per OSHA 29 CFR 1910.147 will be followed.

Lockout is the placement of a device that uses a positive means, such as lock, to hold an energy or material-isolating device such that the equipment cannot be operated until the lockout device is removed. If a device cannot be locked out, a tagout system shall be used. Tagout is the placement of a warning tag on energy or material isolating device indicating that the equipment controls may not be operated until the tag is removed by the personnel who attached the tag.

4.12. Electrical Safety

Electricity may pose a particular hazard to site workers due to the use of portable electrical equipment. If wiring or other electrical work is needed, a qualified electrician must perform it.

General electrical safety requirements include:

- All electrical wiring and equipment must be a type listed by Underwriters Laboratories (UL), Factory Mutual Engineering Corporation (FM), or other recognized testing or listing agency.
- All installations must comply with the National Electrical Safety Code (NESC), the National Electrical Code (NEC), or USCG regulations.
- Portable and semi-portable tools and equipment must be grounded by a multi-conductor cord having an identified grounding conductor and a multi-contact polarized plug-in receptacle.
- Tools protected by an approved system of double insulation, or its equivalent, need not be grounded. Double insulated tools must be distinctly marked and listed by UL or FM.
- Live parts of wiring or equipment must be guarded to prevent persons or objects from touching them.
- Electric wire or flexible cord passing through work areas must be covered or elevated to protect it from damage by foot traffic, vehicles, sharp corners, projections, or pinching.
- All circuits must be protected from overload.
- Temporary power lines, switchboxes, receptacle boxes, metal cabinets, and enclosures around equipment must be marked to indicate the maximum operating voltage.
Plugs and receptacles must be kept out of water unless of an approved submersible construction.

All extension cord outlets must be equipped with ground fault circuit interrupters (GFCI).

Attachment plugs or other connectors must be equipped with a cord grip and be constructed to endure rough treatment.

Extension cords or cables must be inspected prior to each use, and replaced if worn or damaged. Cords and cables must not be fastened with staples, hung from nails, or suspended by bare wire.

Flexible cords must be used only in continuous lengths without splice, with the exception of molded or vulcanized splices made by a qualified electrician.

### 4.13. Lifting Safety

Using proper lifting techniques may prevent back strain or injury. The fundamentals of proper lifting include:

- Consider the size, shape, and weight of the object to be lifted. A mechanical lifting device or additional persons must be used to lift an object if it cannot be lifted safely alone.
- The hands and the object should be free of dirt or grease that could prevent a firm grip.
- Gloves must be used, and the object inspected for metal slivers, jagged edges, burrs, or rough or slippery surfaces.
- Fingers must be kept away from points that could crush or pinch them, especially when putting an object down.
- Feet must be placed far enough apart for balance. The footing should be solid and the intended pathway should be clear.
- The load should be kept as low as possible, close to the body with the knees bent.
- To lift the load, grip firmly and lift with the legs, keeping the back as straight as possible.
- A worker should not carry a load that he or she cannot see around or over.
- When putting an object down, the stance and position are identical to that for lifting; the legs are bent at the knees, and the back is straight as the object is lowered.

### 4.14. Ladder Safety

When portable ladders are used for access to an upper landing surface, the ladder side rails shall extend at least 3 feet (9 m) above the upper landing surface to which the ladder
is used to gain access; or, when such an extension is not possible because of the ladder’s length, then the ladder shall be secured at its top to a rigid support that will not deflect, and a grasping device, such as a grab rail, shall be provided to assist employees in mounting and dismounting the ladder. In no case shall the extension be such that ladder deflection under a load would, by itself, cause the ladder to slip off its support.

- Ladders shall be maintained free of oil, grease, and other slipping hazards.
- Ladders shall not be loaded beyond the maximum intended load for which they were built, or beyond their manufacturer’s rated capacity.
- Ladders shall be used only for the purpose for which they were designed.
- Non-self-supporting ladders shall be used at an angle such that the horizontal distance from the top support to the foot of the ladder is approximately one-quarter of the working length of the ladder (the distance along the ladder between the foot and the top support).
- Wood job-made ladders with spliced side rails shall be used at an angle such that the horizontal distance is one-eighth the working length of the ladder.
- Fixed ladders shall be used at a pitch no greater than 90 degrees from the horizontal, as measured to the back side of the ladder.
- Ladders shall be used only on stable and level surfaces unless secured to prevent accidental displacement.
- Ladders shall not be used on slippery surfaces unless secured or provided with slip-resistant feet to prevent accidental displacement. Slip-resistant feet shall not be used as a substitute for care in placing, lashing, or holding a ladder that is used upon slippery surfaces, including, but not limited to, flat metal or concrete surfaces that are constructed so they cannot be prevented from becoming slippery.
- Ladders placed in any location where they can be displaced by workplace activities or traffic, such as in passageways, doorways, or drive ways, shall be secured to prevent accidental displacement, or a barricade shall be used to keep the activities or traffic away from the ladder.
- The area around the top and bottom of ladders shall be kept clear.
- The top of a non-self-supporting ladder shall be placed with the two rails supported equally unless it is equipped with a single support attachment.
- Ladders shall not be moved, shifted, or extended while occupied.
- Ladders shall have non-conductive side rails if they are used where the employee or the ladder could contact exposed energized electrical equipment.
- The top, top step, or the step labeled that it or any step above it should not be used as a step.
· Cross-bracing on the rear section of stepladders shall not be used for climbing unless the ladders are designed and provided with steps for climbing on both front and rear sections.

· Ladders shall be inspected by qualified staff for visible defects on a daily basis and after any occurrence that could affect their safe use.

· Portable ladders with structural defects, such as, but not limited to, broken or missing rungs, cleats, or steps; broken or split rails; corroded components; or other faulty or defective components shall either be immediately marked in a manner that readily identifies them as defective, or be tagged with “Do Not Use” or similar language, and shall be withdrawn from service.

· Fixed ladders with structural defects, such as, but not limited to, broken or missing rungs, cleats, or steps; broken or split rails; or corroded components; shall be withdrawn from service.

· Ladder repairs shall restore the ladder to a condition meeting its original design criteria, before the ladder is returned to use.

· Single-rail ladders shall not be used.

· When ascending or descending a ladder, the user shall face the ladder.

· Each employee shall use at least one hand to grasp the ladder when progressing up and/or down the ladder.

An employee shall not carry any object or load that could cause the employee to lose balance and fall.

4.15. Hot Work Safety Program

Welding, cutting, burning and heating operations have a high potential for personal injuries and fires. Precautions should be taken to assure a safe work environment.

All personnel performing Hot Work must follow guidelines set forth in their employer’s safety program.

The following are minimum safety precautions that must be taken during any welding, cutting, grinding or any other spark producing task.

· Any combustible materials such as paper clippings, wood shavings or textile fibers must be located a minimum of 35 feet away from the Hot Work activity. Flammables/combustibles may need to be shielded or covered by guards or flameproof covers if they cannot be moved.

· Any combustible metals such as magnesium or titanium must be identified and protected or removed prior to Hot Work being performed.
• All personal protective equipment (PPE) must be in good condition and used as required. Fire suppression equipment must be available and operational. Assure the proper type of extinguisher (e.g. Type A, B, C or D) is available.

• When Hot Work is to be performed on tanks, lines, or other equipment all associated pipes, lines, or other connections shall be disconnected or otherwise protected to assure complete isolation of the Hot Work area from combustible gases.

• Nearby moving or energized equipment that may create a safety hazard will be de-energized.

• Sewers and manholes in the immediate area will be tested and sealed as necessary.

• Used containers will be cleaned before any welding or cutting is performed on them.

• Continuous monitoring or periodic retesting of the area must be conducted as per the employer’s hot work procedure.

• The assigned fire watch must remain at the Hot Work site for a continuous 30 minute period after the completion of the hot work.

4.16. Pressurized Systems

Some piping and process systems may still contain residual pressure, as the systems were not decommissioned prior to site shut-down. Most of these systems will be found in the Acid Plant areas and may contain highly corrosive materials, but other piping systems throughout the facility have the potential to be pressurized. Caution must be exercised when dismantling any piping system, regardless of contents, that has the potential for pressurization. Properly trained personnel must inspect piping systems to verify that all residual pressure has been safely released prior to breaking any lines in the system in preparation for dismantling and demolition. If a system is found to be pressurized, contact the appropriate site personnel to determine the contents of the system and the proper procedure to safely de-pressurize the system.
5. Personal Protective Equipment

5.1. Levels of Protection

PPE is required to safeguard Site Personnel from various hazards. Varying levels of protection may be required depending on the levels of COC and the degree of physical hazard. This section presents the various levels of protection and defines the conditions of use for each level. A summary of the protective levels is presented in this section.

5.1.1. Level D Protection

The minimum level of protection that will be required at the site will be Level D, which will be worn when site conditions or air monitoring indicates no inhalation hazard exists. The following equipment will be used:

- Work clothing as prescribed by weather;
- Steel toe work boots, meeting ASTM International (ASTM) F2412-05 and F2413-05;
- Safety glasses or goggles, meeting ANSI Z87;
- Outer gloves chosen based on COC over nitrile surgical gloves (if handling soils or groundwater);
- Hard hat, meeting ANSI Z89, when falling object hazards are present; and
- Hearing protection (if noise levels exceed 85 dBA, then hearing protection with a USEPA NRR of at least 20 dBA must be used).

5.1.2. Modified Level D Protection

Modified Level D will be used when airborne contaminants are not present at levels of concern, but site activities present an increased potential for skin contact with contaminated materials. Modified Level D consists of:

- Tyvek® coveralls (polyethylene coated Tyvek® suits for handling liquids) when skin contact with COC-impacted media is anticipated;
- Latex/polyvinyl chloride (PVC) overboots when contact with COC-impacted media is anticipated;
- Steel toe work boots, meeting ASTM F2412-05 and F2413-05;
- Safety glasses or goggles, meeting ANSI Z87;
- Face shield in addition to safety glasses or goggles when projectiles or splash hazards exist;
Section 5  
Personal Protective Equipment

- Outer gloves chosen based on COC over nitrile surgical gloves;
- Hard hat, meeting ANSI Z89 when falling object hazards are present;
- Hearing protection (if noise levels exceed 85 dBA, then hearing protection with a USEPA NRR of at least 20 dBA must be used); and
- Personal Flotation Device (PFD) if working in or near the water.

**5.1.3. Level C Protection**

Level C protection will be required when the airborne concentration of COC reaches ½ of the OSHA Permissible Exposure Limit (PEL) or American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Value (TLV). The following equipment will be used for Level C protection:

- Air-purifying respirator with appropriate cartridges for site COC;
- Polyethylene-coated Tyvek® suit (or equivalent), with ankles and cuffs taped to boots and gloves;
- Outer gloves chosen based on site COC over nitrile surgical gloves;
- Steel toe work boots, meeting ASTM F2412-05 and F2413-05;
- Chemical resistant boots with steel toes or latex/PVC overboots over steel toe boots;
- Hard hat, meeting ANSI Z89;
- Hearing protection (if noise levels exceed 85 dBA, then hearing protection with a USEPA NRR of at least 20 dBA must be used); and
- Personal Flotation Device (PFD) if working in or near the water.

**5.1.4. Level B Protection**

Level B will be used when site activities present an increased potential for skin contact or when air monitoring warrants an upgrade to Level B. Level B consists of:

- Tyvek® coveralls over Nomex® or 100% cotton coveralls.
- Conductive footwear when contact with any energetic hazardous materials is anticipated and when working on conductive floors.
- Steel toe work shoes, meeting ASTM F2412-05 and F2413-05.
- Safety glasses or goggles with side shields, meeting ANSI Z87.1; assure that tinted safety glasses are not worn indoors.
- Full Face Supplied Air Respirator.
- Leather gloves over PVC surgical gloves; however, gloves should not be worn around moving machine parts such as belts, pulleys and gears.
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- Hard hat meeting ANSI Z89.

NOTE: Activities requiring Level A PPE are not anticipated. If project activities require the use of Level A protection an addendum to the HASP will be issued.

5.1.4.1. **Donning Procedures**
- Remove bulky outerwear; remove street clothes and store in clean location.
- Put on the required chemical protective coveralls.
- Put on the required chemical protective boots or boot cover.
- Put on the required chemical protective gloves.
- Tape the wrists of the protective coveralls to the gloves.
- Don remaining PPE, such as safety glasses or goggles and hard hat.

5.1.4.2. **Doffing Procedures**
- Upon entering the CRZ, rinse contaminated materials from the boots or remove contaminated boot covers.
- Clean reusable protective equipment.
- Remove protective garments and equipment. All disposable clothing should be placed in plastic bags, which are labeled with contaminated waste labels.
- Wash hands, face, and neck.
- Proceed to clean area and dress in clean clothing

All disposable equipment, garments and PPE must be bagged in plastic bags, labeled for disposal. See Section 7, Work Zones and Decontamination, for detailed information on decontamination stations.

5.2. **Selection of PPE**

Equipment for personal protection will be selected based on the potential for contact, site conditions, ambient air quality, and the judgment of supervising Site Personnel and health and safety professionals. The PPE used will be chosen to be effective against the COC present on the site.

5.3. **Site Respiratory Protection Program**

Respiratory protection is an integral part of employee health and safety at the site due to potentially hazardous concentrations of airborne COC. Respiratory protection programs on-site shall consist of the following (as a minimum):

- All personnel who may use respiratory protection should have an assigned respirator.
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Personal Protective Equipment

- All on-site personnel who may use respiratory protection will have been fit tested and trained in the use of a full-face air-purifying respirator within the past 12 months.

- All on-site personnel who may use respiratory protection must within the past year have been medically certified as being capable of wearing a respirator. Documentation of the medical certification must be provided to the Texas Custodial Trust Safety officer, prior to commencement of site work. PIRNIE’s HSS is designated by the Trust to maintain all certifications.

- Only cleaned, maintained, NIOSH-approved respirators will be used.

- If respirators are used, the respirator cartridge is to be properly disposed of as determined by the manufacture guidelines, or when load-up or breakthrough occurs.

- Contact lenses are not to be worn when a respirator is worn.

- All on-site personnel who may use respiratory protection must be clean-shaven. Mustaches and sideburns are permitted, but they must not touch the sealing surface of the respirator.

- Respirators will be inspected, and a negative pressure test performed prior to each use.

- After each use, the respirator will be wiped with a disinfectant, cleansing wipe. When used, the respirator will be thoroughly cleaned at the end of the work shift. The respirator will be stored in a clean plastic bag, away from direct sunlight in a clean, dry location, in a manner that will not distort the face piece.

5.4. Using PPE

Depending upon the level of protection selected, specific donning and doffing procedures may be required. The procedures presented in this section are required if Modified Level D or Level C PPE is used. All personnel entering the EZ must put on the required PPE in accordance with the requirements of this SHASP. When leaving the EZ, PPE will be removed in accordance with the procedures listed, to minimize the spread of COC.

5.4.1. Donning Procedures

These procedures are required only if Modified Level D or Level C PPE is used on the site:

- Remove bulky outerwear. Remove street clothes and store in clean location;
- Put on work clothes or coveralls;
- Put on the required chemical protective coveralls;
- Put on the required chemical protective boots or boot covers;
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- Tape the legs of the coveralls to the boots with duct tape;
- Put on the required chemical protective gloves;
- Tape the wrists of the protective coveralls to the gloves;
- Don the required respirator and perform appropriate fit check (Level C);
- Put hood or head covering over head and respirator straps and tape hood to face piece (Level C); and
- Don remaining PPE, such as safety glasses or goggles and hard hat.

When these procedures are instituted, one person must remain outside the work area to ensure that each person entering has the proper protective equipment.

5.4.2. Doffing Procedures

The following procedures are only required if Modified Level D or Level C PPE is required for the site. Whenever a person leaves the work area, the following decontamination sequence will be followed:

- Upon entering the CRZ, rinse contaminated materials from the boots or remove contaminated boot covers;
- Clean reusable protective equipment;
- Remove protective garments, equipment, and respirator (Level C). All disposable clothing should be placed in plastic bags, which are labeled with contaminated waste labels;
- Wash hands, face, and neck (or shower if necessary);
- Proceed to clean area and dress in clean clothing; and
- Clean and disinfect respirator for next use.

All disposable equipment, garments, and PPE must be bagged in plastic bags, labeled for disposal. See Section 7, Work Zones and Decontamination, for detailed information on decontamination stations.

5.5. Selection Matrix

The level of personal protection selected will be based on air monitoring of the work environment and an assessment by the qualified health and safety staff of the potential for skin and respiratory contact with COC. The PPE selection matrix is presented in Table 5-1. This matrix is based on information available at the time this plan was written. The Airborne Contaminant Action Levels in Section 6 should be used to verify that the PPE prescribed in these matrices is appropriate.
### Table 5-1: PPE Selection Matrix

<table>
<thead>
<tr>
<th>Task</th>
<th>Level of Protection</th>
</tr>
</thead>
<tbody>
<tr>
<td>Site Set-Up, SZ Work</td>
<td>Level D/Modified Level D</td>
</tr>
<tr>
<td>Demolition</td>
<td>Level D/Modified Level D</td>
</tr>
<tr>
<td>Drum Handling</td>
<td>Level D/Modified Level D</td>
</tr>
<tr>
<td>Excavation</td>
<td>Modified Level D/Level C</td>
</tr>
<tr>
<td>Decontamination</td>
<td>Modified Level D/Level C</td>
</tr>
<tr>
<td>Demobilization</td>
<td>Modified Level D/Level C</td>
</tr>
</tbody>
</table>
6. Air Monitoring

6.1. Air Monitoring

6.1.1. General
Air monitoring will be integral to all activity during the cleanup of the former ASARCO smelter property. The air monitoring program will be implemented to include three components: 1) worker monitoring, 2) work area monitoring and 3) Site perimeter monitoring. All three components of the program will require selected air monitoring instruments discussed in Section 6.1.2. The worker monitoring component, discussed in Section 6.1.3, focuses on protection of workers. The work area monitoring component, discussed in Section 6.1.4, focuses on controlling airborne constituents on-site. The perimeter monitoring component discussed in Section 6.1.5 [and also described in the Community Assurance Plan (CAP), Appendix C] focuses on confirming the prevention of airborne dust migration from the site.

6.1.2. Air Monitoring Instrument Maintenance and Calibration
All air monitoring instrumentation shall be maintained and calibrated in accordance with manufacturer’s instructions and procedures. Instruments that are anticipated to be used are listed in Table 6-1.

Table 6-1: Ambient Air Monitoring Instruments

<table>
<thead>
<tr>
<th>Parameter to monitor</th>
<th>Instrument</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dust (continuous)</td>
<td>Portable continuous particle size monitors (PCPSMs) capable of measuring real time total particulate concentrations in air with data logging.</td>
</tr>
<tr>
<td>Dust (baseline)</td>
<td>High volume air sampler or Gilian air sampler</td>
</tr>
<tr>
<td>Weather conditions at Site (continuous)</td>
<td>Portable meteorological station capable of measuring wind direction and speed, temperature, humidity and precipitation with data logging.</td>
</tr>
<tr>
<td>Personnel breathing zone (baseline)</td>
<td>Gilian air sampler or equivalent with compound specific detector tubes when specified.</td>
</tr>
<tr>
<td>Personnel breathing zone (continuous organic exposure monitoring when needed)</td>
<td>Photo-ionization detector (PID).</td>
</tr>
<tr>
<td>Work atmosphere and personnel breathing zone (continuous monitoring when needed)</td>
<td>4-gas meter including combustible gas (LEL), oxygen (O₂), carbon monoxide (CO) and hydrogen sulfide (H₂S).</td>
</tr>
</tbody>
</table>
Calibration activities should be conducted under the approximate environmental conditions in which the instrument will be used. Instruments must be calibrated before and after use, noting the reading(s) and any adjustments that are necessary. All air monitoring equipment calibrations, including the standard used for calibration, must be documented on a calibration log or in a field notebook. All air monitoring equipment will be maintained and calibrated in accordance with the specific manufacturer’s procedures. Preventive maintenance and repairs will be conducted in accordance with the respective manufacturer’s procedures. When applicable, only manufacturer-trained and/or authorized personnel will be allowed to perform instrument repairs or preventive maintenance.

If an instrument is found to be inoperative or suspected of giving erroneous readings, the FSO will be responsible for immediately removing the instrument from service and obtaining a replacement unit. If the instrument is essential for safe operation during a specific activity, that activity must cease until an appropriate replacement unit is obtained. The FSO will be responsible for ensuring a replacement unit is obtained and/or repairs are initiated on the defective equipment.

6.1.3. Worker Air Monitoring

Air monitoring will be conducted to determine employee exposure to airborne constituents and assure the working environment is safe to occupy. The monitoring results will dictate work procedures and the selection of PPE. The monitoring devices to be used are personal air pumps (e.g. Gilian air sampler) with compound specific detection tubes (as needed), a Photo-Ionization Detector (PID) with a 10.2 eV lamp and a four-gas meter to measure lower explosive limit (LEL), oxygen, carbon monoxide and hydrogen sulfide.

Monitoring for oxygen, flammable vapors, hydrogen sulfide, and organic vapors will be conducted during any excavation entry or other area where these constituents are suspected. Air monitoring will be conducted continuously with the four-gas meter during drilling and/or in areas where flammable vapors or gases are suspect. All work activity must stop where tests indicate the concentration of flammable vapors exceeds 10% of the LEL at a location with a potential ignition source. Such an area must be ventilated to reduce the concentration to an acceptable level. In areas where petroleum hydrocarbons are suspected, benzene detector tube readings must be taken if PID readings exceed 2 parts per million (ppm), and are sustained for 15 minutes in the breathing zone. Specific action levels in milligrams per cubic meter (mg/m³) or ppm and response actions for the other constituents are provided in Table 6-2.
### Table 6-2: On-Site Action Levels and Response Actions Requirements

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Standard</th>
<th>Action Level</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arsenic (Inorganic)</td>
<td>PEL = 0.01 mg/m³</td>
<td>Greater than 0.005 mg/m³ (action level) sustained in the breathing zone for 1 minute.</td>
<td>- Stop work and leave the immediate area</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Initiate dust suppression activities</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- FSO dons Level C PPE and monitors again after dust suppression is initiated</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- If readings are less than 0.005 mg/m³, resume work</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- If readings are greater than 0.005 mg/m³ continue dust suppression, and don Level C PPE</td>
</tr>
<tr>
<td>Cadmium</td>
<td>PEL = 0.005 mg/m³</td>
<td>Greater than 0.003 mg/m³ (action level) sustained in the breathing zone for 1 minute.</td>
<td>- Stop work and leave the immediate area</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Initiate dust suppression activities</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- FSO dons Level C PPE and monitors again after dust suppression is initiated</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- If readings are less than 0.003 mg/m³, resume work</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- If readings are greater than 0.003 mg/m³ continue dust suppression, and don Level C PPE</td>
</tr>
<tr>
<td>Chromium</td>
<td>PEL = 0.5 mg/m³, REL = 1.0 mg/m³</td>
<td>Greater than 0.3 mg/m³ (action level) sustained in the breathing zone for 1 minute.</td>
<td>- Stop work and leave the immediate area</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Initiate dust suppression activities</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- FSO dons Level C PPE and monitors again after dust suppression is initiated</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- If readings are less than 0.3 mg/m³, resume work</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- If readings are greater than 0.3 mg/m³ continue dust suppression, and don Level C PPE</td>
</tr>
<tr>
<td>Copper</td>
<td>PEL = 1 mg/m³, REL = 1 mg/m³</td>
<td>Greater than 0.5 mg/m³ (action level) sustained in the breathing zone for 1 minute.</td>
<td>- Stop work and leave the immediate area</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Initiate dust suppression activities</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- FSO dons Level C PPE and monitors again after dust suppression is initiated</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- If readings are less than 0.5 mg/m³, resume work</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- If readings are greater than 0.5 mg/m³ continue dust suppression, and don Level C PPE</td>
</tr>
<tr>
<td>Iron (as Iron Oxide Fe₂O₃)</td>
<td>PEL = 5 mg/m³, REL = 10 mg/m³</td>
<td>Greater than 3 mg/m³ (action level) sustained in the breathing zone for 1 minute</td>
<td>- Stop work and leave the immediate area</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Initiate dust suppression activities</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- FSO dons Level C PPE and monitors again after dust suppression is initiated</td>
</tr>
</tbody>
</table>
### Parameter | Standard | Action Level | Action |
---|---|---|---|
**Lead (Inorganic)** | PEL = 0.05 mg/m³  
REL = 0.05 mg/m³ | Greater than 0.03 mg/m³ (action level) sustained in the breathing zone for 1 minute. | • Stop work and leave the immediate area  
• Initiate dust suppression activities  
• FSO dons Level C PPE and monitors again after dust suppression is initiated  
• If readings are less than 0.03 mg/m³, resume work  
• If readings are greater than 0.03 mg/m³ continue dust suppression, and don Level C PPE |
**Selenium** | PEL = 0.3 mg/m³  
REL = 0.2 mg/m³ | Greater than 0.1 mg/m³ (action level) sustained in the breathing zone for 1 minute. | • Stop work and leave the immediate area  
• Initiate dust suppression activities  
• FSO dons Level C PPE and monitors again after dust suppression is initiated  
• If readings are less than 0.1 mg/m³, resume work  
• If readings are greater than 0.1 mg/m³ continue dust suppression, and don Level C PPE |
**Zinc (as Zinc Oxide ZnO)** | PEL = 5 mg/m³  
REL = 5 mg/m³ | Greater than 3 mg/m³ (action level) sustained in the breathing zone for 1 minute. | • Stop work and leave the immediate area  
• Initiate dust suppression activities  
• FSO dons Level C PPE and monitors again after dust suppression is initiated  
• If readings are less than 3 mg/m³, resume work  
• If readings are greater than 3 mg/m³ continue dust suppression, and don Level C PPE |
**Airborne Particulates (Nuisance dust)** | PEL = 15 mg/m³ / 24-hour period | 0 to 1.5 mg/m³  
>1.5 mg/m³ | • Normal operations; continue hourly breathing zone monitoring  
• Initiate dust suppression measures; if suppression measures are insufficient to reduce particulates below 1.5 mg/m³ to 3 mg/m³, upgrade to Level C and increase monitoring frequency to every 15 minutes |
**Silica** | REL = 0.05 mg/m³ | Greater than 0.025 mg/m³ (action level) sustained in the breathing zone for 1 minute. | • Stop work and leave the immediate area  
• Initiate dust suppression activities  
• FSO dons Level C PPE and monitors again after dust suppression is initiated  
• If readings are less than 0.025 mg/m³, resume work |
### Section 6
Air Monitoring

#### Parameter

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Standard</th>
<th>Action Level</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Benzene</strong></td>
<td>PEL = Ca TWA 0.1 ppm, St 1 ppm</td>
<td>1 ppm to 10 ppm</td>
<td>Normal operations</td>
</tr>
<tr>
<td></td>
<td>REL = 0.1-1 ST ppm</td>
<td>10 ppm</td>
<td>Upgrade to Level C PPE</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Stop work; investigate cause of reading, contact HSO</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Carbon Monoxide</strong></td>
<td>PEL = 50 ppm</td>
<td>0 ppm to 20 ppm</td>
<td>Normal operations</td>
</tr>
<tr>
<td></td>
<td>REL = 35 ppm</td>
<td>&gt; 20 ppm</td>
<td>Stop work, evacuate confined spaces/work area, investigate cause of reading, and ventilate area</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Flammable Vapors (LEL)</strong></td>
<td>(1)</td>
<td>&lt; 10% LEL</td>
<td>Normal operations</td>
</tr>
<tr>
<td></td>
<td></td>
<td>≥ 10% LEL</td>
<td>Stop work, ventilate area, investigate source of vapors</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Hydrogen Sulfide</strong></td>
<td>PEL = 20 ppm</td>
<td>0 ppm to 5 ppm</td>
<td>Normal operations</td>
</tr>
<tr>
<td></td>
<td>REL = 10 ppm</td>
<td>&gt; 5 ppm</td>
<td>Stop work, evacuate confined spaces/work area, investigate cause of reading, and ventilate area</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Oxygen</strong></td>
<td>(1)</td>
<td>≤ 19.5%</td>
<td>Stop work, evacuate confined spaces/work area, investigate cause of reading, and ventilate area</td>
</tr>
<tr>
<td></td>
<td></td>
<td>&gt; 19.5% to &lt; 23.5%</td>
<td>Normal operations</td>
</tr>
<tr>
<td></td>
<td></td>
<td>≥ 23.5%</td>
<td>Stop work, evacuate confined spaces/work area, investigate cause of reading, and ventilate area</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total Hydrocarbons</strong></td>
<td>(1)</td>
<td>0 ppm to 2 ppm (above background)</td>
<td>Normal operations; continue hourly breathing zone monitoring</td>
</tr>
<tr>
<td></td>
<td></td>
<td>&gt; 2 ppm to 5 ppm</td>
<td>Increase monitoring frequency to every 15 minutes and use benzene detector tube to screen for the presence of benzene</td>
</tr>
<tr>
<td></td>
<td></td>
<td>≥ 5 ppm to ≤ 50 ppm</td>
<td>Upgrade to Level C PPE; continue screening for benzene</td>
</tr>
<tr>
<td></td>
<td></td>
<td>&gt; 50 ppm</td>
<td>Stop work; investigate cause of reading</td>
</tr>
</tbody>
</table>

PEL = OSHA Permissible Exposure Limit
REL = NIOSH Recommended Exposure Limit
(1) = Best Practice
ST = Short-term
Worker airborne particulate monitoring will be completed in conjunction with the work area monitoring described in section 6.1.4. For a given work area, characterization samples (e.g. subsurface data, wipe sample results) will be reviewed to determine an initial assessment of the hazards. Appropriate PPE will be specified consistent with the identified hazards. Calculations will be performed to determine action levels of the work area portable continuous particle size monitors (PCPSMs) based on maximum soil or dust COC values in the work area. Gilian samplers will be calibrated and attached to workers to obtain representative 8-hour samples during work activities. Samples will be retrieved from the Gilian samplers and evaluated for the constituents shown in Table 6-2 (except organic compounds unless identified in the work area). Analytical results will be reviewed to confirm workers are not exposed to constituents above Permissible Exposure Limits (PELs) or other applicable standards. If needed, PPE requirements will be revised and PCPSM action levels adjusted.

### 6.1.4. Work Area Air Monitoring

Work areas will be continuously monitored using PCPSMs to confirm work area action levels are not exceeded (see Table 6-2). As shown in Figure 6-1, work areas will be instrumented with PCPSMs, one up-wind and one down-wind (based on anticipated prevailing and measured winds from the meteorological station). For a given work area, characterization samples (e.g. subsurface data, wipe sample results) will be reviewed to determine an initial assessment of the hazards. Appropriate PPE will be specified consistent with the identified hazards. Calculations will be performed to determine action levels of the work area PCPSMs based on observed maximum soil or dust COC values in the work area. Care will be taken to assure all workers in the area know the COCs that are creating the lowest action levels from direct PCPSM readings since they may be different from area to area. Response actions will be taken in accordance with Table 6-2 if the action levels are exceeded.

### 6.1.5. Perimeter Air Monitoring Program

To confirm and document that operations on-site are not causing migration of COCs off-site, continuous dust monitoring at the site perimeter will be implemented during demolition and site remediation activities. Figure 6-1 shows the anticipated monitoring locations. PCPSMs will be placed along the site perimeter to monitor dust. PCPSMs will be placed up-wind, cross-wind, and down-wind of site operations. PCPSM locations will be adjusted to account for seasonal prevailing wind directions. In addition, a PCPSM will be located to monitor conditions near the Calavera subdivision. High volume air samplers will also be used to monitor certain activities at selected times to confirm baseline data for PCPSM calculated values. The number and location of the monitors will be matched to the number and type of activities taking place at the site. Consistent with materials at the Site, Table 6-3 shows the constituents that will be evaluated and reported with action levels in micrograms per cubic meter ($\mu$g/m$^3$) shown taken from the TCEQ Effects Screening Level table, published in June, 2010. If action levels are exceeded,
Legend

- Perimeter Air Sampling Location (select 24 hr period)
- Meteorological Station
- Perimeter Dust Monitoring Location (Continuous)
- Work Area Dust Monitoring Location (Continuous)
- Texas Custodial Trust Property Boundary
- Work Area
- Prevailing Wind Direction

Note: The prevailing wind direction indicated is based on average annual prevailing wind direction. Dust monitor locations will be adjusted to account for seasonal prevailing wind directions. See Section 6.1.5.
background values will be evaluated and compared to measured values. If site activities are determined to be the cause of the exceedances, work will be stopped and additional dust suppression activities will be implemented. In the event additional constituents are identified during site activities, they will be added to the monitoring program. Data will be downloaded from PCPSMs and evaluated daily and reported in accordance with the CAP in Appendix C.

Table 6-3: Perimeter Action Levels

<table>
<thead>
<tr>
<th>Perimeter</th>
<th>Analytical Method</th>
<th>1-hour ST-ESL (µg/m³)</th>
<th>Ave-annual LT-ESL (µg/m³)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arsenic (Inorganic)</td>
<td>EPA 6010</td>
<td>0.1</td>
<td>0.01</td>
</tr>
<tr>
<td>Cadmium</td>
<td>EPA 6010/6020</td>
<td>0.1</td>
<td>0.01</td>
</tr>
<tr>
<td>Chromium</td>
<td>EPA 6010</td>
<td>3.6</td>
<td>0.041</td>
</tr>
<tr>
<td>Copper</td>
<td>EPA 6010/6020</td>
<td>10</td>
<td>1</td>
</tr>
<tr>
<td>Iron (as Iron Oxide Fe₂O₃)</td>
<td>EPA 6010/6020</td>
<td>50 PM</td>
<td>5 PM</td>
</tr>
<tr>
<td>Lead (¹) (Inorganic)</td>
<td>EPA 6010</td>
<td>0.15 (rolling 3-month average)</td>
<td>1.5 (quarterly average)</td>
</tr>
<tr>
<td>Mercury</td>
<td>EPA 7470</td>
<td>0.25</td>
<td>0.025</td>
</tr>
<tr>
<td>Selenium</td>
<td>EPA 6010/6020</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Zinc (as Zinc Oxide ZnO)</td>
<td>EPA 6010/6020</td>
<td>20 PM</td>
<td>2 PM</td>
</tr>
<tr>
<td>Airborne Particulates (¹)</td>
<td>NA(²)</td>
<td>150 PM10, 24-hour</td>
<td>15 PM2.5</td>
</tr>
<tr>
<td>Silica</td>
<td>EPA 6010/6020</td>
<td>14 (PM10)</td>
<td>0.27 PM4</td>
</tr>
</tbody>
</table>

¹ From national Ambient Air Quality Standards (NAAQS)
² Collected in accordance with Manufacturer’s Operating Procedures.

6.2. Noise Monitoring

Noise monitoring may be conducted as required if excessive noise is suspected utilizing applicable, calibrated instruments. Hearing protection is mandatory for all employees in noise hazard areas, such as around heavy equipment and any area above a sound level of 85 dB. As a general rule, sound levels that cause speech interference at normal conversation distance should require the use of hearing protection.
7. Work Zones and Decontamination

7.1. Work Zones

7.1.1. Authorization to Enter

Only personnel with the appropriate training and medical certifications (if respirators are required) will be allowed to work at the project site. The Trust (or their designee) will maintain a list of authorized persons; only personnel on the authorized persons list will be allowed to enter the site work areas.

7.1.2. Site Orientation and Hazard Briefing

No person will be allowed in the work area during site operations without first being given a site orientation and hazard briefing. This orientation will be presented by the Trust Safety Officer (or designee), and will consist of a review of this SHASP and any applicable site-specific HASPs. This review must cover the chemical, physical, and biological hazards, protective equipment, safe work procedures, and emergency procedures for the project. Following this initial meeting, daily safety meetings will be held each day before work begins. A shortened safety briefing will be presented to site visitors.

All people entering the site work areas, including visitors, must document their attendance at this briefing, as well as the daily safety meetings. An example form is included with this plan (Appendix A) or other approved forms.

7.1.3. Certification Documents

A training and medical file will be established by each entity on-site for and kept on site during all site operations. Specialty training, such as first aid/cardio pulmonary resuscitation (CPR) certificates, as well as current medical clearances for all project field personnel required to wear respirators, will be maintained within that file. All contractors and associated subcontractors must provide their training and medical documentation to the Trust prior to starting work.

7.1.4. Entry Log

A log-in/log-out sheet will be maintained at the site by the Trust. Personnel must sign in and out on a log sheet at the Security Gate as they enter and leave the site.
7.1.5. **Entry Requirements**

In addition to the authorization, hazard briefing, and certification requirements listed above, no person will be allowed in any work area unless they are wearing the minimum PPE as described in Section 5, Personal Protective Equipment.

7.1.6. **Emergency Entry and Exit**

People who must enter a work area on an emergency basis will be briefed of the hazards. All activities will cease in the event of an emergency. People exiting the work area because of an emergency will gather in a safe area for a head count. The FSO is responsible for ensuring that all people who entered the work area have exited in the event of an emergency.

Prior to the beginning of every major site activity (i.e.: demolition of smelter buildings) the Trust will offer to set up a briefing for First Responders (Fire, Rescue, etc.) from the City of El Paso to acquaint them on the general area of work and expected hazards. This briefing will be given by the Health and Safety Team. Should it be necessary during on-site activities to call First Responders crews to the site the Trust or controlling contractor will brief them on the specific emergency situation.

7.1.7. **Contamination Control Zones for Environmental Remediation Work**

Contamination control zones (CCZ) are maintained to prevent the spread of contamination and to prevent unauthorized people from entering hazardous areas.

7.1.7.1. **Exclusion Zone**

An EZ may consist of a specific work area, or may be the entire area of potential contamination CCZ. All employees entering an EZ must use the required PPE, and must have the appropriate training and medical clearance for hazardous waste work. The EZ is the defined area where there is a possible respiratory and/or contact health hazard. Cones, caution tape, or a site diagram will identify the location of each EZ.

7.1.7.2. **Contamination Reduction Zone**

The CRZ or transition area will be established, if necessary, to perform decontamination of personnel and equipment. All personnel entering or leaving the EZ will pass through this area to prevent any cross-contamination. Tools, equipment, and machinery will be decontaminated in a specific location. The decontamination of all personnel will be performed on site adjacent to the EZ. Personal protective outer garments and respiratory protection will be removed in the CRZ and prepared for cleaning or disposal. This zone is the only appropriate corridor between the EZ and the SZ.
7.1.7.3. Support Zone
The SZ is a clean area outside the CRZ located to prevent employee exposure to hazardous substances. Eating and drinking will be permitted in the support area only after proper decontamination.

7.1.8. Posting
Work areas will be prominently marked and delineated using cones, caution tape, or a site diagram.

7.1.9. Site Inspections
The FSO will conduct a daily inspection of site activities, equipment, and procedures to verify that the required elements are in place.

7.2. Decontamination

7.2.1. Personnel Decontamination
All personnel wearing Modified Level D, C or Level B protective equipment in the EZ must undergo personal decontamination prior to entering the SZ. The personnel decontamination area will consist of the following stations at a minimum:

- **Station 1:** Personnel leaving the contaminated zone will remove the gross contamination from their outer clothing and boots.
- **Station 2:** Personnel will remove their outer garment and gloves and dispose of it in properly labeled containers. Personnel will then decontaminate their hard hats, and boots with an aqueous solution of detergent or other appropriate cleaning solution. These items are then hand carried to the next station.
- **Station 3:** Personnel will thoroughly wash their hands and face before leaving the CRZ. Respirators will be sanitized and then placed in a clean plastic bag.

**NOTE:** There is a working Bath House on the ASARCO site with a “clean” side and a “dirty” side where workers on the site can, after Station 3 (end of the work day) enter the dirty side of the Bath House; use an assigned locker for their work clothing, take a shower, enter the clean side to an assigned locker, put on their street clothes and leave the site. The next day they reverse the procedure.

7.2.2. Equipment Decontamination
All vehicles that have entered the EZ will be decontaminated at the decontamination pad prior to leaving the zone. If the level of vehicle contamination is low, decontamination may be limited to rinsing of tires and wheel wells with water. If the vehicle is significantly contaminated, steam cleaning or pressure washing of vehicles and equipment may be required. See also additional instructions in Section 3.2.8 and the ERM Demolition HASP.
7.2.3. **Personal Protective Equipment Decontamination**

Where and whenever possible, single-use, external protective clothing must be used for work within the EZ or CRZ. This protective clothing must be disposed of in properly labeled containers. Reusable protective clothing will be rinsed at the site with detergent and water. The rinsate will be collected for disposal.

When removed from the CRZ, the respirator will be thoroughly cleaned with soap and water. The respirator face piece, straps, valves, and covers must be thoroughly cleaned at the end of each work shift and be ready for use prior to the next shift. Respirator parts may be disinfected with a solution of bleach and water, or by using a spray disinfectant.
8. Training and Medical Surveillance

8.1. Training

8.1.1. General

All on-site project remediation personnel, less security personnel, who work in areas where they may be exposed to site contaminants must be trained as required by OSHA Regulation 29 CFR 1910.120 (HAZWOPER). Field employees also must receive a minimum of three days of actual field experience under the direct supervision of a trained, experienced supervisor. Personnel who completed their initial training more than 12 months prior to the start of the project must have completed an eight-hour refresher course within the past 12 months. (See section 2.2 for exceptions to the 40 Hour HAZWOPER requirement).

8.1.2. Basic 40-Hour Course

The following is a list of the topics typically covered in a 40-hour HAZWOPER training course:

- General safety procedures;
- Physical hazards (fall protection, noise, heat stress, cold stress);
- Names and job descriptions of key personnel responsible for site health and safety;
- Safety, health, and other hazards typically present at hazardous waste sites;
- Use, application, and limitations of PPE;
- Work practices by which employees can minimize risks from hazards;
- Safe use of engineering controls and equipment on site;
- Medical surveillance requirements;
- Recognition of symptoms and signs which might indicate overexposure to hazards;
- Worker right-to-know (Hazard Communication OSHA 1910.1200);
- Routes of exposure to contaminants;
- Engineering controls and safe work practices;
- Components of a health and safety program and a site-specific HASP;
- Decontamination practices for personnel and equipment;
Section 8
Training and Medical Surveillance

- Confined-space entry procedures; and
- General emergency response procedures.

8.1.3. Supervisor Course
Management and supervisors must receive an additional eight hours of training, which typically includes:

- General site safety and health procedures;
- PPE programs; and
- Air monitoring techniques.

8.1.4. Site-Specific Training
Site-specific training will be accomplished for personnel by Site Personnel reading this SHASP, or through a thorough site briefing by the Health & Safety Team on the contents of this SHASP before work begins. The review must include a discussion of the chemical, physical, and biological hazards; the protective equipment and safety procedures; and emergency procedures.

8.1.5. Daily Safety Meetings
The Trust will organize daily safety meetings that will cover the work to be accomplished, the hazards anticipated, the PPE and procedures required to minimize site hazards, and emergency procedures. If designated a member of the Health & Safety Team will present these meetings prior to beginning the day’s fieldwork. No work will be performed in an EZ before the daily safety meeting has been held. The daily safety meeting must also be held prior to new tasks, and repeated if new hazards are encountered. Daily Safety Meetings should be documented on a field log or similar method and retained for review.

8.1.6. First Aid and CPR
At least employee current in first aid/CPR should be assigned to the work crew and be on the site during operations. These individuals must also receive training regarding the precautions and protective equipment necessary to protect against exposure to blood-borne pathogens.

8.2. Medical Surveillance
Medical surveillance of Site Personnel shall be provided by entities of employees working on the Site that are engaged in activities regulated by OSHA at 29 CFR 1910.120 (F) or other applicable regulation. Contractors and associated subcontractors shall included specifics of medical surveillance programs in site-specific HASPs.
9. Emergency Procedures

9.1. General

Prior to the start of operations, the work area will be evaluated for the potential for fire, contaminant release, or other catastrophic event. Unusual conditions or events, activities, chemicals, and conditions should be reported to the Health & Safety Team immediately.

The Health & Safety Team will establish evacuation routes and assembly areas for the work site. All personnel entering the site will be informed of this route and the assembly area.

9.2. Emergency Response

If an incident occurs the following steps will be taken:

- The FSO or other supervisory personnel will evaluate the incident and assess the need for assistance and/or evacuation;
- The FSO or other supervisory personnel will call for outside assistance as needed;
- The FSO or other supervisory personnel will ensure the Trust is notified promptly of the incident; and
- The FSO or other supervisory personnel will take appropriate measures to stabilize the incident scene.

9.2.1. Fire

In the case of a fire, the FSO or other supervisory personnel will assess the situation and direct fire-fighting activities. The FSO or other supervisory personnel will ensure that the Trust is immediately notified of any fires. Site Personnel will attempt to extinguish the fire with available extinguishers, if safe to do so. In the event of a fire that Site Personnel are unable to safely extinguish with one fire extinguisher, the local fire department will be summoned.

9.2.2. Contaminant Release

In the event of a contaminant release, the following steps will be taken:

- Notify FSO and Trust immediately;
- Evacuate immediate area of release;
- Conduct air monitoring to determine needed level of PPE;
- Don required level of PPE and prepare to implement control procedures; and
- Take measures to safely contain and control released materials.

The FSO, Trust and other supervisory personnel here has the authority to commit resources as needed to contain and control released material and to prevent its spread to off-site areas.

9.3. **Medical Emergency**

All injuries must be promptly reported to the Health & Safety Team, who will:

- Assure that the injured employee receives prompt first aid and medical attention;
- In emergency situations, the worker is to be transported by appropriate means to the nearest urgent care facility (normally a hospital emergency room); and in non-emergency, the injured employee’s supervisor will determine appropriate steps to be taken.

9.3.1. **Emergency Care Steps**

Survey the scene. Determine if it is safe to proceed. Try to determine if the conditions that caused the incident are still a threat. Protect yourself from exposure before attempting to rescue the victim.

- Do a primary survey of the victim. Check for airway obstruction, breathing, and pulse. Assess likely routes of chemical exposure by examining the eyes, mouth, nose, and skin of the victim for symptoms.
- Phone Emergency Medical Services (EMS). Give the location, telephone number used, caller’s name, what happened, number of victims, victim’s condition, and help being given.
- Maintain airway and perform rescue breathing as necessary.
- Perform CPR as necessary.
- Do a secondary survey of the victim. Check vital signs and do a head-to-toe exam.

Treat other conditions as necessary. If the victim can be moved, take him/her to a location away from the work area where EMS can gain access.

9.4. **First Aid - General**

All persons must report any injury or illness to their immediate supervisor. Trained personnel will provide first aid. Injuries and illnesses requiring medical treatment must be documented. The Health and Safety Team must conduct an Incident Investigation as soon as emergency conditions no longer exist and first aid and/or medical treatment have been ensured. IIs must be completed and submitted to the Trust within 24 hours after the incident.
If first-aid treatment is required, first aid kits are kept at the CRZ. If treatment beyond first aid is required, the injured person(s) should be transported to the medical facility. If the injured person is not ambulatory, or shows any sign of not being in a comfortable and stable condition for transport, then an ambulance/paramedics should be summoned. If there is any doubt as to the injured worker’s condition, it is best to let the local paramedic or ambulance service examine and transport the worker.

9.4.1. First Aid - Inhalation

Any employee complaining of symptoms of chemical overexposure as described in Section 4, General Site Safety Procedures will be removed from the work area and transported to the designated medical facility for examination and treatment.

9.4.2. First Aid - Ingestion

Call EMS and consult a poison control center for advice. If available, refer to the MSDS for treatment information. If the victim is unconscious, keep them on their side and clear the airway if vomiting occurs.

9.4.3. First Aid – Skin Contact

Project personnel, who have had skin contact with contaminants will, unless the contact is severe, proceed through the CRZ, to the wash area. Personnel will remove any contaminated clothing, and then flush the affected area with water for at least 15 minutes. The worker should be transported to the medical facility if he/she shows any sign of skin reddening, irritation, or if he/she requests a medical examination.

9.4.4. First Aid – Eye Contact

Project personnel who have had contaminants splashed in their eyes or who have experienced eye irritation while in the EZ, must immediately proceed to the eyewash station in the CRZ. Do not decontaminate prior to using the eyewash. Remove whatever protective clothing is necessary to use the eyewash. Flush the eye with clean running water for at least 15 minutes. Arrange prompt transport to the designated medical facility.

9.5. Reporting Injuries, Illnesses, and Near Miss Incidents

Injuries and illnesses, however minor, shall be reported to the injured employee’s supervisor immediately. The supervisor shall complete an injury report and submit it to the Trust within 24 hours.

Near miss incidents are situations in which no injury or property damage occurred, but under slightly different circumstances an injury or property damage could have occurred. Near misses are caused by the same factors as injuries; therefore, they must be reported and investigated in the same manner.
9.6. Emergency Information

The means to summon local public response agencies such as police, fire, and ambulance will be reviewed in the daily safety meeting. These agencies are identified in Table 9-1.

Table 9-1: Emergency Contact Phone Numbers ASARCO Smelter Site

<table>
<thead>
<tr>
<th>Name</th>
<th>Telephone Numbers</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Office</td>
</tr>
<tr>
<td>Fire Department City of El Paso</td>
<td>--</td>
</tr>
<tr>
<td>Hospital</td>
<td>--</td>
</tr>
<tr>
<td>Medical Clinic</td>
<td>--</td>
</tr>
<tr>
<td>Police Department</td>
<td>--</td>
</tr>
<tr>
<td>Malcolm Pirnie</td>
<td></td>
</tr>
<tr>
<td>Site Supervisor – Alicia Fogg</td>
<td>915-747-3907</td>
</tr>
<tr>
<td>Project Manager – Scott Brown</td>
<td>602-438-0883</td>
</tr>
<tr>
<td>On-Site Technical Manager - Doug Solon</td>
<td>915-533-9025</td>
</tr>
<tr>
<td>Health and Safety Project Manager – Marc Gunter</td>
<td>908-685-7879</td>
</tr>
<tr>
<td>FSO - Bill Copeland</td>
<td>915-533-9025</td>
</tr>
<tr>
<td>ERM</td>
<td></td>
</tr>
<tr>
<td>Site Manager – Adrian Velazquez</td>
<td></td>
</tr>
<tr>
<td>FSO – Mike Casbon</td>
<td>--</td>
</tr>
<tr>
<td>Partner-in-Charge – Jeff Baugess</td>
<td>281-600-1232</td>
</tr>
<tr>
<td>Project Manager – Amy McDonald</td>
<td>281-600-1070</td>
</tr>
<tr>
<td>Health and Safety Project Manager – Richard Ecord</td>
<td>404-816-6606</td>
</tr>
<tr>
<td>Project Navigator</td>
<td></td>
</tr>
<tr>
<td>On-Site Manager - Walter Boyle</td>
<td></td>
</tr>
<tr>
<td>Trustee - Roberto Puga</td>
<td>714-388-1802</td>
</tr>
<tr>
<td>Security Gate</td>
<td>--</td>
</tr>
<tr>
<td>Border Patrol Supervisor</td>
<td>915-585-4184</td>
</tr>
<tr>
<td>Border Patrol Control</td>
<td>915-872-4788</td>
</tr>
</tbody>
</table>
9.6.1. **Directions to Hospital**

Directions to Providence Memorial Hospital
2001 North Oregon Street, El Paso, TX 79902 – (915) 577-6011
3.1 miles – about 7 minutes

- Head south on W. Paisano Drive toward Ruhlen Ct
- Exit onto W Yandell Drive toward I-85/S Downtown
- Turn left at Hawthorne St
- Turn right at Rim Rd
- Turn Left to Providence Memorial Hospital Emergency Room

Map from Google Maps
APPENDIX A

EXAMPLE SAFETY MEETING FORM
# DAILY HEALTH & SAFETY MEETING FORM

This form documents the Safety meeting conducted in accordance with the Site HASP. Personnel who perform work operations on-site during the day are required to attend this meeting and to acknowledge their attendance, at least daily.

<table>
<thead>
<tr>
<th>Project Name:</th>
<th>Project Location:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Date:</th>
<th>Time:</th>
<th>Conducted by:</th>
<th>Signature/Title:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Client:</th>
<th>Client Contact:</th>
<th>Subcontractor companies:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

## Tasks

Think through the Tasks (list the tasks for the day):

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

## Other Hazardous Activities - Check the box if there are any other activities that may pose hazards to personnel.

- [ ] If yes, describe them here:

- [ ] How will they be controlled?

## Prework Authorization - check activities to be conducted that require permit issuance or completion of a checklist or similar before work begins:

<table>
<thead>
<tr>
<th>Doc #</th>
<th>Doc #</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Not applicable</th>
<th>Working at Height</th>
<th>Confined Space</th>
</tr>
</thead>
<tbody>
<tr>
<td>Energy Isolation (LOTO)</td>
<td>Excavation/Trenching</td>
<td>Hot Work</td>
</tr>
<tr>
<td>Mechanical Lifting Ops</td>
<td>Overhead &amp; Buried Utilities</td>
<td>Other permit</td>
</tr>
</tbody>
</table>

## Discuss following questions (for some review previous day's post activities). Check if yes:

- [ ] Incidents from day before to review?
- [ ] Lessons learned from the day before?
- [ ] Any corrective actions from yesterday?
- [ ] Will any work deviate from plan?
- [ ] Are all required procedures addressed?
- [ ] Task Hazards reviewed, as needed?
- [ ] Staff has appropriate PPE?
- [ ] Staff knows Emergency Plan (EAP)?
- [ ] All equipment checked & OK?
- [ ] Staff knows gathering points?

## Recognize the hazards (check all those that are discussed) (Examples are provided) and Assess the Risks (Low, Medium, High - circle risk level) - Provide an overall assessment of hazards to be encountered today and briefly list them under the hazard category.

<table>
<thead>
<tr>
<th>Gravity (i.e., ladder, scaffold, trips) (L M H)</th>
<th>Motion (i.e., traffic, moving water) (L M H)</th>
<th>Mechanical (i.e., augers, motors) (L M H)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electrical (i.e., utilities, lightning) (L M H)</td>
<td>Pressure (i.e., gas cylinders, wells) (L M H)</td>
<td>Environment (i.e., heat, cold, ice) (L M H)</td>
</tr>
<tr>
<td>Chemical (i.e., fuel, acid, paint) (L M H)</td>
<td>Biological (i.e., ticks, poison ivy) (L M H)</td>
<td>Radiation (i.e., alpha, sun, laser) (L M H)</td>
</tr>
<tr>
<td>Sound (i.e., machinery, generators) (L M H)</td>
<td>Personal (i.e. alone, night, not fit) (L M H)</td>
<td>Dozer (L M H)</td>
</tr>
</tbody>
</table>

## Comments:

- [ ] Staff knows Emergency Plan (EAP)?
Important Information and Numbers

Visitor Name/Co - not involved in work

In Out

In Out

In Out

Post Daily Activities Review - Review at end of day or before next day’s work (Check those applicable and explain:)

☐ Lessons learned and best practices learned today: ________________________________

☐ Incidents that occurred today: ________________________________

☐ Any Stop Work interventions today? ________________________________

☐ Corrective/Preventive Actions needed for future work: ________________________________

☐ Any other H&S issues: ________________________________

Keep H&S 1st in all things
APPENDIX B

MATERIAL SAFETY DATA SHEETS FOR PRIMARY CHEMICALS OF CONCERN
MATERIAL SAFETY DATA SHEET
(POLYCHLORINATED BIPHENYLS)

COMPOSITION/INFORMATION ON INGREDIENTS
Ingredients Name: polychlorinated biphenyls (PCBs)

HAZARD IDENTIFICATION
Reports of Carcinogenicity: YES

HEALTH HAZARDS ACUTE AND CHRONIC
- **Eyes**: Moderately irritating to eye tissues.
- **Skin**: Can be absorbed through intact skin, may cause de-fatting, potential for chloracne.
- **Inhalation**: Possible liver injury.
- **Ingestion**: Slightly toxic; reasonably anticipated to be carcinogenic.

EFFECTS OF OVER-EXPOSURE
Can cause dermatological symptoms; however, these are reversible upon removal of exposure source.

FIRST AID MEASURES
- **Eyes**: Irrigate immediately with copious quantities of running water for at least 15 minutes if liquid or solid PCBs get into them.
- **Skin**: Contaminated clothing should be removed and the skin washed thoroughly with soap and water. Hot PCBs may cause thermal burns.
- **Inhalation**: Remove to fresh air; if skin rash or respiratory irritation persists, consult a physician (if electrical equipment arcs over, PCBs may decompose to produce hydrochloric acid).
- **Ingestion**: Consult a physician. Do not induce vomiting or give any oily laxatives. (If large amounts are ingested, gastric lavage is suggested).

FIRE FIGHTING MEASURES: Flash Point: >141 °C (285.8 °F)
**EXTINGUISHING MEDIA**: PCBs are fire-resistant compounds.
**FIRE-FIGHTING PROCEDURES**

Standard fire-fighting wearing apparel and self-contained breathing apparatus should be worn when fighting fires that involve possible exposure to chemical combustion products. Fire fighting equipment should be thoroughly cleaned and decontaminated after use.

**UNUSUAL FIRE/EXPLOSION HAZARD**

If a PCB transformer is involved in a fire-related incident, the owner of the transformer is required to report the incident. Consult and follow appropriate federal, provincial and local regulations.

*Note: When askarel liquid becomes involved in a fire, toxic by-products of combustion are typically produced including polychlorinated dibenzofurans and polychlorinated dibenzodioxins, both known carcinogens. The structures of these chemical species are as follows:*

```
\[
\begin{align*}
\text{TCDF} & : \quad C_{12}H_8nCl_nO \\
\text{n} & = 4 - 8 \\
\end{align*}
\]

\[
\begin{align*}
2,3,7,8\text{-tetrachlorodibenzofuran} \\
\end{align*}
\]

\[
\begin{align*}
\text{TCDD} & : \quad C_{12}H_8nCl_nO_2 \\
\text{n} & = 4 - 8 \\
\end{align*}
\]

\[
\begin{align*}
2,3,7,8\text{-tetrachloro-dibenzo-p-dioxin} \\
\end{align*}
\]

*Note: 2,3,7,8-tetrachloro-dibenzo-p-dioxin is one of the most potent teratogenic, mutagenic and carcinogenic agents known to man.*

**SPILL RELEASE PROCEDURES**

Cleanup & disposal of liquid PCBs are strictly regulated by the federal government. Ventilate area. Contain spill/leak. Remove spill by means of absorptive material. Spill clean-up personnel should use proper protective clothing. All wastes and residues containing PCBs should be collected, containerized, marked and disposed of in the manner prescribed by applicable federal, provincial and local laws.

**HANDLING AND STORAGE PRECAUTIONS**

Care should be taken to prevent entry into the environment through spills, leakage, use, vaporization, or disposal of liquid. Avoid prolonged breathing of vapours or mists. Avoid contact with eyes or prolonged contact with skin. Comply with all federal, provincial and local regulations.
OTHER PRECAUTIONS

Federal regulations require PCBs, PCB items, storage areas, transformer vaults, and transport vehicles to be appropriately labelled.

RESPIRATORY PROTECTION

Use OHSA approved equipment when airborne exposure limits are exceeded. Full facepiece equipment is recommended and, if used, replaces need for face shield and/or chemical splash goggles. The respirator use limitations specified by the manufacturer must be observed.

VENTILATION

Provide natural or mechanical ventilation to control exposure levels below airborne exposure levels.

PROTECTIVE GLOVES: Wear appropriate chemical resistant gloves to prevent skin contact.

EYE PROTECTION: Wear chemical splash goggles and have eye baths available.

OTHER PROTECTIVE EQUIPMENT

Wear appropriate protective clothing. Provide a safety shower at any location where skin contact can occur.

WORK HYGIENIC PRACTICES

Wash thoroughly after handling. Supplemental safety and health: none

PHYSICAL/CHEMICAL PROPERTIES

- **Vapour pressure:** (mm Hg @100 °F) 0.005 - 0.00006
- **Viscosity:** (CENTISTOKES) 3.6 - 540
- **Stability indicator/materials to avoid:** Yes
- **Stability Condition to Avoid:** PCBs are very stable, fire-resistant compounds.

HAZARDOUS DECOMPOSITION PRODUCTS

Carbon monoxide, carbon dioxide, hydrogen chloride, phenolics, aldehydes, furans, dioxins

WASTE DISPOSAL METHODS

Consult the applicable PCB regulations prior to any disposal of PCBs or PCB-contaminated items.
Date of issue: 28 September 2005

SECTION 1 - IDENTIFICATION OF THE PRODUCT AND OF THE COMPANY

Product name: Organic Solvent
Application: Determination of olive oil acidity

Manufacturer identification: Hanna Instruments Italia s.r.l.
Viale delle Industrie, 12/A
35010 Villafranca Padovana, Italy
tel. n.°: +39-049-9070211

Emergency Telephone n. °: +39-02-66101029
CENTRO ANTIVELENI
OSPEDALE NIGUARDA (MI) - ITALY

SECTION 2 - COMPOSITION/INFORMATION ON INGREDIENTS

<table>
<thead>
<tr>
<th>NAME (EC directives)</th>
<th>EC-Index-No.</th>
<th>CAS No.</th>
<th>LABELLING (EC directives)</th>
<th>CONTENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diethyl Ether</td>
<td>603-022-00-4</td>
<td>60-29-7</td>
<td>F+, Xn</td>
<td>≥ 60% - &lt; 70%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>R 12-19-22-66-67</td>
<td></td>
</tr>
<tr>
<td>Ethanol</td>
<td>603-002-00-5</td>
<td>64-17-5</td>
<td>F</td>
<td>≥ 30% - &lt; 40%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>R 11</td>
<td></td>
</tr>
</tbody>
</table>

SECTION 3 - HAZARD IDENTIFICATION
Extremely Flammable. May form explosive peroxides. Harmful if swallowed. Repeated exposure may cause skin dryness or cracking. Vapors may cause drowsiness and dizziness.

SECTION 4 - FIRST AID MEASURES
Remove contaminated, soaked clothing immediately and dispose of safely.
- After inhalation: fresh air. If necessary, apply mouth to mouth resuscitation or mechanical ventilation. Keep airways free.
- After skin contact: wash off with plenty of water.
- After eye contact: rinse out with water for at least 10 minutes. Obtain medical attention.

In case of spontaneous vomiting: risk of aspiration. Pulmonary failure possible. Summon doctor.

SECTION 5 – FIRE-FIGHTING MEASURES
- Suitable extinguishing media
  - Foam, dry powder or carbon dioxide.
- Special risks:
  - Combustible. Vapors heavier than air. Forms explosive mixtures with air at ambient temperatures. Development of hazardous combustion gases or vapors possible in the event of fire. Keep away from sources of ignition.
- Special protective equipment for fire fighting:
  - Do not stay in dangerous zone without suitable chemical protection clothing and self-contained breathing apparatus.
- Additional information:
  - Keep away sources of ignition. Beware of backfiring. Take measures to prevent electrostatic charging. Prevent fire-fighting water from entering surface water or groundwater.
SECTION 6 - ACCIDENTAL RELEASE MEASURES

- Personal precautions:
  - Avoid substance contact. Do not inhale vapors. Ensure supply of fresh air in enclosed rooms.

- Environmental precautions:
  - Do not discharge into the drains/surface waters/groundwater.

- Additional notes:
  - Take up with liquid-absorbent material.
  - Clean up affected area and dispose according to local regulation.

SECTION 7 - HANDLING AND STORAGE

- Handling:
  - Takes measures to prevent electrostatic charging. Keep away from sources of ignition.
  - Work under hood. Do not inhale substance.
  - Avoid generation of vapors/aerosols.

- Storage:
  - Tightly closed. In a well ventilated place. Keep away from sources of ignition and heat. Store at room temperature (+15 to +25 °C recommended).
  - Protect from light and moisture.
  - Accessible only for authorized persons.

SECTION 8 - EXPOSURE CONTROL/PERSONAL PROTECTION

- Ingredients with occupational exposure limits to be monitored:
  - DIETHYL ETHER
    MAK 400 ml/m³; 1200 mg/m³
  - ETHANOL
    MAK 500 ml/m³; 960 mg/m³

- Personal protective equipment:
  - As appropriate to quantity handled.

- Respiratory protection:
  - Required when vapors/aerosols are generated.
  - Work under hood.

- Protective gloves:
  - Rubber or plastic

- Eye protection:
  - Goggles or face mask

SECTION 9 - PHYSICAL/CHEMICAL PROPERTIES

- Appearance and odor: colorless liquid, characteristic odor
- Solubility in water: partially soluble
- Melting point: ND
- Boiling point: 42°C
- pH value at 20 °C: NA
- Density at 20 °C: 0.75 g/cm³
- Ignition temperature: ND
- Flash point: ND

SECTION 10 - STABILITY AND REACTIVITY

- Conditions to be avoided:
  - Heating.

- Substances to be avoided:
  - Alkali metals, alkaline earth metals, alkali oxides, halogens, halogen-halogen compounds, nonmetals, nonmetallic oxyhalides, strong oxidizing agents, chromyl chloride, turpentine oils and/or turpentine substitutes, nitrates, metallic chlorides.

- Hazardous decomposition products:
  - Peroxides.

- Further information:
  - Light sensitive; sensitive to air.
  - Highly flammable.
  - Unsuitable working materials: various plastics, rubber.
  - Explosive with air in a vaporous/gaseous state.
SECTION 11 - TOXICOLOGICAL INFORMATION

Quantitative data on the toxicity of this product are not available.

APPLICABLE TO MAIN COMPONENT(S):

- **Toxicological data**
  - **Diethyl Ether**: acute toxicity:
    - \(\text{LD}_{50}\) (oral, rat): 1215 mg/kg.
    - \(\text{LC}_{50}\) (inhalation, rat): 73000 ppm(V) /2 h.
    - \(\text{LDL}_0\) (oral, human): 260 mg/Kg.
  - **Ethanol**: acute toxicity:
    - \(\text{LD}_{50}\) (oral, rat): 6200 mg/kg (anhydrous substance).
    - \(\text{LC}_{50}\) (inhalation, rat): > 8000 mg/l /4 h (anhydrous substance).
    - \(\text{LD}_{50}\) (dermal, rabbit): > 20000 mg/Kg (anhydrous substance).

- **In case if inhalation**: mucosal irritation, absorption, drowsiness.
- **In case of skin contact**: drying-out effect resulting in rough and chapped skin. Dermatitis.
- **In case of eye contact**: slight irritations.
- **In case of ingestion**: nausea and vomiting, absorption.
  After ingestion the substance may cause a risk of aspiration. Passage into the lung can result in a condition resembling pneumonia.
- **After absorption**: salivation, euphoria, dizziness, inebriation, narcosis, ataxia, collapse, unconsciousness, coma, respiratory paralysis.
- **Systemic effects**
  - The following applies to Diethyl Ether:
    - the possibility of an embryotoxic effect has not been fully assessed.
  - The following applies to Ethanol:
    - an embryotoxic effect need not be feared when threshold limit value is observed. A mutagenic effect has been demonstrated in animal studies on mammals, justifying the assumption that exposure of humans to the substance produces hereditary effects. Substance with carcinogenic and genotoxic effect whose potency, however, is considered to be so low that no appreciable contribution to the cancer risk in humans is to be expected where the limit value for occupational safety is observed.
- **Further data**: narcotic!
  the product should be handled with the care usual when dealing with chemicals.

SECTION 12 - ECOLOGICAL INFORMATION

- **Ecotoxic effects**: quantitative data on the ecological effect of this product are not available.
- **Biological effects**: toxic for aquatic organisms. When used properly, no impairments in the function of waste-water-treatment plants are to be expected.
- **Further ecological data**: applicable to partial component(s):
  - The following applies to Diethyl Ether:
    - Fish toxicity: \(L.\text{idus}\) \(\text{LC}_{50}\): 2840 mg/l; \(Daphnia\) toxicity: \(Daphnia\) \(\text{LC}_{50}\): 100 mg/l.
  - The following applies to Ethanol:
    - Fish toxicity: \(L.\text{idus}\) \(\text{LC}_{50}\): 8140 mg/l /48h; \(Daphnia\) toxicity: \(Daphnia\) magna \(\text{EC}_{50}\): 9268-14221 mg/l /48h. Maximum permissible toxic concentration: Algeal toxicity: \(S.c.quadricauda\) \(\text{IC}_{5}\): 5000 mg/l /7d; Bacterial toxicity: \(P.s.putida\) \(\text{EC}_{5}\): 6500 mg/l /16h; Protozoa: \(E.sulcatum\) \(\text{EC}_{5}\): 65 mg/l /72h.

DO NOT ALLOW TO ENTER WATERS, WASTE WATERS, OR SOIL!

SECTION 13 - DISPOSAL CONSIDERATIONS

- **Waste disposal**:
  - Chemical residues are generally classified as special waste and thus covered by local regulations. Contact local authorities or disposal companies for advice.
  - Handle contaminated packaging in the same way as the substance itself.
SECTION 14 - TRANSPORT INFORMATION

For HI 3897:
These transport data apply to the COMPLETE KIT:

- Land transport
  - ADR/RID: 9, II
  - UN-No.: 3316
  - Name: CHEMICAL KIT

- Sea transport
  - IMDG: 9/UN 3316/PG II
  - Name: CHEMICAL KIT

- Air transport
  - ICAO/IATA: 9/UN 3316/PG II
  - Name: CHEMICAL KIT

For HI 3897-010:

- Land transport
  - ADR/RID: 3, II
  - UN-No.: 1993
  - Name: FLAMMABLE LIQUID, N.O.S. (Diethyl ether, Ethanol)

- Sea transport
  - IMDG: 3/UN 1993/PG II
  - Name: FLAMMABLE LIQUID, N.O.S. (Diethyl ether, Ethanol)

- Air transport
  - ICAO/IATA: 3/UN 1993/PG II
  - Name: FLAMMABLE LIQUID, N.O.S. (Diethyl ether, Ethanol)

SECTION 15 - REGULATORY INFORMATION

Labeling according to EC Directives:
Symbol: \( \text{F}^+, \text{Xn} \)
R-phrases: 12-19-22-66-67
Highly flammable, Harmful.
Extremely Flammable. May form explosive peroxides. Harmful if swallowed. Repeated exposure may cause skin dryness or cracking. Vapours may cause drowsiness and dizziness.

S-phrases: 9-16-29-33
Keep container in a well-ventilated place. Keep away from sources of ignition - No smoking. Do not empty into drains. Take precautionary measures against static discharges.
Contains: Diethyl Ether, Ethanol

SECTION 16 - OTHER INFORMATION

- Supersedes edition of: / (1st edition)
- Legend: NA Not applicable
- ND Not determined

THE INFORMATION CONTAINED HEREIN IS BASED ON THE PRESENT STATE OF OUR KNOWLEDGE. IT CHARACTERIZES THE PRODUCT WITH REGARD TO THE APPROPRIATE SAFETY PRECAUTIONS. IT DOES NOT REPRESENT A GUARANTEE OF THE PROPERTIES OF THE PRODUCT.
## Material Safety Data Sheet

**Hydrazine MSDS**

### Section 1: Chemical Product and Company Identification

<table>
<thead>
<tr>
<th>Product Name:</th>
<th>Hydrazine</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Contact Information:</strong></td>
<td>Sciencelab.com, Inc.</td>
</tr>
<tr>
<td>14025 Smith Rd.</td>
<td></td>
</tr>
<tr>
<td>Houston, Texas 77396</td>
<td></td>
</tr>
<tr>
<td>US Sales:</td>
<td>1-800-901-7247</td>
</tr>
<tr>
<td>International Sales:</td>
<td>1-281-441-4400</td>
</tr>
<tr>
<td>Order Online:</td>
<td>ScienceLab.com</td>
</tr>
<tr>
<td>CHEMTREC (24HR Emergency Telephone), call:</td>
<td>1-800-424-9300</td>
</tr>
<tr>
<td>International CHEMTREC, call:</td>
<td>1-703-527-3887</td>
</tr>
<tr>
<td>For non-emergency assistance, call:</td>
<td>1-281-441-4400</td>
</tr>
</tbody>
</table>

| Catalog Codes: | SLH2236 |
| CAS#: | 302-01-2 |
| RTECS: | MU7175000 |
| TSCA: | TSCA 8(b) inventory: Hydrazine |
| CI#: | Not available. |
| Synonym: | |
| Chemical Formula: | N2H4 |

### Section 2: Composition and Information on Ingredients

<table>
<thead>
<tr>
<th>Name</th>
<th>CAS #</th>
<th>% by Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hydrazine</td>
<td>302-01-2</td>
<td>100</td>
</tr>
</tbody>
</table>

**Toxicological Data on Ingredients:** Hydrazine: VAPOR (LC50): Acute: 570 ppm 4 hour(s) [Rat].

### Section 3: Hazards Identification

**Potential Acute Health Effects:**
Very hazardous in case of skin contact (irritant), of ingestion. Hazardous in case of skin contact (corrosive), of eye contact (irritant), of inhalation. Slightly hazardous in case of skin contact (permeator). Liquid or spray mist may produce tissue damage particularly on mucous membranes of eyes, mouth and respiratory tract. Skin contact may produce burns. Inhalation of the spray mist may produce severe irritation of respiratory tract, characterized by coughing, choking, or shortness of breath. Severe over-exposure can result in death.

**Potential Chronic Health Effects:**
Hazardous in case of skin contact (permeator). CARCINOGENIC EFFECTS: Classified + (PROVEN) by OSHA. Classified 2B (Possible for human.) by IARC. Classified A2 (Suspected for human.) by ACGIH, 2 (Reasonably anticipated.) by NTP. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance is toxic to blood, kidneys, lungs, the nervous system, mucous membranes. Repeated or prolonged exposure to the substance can produce target organs damage. Repeated or prolonged contact with spray mist may produce chronic eye irritation and severe skin irritation. Repeated or prolonged exposure to spray mist may produce respiratory tract irritation leading to frequent attacks of bronchial infection. Repeated exposure to an highly toxic material may produce general deterioration of health by an accumulation in one or many human organs.
### Section 4: First Aid Measures

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

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

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

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

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

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

**Serious Ingestion:** Not available.

### Section 5: Fire and Explosion Data

**Flammability of the Product:** Flammable.

**Auto-Ignition Temperature:** Not available.

**Flash Points:** CLOSED CUP: 37.78°C (100°F).

**Flammable Limits:** LOWER: 2.9% UPPER: 98%

**Products of Combustion:** Not available.

**Fire Hazards in Presence of Various Substances:** Flammable in presence of open flames and sparks, of heat, of oxidizing materials.

**Explosion Hazards in Presence of Various Substances:**

**Fire Fighting Media and Instructions:**
Flammable liquid, soluble or dispersed in water. SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use alcohol foam, water spray or fog. Cool containing vessels with water jet in order to prevent pressure build-up, autoignition or explosion.

**Special Remarks on Fire Hazards:** Not available.

**Special Remarks on Explosion Hazards:** Not available.

### Section 6: Accidental Release Measures
Small Spill:
Dilute with water and mop up, or absorb with an inert dry material and place in an appropriate waste disposal container.

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

Section 7: Handling and Storage

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

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

Section 8: Exposure Controls/Personal Protection

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

Personal Protection:

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

Exposure Limits:
TWA: 0.1 (ppm) from ACGIH (TLV) [1995] TWA: 0.1 (mg/m3) from ACGIH [1995] Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Liquid.
Odor: Not available.
Taste: Not available.
Molecular Weight: 32.05 g/mole
Color: Not available.
pH (1% soln/water): Not available.
Boiling Point: 113.5°C (236.3°F)
Melting Point: 1.4°C (34.5°F)
Critical Temperature: Not available.
Specific Gravity: 1 (Water = 1)
Vapor Pressure: 10 mm of Hg (@ 20°C)
Vapor Density: 1.1 (Air = 1)
Volatility: Not available.
Odor Threshold: 3.7 ppm
Water/Oil Dist. Coeff.: The product is more soluble in oil; log(oil/water) = 0.2
Ionicity (in Water): Not available.
Dispersion Properties: See solubility in water.
Solubility: Easily soluble in cold water, hot water.

Section 10: Stability and Reactivity Data

Stability: Unstable.
Instability Temperature: Not available.
Conditions of Instability: Not available.
Incompatibility with various substances:
Extremely reactive or incompatible with acids. Reactive with moisture. The product may undergo hazardous decomposition, condensation or polymerization, it may react violently with water to emit toxic gases or it may become self-reactive under conditions of shock or increase in temperature or pressure.
Corrosivity: Non-corrosive in presence of glass.
Special Remarks on Reactivity: Not available.
Special Remarks on Corrosivity: Not available.
Polymerization: No.

Section 11: Toxicological Information

Routes of Entry: Eye contact. Inhalation. Ingestion.
Toxicity to Animals:
WARNING: THE LC50 VALUES HEREUNDER ARE ESTIMATED ON THE BASIS OF A 4-HOUR EXPOSURE. Acute toxicity of the vapor (LC50): 570 ppm 4 hour(s) [Rat].
Chronic Effects on Humans:
CARCINOGENIC EFFECTS: Classified + (PROVEN) by OSHA. Classified 2B (Possible for human.) by IARC. Classified A2 (Suspected for human.) by ACGIH, 2 (Reasonably anticipated.) by NTP. The substance is toxic to blood, kidneys, lungs, the nervous system, mucous membranes.
Other Toxic Effects on Humans:
Very hazardous in case of skin contact (irritant), of ingestion. Hazardous in case of skin contact (corrosive), of inhalation. Slightly hazardous in case of skin contact (permeator).
Special Remarks on Toxicity to Animals: Not available.
Special Remarks on Chronic Effects on Humans: Animal embryotoxic.
Special Remarks on other Toxic Effects on Humans: Not available.

Section 12: Ecological Information
### Ecotoxicity
Not available.

### BOD5 and COD
Not available.

### Products of Biodegradation
Possibly hazardous short/long term degradation products are to be expected.

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

### Special Remarks on the Products of Biodegradation
Not available.

### Section 13: Disposal Considerations

**Waste Disposal:**

### Section 14: Transport Information

**DOT Classification:** CLASS 8: Corrosive liquid.

**Identification:** Hydrazine, anhydrous : UN2029 PG: I

**Special Provisions for Transport:** Not available.

### Section 15: Other Regulatory Information

**Federal and State Regulations:**
California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer, birth defects or other reproductive harm, which would require a warning under the statute: Hydrazine California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer which would require a warning under the statute: Hydrazine Pennsylvania RTK: Hydrazine Massachusetts RTK: Hydrazine TSCA 8(b) inventory: Hydrazine SARA 302/304/311/312 extremely hazardous substances: Hydrazine SARA 313 toxic chemical notification and release reporting: Hydrazine CERCLA: Hazardous substances.: Hydrazine


**Other Classifications:**

**WHMIS (Canada):**
CLASS B-3: Combustible liquid with a flash point between 37.8°C (100°F) and 93.3°C (200°F). CLASS D-1A: Material causing immediate and serious toxic effects (VERY TOXIC). CLASS D-2A: Material causing other toxic effects (VERY TOXIC). CLASS E: Corrosive liquid. CLASS F: Dangerously reactive material.

**DSCL (EEC):**

**HMIS (U.S.A.):**
- Health Hazard: 3
- Fire Hazard: 3
- Reactivity: 2

**Personal Protection:**

**National Fire Protection Association (U.S.A.):**
- Health: 3
- Flammability: 3
- Reactivity: 3

**Specific hazard:**
APPENDIX C

COMMUNITY ASSURANCE PLAN
Texas Custodial Trust
Former ASARCO
El Paso Site
Community Assurance Plan (CAP)

April 14, 2011

Report Prepared for Project Navigator, LTD (Trustee) By:

Malcolm Pirnie, Inc.
211 N. Florence St.
Suite 202
El Paso, TX  79901
915-533-9025
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1. Introduction and Purpose

The purpose of this Community Assurance Plan is to describe the actions that will be taken by the Texas Custodial Trust (Trust) for safety of the community surrounding the former ASARCO Smelter location during activities at the site (Figure 1). Activities related to environmental cleanup, demolition of buildings and other site structures and preparation of the site for redevelopment will be initiated during late 2010 and are likely to continue for a duration of up to five years. Some of the planned activities include the following:

- Decontamination of existing structures
- Demolition of existing structures
- Soil sampling
- Groundwater sampling
- Surface water sampling
- Geophysical studies of soil and slag thickness
- Operation and maintenance of existing groundwater remediation systems
- Construction of new groundwater remediation systems
- Construction of protective caps and covers for impacted soil and slag areas
- Construction of improved surface water control systems
- Earth moving and containment cell construction
- Improvement of existing erosion control systems
- Construction of new erosion control systems

Detailed descriptions of the environmental activities will be provided in management plans (e.g. work plans, health and safety plans) which will be posted on the Trust website (www.Recastingthesmelter.com) and submitted and reviewed by the Texas Commission on Environmental Quality (TCEQ) in consultation with the United States Environmental Protection Agency (USEPA) prior to initiation of field work. In this document we describe the safety controls and monitoring systems that will be deployed to prevent, reduce or mitigate safety hazards for protection of the community. Technical details of these controls and monitoring systems are provided in the management plans described above.
2. Traffic Flow and Control

2.1. Site Ingress and Egress

To reduce the amount of traffic on city streets, small vehicles that can pass under the railroad tracks will be encouraged to use Executive Center Boulevard, turn south onto Paisano Drive and then enter through the main site entrance. Small vehicles will depart the site by making a right or left turn on Paisano Drive. Large commercial vehicles (dump trucks, flatbeds) will access the site from northbound Paisano Drive using the large truck entrance south of the main plant entrance. When leaving the site, commercial vehicles will be directed to make a right turn only (northbound) onto Paisano Drive. To limit traffic delays on Paisano Drive, commercial vehicles will be instructed to space themselves (about 20 seconds apart) when exiting the facility.

2.2. Vehicle Decontamination, Dust Control and Road Clean-up

Prior to leaving the site, material from the site will be removed from vehicles in accordance with the site decontamination procedures. Control measures, such as road wetting, sealing and/or gravel placement will be implemented to prevent dust generation as vehicles enter or depart the site. Site entrance/exit areas and Paisano Drive will be inspected and cleaned to maintain safe passage.

2.3. Traffic Control

At times, when heavy truck traffic is planned at the site, announcements will be made on the project website and appropriate signage and flagmen/women will be placed at the entrance and exit of the site to provide traffic control. When needed, permanent lane closures may be required as part of the demolition and/or remediation activities. In these instances, lane closures will be permitted as required by the City of El Paso and/or the Texas Department of Transportation (TxDOT). Lane closures will also be announced on the project website (www.RecastingtheSmelter.com), in addition to the announcements required by the City and TxDOT.
3. Dust Control and Air Monitoring Program

3.1. Achieving Goal of No Visible Dust

Controlling dust during demolition and remediation activities will be a daily standard operating procedure. Operations at the site will be conducted to achieve a “no visible dust” goal so that dust from the site does not migrate beyond the perimeter. Dust will be controlled in excavations by pre-watering, careful excavation, spraying water during excavation and use of designated haul routes where dust control is implemented. Dust control will also be practiced during building decontamination and demolition operations by isolating dusty operations with portable barriers, spraying water and utilizing designated haul routes where dust control is implemented.

3.2. Perimeter Air Monitoring Program

To confirm and document that operations on-site are not causing migration of constituents of concern off-site, continuous dust monitoring will be implemented during demolition and site remediation activities. To measure wind speed, direction and other weather data at the site, a meteorological station will be installed and operated continuously. In addition, portable continuous particle size monitors (PCPSMs) will be placed at locations on the site perimeter to monitor dust. PCPSMs will be placed up-wind, cross-wind, and down-wind of site operations. PCPSM locations will be adjusted to account for seasonal prevailing winds. A dedicated PCPSM will be located to monitor conditions near the La Calavera subdivision.

High volume air samplers will also be used to monitor certain activities at selected times to confirm baseline data for PCPSM calculated values. The number and location of the monitors will be matched to the number and type of activities taking place at the site and the weather conditions at the time. Figure 2 shows an example layout of the instruments that will be used.

Based on the types of materials observed at the site, Table 1 shows the constituents that will be monitored and reported. In the event additional constituents are identified during site remediation activities, those constituents will be added to the monitoring program. Data will be evaluated daily and reported in accordance with Section 7.
Table 1
Perimeter Air Monitoring Constituents
El Paso Smelter Site
El Paso, Texas

<table>
<thead>
<tr>
<th>Nuisance Dust (continuous daily sampling and baseline direct measurement)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Dust (from portable and continuous particle size monitors and high volume air samplers)</td>
</tr>
<tr>
<td>Metals (calculated daily and baseline direct measurement)</td>
</tr>
<tr>
<td>Arsenic</td>
</tr>
<tr>
<td>Cadmium</td>
</tr>
<tr>
<td>Chromium</td>
</tr>
<tr>
<td>Copper</td>
</tr>
<tr>
<td>Lead</td>
</tr>
<tr>
<td>Selenium</td>
</tr>
<tr>
<td>Zinc</td>
</tr>
</tbody>
</table>
4. Surface Water Control and Monitoring Program

4.1. On-site Collection, Retention, Testing, Treatment and Discharge

When it rains, water that comes in contact with the main plant site is collected and retained on-site in lined retention ponds. Water that comes through the Parker Brothers Arroyo from the east side of I-10 is either routed through the site in a culvert (i.e. does not contact material in Parker Brothers Arroyo) or is collected and retained in Parker Brothers Arroyo above Paisano Drive. Retained water is then tested and compared to permitted discharge values. If the tested water is below the allowable discharge values, it is pumped from the retention ponds and discharged to the outlet at Parker Brothers Arroyo. If the tested water does not meet allowable discharge values, it is treated on-site, retested and then either discharged or evaporated. Figure 3 shows the site, the collection points and the retention basins. The Parker Brothers Arroyo discharge point is also shown (SW-5).

4.2. Semi Annual Surface Water Sampling

Surface water is sampled twice a year at eleven locations to determine water quality. The eleven locations (SEP-1 through SEP-4, SEP-6, SEP-7, and SEP-9 through SEP-13) are shown on Figure 3. Samples are collected at these locations and tested for the same constituents of concern for which groundwater is tested (see Section 5). Results will be posted on the website in accordance with Section 7.

4.3. Erosion Control

The slopes below the main plant area will be graded to improve drainage, and erosion control materials will be installed and maintained to limit degradation of these slopes. The main plant area will be maintained to promote water drainage to the designated collection points. The property east of I-10 will also be maintained to prevent erosion of reclaimed areas and other areas slated for excavation and removal.
5. Groundwater Monitoring Program

ASARCO conducted groundwater monitoring from 1996 through 2009 to evaluate the nature and extent of constituents in groundwater beneath the facility and adjacent properties. Although the groundwater beneath the former smelter site is not directly used as a source of drinking water, the Trust will continue to monitor groundwater quality during demolition and remediation activities.

5.1. Wells Monitored

Wells have been selected for on-going sampling and analysis during demolition and remediation activities to monitor groundwater quality beneath the site and adjacent properties. Groundwater conditions will be monitored east of Interstate 10 above (or upgradient of) the plant site, at various locations across the plant site, and in the former Smeltertown area beneath (or downgradient of) the plant site (Figure 4). The monitoring program will be conducted on a semi-annual basis (twice a year) to understand the groundwater conditions as remediation progresses. Results will be posted on the website in accordance with Section 7.

5.2. Constituents

The constituents to be tested in groundwater include metals and general water chemistry parameters. The list of constituents has been selected to address known metals found in soils and groundwater at the site, as well as other parameters selected to aid in evaluation of remedial progress. In the event additional constituents are identified during site remediation activities, those constituents will be added to the monitoring program. The constituents to be monitored in groundwater are presented in Table 2.
Table 2
Parameter List for Groundwater Monitoring
El Paso Smelter Site,
El Paso, Texas

<table>
<thead>
<tr>
<th>Metals (Total and Dissolved)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Antimony</td>
<td>Lead</td>
</tr>
<tr>
<td>Arsenic</td>
<td>Manganese</td>
</tr>
<tr>
<td>Barium</td>
<td>Mercury</td>
</tr>
<tr>
<td>Cadmium</td>
<td>Molybdenum</td>
</tr>
<tr>
<td>Chromium</td>
<td>Nickel</td>
</tr>
<tr>
<td>Cobalt</td>
<td>Selenium</td>
</tr>
<tr>
<td>Copper</td>
<td>Thallium</td>
</tr>
<tr>
<td>Iron</td>
<td>Zinc</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Cations/Anions</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Aluminum</td>
<td>Total and dissolved</td>
</tr>
<tr>
<td>Calcium</td>
<td>Total and dissolved</td>
</tr>
<tr>
<td>Magnesium</td>
<td>Total and dissolved</td>
</tr>
<tr>
<td>Potassium</td>
<td>Total and dissolved</td>
</tr>
<tr>
<td>Sodium</td>
<td>Total and dissolved</td>
</tr>
<tr>
<td>Sulfate</td>
<td>Total and dissolved</td>
</tr>
<tr>
<td>Chloride</td>
<td>Total</td>
</tr>
<tr>
<td>Fluoride</td>
<td>Total</td>
</tr>
<tr>
<td>Nitrate/Nitrite</td>
<td>Total</td>
</tr>
<tr>
<td>Sulfide</td>
<td>Total</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>General Chemistry</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Alkalinity</td>
<td></td>
</tr>
<tr>
<td>Total Dissolved Solids</td>
<td></td>
</tr>
<tr>
<td>Total Suspended Solids</td>
<td></td>
</tr>
<tr>
<td>Total Organic Carbon</td>
<td></td>
</tr>
<tr>
<td>Field Parameters (ph, temperature, dissolved oxygen, specific conductance, oxidation/reduction potential, ferrous iron and turbidity)</td>
<td></td>
</tr>
</tbody>
</table>
6. Special Considerations for La Calavera Residents

Some demolition activities (e.g. stack demolition) have the potential to produce brief periods of noise, vibration and dust that could be a nuisance to residents in the La Calavera subdivision. Prudent and appropriate means will be used to prevent, reduce or mitigate these disturbances to surrounding communities, but for certain activities, special considerations will be provided by the Trust. As discussed in Section 3, a dedicated dust monitoring instrument will be maintained adjacent to this area. In addition, to ease resident’s potential concerns, the Trust will announce the anticipated dates of certain site activities in advance and if warranted based on relative ability to prevent or reduce these disturbances provide residents of the La Calavera subdivision the option of staying a day or two at a local hotel during peak times of these activities.
7. Reporting and Site Contacts

The Trust will provide regular reports on activities and findings on the project web site (www.Recastingthesmelter.com). The Trust will also conduct public meetings to discuss progress and answer questions from the community. Please refer to the Community Participation Plan for details.

Telephone numbers and email addresses of Trust key staff are provided below. The project website (www.Recastingthesmelter.com) is also provided to facilitate community access to the project team for questions and comments related to site activities. Questions and comments can be submitted directly through the website.

- Roberto Puga       rpuga@projectnavigator.com       714-388-1802
- Walter Boyle       wboyle@projectnavigator.com     915-433-3779
- Elizabeth Schell   eschell@projectnavigator.com    917-653-9570
NOTE:
All low points on the plant site are pumped to the onsite retention ponds and held until sampling results are received. If concentrations in water are below permitted concentrations, water is then pumped to Outfall SW 5. If the concentrations are above the permitted concentrations, the water is treated at the on-site treatment plant and then discharged.