HEALTH AND SAFETY PLAN FOR THE FORMER SATRALLOY SITE JEFFERSON COUNTY, OHIO

PLAN

Submitted To: Ohio Environmental Protection Agency
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List of Acronyms, Abbreviations, and Definitions

ACGIH	American Conference of Governmental Industrial Hygienists
ACM	Asbestos-Containing Material
Breathing Zone	The worker's breathing zone is an imaginary sphere of 2-foot radius surrounding the head.
CAPM	Cyprus Amax Project Manager
CDL	Commercial Driver's License
CRZ	Contamination Reduction Zone. The area designated for removal of contaminants from personnel and equipment. This area is adjacent to the Exclusion Zone.
COPC	Constituent of Potential Concern. Constituent at the Site that may present a potential significant risk to human health or the environment.
CPR	Cardiopulmonary Resuscitation
Exclusion Zone	The area within which all personnel must be directly involved in the ongoing work, have designated personal protective equipment (PPE), and meet training and medical monitoring requirements. The Exclusion Zone will be defined in the field by the Site Health and Safety Officer.
GCS	Golder Construction Services
HASP	Health and Safety Plan
HSC	Contractor Health and Safety Coordinator
HSO	Project Health and Safety Officer
IDLH	Immediately Dangerous to Life and Health
LEL	Lower Explosive Limit
MSDS	Material Safety Data Sheets, which provide information on the physical, chemical, and hazardous properties of chemical compounds.
NBR	Nitrile butadiene rubber
NIOSH	National Institute of Occupational Safety and Health
OEPA	Ohio Environmental Protection Agency
OSHA	Occupational Safety and Health Administration
PEL	Permissible Exposure Limit (OSHA)
PID	Photoionization Detector
PPE	Personal Protective Equipment
PPMV	Parts per million by volume
REL	Recommended Exposure Limit (NIOSH)
SSO	Site Safety Officer
Support Zone	The area outside the Exclusion Zone that is considered clean for the purpose of the HASP. It is used for transfer of equipment and materials into the work Site (i.e., support), laydown and storage, parking, offices, and similar activities, as well as providing a location for communications between multiple Exclusion Zones.
TLV	Threshold Limit Value
TRP	Total Respirable Particulates
USEPA	U.S. Environmental Protection Agency

1.0 INTRODUCTION

1.1 Purpose and Scope

This Site Health and Safety Plan (Site HASP) has been prepared by Golder Associates Inc. (Golder) on behalf of Cyprus Amax Minerals Company (Cyprus Amax) for use during field activities at the Former Satralloy Site located on 4243 County Road 74, Mingo Junction, Jefferson County, Ohio (the Site).

The purpose of this Site HASP is to provide an overview of Site conditions and establish the minimum required procedures to be implemented for protecting the health and safety of on-Site personnel when conducting field tasks associated with regulated materials abatement associated with the buildings, demolition of the buildings at the Site and other related activities, including but not limited to:

- Interim actions:
  - Installation of security fencing and guardrails
  - Hazard reduction in buildings prior to demolition
  - Regulated materials abatement associated with the buildings prior to demolition including asbestos abatement (transite panels), removal of chromium containing dust, former processing chemicals and oil.
  - Demolition of buildings and other structures
  - Consolidation of baghouse dust and other materials
  - Re-establishment of the lower rail spur
- Site investigation activities:
  - Site visits
  - Drilling
  - Surface soil sampling
  - Subsurface soil sampling
  - Surface water sampling
  - Sediment sampling
  - Groundwater sampling
  - Biological sampling (aquatic and terrestrial)

This HASP will be revised as needed for planned future remediation activities.

Each contractor is responsible for identifying its own health and safety coordinator (HSC) and developing its own HASP that incorporates the elements presented in this overall Site HASP and outlines the procedures it will implement during its field tasks. This Site HASP is also the HASP for Golder Associates Inc. (Golder) and Golder Construction Services (GCS) employees. Each subcontractor to Golder is required to prepare its own HASP and follow the contractor requirements under this Site HASP.

This health and safety program was prepared in accordance with requirements established by the Occupational Safety and Health Administration (OSHA) in 29 CFR 1910.120. Other applicable OSHA requirements found in construction standards (29 CFR 1926) and applicable Federal and State regulations and guidelines were also used in the development of this HASP.

1.2 Site Background

1.2.1 Site Description

Site Address	4243 County Road 74, Mingo Junction (Cross Creek Township), Jefferson County, Ohio
Site Access Routes	Vehicle access from CR 74 will be controlled by gates to be installed as part of the interim actions. Overland access to the property via foot or trail vehicles is uncontrolled; however, No Trespassing signs are posted and the Site is monitored 24/7 by security.
Site Size	333.5 acres, bordered on the east, west, and south by Cross Creek.
Site Topography	Site encompasses a ridge and ranges from approximately 700 ft MSL in the creek bed to approximately 1200 ft MSL at the northern end of the ridge.
Potable Water	Potable water is not available on the Site.
Land-based Telephone	A land-based telephone is located in the Site trailer.
Restrooms	Restrooms are located immediately outside of the Site trailer.

The Site consists of approximately 333.5 acres of land and includes an abandoned ferrochromium alloy processing plant site. The Site is located on County Road 74 in Cross Creek Township, Jefferson County, Ohio, approximately four miles south of Steubenville (Figure 1). The Site is bordered on the west, south, and east by Cross Creek (Figure 2), a perennial stream which discharges into the Ohio River. Access to the Site is via County Road 74.

The topography of the Site rises about 500 feet above the lowland flood plain of Cross Creek to a plateau surface. The eastern portion of the Site consists of a relatively flat lowland area comprising the main plant area, while the western portion of the Site is an upland plateau used for process material disposal, primarily slag, from former chromium ore processing operations. In the north, the Site is largely an upland plateau and consists of heavily wooded areas. The northern portion of the Site includes abandoned coal mine workings from the underground room-and-pillar Kolmont No.1 Coal Mine operated by the Wayne Coal Company, and also slag from former Site operations.

Immediately north of the Site is the Gould's Railroad tunnel. This currently operational tunnel, originally built in 1864, was enlarged to eliminate clearance restrictions in the 1950s. Much of the area surrounding

the Site is rural, used for agricultural purposes with a few residences and small businesses located along Route 74. The nearby towns of Kolmont and New Alexandria consist of several residential properties and small businesses.

Former processing facilities consisted primarily of two production mills ("Mill Buildings"), baghouses adjacent to the two Mill Buildings (for air pollution control during operation), ancillary support buildings, bins used for unloading rail cars, an office building, a laboratory, a water supply plant, and a wastewater treatment plant (Figure 2). The alloys produced in the Mill Buildings were made from chromium ores by smelting and refining in electric-arc furnaces. Four furnaces and two converters were housed in the Mill Buildings. In addition to these structures in the "Plant Area," piping, formerly used for transporting by-products from the processing operations to other on-Site locations, are present from the Mill Buildings to areas located in the upland areas north of the Mill Buildings. By-products were either pumped as slurry through this piping or were hauled in trucks to the "Ridge Top Area" and "Former Coal Mine Area" of the uplands.

The ore and other raw materials were brought into the Site via rail. Abandoned railroad headings and secondary access roads are also present across the Site.

2.0 ROLES AND RESPONSIBILITIES

2.1 Site Health and Safety Personnel

Cyprus Amax and Golder personnel are responsible for managing contractor activities including conducting daily safety briefings and disseminating Site related safety information. Each contractor shall designate its own HSC who will be responsible for managing the health and safety of its personnel.

2.1.1 Cyprus Amax Project Manager (CAPM)

The CAPM will have overall responsibility for the work being conducted at the Site. The CAPM will ensure that all project and regulatory requirements are met. The CAPM will be the official point of contact for all communications with Ohio Environmental Protection Agency (OEPA), although the CAPM may authorize direct contact by other members of the project team as appropriate.

2.1.2 Cyprus Amax Site Representative (CASR)

The CASR is responsible for managing the overall activities at the Site, and is the main point of contact for Cyprus Amax for contractors. The CASR will be available to assist in Safety and Health matters if the Project HSO is unavailable and will have the authority to take whatever actions may be necessary to provide a safe working environment for project personnel.

2.1.3 Golder Project Manager

The Golder Project Manager has the overall responsibility for implementation of the project and will have the authority to take whatever actions may be necessary to provide a safe working environment for project personnel.

2.1.4 Project Health and Safety Officer (HSO)

The HSO is responsible for health and safety matters associated with the project and has broad authority to assure that activities are conducted to protect human health and the environment. The HSO will be available to assist in Safety and Health matters if the Site Safety Office (SSO) is unavailable and will have the authority to take whatever actions may be necessary to provide a safe working environment for project personnel.

2.1.5 Site Safety Officer (SSO)

The SSO is responsible for disseminating Site health and safety related information to Contractors through daily Site briefings. The SSO is the main point of contact for Contractor HSCs and will be responsible for assuring that the procedures of this HASP are implemented in the field.

The SSO will be nominated by the Golder Project Manager and approved by the CAPM and is responsible for implementing the procedures established in this HASP and, if necessary, has the authority to temporarily halt work for health and safety reasons. If the SSO is not able to be on-Site, he/she will appoint an alternate on a case-by-case basis so that there is always a SSO on Site when work is ongoing.

2.1.6 Ohio EPA Site Coordinator

The Ohio EPA Site Coordinator will provide general project oversight and be responsible for ensuring that Agency personnel who will be working on this project, and have the potential for exposure to Site contaminants, have been provided a copy of this HASP to review.

2.1.7 Contractor

A Contractor is any company or entity under contract to Cyprus Amax or Golder Associates to perform work at the Satralloy Site.

2.2 Contractor Health and Safety Plans

2.2.1 Contractor Responsibilities

Each contractor (and subcontractor) shall be responsible for designating its own HSC and for fully implementing the requirements of the Site HASP plus any additional requirements specific to the particular activities and/or tasks being performed by the contractor in its own HASP. Contractor health and safety responsibilities include:

- Designating a HSC responsible for health and safety of Contractor personnel.
- Preparing a Contractor's Site-specific HASP which includes the elements of the Site HASP and a task-specific safety analysis for each task under its contract. The Contractor's HASP must be submitted to the Golder HSO (or his designee) for review and approval prior to starting work.
- Ensuring that all health and safety activities identified in its HASP and task-specific safety analysis are conducted and/or implemented.
- Identifying operational changes that require modification of the HASP, task-analysis or procedures and ensuring that modifications are made and implemented.
- Using appropriate safety procedures, equipment, and adequately trained personnel as identified in the task-specific safety analysis.
- Providing appropriate personal protective equipment (PPE) as identified in the task-specific safety analysis.
- Conducting routine safety inspections of Contractor work areas and ensuring timely corrective actions(s).
- Each contractor must document training for all on-Site personnel.

2.2.2 Content of Contractor HASP

At a minimum, Contractor HASPs must include the following:

- A task-specific safety analysis that includes an exposure analysis and PPE to be worn during performance of each task. A task-specific safety analysis shall be developed for each phase of work under a contractor's scope of work.
- Training documentation that demonstrates that personnel have appropriate training as outlined in this Site HASP and for their individual tasks.
- Documentation that verifies that personnel are included in the Contractor's medical surveillance program.
- Safety policies and procedures to be implemented during performance of tasks (e.g., heat stress, cold stress, sampling methods, etc.) Copies of these procedures must be maintained either in the Contractor's HASP as an appendix or on-Site in a separate binder and be available for review.
- Spill containment procedures, if applicable to the tasks to be performed.
- Signatures of all personnel who work at the Site to demonstrate that they have read and understood both the Site HASP and Contractor's HASP.

2.2.3 Site Safety Analysis Checklists

Cyprus Amax requires each contractor to complete a set of Site Safety Analysis checklists. A Site safety analysis checklist is provided in Appendix A.

2.3 Limited Contractor Use of Site HASP

Contractors (other than Golder) performing short duration/temporary activities that present a low risk of exposure to contaminants at the Site may work under this Site HASP under the direction of the CASR or the SSO. This alternative must be approved before work is initiated and applies to activities such as surveying, fence repair and utility workers (e.g., telephone and electricity installation for trailers, removal of power lines, etc.).

3.0 GENERAL REQUIREMENTS

The level of protection and the procedures specified in this HASP are based on the information currently available and represent the minimum health and safety requirements to be observed by all Site personnel. The general requirements outlined in this section apply to all Site personnel.

All personnel engaged in on-Site activities shall read this document carefully and sign the Site Health and Safety Plan Acknowledgement Form (Appendix B). Personnel who have any questions or concerns regarding implementation of this program are encouraged to request clarification from the SSO, HSO or the CASR (Section 2.1).

All personnel shall follow the basic health and safety procedures presented in this HASP; be alert to the hazards associated with working close to vehicles, equipment and waterways; be aware of the proper procedures to work with potentially hazardous substances; and use common sense and exercise reasonable caution at all times. In addition, daily safety briefings will be held by the SSO and documented in the field notes. Contractors shall conduct task-specific safety briefings, as needed.

Should any hazardous situation arise which is beyond the scope of the procedures or personal protection required by this HASP or a task-specific hazard analysis, work activities will be immediately halted. Work will resume pending discussion with the SSO, HSO and the CASR and revision of the pertinent health and safety procedures, if appropriate. Any revision of the health and safety plan and/or procedures will be recorded in the Field Procedure Change Authorization Form (Appendix C), and will require authorization from the SSO, the HSO, the Golder Project Manager, and the CASR.

Unsafe work practices or procedures are never justified by “extenuating circumstances” such as budget or time constraints, equipment breakdown, changing or unexpected conditions, etc. In fact, the opposite is true. Under stressful circumstances all project personnel must be mindful of the potential to consciously or unconsciously compromise health and safety standards, and be especially safety conscious. All Site personnel shall place “safety first” at all times.

The following procedures will be implemented for this project:

- Fieldwork shall be performed by teams of two or more people (“buddy system”). Oversight personnel (e.g., OEPA Site Coordinator, Cyprus Amax representatives, Golder Project Manager, SSO) and security personnel shall use the buddy system, but this shall not be taken to mean that they must always have a second person in the immediate vicinity. For oversight and security personnel, line-of-sight or radio contact with routine check-in to a specified “buddy” shall be sufficient.
- Site activities shall be performed during daylight hours, unless adequate artificial lighting is provided. Artificial lighting must comply with 29 CFR 1910.120 (m). Table 1 presents

the minimum illumination intensities. The need for artificial lighting shall be determined using a light meter.

- All personnel will sign in and out of the Site.
- All hazardous materials brought to the Site will have the appropriate Material Safety Data Sheet(s) (MSDS) provided to the SSO.

3.1 Individual Responsibilities

The ultimate responsibility for health and safety on Site rests with each individual and his or her colleagues. Each person is responsible for exercising the utmost care and good judgment in protecting his or her own health and safety and that of colleagues. Should any person observe a potentially unsafe condition or situation, it is the responsibility of that person to immediately bring the observed condition to the attention of the appropriate health and safety personnel as designated in Section 2.1. It is the responsibility of the HSC administrating the affected HASP to follow-up the verbal notification by completing the Field Change Authorization Form (Appendix C).

Should a person find himself or herself in a potentially hazardous situation, the person shall immediately discontinue the activity and immediately notify the SSO of the nature of the hazard. In the event of an immediately dangerous or life-threatening situation, the person always has “stop work” authority.

Each person has a responsibility to understand how to perform assigned tasks safely, to work safely, to identify and help correct potential problems and to stop work if an imminent danger exists. The Golder Project Manager and each Contractor has the responsibility and accountability for planning, leading, and controlling safety performance for their staff. The SSO will support Contractors by providing information, technical analysis, advice and assistance, and by evaluating safety performance. All Site personnel have responsibility for performing work in a safe manner as follows:

- Becoming familiar with the requirements, information, instructions, and emergency response actions contained in this HASP and applicable task-specific HASPs.
- Complying with all applicable health and safety rules, regulations, and procedures.
- Monitoring the work Site for unauthorized personnel and unauthorized work.
- Inspecting all tools and equipment, including PPE, daily, prior to and during use.
- Reporting any unsafe or potentially hazardous conditions to a supervisor.
- Stopping work if an unsafe situation exists.
- Setting an example for safe work practices and attitudes by personal action and participation.

3.2 Communications

Prior to initiating field activities, all personnel shall become familiar with the communications equipment and procedures at the Site. A telephone land line is available at the Cyprus Amax Site trailer. Contact

numbers for key Site personnel and emergency services will be available in the trailers at all times. Because cell phone service at the Site is unreliable, two-way radios will be provided to personnel working in remote areas. All personnel shall be able to communicate with the SSO and field supervisor via radio to ensure that emergency response is immediately available at all times while working in any area of the Site. All personnel shall carry the full list of emergency response numbers (Appendix D).

3.3 First Aid

A basic first aid kit shall be available in all field vehicles during all Site fieldwork. This kit shall be of an appropriate size in relation to the number of personnel on Site and shall include, at a minimum, two pairs of latex gloves, CPR barrier, and eye wash solution in addition to typical first aid supplies. Contractors working at the Site shall have at least one person trained in basic or advanced first aid.

3.4 General Hygiene and Conduct Guidelines

The following general personal hygiene and work practice guidelines are intended to prevent injuries and adverse health effects. These guidelines represent the minimum standard procedures for reducing potential risks associated with various aspects of this project and shall be followed by Site personnel at all times.

- If the SSO or Contractor HSC determines that a respirator is necessary, any facial hair that would interfere with the proper fit of such equipment shall be removed. (Please note that until the Mill Buildings are abated of all regulated materials, HAZWOPER Level C is required for activities in the Mill Buildings)
- A multi-purpose (ABC) dry chemical fire extinguisher, a complete field first aid kit, and a bottle of emergency eye wash solution shall be maintained in every field vehicle.
- Thoroughly wash hands and, if necessary, face before eating, smoking, or putting anything in your mouth (i.e., avoid hand to mouth contamination) and before leaving the Site.
- Eating, drinking, chewing gum or tobacco, and smoking are permitted only in areas designated by the SSO. Under no circumstances will these activities be permitted in the immediate vicinity of any intrusive activities (e.g., drilling, test pits, etc.) or near any area where hazardous substance contamination is either known or suspected.
- Be alert to potentially changing exposure indicators, such as perceptible odors.
- Do not, under any circumstances, enter or ride in or on any backhoe bucket, materials hoist, or any other similar device not specifically designed for carrying personnel. The basic rule of thumb regarding equipment is if it does not have a seat belt you should not be riding on it.
- Be alert to the symptoms of fatigue and heat/cold stress and their effects on the normal caution and judgment of personnel.
- Use hearing protection in situations where noise could pose a health hazard. A good rule of thumb is that if it is necessary to shout to communicate at a distance of three feet over continuous noise, hearing protection should be worn. Likewise, any impact noises from

activities that are loud enough to cause discomfort indicate the need for hearing protection.

- Always use the level of PPE as required by this HASP. Reduced levels of protection can result in exposure or injury; excessive levels of safety equipment can impair efficiency and increase the potential for accidents.
- Be aware of the affect of inclement weather (e.g., rain, snow, ice, lightning, etc.) on Site safety. Be prepared to suspend activities as conditions warrant.
- All personnel are required to wear colored reflective vests at all times when on-Site and the minimum level of PPE required for the work activity by this HASP, or a more stringent contractor Site HASP for that activity.
- Traffic cones and signage, and other warning devices may be required if the public rights-of-ways are obstructed.

3.5 Medical Surveillance and Training

Personnel engaged in on-Site activities on this project shall be participants in their employer's medical surveillance program. This program shall meet, at a minimum, the requirements of 29 CFR 1910.120(f). An exception may be made where medical surveillance is not required as defined in 29 CFR 1910.120(a) and approved by Cyprus Amax.

Personnel conducting work activities with the potential for contact with contaminated soil (including slag and other processed byproducts), water, and/or air will be trained in accordance with 29 CFR 1910.120(e), including respiratory protection, personal protective equipment, decontamination, hazard recognition, construction site safety, and the proper calibration and use of the field monitoring instruments required for the particular task(s). Previously trained personnel shall have completed appropriate refresher courses as detailed in 29 CFR 1910.120(e).

Personnel who operate specialized equipment (e.g., drill rigs, backhoes) shall be qualified and trained by their employer(s) to operate such equipment.

Some non-intrusive activities (e.g., Site visits, supply delivery, surveying activities, etc.) will not involve personnel exposure or the reasonable possibility of personnel exposure to chemical hazards, and in these cases, 40-hour HAZWOPER training may not be required. The HSO will make the determination of training requirements on a case-by-case basis and will consult with the CASR and Golder Project Manager, as necessary.

In addition to the training described above, all personnel working at or visiting the Site shall receive an initial health and safety briefing. This briefing will be administered and conducted by the SSO or his designee. At a minimum, this briefing will cover the following:

- Names of personnel responsible for Site safety & health.

- Health and safety hazards present at the Site.
- The use of PPE.
- Work practices or other methods to minimize risk from hazards.
- Safe use of engineering controls and equipment at the Site.
- Recognition of signs and symptoms which might indicate over exposure to hazards.
- The contents of the HASP.
- Summary of current activities taking place at the Site that may pose safety risks.

Prior to attending the briefing, all personnel shall review this HASP and shall sign the Site Health and Safety Plan Acknowledgement Form (Appendix B). At the conclusion of the on-Site training, personnel receiving the training shall sign and date an attendance sheet as provided by the SSO.

3.6 Site Safety Meetings

The SSO shall conduct a Site safety briefing for all personnel daily before beginning fieldwork. These meetings shall be documented in the field notes. The topics to be covered will be determined by the task activities, and should include:

- Weather-related safety issues.
- Hazards specific to the task(s), particularly upon the initiation of any new activity, and required protective equipment (including job safety analysis forms).
- Unusual Site conditions/areas.
- Coverage of activities by other contractors working at the Site (if applicable).
- Safety problems and issues.
- Conduct a safety share.
- Changes to materials being used by Site field investigation team or subcontractors (i.e., additional MSDS available).
- Changes in the HASP.

Contractors shall conduct separate safety meetings to address task-specific concerns. These meetings also shall be documented in the Contractors' field notes.

3.7 Job Safety Analysis

A job safety analysis is a documented process whereby the tasks required to accomplish a phase of work are outlined, the actual or potential hazards of each step are identified, and measures for the elimination or control of those hazards are developed for implementation. For each task or work activity identified in the Contractor HASP for which a standard work practice does not exist, a task-specific safety analysis must be developed and workers must be trained on its contents prior to commencing work. Guidelines for developing a job safety analysis include the following:

- Project personnel who have the knowledge of the tasks and who will be performing the work should help the health and safety personnel create the task-specific safety analysis.
- The Job Safety Analysis Form is located in Appendix E. It is better to list acceptable performance parameters in the recommended control column rather than provide specific or too-detailed information that can limit the applicability of the task-specific safety analysis (e.g., listing a specific type of equipment or tool to be used when several acceptable types of equipment or tools can be used).
- List information in the task-specific safety analysis directly applicable to the task and avoid general information that addresses project-wide concerns that are already covered in the Site HASP.

Once developed, a task-specific safety analysis should be reviewed at the daily safety briefing or as part of the work plan review prior to initiating the activity or task.

4.0 HAZARD EVALUATION

Potential Site hazards include chemical hazards, physical hazards, and biological hazards. Each of these potential hazards is addressed below.

4.1 Potential Chemical Hazards

Results of past sampling activities at the Site indicate that chemical contamination of groundwater, surface water, slag, and baghouse dust is a potential concern at the Site.

Constituents of potential concern (COPCs) for human health and the materials they are expected to be in at the Site are listed in Table 2. This list may be modified based on on-going Site characterization, sampling and analysis. The following paragraphs provide a general summary of the materials identified at the Site and the COPCs associated with them.

The Site's former laboratory contained many reagents and sample residues. While these materials were reportedly removed from the former laboratory building and disposed of by Evergreen Environmental in the mid-1990s, exposure to residual concentrations of these unidentified compounds may be a hazard associated with this building. Even though this building has burned and collapsed care, should be taking when in the proximity of the structure.

Materials located inside the wastewater treatment plant building are potentially dangerous because of their high pH or caustic effect (e.g., a sample collected from some of these materials indicated a pH of 10 standard units).

Some on-Site activities may pose a risk of exposure to regulated materials present or potentially present within Site buildings. Regulated materials, such as asbestos, lead, Arochlors (PCBs), mercury and petroleum hydrocarbons, may be present in the buildings and may be associated with either the building structure and/or former operations. In addition, a grey, talc-like dust was observed covering much of the surfaces within both mill buildings, which may provide an inhalation risk for active work within these buildings. Potential contaminant exposure concerns with regulated materials in buildings are summarized on Table 3.

Several metals including trivalent chromium are present in some Site materials, including slag and bag house dust. Because trivalent chromium is present, it is possible that hexavalent chromium, which is considered a potential lung carcinogen, is also present in these materials. Hexavalent chromium has been identified in Site surface waters.

Slag materials are also anticipated to be caustic, or have a high pH. Materials with an elevated pH can cause severe irritation or burning of the eyes and skin especially in the presence of moisture. They can also cause irritation to the respiratory system and long-term exposure can cause permanent damage.

A summary of analytical data collected to date for COPCs identified in on-Site materials are provided in Tables 4 through 7.

4.2 Potential Exposure Pathways

Potential exposure pathways during on-Site work may include:

- Inhalation of potentially toxic substances in former processing areas, particularly within the buildings and baghouse areas.
- Inadvertent ingestion of potentially toxic substances via hand to mouth contact or deliberate ingestion of materials inadvertently contaminated with potentially toxic materials.
- Dermal exposure and possible subcutaneous (skin) absorption of lipophilic (readily absorbed through the skin) organic chemicals.
- Dermal exposure and possible tissue damage associated with contact with acidic and/or basic solutions.

Exposure via the ingestion route can be controlled effectively by the means of good personal hygiene habits. Smoking, eating, drinking and chewing are strictly prohibited in contaminated areas. Work zones are shown in Figure 3. Similarly, good personal hygiene and appropriate clothing can eliminate dermal exposure. Exposure via inhalation or dermal exposure will be controlled with the use of the appropriate PPE.

Exposure control during asbestos abatement and demolition shall be described in the HASPs prepared by the Contractors for these activities. All personnel directly involved in the abatement and demolition of the buildings shall be subject to the requirements of these activity-specific plans. The abatement and demolition contractors shall have full responsibility for the health and safety of all personnel in their associated work areas until the work has been completed.

Exposure control for other Site activities, such as Site assessment and subsurface soil sampling, shall be described in a task-specific safety analysis for each activity.

4.3 Health Effects

The health effects associated with the materials at the Site are varied. Personnel who experience any of the following symptoms should report the occurrence to the SSO and their HSC promptly:

- Skin, eye, or respiratory system irritations
- Skin rashes/burns
- Headaches
- Nausea and/or GI tract problems
- Muscle spasms/tremors
- Chills
- Fatigue

Note that the above symptoms are not necessarily caused by chemical exposure. If personnel experience any of the above symptoms, the SSO may evacuate the area, if necessary, (in an upwind direction if possible) and evaluate affected personnel for signs and symptoms of exposure. Symptoms and first aid for exposure are listed in Table 8. Any serious medical problem should be referred to professional medical care. Qualified personnel may take first aid measures if the symptoms are minor; otherwise, affected persons are to be transported to the designated medical facility. The activity shall not resume until the problem is identified and appropriate level of protection is implemented.

4.4 Hazard Communications

At the time of initial assignment, when unknown materials are encountered at the Site, or whenever a new hazard is introduced into the work area, personnel will attend a health and safety meeting or briefing that includes the information indicated below:

- Hazardous chemicals present at the work Site.
- Physical and health risks of the hazardous chemicals or unknown conditions.
- The signs and symptoms of overexposure.
- Procedures to follow in the case of over-exposure to hazardous chemicals.
- Location of the MSDS file and Written Hazard Communication Program.
- How to determine the presence or release of hazardous chemicals in the work area.
- How to read labels and review MSDSs to obtain hazard information.
- How to reduce or prevent exposure to hazardous chemicals through the use of controls procedures, work practices, and personal protective equipment.
- Hazardous, non-routine tasks to be performed.
- How to handle unlabeled containers or piping.

4.5 Potential Physical Hazards

Potential physical hazards at the Site include, but are not limited to, the items outlined in the subsections below. The following universal precautions should be followed by all Site personnel.

4.5.1 Heavy Equipment and Vehicles

Work around heavy equipment and vehicles, such as drilling equipment, excavators, cranes, trucks, etc., presents significant potential hazards to personnel. Heavy equipment may impose visibility limitations for the operator, increasing the risk of the equipment operator to unknowingly drive or back over someone or something. The fuel supply (gasoline or diesel) for the equipment presents a hazard because the fuel is flammable or combustible. Storage containers and storage areas for fuel supplies should be protected, and the equipment itself should be kept away from sources of open flame. In addition, the exhaust from equipment should be directed away from any occupied work areas to minimize the exposure of personnel to combustion products in the exhaust.

Key hazards include:

- Being struck by equipment.
- Exhaust (carbon monoxide and hazardous particulates).
- Fuel toxicity and flammability.
- Noise.
- Flying rock particles if drilling, chipping, or similar activities are being performed.
- Breaking of cables, air hoses, and other components that are under tension or pressure.

Precautions include:

- Never approach an operational piece of heavy equipment until the operator is aware of your presence and your desire to approach and signals the OK – when so equipped use radio contact.
- Stand in a safe location well outside the maximum extended reach of the shovel or excavator arm, and out of the way of other mobile equipment. With an excavator, the optimum location is within the quadrant of the operator's visual coverage. Around drilling equipment, avoid locations in the potential trajectories of snapped cables, falling rods, etc.
- When contact is made, either radio or visual, advise the operator of your wish to approach the equipment. The operator may want to complete a task prior to shutting down. If so, remain at the same location until the operator signals the OK to advance. For excavators and loaders, this will usually involve the bucket being lowered to the ground. However, practices may vary between contractors. It is advisable to check with SSO to understand the protocols before entering areas where heavy equipment is operating.

Safe driving practices include:

Note that heavy equipment activity may change daily or hourly, with differing potential hazards to be identified and addressed. It is your responsibility to understand the traffic and equipment operating rules of the Site. Ask the SSO for this information upon entering the Site for the first time.

- All pieces of hauling equipment and large mobile equipment will have the right of way on all roadways. All other equipment shall give way and shall keep a safe distance until the roadway is cleared.
- In areas of traffic congestion and narrow travel-ways, the smallest vehicle shall always yield to larger vehicles.
- When following heavy equipment, maintain a safe traveling distance at all times. The driver's-side mirror should always be visible to you, and hence you to the operator. Overtaking hauling trucks and dump trucks should be done only when told to by the driver of the truck. Visual and/or radio contact must be made with the driver.
- On construction sites, traffic may travel on the either the right-hand or left-hand side of the road. Practices may vary between sites. Check with the SSO to determine traffic protocols before traveling on Site roadways.
- If there is enough traffic to cause congestion, spotters shall be used as needed to control traffic flow.

When working with machinery or mechanical equipment such as drive shafts, cables, or exposed chains, do not wear loose clothing. When performing maintenance or working directly with parts, the equipment shall be shut off, and the wheels chocked if vehicle is on an incline.

Initial reconnaissance indicates that there are no active underground or overhead utilities at this Site. However, during intrusive exploration activities, such as drilling or test pit excavation, all personnel shall be cognizant of the potential to encounter unknown utilities. If such utilities are encountered, stop the activity and immediately notify the SSO. Do not resume work until the nature of the utility has been determined and appropriate actions have been taken.

Use and operation of construction equipment such as motorized vehicles, heavy equipment, water trucks, and haul trucks (excluding passenger vehicles and pickup trucks) shall meet the following requirements:

- On-Site equipment shall meet the requirements of all relevant OSHA standards.
- Equipment will be inspected by the Contractor's HSC or designee upon arrival at the Site prior to use. The inspection will include a check for cleanliness, fluid leaks, and confirming installation of appropriate safety devices, including seat belts, headlamps and brake lights, backup alarms, appropriate fire extinguisher, and rollover protection. Results of the inspection will be documented on an inspection checklist, which will be maintained on Site. Deficiencies found shall be corrected before use.
- Operators shall complete inspections on all construction equipment prior to use each day to ensure that parts, accessories, and equipment are in safe operating condition and free of apparent damage. The inspection shall be documented. The inspection should

include, as a minimum, basic equipment and motor vehicle components and systems such as service brakes, parking brakes, emergency brakes, horn, steering mechanisms, operating controls, windshields, windows, mirrors, tires, lights, seat belts, headlamps, brake lights, rollover protection structures, backup alarms and evidence of fluid leaks. Deficiencies shall be noted and corrected prior to use. Copies of the inspections shall be maintained on-Site and readily available for inspection by the Site SSO. Vehicles are to be taken out of service if they do not pass inspection.

- Operators of over-the-road vehicles on the Site such as haul trucks and water trucks must possess a valid commercial driver's license (CDL) if a CDL is normally required when operating such vehicles on public roads.
- Contractors shall obtain copies of valid and relevant vehicle operator licenses such as a CDL (or have a system in place to verify possession of current licenses) and/or training records. Copies of any sensitive personally identifiable information should not be included on project records delivered to Cyprus Amax.
- Construction equipment used for demolition or materials handling shall be equipped with a demolition cage, wire screen, or equivalent structures to prevent materials or debris from breaking cab windows where the potential for window breakage hazards exists.
- Construction equipment shall be equipped with operable audible backup alarms.
- Construction equipment shall have operable visual backup indicators.
- Eating, drinking, smoking, and using cellular telephones (including the use of a hands-free feature in conjunction with a cellular phone) are prohibited when operating construction equipment.
- Construction equipment operators shall have the experience, skills, and knowledge to safely operate the equipment to be used. Each Contractor is responsible for ensuring that operators have the appropriate skills and qualifications and shall ensure the following is accomplished:
  - Evaluate each operator's experience relative to the job task(s).
  - Evaluate each operator's skills prior to unsupervised operation of the vehicles or equipment.
  - The Contractor shall maintain documentation of their evaluation(s) of each operator's capability to operate each assigned vehicle/equipment type in a safe manner.
- Over-the-road haul vehicles shall have documentation of annual inspections in accordance with Department of Transportation requirements given in 40 CFR 396, Subpart B, Appendix G, Minimum Periodic Inspection Standards.
- The Contractor shall ensure that haul trucks are not loaded beyond the truck/trailer manufacturer's recommendations.
- All construction equipment is to have documented preventive maintenance compliant with the manufacturer's minimum recommendations. The preventive maintenance program is to be implemented by a trained/qualified individual and preventive maintenance records shall be maintained on-Site. For rental equipment, copies of recent preventive maintenance records shall be obtained from the vendor and maintained on-Site while the equipment remains on-Site.
- Repair/maintenance work shall not be conducted on heavy equipment from heights greater than six feet without proper man-lifts, work platforms, fall protection, or an approved job safety analysis if fall protection is not feasible or creates a greater hazard.

- Equipment operators may not work for more than 12 hours in any 24-hour period without prior acceptance from the SSO.
- Operators shall not jump to the ground from vehicle ladders, cabs, or platforms.
- Equipment shall be operated on grades in accordance with the equipment manufacturer's recommendations.
- Whenever the equipment is parked, the parking brake shall be set. Equipment parked on inclines shall have the wheels chocked and the parking brake set.
- Chocking is required whenever a worker is under any part of any construction equipment or associated loads and during decontamination or cleaning processes.
- Chocking is not required for tracked equipment or rubber-tired equipment if the parking brakes are set and components such as blades, buckets, outriggers, etc. are fully lowered to the ground and the equipment is completely stabilized.
- Equipment shall be parked in a zero energy condition so that there is no retained energy remaining in the equipment.
- On-Site equipment maintenance operations that pose a hazard to personnel shall be addressed in the task-specific HASP.
- Personnel in areas in which heavy equipment is being operated shall wear high visibility traffic safety vests and make eye contact with the operator before approaching.

All-terrain vehicles (ATVs) and utility vehicles safety measures include:

- The vehicle must be appropriate for the specific task(s) to be performed.
- The vehicle must be equipped with a rollover protective structure, seatbelts, headlights, brake lights, side or rearview mirrors, and a high-visibility flag extending upwards a minimum of 4 feet above the rollbar.
- Operators are required to read and follow the guidelines of the vehicle operator's manual.

4.5.2 Material Handling and Storage

All material shall be stored in a manner to prevent blowing, falling, sliding, or collapsing.

Walkways and aisles shall be kept clear at all times. Laydown areas shall be orderly. Material shall be stored on level ground, and the boundaries of laydown areas shall be identified. Material shall not be stored within 6 feet of hoistways or within 10 feet of roof edges. Poles, pipe, and other stock that may roll shall be wedged to prevent spreading and rolling.

Nails (screws, etc.) shall be removed from lumber that is to be reused. Nails in scrap lumber that will not be rehandled shall be bent back. Nails may be left as-is in lumber that will be not be handled or to which personnel will not be exposed.

No material, tools, or equipment shall be leaned against other objects or walls unless they are secured from movement.

Personnel moving material by hand shall use proper lifting techniques and gloves.

4.5.3 Rigging

All rigging shall be inspected by a competent person and marked as inspected before each use and at least annually. All rigging shall be clearly labeled with its capacity. All rigging shall be stored in a rigging loft or an equivalent area where it will not be exposed to the elements.

In addition, the following applies to rigging operations:

- A shackle shall be used to hold two or more eyes of a choker in a hook.
- All hooks must have a safety latch or be moused (a safety measure to keep slings or line from coming off), except during steel erection or when shake out hooks are properly used.
- Do not rig from a structural member until it has been ascertained that the member will support the load.
- Use only rigging equipment designed for the intended use.
- Hooks, shackles, chain hoists, beam clamps, and all rigging equipment shall be inspected prior to use.
- Rigging equipment shall never be used to handle loads beyond their rated capacity.
- Unsecured and unattended loads shall not be left suspended.
- No part of the body shall be allowed below a suspended load.
- The load chain must not be wrapped around the load.
- Softeners should be used where possible, to obtain a "bite" on the material being rigged.
- Fiber rope (manila and synthetics) must not be used in or near operations involving the use of corrosive substances, and shall be visually inspected before each use for excessive broken fibers, wear, and deteriorated strands.
- Wire rope must not be used on hoisting equipment after exposure to fire or extreme heat, if burned from contact with electricity, or when visual inspection shows damaged strands, corrosion, or more than 10 percent of the wires broken in one lay.

4.5.4 Tools

All tools shall be kept in good condition and properly stored. Tools shall not be altered, and they shall be used only for their intended purposes. Guards shall not be removed from tools, and all potential pinch points, open drums, and fly wheels shall be guarded. All tools shall be inspected before used with special attention to power cords and the condition of all operating parts. Any damage to the tool requires that the tool be removed from use until repaired. Owner’s manuals shall be available and personnel shall be trained in the safe operation of all tools they use.

Power tools shall be equipped with constant pressure switches that will shut the tool off when the switch is released. All power tools and electrical equipment shall be double-insulated or be equipped with grounding plugs. OSHA regulations at 40 CFR 1926.404(b)(1)(ii) require that “All 120-volt, single-phase 15- and 20-ampere receptacle outlets on construction sites, which are not a part of the permanent wiring

of the building or structure and which are in use by employees, shall have approved ground-fault circuit interrupters for personnel protection. Receptacles on a two-wire, single-phase portable or vehicle-mounted generator rated not more than 5kW, where the circuit conductors of the generator are insulated from the generator frame and all other grounded surfaces, need not be protected with ground-fault circuit interrupters."

Personnel using powder actuated tools shall be certified and have on their person a card stating such. The loads for powder-actuated tools shall be kept in a locked red box labeled "DANGER – EXPLOSIVES" which shall itself be kept in a locked area with restricted access.

All bench mounted and floor mounted tools shall be secured. Tools that come equipped with handles shall be used with the handles installed. Cheater bars are not permitted. Impact tools shall be free of mushroomed heads and cracks. Work benches and saw horses shall be provided when needed.

Defective tools (as well as materials and equipment) shall not be used. When a defective tool is found, it shall be taken out of service immediately by tagging it, destroying it, or removing it from the project Site.

4.5.5 Burning and Welding

A welding/burning (hot work) permit is required in all areas before striking an arc or lighting a torch. All exposed combustible materials below welding and burning areas must be removed to a safe location, covered with a fire retardant material, or protected by containing all sparks and slag. A 20ABC rated (or larger) dry chemical fire extinguisher will be provided and shall be located within 30 feet of any welding, burning or hot work operation. Personnel shall be trained in the use of fire extinguishers.

No welding or burning is to be done on or in any closed vessel, tank, line or confined space unless it has been decontaminated, tested, and a permit issued.

The user must inspect all leads, grounds, clamps, welding machines, hoses, gauges, torches, and cylinders before they are put into operation. All fittings, couplings, and connections are to be free of leaks. Testing shall be done with soap and water. All burning rigs must be broken down with regulators removed and protective caps screwed down hand tight prior to vehicular transporting. Compressed gas cylinders must be secured vertically to an adequate support while in storage, transit, or use. The protective cap must be on during storage and transit.

Burning goggles with not less than a number three density lens with plastic cover plates on both sides are required for all gas burning operations.

Personnel shall never leave a torch in a vessel, tank, or other closed container because of the potential leakage hazard. Oxygen shall never be used to operate pneumatic tools, pressurize a container, blow out lines, or as a substitute for compressed air or other gases.

Compressed gas cylinders shall be raised and lowered with approved rigging gear only. Personnel shall not strike an arc on cylinders or use them as rollers. Compressed gas cylinders must be secured to a cylinder cart or chained to a stable structure when not being moved.

Oil and grease shall be kept away from oxygen regulators, hoses, and fittings.

4.5.6 Compressed Air

Only hoses and couplings designed to handle compressed air shall be used. These hoses and couplings shall be inspected before each use. Chicago or similar type couplings shall be secured together by metal fasteners where holes are provided.

Pressurized hoses shall never be crimped, coupled, or uncoupled. The user shall shut off the valve and bleed down the hose. All hoses exceeding ½-inch inside diameter shall have a safety device at the source of supply or a branch line to reduce pressure in case of hose failure.

Compressed air used for cleaning shall not exceed 30 psi. Compressed gases, other than air, should not be used for cleaning clothing, workbenches, or machinery. Support hoses from conduit, process lines, or sprinkler lines shall not be used.

4.5.7 Equipment

Equipment shall be used only for its intended purpose. No maintenance or repair work may be done on equipment, belts, drives, conveyors, or vehicles while in operation. They must be shut down, locked out and tagged, or otherwise immobilized or de-energized.

4.5.7.1 Safety Belts

Generally, safety belts must be worn and tied off to independent life lines when working from elevated areas under one or more of the following conditions:

- The roof pitch equals or exceed 4 in 12.
- The work requires personnel to be within 4 feet of the edge of a roof not protected by a standard guard rail.
- Two-point suspension scaffolds or stages are in use.
- Scaffolds with incomplete handrails and decking are used.
- Ladders are laced near the edge of a roof or floor opening.

- No protection is available to prevent the worker from falling.

Every individual issued a safety belt shall be instructed by a qualified person in the proper method of wearing, using, and securing the lanyard.

Every safety belt and lanyard must be inspected by a qualified person upon issue, and by the wearer before each use.

4.5.7.2 Ladders

Ladders must be inspected by a qualified person and approved for use before being put into service. Each user must visually inspect ladders before each use.

Painted ladders shall not be used. If it is necessary to place a ladder in or over a doorway, barricade the door and post warning signs. While ascending and descending, a straight ladder shall be held with two hands while a stepladder is held with at least one hand. A hand line shall be used if necessary to raise or lower materials.

Both feet must be kept on the ladder rungs. Workers shall always face the ladder. A safety belt is required if it is necessary to work backwards from a ladder.

Only one person is allowed on a ladder, unless "two-man" stepladders are in use. Metal ladders must never be used during performance of electric work, electric welding, or any work near electric lines or services. If it is necessary to use a ladder on top of a scaffold, the ladder must be tied off and the user must wear a safety belt, and the SSO must specifically approve this activity.

Straight and Extension Ladders

- Place ladder so the base is out one fourth the vertical distance from the ground to the object against which the ladder is leaning.
- Ladders must be adequately tied off or held.
- The top of the ladder used as access to an elevated work area must extend at least 3 feet beyond the supporting object.
- After the extension section has been raised to the desired height, the safety dogs or latches must be engaged and the extension rope secured to a rung on the base section of the ladder before use.
- Extension ladder sections are not to be used separately.

Stepladders

- Stepladders must be set level on all 4 feet, with spreaders locked place. Do not use as a straight ladder.
- Never stand on the top or on the first step below the top of a stepladder.
- Stepladders must be tied off when used close to the edge of an elevated platform, roof or floor opening, or when they exceed 8 feet in height, and the SSO must specifically approve this activity.

4.5.8 Cranes

Before the start of each shift, the operator shall thoroughly inspect his/her equipment. Monthly inspections (or periodic inspections) shall be made and records maintained of all inspections and maintenance activities. All inspections shall be carried out by a qualified person with a thorough knowledge of the equipment involved.

Every crane must be equipped with a load chart posted in the operator's control station. The chart must include: nameplate identification information; load ratings for the boom at all stated operating radii or angles for different counterweights, boom lengths, and types; jib rating; and the method for calculating boom jib ratings.

An authorized signalman should be appointed to work with the operator. The operator should take directions, using standard hand signals or approved electronic communication equipment, only from the designated signalman. Hand signal instructions shall be posted on the job site. If an operator loses sight or communication with the signalman he should stop operation immediately.

The load weight is the single variable in mobile crane operation that is always changing. Its effect should never be overlooked. It is very important to determine the weight of any load before rigging, and make allowance for unknown factors. Rigging equipment must be included in the load weight. When approaching the upper 25 percent of the cranes rated capacity, it is a good idea to measure the load radius. The crane outriggers should always be used for lifting.

When a crane is being used with a demolition ball, the weight shall not exceed 50 percent of the safe load of the boom at maximum length and angle of operation, or 25 percent of the nominal breaking strength of the supporting line, whichever is less. The boom swing must not exceed 30 degrees from the center line (front to back) of the crane mounting. The load line and swivel type attachment must be checked at least twice daily.

The demolition ball shall be attached to the load line with a swivel type connection to prevent twisting of the load line. It shall be attached by positive means in such a manner that the ball cannot become

disconnected by slack in the load line or other causes. The use of tires for the swivel connection shall be prohibited. Under no circumstances shall a person be allowed to ride on or work from a demolition ball.

The use of a clamshell bucket may present special problems. The operator should be ready to release the closing line if an overly heavy weight is bitten off. When using a clamshell bucket, special care must be taken by workers to stay clear of debris hanging out or falling from the bucket. Never work under a suspended load.

All equipment, ropes, and slings must be in good condition, free of kinks or bends, and/or exposed to corrosives, rusting, or welding operations. If defects are found during inspection, the equipment must be destroyed or tagged and removed from the project for repair. The working capacity of all rigging equipment should be known prior to its use and never exceeded.

The problem of cranes and electrical hazards simply cannot be overstated. Electrocution is the largest cause of crane fatalities. Live power lines have areas called the "absolute limit of approach". No exceptions to the rule prohibiting entry into this area can be made unless the line has been insulated or de-energized.

Line rating	Minimum Clearance
<50 KV	10 feet
>50 KV	10 feet plus 0.4 inches for each KV over 50, or twice the length of the line insulator.

A signalman must be assigned to warn the operator when he is nearing the absolute limit of approach. The operator must be notified when he is within a boom's length of the limit. The use of a signalman is mandatory, and the absolute limit of approach can never be compromised.

If, despite all precautions, the crane makes contact with a live circuit, the operator should stay inside the cab. All personnel must stay away from the machine, its load, and the surrounding area, which will be charged. The operator can try, by himself, to back the crane away from the power line, or to lower the boom and then move away from the line. If he cannot do so, he should wait for electrical authorities to de-energize the line. If the operator is forced to leave the machine, he must jump completely clear of it and with his/her feet together. **Stepping down, or allowing any part of his her body to touch the machine and ground at the same item, will result in electrocution.**

Except in certain emergencies, the operator must never leave the crane while a load is suspended.

Only approved baskets shall be used. All personnel entering a personnel basket for the purpose of being elevated must wear safety belts, tied off securely to the safety cable above them.

4.5.9 Heat Stress

Weather conditions affecting the health and safety of Site personnel include high temperatures resulting in increased risk of heat stress. Frequent rest in a cool area with sufficient fluids, such as water or sports drinks, and appropriate clothing (light-colored, lightweight clothing) will minimize the risk. Personnel should monitor fluid intake to avoid dehydration; and encourage co-workers to drink fluids.

The following three conditions of heat stress could occur during tasks in periods of high ambient temperature:

- ***Heat Syncope***: If a person has been standing still for some time, a sudden fainting spell could occur as a result of blood pooling in the lower parts of the body. Recovery is typically instantaneous but injury may occur from a fall. If these symptoms occur, remove clothing, provide a tepid water bath or sponge bath, provide oral fluids, and rest in a cool environment. Contact the SSO immediately. Any person who loses consciousness should be evaluated by a medical professional.
- ***Heat Exhaustion***: This condition occurs when the core temperature of an individual rises slightly. Heat exhaustion is characterized by profuse sweating, clammy skin, dizziness, confusion, and lightheadedness. If these symptoms occur, the individual should leave the work area and proceed to the nearest air conditioned location, drink liquids (water and/or a sports drink), and rest until the symptoms pass. Contact the SSO immediately. Any person who loses consciousness or has an altered mental status should be evaluated by a medical professional.
- ***Heat Stroke***: Heat stroke is often a fatal condition. The individual stops sweating and the core body temperature rises rapidly. The face and upper chest are bright red or bluish in color. Convulsions may occur as the body temperature rises. Disorientation, collapse, and unconsciousness also may occur. Note that sunburn and previous sweat may mask some of these symptoms. If heat stroke is suspected, call Emergency Medical Services (EMS) (or 911) immediately. Remove excess clothing and cool the person by sponging with cool or lukewarm water. Never place ice on the person or throw water on the individual. Contact the SSO and Golder Project Manager as soon as time permits.

Measures for preventing heat stress:

- Identify and evaluate all jobs which may result in excess heat stress.
- Minimize heat disorders through the use of engineering controls, training, work practices, acclimatization, and other protection measures, such as providing plenty of fluids, limiting amount of time in direct sun or in respirators, taking frequent breaks, etc.
- Prepare for the hot weather season and use hot weather alert procedures.

Measures for reducing chances of heat stress:

- Increase the frequency and duration of rest breaks.
- Schedule tasks to avoid heavy physical activity during the hottest parts of the day.
- Provide cool drinking water or an electrolyte-replacement drink and encourage its consumption.
- Use additional workers for the job or slow down the pace of the work.

Everyone should understand the signs and symptoms of heat stress. If heat stress is suspected, the affected person shall be given a rest period. A rest period shall consist of a continuous time period of at least five minutes, preferably in a shaded area. The person shall not be assigned to other work during this rest period. If the pulse rate exceeds 110 beats per minute, the SSO or his designee shall take his or her oral temperature with a clean disposable calorimetric oral thermometer. If the oral temperature exceeds 99.6°F, the next work period shall be shortened by one-third. The pulse rate and oral temperature shall be monitored at the beginning of the next rest period, and if the oral temperature exceeds 99.6°F, the work period shall be shortened by one third, etc., until the oral temperature is below 99.6°F.

4.5.10 Cold Stress and Hypothermia

Personnel should protect themselves from the cold by wearing appropriate clothing, including an outer water and wind-proof protective shell. Dressing in layers allows the individual to adjust clothing as weather conditions change, or as physical activity warms the individual; such adjustments can prevent the person from getting wet from perspiration, and becoming more susceptible to hypothermia. Personnel should monitor fluid intake to avoid dehydration and encourage co-workers to drink fluids.

Hypothermia: This condition occurs when the body's core temperature drops below 35° C (92° F). Wind and wetness increase the chances of hypothermia because they lower body temperature faster than it can be generated. Signs of hypothermia include clumsiness, tiredness, reluctance to keep moving, irrationality, confusion, muscle stiffness, uncontrolled shivering (once shivering stops, the individual is critical and subject to collapse). Look for signs of hypothermia in your co-workers when weather conditions present a hazard, and retreat to a heated vehicle or building as necessary. This condition requires emergency care and hospitalization (call 911). Note: Hypothermia can occur during warm weather if personnel are exposed to water, wind, or other conditions that accelerate the loss of body heat.

Six main factors involved in causing cold stress:

- Temperature
- Humidity
- Movement of air
- Radiant temperature of the surroundings
- Clothing
- Level of physical activity

Measures for reducing chances of cold stress:

- Dress appropriately for expected weather conditions. Dress in a minimum of three layers (a skin layer to absorb moisture and keep the skin dry, an insulating layer, and an outer protective layer).
- Change into dry socks as necessary, because perspiration held by the socks prompts cooling of the feet. Should clothing become wet, it is imperative that the person change into dry clothes before resuming work.
- Avoid vasodilators (dilate blood vessels) which allow the body to lose heat faster which can accelerate hypothermia. These include alcohol and certain drugs.
- Avoid vasoconstrictors (constrict blood vessels), including tobacco products, which constrict blood vessels and can accelerate the onset of frostbite.
- Avoid touching cold metal with bare skin.
- Keep active.
- Use shelter where available.

4.5.11 Lightning

Lightning typically occurs during thunderstorms and similar intense rainfall events. Hazards associated with lightning include direct electrocution, burns, and flying debris in the vicinity of the lightning strike. Although lightning typically strikes the highest objects in the area and is preferentially attracted to good conductors (such as metal poles), it is unpredictable. Consequently, **a potential lightning hazard shall be assumed whenever thunderstorms are occurring at, or in the vicinity of the Site**.

Procedures for personnel working out-of-doors when a potential lightning hazard exists:

- For drilling or excavation activities, stop work. Lower the mast of the drill rig, if possible. Move to an appropriate shelter, such as the administration building, or into a pickup truck or car until the hazard is no longer present.
- For investigation and/or sampling activities in remote areas accessible only by foot, immediately move to lower ground to the extent possible and proceed to a suitable shelter or vehicle. Avoid traversing along high points, such as ridges, and open areas.
- For abatement, demolition, or other construction activities, stop work in accordance with the activity-specific HASP.
- Seek safe shelter when you first hear thunder, see dark threatening clouds developing overhead or lightning. Count the seconds between the time you see lightning and hear the thunder. Stay in safe Shelter if that time is less than 30 seconds.
- Stay inside until 30 minutes after you last hear thunder.
- Notify the SSO when lightning or thunder is observed, because thunder may not be heard by personnel wearing hearing protection and lightning is obstructed by Site features such as tress or buildings.

When a safe location is not nearby:

- Do **NOT** seek shelter under tall isolated trees. The tree may help you stay dry but will significantly increase your risk of being struck by lightning.
- Do **NOT** seek shelter under partially enclosed buildings.
- Stay away from tall, isolated objects. Lightning typically strikes the tallest object. That may be you in an open field or clearing.
- Know the weather patterns of the area and know the daily weather forecast. If there is a high chance of thunderstorms, curtail your outdoor activities.
- Wet ropes can make excellent conductors. Do **NOT** keep ropes attached to you; the electrical current can travel along the rope, especially if it is wet.
- Stay away from metal objects, such as fences, poles and backpacks. Metal is an excellent conductor. The current from a lightning flash will easily travel for long distance.

4.5.12 Slips, Trips, Falls, and Terrain Hazards

The nature of fieldwork often results in having to walk on uneven surfaces, steep slopes, and in wooded areas to reach the work area. For this work, the following safe work practices should be observed:

- Wear proper footwear (steel-toed boots with ankle support).
- Keep boots clean, because slips may result from mud in the treads.
- Avoid jumping across obstacles (e.g., fallen trees, ditches).
- Exercise caution while carrying equipment; share the load with your co-worker when necessary.
- Know where you are; have topographic maps, GPS units, and/or other locating equipment.
- Horizontal or vertical shafts left from underground mining operations may be completely unprotected, hidden by vegetation, or covered by rotting boards at the surface; horizontal openings may seem sturdy, but rotting timbers and unstable rock formations may be present.
- Do not work in potentially hazardous terrain at dawn or dusk when full daylight is not present.

In addition to the precautions for working around heavy equipment, excavation and trenching require additional care and precautions. Excavations, trenching, and shoring shall comply with all applicable laws, rules, and regulations, including but not limited to 29 CFR 1926, Subpart P (Excavation, Trenching, and Shoring). OSHA Pamphlet 2226 (Excavation and Trenching Operations) can be used as an additional aid.

- If the project includes constructed slopes in excess of 2.5 horizontal to 1 vertical, personnel are not to attempt to walk on the slope without appropriate fall protection equipment such as a safety harnesses. Prior approval must be obtained from the Golder Project Manager for such activities.

- Since slope and trench failures are not uncommon, observe the following regarding excavation and trenching:
  - Always stand or keep material or equipment several feet away from the edge of a trench or slope.
  - If work is to be conducted in a trench greater than 4 feet deep, then appropriate shoring must be installed in the trench, as designed and approved by a competent person (i.e., professional geotechnical engineer). Remember that the height of the spoil pile next to a trench is added to the depth of the trench when discussing total depth and angle of response. Work in shored trenches must first be approved by the SSO.
  - Temporary spoil shall be placed no closer than two feet from the surface edge of the excavation, measured from the nearest base of the spoil to the cut.
  - If the excavation is more than 4 feet deep, ladders, ramps, or stairways must be provided at intervals of at least every 25 feet.
  - Never enter an excavation or trench if there is standing water in the bottom, rendering it impossible to observe the bottom.

4.5.13 Sharp Debris

Sharp debris may be present on Site in the former processing buildings, unknown waste disposal areas, old oil wells, and other locations. Sharp debris is also likely to result from demolition operations. To the extent possible, avoid contact with sharp debris. Where this is not feasible, wear heavy leather gloves and heavy clothing, and handle all debris with extreme care.

4.5.14 Working at Heights

When planning for work at height, consideration must be made for where the work will be done. The first choice will be any existing structure which allows safe access and provides a safe working place. Where it is not possible to work safely from the existing structure, an extra working platform must be provided.

Contractors performing work at heights greater than 6 feet shall provide fall protection and rescue plans in their task-specific safety analyses.

Contractor personnel working over any machinery, open spaces, hazardous substances, unguarded heights or steep slopes, or otherwise exposed to falls 6 feet or greater in height shall be protected by adequate fixed scaffolding, guard rails or safety nets, or secured by personal fall arrest systems. Shock-absorbing lanyards shall be used where feasible to prevent injury during a fall. Where conventional fall protection is infeasible or creates a greater hazard, the Contractor may submit a fall protection plan as outlined in 29 CFR 1926 .502(k) to the SSO for acceptance. Contractors shall allow sufficient time for plan review, acceptance, and implementation of plan requirements. Fall protection, stairways and ladders shall meet the requirements of 29 CFR 1926 Subpart M, Fall Protection, and 29 CFR 1926 Subpart X, Stairways and Ladders. Use of portable ladders requires maintaining three points of contact at all times, otherwise alternative means such as scaffolds or sky lifts shall be used.

Fall hazards associated with construction equipment inspection, maintenance, and repair operations shall be assessed and adequately controlled using best available practices. Personal fall arrest systems shall be inspected prior to each use for wear, damage and other deterioration, and defective components shall be removed from service as outlined in 29 CFR 1926.502(d)(21). Fall arrest systems must be rigged to stop the fall before the fall arrest system has fully extended and the user has come into contact with the ground or other objects below the work area.

Rules to help prevent falls:

- Don't work at height unless it is essential.
- Make sure the working platform is secure. Check that it:
  - will support the weight of workers using it and any materials and equipment they are likely to use or store on it.
  - is stable and will not overturn. For example, scaffolds usually need to be tied to a supporting structure. Mobile elevating work platforms may not be safe on uneven or sloping ground.
  - provides adequate working space.
  - is placed on stable ground or on a stable support or structure.
- Provide guard rails, barriers etc at open edges, including edges of floors, floor openings, edges of roofs and edges of working platforms. When installing guard rails in buildings, activities will not begin until SSO has approved fall protection methods.

Steps to take before working at height

- Check to ensure there is a safe method of getting to and from the work area.
- Decide the particular equipment which will be suitable for the job and the conditions on Site.
- Make sure work platforms and all edges have guard rails and toe boards or other barriers.
- Make sure that the equipment needed is delivered to the Site in good time and that the Site has been prepared for it.
- Check that the equipment is in good condition and make sure that whoever puts the equipment together is trained and knows what they are doing.
- Make sure those who use the equipment are supervised so that they use it properly. The more specialized the equipment (for example, boatswain's chairs and rope access equipment), the greater the degree of training and supervision required to ensure safety.
- Check any equipment provided by another company is safe and in good condition before using it.
- If equipment is defective, stop work.
- Contact the SSO and field team leader if any defects in equipment are identified.
- Use a harness and related fall protection equipment if working at heights greater than 6 feet above ground.

The Safety requirements outlined in 29 CFR 1910.28 outlined the Safety requirements for scaffolding and 1926.502 fall protection must be followed.

4.5.15 Hand-Held Equipment

Hand-held equipment, both power and manual, presents a potential hazard to the operator. Types of equipment that may be used for demolition and construction activities include saws, drills, hammers, cutting torches, welding equipment, chain hoists, and the like. Safety requirements for using hand-held equipment will be established in the contractor's HASP for these activities and shall follow industry standards, manufacturer's recommendations, and good practice.

4.5.16 Hazardous Ground Releasing Gases

Because of former mining of the coal-bearing beds and the presence of several abandoned oil and gas wells at the Site, there may be a potential for encountering reactive, flammable, and/or explosive gases. Therefore, no open flames, matches, cigarette lighters, or fires of any kind shall be allowed within 50 feet of any excavations, monitoring wells, manholes, oil wells, or building structures within the plant area or in the northern portion of the property where underground mines may exist. During exploration activities, personnel shall be cognizant for unusual odors that may indicate the presence of hydrocarbons or other gases. If such odors are noticed, stop the activity immediately and notify the SSO. Do not resume work until the nature of the gas has been determined and appropriate actions have been taken.

4.5.17 Heat and Ignition Sources

Power tools and cutting torches are anticipated for use during demolition activities, and may be used at other times on-Site during the Interim Security Installation. Any contractor using such equipment shall include a fire prevention plan in their Site-specific HASP. Personnel with incidental use of such equipment shall ensure that the equipment is used away from potentially ignitable material. Cutting torches shall be used within a restricted area to protect other personnel. Hot work permits must be obtained from the SSO.

4.5.18 Confined Space

A confined space is defined as any space not currently used or intended for human occupancy, having a limited means of egress. Confined spaces include but are not limited to storage tanks, process vessels, ventilation or exhaust ducts, underground utility vaults, sewers, culverts, and open top spaces more than 4 feet deep such as pits, trenches or vats. Confined space entry requires special training. At no time shall any personnel enter a confined space without first receiving confined space training and authorization from the SSO.

A permit-required confined space is a confined space as defined above that is also subject to the accumulation of toxic constituents, a flammable or oxygen deficient atmosphere, or other hazards, such as engulfment, or electrical or mechanical hazards should equipment be inadvertently activated while an individual is in the space.

4.5.19 Working with Cement

Contact with wet (uncured) concrete, mortar, cement, or cement mixtures can cause skin irritation, severe chemical burns, or serious eye damage. Precautions shall be taken to avoid contact with eyes and skin, including the use of rubber work gloves and safety glasses. Use safe work practices to avoid skin and eye exposure.

4.6 Potential Biological Hazards

The following universal procedures apply to all Site personnel. Notify the SSO if medical attention is necessary.

4.6.1 Infection

Contact with solid waste, debris, or other materials can lead to infected cuts. When the skin is abraded or cut, personnel shall follow first aid procedures for disinfection of cuts and abrasions.

4.6.2 Ticks

The Site may contain ticks, which can transmit Rocky Mountain Spotted Fever and Lyme Disease. During tick season (March to November), Site workers should routinely check for ticks. Light colored clothing should be worn and any openings (shirt and pant cuffs) should be secured to inhibit tick movement from clothing to skin. The use of insect repellents should be considered if its use will not interfere with sampling activities; ***check with the SSO in advance of using repellants for sample interference concerns***.

If you find a tick biting your skin, remove it carefully with tweezers, avoiding crushing the tick, and being sure to remove the mouth parts from your skin. A commercial tick removal tool can also be used. If the tick resists or cannot be completely removed, seek medical attention. Following removal of the tick, wash your hands, disinfect the area, and dress it with a bandage. Following a tick bite, watch for symptoms of Lyme disease or Rocky Mountain Spotted Fever. Field personnel shall acquaint themselves with the symptoms of tick-borne diseases detailed below and shall contact a physician as well as the SSO, if disease is suspected.

Symptoms of Rocky Mountain Spotted Fever include fever, chills, headache, abdominal muscle pain, and nausea. A red rash develops at the wrist and ankles two to five days after exposure. Symptoms develop

two to fourteen days after exposure. Symptoms of Lyme Disease include fatigue and stiffness (particularly in the neck). There may be a red circular, or bull's-eye, rash. Fever may be present. Symptoms develop a few days to two years after exposure.

4.6.3 Insect Bites and Stings

An insect bite or sting is usually a minor problem for most people. Such insects include bees, wasps, hornets, yellow jackets, and fire ants. Usually there are no major effects. Some people, however, are especially sensitive to bee stings, or may even develop a life-threatening allergic reaction. Prompt emergency care may save their life.

Common Response to Insect Bite/Sting:

- If the stinger is still visible in the wound, scrape off the stinger using a credit card or the edge of a fingernail or knife blade. Do not squeeze the stinger with your nails or tweezers because that may inject more venom.
- Wash and dry the area thoroughly.
- Apply a cold pack. Wrap an ice bag in a damp cloth and apply to the stung area. This reduces pain and swelling.
- Apply Calamine lotion, a lotion containing Benadryl, or a paste made of baking soda and water.
- Stay close to a phone for the next two hours. Reactions, if any, will likely take place within the first two hours or so.

Special Response to Insect Bite/Sting:

If a person is known to have had allergic reactions to bee or other insect stings in the past, it is a more serious matter. Anyone can have an allergic reaction to a bee sting, even if they were stung before with no reaction. Allergic reactions to bee stings may occur as swelling around the lips and eyes, rapid development of a rash, difficulty breathing, or signs of shock (pale skin, rapid pulse, and fainting). If any of these symptoms occur, call 911 immediately. Check to see if the person is carrying an emergency bee sting treatment kit. Follow the written directions to use it.

People with previous reactions to bee, wasp, hornet, fire ant, or yellow jacket sting, must always carry a "bee-sting kit" (e.g., Epi-Pen or Ana-Kit) and inform their co-workers and the SSO. They should avoid bright clothing and scented toiletries when outside. If an Epi-Pen or similar device is used, the employee must be immediately transported to an emergency medical facility, or EMS summoned, as additional treatment may be required to control the allergic reaction.

4.6.4 Poisonous Spiders

In Ohio two main groups of spiders pose a potential hazard to humans: the recluse spiders and the widow spiders. Two species of recluse spiders are found in Ohio, the brown recluse – *Loxosceles recluse* and the Mediterranean recluse – *Loxosceles rufescens*. These species have been found only in or near buildings, and they may not survive over the winter outside. As the name "recluse" suggests, these are relatively shy spiders. The recluse spiders are mostly a pale or reddish brown color. On very close inspection there is a violin-like pattern on the top of the front part of body. The bite of recluse spiders is often not very painful at the time of the bite, but the pain may become quite severe after a few hours. The venom is rarely life-threatening except when the victim is very young or aged.

Both the black widow spider (*L. mactans*) and northern widow spider (*L. various*) are present in Ohio, although uncommon. The black widow spider is found primarily in the southern Ohio counties, whereas the northern widow spider is found in the northern Ohio counties. The widow spiders occur primarily outdoors and are not aggressive unless confined or disturbed.

Adult black widow spiders have shiny, jet black, rounded, globular abdomens with two reddish or yellowish triangles on the underside that form a characteristic hourglass marking.

Adult female northern widow spiders are shiny black or brown-black with two reddish triangles on the underside, resembling a split hourglass. These spiders are about ½-inch long, not including the legs (about 1-1/2-inches when legs are spread). Adult males are harmless, about half the female's size, with smaller bodies, longer legs and usually have yellow and red bands and spots over the back as do the immature stages.

The severity of an individual's reaction to the widow spider bite depends on the area of the body bitten, amount of venom injected, and their sensitivity to the venom. The bite of a widow spider initially may go unnoticed, but some people report a short stabbing pain. At first, there may be slight local swelling and two faint red spots, which are puncture points from the fangs. Pain soon begins and usually progresses from the bite site to finally localize in the abdomen and back. Severe cramping or rigidity may occur in the abdominal muscles. Other symptoms may include nausea, profuse perspiration, tremors, labored breathing, restlessness, increased blood pressure, and fever.

If bitten, remain calm and immediately seek medical attention.

4.6.5 Poisonous Plants

Skin-sensitizing (poisonous) vegetation such as poison ivy or poison sumac produce a bumpy, swollen rash at the point of contact. Both poison ivy and poison sumac are common on the Site. This rash is easily spread if the oil gets on the fingers. All personnel shall be able to identify poisonous plants at the

Site, and shall avoid contact with such plants. In the case of inadvertent or unavoidable contact, wash affected area(s) including tools and clothing as soon as possible. Use over-the-counter medications to reduce the irritation. Avoid scratching the rash. Cover the affected area(s) with clean dressings. Severe exposure may necessitate evaluation by a medical professional.

4.6.6 Venomous Snakes

Ohio has three species of venomous snakes, two of which have rattles at the end of the tail (Eastern Massauga & Timber Rattlesnake). The third species, which is more likely to be encountered at the site, is the Copperhead, a pit viper that is not a rattlesnake. Characteristics of these venomous snakes are:

- Head is distinctly triangular.
- Pupils are elliptical (not round).
- Pits as well as nostrils are present on the head.
- Undivided scales are present on underside of tail.

Measures for preventing snake bites include:

- Leave snakes alone. Many people are bitten because they try to kill a snake or get too close to it.
- Stay out of tall grass unless you wear thick leather boots and remain on access roads as much as possible.
- Do not reach into brushy areas, under rocks, or into other locations where potential inhabitants may not be visible; keep hands and feet out of areas you cannot see. Do not pick up rocks or firewood unless you are out of a snake's striking distance.
- Be cautious and alert when climbing rocks.

If someone has been bitten by a snake, call for emergency assistance immediately. Responding quickly in this type of emergency is crucial. Even non-venomous bites pose threats of tetanus, infection and allergic reaction and should be evaluated by a physician. While waiting for emergency assistance:

- Remove constricting items on the victim, such as jewelry or tight fitting clothes, which could cut off blood flow if the bite area swells.
- Immobilize the bitten area and keep it lower than the heart. The affected limb should be used as little as possible.
- Cleanse the wound, but don't flush it with water. Cover the wound with a clean, dry dressing.
- Do not use a tourniquet or constricting band. Do not apply ice or chilled water. Do not apply alcohol to the wound. Do not cut the wound.
- Monitor pulse rate and breathing.
- Applying mechanical suction (such as with a Sawyer Extractor) is highly unlikely to remove any significant amount of venom, and may increase tissue damage.

Personnel performing field operations, particularly in remote areas or adjacent to bodies of water, shall wear heavy leather boots that lace above the ankle and heavy pants.

4.6.7 Mammals

The Site may harbor mammals that are infected with rabies. Wild animals most frequently infected with rabies include rodents, skunks, raccoons, foxes, and bats; however, any warm-blooded animal could be infected. Squirrels, groundhogs, horses, cattle and rabbits have tested positive for rabies. Dogs and cats are frequently rabies infected if not immunized.

Rabies infection is not always apparent, but signs to look for in animals are over aggressiveness or passivity. Spotting animals which are normally nocturnal (active at night) during the day and being able to approach them would be an example of unusual behavior. Finding a bat alive and on the ground is abnormal.

Personnel should be alert to these animals, particularly around holes in the ground. The best precaution is to observe all wild animals from a safe distance.

If bitten by an animal suspected of being infected with rabies, wash the bite area as quickly as possible with soap, water and disinfect with 70 percent isopropyl alcohol, then seek medical attention for follow-up.

Bears may be present at the Site. The best precaution if somebody sees a bear is to turn around and go back, or circle far around. Do not disturb it. Notify the SSO immediately.

5.0 SITE MONITORING AND ACTION LEVELS

Potential inhalation exposures will be evaluated by air monitoring for anticipated contaminants listed herein when performing subsurface investigations or sampling. Practices used to minimize potential airborne exposure when performing these activities shall include:

- Standing upwind of the field activity.
- Minimize generation of dust.
- Standing away from visible aerosols (e.g., water spray or gases from boreholes) until they have dissipated and air monitoring confirms that conditions have stabilized.
- Recognizing potential warning properties of contaminants and of dust that may be present during field activities (e.g., odor, irritation, nausea, etc.).
- Wearing appropriate PPE.

The following methods and procedures apply to all Site personnel.

5.1 Air Monitoring

Air monitoring is required during intrusive work, such as remediation, excavation, boring installation, well drilling, and sampling of monitoring wells. Perimeter and personnel air monitoring will be required during the abatement of the regulated materials. Intrusive activities have the potential for exposures to metals and particulates. The requirements for air monitoring and associated action levels for anticipated Site activities are outlined in Table 9. The monitoring methods involved and their interpretation are discussed in the following sections.

With the concurrence of the SSO, exposure monitoring may be discontinued after representative initial monitoring is conducted and worker exposures are shown to be adequately controlled through the use of engineering, work procedures, and/or PPE. If work activities change so that the initial monitoring is no longer representative of worker exposure, monitoring must be reinitiated. Exposure monitoring activities must be detailed in the task-specific safety analysis.

5.1.1 Aerosol Monitoring

An aerosol monitor will be used to provide real-time measurements of total respirable particulates (TRP). The data collected will provide real-time information that will be used to evaluate the effectiveness of dust control procedures being implemented by the remediation construction contractor. The aerosol monitors will be carried by at least one qualified person (SSO or designated representative) for each active work area. The SSO or designated representative will walk around the active work area to obtain both upwind and downwind readings.

Approximately once an hour, personnel will observe the aerosol monitor readings for approximately five minutes and estimate a five-minute average TRP concentration. These estimated five-minute average concentrations will be recorded on field log sheets. The aerosol monitors will also be programmed to alarm if the five-minute average TRP Action Level of 2.5 mg/m^3 is exceeded (Table 9). The monitors will be factory calibrated and operated in accordance with the manufacturer's instructions.

In order to determine appropriate hazard controls, real time aerosol monitoring readings must be taken every 15 minutes for the first hour of work per activity. If the TRP action level is not exceeded, aerosol monitoring readings will be taken once per hour.

5.1.2 Integrated Personal Air Monitoring

Integrated personal air monitoring refers to the continuous collection of a sample over a period of time for subsequent analysis, usually by a laboratory. This monitoring typically involves the use of portable sampling pumps and an appropriate collection media such as filters, impingers, or adsorption tubes. Integrated monitoring can also be performed using organic vapor monitors and other passive sampling devices. Per 29 CFR 1926.1126 Subpart Z, initial monitoring shall be performed to determine the eight-hour time weighted average exposure for personnel on the basis of a sufficient number of personal breathing zone air samples to accurately characterize full shift exposure on each shift, for each job classification, in each work area. In order to provide representative sampling to meet this requirement, the samples shall be collected from the personnel expected to have the highest exposures. Integrated sampling for workers should be conducted on the first day of intrusive activities (for each type of task) for hexavalent chromium, lead, manganese, arsenic, vanadium, chromium (trivalent). If initial monitoring indicates the exposures are below 5.0 mg/m^3 respirable particulate and the respective PELs of the metals listed above, monitoring can be discontinued.

Personal sampling and analysis shall be performed in accordance with the OSHA Industrial Hygiene Technical Manual, the National Institute for Occupational Safety and Health (NIOSH) Manual of Analytical Methods, or other acceptable industrial hygiene practices. Only analytical laboratories accredited by the American Industrial Hygiene Association shall perform sample analysis. The laboratory analysis will include field blanks, as required by the individual method or laboratory. Prior to sampling, the specific sampling and analytical method should be discussed with the receiving laboratory to determine any special requirements or variations to established methods necessary to collect an acceptable sample.

5.1.2.1 Non-Intrusive Tasks

During non-intrusive activities, and for all areas in which soil or surface contamination is not present, air monitoring is not required. Figure 3 provides a map with designated Site control areas. Field team personnel shall be aware of any conditions that would indicate potential airborne chemical exposure (e.g.,

odor, visible plume or smoke, non-aqueous liquids, etc.). If such indicators are encountered, discontinue work and contact the SSO.

5.1.2.2 Intrusive Tasks

Intrusive activities subject to routine air monitoring include but are not limited to fence installation, soil sampling, and silt fence installation in contaminated soils and all work in Site buildings. At a minimum, air monitoring equipment will be used to provide real-time measurements of total respirable airborne dust levels.

5.1.3 Regulated Materials and Demolition

Air monitoring for regulated materials during abatement and demolition activities will be conducted by demolition and abatement contractors as outlined in their task-specific hazard analyses and in compliance with all applicable laws and regulations. This monitoring is in addition to perimeter air monitoring performed by Golder.

5.1.4 Combustible Ground Releasing Gases

Under certain conditions coal seams can generate large volumes of methane gas, which may exist in the subsurface. Digging or drilling can pose asphyxiation, fire, and explosion hazards. If drilling in coal strata is performed, an MSA Passport multi-gas meter (oxygen, combustible gas, and hydrogen sulfide detector), or an equivalent direct reading instrument, shall be used to monitor combustible gas concentrations in the work zone 12 inches above ground surface and in the borehole during drilling. The instrument calibration shall be checked daily. A threshold limit value (TLV) and permissible exposure limit (PEL) have not been established for methane, although NIOSH and OSHA consider 10 percent or greater of the Lower Explosive Limit (LEL) to be an immediately dangerous to life and health (IDLH) condition in a confined space; these values shall be used to trigger action levels for this project unless approved otherwise by the SSO and the CASR. No hot work shall be performed if the combustible gas concentration is 10 percent or greater of the LEL.

6.0 SITE SAFETY CONTROLS AND WORK ZONES

The following sections discuss minimum personal protective equipment (PPE) requirements and apply to all Site personnel.

6.1 Personal Protective Clothing and Respiratory Protection

The following PPE scheme will be used to designate the required level(s) of PPE and respiratory protection: the alphabetical designations “B”, “C”, and “D” shall refer specifically to levels of respiratory protection, namely pressure-demand air supplying respirators with escape provisions, air purifying respirators, and no respiratory protection, respectively. Because potential dermal exposure hazards may require a wide variety of personal protective clothing without regard to the required level of respiratory protection, the numerical designations “1”, “2”, and “3” will be used to specify the level of protective clothing to be used in addition to the designated level of respiratory protection as described below (i.e., the level of protective equipment can be completely defined by a designation of “D-1”, “D-2”, etc.).

The required levels of protective equipment and upgrade criteria for each work task are specified below. The wearer shall inspect all equipment and clothing prior to use. All damaged or faulty protective equipment will be rejected and disposed of as non-contaminated waste. Each Contractor shall specify the PPE level required for each task in each task-specific hazard analysis.

Each individual is responsible for ensuring appropriate inspection and upkeep of his/her equipment.

LEVEL D-1, PROTECTIVE CLOTHING

- Standard work clothes (long pants)
- Half-sleeve shirt or blouse as a minimum
- Steel toed boots
- Safety glasses
- Orange (or other bright neon colored) safety vests
- Hard hats - If you are on the Site and outside of the trailers or the Contractor parking area, a hard hat must be worn
- Hearing protection (during drilling and other noise producing activities)

LEVEL D-2, MODIFIED PROTECTIVE CLOTHING

- Level D-1 protective clothing plus a long-sleeved shirt
- Inner latex gloves
- Outer NBR gloves

LEVEL D-3, MODIFIED PROTECTIVE CLOTHING PLUS COVERALLS

- Level D-1 protective clothing
- Inner latex gloves
- Outer NBR gloves
- Polycoated Tyvek or Tyvek coveralls with taped openings

LEVEL C PROTECTION

- Full or half-face air-purifying respirator[1]
- Tyvek coverall
- Boots: chemical protective cover, steel toed
- Chemical protective inner and outer gloves
- Hard hat, safety glasses, safety vest, hearing protection per Level D-1

LEVEL B PROTECTION

- Positive pressure, full-facepiece self-contained breathing apparatus (SCBA), or positive pressure supplied air respirator with escape SCBA.
- Hooded chemical-resistant clothing (overalls and long-sleeved jacket; coveralls; one or two-piece chemical-splash suit; disposable chemical-resistant overalls).
- Tyvek coverall
- Boots: chemical protective cover, steel toed
- Chemical protective inner and outer gloves
- Hard hat, safety glasses, safety vest, hearing protection per Level D-1

6.1.1 Minimal PPE Requirements for Tasks

The initial level of PPE required during non-intrusive Site activities, including the initial Site reconnaissance, will be D-1 (Respiratory Level D and Clothing Level 1). At a minimum, initial PPE for intrusive activities including groundwater, surface water, and slag pile sampling, boring and well installation, and fence installation will be D-2. The need for further upgrading will be determined by air monitoring results during intrusive activities. Personnel should make sound task-specific judgments during the implementation of the work and use higher degree of clothing protection if needed to improve personal hygiene (use gloves or Tyvek in dirty conditions).

If there is any asbestos sampling to be completed, all work must be completed in Level C. Once asbestos abatement begins, then air monitoring must commence per applicable regulations.

[1] Prior to use, Site personnel shall have a qualitative respirator fit test.

When working with cement, all work must be completed in Level D-2 modified. If conditions are found which require protection greater than the existing Level of Protection, personnel shall stop work and leave the area immediately and obtain the required protective equipment. Should personnel suspect an inhalation hazard (e.g., unusual and continuous odors, dizziness, or respiratory irritation), they shall immediately move upwind from the area and notify the SSO. Work shall not proceed in these areas until air monitoring has been completed to assess the nature of the hazard and additional protective measures are used to the satisfaction of the SSO. Re-entry shall be from an upwind position (when possible). Monitoring shall precede re-entry. Personnel who experienced symptoms shall not re-enter the area until symptoms have subsided and additional PPE/precautions are implemented. An examination by a physician may be required by the SSO depending on the symptoms and duration.

6.2 Work Zones, Site Safety Zones and Access Control

The following work zones apply to all Site personnel.

6.2.1 Work Zones

The Site has been divided into three overall work zones as shown in Figure 3:

- **Clean Area** – The "clean area" includes the two parking lots where the Site and Security trailers are located. No PPE requirements are in place in the clean area.
- **Contaminated Area –** The "contaminated area" includes the two Mill Buildings. All personnel entering these buildings are required to wear Level C PPE
- **Potential Contaminated Area –** The "potentially contaminated area" includes all locations within the Site boundaries outside of the clean area and the contaminated area. All personnel must wear standard Level D-1 PPE.

6.2.2 Work in Buildings

Due to potential presence of asbestos and metal-contaminated dust, all work conducted inside the Mill Buildings must be completed in Level C, until air monitoring indicates compliance with OSHA permissible exposure limits (PELs) or action levels in Table 9.

6.2.3 Safety Zones

6.2.3.1 Intrusive Activities

During intrusive activities, Site Safety Zones will be established by the SSO, if required, to protect Site workers not involved in the intrusive activity. At a minimum, the safety zones include an Exclusion Zone, Contamination Reduction Zone (CRZ) and a Support Zone. An Exclusion Zone will generally be set to provide a 25-foot buffer from the intrusive activity. Exposed materials such as cuttings will be contained or covered, if necessary based on Site conditions, to prevent dispersion by wind or water. The limits of the Exclusion Zone will be marked with high-visibility flagging tape, traffic cones, or similar devices.

The Exclusion Zone will be accessed through a CRZ. The CRZ shall be used for gross decontamination of both personnel and equipment. It shall be configured to allow the decontamination of the field crew while upwind of the Exclusion Zone. The SSO or his/her designee will ensure that all personnel entering the Exclusion Zone wear the required protective equipment and that upgraded level of protection equipment is readily available.

6.2.3.2 Non-intrusive Activities

No on-Site safety zones are required for non-intrusive activities. However, all personnel conducting non-intrusive activities must be mindful of and adhere to the safety zones established for other Site activities.

6.3 Decontamination

Decontamination will involve two phases. Gross decontamination of personnel and equipment, comprising removal of mud by dry brushing or scraping, will take place in the CRZ established at the location of each intrusive activity.

Prior to leaving the Site, personnel and equipment will undergo full decontamination if Level D-3, Level C, or higher protection is used. The decontamination area shall also have the following:

- A general washwater source.
- 2 wash tubs (1 wash, 1 rinse).
- Scrub brushes.
- Disposable towels and plastic bags.
- Seating to facilitate boot removal.
- Decontamination solution (e.g., Alconox).
- Duct tape.
- Hand soap.
- A portable water source for skin wash.
- Receptacle to dispose of used cleaning materials and disposable products

Heavy equipment and personnel leaving the Site shall be decontaminated by dry methods or washing on a decontamination pad to remove visible soil, mud, and other debris that could otherwise enter the environment. Loose soil shall be removed by dry or wet brushing, vacuuming, wiping, scraping, shaking, patting, water washing, or other physical means.

Monitoring equipment, sampling tools, and hand tools shall be decontaminated as needed using methods appropriate for the type of equipment. Potentially contaminated equipment shall be wrapped in plastic during on-Site transport to avoid the potential for spreading contamination.

Disposable personal protective equipment shall be placed in an appropriate container. These drums shall be placed in a secure area of the Site for temporary storage, and ultimately disposed of at a suitable permitted facility in compliance with applicable regulations.

Decontamination liquids shall be placed in covered 55-gallon drums. These drums shall be placed in a secure area of the Site for temporary storage, and ultimately disposed of at a suitable permitted facility in compliance with applicable regulations.

All personnel shall wash their hands and face prior to leaving the Site. Clothing that is visually free of loose soil may be worn off-Site. It is recommended that personnel have a change of clothing and shoes for wearing off-Site.

Any laundries or cleaning facilities handling protective clothing shall be informed of the potentially harmful effects of exposure.

6.4 Hot Work Permits

All hot work (flame- or spark-producing activity or energized electrical systems which will also require a lock out procedure) requires completion of a hot work permit, (Appendix F or equivalent), and authorization by the SSO. Hot work permits are completed by the organization performing hot work and normally authorized for one shift of work, at one location. To facilitate the hot work permit process, hot work shall be conducted during normal business hours unless special arrangements have been made in advance with the SSO.

Multiple-day permits may be issued for equipment maintenance operations if an area, prepared and approved for hot work, is used and maintained. The Contractor performing hot work is responsible for implementing a hot work program consistent with the requirements of NFPA 51B, Standard for Fire Prevention During Welding, Cutting or Other Hot Work. NFPA 51B is incorporated by reference into 29 CFR 1910.252, General Requirements for Welding, Cutting, and Brazing.

6.5 Access Control

The Site boundaries have been established using a variety of methods, including signage, installation of fencing and guard rails. Site buildings have been secured with fencing and dangerous areas within the buildings have been marked with colored flagging, caution tape or fencing. The Site is patrolled 24 hours/day, seven days/week by security personnel.

7.0 CONTINGENCY AND EMERGENCY RESPONSE PLANS

If an accident occurs or an unanticipated, potentially hazardous situation arises such as explosion, vapor release, unusual or excessive odors, Site personnel shall cease operations, move away to a safe area, and contact the SSO. The following procedures have been established to handle emergencies that might occur during Site activities.

Prior to starting intrusive work, Site personnel shall familiarize themselves with the radio channel to reach the SSO and the location of the nearest phones and medical facilities. Also, the local police and fire departments, as well as the local hospital, shall be notified by the SSO of the impending work at the Site. In the event of a serious emergency (e.g. medical problems beyond routine first aid and fire beyond incipient stage), Site personnel shall contact the local Emergency Response Unit using the emergency number (911), inform them of the nature of the emergency, and then notify the SSO, the CASR and the Golder Project Manager. Golder personnel shall also call their HSC and Workcare (888-449-7787). When help arrives, Site personnel shall defer all emergency response authority to appropriate responding agency personnel. Emergency notification information is provided in Appendix D.

7.1 Medical Emergency Response Plan

Other than removal of outer protective garments and gross contamination (e.g., mud), immediate emergency treatment of injuries should take precedence over personal decontamination. Should any person on Site be injured or become ill, initiate the following emergency response actions and notify the SSO as soon as possible:

1. If able, the injured person should proceed to the nearest available source of first aid. If the injured party is extremely muddy, remove outer garments and, if necessary, wash the injured area with soap and water. If the “injury” involves a potential overexposure to hazardous gases or vapors (headache, dizziness, nausea, disorientation), get the victim to fresh air and take him or her to the local hospital as soon as possible.

   If the injury involves foreign material in the eyes, immediately flush the eyes with emergency eye wash solution and/or rinse with copious amounts of potable water for at least 15 minutes. Obtain or administer first aid as required. If further medical treatment is required, seek professional medical assistance as discussed below in item 3.

   Severe injuries involving large quantities of blood require that first aid providers don Tyvek coveralls and safety glasses in addition to nitrile or latex medical exam gloves.

2. If EMS or a hospital is involved in the medical response, notify them of any potential contamination from the Site.

3. If the victim is unconscious or unable to move, or if there is any evidence of spinal injury, do not move the injured person, unless absolutely necessary to save his or her life, until the nature of the injury has been determined. Administer rescue breathing using a CPR barrier if the victim is not breathing, control severe bleeding, and immediately seek medical assistance as discussed below.

4. If further medical treatment is required and:

   a. the injury is not severe, take the injured party to the hospital by private automobile.
   b. the injury is severe, immediately call for an Ambulance and/or Fire/Rescue (911) (Appendix D).

   In both cases, if decontamination is not undertaken, appropriate precautions should be taken to avoid transfer of contaminants to vehicles and other facilities. This can be done by covering the vehicle's interior with plastic sheeting or the exposure blanket contained in the first aid kit. A victim should never be wrapped in plastic sheeting.

5. An individual designated by the SSO shall accompany any injured person taken to the hospital to ensure prompt and proper medical attention. The accompanying person should notify the hospital or medical facility of the potential contaminates that may be on the injured person. After proper medical treatment has been obtained, the designated companion should notify the SSO and prepare a written report.

   In the event that any personnel are injured at the Site, all available technical information and supporting documentation needed shall be provided to any treating physicians, health care workers, or health care facilities.

For a medical emergency, the first responder will be from the Hillndale Fire Department Emergency Medical Services (EMS) located at 2709 Wilson Ave Steubenville, OH 43952. The Chief of the Hillndale Fire Department is Jeff Winland. The EMS personnel will make the decision on Site if an airlift medical evacuation is required. The EMS personnel have radio and phone contact with the medevac service located at the Life Line Hospital in Wintersville.

7.2 Fire and Explosions

Dry chemical (ABC) fire extinguishers are effective for fires involving ordinary combustibles such as wood, grass, flammable liquids, and electrical equipment. They are also appropriate for fires in their incipient stages and small, localized fires such as a drum of burning refuse, a small burning gasoline spill, a vehicle engine fire, etc. No attempt should be made to use these extinguishers for well-established fires or large areas or volumes of flammable liquids.

In the case of fire, prevention is the best contingency plan. There shall be no smoking on Site except in pre-designated areas. In the event of a fire during intrusive tasks, personnel shall attempt to extinguish the fire only if it is in an incipient stage with on-Site fire extinguishers. If a fire cannot be controlled in this manner, personnel shall notify the SSO and follow the procedure outlined below.

Catalytic converters on the underside of vehicles can be sufficiently hot to ignite dry grass. Personnel should avoid driving over dry grass that is higher than the ground clearance of the vehicle, and be aware of the potential fire hazard posed by the catalytic converter, at all times. Never allow a running vehicle to sit in a stationary position or park a vehicle over dry grass or other combustible materials.

In the event of a fire or explosion:

1. If the situation can be readily controlled with available resources without jeopardizing the health and safety of Site personnel, take immediate action to do so. If not:
2. Isolate the fire to prevent spreading, if possible.
3. Clear the area of all personnel working in the immediate vicinity.
4. Immediately notify SSO and the Hillndale Fire Department (740) 457-8460 or 911.

7.3 Chemical Exposure First Aid

In an event of exposure to chemicals through inhalation:

1. Move the victim to an up-wind location for fresh air.
2. Initiate CPR to revive the victim, if necessary.
3. Contact EMS, if necessary.

For exposure through dermal route (including eyes):

1. Wash the affected area with copious fluids for at least fifteen (15) minutes.
2. If irritation persists, seek professional medical care.

For ingestion:

1. Contact the National Poison Control Center for advice.
2. Transport the victim to the hospital. Take a copy of this HASP to the hospital, if readily available.

Notify the SSO as soon as possible of any exposure incidents.

7.4 Unforeseen Circumstances

The health and safety procedures specified in this plan are based on the best information available at the time. Unknown conditions may exist, and known conditions may change. This plan cannot account for every unknown or anticipate every contingency. Should personnel suspect or encounter areas of substantially higher levels of contamination, or should any situation arise which is obviously beyond the scope of the safety procedures specified herein, work activities shall be halted pending discussions with the SSO, the HSO, the CASR, and the Golder Project Manager and implementation of appropriate protective measures.

7.5 Accident and Incident Reports

If an incident or accident occurs, the HSO, SSO, HSC and Golder Project Manager shall be notified and the appropriate action shall be completed as determined by the Golder Project Manager and HSC. A

summary report may be completed by eyewitnesses (if possible) along with assistance from the SSO. The report will be forwarded to the HSC as soon as possible for further investigation or follow up.

7.6 Emergency Contacts

Emergency notification information is provided in Appendix D. In addition, all the Site security personnel under contract to Cyprus Amax are off duty police officers from the Jefferson County Sherriff's Office, the Cross Creek Township Police Department, or the Mingo Junction Police Department. All these officers have training in first aid, response coordination and law enforcement. These security personnel are normally on the Site Radio Channel 5.

The Site address to provide and first aid, law enforcement, fire department or other rescue organizations is:

- The Satralloy Site in Mingo Junction on County Road 74 just down from the Kolmont Bridge.
- The formal address for the Site is 4243 County Road 74, Mingo Junction, OH 43938.

7.7 Directions to Hospital

The nearest hospital is the Trinity Medical Center West at 4000 Johnson Road Phone (740) 264-8000.

Directions (primary route):

When leaving the Site turn left onto County Road 74 to the #2 Bridge	0.5 miles
Turn left after the bridge staying on County Road 74	0.8 miles
At the T-intersection go straight onto County Road 28/Goulds Road	1.6 miles
Continue and take a right turn onto Wilson Ave	0.2 miles
Turn left onto Williams Blvd	0.2 miles
Turn right onto Tweed Ave (Tweed will quickly have a jog to the left)	0.8 miles
Turn left onto Lincoln Ave	0.1 miles
Stay straight going onto Sinclair Ave continue up the hill	1.9 miles
Turn right onto John Scott Highway	0.1 miles
Turn right onto Lauretta Drive	0.3 miles
Turn slight right onto St. Charles Drive	0.2 miles
Turn right onto Johnson Road (stay on Johnson Road)	0.2 miles
Follow signs to the Emergency Room	

Alternate route directions (use only if primary route unavailable, as this is longer):

When leaving the Site turn right onto County Road 74 toward Sheep Rock Rd	2.0 miles
CR-74 becomes Chappel Hill Rd/Township Hwy 184	0.2 miles
Turn sharp left onto OH-151	0.6 miles
Turn left onto Scott Featner Rd/Township Hwy 168	1.8 miles
Scott Featner Rd / Township Hwy 168 becomes CR-74	0.8 miles
Stay straight to go onto County Road 28/Goulds Rd	2.6 miles
Turn right onto Coal Hill Rd	0.6 miles
Coal Hills Rd becomes Lincoln Ave	0.2 miles
Turn left onto Sinclair Ave	1.9 miles
Turn right onto John Scott Highway	0.1 miles
Turn right onto Lauretta Drive	0.3 miles
Turn slight right onto St. Charles Drive	0.2 miles
Turn right onto Johnson Road (stay on Johnson Road)	0.2 miles
Follow signs to the Emergency Room	

TABLES

TABLE 1
MINIMUM ILLUMINATION LEVELS IN FOOT-CANDLES

FOOT-CANDLES	AREA OR OPERATIONS
5	General site areas.
3	Excavation and waste areas, access ways, active storage areas, loading platforms, refueling, and field maintenance areas.
5	Indoors: warehouses, corridors, hallways, and exit ways.
5	Tunnels, shafts, and general underground work areas; (Exception: minimum of 10 foot-candles is required at tunnel and shaft heading during drilling, mucking, and scaling. Mine Safety and Health Administration approved cap lights shall be acceptable for use in the tunnel heading.
10	General shops (e.g., mechanical and electrical equipment rooms, active storerooms, barracks or living quarters, locker or dressing rooms, dining areas, and indoor toilets and workrooms.
30	First aid stations, infirmaries, and offices.

TABLE 2
EXPOSURE LIMITS FOR CONSTITUENTS OF POTENTIAL CONCERN

SUBSTANCE	EXPOSURE LIMIT	IDLH LEVEL	MATERIALS ON SITE
Aluminum	OSHA PEL 15 mg/m^3 (total dust)	No IDLH	Slag
	5 mg/m^3 (respirable dust)		Bag House Dust
			Surface Waters
			Cross Creek
Aroclor-1242 (Chlorodiphenyl/PCB)	1 mg/m^3 (skin)	Ca (5 mg/m^3)	Possibly oils in equipment.
	NIOSH REL		
	602 mg/m^3		
CAS # 53469-21-9 (PCBs)	PCBs are NIOSH Potential Occupational Carcinogen. Occupational exposures to carcinogens should be limited to the lowest feasible concentration.		
Arsenic	0.010 mg/m^3	Ca (5 mg/m^3)	Slag
	NIOSH REL 0.002 mg/m^3		Bag House Dust
			Surface waters
			Cross Creek
Asbestos Containing Materials (ACM)	NIOSH Potential Occupational Carcinogen. Occupational exposures to carcinogens should be limited to the lowest feasible concentration.	Potential Human Carcinogen	See Table 3
	10^{-7} (fiber/m^3)	No IDLH	
Barium	OSHA PEL 0.5 mg/m^3 (for general industry)	50 mg/m^3	Railroad ties
Chromium (III)	1 mg/m^3	250 mg/m^3	Slag
(trivalent)			Bag House Dust
Chromium (VI)	5 µg/m^3	Group A – Known Human Carcinogen	Site Surface Water Bag House Dust
(hexavalent)		No IDLH	
Iron	OSHA = TWA 10 mg/m^3	1500	Bag House Dust
(Iron oxide dust & fume)		(as Fe)	Surface Waters
Lead	0.100 mg/m^3 (as Pb)	100 mg/m^3	Bag House Dust
		(as Pb)	Paint surfaces in the buildings
			Surface Water
Manganese	OSHA: 5 mg/m^3	500 mg/m^3	Slag
		(as Mn)	
Mercury	NIOSH = 0.01 mg/m^3	2 mg/m3 (as Hg)	See Table 3
Nickel	NIOSH = 1mg/m3	10 mg/m3	Surface Waters
Petroleum Hydrocarbons	5.0 mg/m^3 (oil mist)	None Listed	Soils in the buildings
			Oils in equipment
Thallium	NIOSH = 0.1 mg/m3	15 mg/m^3	Slag
	OSHA = 0.1mg/m3	(as Tl)	Surface Waters
			Cross Creek
Vanadium	1 mg/m^3	35 mg/m^3	Slag
	(ferrovanadium dust)	(as V)	
Elevated pH	OSHA = 15 mg/m^3 total dust,	NA	Slag
	5 mg/m^3 respirable dust		

Notes:
OSHA PEL is 0.1 fiber (longer than 5 micrometers and having a length-to-diameter aspect ratio of at least 3 to 1) per cubic centimeter of air (0.1 fiber/cm3), as determined by the membrane filter method at approximately 400X magnification with phase contrast illumination. (29 CFR 1910.1001).

IDLH = Immediately Dangerous to Life or Health. Ca = Human Carcinogen.

TABLE 3
POTENTIAL REGULATED MATERIALS IN BUILDINGS

POTENTIAL EXPOSURE RISKS	POTENTIAL CONSTITUENT EXPOSURE ISSUES
Electrical Duct Banks	ACM
Face Brick	Metals
Fire Brick	ACM & Metals
Glazed Block	Metals
High Voltage Cable	ACM (wrap)
	PCBs (insulation)
Hydraulic/Equipment Oil	PCBs and TPH
Electrical Equipment Oil (transformers, capacitors, switches)	PCBs and TPH
Fluorescent Light Ballasts	PCBs
Painted Surfaces	Lead
Track Ballast	PCBs, Metals
Sewer and pit residuals	Metals
Thermal System Insulation – piping, ducts, elbows/tees/fittings, gaskets, expansion joint, etc.	ACM
Surfacing Materials – ceiling tile, plaster, exterior siding, transite, ceiling “blanket” insulation, textured ceiling, etc.	ACM
Floor Tile & Mastic, Carpet Mastic	ACM
Roof Flashing	ACM
Roofing	ACM & Lead
Underground Piping	ACM
Other Building Materials – fire doors, control panel backing, lamp ballast backing, radiator lining, insulated wood panels and doors, cooling tower slats, etc.	ACM and Metals
Window Caulk	ACM and PCBs
Wastewater Treatment Plant	Caustic Materials
Bags of Industrial Materials	Metals

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TABLE 4
SURFACE SLAG COPC CONCENTRATIONS

PARAMETER	EPA PRG, DIRECT CONTACT (mg/kg)		SLAG SURFACE SAMPLES (mg/kg)	
	RESIDENTIAL	INDUSTRIAL	LOW	HIGH
Arsenic	0.39	1.59	**1.2**	**57**
Chromium	210	448	**611**	**8,690**
Iron	23,000	100,000	127	16,400
Lead	400	800	0.72	373
Manganese	1,800	19,000	107	**7,530**
Vanadium	78	1,000	16	**85**

Notes:

a. Data from Scoping Study, Golder May 2008.

b. USEPA Region 9 Preliminary Remediation Goals, PRGs, Soil Screening Levels, October 2004.

c. Bold and shaded = exceeds residential soil screening level.

d. Bold, shaded, and red = exceeds industrial soil screening level.

TABLE 5
SUBSURFACE SLAG COPC CONCENTRATIONS

Parameter	EPA PRG (mg/kg)		SUBSURFACE SLAG (mg/kg)		
	RESIDENTIAL	INDUSTRIAL	AVERAGE	LOW	HIGH
Arsenic	0.39	1.59	**5.8**	**0.5**	**42.1**
Chromium (note e)	210	448	**16,700**	100	**91,300**
Iron	23,000	100,000	15,300	700	**65,400**
Lead	400	800	11.6	2.2	1,577
Manganese	1,800	19,000	800	200	**5,100**
Vanadium	78	1,000	**100**	0	**600**

Notes:

a. Data from Mineralogy Study, Golder 2008.

b. USEPA Region 9 Preliminary Remediation Goals, PRGs, Soil Screening Levels, October 2004.

c. Bold and shaded = exceeds residential soil screening level.

d. Bold, shaded, and red = exceeds industrial soil screening level.

e. PRGs are for hexavalent chromium; slag values are total chromium (primarily trivalent).

TABLE 6
SURFACE WATER COPC CONCENTRATIONS

PARAMETER	EPA PRG (ug/L)	SITE SURFACE WATER SAMPLES (ug/L)	
		LOW	HIGH
Aluminum	36,000	ND	**67,800**
Arsenic	0.045	ND	**14.7**
Chromium	55,000	ND	477
Chromium, hexavalent	110	ND	**830**
Iron	11,000	ND	**83,100**
Lead	---	ND	35.3
Magnesium	---	ND	182,000
Nickel	730	ND	**796**
Thallium	2.4	ND	**55**
Bis(2-ethylhexyl)phthalte	4.8	ND	**6.9**

Notes:

a. Data from Scoping Study, Golder May 2008.

b. USEPA Region 9 Preliminary Remediation Goals, PRGs, Soil Screening Levels, October 2004.

c. Bold and shaded = exceeds residential soil screening level.

d. Bold, shaded, and red = exceeds industrial soil screening level.

TABLE 7
CROSS CREEK COPC DATA

PARAMETER NAME	EPA PRG (ug/L)	SITE SURFACE WATER SAMPLES (ug/L)	
		CCW – LOW	CCW – HIGH
Arsenic	0.045	ND	**5.4**
Thallium	2.4	ND	**6.4**

Notes:

a. Data from Scoping Study, Golder May 2008.

b. USEPA Region 9 Preliminary Remediation Goals, PRGs, Soil Screening Levels, October 2004.

c. Bold and shaded = exceeds residential soil screening level.

d. Bold, shaded, and red = exceeds industrial soil screening level.

TABLE 8
EXPOSURE AND FIRST AID INFORMATION

SUBSTANCES PRESENT	SYMPTOMS OF ACUTE EXPOSURE	FIRST AID
Polychlorinated Biphenyls (PCBs)	Irritation of eyes, skin	Eye: Irrigate immediately Skin: Flush with water promptly Inhalation: Fresh air Swallow: Immediate medical attention
Aluminum	Irritation to eyes, skin and respiratory system.	Eye: Water irrigation immediately Breath: Fresh air
Arsenic	Ulceration of septum, dermatitis, gastrointestinal distress, peripheral neuropathy, Respiratory irritation, hyperpigmentation of skin.	Eye: Irrigate immediately Skin: Soap/water wash immediately Inhalation: Fresh air Swallow: Immediate medical attention
Chromium (most common in trivalent form, but also can be in more toxic hexavalent form)	Eye irritation, sensitization dermatitis. Hexavalent chromium (Cr+6) is considered a known lung carcinogen. Irritation of the nose, throat and lungs to damage to the mucous membranes of the nasal passage, damage to eyes and skin if in high concentrations.	Eye: Irrigate immediately Skin: Water flush promptly Inhalation: Respiratory support Swallow: Immediate medical attention
Iron	Benign pneumoconiosis with X-ray shadows indistinguishable from fibrotic pneumoconiosis (siderosis). Respiratory problems.	Inhalation: Respiratory support
Lead	Weakness, lassitude, insomnia, facial pallor, tremor, constipation, abdominal pain.	Eyes: Water irrigation immediately Skin: Soap/water flush promptly Inhalation: Respiratory support Swallow: Immediate medical attention
Manganese	Affects respiratory system, CNS, blood and kidneys. Manganism; asthenia, insomnia, mental	Inhalation: Respiratory support Swallow: Immediate medical attention.
Mercury	Irritation of eyes, skin, cough, chest pain, Inhalation difficulty, tremor, insomnia, irritability, headache, fatigue, weakness.	Eyes: Water irrigation immediately Skin: Soap wash promptly Inhalation: Respiratory support Swallow: Immediate medical attention
Nickel	Dermatitis, allergic asthma, pneumonia, nasal cavities, lungs, skin. Lung and nasal cancer.	Skin: Water flush immediately Inhalation: Respiratory support Swallow: Medical attention immediately.
Total Petroleum Hydrocarbons (TPH)	Eye, skin, respiratory system irritation	Eyes: Water irrigation immediately Skin: Soap/water wash promptly Inhalation: Respiratory support Swallow: Immediate medical attention

TABLE 8
EXPOSURE AND FIRST AID INFORMATION

SUBSTANCES PRESENT	SYMPTOMS OF ACUTE EXPOSURE	FIRST AID
Thallium	Nausea, diarrhea, abdominal pain, vomiting, ptosis, strabismus; peri neuritis, tremor; rester tight, chest pain, pulmonary edema; covulsions, chorea, psychosis; liver, kidney	Eyes: Water irrigation immediately
		Skin: Water flush promptly
		Inhalation: Respiratory support
		Swallow: Medical attention immediately.
Vanadium	Irritation of eyes, skin, throat; green tongue, metallic taste, eczema; cough; fine rales, wheez, bronchitis, dyspnea.	Eye: Water irrigation immediately
		Skin: Soap/water wash promptly
		Swallw: Medical attention immediately.
Cement	Eye and skin, irritation, chemical burns.	Eyes: Water irrigation immediately
		Skin: Water irrigation immediately
		Seek medical attention
Elevated pH	Severe irritation or burning of the eyes. Severe irritation of the skin especially in the presence of moisture. Severe irritation of gastrointestinal tract if swallowed. Severe irritation of the respiratory system. Long-term exposure can cause permanent damage.	Inhalation: Remove to fresh air. Get medical attention for any breathing difficulty.
		Eyes: Wash thoroughly with running water.
	May aggravate existing disorders of the eyes, skin, gastrointestinal tract.	Skin: Wash exposed area with soap and water.
		Swallow: If large amounts were swallowed, give water to drink and get medical advice.
		Seek medical attention

TABLE 9
SITE ACTION LEVELS

INSTRUMENT	ACTION LEVEL/CRITERIA	SPECIFIC ACTION
PID (MiniRae, OVM, Photovac or other similar instrument)	If the PID reading is 5 ppmv above background level (in breathing zone for 5 minute average)	Cease work, monitor again and evaluate mechanical ventilation if contamination continues. Upgrade to Level C if control is not feasible.
Combustible gas meter – Oxygen levels and % LEL	If oxygen level is < 19.5% or > 23.5%	Cease work and evacuate area. Evaluate if mechanical ventilation is feasible.
	If %LEL is >10%	
Particulate Monitor	2.5 mg/m^3 for respirable particulate and potential metals exposure (Cr+6, Ni, Cd in breathing zone for 5 minute average)	Cease work, monitor again and evaluate dust control options if dust levels remain elevated. Upgrade to level C if control is not feasible.

Note:

On Feb. 28, 2006, the Department of Labor published the Hexavalent Chromium Standard addressing occupational exposure to hexavalent chromium. (General Industry standard 1910.1026) OSHA determined that the new standard was necessary to reduce significant health risks posed by occupational exposure to Cr(VI). The new standard provides greater protection by lowering the permissible exposure limit (PEL) from 52 micrograms of Cr(VI) per cubic meter of air (52 $\mu g/m^3$) to 5 $\mu g/m^3$ and the action level for the standard where requirements such as medical surveillance may be required is 2.5 $\mu g/m^3$.

FIGURES

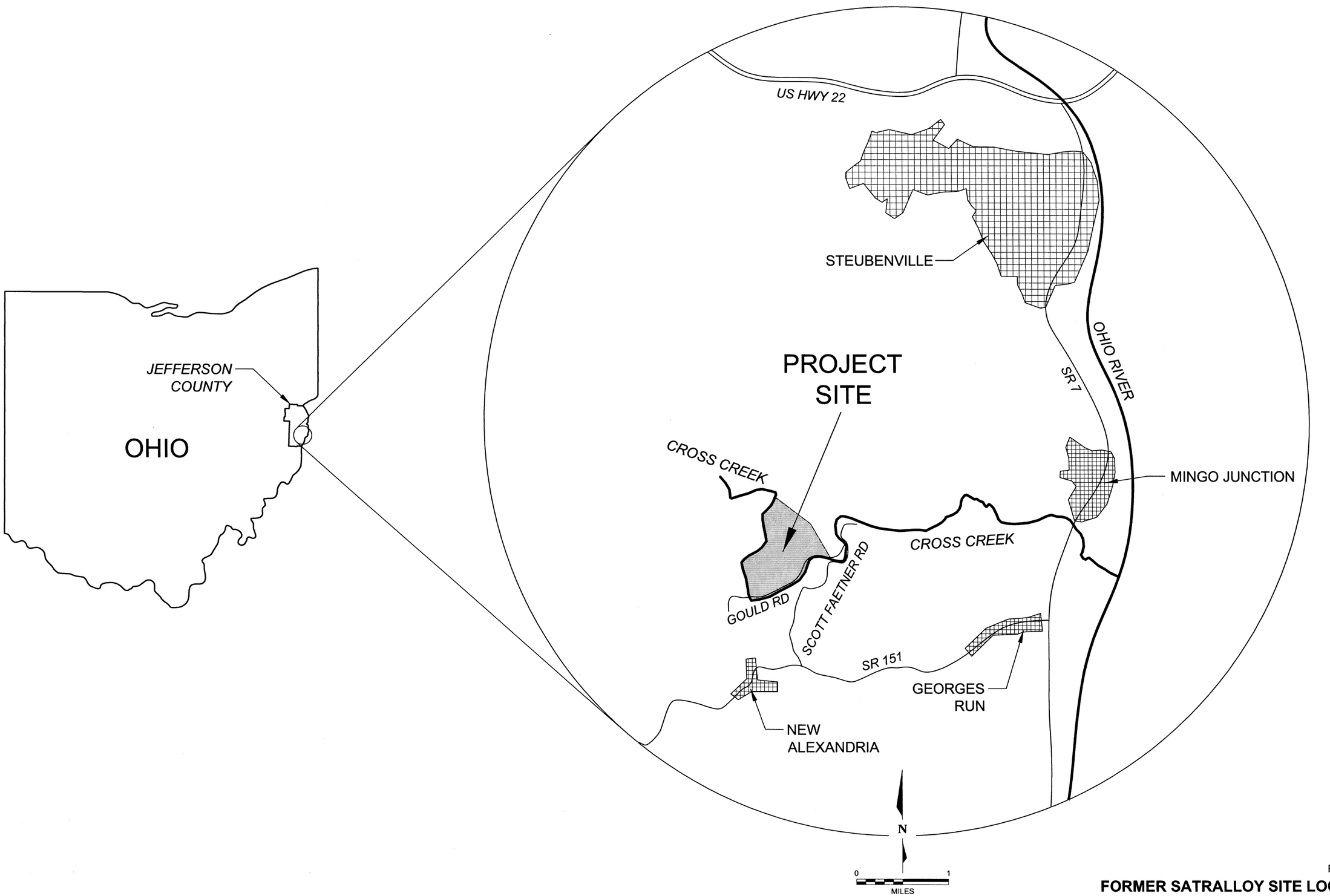

FIGURE **1**

FORMER SATRALLOY SITE LOCATION

CYPRUS AMAX / FORMER SATRALLOY SITE R\FS / OH

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CROSS CREEK

MINE PERIMETER ROAD

COUNTY ROUTE 74

GOULD ROAD BRIDGE OVER CROSS CREEK

SHEEP ROCK ROAD

CHROMITE STORAGE AREA

FORMER RAILROAD SPURS

NORTHERN AREA

NORTH MILL BUILDING

PLANT AREA

CROSS CREEK

ADMINISTRATIVE OFFICES

WATER PLANT

WASTE WATER TREATMENT PLANT

RAILROAD BRIDGE OVER CROSS CREEK

SOUTH MILL BUILDING

COUNTY ROUTE 74

FORMER JIG SLUDGE PONDS (APPROXIMATE)

GOULD ROAD

SOUTHERN AREA

LEGEND:

- SITE BOUNDARY
- MINE SPOILS
- ACCESS ROAD
- KOLMONT #1 COAL MINE (PORTIONS OF THIS AREA ARE PARTIALLY COLLAPSED, UNDERGROUND WORKINGS LIKELY EXIST LOCALLY)
- SLAG
- HIGH ANGLE SLAG SLOPE
- INTERMEDIATE SLAG SLOPE
- CHROMITE STORAGE AREA
- UNSTABLE SLAG PILE SLOPE
- SITE STRUCTURES
- CREEK
- RAILROAD

0 500 100

SCALE IN FEET
SCALE IS APPROXIMATE

FIGURE **2**

SITE MAP

G&K/SATRALLOY RI/FS/OH

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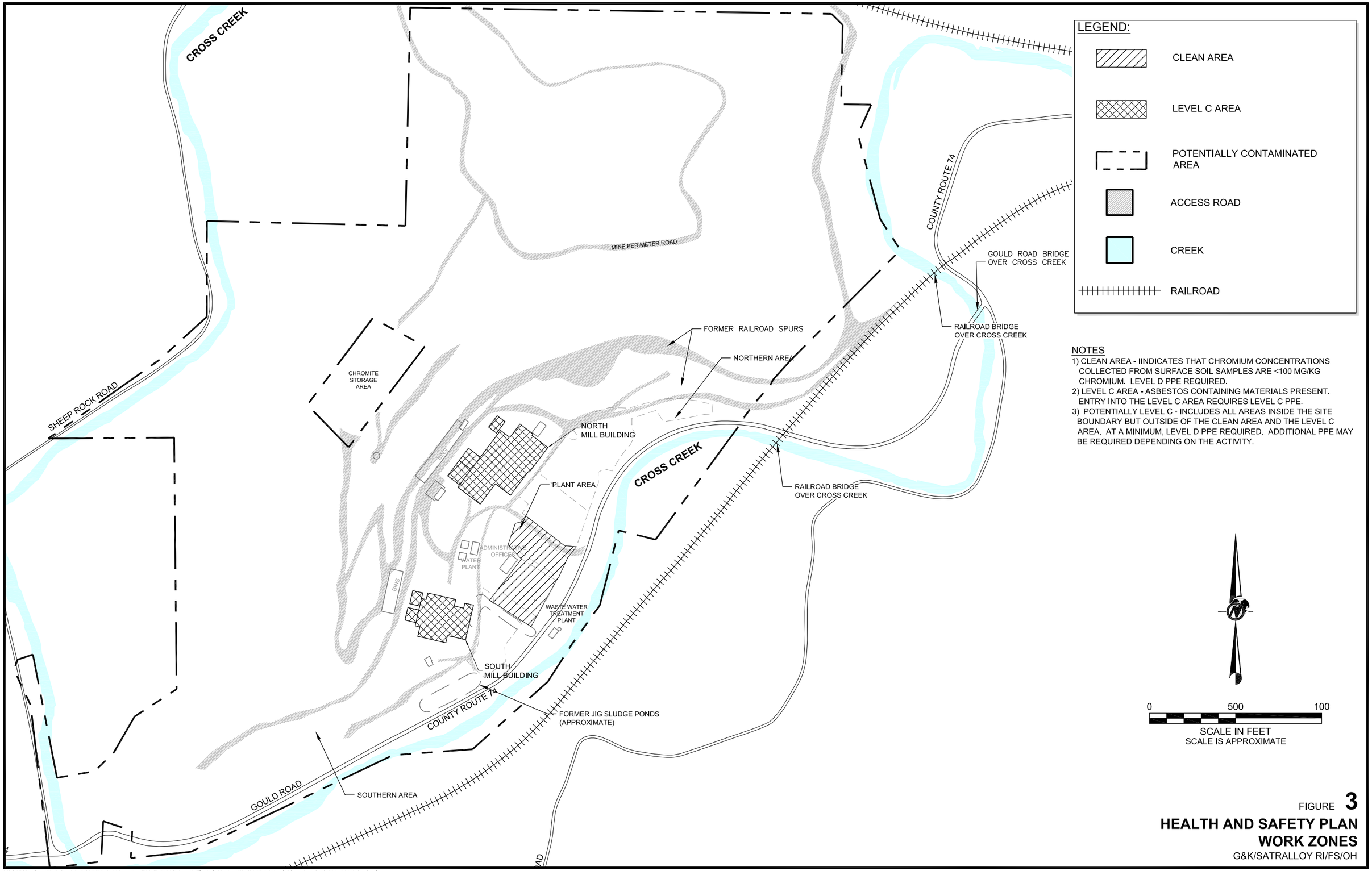

FIGURE **3**

HEALTH AND SAFETY PLAN WORK ZONES

G&K/SATRALLOY RI/FS/OH

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APPENDIX A
SAFETY ANALYSIS CHECKLIST

Checklist A: Physical Hazards

Project Name/ Task: RI/FS for the Former Satralloy Site (Jefferson County, Ohio)

SSA Participants: Golder Associates Project Team

Category	Section	Subject	Applicability YES	(Check one) NO
Physical	A	Terrain, topography	X	
Hazards	B	Overhead obstructions (OHO)		X
	B1	If yes, has an OHOP been prepared?		
	C	Underground obstructions (i.e. electric, gas, water, cable)	X	
	C1	Will intrusive activities be performed?	X	
	C2	If yes, review underground obstruction procedure.	X	
	D	Elevated work (over 5 ft) to be performed?	X	
	D1	Has a fall protection plan been developed?	X	
	D2	Has a rescue plan been developed?	X	
	E	Excavation, trenches	X	
	E1	If yes, who is the competent person?	X	
	E2	How will the excavation be sloped/shored/barricaded?	X	
	F	Will heavy equipment be used?	X	
	G	Traffic (flow and congestion)	X	
	G1	If yes, discussed w/contractor?	X	
	G2	What requirements for spotters?	X	
	H	Slip, trip, or fall potential	X	
	I	Weather (heat, ice, rain)	X	
	I1	Has heat or cold stress been identified?	X	
	J	Rigging, suspended loads		X
	K	Confined space entry		X
	K1	If yes, has rescue team been trained and notified?		
	L	Heat/ignition sources (power tools, torches, lamps)	X	
	M	Explosion potential (static, vapor, storage)		X
	N	Is there a potential for fire?	X	
	O	Rotating equipment/moving parts	X	
	O1	Will personnel be exposed to rotating equipment/moving parts?	X	
	O2	What additional guards can be installed to minimize potential?		X
	P	Pinch points		X
	Q	Drill rigs	X	
	R	Is there work over/adjacent to water?	X	
	S	Will drum handling be performed?	X	
	T	Are there any noise sources?	X	
	U	Will there be any high pressure or steam?		X
	V	Is hand safety an issue?	X	
	V1	Is there a tool to reduce the hazard?		X
	V2	Are additional precautions (PPE) to be used?	X	

Note: Fill out "Comments" section if any are "yes".

Comments: Physical Hazards

Comments give HASP sections where item is addressed.

Item Letter
A – Section 1.2.
C, C1, C2 – Underground utilities are present. Drilling and limited excavation will be performed during the RI; see Section 4.5.1. Historical Site drawings confirmed by geophysical investigation will be used to locate underground utilities before drilling or excavation is performed.
D, D1, D2 – Section 4.5.14. Contractors with elevated work requirements (e.g. demolition) will be required to provide fall protection and rescue plans in their site-specific HASPs.
E, E1, E2 – Section 4.5.12. A professional geotechnical engineer will be the competent person.
F – Section 4.5.1.
G, G1, G2 – Section 4.5.1.
H – Section 4.5.12.
I, I1 – Sections 4.5.9 and 4.5.10.
K – Confined space entry is not anticipated, but is addressed in Section 4.5.18.
L – Section 4.5.17.
N – Section 6.4 and 7.2.
O and O1 – Drill rigs will be used. See Item Q and Section 4.5.1.
Q – Section 4.5.1 and 4.5.3.
R – Sampling of water and sediment from Cross Creek will be performed. Precautions in Section 2 and 3 address associated hazards sufficiently for this purpose.
S – General precautions in Sections 2 and 3 are sufficient for the limited drum handling to be performed during the RI. Protection against chemical hazards is addressed at many places in the HASP.
T – Section 3.4, 4.5.1, and 6.1
V and V2 – Section 4.5.15.

Checklist B: Chemical Hazards

Project Name/ Task: RI/FS for the Former Satralloy Site (Jefferson County, Ohio)

SSA Participants: Golder Associates Project Team

Category	Section	Subject	Applicability YES	(Check one) NO
Chemical	A	Is the site HASP current for these activities? Provide date and title of HASP.	X	
Hazards	B	Are contaminants present (most recent data)?	X	
	C	If yes, what are the concentration levels?	X	
	D	Are the contaminants toxic? (i.e. carcinogenic, mutagenic, neurotoxin)?	X	
	E	Do routes of exposure include inhalation, ingestion, dermal sorption?	X	
	F	Are there PPE requirements? If yes, what are the levels of protection?	X	
	G	Are there air monitoring requirements?	X	
	H	Is there proximity to site operations? If yes, specify the hazards of exposure to these operations.		X
	H1	Are area orientations required?	X	
	H2	Are additional site/operations permits/notifications required?		X
	I	Will sample preservatives be prepared in the field?		X

Note: Fill out "Comments" section if any are "yes".

Comments: Chemical Hazards

Comments give HASP sections where item is addressed.

Item Letter
A – This checklist is Appendix A to the HASP – see cover page for title and date.
B, C – See Section 3 of the *Remedial Investigation / Feasibility Study Workplan for the Former Satralloy Site*, and the *Scoping Study Report for the Former Satralloy Site* (Appendix B to the RI/FS Workplan).
D – Section 4.1.
E – Section 4.2.
F – Section 6.1.
G – Section 5.1.
H1 – Section 3.6.

Checklist C: Process Safety Hazards

Project Name/ Task: RI/FS for the Former Satralloy Site (Jefferson County, Ohio)

SSA Participants: Golder Associates Project Team

(Note: this section applies only if the project involves a process which is covered by 29CFR1910.110)

Category	Section	Subject	Applicability YES	(Check one) NO
Process Safety	A	Highly hazardous chemicals as determined by 1910.119		X
Hazards	B	Steam processes		X
	C	High pressure (>3000 psi)		X
	D	Heat generation		X
	E	Chemical addition		X

Note: Fill out "Comments" section if any are "yes".

Comments: Process Safety Hazards

Comments give HASP sections where item is addressed.

Item Letter
(None applicable)

Checklist D: Non-Regulated Process Hazards

Project Name/ Task: RI/FS for the Former Satralloy Site (Jefferson County, Ohio)

SSA Participants: Golder Associates Project Team

(Note: this section to be completed if a non-regulated process is involved)

Category	Section	Subject	Applicability YES	(Check one) NO
Non-regulated Process	A	Is there an O&M Manual?		X
Hazards	A1	Does it address requirements such as: safety interlocks/valve inspection frequency?		X
	B	Pipe code and classification		X
	B1	Are materials of construction consistent throughout?		X
	B2	Are valves and sample ports easily accessible?		X
	B3	Are valves and joints adequately supported?		X
	C	Electrical classification and codes		X
	D	Are there lockout/tag-out requirements? (electrical, mechanical, hydraulic, pneumatic)		X
	E	Management of change		X

Note: Fill out "Comments" section if any are "yes".

Comments: Non-Regulated Process Hazards

Comments give HASP sections where item is addressed.

Item Letter
(None applicable)

Checklist E: Other Hazards

Project Name/ Task: RI/FS for the Former Satralloy Site (Jefferson County, Ohio)

SSA Participants: Golder Associates Project Team

Category	Section	Subject	Applicability YES	(Check one) NO
Driving	A1	Will transportation involve personal, rental, or company vehicles? If yes, be specific as to type of vehicles.	X	
	A2	Does the vehicle meet Company requirements?	X	
	A3	Are drivers familiar with the vehicle to be used?	X	
	A4	Will work & travel exceed 12 hours?		X
	A5	Will travel exceed 200 miles?	X	
	A6	Are directions to the site available?	X	
Other Hazards	B	Are there biological hazards present (i.e. poisonous plants, vectors, wild animals, snakes, ticks)?	X	
	C	Are there any other hazards applicable to the work being performed?	X	
Waste Management	D	Is the waste management plan (WMP) current? If yes, list date and title of WMP.	X	
	D1	Has the WMP been reviewed by a waste management professional? If yes, list name of individual.	X	

Note: Fill out "Comments" section if any are "yes".

Comments: Other Hazards

Comments give HASP sections where item is addressed.

Item Letter
A1 – Personal and rental vehicles will be used. Vehicle types will vary (car, SUV, van).
A2 – Golder's Employee Handbook, page C-12. Golder's rental policy states that employees must rent compact or intermediate cars unless client convenience or equipment transportation needs require the rental of a full-size vehicle. Only drivers specifically approved in the rental agreement should drive the rented vehicle. Golder employees are not to employ rented cars for off-road use unless the rental agreement specifically allows off-road use.
A4 – Golder's Employee Handbook, page C-12. Responsible conduct mandates familiarity with vehicle one is operating.
A5 – Air travel exceeds 200 miles. Car travel may exceed 200 miles when mobilizing equipment for major field efforts.
A6 – Personnel traveling to the Site are given directions. Site address: County Road 74, Steubenville (Jefferson County), Ohio. Directions: From the north - take route (State Route) 7 south. Go through Steubenville and take SR 151 Smithville exit. Turn right off the ramp and go west on SR 151. Continue past the sign that says "Welcome to New Alexandria" (brown sign, yellow letters) and look for Scott Featner Road. Turn Right on Scott Featner and continue to the bottom of the hill (go up then down the hill). Turn left onto County Road 74 (Gould Road). The site is on the right. From the south – take Route 7 north to SR 151, turn left on 151. Continue past the sign that says "Welcome to New Alexandria" (brown sign, yellow letters) and look for Scott Featner Road. Turn Right on Scott Featner and continue to the bottom of the hill (go up then down the hill). Turn left onto County Road 74 (Gould Road). The site is on the right.
B – Section 4.6.
C – Section 4.
D – Management and disposal of investigation-derived waste (IDW) is addressed in the Site's *Field Sampling Procedures*, which is Appendix D of the *Remedial Investigation / Feasibility Study Workplan for the Former Satralloy Site*.
D1 – Lee K. Holder, P.E. (Project Manager).

APPENDIX B
SITE HEALTH AND SAFETY PLAN ACKNOWLEDGEMENT FORM

Health and Safety Acknowledgement Form

By signing this form, you acknowledge that you have read, understand, and will follow the provisions of the Health and Safety Program (HASP) for the Former Satralloy Site (Jefferson County, Ohio). A copy of signed acknowledgment forms shall be kept in the project file.

Signature : _____ Date :_____

Signature : _____ Date :_____

Signature : _____ Date :_____

Signature : _____ Date :_____

Signature : _____ Date :_____

Signature : _____ Date :_____

Signature : _____ Date :_____

Signature : _____ Date :_____

Signature : _____ Date :_____

Signature: _____ Date: _____

APPENDIX C
FIELD PROCEDURE CHANGE AUTHORIZATION FORM

Field Safety Procedures Change Authorization

This Safety Procedures Change Authorization Form will be completed and signed before any safety procedures identified in this Site Safety Plan can be modified by the Field Team. All revisions to safety procedures must be approved by the Golder Project Manager.

Instruction Number _____
Duration of Authorization Requested _____ Date:
to be changed ☐ Today only
☐ Duration of Task

Description of Procedures Modification:

Justification:

Person Requesting Change:	**Verbal Authorization Received From:**
Name	Name Time
Title	Title
Signature	Approved By (Signature of person named above to be obtained within 48 hours of verbal authorization)

APPENDIX D
LIST OF EMERGENCY CONTACT NUMBERS

LIST OF EMERGENCY CONTACT INFORMATION
Former Satralloy Site (Jefferson County, Ohio)

Name	Address	Phone
Police, Fire or Medical Emergency		911
National Poison Control Center		800-222-1222
Trinity Medical Center West	4000 Johnson Road Steubenville, OH 43952	740-264-8000
Hillndale Fire Department	2709 Wilson Avenue Steubenville, OH 43952	740-457-8460
Mingo Junction Fire Department	501 Commercial Street Mingo Junction, OH 43938	740-535-1959
Ohio EPA Emergency Response Hotline		800-282-9378

Golder Associates Inc				
Name	Title	Address	Phone	E-Mail
Lee Holder	Golder Project Manager	18300 NE Union Hill Road, Suite. 200 Redmond, WA 98052	425-883-0777 (o) 425-248-1347 (c)	lholder@golder.com
Charlie Haury	HSO	9428 Baymeadows Road, Suite 400 Jacksonville, FL 32256	904-363-3430 (o) 904-607-6057 (c)	chaury@golder.com
Ben Hale	SSO for Interim Security Measures	2600 Tiller Lane Columbus, OH 43231	614-899-9288 (o) 330-265-9913 (c)	bhale@golder.com

Cyprus Amax				
Barbara Nielson	Cyprus Amax Project Manager	333 North Central Ave. Phoenix, AZ 85004	602-366-8270 480-313-2895 (c)	barbara_nielsen@fmi.com
Soren Suver	Cyprus Amax Site Representative	303 Walden Court Wexford, PA 15090-9455	724-940-4368 (o) 631-374-8121 (c)	Soren18@optonline.net
Ohio EPA				
Name	Title	Address	Phone	E-Mail
Michael D. Sherron	Site Coordinator	2195 East Front Street Logan, OH 43138	740-380-5251 (o) 614-886-5427 (c)	Michael.Sherron@epa.state.oh.us

APPENDIX E
JOB SAFETY ANALYSIS FORM

Job Safety Analysis (JSA) Form

Guidelines for Job Safety Analysis (JSA)

A Job Safety Analysis (JSA) is a process for studying a job to identify the associated hazards and develop solutions to eliminate or control these hazards.

Undertaking a JSA

Step 1 Identify the job to be performed by the work team or individual

Step 2 Break down the job into main tasks (steps) to be performed.

Step 3 Identify the hazards associated with each key task.

- Could someone slip, trip, or fall?
- Could someone be struck by equipment?
- Could someone become caught in equipment?
- Is there any chemical exposure?
- Could chemicals or substances spill?
- Is the temperature or weather a factor?
- Does the task involve the use of electrical equipment?
- Are there any underground services?
- Does the surrounding environment present any hazards?
- Is fatigue likely to be a factor?
- Could members of the public / contractors be harmed?
- Could the task result in environmental harm?

Step 4 Determine the most appropriate measure(s) to control each hazard using the hierarchy of controls.

- Eliminate the hazard.
- Substitute the hazard;
- Isolate the hazard;
- Introduce engineering controls;
- Introduce administrative controls;
- Use personal protective clothing and equipment.

Step 5 Assess the residual risk that would be present once the control has been implemented.

Step 6 Record the JSA results on the following pages.

Risk Matrix

Consequence or Impact Description:

Insignificant	1	No injuries, low financial loss.
Minor	2	First aid treatment, on-site release immediately contained, limited financial loss.
Significant	3	Medical treatment (Personal injuries) required, on-site release contained with outside assistance, moderate financial loss.
Major	4	Extensive injuries, loss of production capability, off-site release with no detrimental effects, high financial loss.
Catastrophic	5	Death, toxic release off-site with detrimental effects, very high financial loss.

Likelihood Description:

Almost certain	5	Incident will occur in every circumstance (e.g., every time).
Likely	4	Incident will probably occur (e.g., 1 in 10 times).
Possible	3	Incident may occur at sometime (e.g., 1 in 100 times).
Unlikely	2	Incident not expected to occur, but conceivable (e.g., 1 in 1, 000 times).
Rare	1	Incident would only occur in exceptional circumstances (e.g., 1 in 10,000 times).

Risk Analysis Matrix:

		Consequence				
Likelihood		**Catastrophic 5**	**Major 4**	**Significant 3**	**Minor 2**	**Insignificant 1**
Almost Certain	**5**	**25 (VH)**	**20**	**15**	**10**	**5**
Likely	**4**	**20**	**16 (H)**	**12**	**8**	**4**
Possible	**3**	**15**	**12**	**9 (M)**	**6**	**3**
Unlikely	**2**	**10**	**8**	**6**	**4 (L)**	**2**
Rare	**1**	**5**	**4**	**3**	**2**	**1 (VL)**

NOTE: To obtain the risk rating, the values for Consequence and Likelihood are multiplied.

Job Safety Analysis (JSA) Form

Activity/Equipment Description:			
OR			
Project No.:		**Short Title:**	
Analysis By:		**Date:**	

Operational "Big Risks" (Checked items have to be addressed in the Hazard Analysis)

Equipment	☐	Lifting/Hoisting	☐	Unguarded Equipment	☐	**NOTES:**
Fall	☐	Weather Conditions	☐	Rigging	☐	
Confined Spaces	☐	Trenches	☐	Equipment Roll-Over	☐	
Hit/Struck/Crush By	☐	Utility Strike	☐	Tire/Brake Failure	☐	
Explosion	☐	Traffic	☐	Alertness/Complacent	☐	
Electrocution	☐	Falsework	☐	Subcontractors	☐	
Burn/Chemicals	☐	Night Work	☐	Supportive Excavation	☐	
Fire	☐	Haul Roads	☐	Crew Inexperience	☐	
Work Area Conditions	☐	Overhead Loads	☐	Working Alone	☐	

Required PPE for Field Activities (**Bold** items require separate hazard analysis and training)

Hard Hat	☐	Ear Muffs	☐	Leather Gloves	☐	**NOTES**
Reflective Vest	☐	Ear Plugs	☐	Kevlar Gloves	☐	
Life Vest	☐	Ladder Climbing Device	☐	Other Gloves-		
Safety Glasses	☐	Chin Strap	☐	*Type:* _____	☐	
Safety Goggles	☐	Welding Hood	☐	**Abrasive Blast Hood**	☐	
Cutting Goggles	☐	Welding Leathers	☐	**Filtering Face Piece**	☐	
Face Shield	☐	Anti-Vibration Gloves	☐	**Full Body Harness**	☐	
Leather Chaps	☐	Rubber Gloves	☐	**Self-Retracting Lifeline**	☐	
Kevlar Chaps	☐	Welding Gloves	☐	Other PPE: _____	☐	
Toe/Foot Guards	☐	Mechanic Gloves	☐	Other PPE: _____	☐	
Steel Toed Boots	☐	Other PPE:	☐	Other PPE:	☐	

Job Safety Analysis (JSA) Form

Steps List the steps required to perform the activity in the sequence they are carried out.	**Hazards** List the hazards that could cause injury or environmental impact associated with each step.	**Risk Control Measures** List the control measures required to eliminate or minimize the risk of injury arising from the identified hazards.	**Residual Risk Score** Risk when control(s) are in place
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14.			
15.			

Site Staff

Name: _____ **Signature:** _____ **Name:** _____ **Signature:** _____

Name: _____ **Signature:** _____ **Name:** _____ **Signature:** _____

Name: _____ **Signature:** _____ **Name:** _____ **Signature:** _____

Name: _____ **Signature:** _____ **Name:** _____ **Signature:** _____

APPENDIX F
HOT WORK PERMIT

	HEALTH AND SAFETY FORMER SATRALLOY SITE	HOT WORK PERMIT

BEFORE INITIATING HOT WORK, ENSURE PRECAUTIONS ARE IN PLACE!
MAKE SURE AN APPROPRIATE FIRE EXTINGUISHER IS READILY AVAILABLE!

This Hot Work Permit is required for any operation involving open flames or producing heat and/or sparks. This includes, but is not limited to: Brazing, Cutting, Grinding, Soldering, Thawing Pipe, Torch-Applied Roofing, and Cadwelding.

INSTRUCTIONS

A. Verify precautions checked at right are in place, or do not proceed with the work.
B. Complete and retain a copy of this permit (provide original to SHSC when the permit is closed).

WORK TYPE:
□ Cutting □ Welding □ Other

DATE: | PERMIT NO.:

LOCATION:

NATURE OF JOB:

NAME OF PERSON DOING HOT WORK:

COMPANY NAME:

RESPONSIBLE SUPERVISOR:

NAME: _____

I verify the above location has been examined and the precautions checked on the Required Precautions Checklist have been taken to prevent fire.

SIGNATURE: _____

START TIME: | FINISH TIME:

ASSIGNED FIRE WATCH:

NAME: _____

SIGNATURE: _____

SHSC REPRESENTATIVE OR DESIGNEE:

NAME: _____

I verify that the location was inspected and determined to be fire safe and that precautions checked on the Required Precautions Checklist are in place. Permission is authorized to start work.

SIGNATURE: _____

PERMIT EXPIRES: | DATE: | TIME: AM PM

REPORT EMERGENCIES BY DIALING 911 ON ANY SITE, COMPANY, OR CELL PHONE AND NOTIFY SSO IMMEDIATELY

THIS PERMIT IS GOOD FOR ONE DAY OR UNTIL EXPIRATION DATE AS NOTED

Required Precautions Checklist

APPLICABLE (Check appropriate box)
YES NO

- ☐ ☐ Available sprinklers, hose streams, or extinguishers are in service/operable.
- ☐ ☐ Hot work equipment in good repair.

Requirements within 35 feet of hot work

- ☐ ☐ Flammable liquids, dust, lint, and oil deposits removed.
- ☐ ☐ Explosive atmosphere in area eliminated.
- ☐ ☐ Floors swept clean.
- ☐ ☐ Combustible floors wet down, covered with damp sand or fire-resistant sheets.
- ☐ ☐ Remove other combustibles where possible. Otherwise protect with fire-resistant tarpaulins or metal shields.
- ☐ ☐ All wall and floor openings covered.
- ☐ ☐ Fire-resistant tarpaulins suspended beneath work.
- ☐ ☐ Vegetation removed or wet down.

Work on walls or ceilings/enclosed equipment

- ☐ ☐ Construction is noncombustible and without combustible covering or insulation.
- ☐ ☐ Combustibles on other side of walls moved away.
- ☐ ☐ Danger exists by conduction of heat into another area.
- ☐ ☐ Enclosed equipment cleaned of all combustibles.
- ☐ ☐ Containers purged of flammable liquids/vapors.

Fire watch/hot work area monitoring

- ☐ ☐ Fire watch will be provided during and for 30 minutes after work, including any coffee or lunch breaks.
- ☐ ☐ Fire watch is supplied with suitable extinguishers.
- ☐ ☐ Fire watch is trained in use of this equipment and in sounding alarm.
- ☐ ☐ Fire watch may be required for adjoining areas, above and below.
- ☐ ☐ Monitor hot work area for 30 minutes after job is completed.
- ☐ ☐ Fire Watch waived (reason) _____
- ☐ ☐ Notify SHSC after hot work is complete.

I verify that I conducted an inspection 30 minutes following completion of hot work and the area was in a fire safe condition.

NAME: _____

SIGNATURE: _____

At Golder Associates we strive to be the most respected global group of companies specializing in ground engineering and environmental services. Employee owned since our formation in 1960, we have created a unique culture with pride in ownership, resulting in long-term organizational stability. Golder professionals take the time to build an understanding of client needs and of the specific environments in which they operate. We continue to expand our technical capabilities and have experienced steady growth with employees now operating from offices located throughout Africa, Asia, Australasia, Europe, North America and South America.

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