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HEALTH AND SAFETY AMENDMENT ABL ROCKET CENTER WV  
12/8/1995  
CH2MHILL

#2  
Box 6

## AMENDMENT CH2M HILL HEALTH AND SAFETY PLAN

This amendment must accompany the health and safety plan (HSP) for the **U.S. Department of the Navy, Atlantic Division (LANTDIV) of the Naval Facilities Engineering Command (NAVFACENGCOM), at the Allegany Balistics Laboratory (ABL) Superfund Site, Reocket Center, West Virginia** approved in **May, 2002**. The purpose of the HSP amendment is to include supplemental information as it becomes available. Supplemental information is used to reevaluate hazards associated with the planned tasks and to revise protective procedures (e.g., new construction). Where the amendment contains information different from the HSP, the amendment will take precedence for the specified task. The amendment includes new information or revises existing HSP information. Sections of the HSP that are not addressed in the amendments do not have changes; therefore, the HSP will be followed. All employees performing tasks covered by this amendment must read both the HSP and this amendment and agree to abide by their provisions (see Attachment 1).

### PROJECT INFORMATION AND DESCRIPTION

<b>PROJECT NO:</b>	152786
<b>CLIENT:</b>	Naval Facilities Engineering Command
<b>SITE NAME:</b>	Allegany Balistics Laboratory (ABL) Superfund Site
<b>SITE ADDRESS:</b>	Rocket Center, West Virginia
<b>PROJECT MANAGER:</b>	Joe Kenderdine/WDC
<b>CH2MHILL OFFICE:</b>	13921 Park Center Road Suite 600 Herndon, VA 201715
<b>DATE(S) OF SITE WORK:</b>	October 27 <sup>th</sup> through December 31 <sup>th</sup> 2002
<b>SITE ACCESS:</b>	Enter through Gate 38.
<b>SITE SIZE:</b>	The site is 1,577 acres.
<b>SITE TOPOGRAPHY:</b>	Approximately 400 acres at plant 1 is in the flood plain of North Branch Potomac River, with the remaining acreage on forested mountainous land.
<b>PREVAILING WEATHER:</b>	The average high temperature ranges between 55° F (November) to 44° F (December). The average low temperature ranges from 32 ° F(November) to ° F (December). The average annual precipitation is 2.91 inches.

**SITE DESCRIPTION  
AND HISTORY:**

ABL is a government-owned (Navy), contractor-operated (ATK Tactical Systems Company LLC), research, development, production, and testing facility for solid propellants and motors for ammunition, rockets, and armaments. Since 1994, ABL has been on the National Priorities List (NPL) and is currently in the Navy's Installation Restoration (IR) Program to address contamination resulting from historical waste disposal activities. Eleven sites have been identified at the facility, including Site 10.

Site 10 is defined as the area around Building 157 on Plant 1 of ABL. A trichloroethene (TCE) still was reportedly operated adjacent to the building from 1959 until the early 1960s. The TCE still is the probable source of groundwater contamination at the site. Contaminated groundwater has migrated approximately 1,000 feet hydraulically downgradient of Building 157 in the alluvial aquifer and approximately 400 feet in the bedrock aquifer.

Based on the long-term monitoring data and the findings of Phase III Aquifer Testing, it was determined that by modifying the existing extraction system to include an additional alluvial extraction well and four bedrock extraction wells, hydraulic containment of the alluvial and bedrock groundwater contamination could be attained.

# 1. Tasks to be Performed Under this Plan

## 1.1 Description of Tasks

Refer to Scope of Work (SOW) for detailed task information. A health and safety risk analysis (Section 1.2) has been performed for each task and is incorporated in this plan through the task-specific hazard controls and requirements for monitoring and protection. Tasks other than those listed below require another approved amendment or revision to this plan before tasks begin. Refer to Section 8.2 for procedures related to "clean" tasks that do not involve hazardous waste operations and emergency response (Hazwoper).

### 1.1.1 Hazwoper-Regulated Tasks

- Install extraction piping.
- Perform well modifications.
- Excavating and staging of contaminated soil.
- Install vaults.
- Install submersible pumps and instrumentation/controls.
- Start-up of groundwater extraction system.

### 1.1.2 Non-Hazwoper-Regulated Tasks

Under specific circumstances, the training and medical monitoring requirements of federal or state Hazwoper regulations are not applicable. It must be demonstrated that the tasks can be performed without the possibility of exposure in order to use non-Hazwoper trained personnel. **Prior approval from the Health and Safety Manager (HSM) is required before these tasks are conducted on regulated hazardous waste sites.**

#### TASKS

#### CONTROLS

- |  |  |
|--|--|
| • Survey for underground utilities.              | • Brief on hazards, limits of access, and emergency procedures |
| • Install erosion control.                       | • Post contaminant areas as appropriate (refer to Section 8.2) |
| • Install electrical conduit.                    | • Sample and monitor as appropriate (refer to Section 5.0)     |
| • Install heat trace for piping.                 |  |
| • Modify the programmable logic controller (PLC) |  |
| • Modify Computer database.                      |  |
| • Electrical/Instrumentation installation.       |  |

## 1.2 Task Hazard Analysis

(Refer to Section 2.3 for hazard controls)

POTENTIAL HAZARDS	TASKS										
	Excavating/ Trenching	Contaminant Piping Installation	Well Modifications	Vault installation	Install electrical conduit	Install Heat Trace	Concrete encasement of electrical	Install Submersible Pump	Containment Soil Handling		
Manual Lifting (HS-29)	X	X	X	X	X		X	X	X		
Fire Prevention (HS-22)	X								X		
Electrical Safety (HS-23)	X		X		X	X		X	X		
Lockout / Tagout (HS-33)		X	X		X			X			
Ladders (HS-25)	X	X		X	X	X					
Compressed Gas Cylinders (HS-63)											
Buried Utilities	X			X	X						
Excavation and Trenching (HS-32)	X	X		X	X				X		
Fall Protection (HS-31)	X	X		X	X						
Earthmoving Equipment (HS-27)	X			X					X		
Confined Space Entry (HS-17)	X	X		X	X						
Concrete Work		X	X	X	X	X					
Cranes and Hoisting		X	X	X							
Demolition (HS-45)		X	X	X							
Scaffolding (HS-73)		X			X						
Steel erection											
Traffic Control (HS-24)											
Welding and cutting (HS-22)		X	X								
Aerial Lifts/elevated work platforms		X			X						
Power-actuated Tools											
Material Handling	X	X	X	X	X			X	X		
Drum Sampling									X		
Forklift operations		X		X							
Flammable/combustible liquids	X										
Pumping Operations	X							X			

## 2.1 Project-Specific Hazards

### 2.1.5 Heavy Equipment/Motor Vehicles

- Never approach operating equipment from the rear. Always make positive contact with the operator, and confirm that the operator has stopped the motion of the equipment.
- Never approach the side of operating equipment, remain outside the swing or turning radius.
- Maintain distance from pinch points of operating equipment.
- Never climb onto operating equipment or operate contractors/subcontractors equipment.
- Never ride on subcontractor equipment unless it is designed to accommodate passengers; equipped with firmly attached passenger seat and seatbelt.
- Never work or walk under a suspended load.
- Never use equipment as personnel lift- do not ride excavator buckets, crane hooks or stand on forklift forks.
- Always stay alert and maintain a safe distance from operating equipment, especially equipment on cross slopes and unstable terrain

### 2.1.6 Earthmoving Equipment (Reference CH2M HILL SOP HS-27, *Earthmoving Equipment*)

- Only authorized personnel are permitted to operate earthmoving equipment.
- Maintain safe distance from operating equipment and stay alert of equipment movement. Avoid positioning between fixed objects and operating equipment and equipment pinch points, remain outside of the equipment swing and turning radius. Pay attention to backup alarms, but not rely on them for protection. Never turn your back on operating equipment.
- Approach operating equipment only after receiving the operator's attention. The operator shall acknowledge your presence and stop movement of the equipment. Caution shall be used when standing next to idle equipment; when equipment is placed in gear it can lurch forward or backward. Never approach operating equipment from the side or rear where the operator's vision is compromised.
- When required to work in proximity to operating equipment, wear high-visibility vests to increase visibility to equipment operators. For work performed after daylight hours, vests shall be made of reflective material or include a reflective stripe or panel.
- Do not ride on earthmoving equipment unless it is specifically designed to accommodate passengers. Only ride in seats that are provided for transportation and that are equipped with seat belts.
- Stay as clear as possible of all hoisting operations. Loads shall not be hoisted overhead of personnel.
- Earthmoving equipment shall not be used to lift or lower personnel.
- If equipment becomes electrically energized, personnel shall be instructed not to touch any part of the equipment or attempt to touch any person who may be in contact with the electrical current. The utility company or appropriate party shall be contacted to have line de-energized prior to approaching the equipment.

### 2.1.7 Excavation (Reference CH2M HILL SOP HS-32, *Excavations*)

- Do not enter the excavations unless completely necessary, and only after the competent person has completed the daily inspection and has authorized entry.
- Follow all excavation entry requirements established by the competent person.
- Do not enter excavations where protective systems are damaged or unstable.
- Do not enter excavations where objects or structures above the work location may become unstable and fall into the excavation.
- Do not enter excavations with the potential for a hazardous atmosphere until the air has been tested and found to be at safe levels.
- Do not enter excavations with accumulated water unless precautions have been taken to prevent excavation cave-in. H&S Self-Assessment Checklist – Excavations, found in Attachment 5 of this plan, should be used to evaluate excavations prior to entry.

### **2.1.8 Concrete**

- Wear appropriate personal protective equipment (eye/face protection, gloves, rubber boots) when in areas where concrete is being poured.
- Ensure emergency eye wash is provided at the location of each concrete pour.
- Float handles may be conductive, ensure handles remain at least 10 feet away from energized electrical.
- Protruding reinforcing steel (rebar), onto which personnel could fall, must be guarded to eliminate the hazard of impalement.
- Stay as clear as possible of all hoisting operations. Loads, including concrete buckets, shall not be hoisted overhead of personnel.
- Maintain a safe distance from formwork and shoring being removed from concrete structures.
- Maintain a safe distance from precast and lift-slab concrete being lifted into position until physically secured.
- Do not ride concrete buckets.

### **2.1.9 Cranes, Hoists, and Rigging**

- Only certified crane operators are permitted to operate cranes.
- Maintain safe distance from operating cranes and stay alert of crane movement. Avoid positioning between fixed objects and operating cranes and crane pinch points, remain outside of the crane swing and turning radius. Never turn your back on operating cranes.
- Approach cranes only after receiving the operator's attention. The operator shall acknowledge your presence and stop movement of the crane. Never approach operating cranes from the side or rear where the operator's vision is compromised.
- When required to work in proximity to operating cranes, wear high-visibility vests to increase visibility to operators. For work performed after daylight hours, vests shall be made of reflective material or include a reflective stripe or panel.
- Stay as clear as possible of all hoisting operations. Loads shall not be hoisted overhead of personnel.
- Cranes shall not be used to lift or lower personnel.
- If crane becomes electrically energized, personnel shall be instructed not to touch any part of the crane or attempt to touch any person who may be in contact with the electrical current. The utility company or appropriate party shall be contacted to have line de-energized prior to approaching the crane.
- Do not exceed hoist load limits.
- Ensure load is level and stable before hoisting
- Inspect all rigging equipment prior to use. Do not use defective rigging for any reason.
- Only use rigging equipment for the purpose it was designed and intended.

### **2.1.10 Rigging**

- Stay as clear as possible of all hoisting operations. Loads shall not be hoisted overhead of personnel.
- Hoists shall not be used to lift or lower personnel.
- Do not exceed hoist load limits.
- Ensure load is level and stable before hoisting
- Inspect all rigging equipment prior to use. Do not use defective rigging for any reason.
- Only use rigging equipment for the purpose it was designed and intended.

### **2.1.11 Fall Protection** (Reference CH2M HILL SOP HS-31, *Fall Protection*)

- Fall protection systems must be used to eliminate fall hazards when performing construction activities at a height of 6 feet or greater.
- Staff exposed to fall hazards must complete the CH2M HILL Fall Protection training course and receive project-specific fall protection training. Do not use fall protection systems on which you have not been trained.
- The SSC must complete the Project Fall Protection Evaluation Form and provide project-specific fall protection training to all staff exposed to fall hazards. The Project Fall Protection Evaluation Form is provided in Attachment 5 of this plan.
- The SSC shall act as competent person and shall inspect and oversee the use of fall protection systems. Follow all requirements established by the competent person for the use and limitation of fall protection systems.
- A registered professional engineer shall oversee the use of horizontal lifelines.
- Only one person shall be simultaneously attached to a vertical lifeline.
- Remain within the guardrail system when provided. Leaning over or stepping across a guardrail system is not permitted.
- Do not stand on objects (boxes, buckets, bricks, blocks, etc.) or ladders to increase working height on top of platforms protected by guardrails.
- Inspect personal fall arrest systems prior to each use. Do not use damaged fall protection systems at any time, or for any reason.
- Set-up personal fall arrest systems so that you can neither free-fall more than 6 feet nor contact any lower level.
- Only attach personal fall arrest systems to anchorage points capable of supporting at least 5,000 pounds. Use fall protection equipment for fall protection only and not to hoist materials. Do not use personal fall arrest systems that have been subjected to impact loading.

### **2.1.12 Welding and Cutting**

- Only authorized and trained personnel are permitted to operate welding/cutting equipment.
- Do not enter areas where welding/cutting operations are taking place unless completely necessary and only after receiving permission from the welding/cutting operator.
- If you must be present in an area during welding/cutting operations, position yourself behind flash screens or wear glasses/goggles with lenses of appropriate darkness.
- Do not look directly at the welding/cutting flash or at reflective surfaces surrounding welding/cutting operations.
- Avoid contacting compressed gas cylinders. Cylinders should be firmly secured in an upright position at all times.
- Be aware of tripping hazards created by welding hoses, power cables, leads, and cords positioned on walking surfaces.

### **2.1.13 Compressed Gas Cylinders**

- Valve caps must be in place when cylinders are transported, moved, or stored
- Cylinder valves must be closed when cylinders are not being used and when cylinders are being moved
- Cylinders must be secured in an upright position at all times
- Cylinders must be positioned to avoid being struck or knock over; coming in contact with electrical circuits or extreme heat sources; and shielded from welding and cutting operations
- Cylinders must be secured on a cradle, basket or pallet when hoisted; they may not be hoisted by choker slings

#### **2.1.14 Aerial Lifts** (Reference CH2M HILL SOP HS-41, *Aerial Lifts*)

- Only authorized and trained personnel are permitted to operate aerial lifts.
- Inspect aerial lifts and test lift controls prior to use.
- Wear a full body harness with lanyard attached to the boom or platform. For scissors lifts where a standard guardrail system is installed and you are working within the confines of such a system, full body harness and lanyard are not required.
- Do not attach lanyard to any adjacent structures or equipment while working from an aerial lift.
- Stand firmly on the floor of the platform and do not sit or climb on the railings of the platform or use planks, ladders, or other devices to increase working height.
- Remain in the platform at all times and do not leave the platform to climb to adjacent structures.
- Position aerial lifts on firm, level surfaces when possible, with the brakes set. Use wheel chocks on inclines. If outriggers are provided, position on solid surfaces or cribbing.
- Maintain safe clearance distances between overhead power lines and any part of the aerial lift or conducting material unless the power lines have been de-energized and grounded, or where insulating barriers have been installed to prevent physical contact. Maintain at least 10 feet from overhead power lines for voltages of 50 kV or less, and 10 feet plus ½ inch for every 1 kV over 50 kV.
- Do not exceed the boom and basket load limits.
- Do not use aerial lifts as cranes, unless specifically designed and approved by the lift manufacturer.
- Do not work or stand below aerial lift operations.
- Do not use aerial lifts when winds exceed 30 miles per hour.

#### **2.1.15 Scaffolds** (Reference CH2M HILL SOP HS-73, *Scaffolds*)

- Do not access scaffolds until the competent person has completed the work shift inspection and has authorized access.
- Follow all requirements established by the competent person or as identified on the scaffold tag.
- Do not access scaffolds that are damaged or unstable at any time and for any reason.
- Only access scaffolds by means of a ladder, stair tower, ladder stand, ramp, integral prefabricated scaffold access, or other equivalent safe means of access. Scaffold crossbracing shall not be used to access scaffold platforms.
- Remain within the scaffold guardrail system when provided. Leaning over or stepping across a guardrail system is not permitted.
- Use personal fall arrest systems when required by the competent person and when working from suspension scaffolds or boatswains' chairs. CH2M HILL's fall protection training must be completed before using personal fall arrest systems.
- Do not stand on objects (boxes, buckets, bricks, blocks, etc.) or ladders on top of scaffold platforms to increase working height unless the platform covers the entire floor area of the room.
- Do not work on scaffolds covered with snow, ice, or other slippery material or work on scaffolds during storms or high winds unless personal fall arrest systems or wind screens are provided and the competent person determines it is safe to remain on the scaffold.

#### **2.1.16 Energized Electrical**

- Only qualified personnel are permitted to work on unprotected energized electrical systems.
- Electrical wiring and equipment shall be de-energized prior to conducting work unless it can be demonstrated that de-energizing introduces additional or increased hazards or is unfeasible due to equipment design or operational limitations.
- All electrical systems shall be considered energized until lockout/tagout procedures are implemented.
- The Energized Electrical Work permit provided in Attachment 5 of this plan must be completed prior to working on unprotected energized electrical systems.
- Follow all control measures and procedures identified on the Energized Electrical Work permit.

## 2.1.17 Hand Tools

- Operate all tools according to the manufacturers' instructions and within design limitations.
- All hand and power tools shall be maintained in a safe condition.
- Tools are to be inspected and tested before use. If a tool is found to be defective it is to be tagged "Do Not Use" and removed from service until repaired.
- Personal protective equipment, such as gloves, safety glasses, earplugs, and face shields, are to be used when exposed to a hazard from the tool.
- Power tools are not to be carried or lowered by the cord or hose.
- Disconnect tools from energy sources when not in use, before servicing and cleaning, and when changing accessories such as blades, bits, and cutters.
- Safety guards on tools are to remain installed while the tool is in use and promptly replaced after repair or maintenance has been performed.
- Tools are to be stored properly, where they will not be damaged or come in contact with hazardous materials.
- If a cordless tool is connected to its recharge unit, both pieces of equipment must conform strictly with electrical standards and manufacturer's specifications.
- Tools used in an explosive environment must be rated (i.e., intrinsically safe, spark proof, etc.) for work in that environment.
- When using a knife or blade tool, stroke or cut away from the body with a smooth motion taking care not use excessive force that could damage tool, material being cut, or unprotected hands.
- Wrenches, including adjustable, pipe, end, and socket wrenches, shall not be used when jaws are sprung to the point that slippage occurs.
- Impact tools, such as drift pins, wedges, and chisels, shall be kept free of mushroomed heads.
- The wooden handles of tools shall be kept free of splinters or cracks and shall be kept tight in the tool.
- Manual and pistol-grip hand tools may involve work with highly repetitive movement, extended elevation, constrained postures, or positioning of body members (e.g., hand, wrist, arm, shoulder, neck, etc.). Consider alternative tool design, improved posture, selection of appropriate materials, work organization, and sequencing to prevent muscular skeletal, repetitive motion, and cumulative trauma stressors.
- Tools shall be tested each day before use to see that safety devices are in proper working condition. The method of testing shall be in accordance with the manufacturer's recommended procedure.
- Belts, gears, shafts, pulleys, sprockets, spindles, drums, fly wheels, chains, or other reciprocating, rotating or moving parts of equipment shall be guarded if such parts are exposed to contact by employees or otherwise create a hazard.
- All liquid fuel-powered tools shall be stopped while being refueled, serviced, or maintained.

## 2.1.18 Lockout/Tagout (Reference CH2M HILL SOP HSE-33, *Lockout/Tagout*)

- Do not work on equipment when the unexpected operation could result in injury, unless lockout/tagout procedures are implemented.
- Staff working under a lockout/tagout procedure must complete the CH2M HILL Lockout/Tagout training course. Project-specific training may also be required on site-specific lockout/tagout procedures.
- Standard lockout/tagout procedures include the following six steps:
  - notify all personnel in the affected area of the lockout/tagout,
  - shut down the equipment using normal operating controls,
  - isolate all energy sources,
  - apply individual lock and tag to each energy isolating device,
  - relieve or restrain all potentially hazardous stored or residual energy, and
  - verify that isolation and de-energization of the equipment has been accomplished. Once verified that the equipment is at the zero energy state, work may begin.
- All safe guards must be put back in place, all affected personnel notified that lockout/tagout has been removed, and controls positioned in the safe mode prior to lockout/tagout removal.
- Do not remove another person's lock or tag.

## 2.1.19 Material Handling Equipment

- CH2M HILL authorizes only those employees qualified by training or previous experience to operate material handling equipment.
- Equipment must be checked at the beginning of each shift to ensure the equipment is in safe operating condition and free of apparent damage. The check should include: service brakes, parking brakes, emergency brakes, tires, horn, back-up alarm, steering mechanism, coupling devices, seat belts and operating controls. All defects shall be corrected before the equipment is placed in service.
- Equipment must be on a stable foundation such as solid ground or cribbing; outriggers are to be fully extended.
- Equipment must not be used to lift personnel, loads must not be lifted over the heads of personnel.
- Equipment, or parts thereof, which are suspended must be substantially blocked or cribbed to prevent shifting before personnel are permitted to work under or between them. All controls shall be in a neutral position, with the motors stopped and brakes set.
- Equipment which is operating in reverse must have a reverse signal alarm distinguishable from the surrounding noise or a signal person when the operators view is obstructed.
- When equipment is used near energized powerlines, the closest part of the equipment must be at least 10' from the powerlines < 50 kV. Provide an additional 4' for every 10 kV over 50 kV. A person must be designated to observe clearances and give timely warning for all operations where it is difficult for the operator to maintain the desired clearance by visual means. All overhead powerlines must be considered to be an energized until the electrical utility authorities indicate that it is not an energized line and it has been visibly grounded.
- Underground utility lines must be located before excavation begins.
- Operators loading/unloading from vehicles are responsible for seeing that vehicle drivers are in the vehicle cab or in a safe area.
- The parking brake shall be set whenever equipment is parked, wheels must be chocked when parked on inclines.
- When not in operation, the blade/bucket must be blocked or grounded; the master clutch must be disengaged when the operator leaves the cab. When equipment is unattended, power must be shut off, brakes set, blades/buckets landed and shift lever in neutral.

## 2.1.20 Confined Space Entry (Reference CH2M HILL SOP HS-17, *Confined Space Entry*)

The following requirements must be met prior to confined space entry:

- Confined space entrants, attendants, and entry supervisors must complete the CH2M HILL 8-Hour Confined Space Entry training.
- A Confined Space Entry Permit (CSEP), Alternative Procedure Certificate (APC), or Nonpermit Certificate (NPC) must be completed and posted near the space entrance point for review.
- Each confined space entrant and attendant must attend a preentry briefing conducted by the entry supervisor.
- Each confined space entrant and attendant must verify that the entry supervisor has authorized entry and that all permit or certificate requirements have been satisfied.
- Only individuals listed on the Authorization/Accountability Log are permitted to enter the space.
- Each confined space entrant and attendant must verify that atmospheric monitoring has been conducted at the frequency specified on the permit or certificate and that monitoring results are documented and within acceptable safe levels.

The following requirements must be met during confined space entry:

- Communication must be maintained between the attendant and entrants to enable the attendant to monitor entrant status.
- Entrants must use equipment specified on the permit or certificate accordingly.
- All permit or certificate requirements must be followed.
- Entrants must evacuate the space upon orders of the attendant or entry supervisor, when an alarm is sounded, or when a prohibited condition or dangerous situation is recognized.
- Entrants and attendants must inform the entry supervisor of any hazards confronted or created in the space or any problems encountered during entry

### 3 Project Organization and Personnel

#### 3.1 CH2M HILL Employee Medical Surveillance and Training

(Reference CH2M HILL SOPs HS-01, *Medical Surveillance*, and HS-02, *Health and Safety Training*)

The employees listed below are enrolled in the CH2M HILL Comprehensive Health and Safety Program and meet state and federal hazardous waste operations requirements for 40-hour initial training, 3-day on-the-job experience, and 8-hour annual refresher training. Employees designated "SSC" have completed a 12-hour site safety coordinator course, and have documented requisite field experience. An SSC with a level designation (D, C, B) equal to or greater than the level of protection being used must be present during all tasks performed in exclusion or decontamination zones. Employees designated "FA-CPR" are currently certified by the American Red Cross, or equivalent, in first aid and CPR. At least one FA-CPR designated employee must be present during all tasks performed in exclusion or decontamination zones. The employees listed below are currently active in a medical surveillance program that meets state and federal regulatory requirements for hazardous waste operations. Certain tasks (e.g., confined-space entry) and contaminants (e.g., lead) may require additional training and medical monitoring.

Pregnant employees are to be informed of and are to follow the procedures in CH2M HILL's SOP HS-04, *Reproduction Protection*, including obtaining a physician's statement of the employee's ability to perform hazardous activities before being assigned fieldwork.

Employee Name	Office	Responsibility	SSC/FA-CPR
Sam Tate	CLE	Construction Manager	Level "C" SSC/FA-CPR
Walter Marquis	BOS	Project Team Leader	Level "C" SSC/FA-CPR

### **3.2.3 CH2M HILL Subcontractors**

(Reference CH2M HILL SOP HS-55, *Subcontractor, Contractor, and Owner*)

Subcontractor: **Beitzel Corporation**

Subcontractor Contact Name: **Larry Schlossnagle**

Telephone: **(301) 245-4107**

The subcontractors listed above are covered by this HSP and must be provided a copy of this plan. However, this plan does not address hazards associated with the tasks and equipment that the subcontractor has expertise in (e.g., drilling, excavation work, electrical). Subcontractors are responsible for the health and safety procedures specific to their work, and are required to submit these procedures to CH2M HILL for review before the start of field work. Subcontractors must comply with the established health and safety plan(s). The CH2M HILL SSC should verify that subcontractor employee training, medical clearance, and fit test records are current and must monitor and enforce compliance with the established plan(s). CH2M HILL's oversight does not relieve subcontractors of their responsibility for effective implementation and compliance with the established plan(s).

CH2M HILL should continuously endeavor to observe subcontractors' safety performance. This endeavor should be reasonable, and include observing for hazards or unsafe practices that are both readily observable and occur in common work areas. CH2M HILL is not responsible for exhaustive observation for hazards and unsafe practices. In addition to this level of observation, the SSC is responsible for confirming CH2M HILL subcontractor performance against both the subcontractor's safety plan and applicable self-assessment checklists. Self-assessment checklists contained in Attachment 6 are to be used by the SSC to review subcontractor performance.

Health and safety related communications with CH2M HILL subcontractors should be conducted as follows:

- Brief subcontractors on the provisions of this plan, and require them to sign the Employee Signoff Form included in Attachment 1.
- Request subcontractor(s) to brief the project team on the hazards and precautions related to their work.
- When apparent non-compliance/unsafe conditions or practices are observed, notify the subcontractor safety representative and require corrective action – the subcontractor is responsible for determining and implementing necessary controls and corrective actions.
- When repeat non-compliance/unsafe conditions are observed, notify the subcontractor safety representative and stop affected work until adequate corrective measures are implemented.
- When an apparent imminent danger exists, immediately remove all affected CH2M HILL employees and subcontractors, notify subcontractor safety representative, and stop affected work until adequate corrective measures are implemented. Notify the Project Manager and HSM as appropriate.
- Document all oral health and safety related communications in project field logbook, daily reports, or other records.

## 4 Personal Protective Equipment (PPE)

(Reference CH2M HILL SOP HS-07, *Personal Protective Equipment*, HS-08, *Respiratory Protection*)

### PPE Specifications <sup>a</sup>

TASK	Level	Body	Head	Respirator <sup>b</sup>
<ul style="list-style-type: none"> <li>- General site entry</li> <li>- Utility location</li> <li>- Erosion control</li> <li>- Install electrical conduit</li> <li>- Heat trace</li> <li>- PLC</li> <li>- Instrumentation installation</li> <li>- System start-up</li> </ul>	D	Work clothes; steel-toe, leather work boots; work glove.	Hardhat <sup>c</sup> Safety glasses Ear protection <sup>d</sup>	None required
<ul style="list-style-type: none"> <li>- Install Pump</li> <li>- Prefrom Well Modifications</li> </ul>	Modified D	Work clothes or cotton coveralls <b>Boots:</b> Steel-toe, chemical-resistant boots OR steel-toe, leather work boots with outer rubber boot covers <b>Gloves:</b> Inner surgical-style nitrile & outer chemical-resistant nitrile gloves.	Hardhat <sup>c</sup> Safety glasses Ear protection <sup>d</sup>	None required
<ul style="list-style-type: none"> <li>- Excavation, installation of extraction piping and vaults and action levels in table 5.1 not exceeded.</li> </ul>	Modified D	<b>Coveralls:</b> Uncoated Tyvek® <b>Boots:</b> Steel-toe, chemical-resistant boots OR steel-toe, leather work boots with outer rubber boot covers <b>Gloves:</b> Inner surgical-style nitrile & outer chemical-resistant nitrile gloves.	Hardhat <sup>c</sup> Splash shield <sup>c</sup> Safety glasses Ear protection <sup>d</sup>	None required.
-Tasks requiring upgrade	C	<b>Coveralls:</b> Polycoated Tyvek® <b>Boots:</b> Steel-toe, chemical-resistant boots OR steel-toe, leather work boots with outer rubber boot covers <b>Gloves:</b> Inner surgical-style nitrile & outer chemical-resistant nitrile gloves.	Hardhat <sup>c</sup> Splash shield <sup>c</sup> Ear protection <sup>d</sup> Spectacle inserts	APR, full face, MSA Ultratwin or equivalent; with GME-H cartridges or equivalent <sup>e</sup> .
-Tasks requiring upgrade	B	<b>Coveralls:</b> Polycoated Tyvek® <b>Boots:</b> Steel-toe, chemical-resistant boots OR steel-toe, leather work boots with outer rubber boot covers <b>Gloves:</b> Inner surgical-style nitrile & outer chemical-resistant nitrile gloves.	Hardhat <sup>c</sup> Splash shield <sup>c</sup> Ear protection <sup>d</sup> Spectacle inserts	Positive-pressure demand self-contained breathing apparatus (SCBA); MSA Ultralite, or equivalent.

### Reasons for Upgrading or Downgrading Level of Protection

Upgrade <sup>f</sup>	Downgrade
<ul style="list-style-type: none"> <li>• Request from individual performing tasks.</li> <li>• Change in work tasks that will increase contact or potential contact with hazardous materials.</li> <li>• Occurrence or likely occurrence of gas or vapor emission.</li> <li>• Known or suspected presence of dermal hazards.</li> <li>• Instrument action levels (Section 5) exceeded.</li> </ul>	<ul style="list-style-type: none"> <li>• New information indicating that situation is less hazardous than originally thought.</li> <li>• Change in site conditions that decreases the hazard.</li> <li>• Change in work task that will reduce contact with hazardous materials.</li> </ul>

<sup>a</sup> Modifications are as indicated. CH2M HILL will provide PPE only to CH2M HILL employees.

<sup>b</sup> No facial hair that would interfere with respirator fit is permitted.

<sup>c</sup> Hardhat and splash-shield areas are to be determined by the SSC.

<sup>d</sup> Ear protection should be worn when conversations cannot be held at distances of 3 feet or less without shouting.

<sup>e</sup> Cartridge change-out schedule is at least every 8 hours (or one work day), except if relative humidity is > 85%, or if organic vapor measurements are > midpoint of Level C range (refer to Section 5)--then at least every 4 hours. If encountered conditions are different than those anticipated in this HSP, contact the HSM.

<sup>f</sup> Performing a task that requires an upgrade to a higher level of protection (e.g., Level D to Level C) is permitted only when the PPE requirements have been approved by the HSM, and an SSC qualified at that level is present.

## 5 Air Monitoring/Sampling (Reference CH2M HILL SOP HS-06, *Air Monitoring*)

### 5.1 Air Monitoring Specifications

Instrument	Tasks	Action Levels <sup>a</sup>		Frequency <sup>b</sup>	Calibration
<b>FID: TVA 1000</b>	- All intrusive activities	0-1 ppm→ 1-5 ppm→ >5 ppm→	Level D Level C Level B	Initially and continuously during task. Record readings every 30-60 minutes	Daily
<b>PID: OVM with 10.6 eV lamp or equivalent</b>	- All intrusive activities	0-5 ppm→ 5-50 ppm→ >50 ppm→	Level D Level C (if VC<1ppm) Level B	Initially and continuously during task. Record readings every 30-60 minutes	Daily
<b>Colormetric Tube: Drager vinyl chloride specific (0.5 to 30 ppm range)</b>	All tasks when PID action levels are exceeded	No color change→  Color change→	See PID  See PID	Initially and periodically when PID/FID =>1 ppm	Not applicable
<b>Dust Monitor:</b>	All intrusive Activities	Visual Dust→	Implement dust suppression	Initially and periodically during task	Not applicable

<sup>a</sup> Action levels apply to sustained breathing-zone measurements above background.

<sup>b</sup> The exact frequency of monitoring depends on field conditions and is to be determined by the SSC; generally, every 5 to 15 minutes if acceptable; more frequently may be appropriate. Monitoring results should be recorded. Documentation should include instrument and calibration information, time, measurement results, personnel monitored, and place/location where measurement is taken (e.g., "Breathing Zone/MW-3", "at surface/SB-2", etc.).

<sup>c</sup> Noise monitoring and audiometric testing also required.

## 8.3 Behavior Based Loss Prevention System

A Behavior Based Loss Prevention System (BBLPS) is a system to prevent or reduce losses using behavior-based tools and proven management techniques to focus on behaviors or acts that could lead to losses.

The four basic Loss Prevention tools that will be used on EE&S CCI projects to implement the BBLPS include:

- Activity Hazard Analysis (AHA)
- Pre-Task Safety Plans (PTSP)
- Safe Work Observations (SWO)
- Loss and Near Loss Investigations (NLI)

The Site Supervisor serves as the Safety Coordinator (SC) and is responsible for implementing the BBLPS on the project site. When a separate individual is assigned as the SC, the SC is delegated authority from the Site Supervisor to implement the BBLPS on the project site, but the Site Supervisor remains accountable for its implementation. The Site Supervisor/Safety Coordinator shall only oversee the subcontractor's implementation of their AHAs and PTSPs processes on the project.

## 8.4 Activity Hazard Analysis

An Activity Hazard Analysis (AHA) defines the activity being performed, the hazards posed and control measures required to perform the work safely. Workers are briefed on the AHA before doing the work and their input is solicited prior, during and after the performance of work to further identify the hazards posed and control measures required.

Activity Hazard Analysis will be prepared before beginning each project activity posing H&S hazards to project personnel using the AHA form provided in **Attachment 5**. The AHA shall identify the work tasks required to perform each activity, along with potential H&S hazards and recommended control measures for each work task. In addition, a listing of the equipment to be used to perform the activity, inspection requirements and training requirements for the safe operation of the equipment listed must be identified.

An AHA shall be prepared for all field activities performed by CCI and subcontractor during the course of the project by the Site Supervisor/SC. The Project-Specific and General Hazards (Sections 2.1 and 2.2, respectively) of the HSP, the Hazard Analysis Table (Table 2.1), and applicable CH2Mhill Standards of Practice (SOPs) should be used as a basis for preparing CCI's AHAs.

CCI subcontractors are required to provide AHA's specific to their scope of work on the project for acceptance by CCI. Each subcontractor shall submit AHAs for their field activities, as defined in their work plan/scope of work, along with their project-specific HSP. Additions or changes in CCI or subcontractor field activities, equipment, tools or material to perform work or additional/different hazard encountered that require additional/different hazard control measures requires either a new AHA to be prepared or an existing AHA to be revised.

## 8.5 Pre-Task Safety Plans

Daily safety meetings are held with all project personnel in attendance to review the hazards posed and required H&S procedures/JSA's, that apply for each day's project activities. The PTSPs serve the same purpose as these general assembly safety meetings, but the PTSPs are held between the crew supervisor and their work crews to focus on those hazards posed to individual work crews. At the start of each day's activities, the crew supervisor completes the PTSP, provided in Attachment 7, with input from the work crew, during their daily safety meeting. The day's tasks, personnel, tools and equipment that will be used to perform these tasks are listed, along with the hazards posed and required H&S procedures, as identified in the JSA. The use of PTSPs, better promotes worker participation in the hazard recognition and control process, while reinforcing the task-specific hazard and required H&S procedures with the crew each day. The use of PTSPs is a common safety practice in the construction industry.

## 8.6 Safe Work Observations

Safe Work Loss-Prevention Observations (SWO's) shall be conducted by Site Supervisor/SC for specific work tasks or operations comparing the actual work process against established safe work procedures identified in the project-specific HSP and AHAs. SWO's are a tool to be used by supervisors to provide positive reinforcement for work practices performed correctly, while also identifying and eliminating deviations from safe work procedures that could result in a loss. Site Supervisor/SC shall perform at least one SWO each week for a tasks/operations addressed in the project-specific HSP or AHA. The Site Supervisor/SC shall complete the SWO form in **Attachment 5** for the task/operation being observed, following the process below.

## 8.7 Loss/Near Loss Investigations

Loss/Near Loss Investigations shall be performed for the all CCI and subcontractor incidents involving:

- Person injuries/illnesses and near miss injuries
- Equipment/property damage
- Spills, leaks, regulatory violations
- Motor vehicle accidents

The cause of loss and near loss incidents are similar, so by identifying and correcting the causes of near loss causes, future loss incidents may be prevented. The following is the Loss/Near Loss Investigation Process:

- Gather all relevant facts, focusing on fact-finding, not fault-finding, while answering the who, what, when, where and how questions.
- Draw conclusions, pitting facts together into a probable scenario.
- Determine incident root cause(s), which are basic causes on why an unsafe act/condition existed.
- Develop and implement solutions, matching all identified root causes with solutions.
- Communicate incident as a Lesson Learned to all project personnel.
- Filed follow-up on implemented corrective active action to confirm solution is appropriate.

Site Supervisors/SSC shall perform an incident investigation, as soon as practical after incident occurrence during the day of the incident, for all Loss and Near Loss Incidents that occur on the project. Loss and Near Loss incident investigations shall be performed using the following incident investigation forms provided in **Attachment 8**:

- *Incident Report Form (IRF)*
- *Incident Investigation Form*
- *Root Cause Analysis Form*

**All Loss and Near Loss incident involving personal injury, property damage in excess of \$1,000 or near loss incidents that could have resulted in serious consequences shall be investigated by completing the incident investigation forms and submitting them to the PM and HSM within 24 hours of incident occurrence. A preliminary Incident Investigation and Root Cause Analysis shall be submitted to the Project Manager and HSM within 24 hours of incident occurs. The final Incident Investigation and Root Cause Analysis shall be submitted after completing a comprehensive investigation of the incident.**

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**10 APPROVAL**

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This site safety plan has been written for use by CH2M HILL only. CH2M HILL claims no responsibility for its use by others unless specified and defined in project or contract documents. The plan is written for the specific site conditions, purposes, dates, and personnel specified and must be amended if those conditions change.

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**10.2 AMENDMENTS**

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**CHANGES MADE BY:** Steve Beck/MKE**DATE:** 10/25/2002

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**CHANGES TO PLAN:**

- Addition of a new field event dates
- Addition to Site Hazwoper Related Tasks
- Addition of Non-Hazwoper Related Activity
- Addition of a new Task Hazard Analysis
- Addition of Project Specific Tasks to section 2.1
- Addition of new CH2MHILL Staff- Verification of Training and Medical Surveillance
- Addition of sub-contractor (Beitzel Corporation)
- Modification to Table 4 (Personal Protective Equipment).
- Modification to Table 5 (Air Monitoring)
- Addition of the Behavioral Based Loss Prevention System (BBLPS) to Section 8
- Addition to Attachment #6 "Self-Assessment Checklist"
- Addition of Attachment #8 Behavioral Based Loss Prevention System (BBLPS) Forms
- Addition of Attachment #9 Forms and Permits

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**AMENDMENT APPROVED BY:**  
SteveBeck/MKE**DATE:** 10/28/2002

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**10.3 DISTRIBUTION**

Name	Office	Responsibility	Number of Copies
Lynn Bong	MKE	Safety Program Assistant	1
Steve Beck	MKE	Health and Safety Manager/Approver	1
Joe Kenderdine	WDC	Project Manager	1
Walter Marquis	BOS	Field Team Leader	1
		Site Safety Coordinator	
Client		Client Project Manager	

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**11 ATTACHMENTS**

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**Attachment 1:** Employee signoff

**Attachment 6:** Self Assessment Checklist

**Attachment 8: Behavioral Based Loss Prevention System**

**Attachment 9:** Forms and Permits

**CH2MHILL**  
**Health and Safety Plan**  
**Attachment 1**

**Employee Sign-Off Form**



**CH2MHILL**  
**Health and Safety Plan**  
**Attachment 6**

**Self-Assessment Checklists**

This checklist shall be used by CH2M HILL personnel **only** and shall be completed at the frequency specified in the project's HSP/FSI.

This checklist is to be used at locations where: 1) CH2M HILL employees are potentially exposed to the hazards of earthmoving equipment operations, 2) CH2M HILL employees are operating earthmoving equipment, and/or 3) CH2M HILL provides oversight of a subcontractor operating earthmoving equipment.

The CH2M HILL Safety Coordinator may consult with subcontractors operating earthmoving equipment when completing this checklist, but shall not direct the means and methods of equipment operations nor direct the details of corrective actions. Earthmoving equipment subcontractors shall determine how to correct deficiencies and we must carefully rely on their expertise. Items considered to be imminently dangerous (possibility of serious injury or death) shall be corrected immediately or all exposed personnel shall be removed from the hazard until corrected.

Project Name: \_\_\_\_\_ Project No.: \_\_\_\_\_

Location: \_\_\_\_\_ PM: \_\_\_\_\_

Auditor: \_\_\_\_\_ Title: \_\_\_\_\_ Date: \_\_\_\_\_

This specific checklist has been completed to:

- Evaluate CH2M HILL employee exposures to earthmoving equipment hazards (complete Section 1).  
 Evaluate CH2M HILL employees operating earthmoving equipment (complete entire checklist).  
 Evaluate CH2M HILL subcontractor's compliance with earthmoving equipment safety requirements (complete entire checklist). Subcontractors Name: \_\_\_\_\_

- Check "Yes" if an assessment item is complete/correct.
- Check "No" if an item is incomplete/deficient. Deficiencies shall be brought to the immediate attention of the earthmoving equipment subcontractor. Section 3 must be completed for all items checked "No."
- Check "N/A" if an item is not applicable.
- Check "N/O" if an item is applicable but was not observed during the assessment.

Numbers in parentheses indicate where a description of this assessment item can be found in Standard of Practice HSE-27.

SAFE WORK PRACTICES (3.1)	<u>SECTION 1</u>			
	<u>Yes</u>	<u>No</u>	<u>N/A</u>	<u>N/O</u>
1. Personnel maintaining safe distance from operating equipment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Positioning personnel in close proximity to operating equipment is avoided	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Personnel wearing high-visibility and/or reflective vests when close to operating equipment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Personnel approach operating equipment safely	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Personnel riding only in seats of equipment cab and using seat belts	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Personnel not positioned under elevated portions of equipment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Personnel not positioned under hoisted loads	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Personnel not hoisted by equipment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. Personnel do not to approach equipment that has become electrically energized	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. Personnel wearing appropriate PPE, per HSP/FSI	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

<b>EQUIPMENT SAFETY REQUIREMENTS PRIOR TO OPERATING EQUIPMENT (3.2.1)</b>	<b>SECTION 2</b>	<b>Yes</b>	<b>No</b>	<b>N/A</b>	<b>N/O</b>
11. Only qualified and authorized personnel operating equipment		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12. Daily safety briefing/meeting conducted with equipment operators		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13. Daily inspection of equipment conducted and documented		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14. Modifications and attachments used approved by equipment manufacturer		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15. Backup alarm or spotter used when backing equipment		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
16. Operational horn provided on bi-directional equipment		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
17. Seat belts are provided and used		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
18. Rollover protective structures (ROPS) provided		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
19. Braking system capable of stopping full payload		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
20. Headlights and taillights operable when additional light required		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
21. Brake lights in operable condition		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
22. Cab glass provides no visible distortion to the operator		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
23. All machine guards are in place		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
24. Hauling equipment (dump trucks) provided with cab shield or canopy		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
25. Dump truck beds provided with positive means of support during maintenance or inspection		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
26. Dump truck operating levers provided with latch to prevent accidental dumping		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
27. Air monitoring conducted per HSP/FSI for hazardous atmospheres		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>EQUIPMENT PLACEMENT (3.2.2)</b>					
28. Equipment position on firm/level surface, outriggers used		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
29. Location of underground utilities identified		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
30. Safe clearance distance maintained while working under overhead power lines		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
31. Safe distance is maintained while traveling under power lines		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
32. Warning system used to remind operator of excavation edge		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
33. Unattended equipment visibly marked at night		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
34. Tools lowered/parking brake set when not in use, wheels chocked when parked on incline		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>EQUIPMENT OPERATION (3.2.3)</b>					
35. Equipment operated on safe roadways and grades		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
36. Equipment operated at safe speed		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
37. Operators maintain unobstructed view of travel path		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
38. Equipment not operated during inclement weather, lightning storms		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
39. Equipment started and moved safely		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
40. Operators keep body parts inside cab during operation		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
41. Vehicle occupants in safe position while loading/unloading		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
42. Signal person visible to operator when required		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
43. Equipment used for hoisting done according to equipment manufacturer specifications		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
44. Lifting and hauling capacities are not exceeded		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>EQUIPMENT MAINTENANCE (3.2.4)</b>					
45. Defective components repaired immediately		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
46. Suspended equipment or attachments supported prior to work under or between		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
47. Lockout/tagout procedures used prior to maintenance		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
48. Tires on split rims removed using safety tire rack or cage		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
49. Good housekeeping maintained on and around equipment		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Excavating at Hazardous Waste Sites (3.2.5)</b>					
50. Waste disposed of according to HSP/FSI		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
51. Appropriate decontamination procedures being followed, per HSP/FSI		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



# CH2MHILL

## H&S Self-Assessment Checklist - FALL PROTECTION

This checklist shall be used by CH2M HILL personnel **only** and shall be completed at the frequency specified in the project's HSP/FSI.

This checklist is to be used at locations where: 1) CH2M HILL employees are required to use fall protection (complete Section 1), 2) CH2M HILL employees are designing or installing fall protection systems (complete Section 2); and/or 3) CH2M HILL provides oversight of a subcontractor whose personnel design or install fall protection systems or are required to use fall protection (complete entire checklist).

SC may consult with subcontractors when completing this checklist, but shall not direct the means and methods of fall protection operations, nor direct the details of corrective actions. Subcontractors shall determine how to correct deficiencies and we must carefully rely on their expertise. Items considered to be imminently dangerous (possibility of serious injury or death) shall be corrected immediately or all exposed personnel shall be removed from the hazard until corrected.

Project Name: \_\_\_\_\_ Project No.: \_\_\_\_\_  
 Location: \_\_\_\_\_ PM: \_\_\_\_\_  
 Auditor: \_\_\_\_\_ Title: \_\_\_\_\_ Date: \_\_\_\_\_

This specific checklist has been completed to:

- Evaluate CH2M HILL employee exposure to fall hazards
- Evaluate a CH2M HILL subcontractor's compliance with fall protection requirements  
 Subcontractors Name: \_\_\_\_\_

- Check "Yes" if an assessment item is complete/correct.
- Check "No" if an item is incomplete/deficient. Deficiencies shall be brought to the immediate attention of the subcontractor. Section 3 must be completed for all items checked "No."
- Check "N/A" if an item is not applicable.
- Check "N/O" if an item is applicable but was not observed during the assessment.

Numbers in parentheses indicate where a description of this assessment item can be found in Standard of Practice HS-31.

<b>FALL PROTECTION USE (3.2)</b>	<b>SECTION 1</b>	<b>Yes</b>	<b>No</b>	<b>N/A</b>	<b>N/O</b>
1. CH2M HILL employees have completed initial fall protection training		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Project Fall Protection Evaluation Form is completed		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. CH2M HILL employees have complete project-specific fall protection training		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Personnel aware of and follow requirements established by competent person		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Personnel only using systems for which they have received training		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Fall protection equipment used only for fall protection and not to hoist materials		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Horizontal lifelines used under supervision of qualified person		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. When vertical lifelines are used, each employee attached to a separate lifeline		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. Personnel remaining within guardrails, when provided		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. Personnel do not stand on objects or ladders on top platforms protected by guardrails		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11. Personal fall arrest systems (PFAS) inspected prior to each use for defects		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12. PFAS rigged such that personnel can neither free-fall more than 6', nor contact any lower level		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13. PFAS anchorages capable of supporting 5,000 pounds		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14. PFAS not be attached to guardrail systems or hoists		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15. PFAS components subjected to impact loading immediately removed from service		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

# CH2MHILL

<u>CONSTRUCTION &amp; INSTALL</u>	<u>SECTION 2</u>	<u>Yes</u>	<u>No</u>	<u>N/A</u>	<u>N/O</u>
<b>GUARDRAILS (3.3.1)</b>					
16. Top rails positioned 39"-45" above the walking/working level		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
17. Midrails, screen, or other barrier between the top rail and the walking/working surface		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
18. Wood construction: 2"x4" top rails, 1"x6" midrails, and 2"x4" posts spaced every 8'		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
19. Pipe construction: 1-1/2" nominal diameter with posts spaced every 8'		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
20. Structural steel construction: 2"x2"x3/8" angles with posts spaced every 8'		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
21. Other construction: pass a 200 lb. load test, no deflection < 39"		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
22. Natural or synthetic rope top rails/midrails inspected frequently & pass 200 lb. load test		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
23. Wire rope top rails/midrails ≥ 1/4" nominal diameter and flagged every 6'		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
24. Points of access (ladderways) provided with gate or offset		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>SAFETY NETS (3.3.2)</b>					
25. Nets installed as close as practicable under the walking/working surface, < 30'		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
26. Potential fall area from bridge surfaces to net unobstructed		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
27. Nets extend outward from the work surface based on the vertical fall distance		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
28. Nets pass drop test or competent person certifies nets are in compliance		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
29. Nets installed with sufficient clearance underneath to prevent contact with the surface		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
30. Nets inspected at least once a week and after any occurrence that could affect its integrity		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
31. Objects in net removed as soon as possible, at least before the next work shift		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
32. Mesh openings ≤ 6" in length on any side		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
33. Border ropes have a minimum breaking strength of 5,000 pounds		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
34. Safety net panel connections as strong as integral net components and spaced ≤ 6' apart		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>PERSONAL FALL ARREST SYSTEMS (3.3.3)</b>					
35. PFAS components meet or exceed OSHA strength criteria		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
36. PFAS rigged such that personnel can neither free-fall more than 6', nor contact any lower level		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
37. Body harness back dee-ring used as attachment point		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
38. Only locking type snaphooks are used		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
39. Horizontal lifelines used under supervision of qualified person with safety factor of ≥ 2		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
40. When vertical lifelines are used, each employee attached to a separate lifeline		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
41. PFAS anchorages independent of anchorages used to support or suspend platforms		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
42. Anchorages capable of supporting ≥ 5,000 lbs. per person or used under supervision of qualified person with safety factor of ≥ 2		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
43. Method of rescue provided in the event of a fall		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>POSITIONING DEVICES (3.3.4)</b>					
44. Components meet or exceed OSHA PFAS construction and strength criteria		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
45. Components inspected prior to each use and defective components removed from service		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
46. Positioning devices rigged such that personnel cannot free-fall more than 2'		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
47. Anchorages capable of supporting ≥ 2 times potential impact load of fall or 3,000 pounds		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>WARNING LINES (3.4.5)</b>					
48. Warning lines 34"-39" from the walking/working surface		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
49. Warning lines flagged at ≤ 6' intervals with high-visibility material		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
50. Warning lines attached at stanchions capable of resisting 16 lb. force without tipping		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
51. Warning lines erected ≥ 6' from each roof edge		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
52. Warning lines erected ≥ 10' from roof edge perpendicular to mechanical equipment travel		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
53. Warning line placed across the access points when not in use		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
54. Only personnel performing roof work between a roof edge and a warning line		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

<u>SECTION 2 (continued)</u>	<u>Yes</u>	<u>No</u>	<u>N/A</u>	<u>N/O</u>
<b>CONTROLLED ACCESS ZONE (3.3.6)</b>				
55. Control lines enclose controlled access zones	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
56. Only personnel engaged in related work permitted in the controlled access zone	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
57. Control lines 30"-45" from the walking/working surface	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
58. Control lines flagged at ≤ 6' intervals with high-visibility material	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
59. Overhand bricklaying control lines positioned 10'-15' from working edge	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
60. Leading edge control lines positioned 6'-25' from leading edge	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
61. Precast concrete control lines positioned 6'-60' or half the length of the erected member	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>SAFETY MONITORING SYSTEM (3.3.7)</b>				
62. Safety monitor designated to observe and warn personnel	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
63. Safety monitor not distracted from the monitoring function	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
64. Safety monitor on the same working surface within sight and voice communication	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
65. Only personnel necessary for work in safety monitoring zone	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
66. Personnel adhere to the safety monitor's instructions	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>FALL PROTECTION PLAN (3.3.8)</b>				
67. Plan prepared by qualified person and specifically for site work being performed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
68. Plan maintained current with changes approved by a qualified person	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
69. Plan maintained at the job site and implemented by competent person	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
70. Plan documents why fall protection systems are infeasible or would create a greater hazard	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
71. Plan discusses measures taken to reduce or eliminate the fall hazards	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
72. Plan discusses when scaffolds, ladders, or vehicle mounted work platforms shall be used	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
73. Locations covered by plan identified and classified as controlled access zones	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
74. Entry into controlled access zone limited to personnel designated in plan	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
75. Safety monitoring system used when no other alternative measure implemented	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>COVERS (3.3.9)</b>				
76. Covers capable of supporting 2x the maximum weight imposed on the cover at any one time	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
77. Covers secured to prevent accidental displacement	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
78. Covers color coded or marked HOLE or COVER	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>FALLING OBJECT PROTECTION (3.3.10)</b>				
79. Personnel exposed to falling objects wearing hard hats	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
80. Objects on elevated surfaces positioned away from surface edge	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
81. Toeboards, screens, guardrails, or canopies used or area barricaded below	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
82. Toeboards, when used, erected along the edge of the overhead walking/working surface	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
83. Toeboards 3-½" high, ≤ ¼" clearance above the surface, and no openings > 1"	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
84. Screening/paneling provided where equipment or materials are piled above toeboards	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
85. Guardrails, when used, no openings small enough to prevent passage of falling objects	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
86. Overhand bricklaying masonry/mortar not stored within 4' of working edge	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
87. Excess overhand bricklaying mortar, masonry units, and other debris kept clear	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
88. Roofing materials not stored within 6' of a roof edge, unless guardrails are provided	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
89. Roofing materials that are near roof edge are stable and self-supporting	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
90. Canopies, when used, strong enough to prevent collapse and penetration by falling objects	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



This checklist shall be used by CH2M HILL personnel **only** and shall be completed at the frequency specified in the project’s HSP/FSI.

This checklist is to be used at locations where: 1) CH2M HILL employees are exposed to crane, hoist and rigging hazards (complete Section 1 and 3) and/or 2) CH2M HILL provides oversight of subcontractor personnel who are exposed to crane, hoist and rigging hazards (complete entire checklist).

SSC or DSC may consult with subcontractors when completing this checklist, but shall not direct the means and methods of crane, hoist and rigging operations nor direct the details of corrective actions. Subcontractors shall determine how to correct deficiencies and we must carefully rely on their expertise. Items considered to be imminently dangerous (possibility of serious injury or death) shall be corrected immediately or all exposed personnel shall be removed from the hazard until corrected.

Completed checklists shall be sent to the HS&E Staff for review.

Project Name: \_\_\_\_\_ Project No.: \_\_\_\_\_  
 Location: \_\_\_\_\_ PM: \_\_\_\_\_  
 Auditor: \_\_\_\_\_ Title: \_\_\_\_\_ Date: \_\_\_\_\_

This specific checklist has been completed to:

Evaluate CH2M HILL employee exposure to crane, hoist and rigging hazards  
 Evaluate a CH2M HILL subcontractor’s compliance with crane, hoist and rigging requirements  
 Subcontractors Name: \_\_\_\_\_

- Check “Yes” if an assessment item is complete/correct.
- Check “No” if an item is incomplete/deficient. Deficiencies shall be brought to the immediate attention of the subcontractor. Section 3 must be completed for all items checked “No.”
- Check “N/A” if an item is not applicable.
- Check “N/O” if an item is applicable but was not observed during the assessment.

Numbers in parentheses indicate where a description of this assessment item can be found in Standard of Practice HS-44.

**SECTION 1**

	Yes	No	N/A	N/O
<b>SAFE WORK PRACTICES (3.1)</b>				
1. Individuals operating cranes and hoists of any type are certified operators	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Cranes have current annual inspection and operations manual with load charts on site	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Swing radius of cranes are guarded and barricaded	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Competent person inspects crane daily	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Pre-lift meetings conducted with all parties involved in crane operations	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Cranes used to lift vertically only	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Adequate distance maintained between cranes parts and overhead power lines	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Dedicated signal person assigned to signal operator	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. Cranes do not swing over live roadways, railways, processes, or occupied buildings	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. Critical lifts have written lifting/rigging plan	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11. No personnel permitted on or under loads lifted by crane. Tag lines used to control load	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12. Manufacturers specifications and limitations for hoists followed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13. Personnel not permitted to ride on material hoists	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14. Weather conditions considered when lifting operations performed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15. All rigging used as intended, inspected, stored, protected and supervised.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
16. No fabrication, modifications, or additions to rigging made without testing and approval	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**SECTION 2**

	<u>Yes</u>	<u>No</u>	<u>N/A</u>	<u>N/O</u>
<b>CRANES: GENERAL (3.2.1)</b>				
17. The competent person inspects all cranes, hoists, and rigging prior to use	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
18. Frequent and periodic inspections have been completed for all cranes to be used	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
19. Crane ropes and hooks have been inspected by an authorized person	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
20. All guards and safety devices installed and equipment removed after maintenance	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
21. A load-rating chart is easily visible to the seated operator	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
22. A designated person has been assigned to signal the operator when visibility is obstructed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
23. Hand signals to crane operators are those prescribed by ANSI	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
24. All outriggers are deployed and seated	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
25. The tires of truck mounted cranes are off the ground when the outriggers are seated	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
26. Cranes are equipped with load limiting devices and boom angle indicator	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
27. Cabs of cranes have adequate access and kept clean of loose tools, cans, and waste	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
28. Cranes are equipped with a 5 BC or higher fire extinguisher	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
29. All windows in cabs are safety glass that does not interfere with the safe operation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
30. All machinery operating on rails, tracks, or trolleys has stops/limiting and overspeed devices	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
31. Moving parts on the crane that employees are exposed to are guarded	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>CRANES: POSITIONING (3.2.2)</b>				
32. Cranes operated near live power lines will maintain minimum distance from the lines <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
33. Adequate clearance must be maintained between a crane and obstructions	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
34. The crane is level and blocked properly	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
35. Swing radius of crane has been barricaded to prevent exposure to struck against/crush hazard	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
36. Exhaust pipes are guarded from employee contact	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>CRANES: OPERATION (3.2.3)</b>				
37. Operator tests brakes when load is near rated capacity of lift	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
38. Sheaves are guarded or warning sign provided to identify hazard	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
39. Load or boom not lowered to where less than two full wraps of rope remain on drum	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
40. If two or more cranes are to be used to lift one load, a designated person is responsible for analyzing, instructing, rigging and signaling movement of the load	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
41. Cranes not operated without full amount of ballast or counterweight	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
42. Tag lines are used to control suspended load	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
43. Sudden acceleration or deceleration of load is avoided	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
44. Loads are not to be passed over personnel or facilities	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
45. No personnel are allowed to ride the load	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
46. Suspended loads are not left unattended	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
47. Lines are not allowed to twist around each other	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>HOISTS: GENERAL (3.2.4)</b>				
48. Manufacturer's specifications and limitations are followed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
49. Load capacities, operating speeds, and special warnings or instructions are posted on hoists	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
50. Hoist ropes are installed in accordance with the wire rope manufacturers' recommendations	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
51. Live booms are not installed on hoists	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
52. Operating rules are posted at the operator's station of hoists	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
53. No person will ride on material hoists except for inspection and maintenance	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
54. All entrances of the hoistways are protected by substantial gates or bars	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
55. Overhead protective coverings are provided on the top of every material host cage or platform	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
56. All hoistway entrance bars and gates are painted with diagonal contrasting colors	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**SECTION 2 (continued)**

	<b>Yes</b>	<b>No</b>	<b>N/A</b>	<b>N/O</b>
<b>RIGGING: GENERAL (3.2.5)</b>				
57. The rigging equipment is not used in excess of the rated capacity of the weakest component	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
58. The rigging competent person has inspected all rigging equipment prior to use on each shift and as necessary during its use	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
59. Documentation of proof testing is available for rigging equipment that has been repaired	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
60. Rigging equipment has not been shortened with knots, bolts or other makeshift devices	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
61. Rigging equipment, when not in use, is removed from the work area	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
62. Rigging equipment has been load tested annually by a competent person and documented	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
63. All hooks used according to manufacturer's recommendations or tested to twice SWL	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
64. Special rigging and hoisting devices are marked and proof tested prior to initial use	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>RIGGING: EQUIPMENT (3.2.6)</b>				
65. Protruding end strands of wire rope have been covered or blunted	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
66. Wire rope not used if the rope shows any sign of excessive wear, corrosion, or defect	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
67. No wire rope slings are used if more than one wire in a lay is broken in the end fitting	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
68. Splices in rope slings are made in accordance with manufacturer's and regulatory specs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
69. Synthetic web slings removed from service if showing any sign of damage	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
70. No job hooks, links, or makeshift fasteners, formed from bolts, rods, etc., are used	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
71. Alloy steel chains have identification stating size, grade, rated capacity and reach	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
72. Manual coupling links or low carbon repair links not used to repair broken lengths of chain	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
73. Shackles and hooks are constructed of forged alloy steel with the identifiable load rating	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>RIGGING: USE (3.2.7)</b>				
74. Rigging not pulled from under a resting load	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
75. Sling(s) is placed in center bowl of hook.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
76. Sharp edges are "packed" to prevent cutting or damaging the rope or slings	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
77. Nylon, polyester, polypropylene web slings or web slings with aluminum fittings will not be used where fumes, vapors, sprays, mists or liquids of acids, caustics or phenolics are present	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
78. Natural or synthetic fiber rope slings used within acceptable operating temperature	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
79. U-bolts used to form wire rope eyes are of proper amount and spacing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
80. U-bolts are installed so that the "U" section is in contact with the dead end of the rope	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
81. When more than one sling is used, or the sling angle is altered, the load has been calculated to assure that the safe working load is not exceeded.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



# CH2MHILL

## H&S Self-Assessment Checklist – HAND AND POWER TOOLS

This checklist shall be used by CH2M HILL personnel **only** and shall be completed at the frequency specified in the project’s HSP/FSI.

This checklist is to be used at locations where: 1) CH2M HILL employees are exposed to hand and power tool hazards and/or 2) CH2M HILL provides oversight of subcontractor personnel who are exposed to hand and power tool hazards.

SSC or DSC may consult with subcontractors when completing this checklist, but shall not direct the means and methods of hand and power tool use nor direct the details of corrective actions. Subcontractors shall determine how to correct deficiencies and we must carefully rely on their expertise. Items considered to be imminently dangerous (possibility of serious injury or death) shall be corrected immediately or all exposed personnel shall be removed from the hazard until corrected.

Completed checklists shall be sent to the HS&E Staff for review.

Project Name: \_\_\_\_\_ Project No.: \_\_\_\_\_

Location: \_\_\_\_\_ PM: \_\_\_\_\_

Auditor: \_\_\_\_\_ Title: \_\_\_\_\_ Date: \_\_\_\_\_

This specific checklist has been completed to:

- Evaluate CH2M HILL employee exposure to hand and power tool hazards.
- Evaluate a CH2M HILL subcontractor’s compliance with hand and power tool requirements.  
Subcontractors Name: \_\_\_\_\_

- Check “Yes” if an assessment item is complete/correct.
- Check “No” if an item is incomplete/deficient. Deficiencies shall be brought to the immediate attention of the subcontractor. Section 3 must be completed for all items checked “No.”
- Check “N/A” if an item is not applicable.
- Check “N/O” if an item is applicable but was not observed during the assessment.

Numbers in parentheses indicate where a description of this assessment item can be found in Standard of Practice HS-50.

### SECTION 1

	<u>Yes</u>	<u>No</u>	<u>N/A</u>	<u>N/O</u>
<b>SAFE WORK PRACTICES (3.1)</b>				
1. All tools operated according to manufacturer’s instructions and design limitations.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. All hand and power tools maintained in a safe condition and inspected and tested before use.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Defective tools are tagged and removed from service until repaired.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. PPE is selected and used according to tool-specific hazards anticipated.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Power tools are not carried or lowered by their cord or hose.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Tools are disconnected from energy sources when not in use, servicing, cleaning, etc.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Safety guards remain installed or are promptly replaced after repair.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Tools are stored properly.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. Cordless tools and recharging units both conform to electrical standards and specifications.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. Tools used in explosive environments are rated for such use.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11. Knife or blade hand tools are used with the proper precautions.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12. Consider controls to avoid muscular skeletal, repetitive motion, and cumulative trauma stressors.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**SECTION 2**

**Yes No N/A N/O**

**GENERAL (3.2.1)**

- 13. PPE is selected and used according to tool-specific hazards anticipated.  Yes  No  N/A  N/O
- 14. Tools are tested daily to assure safety devices are operating properly.  Yes  No  N/A  N/O
- 15. Damaged tools are removed from service until repaired.  Yes  No  N/A  N/O
- 16. Power operated tools designed to accommodate guards have guards installed.  Yes  No  N/A  N/O
- 17. Rotating or moving parts on tools are properly guarded.  Yes  No  N/A  N/O
- 18. Machines designed for fixed locations are secured or anchored.  Yes  No  N/A  N/O
- 19. Floor and bench-mounted grinders are provided with properly positioned work rests.  Yes  No  N/A  N/O
- 20. Guards are provided at point of operation, nip points, rotating parts, etc.  Yes  No  N/A  N/O
- 21. Fluid used in hydraulic-powered tools is approved fire-resistant fluid.  Yes  No  N/A  N/O

**ELECTRIC-POWERED TOOLS (3.2.2)**

- 22. Electric tools are approved double insulated or grounded and used according to SOP HS-23.  Yes  No  N/A  N/O
- 23. Electric cords are not used for hoisting or lowering tools.  Yes  No  N/A  N/O
- 24. Electric tools are used in damp/ wet locations are approved for such locations or GFCI installed.  Yes  No  N/A  N/O
- 25. Hand-held tools are equipped with appropriate on/off controls appropriate for the tool.  Yes  No  N/A  N/O
- 26. Portable, power-driven circular saws are equipped with proper guards.  Yes  No  N/A  N/O

**ABRASIVE WHEEL TOOLS (3.2.3)**

- 27. All employees using abrasive wheel tools are wearing eye protection.  Yes  No  N/A  N/O
- 28. All grinding machines are supplied with sufficient power to maintain spindle speed.  Yes  No  N/A  N/O
- 29. Abrasive wheels are closely inspected and ring-tested before use.  Yes  No  N/A  N/O
- 30. Grinding wheels are properly installed.  Yes  No  N/A  N/O
- 31. Cup-type wheels for external grinding are protected by the proper guard or flanges.  Yes  No  N/A  N/O
- 32. Portable abrasive wheels used for internal grinding are protected by safety flanges.  Yes  No  N/A  N/O
- 33. Safety flanges are used only with wheels designed to fit the flanges.  Yes  No  N/A  N/O
- 34. Safety guards on abrasive wheel tools are mounted properly and of sufficient strength.  Yes  No  N/A  N/O

**PNEUMATIC-POWERED TOOLS (3.2.4)**

- 35. Tools are secured to hoses or whip by positive means to prevent disconnection.  Yes  No  N/A  N/O
- 36. Safety clips or retainers are installed to prevent attachments being expelled.  Yes  No  N/A  N/O
- 37. Safety devices are installed on automatic fastener feed tools as required.  Yes  No  N/A  N/O
- 38. Compressed air is not used for cleaning unless reduced to < 30 psi, with PPE, and guarded.  Yes  No  N/A  N/O
- 39. Manufacturer’s safe operating pressure for hoses, pipes, valves, etc. are not exceeded.  Yes  No  N/A  N/O
- 40. Hoses are not used for hoisting or lowering tools.  Yes  No  N/A  N/O
- 41. All hoses >1/2-inch diameter have safety device at source to reduce pressure upon hose failure.  Yes  No  N/A  N/O
- 42. Airless spray guns have required safety devices installed.  Yes  No  N/A  N/O
- 43. Blast cleaning nozzles are equipped with operating valves, which are held open manually.  Yes  No  N/A  N/O
- 44. Supports are provided for mounting nozzles when not in use.  Yes  No  N/A  N/O
- 45. Air receiver drains, handholes, and manholes are easily accessible.  Yes  No  N/A  N/O
- 46. Air receivers are equipped with drainpipes and valves for removal of accumulated oil and water.  Yes  No  N/A  N/O
- 47. Air receivers are completely drained at required intervals.  Yes  No  N/A  N/O
- 48. Air receivers are equipped with indicating pressure gauges.  Yes  No  N/A  N/O
- 49. Safety, indicating, and controlling devices are installed as required.  Yes  No  N/A  N/O
- 50. Safety valves are tested frequently and at regular intervals to assure good operating condition.  Yes  No  N/A  N/O

**SECTION 2 (continued)**

Yes   No   N/A   N/O

**LIQUID FUEL-POWERED TOOLS (3.2.5)**

- |   |                          |                          |                          |                          |
|---|--------------------------|--------------------------|--------------------------|--------------------------|
| 51. Liquid fuel-powered tools are stopped when refueling, servicing, or maintaining.                | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 52. Liquid fuels are stored, handled, and transported in accordance with SOP HS-21                  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 53. Liquid fuel-powered tools are used in confined spaces in accordance with SOP HS-17.             | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 54. Safe operating pressures of hoses, valves, pipes, filters, and other fittings are not exceeded. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

**POWDER-ACTUATED TOOLS (3.2.6)**

- |  |                          |                          |                          |                          |
|--|--------------------------|--------------------------|--------------------------|--------------------------|
| 55. Only trained employee operates powder-actuated tools.  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 56. Powder-actuated tools are not loaded until just prior to intended firing time.                 | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 57. Tools are not pointed at any employee at any time.   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 58. Hands are kept clear of open barrel end.   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 59. Loaded tools are not left unattended.  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 60. Fasteners are not driven into very hard or brittle materials.                                  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 61. Fasteners are not driven into easily penetrated materials unless suitable backing is provided. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 62. Fasteners are not driven into spalled areas.   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 63. Powder-actuated tools are not used in an explosive or flammable atmosphere.                    | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 64. All tools are used with correct shields, guards, or attachments recommended by manufacturer.   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

**JACKING TOOLS (3.2.7)**

- |   |                          |                          |                          |                          |
|---|--------------------------|--------------------------|--------------------------|--------------------------|
| 65. Rated capacities are legibly marked on jacks and not exceeded.                        | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 66. Jacks have a positive stop to prevent over-travel.                                    | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 67. The base of jacks are blocked or cribbed to provide a firm foundation, when required. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 68. Wood blocks are place between the cap and load to prevent slippage, when required.    | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 69. After load is raised, it is cribbed, blocked, or otherwise secured immediately.       | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 70. Antifreeze is used when hydraulic jacks are exposed to freezing temperatures.         | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 71. All jacks are properly lubricated.  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 72. Jacks are inspected as required.  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 73. Repair or replacement parts are examined for possible defects.                        | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 74. Jacks not working properly are removed from service and repaired or replaced.         | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

**HAND TOOLS (3.2.8)**

- |  |                          |                          |                          |                          |
|--|--------------------------|--------------------------|--------------------------|--------------------------|
| 75. Wrenches are not used when jaws are sprung to the point of slippage.                         | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 76. Impact tools are kept free of mushroomed heads.  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 77. Wooden handles of tools are kept free of splinters or cracks and are tightly fitted in tool. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |



**CH2MHILL**  
**Health and Safety Plan**  
**Attachment 8**

**Behavior Based Loss Prevention System Forms**

Project: \_\_\_\_\_ Location: \_\_\_\_\_ Date: \_\_\_\_\_  
 Safety Coord./Supervisor: \_\_\_\_\_

Job Activity: \_\_\_\_\_

Task Personnel: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

List Tasks: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Tools/Equipment/Materials required (ladders, scaffolds, fall protection, cranes/rigging, heavy equipment, power tools, cords, generators, compressed gases, regulated chemical products, etc.):  
 \_\_\_\_\_  
 \_\_\_\_\_

Potential H&S Hazards, including chemical, physical, safety, biological and environmental (Check all that apply):

<input type="checkbox"/> Chemical burns/contact	<input type="checkbox"/> Trench, excavations, cave-ins	<input type="checkbox"/> Ergonomics
<input type="checkbox"/> Pressurized lines/equipment	<input type="checkbox"/> Overexertion	<input type="checkbox"/> Chemical splash
<input type="checkbox"/> Thermal burns	<input type="checkbox"/> Pinch points	<input type="checkbox"/> Poisonous plants/insects
<input type="checkbox"/> Electrical	<input type="checkbox"/> Cuts/abrasions	<input type="checkbox"/> Eye hazards/flying projectile
<input type="checkbox"/> Weather conditions	<input type="checkbox"/> Spills	<input type="checkbox"/> Inhalation hazard
<input type="checkbox"/> Heights/fall > 6'	<input type="checkbox"/> Overhead Electrical hazards	<input type="checkbox"/> Heat/cold stress
<input type="checkbox"/> Noise	<input type="checkbox"/> Elevated loads	<input type="checkbox"/> Water/drowning hazard
<input type="checkbox"/> Explosion/fire	<input type="checkbox"/> Slips, trip and falls	<input type="checkbox"/> Heavy equipment
<input type="checkbox"/> Radiation	<input type="checkbox"/> Manual lifting	<input type="checkbox"/> Aerial lifts/platforms
<input type="checkbox"/> Confined space entry	<input type="checkbox"/> Welding/cutting	<input type="checkbox"/> Demolition

Other Potential Hazards (Describe):  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Hazard Control Measures (Check all that apply):			
<b>PPE</b> <input type="checkbox"/> Thermal/lined <input type="checkbox"/> Eye <input type="checkbox"/> Dermal/hand <input type="checkbox"/> Hearing <input type="checkbox"/> Respiratory <input type="checkbox"/> Reflective vests <input type="checkbox"/> Flotation device	<b>Protective Systems</b> <input type="checkbox"/> Locate buried utilities <input type="checkbox"/> Competent person <input type="checkbox"/> Daily inspections <input type="checkbox"/> Sloping <input type="checkbox"/> Shoring <input type="checkbox"/> Trench box <input type="checkbox"/> Barricades	<b>Fire Protection</b> <input type="checkbox"/> Fire extinguishers <input type="checkbox"/> Fire watch <input type="checkbox"/> Non-spark tools <input type="checkbox"/> Grounding/bonding <input type="checkbox"/> Intrinsically safe equipment <input type="checkbox"/> Combustible materials storage <input type="checkbox"/> Chemical Storage	<b>Electrical</b> <input type="checkbox"/> Lockout/tagout <input type="checkbox"/> Grounded <input type="checkbox"/> Panels covered <input type="checkbox"/> GFCI/extension cords <input type="checkbox"/> Power tools/cord inspected <input type="checkbox"/> Insulated tools/gloves
<b>Fall Protection</b> <input type="checkbox"/> Harness/lanyards <input type="checkbox"/> Adequate anchorage <input type="checkbox"/> Guardrail system <input type="checkbox"/> Covered opening <input type="checkbox"/> Fixed barricades <input type="checkbox"/> Warning system	<b>Air Monitoring</b> <input type="checkbox"/> PID/FID <input type="checkbox"/> Detector tubes <input type="checkbox"/> Radiation <input type="checkbox"/> Personnel sampling <input type="checkbox"/> LEL/O2 <input type="checkbox"/> Other	<b>Proper Equipment</b> <input type="checkbox"/> Aerial lift/ladders/scaffolds <input type="checkbox"/> Forklift/ Heavy equipment <input type="checkbox"/> Backup alarms <input type="checkbox"/> Hand/power tools <input type="checkbox"/> Crane w/current inspection <input type="checkbox"/> Proper rigging <input type="checkbox"/> Operator qualified	<b>Welding &amp; Cutting</b> <input type="checkbox"/> Cylinders secured/capped <input type="checkbox"/> Cylinders separated/upright <input type="checkbox"/> Flash-back arrestors <input type="checkbox"/> No cylinders in CSE <input type="checkbox"/> Flame retardant clothing <input type="checkbox"/> Appropriate goggles
<b>Confined Space Entry</b> <input type="checkbox"/> Isolation <input type="checkbox"/> Air monitoring <input type="checkbox"/> Trained personnel <input type="checkbox"/> Permit completed <input type="checkbox"/> Rescue provisions	<b>Medical/Emerg. Response</b> <input type="checkbox"/> First-aid & BBP kit <input type="checkbox"/> Eye wash <input type="checkbox"/> FA-CPR training <input type="checkbox"/> Route to hospital	<b>Heat/Cold Stress</b> <input type="checkbox"/> Work/rest regime <input type="checkbox"/> Rest area <input type="checkbox"/> Liquids available <input type="checkbox"/> Monitoring <input type="checkbox"/> Training	<b>Vehicle/Traffic</b> <input type="checkbox"/> Traffic Awareness <input type="checkbox"/> Traffic control <input type="checkbox"/> Barricades <input type="checkbox"/> Flags <input type="checkbox"/> Signs
<b>Permits</b> <input type="checkbox"/> Hot work <input type="checkbox"/> Confined space <input type="checkbox"/> Lockout/tagout <input type="checkbox"/> Excavation <input type="checkbox"/> Demolition <input type="checkbox"/> Energized work <input type="checkbox"/> Local/Environmental	<b>Demolition</b> <input type="checkbox"/> Pre-demolition survey <input type="checkbox"/> Structure condition <input type="checkbox"/> Isolate area/utilities <input type="checkbox"/> Competent person <input type="checkbox"/> Hazmat present	<b>Inspections</b> <input type="checkbox"/> Ladders/aerial lifts <input type="checkbox"/> Lanyards/harness <input type="checkbox"/> Scaffolds <input type="checkbox"/> Heavy equipment <input type="checkbox"/> Cranes and rigging <input type="checkbox"/> Other per Field Safety Plan	<b>Training</b> <input type="checkbox"/> Hazwaste <input type="checkbox"/> Construction <input type="checkbox"/> Equipment <input type="checkbox"/> Competent person <input type="checkbox"/> Task-specific (AHA) <input type="checkbox"/> Hazcom
FieldNotes: _____ _____ _____			

Supervisor signature: \_\_\_\_\_

Date: \_\_\_\_\_

**Safe Work Loss-Prevention Observation Checklist**

Date: \_\_\_\_\_ Task: \_\_\_\_\_ Observer: \_\_\_\_\_

Position/Title of worker observed: \_\_\_\_\_ Background Information/comments: \_\_\_\_\_

Project Lessons Learned:

- ❖ Identify and reinforce safe work practices/behaviors
- ❖ Identify and improve on at-risk practices/acts
- ❖ Identify and improve on practices, conditions, controls, and compliance that eliminate or reduce hazards
- ❖ Proactive PM support facilitates eliminating/reducing hazards (do you have what you need?)
- ❖ Positive, corrective, cooperative, collaborative feedback/recommendations

Actions & Behaviors	Safe	At-Risk	Safer Options
Current & accurate Pre-Task Planning/Briefing (Project safety plan, AHA, PTSP, tailgate briefing, etc., as needed)			
Properly trained/qualified/experienced			
Tools/equipment available and adequate			
Proper use of tools			
Barricades/work zone control			
Housekeeping			
Communication			
Work Approach/Habits			
Attitude			
Focus/attentiveness			
Pace			
Uncomfortable position			
Inconvenient location			
Position/Line of fire			
Apparel (hair, loose clothing, jewelry)			
Repetitive motion			

<b>Activity:</b>	<b>Date:</b>
	<b>Project:</b>
<b>Description of the work:</b>	<b>Site Supervisor:</b>
	<b>Site Safety Officer:</b>
	<b>Review for latest use: Before the job is performed.</b>

<b>Work Activity Sequence</b> (Identify the principal steps involved and the sequence of work activities)	<b>Potential Health and Safety Hazards</b> (Analyze each principal step for potential hazards)	<b>Hazard Controls</b> (Develop specific controls for each potential hazard)

<b>Equipment to be used</b> (List equipment to be used in the work activity)	<b>Inspection Requirements</b> (List inspection requirements for the work activity)	<b>Training Requirements</b> (List training requirements including hazard communication)

**PRINT NAME**

Supervisor Name: \_\_\_\_\_

Safety Officer Name: \_\_\_\_\_

Employee Name(s): \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**SIGNATURE**

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Date/Time: \_\_\_\_\_





# Incident & Near-Loss Investigation Report Form

## Employer Information

Company Name: \_\_\_\_\_

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

Project Location: \_\_\_\_\_

Task Location: \_\_\_\_\_

Job Assignment: \_\_\_\_\_ Business Group: \_\_\_\_\_

Preparer's Name: \_\_\_\_\_ Preparer's Employee Number: \_\_\_\_\_

## Incident Specific Information

Date of Incident: \_\_\_\_\_ Time of Incident: \_\_\_\_\_ a.m./p.m.

Location of incident:

Company premises       Field       In Transit       Other: \_\_\_\_\_

Address where the incident occurred: \_\_\_\_\_

Equipment Malfunction : Yes  No       Activity was a Routine Task: Yes  No

Describe any property damage: \_\_\_\_\_

Specific activity the employee was engaged in when the incident occurred:

\_\_\_\_\_

All equipment, materials, or chemicals the employee was using when the incident occurred:

\_\_\_\_\_

Describe the specific incident and how it occurred:

\_\_\_\_\_

\_\_\_\_\_

Describe how this incident may have been prevented:

\_\_\_\_\_

\_\_\_\_\_

Contributing Factors (Describe in detail why incident occurred):

\_\_\_\_\_

\_\_\_\_\_

Date employer notified of incident: \_\_\_\_\_ To whom reported: \_\_\_\_\_

**Witness Information (First Witness)**

Name: \_\_\_\_\_  
Employee Number (for CH2M HILL employees): \_\_\_\_\_  
Address: \_\_\_\_\_  
City: \_\_\_\_\_  
Zip Code : \_\_\_\_\_  
Phone: \_\_\_\_\_

**Witness Information (Second Witness)**

Name: \_\_\_\_\_  
Employee Number (for CH2M HILL employees): \_\_\_\_\_  
Address: \_\_\_\_\_  
City: \_\_\_\_\_  
Zip Code: \_\_\_\_\_  
Phone : \_\_\_\_\_

Additional information or comments: \_\_\_\_\_  
\_\_\_\_\_

**THE ROOT CAUSE ANALYSIS FORM MUST BE COMPLETED FOR ALL INJURIES AND ILLNESSES OR ACTUAL LOSSES.  
COMPLETION OF THE ROOT CAUSE ANALYSIS FORM FOR NEAR LOSSES IS OPTIONAL, AT THE DISCRETION OF THE SAFETY  
COORDINATOR**



## CH2MHILL

### Injury and Illness Treatment Considerations

IMMEDIATELY REPORT ALL incidents to the project Safety Coordinator (SC), and H&S. Additional notifications will be managed by the SC and H&S.

H&S staff will determine if the injury is work-related and/or OSHA RECORDABLE. HR will process workers compensation filings, and a workers comp agent will independently evaluate work-relatedness and compensability.

Generally, a work-related injury illness is *OSHA recordable* if they result in *medical treatment beyond first aid*, or other indicators (e.g., broken bone, loss of consciousness).

Treatment considerations covered in these guidelines focus on differentiating between *first aid* and *medical treatment*.

### What do you do with this information?

Employee's should be aware of those situations where treatment options are considered "borderline".

"Borderline" treatment options include those situations where simple *first aid* may provide intervention that is as effective as *medical treatment*. **These borderline situations are limited specifically to:**

- The use of prescriptions medications vs. OTC medications (at no more than OTC dosages), and
- The use of sutures vs. butterfly bandages.

The injured employee is permitted to discuss with the attending medical provider the most appropriate treatment during these borderline situations.

No individual is permitted to participate in medical treatment decisions except for the injured employee and the attending medical provider!

The following examples are provided to illustrate the common borderline treatment scenarios that may be encountered.

**Example:** The medical provider determines that either a follow-up Lyme test or preventative antibiotics is appropriate in treating a tick bite. The first is considered first aid, while the second is considered medical treatment and therefore recordable.

**Example:** The medical provider determines that either normal over-the-counter (OTC) dosage of OTC medication (e.g., ibuprofen) or prescription anti-inflammatory is appropriate in treating a strain. The first is considered *first aid*, while the second is considered *medical treatment* and therefore recordable.

**Example:** The medical provider determines that either butterfly bandage or sutures will effectively treat a wound. The first is considered *first aid*, while the second is considered *medical treatment* and therefore OSHA recordable.

To report an injury or illness, contact H&S:

John Longo/NJO

973/316-0159 x4543

973/449-3587 (cell)

Steve Beck/MKE

414/272-2426 x277

HS&E 24-hr Emergency

Pager

888/444-1226

While it is reasonable to be considerate of OSHA recordability rules, it is not reasonable to deny yourself necessary treatment. **NEVER** refuse any treatment that a medical provider believes is necessary!

**Incident & Near-Loss  
Root Cause Analysis Form**

**Root Cause Analysis (RCA)**

Root Cause Categories (RCC): Select the RCC numbered below that applies for the root cause (RC) and/or contributing factor (CF) in the first column, then describe the specific root cause and corrective actions in each column.

1. Lack of skill or knowledge
2. Absence of, inadequate, or lack of current operational procedures or work standards
3. Inadequate communication of expectations regarding procedures or work standards
4. Absence of or inadequate tools or equipment
5. Correct way takes more time and/or requires more effort
6. Short cutting standard procedures and safe practices is positively reinforced or tolerated
7. Person thinks there is no personal benefit to always doing the job according to standards

RCC #	Root Cause(s)	Corrective Actions	RC <sup>1</sup>	CF <sup>2</sup>	Due Date	Completion Date	Date Verified

<sup>1</sup> RC = Root Cause; <sup>2</sup> CF = Contributing Factors (check which applies)

**Investigation Team Members**

Name	Job Title	Date

**Results of Solution Verification and Validation**


**Reviewed By**

Name	Job Title	Date

## **Determination of Root Cause(s)**

For minor losses or near losses the information may be gathered by the supervisor or other personnel immediately following the loss. Based on the complexity of the situation, this information may be all that is necessary to enable the investigation team to analyze the loss, to determine the root cause, and to develop recommendations. More complex situations may require the investigation team to revisit the loss site or re-interview key witnesses to obtain answers to questions that may arise during the investigation process.

Photographs or videotapes of the scene and damaged equipment should be taken from all sides and from various distances. This point is especially important when the investigation team will not be able to review the loss scene.

The investigation team must use the Root Cause Analysis Flow Chart to assist in identifying the root cause(s) of a loss. Any loss may have one or more “root causes” and “contributing factors”. The “root cause” is the primary or immediate cause of the incident, while a “contributing factor” is a condition or event that contributes to the incident happening, but is not the primary cause of the incident. Root causes and contributing factors that relate to the *person* involved in the loss, his or her peers, or the supervisor should be referred to as “personal factors”. Causes that pertain to the *system* within which the loss or injury occurred should be referred to as “job factors”.

### Personal Factors

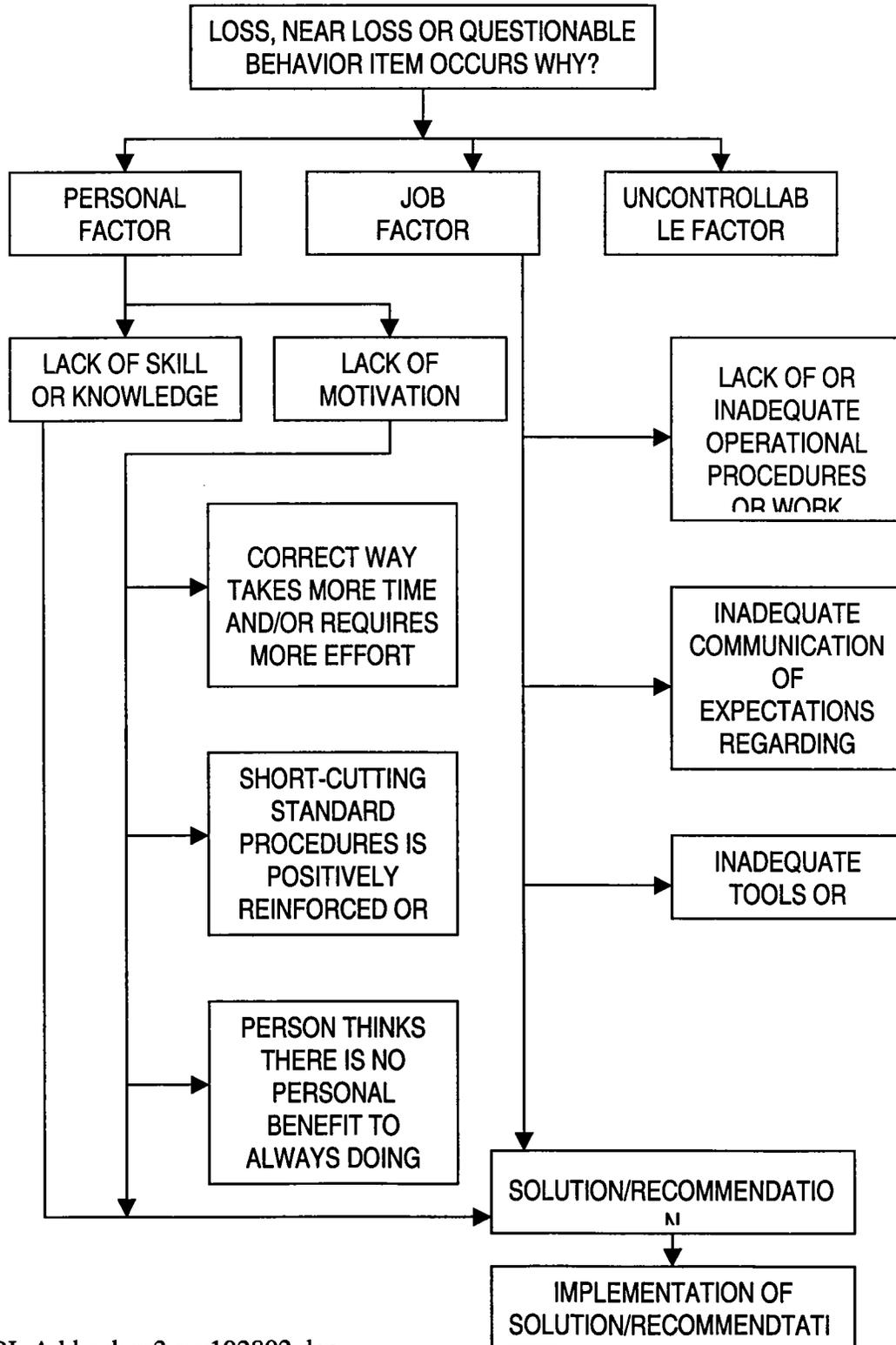
- Lack of skill or knowledge
- Correct way takes more time and/or requires more effort
- Short-cutting standard procedures is positively reinforced or tolerated
- Person thinks that there is no personal benefit to always doing the job according to standards

### Job Factors

- Lack of or inadequate operational procedures or work standards.
- Inadequate communication of expectations regarding procedures or standards
- Inadequate tools or equipment

The root cause(s) could be any one or a combination of these seven possibilities or some other “uncontrollable factor”. In the vast majority of losses, the root cause is very much related to one or more of these seven factors. Uncontrollable factors should be used rarely and only after a thorough review eliminates “all” seven other factors.

Root Cause Analysis  
Flow Chart



**CH2MHILL**  
**Health and Safety Plan**  
**Attachment 9**

**Forms and Permits**





Energized electrical parts to which an employee may be exposed shall be deenergized before being worked on or near, unless deenergizing the parts introduce additional or increased hazards or is infeasible due to equipment design or operational limitations. In such cases, this permit must be used to assess the specific hazards and provide measures to control the hazards. This permit is intended to be used for specific equipment/tasks and should not be used in a generic manner.

<b>PROJECT/TASK INFORMATION</b>
Project name: _____
Date task to start: _____ Estimated duration of work: _____
Description of task: _____

**EQUIPMENT INFORMATION**

Describe reason(s) why electrical parts cannot be deenergized: _____
Describe the construction and operations of the equipment: _____
Does this equipment have a disconnect? Y N Location: _____
Describe the hazards involved with this work activity: _____

**CONTROL MEASURES (provide required equipment and application)**

Personal protective equipment: _____
Isolation and shielding materials: _____
Insulated tools: _____
Testing equipment: _____

**PROCEDURES**

A step-by-step work procedure has been created for the work to be done? Y N Attach procedure to permit

The following individuals have reviewed, understood and agreed to abide by the provisions of the step-by-step procedure and this permit. CH2M HILL employees also have successfully completed the General Electrical Safety Training in the Basic Program.

NAME SIGNATURE DATE

_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

**APPROVALS**

Client/Owner of equipment: _____
CH2M HILL Project Manager: _____
HSE Manager: _____
Date: _____
Date: _____
Date: _____











**PROJECT FALL PROTECTION EVALUATION FORM**

This form is to be completed by the CH2M HILL project SC prior to performing activities that expose CH2M HILL personnel to fall hazards. The form is used to: 1) identify project fall hazards and determine fall protection systems available to mitigate the hazards, 2) identify personal fall arrest system equipment required, and 3) provide project-specific fall protection training. Activities and work locations must be evaluated to determine potential fall hazards. If personnel are exposed to fall hazards greater than 6 feet during construction activities or 4 feet during general industry activities, fall protection systems must be used.

**PROJECT INFORMATION**

Project Name: \_\_\_\_\_ Project Number: \_\_\_\_\_ Date: \_\_\_\_\_  
 Scope of Work: \_\_\_\_\_  
 Work Area: \_\_\_\_\_  
 Describe fall hazard activities: \_\_\_\_\_

**FALL HAZARD DETERMINATION & FALL PROTECTION SYSTEMS**

FALL HAZARD		Guardrail	Net	Safety	PFAS	Cover	Positioning	Warning	Access	Controlled	Safety	Monitoring	Fall Protection Plan
CONVENTIONAL SYSTEMS							ALTERNATIVE SYSTEMS						
Unprotected sides & edges													
Leading edges													*
Holes													
Wall openings													
Ramps, runways & walkways													
Hoist areas													
Excavations													
Wells, pits & shafts													
Dangerous equipment													
Formwork & reinforcing steel work													
Precast concrete erection													*
Overhand bricklaying													
Low-slope roofing work													
Sleep roof													
Residential construction													*
Other surfaces													

\* Fall protection plans may only be used if conventional systems are determined to be infeasible or would create a greater hazard. Contact HS&B Staff for plan development. Shading indicates fall protection systems that are not permitted for the fall hazard listed.

**PERSONAL FALL ARREST SYSTEM EQUIPMENT REQUIRED**

Full body harness	Lanyard, standard	Lifeline, horizontal
Boatswain's chair	Lanyard, shock-absorbing	Lifeline, vertical
Descent system	Lanyard, ripsitch	Lifeline, self-retracting
Rope grab	Lanyard, self-retracting	Winch
Other equipment:		

The SC shall use this form to inform project staff of the potential fall hazards and specific fall protection systems to be used to control the hazards. SC shall instruct staff on the proper use, limitations, and inspection procedures for each fall protection component and system.

SC Signature \_\_\_\_\_

Date \_\_\_\_\_







Final

Health and Safety Plan (HASP)

for the

Site 5 Landfill

Methane Gas Extraction Pilot Test

Allegany Ballistics Laboratory (ABL) Superfund Site  
Rocket Center, West Virginia

Contract Task Order 0116  
May 2002

Prepared for

Department of the Navy  
Atlantic Division  
Naval Facilities Engineering Command

Under the

LANTDIV CLEAN II Program  
Contract N62470-95-D-6007

Prepared by



Herndon, Virginia

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# CH2M HILL HEALTH AND SAFETY PLAN

This Health and Safety Plan (HSP) will be kept on the site during field activities and will be reviewed as necessary. The plan will be amended or revised as project activities or conditions change or when supplemental information becomes available. The plan adopts, by reference, the Standards of Practice (SOPs) in the CH2M HILL *Corporate Health and Safety Program, Program and Training Manual*, as appropriate. In addition, this plan adopts procedures in the project Work Plan, where applicable. The Site Safety Coordinator (SSC) is to be familiar with these SOPs and the contents of this plan. CH2M HILL's personnel and subcontractors must sign Attachment I.

## Project Information and Description

PROJECT NOS: 158030, 138762, 152786

CLIENT: Naval Facilities Engineering Command

PROJECT/SITE NAME: Allegany Ballistics Laboratory Superfund Site

SITE ADDRESS: Rocket Center, West Virginia

CH2M HILL PROJECT MANAGER: Joe Kenderline

CH2M HILL OFFICE: Herndon, VA (WDC)

DATE HEALTH AND SAFETY PLAN PREPARED: 11/13/2001

DATE(S) OF SITE WORK: January 2002

SITE ACCESS: Entry through Gate 38

SITE SIZE: 1,577 acres

**SITE TOPOGRAPHY:** Approximately 400 acres at plant 1 is in the flood plain of North Branch Potomac River, with the remaining acreage on forested mountainous land.

**PREVAILING WEATHER:** The climate is temperate and humid. The average summer temperature is 73 degrees Fahrenheit, with daily highs in the mid 90's during July and August. December, January and February are the coldest months of the year, with an average daily temperature of 34 degrees Fahrenheit. The average annual precipitation is 38 inches and it is fairly evenly distributed throughout the year.

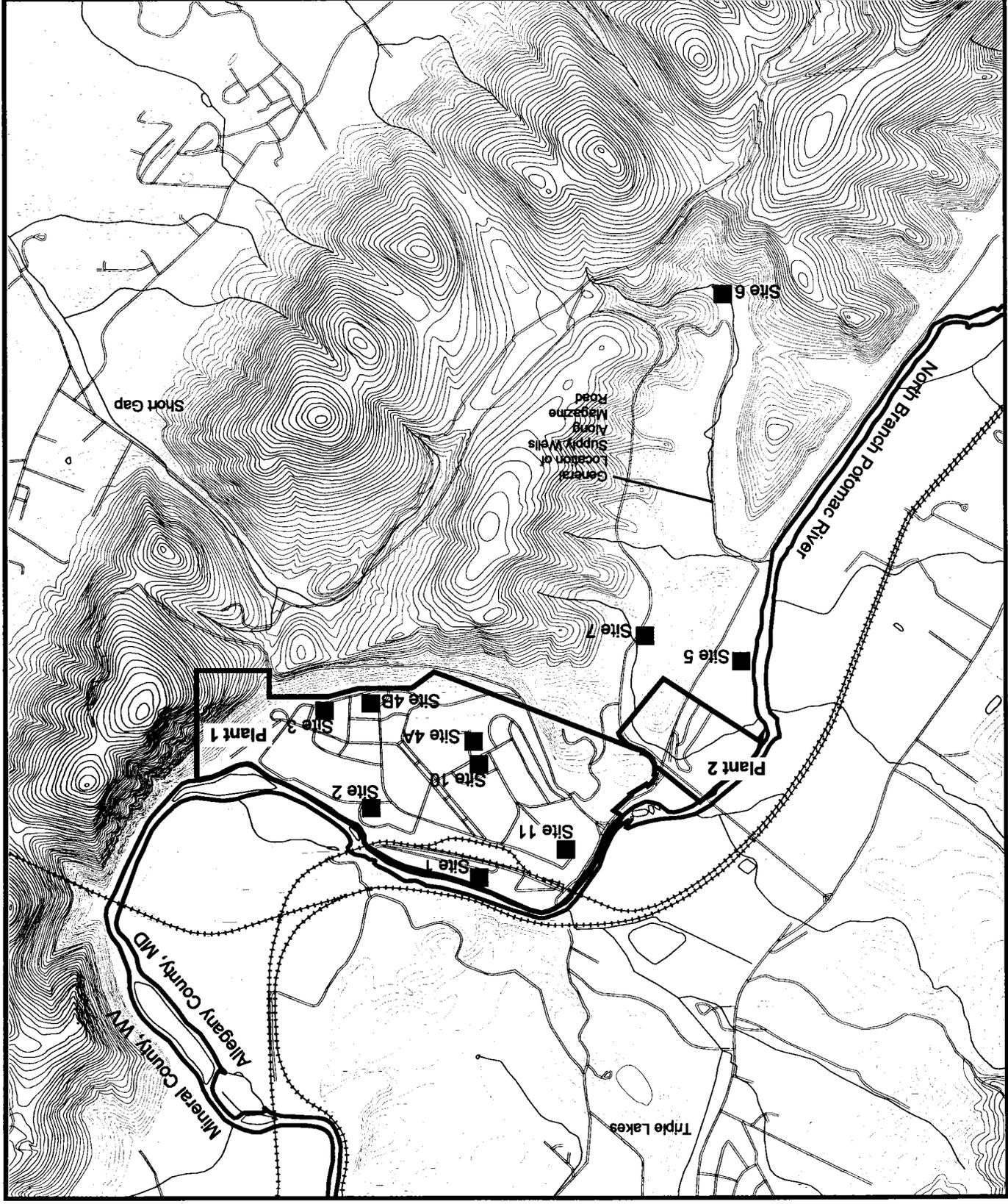
**SITE DESCRIPTION AND HISTORY:** ABL is a government owned, contractor operated research, development, and production facility located in Mineral County, West Virginia. Since 1943, the facility has been used primarily for research, development, testing and production of solid propellant rocket motors for the Department of Defense and NASA. The facility consists of two plants (Figure 1-1). Plant 1, occupying approximately 1,577 acres, is owned by the Navy and operated by Alliant Technologies. Plant 2, a 57-acre area adjacent to plant 1 is owned by Alliant Technologies. Figure 1-2 presents the general topography of the landfill gas monitoring and vent well locations for Site 5, Inert Landfill.

# CH2MHILL

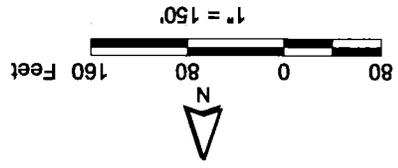
Figure 1-1  
Facility, Plant, and Site Locations  
Allegheny Ballistics Laboratory

Source: USGS 7.5 minute Cresaptown, WV-MD digital quadrangle map

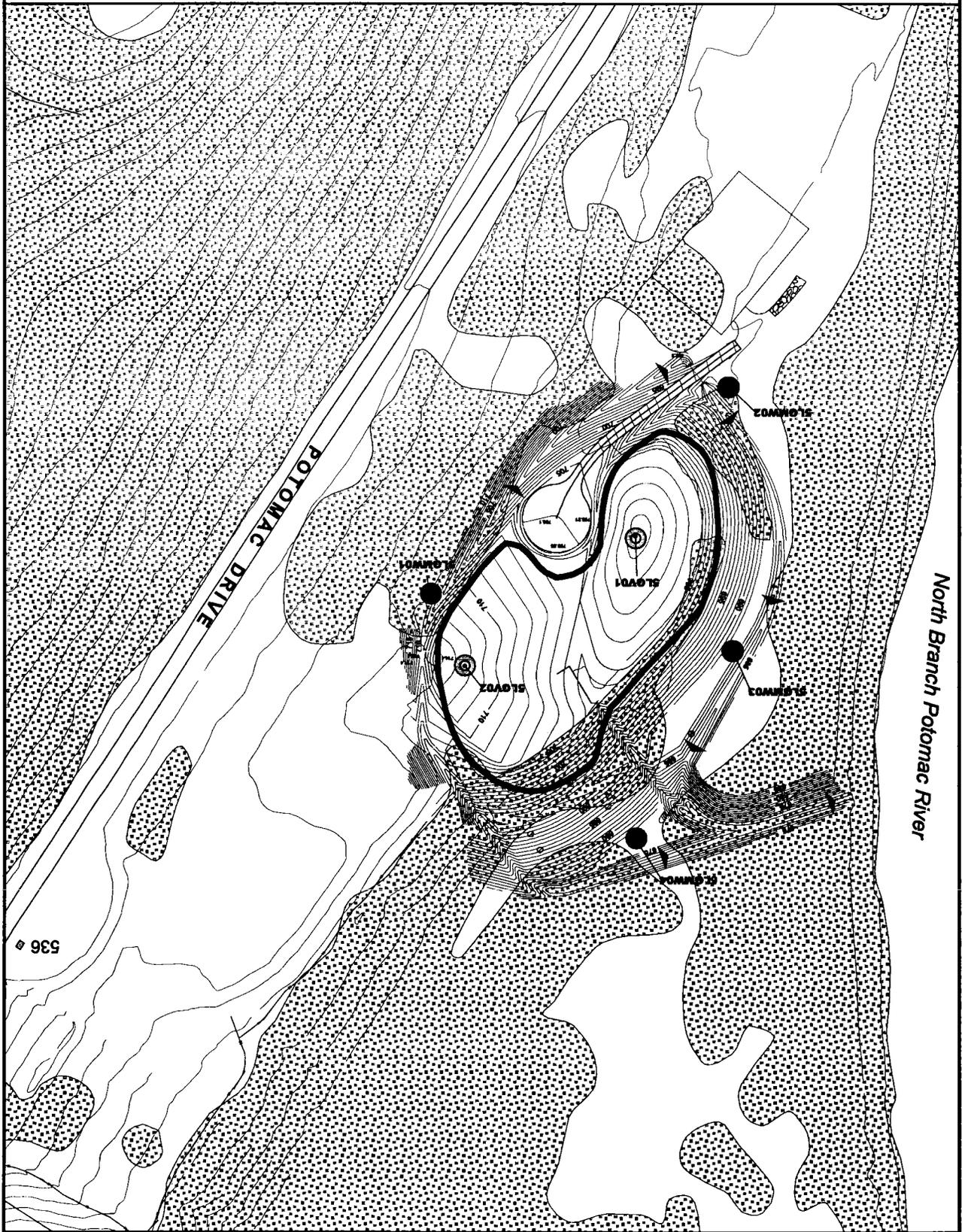
One Inch Equals  
Two Thousand Feet



Allegany Ballistics Laboratory  
For Site 5, Inert Landfill  
Operation and Maintenance  
Monitoring and Vent Well Locations  
Figure 1-2 - Landfill Gas



- LEGEND**
- Landfill Gas Monitoring Well
  - Landfill Gas Vent
  - ▲ Edge of Waste



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# 1 Tasks to be Performed Under this Plan

## 1.1 Description of Tasks

A health and safety risk analysis (Section 1.2) has been performed for each task and is incorporated in this plan through task-specific hazard controls and requirements for monitoring and protection. Tasks other than those listed below require an approved amendment or revision to this plan before tasks begin. Refer to Section 8.2 for procedures related to "clean" tasks that do not involve hazardous waste operations and emergency response (Hazwoper).

**NEW OR CONTINUED PROJECT TASKS REQUIRE COMPLETION OF ATTACHMENT 7 TO ENSURE THAT THE HAZARDS ASSOCIATED WITH NEW TASKS ARE ADEQUATELY ADDRESSED.**

### 1.1.1 Site 5 Methane Pilot Test

#### Background

The Site 5 landfill is currently generating elevated levels (relative to the Lower Explosive Limit (LEL)) of potentially explosive gas (i.e., methane), as evidenced by the recent monitoring at the site. Methane gas concentrations greater than 100% of the LEL were measured in Landfill Gas Monitoring Well 5LGMW04 during the December 2000 and then June, July, and September 2001 monitoring events. Insufficient information is currently available to determine if the landfill gas measured from 5LGMW04 represents a small, isolated pocket or an extensive accumulation. A pilot test will be conducted to collect this information and to determine if gas extraction is a viable remedy.

The specific pilot test objectives are to: 1) determine whether methane gas in 5LGMW04 represents a small, isolated pocket or an extensive accumulation, and 2) determine whether extraction of the gas is effective at reducing levels present in the monitoring well. The following describes the equipment used and tasks conducted during the test.

#### Soil Vapor Extraction (SVE) Equipment

A portable SVE system, capable of extracting 100 standard cubic feet per minute (SCFM) of soil vapor at 20 inches of water, vacuum, will be used to extract soil gas from monitoring well 5LGMW04. The SVE system electrical equipment will be explosion proof to handle explosive gases. The system will be connected to the landfill gas monitoring well using flexible 2-inch diameter piping. The extracted soil vapor will be pretreated using a moisture knock-out drum to remove entrained water droplets and an in-line particulate filter to remove any soil particles. The extracted soil gas will be vented directly to the atmosphere. WDEP approval for the discharge of the soil gas to the atmosphere will be obtained prior to starting the pilot test.

#### VOC Emission Limitations

The methane concentration and emission rate will be monitored during the methane pilot test to ensure compliance with federal performance standards that require VOC emissions from the landfill not exceed 3,000 pounds per day (lbs/day). A VOC emission rate of approximately 800 lbs/day was calculated using the maximum methane concentration (13.2%) measured from LFG monitoring well 5LGMW04 during the September 2000 monitoring event and the SVE design flow rate of 100 cubic feet per minute (cfm). To exceed the maximum allowable VOC emission rate of 3,000 lbs/day, the methane concentration would need to be greater than 50% at a vapor flow rate of 100 cfm. If methane concentrations greater than 50 percent are observed during start up, then the VOC emission rate will be recalculated using the actual vapor flow rate and, if necessary, the vapor flow rate will be reduced to ensure compliance with federal performance standards. The vapor flow rate will be reduced by opening a dilution valve to bleed in ambient air. Daily VOC mass emission rates will be calculated and recorded from the data collected during the test as discussed below.

**Monitoring and Data Collection**

The pilot test will be conducted continuously for 5 weekdays from Monday to Friday. Methane concentrations will be monitored using a LandTec Model GA90 or GEM 500. Methane concentrations will be monitored at least twice a day during the soil gas vacuum extraction and once a day the following week and weekly for the next three weeks. SVE flowrate and vacuum will be monitored at least twice a day during the pilot test. The following monitoring parameters and reporting units will be recorded:

- SVE flowrate and vacuum (cfm and inches WC, vacuum)
- Methane, percent by volume (CH<sub>4</sub>, %)
- Barometric Pressure, inches mercury (In. Hg)
- Weather: precipitation conditions and approximate ambient temperature.
- Optional: Carbon dioxide, percent by volume (CO<sub>2</sub>,%)
- Optional: Oxygen, percent by volume (O<sub>2</sub>,%)

The methane gas meter will be calibrated daily, in accordance with the manufacturer's recommendations. The calibration gas cylinder lot number and results of the calibration check will be recorded in the field notebook.

**Documentation**

The results, conclusions, and recommendations will be documented in a technical memorandum.

**1.1.2 Hazwoper-Regulated Tasks**

- Geoprobe boring/direct push sampling
- Soil Boring (Drilling)
- Hand Auger sampling
- Long-term Groundwater monitoring
- Water level measurements
- Monitoring well installation
- Surface water sampling from river bank
- Water sampling from a boat
- Sediment sampling
- Landfill Gas Pilot Testing
- Groundwater pump and treat.

**1.1.3 Non-Hazwoper-Regulated Tasks**

Under specific circumstances, the training and medical monitoring requirements of federal or state Hazwoper regulations are not applicable. It must be demonstrated that the tasks can be performed without the possibility of exposure in order to use non-Hazwoper-trained personnel. Prior approval from the Health and Safety Manager (HSM) is required before these tasks are conducted on regulated hazardous waste sites.

**TASKS**

- None anticipated

**CONTROLS**

- Brief on hazards, limits of access, and emergency procedures
- Post contaminant areas as appropriate (refer to Section 8.2 for details)
- Sample and monitor as appropriate (refer to Section 5.0)

## 1.2 Task Hazard Analysis

(Refer to Section 2 for hazard controls)

Tasks	Flying debris/objects	Noise > 85dBA	Electrical	Suspended loads	Buried utilities, drums, tanks	Slip, trip, fall	Back injury	Confined space entry	Trenches / excavations	Visible lightning	Vehicle traffic	Elevated work areas/falls	Fires	Entanglement	Drilling	Heavy equipment	Working near water	Working from boat	IDW Drum Sampling
Remediation Oversight (Landfill Gas Pilot Testing & Groundwater Pump and Treat)	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
Drilling, Geoprobe, Direct Push Sampling, & Monitoring Well Installation	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
Groundwater Monitoring & Water Level Measurements	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
Surface Water & Sediment Sampling using a Boat	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
Surface Water & Sediment Sampling from the Shore or Water	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
Hand Augering	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	

## 2 Hazard Controls

This section provides safe work practices and control measures used to reduce or eliminate potential hazards. These practices and controls are to be implemented by the party in control of either the site or the particular hazard. CH2M HILL employees and subcontractors must remain aware of the hazards affecting them regardless of who is responsible for controlling the hazards. CH2M HILL employees and subcontractors who do not understand any of these provisions should contact the SSC for clarification.

In addition to the controls specified in this section, Project-Activity Self-Assessment Checklists are contained in Attachment 6. These checklists are to be used to assess the adequacy of CH2M HILL and subcontractor site-specific safety requirements. The objective of the self-assessment process is to identify gaps in project safety performance, and prompt for corrective actions in addressing these gaps. Self-assessment checklists should be completed early in the project, when tasks or conditions change, or when otherwise specified by the HSM. The self-assessment checklists, including documented corrective actions, should be made part of the permanent project records, and be promptly submitted to the HSM.

Project-specific frequency for completing self-assessments: **Initially and periodically (e.g., weekly) for applicable tasks.**

### 2.1 Project-Specific Hazards

#### 2.1.1 Methane

Prior to the extraction of Methane gas for the proposed Pilot Tests, the following must be adhered to:

- The manufacturers instructions for the Soil Vapor Extraction (SVE) Unit must be read and adhered to.
- Due to the highly explosive characteristic of methane, follow all bonding and grounding requirements required by the manufacturer of the SVE.
- Only intrinsically safe equipment may be used around the extraction system (Class I, Division I). Therefore, cellular phones, beepers, radios, or other equipment which may produce sparks, static or flame are prohibited in the vicinity of the operation.
- Smoking is Prohibited.
- Monitor methane concentrations using a meter twice a day during the test.

#### 2.1.2 Drilling (Reference CH2M HILL SOP HS-35, Drilling)

- Only authorized personnel are permitted to operate drill rigs.
- Stay clear of areas surrounding drill rigs during every startup.
- Stay clear of the rotating augers and other rotating components of drill rigs.
- Stay as clear as possible of all hoisting operations. Loads shall not be hoisted overhead of personnel.
- Do not wear loose-fitting clothing or other items such as rings or watches that could get caught in moving parts.
- Long hair should have it restrained.
- If equipment becomes electrically energized, personnel shall be instructed not to touch any part of the equipment or attempt to touch any person who may be in contact with the electrical current. The utility company or appropriate party shall be contacted to have line de-energized prior to approaching the equipment.
- Smoking around drilling operations is prohibited.

#### 2.1.3 Working Above or Near Water

- Fall protection should be provided to prevent personnel from falling into water. Where fall protection systems are not provided and the danger of drowning exists, U.S. Coast Guard-approved personal flotation devices (PFDs), or life jacket, shall be worn.
- Inspect PFDs prior to use. Do not use defective PFDs.
- A life-saving skiff must be provided for emergency rescue.

- A minimum of one ring buoy with 90 feet of 3/8-inch solid-braid polypropylene (or equal) rope must be provided for emergency rescue.
- Use sampling and other equipment according to the manufacturers' instructions.

#### 2.1.4 Working On Water

- Safe means of boarding or leaving the boat or platform must be provided to prevent slipping and falling.
- Boat/barge must be equipped with adequate railing.
- Boat/barge must be operated according to U.S. Coast Guard regulations (speed, lighting, right-of-way, etc.).
- Staff should be instructed on safe use and operation of boat prior to use.
- Work requiring the use of a boat will not take place at night or during inclement weather.
- Shut off engine before refueling. Do not smoke while refueling.

### 2.2 General Hazards

#### 2.2.1 General Practices and Housekeeping

(Reference CH2M HILL SOP HS-20, *General Practices*)

- Site work should be performed during daylight hours whenever possible. Work conducted during hours of darkness require enough illumination intensity to read a newspaper without difficulty.
- Good housekeeping must be maintained at all times in all project work areas.
- Common paths of travel should be established and kept free from the accumulation of materials.
- Keep access to aisles, exits, ladders, stairways, scaffolding, and emergency equipment free from obstructions.
- Provide slip-resistant surfaces, ropes, and/or other devices to be used.
- Specific areas should be designated for the proper storage of materials.
- Tools, equipment, materials, and supplies shall be stored in an orderly manner.
- As work progresses, scrap and unessential materials must be neatly stored or removed from the work area.
- Containers should be provided for collecting trash and other debris and shall be removed at regular intervals.
- All spills shall be quickly cleaned up. Oil and grease shall be cleaned from walking and working surfaces.

#### 2.2.2 Hazard Communication

(Reference CH2M HILL SOP HS-05, *Hazard Communication*)

The SSC is to perform the following:

- Complete an inventory of chemicals brought on site by CH2M HILL using Attachment 2.
- Confirm that an inventory of chemicals brought on site by CH2M HILL subcontractors is available.
- Request or confirm locations of Material Safety Data Sheets (MSDSs) from the client, contractors, and subcontractors for chemicals to which CH2M HILL employees potentially are exposed.
- Before or as the chemicals arrive on site, obtain an MSDS for each hazardous chemical.
- Label chemical containers with the identity of the chemical and with hazard warnings, and store properly.
- Give employees required chemical-specific HAZCOM training using Attachment 3.
- Store all materials properly, giving consideration to compatibility, quantity limits, secondary containment, fire prevention, and environmental conditions.

#### 2.2.3 Shipping and Transportation of Chemical Products

(Reference CH2M HILL's *Procedures for Shipping and Transporting Dangerous Goods*)

Chemicals brought to the site might be defined as hazardous materials by the U.S. Department of Transportation (DOT). All staff who ship the materials or transport them by road must receive CH2M HILL training in shipping dangerous goods. All hazardous materials that are shipped (e.g., via Federal Express) or are transported by road must be properly identified, labeled, packed, and documented by trained staff. Contact the HSM or the Equipment Coordinator for additional information.

## 2.2.4 Lifting

(Reference CH2M HILL SOP HS-29, *Lifting*)

- Proper lifting techniques must be used when lifting any object.
  - Plan storage and staging to minimize lifting or carrying distances.
  - Split heavy loads into smaller loads.
  - Use mechanical lifting aids whenever possible.
  - Have someone assist with the lift -- especially for heavy or awkward loads.
  - Make sure the path of travel is clear prior to the lift.

## 2.2.5 Fire Prevention

(Reference CH2M HILL SOP HS-22, *Fire Prevention*)

- Fire extinguishers shall be provided so that the travel distance from any work area to the nearest extinguisher is less than 100 feet. When 5 gallons or more of a flammable or combustible liquid is being used, an extinguisher must be within 50 feet. Extinguishers must:
  - be maintained in a fully charged and operable condition,
  - be visually inspected each month, and
  - undergo a maintenance check each year.
- The area in front of extinguishers must be kept clear.
  - Post "Exit" signs over exiting doors, and post "Fire Extinguisher" signs over extinguisher locations.
  - Combustible materials stored outside should be at least 10 feet from any building.
  - Solvent waste and oily rags must be kept in a fire resistant, covered container until removed from the site.
  - Flammable/combustible liquids must be kept in approved containers, and must be stored in an approved storage cabinet.

## 2.2.6 Heat Stress

(Reference CH2M HILL SOP HS-09, *Heat and Cold Stress*)

- Drink 16 ounces of water before beginning work. Disposable cups and water maintained at 50°F to 60°F should be available. Under severe conditions, drink 1 to 2 cups every 20 minutes, for a total of 1 to 2 gallons per day. Do not use alcohol in place of water or other nonalcoholic fluids. Decrease your intake of coffee and caffeinated soft drinks during working hours.
- Acclimate yourself by slowly increasing workloads (e.g., do not begin with extremely demanding activities).
- Use cooling devices, such as cooling vests, to aid natural body ventilation. These devices add weight, so their use should be balanced against efficiency.
- Use mobile showers or hose-down facilities to reduce body temperature and cool protective clothing.
- Conduct field activities in the early morning or evening and rotate shifts of workers, if possible.
- Avoid direct sun whenever possible, which can decrease physical efficiency and increase the probability of heat stress. Take regular breaks in a cool, shaded area. Use a wide-brim hat or an umbrella when working under direct sun for extended periods.
- Provide adequate shelter/shade to protect personnel against radiant heat (sun, flames, hot metal).
- Maintain good hygiene standards by frequently changing clothing and showering.
- Observe one another for signs of heat stress. Persons who experience signs of heat syncope, heat rash, or heat cramps should consult the SSC/DSC to avoid progression of heat-related illness.

**SYMPTOMS AND TREATMENT OF HEAT STRESS**

Heat Stroke	Heat Exhaustion	Heat Cramps	Heat Rash	Heat Syncope
<p><b>Signs and Symptoms</b>                      Red, hot, dry skin; dizziness; rapid confusion; rapid breathing and pulse; high oral temperature.</p>	<p><b>Signs and Symptoms</b>                      Fatigue, nausea, headache, giddiness; skin clammy and moist; complexion pale, muddly, or flushed; may faint on standing; rapid thready pulse and low blood pressure; oral temperature normal or low</p>	<p><b>Signs and Symptoms</b>                      Painful spasms in muscles used during work (arms, legs, or abdomen); onset during or after work hours.</p>	<p><b>Signs and Symptoms</b>                      Pruruse tiny raised red blister-like vesicles on affected areas, along with pricking sensations during heat exposure.</p>	<p><b>Signs and Symptoms</b>                      Stuggishness or fainting while standing erect or immobile in heat.</p>
<p><b>Treatment</b>                      Cool rapidly by soaking in cool-water but not cold-water. Call ambulance, and get medical attention immediately!</p>	<p><b>Treatment</b>                      Remove to cooler area. Rest lying down, with head in low position. Administer fluids by mouth. Seek medical attention.</p>	<p><b>Treatment</b>                      Remove to cooler area. Rest lying down. Increase fluid intake.</p>	<p><b>Treatment</b>                      Use mild drying lotions and powders, and keep skin clean for drying and preventing infection.</p>	<p><b>Treatment</b>                      Remove to cooler area. Rest lying down. Increase fluid intake. Recovery usually is prompt and complete.</p>

**Monitoring Heat Stress**

These procedures should be considered when the ambient air temperature exceeds 70°F, the relative humidity is high (>50 percent), or when workers exhibit symptoms of heat stress.

The heart rate (HR) should be measured by the radial pulse for 30 seconds, as early as possible in the resting period. The HR at the beginning of the rest period should not exceed 100 beats/minute, or 20 beats/minute above resting pulse. If the HR is higher, the next work period should be shortened by 33 percent, while the length of the rest period stays the same. If the pulse rate still exceeds 100 beats/minute at the beginning of the next rest period, the work cycle should be further shortened by 33 percent. The procedure is continued until the rate is maintained below 100 beats/minute, or 20 beats/minute above resting pulse.

**2.2.7 Cold Stress (Reference CH2M HILL SOP HS-09, Heat and Cold Stress)**

- Be aware of the symptoms of cold-related disorders, and wear proper, layered clothing for the anticipated fieldwork. Appropriate rain gear is a must in cool weather.
- Consider monitoring the work conditions and adjusting the work schedule using guidelines developed by the U.S. Army (wind-chill index) and the National Safety Council (NSC).
- Wind-Chill Index is used to estimate the combined effect of wind and low air temperatures on exposed skin. The wind-chill index does not take into account the body part that is exposed, the level of activity, or the amount or type of clothing worn. For those reasons, it should only be used as a guideline to warn workers when they are in a situation that can cause cold-related illnesses.
- NSC Guidelines for Work and Warm-Up Schedules can be used with the wind-chill index to estimate work and warm-up schedules for fieldwork. The guidelines are not absolute; workers should be monitored for symptoms of cold-related illnesses. If symptoms are not observed, the work duration can be increased.
- Persons who experience initial signs of immersion foot, frostbite, hypothermia should consult the SSC/DSC to avoid progression of cold-related illness.
- Observe one another for initial signs of cold-related disorders.
- Obtain and review weather forecast – be aware of predicted weather systems along with sudden drops in temperature, increase in winds, and precipitation.

SYMPTOMS AND TREATMENT OF COLD STRESS

Immersion (Trench) Foot	Frostbite	Hypothermia
<p><b>Signs and Symptoms</b> Feet discolored and painful; infection and swelling present.</p> <p><b>Treatment</b> Seek medical treatment immediately.</p>	<p>Blanched, white, waxy skin, but tissue resilient; tissue cold and pale.</p> <p>Remove victim to a warm place. Re-warm area quickly in warm—but not hot—water. Have victim drink warm fluids, but not coffee or alcohol. Do not break blisters. Elevate the injured area, and get medical attention.</p>	<p>Shivering, apathy, sleepiness; rapid drop in body temperature; glassy stare; slow pulse; slow respiration.</p> <p>Remove victim to a warm place. Have victim drink warm fluids, but not coffee or alcohol. Get medical attention.</p>

2.2.8 Electrical

(Reference CH2M HILL SOP HS-23, *Electrical*)

- Only qualified personnel are permitted to work on unprotected energized electrical systems.
- Only authorized personnel are permitted to enter high-voltage areas.
- Do not tamper with electrical wiring and equipment unless qualified to do so. All electrical wiring and equipment must be considered energized until lockout/tagout procedures are implemented.
- Inspect electrical equipment, power tools, and extension cords for damage prior to use. Do not use defective electrical equipment, remove from service.
- All temporary wiring, including extension cords and electrical power tools, must have ground fault circuit interrupters (GFCIs) installed.
- Extension cords must be:
  - equipped with third-wire grounding.
  - covered, elevated, or protected from damage when passing through work areas.
  - protected from pinching if routed through doorways.
  - not fastened with staples, hung from nails, or suspended with wire.
- Electrical power tools and equipment must be effectively grounded or double-insulated UL approved.
- Operate and maintain electric power tools and equipment according to manufacturers' instructions.
- Maintain safe clearance distances between overhead power lines and any electrical conducting material unless the power lines have been de-energized and grounded, or where insulating barriers have been installed to prevent physical contact. Maintain at least 10 feet from overhead power lines for voltages of 50 kV or less, and 10 feet plus 1/2 inch for every 1 kV over 50 kV.
- Temporary lights shall not be suspended by their electric cord unless designed for suspension. Lights shall be protected from accidental contact or breakage.
- Protect all electrical equipment, tools, switches, and outlets from environmental elements.

2.2.9 Procedures for Locating Buried Utilities

Local Utility Mark-Out Service

Name: Miss Utility

Phone: 1-800-257-7777

- Where available, obtain utility diagrams for the facility.
- Review locations of sanitary and storm sewers, electrical conduits, water supply lines, natural gas lines, and fuel tanks and lines.
- Review proposed locations of intrusive work with facility personnel knowledgeable of locations of utilities.
- Check locations against information from utility mark-out service.
- Where necessary (e.g., uncertainty about utility locations), excavation or drilling of the upper depth interval should be performed manually.

Bee and other stinging insects may be encountered almost anywhere and may present a serious hazard, particularly to people who are allergic. Watch for and avoid nests. Keep exposed skin to a minimum. Carry a kit if you have had allergic reactions in the past, and inform the SSC and/or buddy. If a stinger is present, remove it carefully with tweezers. Wash and disinfect the wound, cover it, and apply ice. Watch for allergic reaction; seek medical attention if a reaction develops.

### 2.3.4 Bees and Other Stinging Insects

If bitten by a tick, grasp it at the point of attachment and carefully remove it. After removing the tick, wash your hands and disinfect and press the bite areas. Save the removed tick. Report the bite to human resources. Look for symptoms of Lyme disease or Rocky Mountain spotted fever (RMSF). Lyme: a rash might appear that looks like a bulls-eye with a small welt in the center. RMSF: a rash of red spots under the skin 3 to 10 days after the tick bite. In both cases, chills, fever, fatigue, headache, stiff neck, and bone pain may develop. If symptoms appear, seek medical attention.

Ticks typically are in wooded areas, bushes, tall grass, and brush. Ticks are black, black and red, or brown and can be up to one-quarter inch in size. Wear tightly woven light-colored clothing with long sleeves and pant legs tucked into boots; spray **only outside** of clothing with permethrin or permethrin and spray skin with only DEET; and check yourself frequently for ticks.

### 2.3.3 Ticks

Poison ivy, poison oak, and poison sumac typically are found in brush or wooded areas. They are more commonly found in moist areas or along the edges of wooded areas. Become familiar with the identity of these plants. Wear protective clothing that covers exposed skin and clothes. Avoid contact with plants and the outside of protective clothing. If skin contacts a plant, wash the area with soap and water immediately. If the reaction is severe or worsens, seek medical attention.

### 2.3.2 Poison Ivy and Poison Sumac

Snakes typically are found in underbrush and tall grassy areas. If you encounter a snake, stay calm and look around; there may be other snakes. Turn around and walk away on the same path you used to approach the area. If a person is bitten by a snake, wash and immobilize the injured area, keeping it lower than the heart if possible. Seek medical attention immediately. **DO NOT** apply ice, cut the wound, or apply a tourniquet. Try to identify the type of snake: note color, size, patterns, and markings.

### 2.3.1 Snakes

## 2.3 Biological Hazards and Controls

When planned activities will not include confined-space entry, permit-required confined spaces accessible to CH2M HILL personnel are to be identified before the task begins. The SSC is to confirm that permit spaces are properly posted or that employees are informed of their locations and hazards.

No confined space entry will be permitted. Confined space entry requires additional health and safety procedures, training, and a permit. If conditions change such that confined-space entry is necessary, contact the HSM to develop the required entry permit.

(Reference CH2M HILL SOP HS-17, *Confined Space Entry*)

### 2.2.10 Confined Space Entry

- Monitor for signs of utilities during advancement of intrusive work (e.g., sudden change in advancement of auger or split spoon).
- When the client or other onsite party is responsible for determining the presence and locations of buried utilities, the SSC should confirm that arrangement.

### 2.3.5 Bloodborne Pathogens

(Reference CH2M HILL SOP HS-36, *Bloodborne Pathogens*)

Exposure to bloodborne pathogens may occur when rendering first aid or CPR, or when coming into contact with landfill waste or waste streams containing potentially infectious material. Exposure controls and personal protective equipment (PPE) are required as specified in CH2M HILL SOP HS-36, *Bloodborne Pathogens*. Hepatitis B vaccination must be offered before the person participates in a task where exposure is a possibility.

### 2.3.6 Other Anticipated Biological Hazards

Tetanus can be contracted from the impalement of rusty metallic objects into the skin. Contact the Regional Human Resources Manager to have an Incident Report Form (IRF) completed and authorization for medical care.

### 2.4 Radiological Hazards and Controls

Refer to CH2M HILL's *Corporate Health and Safety Program, Program and Training Manual*, and *Corporate Health and Safety Program, Radiation Protection Program Manual*, for standards of practice in contaminated areas.

None Known

## 2.5 Contaminants of Concern

(Refer to Project Files for more detailed contaminant information)

Contaminant	Location and Maximum <sup>a</sup> Concentration (ppm)		Exposure Limit <sup>b</sup>	IDLH <sup>c</sup>	Symptoms and Effects of Exposure	PPE <sup>d</sup> (eV)
	Site 1	Site 11				
Arsenic	GW: 0.75 SB: 20.8	Site 1	0.01 mg/m <sup>3</sup>	5 Ca	Ulceration of nasal septum, respiratory irritation, dermatitis, gastrointestinal disturbances, peripheral neuropathy, hyperpigmentation	NA
Barium	GW: 25.8 SB: 2.6		0.5 mg/m <sup>3</sup>	1,100 mg/m <sup>3</sup>	Irritation of upper respiratory system, gastroenteritis, muscle spasms, slow pulse, extrasystoles, hypokalemia, irritated eyes and skin, shin burns.	NA
2-Butanone (Methyl Ethyl Ketone, MEK)	GW: 0.082 SB: 1.4	SWMU 37	200 ppm	3,000	Eye, skin, and nose irritation; headache; dizziness; vomiting; dermatitis	9.54
Cadmium	GW: 0.11 SB: 48.2	Site 1	0.005 mg/m <sup>3</sup>	9 Ca	Pulmonary edema, coughing, chest tightness/pain, headache, chills, muscle aches, nausea, vomiting, diarrhea, difficulty breathing, loss of sense of smell, emphysema, mild anemia	NA
Carbon Tetrachloride	GW: 5 SB: 4.1	Site 1	2 ppm	200 Ca	Central nervous system (CNS) depression, nausea, vomiting, eye and skin irritation, liver and kidney injury, drowsiness, dizziness	11.47
Chlorobenzene	GW: 0.15 SB: 8.6	SWMU 52	10 ppm	1,000	Skin, eye, and nose irritation; drowsiness; uncoordination; CNS depression	9.07
Chloroform	GW: 0.012 SB: 2.8	Site 1	2 ppm	500 Ca	Dizziness, mental dullness, nausea, confusion, disorientation, headache, fatigue, eye and skin irritation, anesthesia, enlarged liver	11.42
Chromium (as total Cr)	GW: 0.451 SB: 1030	Site 11 SWMU 37 N	0.5 mg/m <sup>3</sup>	25	Irritated eyes, sensitization dermatitis, histologic fibrosis of lungs	NA
Cobalt (Metal, Dusts, and Fumes)	GW: 0.771 SB: 55.2	Site 11	0.05 mg/m <sup>3</sup>	20	Coughing, difficulty breathing, wheezing, decreased pulmonary function, diffuse nodule fibrosus, dermatitis, respiratory hypersensitivity, asthma	NA
1,1-Dichloroethane (1,1-DCCA)	GW: 0.003		100 ppm	3,000	CNS depression, skin irritation; liver, kidney, and lung damage	11.06
1,1-Dichloroethylene (1,1-DCE)	GW: 0.003		1 ppm	ND (Ca)	Irritation to eyes, skin, throat; dizziness, headaches, nausea, dyspnea, liver and kidney dysfunction; pneumitis.	10.0
1,2-Dichloroethylene (1,2-DCE)	GW: 0.030		200 ppm	4,000 ppm	CNS depression, eye and respiratory system irritation.	9.65
Dioxins	Soil: 1.4x10 <sup>-3</sup>	ppb	1.2x10 <sup>-9</sup> mg/m <sup>3</sup>	Ca	Skin and eye irritant; potential carcinogen	NA
Lead	GW: 1.16 SB: 1730		0.05 mg/m <sup>3</sup>	100	Weakness lassitude, facial pallor, pal eye, weight loss, malnutrition, abdominal pain, constipation, anemia, gingival lead line, tremors, paralysis of wrist and ankles, encephalopathy, kidney disease, irritated eyes, hypertension	NA
Mercury	GW: 0.002 SB: 35.2	Site 1 Site 1	0.05 mg/m <sup>3</sup>	10	Skin and eye irritation, cough, chest pain, difficult breathing, bronchitis, pneumonitis, tremors, insomnia, irritability, indecision, headache, fatigue, weakness, GI disturbance	NA

## 2.5 Contaminants of Concern

(Refer to Project Files for more detailed contaminant information)

Contaminant	Location and Maximum <sup>a</sup>		Exposure Limit <sup>b</sup>	IDLH <sup>c</sup>	Symptoms and Effects of Exposure	PIP <sup>d</sup> (eV)
	Concentration (ppm)	Site				
Naphthalene	GW: 0.002	Site 11	10 ppm	250	Eye irritation, headache, confusion, excitement, nausea, vomiting, abdominal pain, bladder irritation, profuse sweating, dermatitis, corneal damage, optical neuritis	8.12
	SB: 470	Site 11				
Nickel	GW: 1.03	Site 1	1 mg/m <sup>3</sup>	10mg/m <sup>3</sup>	Dermatitis, allergic asthma, pneumitis- carcinogen.	N/A
	SB: 3,210			CA		
PNAs (Limits as Coal Tar Pitch)	SB: 4.4		02 mg/m <sup>3</sup>	80 Ca	Dermatitis and bronchitis	UK
	GW: 0.021		25 ppm	150 Ca	Eye, nose, and throat irritation; nausea; flushed face and neck; vertigo; dizziness; sleepiness; skin redness; headache; liver damage	9.32
1,1,1-Trichloroethane (1,1,1-TCA)	GW: 7.7	Site 1	350ppm	1000 ppm	Headache, lassitude, CNS depression, poor equilibrium, irritated eyes; dermatitis, cardiac arrhythmia.	11.0
	SB: 1.2	Site 1				
Trichloroethylene (TCE)	GW: 250		50 ppm	1,000 Ca	Headache, vertigo, visual disturbance, eye and skin irritation, fatigue, giddiness, tremors, sleepiness, nausea, vomiting, dermatitis, cardiac arrhythmia, paresthesia, liver injury	9.45
	SB: 360	Site 1				
Toluene	GW: 0.7	Site 1	50 ppm	500	Eye and nose irritation, fatigue, weakness, confusion, dizziness, headache, dilated pupils, excessive tearing, nervousness, muscle fatigue, paresthesia, dermatitis, liver and kidney damage	8.82
	SB: 0.66	Site 1				
Vinyl Chloride	GW: 1.4	Site 1	1 ppm	NL Ca	Weakness, abdominal pain, gastrointestinal bleeding, enlarged liver, pallor or cyanosis of extremities	9.99
	SB: 0.38	Site 1				

### Footnotes:

<sup>a</sup> Specify sample-designation and media: SB (Soil Boring), A (Air), D (Drums), GW (Groundwater), L (Lagoon), TK (Tank), S (Surface Soil), SL (Sludge), SW (Surface Water).

<sup>b</sup> Appropriate value of PEL, REL, or TLV listed.

<sup>c</sup> IDLH = immediately dangerous to life and health (units are the same as specified "Exposure Limit" units for that contaminant); NL = No limit found in reference materials; CA = Potential occupational carcinogen.

<sup>d</sup> PIP = photoionization potential; NA = Not applicable; UK = Unknown.

## 2.6 Potential Routes of Exposure

**Dermal:** Contact with contaminated media. This route of exposure is minimized through proper use of PPE, as specified in Section 4.

**Inhalation:** Vapors and contaminated particulates. This route of exposure is minimized through proper respiratory protection and monitoring, as specified in Sections 4 and 5, respectively.

**Other:** Inadvertent ingestion of contaminated media. This route should not present a concern if good hygiene practices are followed (e.g., wash hands and face before drinking or smoking).

### 3 Project Organization and Personnel

#### 3.1 CH2M HILL Employee Medical Surveillance and Training

(Reference CH2M HILL SOPs HS-01, Medical Surveillance, and HS-02, Health and Safety Training)

The employees listed below are enrolled in the CH2M HILL Comprehensive Health and Safety Program and meet state and federal hazardous waste operations requirements for 40-hour initial training, 3-day on-the-job experience, and 8-hour annual refresher training. Employees designated "SSC" have completed a 12-hour site safety coordinator course, and have documented requisite field experience. An SSC with a level designation (D, C, B) equal to or greater than the level of protection being used during all tasks performed in exclusion or decontamination zones. Employees designated "FA-CPR" are currently certified by the American Red Cross, or equivalent, in first aid and CPR. At least one FA-CPR designated employee must be present during all tasks performed in exclusion or decontamination zones. The employees listed below are currently active in a medical surveillance program that meets state and federal regulatory requirements for hazardous waste operations. Certain tasks (e.g., confined-space entry) and contaminants (e.g., lead) may require additional training and medical monitoring.

Pregnant employees are to be informed of and are to follow the procedures in CH2M HILL's SOP HS-04, *Reproduction Protection*, including obtaining a physician's statement of the employee's ability to perform hazardous activities before being assigned fieldwork.

Employee Name	Office	Responsibility	SSC/FA-CPR
Don Martinson	WDC	Field Team Member	Level B SSC; FA-CPR
Robert Pierpont	WDC	Field Team Member	Level C SSC; FA-CPR
Kimble Thrash	WDC	Field Team Member	Level C SSC; FA-CPR
Edward Corack	WDC	Field Team Member	Level C SSC; FA-CPR
Brett Doerr	WDC	Activity Manager	Level C SSC; FA-CPR
Joe Kenderline	WDC	Project Manager	Level C SSC; FA-CPR

#### 3.2 Field Team Chain of Command and Communication Procedures

##### 3.2.1 Client

Contact Name: Dominic O'Connor/LANTDIV  
 Phone: 1-757-322-4795  
 Facility Contact Name: Dave McBride/NAVSEA  
 Phone: 1-304-726-5354

##### 3.2.2 CH2M HILL

Project Manager: Joe Kenderline/WDC  
 Health and Safety Manager: John Longo/NJO  
 Field Team Leader: TBD  
 Site Safety Coordinator: TBD

The SSC is responsible for contacting the Field Team Leader and Project Manager. In general, the Project Manager will contact the client. The Health and Safety Manager should be contacted as appropriate.

### 3.2.3 CH2M HILL Subcontractors

(Reference CH2M HILL SOP HS-55, *Subcontractor, Contractor, and Owner*)

Subcontractor: To be determined per task.

Subcontractor Contact Name: Identify in project records or field log per task.

Telephone:

The subcontractors listed above are covered by this HSP and must be provided a copy of this plan. However, this plan does not address hazards associated with the tasks and equipment that the subcontractor has expertise in (e.g., drilling, excavation work, electrical). Subcontractors are responsible for the health and safety procedures specific to their work, and are required to submit these procedures to CH2M HILL for review before the start of field work. Subcontractors must comply with the established health and safety plan(s). The CH2M HILL SSC should verify that subcontractor employee training, medical clearance, and fit test records are current and must monitor and enforce compliance with the established plan(s). CH2M HILL's oversight does not relieve subcontractors of their responsibility for effective implementation and compliance with the established plan(s).

CH2M HILL should continuously endeavor to observe subcontractors' safety performance. This endeavor should be reasonable, and include observing for hazards or unsafe practices that are both readily observable and occur in common work areas. CH2M HILL is not responsible for exhaustive observation for hazards and unsafe practices. In addition to this level of observation, the SSC is responsible for confirming CH2M HILL subcontractor performance against both the subcontractor's safety plan and applicable self-assessment checklists. Self-assessment checklists contained in Attachment 6 are to be used by the SSC to review subcontractor performance. Health and safety related communications with CH2M HILL subcontractors should be conducted as follows:

- Brief subcontractors on the provisions of this plan, and require them to sign the Employee Signoff Form included in Attachment 1.
- Request subcontractor(s) to brief the project team on the hazards and precautions related to their work.
- When apparent non-compliance/unsafe conditions or practices are observed, notify the subcontractor safety representative and require corrective action – the subcontractor is responsible for determining and implementing necessary controls and corrective actions.
- When repeat non-compliance/unsafe conditions are observed, notify the subcontractor safety representative and stop affected work until adequate corrective measures are implemented.
- When an apparent imminent danger exists, immediately remove all affected CH2M HILL employees and subcontractors, notify subcontractor safety representative, and stop affected work until adequate corrective measures are implemented. Notify the Project Manager and HSM as appropriate.
- Document all oral health and safety related communications in project field logbook, daily reports, or other records.

## 4 Personal Protective Equipment (PPE)

(Reference CH2M HILL SOP HS-07, Personal Protective Equipment, HS-08, Respiratory Protection)

### PPE Specifications <sup>a</sup>

Task	Level	Body	Head	Respirator <sup>b</sup>
General site uniform when no chemical exposure is anticipated. Landfill gas pilot testing	D	Work clothes; steel-toe, leather work boots; work glove.	Hardhat <sup>c</sup> Safety glasses <sup>d</sup> Ear protection <sup>d</sup>	None required
Geoprobe boring Water level measurements Hand auger sampling River sampling Sediment sampling GW treatment operations	D	Boots: Steel-toe leather work boots Gloves: Inner surgical-style nitrile &/or outer chemical-resistant nitrile gloves.	Hardhat <sup>c</sup> Splash shield <sup>e</sup> Safety glasses <sup>d</sup> Ear protection <sup>d</sup>	None required.
Conventional drilling Well installation Tasks requiring additional chemical protective clothing	Modified D	Coveralls: Uncoated Tyvek® Boots: Steel-toe, chemical-resistant boots OR steel-toe, leather work boots with outer rubber boot covers Gloves: Inner surgical-style nitrile & outer chemical-resistant nitrile gloves.	Hardhat <sup>c</sup> Splash shield <sup>e</sup> Safety glasses <sup>d</sup> Ear protection <sup>d</sup>	None required.
Tasks requiring upgrade per Section 5.2 or 6.	C	Coveralls: Polycoated Tyvek® Boots: Steel-toe, chemical-resistant boots OR steel-toe, leather work boots with outer rubber boot covers Gloves: Inner surgical-style nitrile & outer chemical-resistant nitrile gloves.	Hardhat <sup>c</sup> Splash shield <sup>e</sup> MSA Ultrawin or equivalent; with GMB-H cartridges or equivalent <sup>f</sup> Spectacle inserts <sup>d</sup> Ear protection <sup>d</sup>	APR, full face, MSA Ultrawin or equivalent; with GMB-H cartridges or equivalent <sup>f</sup> .

### Reasons for Upgrading or Downgrading Level of Protection

Upgrade <sup>f</sup>	Downgrade
<ul style="list-style-type: none"> <li>Request from individual performing tasks.</li> <li>Change in work tasks that will increase contact or potential contact with hazardous materials.</li> <li>Occurrence or likely occurrence of gas or vapor emission.</li> <li>Known or suspected presence of dermal hazards.</li> <li>Instrument action levels (Section 5) exceeded.</li> </ul>	<ul style="list-style-type: none"> <li>New information indicating that situation is less hazardous than originally thought.</li> <li>Change in site conditions that decreases the hazard.</li> <li>Change in work task that will reduce contact with hazardous materials.</li> </ul>

<sup>a</sup> Modifications are as indicated. CH2M HILL will provide PPE only to CH2M HILL employees.  
<sup>b</sup> No facial hair that would interfere with respirator fit is permitted.  
<sup>c</sup> Hardhat and splash-shield areas are to be determined by the SSC.  
<sup>d</sup> Ear protection should be worn when conversations cannot be held at distances of 3 feet or less without shouting.  
<sup>e</sup> Cartridge change-out schedule is at least every 8 hours (or one work day), except if relative humidity is > 85%, or if organic vapor measurements are > midpoint of Level C range (refer to Section 5)--then at least every 4 hours. If encountered conditions are different than those anticipated in this HSP, contact the HSM.  
<sup>f</sup> Performing a task that requires an upgrade to a higher level of protection (e.g., Level D to Level C) is permitted only when the PPE requirements have been approved by the HSM, and an SSC qualified at that level is present.

## 5 Air Monitoring/Sampling

(Reference CH2M HILL SOP HS-06, Air Monitoring)

### 5.1 Air Monitoring Specifications

Instrument	Tasks	Action Levels <sup>a</sup>	Frequency <sup>b</sup>	Calibration
FTD: TVA 1000	Drilling	0-1 ppm	Initially and periodically during task	Daily
	Well installation Direct Push sampling.	1-5 ppm >5 ppm	Initially and periodically during task	Daily
PID: OVM with 10.6eV lamp or equivalent	Groundwater sampling	0-5 ppm	Initially and periodically during task	Daily
	Soil Boring (Drilling) & Well installation.	5-50 ppm	Initially and periodically during task	Daily
		>50 ppm	Initially and periodically during task	NA
Dust Monitor: Visual	If no dust visible.	Level D	Initially and periodically during tasks	NA
	Visible Dust	Utilize Engineering Controls (i.e. watering down means).	Initially and periodically during tasks	NA
Colorimetric Tube: Dräger vinyl chloride specific (0.5 to 30 ppm range) with pre-tube, and intrusive soil activity.	All Tasks involving Groundwater sampling	< 1 ppm	Initially and periodically when PID/FID > 1 ppm	Not applicable
	Level D or C <sub>i</sub> per total PID reading	Level B	Initially and periodically when PID/FID > 1 ppm	Not applicable

<sup>a</sup> Action levels apply to sustained breathing-zone measurements above background.  
<sup>b</sup> The exact frequency of monitoring depends on field conditions and is to be determined by the SSC, generally, every 5 to 15 minutes if acceptable; more frequently may be appropriate. Monitoring results should be recorded. Documentation should include instrument and calibration information, time, measurement results, personnel monitored, and place/location where measurement is taken (e.g., "Breathing Zone/MW-3", "at surface/SB-2", etc.).

### 5.2 Calibration Specifications

(Refer to the respective manufacturer's instructions for proper instrument-maintenance procedures)

Instrument	Gas	Span	Reading	Method
PID: OVM, 10.6 or 11.8 eV bulb	100 ppm isobutylene	RF = 1.0	100 ppm	1.5 lpm reg T-tubing
PID: MiniRAE, 10.6 eV bulb	100 ppm isobutylene	CF = 100	100 ppm	1.5 lpm reg T-tubing

### 5.3 Air Sampling

Sampling, in addition to real-time monitoring, may be required by other OSHA regulations where there may be exposure to certain contaminants. Air sampling typically is required when site contaminants include lead, cadmium, arsenic, asbestos, and certain volatile organic compounds. Contact the HSM immediately if these contaminants are encountered.

#### Method Description

Personal air sampling methodology will be determined on the site conditions and contaminated levels encountered. The CH2MHILL Health and Safety Manager will make this determination.

#### Personnel and Areas

Results must be sent immediately to the HSM. Regulations may require reporting to monitored personnel. Results reported to:

HSM: John Longo/NJO  
 Other: Steve Beck/MKE

Sorbent material will be maintained in the support zone. Incidental spills will be contained with sorbent and disposed of properly.

## 7 Spill-Containment Procedures

Figure 6-1 illustrates a conceptual establishment of work zones, including the decontamination line. Work zones are to be modified by the SSC to accommodate task-specific requirements.

No eating, drinking, or smoking is permitted in contaminated areas and in exclusion or decontamination zones. The SSC should establish areas for eating, drinking, and smoking. Contact lenses are not permitted in exclusion or decontamination zones.

### 6.2 Diagram of Personnel-Decontamination Line

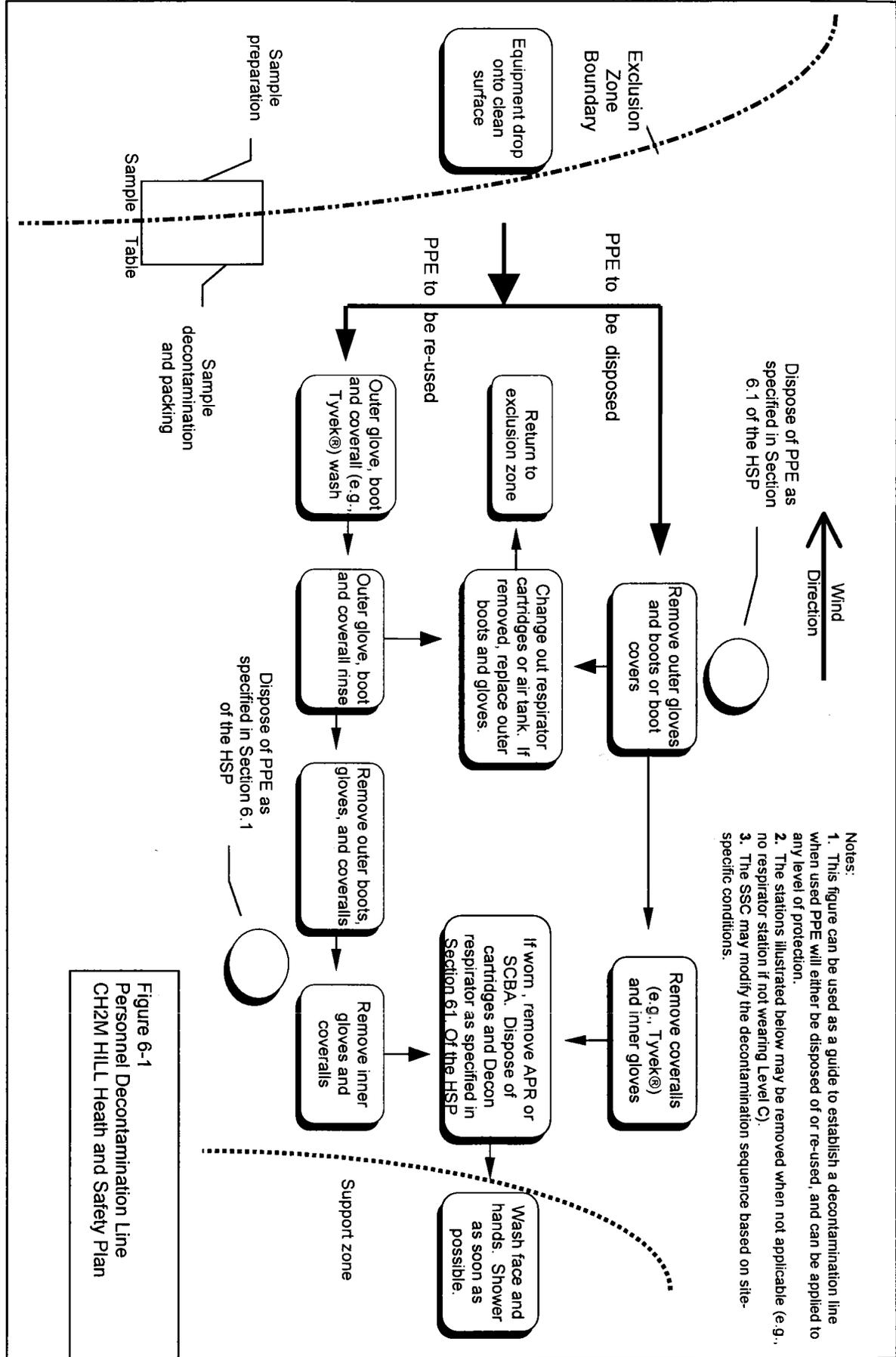
Personnel	Sample Equipment	Heavy Equipment
<ul style="list-style-type: none"> <li>• Boot wash/rinse</li> <li>• Glove wash/rinse</li> <li>• Outer-glove removal</li> <li>• Body-suit removal</li> <li>• Inner-glove removal</li> <li>• Respirator removal</li> <li>• Hand wash/rinse</li> <li>• Face wash/rinse</li> <li>• Shower ASAP</li> <li>• Dispose of PPE in municipal trash, or contain for disposal</li> <li>• Dispose of personnel rinse water to facility or sanitary sewer, or contain for offsite disposal</li> </ul>	<ul style="list-style-type: none"> <li>• Wash/rinse equipment</li> <li>• Solvent-rinse equipment</li> <li>• Contain solvent waste for offsite disposal</li> </ul>	<ul style="list-style-type: none"> <li>• Power wash</li> <li>• Steam clean</li> <li>• Dispose of equipment rinse water to facility or sanitary sewer, or contain for offsite disposal</li> </ul>

### 6.1 Decontamination Specifications

The SSC must establish and monitor the decontamination procedures and their effectiveness. Decontamination procedures found to be ineffective will be modified by the SSC. The SSC must ensure that procedures are established for disposing of materials generated on the site.

(Reference CH2M HILL SOP HS-13, *Decontamination*)

## 6 Decontamination



- Notes:
1. This figure can be used as a guide to establish a decontamination line when used PPE will either be disposed of or re-used, and can be applied to any level of protection.
  2. The stations illustrated below may be removed when not applicable (e.g., no respirator station if not wearing Level C).
  3. The SSC may modify the decontamination sequence based on site-specific conditions.

Figure 6-1  
 Personnel Decontamination Line  
 CH2M HILL Health and Safety Plan

## 8 Site-Control Plan

### 8.1 Site-Control Procedures

(Reference CH2M HILL SOP HS-11, *Site Control*)

- The SSC will conduct a site safety briefing (see below) before starting field activities or as tasks and site conditions change.
- Topics for briefing on site safety: general discussion of Health and Safety Plan, site-specific hazards, locations of work zones, PPE requirements, equipment, special procedures, emergencies.
- The SSC records attendance at safety briefings in a logbook and documents the topics discussed.
- Post the OSHA job-site poster in a central and conspicuous location in accordance with CH2M HILL SOP HS-71, *OSHA Postings*.
- Establish support, decontamination, and exclusion zones. Delineate with flags or cones as appropriate. Support zone should be upwind of the site. Use access control at entry and exit from each work zone.
- Establish onsite communication consisting of the following:
  - Line-of-sight and hand signals
  - Air horn
  - Two-way radio or cellular telephone if available
- Establish offsite communication.
- Establish and maintain the "buddy system."
- Initial air monitoring is conducted by the SSC in appropriate level of protection.
- The SSC is to conduct periodic inspections of work practices to determine the effectiveness of this plan – refer to Sections 2 and 3. Deficiencies are to be noted, reported to the HSM, and corrected.

### 8.2 Hazwoper Compliance Plan

(Reference CH2M HILL SOP HS-19, *Site-Specific Written Safety Plans*)

- Certain parts of the site work are covered by state or federal Hazwoper standards and therefore require training and medical monitoring. Anticipated Hazwoper tasks (Section 1.1.1) might occur consecutively or concurrently with respect to non-Hazwoper tasks. This section outlines procedures to be followed when approved activities specified in Section 1.1.2 do not require 24- or 40-hour training. Non-Hazwoper-trained personnel also must be trained in accordance with all other state and federal OSHA requirements.
- In many cases, air sampling, in addition to real-time monitoring, must confirm that there is no exposure to gases or vapors before non-Hazwoper-trained personnel are allowed on the site, or while non-Hazwoper-trained staff are working in proximity to Hazwoper activities. Other data (e.g., soil) also must document that there is no potential for exposure. The HSM must approve the interpretation of these data. Refer to subsections 2.5 and 5.3 for contaminant data and air sampling requirements, respectively.
  - When non-Hazwoper-trained personnel are at risk of exposure, the SSC must post the exclusion zone and inform non-Hazwoper-trained personnel of the:
    - nature of the existing contamination and its locations
    - limitations of their access
    - emergency action plan for the site
  - Periodic air monitoring with direct-reading instruments conducted during regulated tasks also should be used to ensure that non-Hazwoper-trained personnel (e.g., in an adjacent area) are not exposed to airborne contaminants.
  - When exposure is possible, non-Hazwoper-trained personnel must be removed from the site until it can be demonstrated that there is no longer a potential for exposure to health and safety hazards.
  - Remediation treatment system start-ups: Once a treatment system begins to pump and treat contaminated media, the site is, for the purposes of applying the Hazwoper standard, considered a treatment, storage, and disposal facility (TSDF). Therefore, once the system begins operation, only Hazwoper-trained personnel (minimum of 24 hour of training) will be permitted to enter the site. All non-Hazwoper-trained personnel must not enter the TSDF area of the site.

## 9 Emergency Response Plan

(Reference CH2M HILL, SOP HS-12, *Emergency Response*)

### 9.1 Pre-Emergency Planning

The SSC performs the applicable pre-emergency planning tasks before starting field activities and coordinates emergency response with CH2M HILL onsite parties, the facility, and local emergency-service providers as appropriate.

- Review the facility emergency and contingency plans where applicable.
- Determine what onsite communication equipment is available (e.g., two-way radio, air horn).
- Determine what offsite communication equipment is needed (e.g., nearest telephone, cell phone).
- Confirm and post emergency telephone numbers, evacuation routes, assembly areas, and route to hospital; communicate the information to onsite personnel.
- Field Trailers: Post "Exit" signs above exit doors, and post "Fire Extinguisher" signs above locations of extinguishers. Keep areas near exits and extinguishers clear.
- Review changed site conditions, onsite operations, and personnel availability in relation to emergency response procedures.
- Where appropriate and acceptable to the client, inform emergency room and ambulance and emergency response teams of anticipated types of site emergencies.
- Designate one vehicle as the emergency vehicle; place hospital directions and map inside; keep keys in ignition during field activities.
- Inventory and check site emergency equipment, supplies, and potable water.
- Communicate emergency procedures for personnel injury, exposures, fires, explosions, and releases.
- Rehearse the emergency response plan before site activities begin, including driving route to hospital.
- Brief new workers on the emergency response plan.

The SSC will evaluate emergency response actions and initiate appropriate follow-up actions.

### 9.2 Emergency Equipment and Supplies

The SSC should mark the locations of emergency equipment on the site map and post the map.

Emergency Equipment and Supplies	Location
20 LB (or two 10-lb) fire extinguisher (A, B, and C classes)	Support Zone/Heavy Equipment
First aid kit	Support Zone/Field Vehicle
Eye Wash	Support & Decon Zone/Field Vehicle
Potable water	Support & Decon Zone/Field Vehicle
Bloodborne-pathogen kit	Support Zone/Field Vehicle
Additional equipment (specify): Cell Phone	Field Vehicle

### 9.3 Incident Response

In fires, explosions, or chemical releases, actions to be taken include the following:

- Shut down CH2M HILL operations and evacuate the immediate work area.
  - Notify appropriate response personnel.
  - Account for personnel at the designated assembly area(s).
  - Assess the need for site evacuation, and evacuate the site as warranted.
- Instead of implementing a work-area evacuation, note that small fires or spills posing minimal safety or health hazards may be controlled.

- Upon any project incident (fire, spill, injury, near miss, death, etc.), immediately notify the PM and HSM. Call emergency beeper number if HSM is unavailable.
- For CH2M HILL work-related injuries or illnesses, contact and help Human Resources administrator complete an Incident Report Form (IRF). IRF must be completed within 24 hours of incident.
- For CH2M HILL subcontractor incidents, complete the Subcontractor Accident/Illness Report Form and submit to the HSM.
- Notify and submit reports to client as required in contract.

## 9.7 Incident Notification and Reporting

Signal	Meaning
Grasping throat with hand	Emergency-help me.
Thumbs up	OK; understood.
Grasping buddy's wrist	Leave area now.
Continuous sounding of horn	Emergency; leave site now.

## 9.6 Evacuation Signals

- Evacuation routes and assembly areas (and alternative routes and assembly areas) are specified on the site map.
- Evacuation route(s) and assembly area(s) will be designated by the SSC before work begins.
- Personnel will assemble at the assembly area(s) upon hearing the emergency signal for evacuation.
- The SSC and a "buddy" will remain on the site after the site has been evacuated (if safe) to assist local responders and advise them of the nature and location of the incident.
- The SSC will account for all personnel in the onsite assembly area.
- A designated person will account for personnel at alternate assembly area(s).
- The SSC will write up the incident as soon as possible after it occurs and submit a report to the Corporate Director of Health and Safety.

## 9.5 Evacuation

- Notify appropriate emergency response authorities listed in Attachment 4 of this document. (e.g., 911).
  - The SSC will assume charge during a medical emergency until the ambulance arrives or until the injured person is admitted to the emergency room.
  - Prevent further injury.
  - Initiate first aid and CPR where feasible.
  - Get medical attention immediately.
  - Perform decontamination where feasible; lifesaving and first aid or medical treatment take priority.
  - Make certain that the injured person is accompanied to the emergency room.
  - When contacting the medical consultant, state that the situation is a CH2M HILL matter, and give your name and telephone number, the name of the injured person, the extent of the injury or exposure, and the name and location of the medical facility where the injured person was taken.
  - Report incident as outlined in Section 9.7.
- The procedures listed below may also be applied to non-emergency incidents. Injuries and illnesses (including overexposure to contaminants) must be reported to Human Resources. If there is doubt about whether medical treatment is necessary, or if the injured person is reluctant to accept medical treatment, contact the CH2M HILL medical consultant. During non-emergencies, follow these procedures as appropriate.

## 9.4 Emergency Medical Treatment

## 10 Approval

This site-specific Health and Safety Plan has been written for use by CH2M HILL only. CH2M HILL claims no responsibility for its use by others unless that use has been specified and defined in project or contract documents. The plan is written for the specific site conditions, purposes, dates, and personnel specified and must be amended if those conditions change.

### 10.1 Original Plan

Written By: Steve Beck/MKE

Date: 11-13-01

Approved By: John Longo/NJO

Date: 11-15-01



NEW OR CONTINUED PROJECT TASKS REQUIRE COMPLETION OF ATTACHMENT 7 TO ENSURE THAT THE HAZARDS ASSOCIATED WITH NEW TASKS ARE ADEQUATELY ADDRESSED.

## 11 Attachments

- Attachment 1: Employee Signoff Form – Field Safety Instructions
- Attachment 2: Project-Specific Chemical Product Hazard Communication Form
- Attachment 3: Chemical-Specific Training Form
- Attachment 4: Emergency Contacts
- Attachment 5: Project Activity Self-Assessment Checklists
- Attachment 6: Applicable Material Safety Data Sheets
- Attachment 7: New Project Task Evaluation Checklist

**Employee Signoff Form – Field Safety Instructions**

**Attachment I**

**CH2M HILL HEALTH AND SAFETY PLAN**



**Project-Specific Chemical Product Hazard Communication Form**

**Attachment 2**

**CH2M HILL HEALTH AND SAFETY PLAN**

**Project-Specific Chemical Product Hazard Communication Form**

This form must be completed prior to performing activities that expose personnel to hazardous chemicals products. Upon completion of this form, the SSC shall verify that training is provided on the hazards associated with these chemicals and the control measures to be used to prevent exposure to CH2M HILL and subcontractor personnel. Labeling and MSDS systems will also be explained.

Project Name: Allegany Ballistics Laboratory Superfund Site  
 Project Number: 152786

MSDSs will be maintained at the following location(s):

**Hazardous Chemical Products Inventory**

Chemical	Quantity	Location	MSDS Available	Identity	Hazard
Methane	1 liter, compressed	Support Zone			
Isobutylene	1 liter, compressed	Support Zone			
Pentane	1 liter, compressed	Support Zone			
Hydrochloric acid	< 500 ml bottles	Support Zone / sample bottles			
Nitric acid	< 500 ml bottles	Support Zone / sample bottles			
Sulfuric Acid	< 500 ml bottles	Support Zone / sample bottles			
Sodium hydroxide	< 500 ml bottles	Support Zone / sample bottles			
Methanol	< 1 Gallon	Support/Decon Zones			
pH buffers	< 500 ml	Support Zone			
MSA Sanitizer	< 1 liter	Support/Decon Zones			
Alconox/Liquinox	< 1liter	Support/Decon Zones			

Refer to SOP HS-05 Hazard Communication for more detailed information.

**Chemical Specific Training Form**

**Attachment 3**

**CH2M HILL HEALTH AND SAFETY PLAN**

Copies of MSDSs, chemical inventories, and CH2M HILL's written hazard communication program shall be made available for employee review in the facility/project hazard communication file.

Training participants shall have the opportunity to ask questions concerning these products and, upon completion of this training, will understand the product hazards and appropriate control measures available for their protection.

- Physical and health hazards
- Control measures that can be used to provide protection (including appropriate work practices, emergency procedures, and personal protective equipment to be used)
- Methods and observations used to detect the presence or release of the regulated product in the workplace (including periodic monitoring, continuous monitoring devices, visual appearance or odor of regulated product when being released, etc.)

The HCC shall use the product MSDS to provide the following information concerning each of the products listed above.


**REGULATED PRODUCTS/TASKS COVERED BY THIS TRAINING:**

NAME	SIGNATURE	NAME	SIGNATURE

**TRAINING PARTICIPANTS:**

HCC:	Trainer:
Location:	Project # : 152786

**CHEMICAL-SPECIFIC TRAINING FORM**



**Emergency Contacts**

**Attachment 4**

**CH2M HILL HEALTH AND SAFETY PLAN**

## Emergency Contacts

### 24-hour CH2M HILL Emergency Beeper – 888/444-1226

Medical Emergency – 911

Facility Medical Response #:

Local Ambulance #:

CH2M HILL Medical Consultant

Dr. Jerry Burke

Health Resources

600 West Cummings Park, Suite 3400

Woburn, MA, 01801-4511

800-350-4511

Local Occupational Physician

Fire/Spill Emergency – 911

Facility Fire Response #:

Cresaptown Fire Dept #:

Security & Police – 911

Facility Security #:

WV State Police #:

24-hour emergency beeper: 888-444-1226

Health and Safety Manager (HSM)

Name: John Longo/NJO

Phone: 973-316-0159 x4543

Cell Ph: 973-449-3587

Regional Human Resources Department

Name: Shannon Loos/MKE

Phone: 414-272-1052

Corporate Human Resources Department

Name: John Monark/COR

Phone: 303/771-0900

Worker's Compensation and Auto Claims

Sterling Administration Services

Phone: 800/420-8926 After hours: 800/497-4566

Report fatalities AND report vehicular accidents involving

pedestrians, motorcycles, or more than two cars.

Contact the Project Manager. Generally, the Project Manager will contact relevant government agencies.

Facility Alarms:

Evacuation Assembly Area(s):

Facility/Site Evacuation Route(s):

Hospital Name/Address:

Memorial Hospital

600 Memorial Ave

Cumberland, MD 21502

Hospital Phone #: 301-777-4000

### Directions to Hospital

Figure A4-1 includes driving directions and a highlighted map to the hospital.



**Project Activity Self-Assessment Checklists**

**Attachment 5**

**CH2M HILL HEALTH AND SAFETY PLAN**

This checklist shall be used by CH2M HILL personnel only and shall be completed at the frequency specified in the project's HSP/FSI.

This checklist is to be used at locations where: 1) CH2M HILL employees are potentially exposed to hazards associated with drilling operations (complete Sections 1 and 3), and/or 2) CH2M HILL oversight of a drilling subcontractor is required (complete entire checklist).

SSC/DSC may consult with drilling subcontractors when completing this checklist, but shall not direct the means and methods of drilling operations nor direct the details of corrective actions. Drilling subcontractors shall determine how to correct deficiencies and we must carefully rely on their expertise. Items considered to be imminently dangerous (possibility of serious injury or death) shall be corrected immediately or all exposed personnel shall be removed from the hazard until corrected.

Completed checklists shall be sent to the health and safety manager for review.

Project Name: \_\_\_\_\_ Project No.: \_\_\_\_\_

Location: \_\_\_\_\_ PM: \_\_\_\_\_

Auditor: \_\_\_\_\_ Title: \_\_\_\_\_ Date: \_\_\_\_\_

This specific checklist has been completed to:

Evaluate CH2M HILL employee exposures to drilling hazards

Evaluate a CH2M HILL subcontractor's compliance with drilling H&S requirements

Subcontractors Name: \_\_\_\_\_

- Check "Yes" if an assessment item is complete/correct.
  - Check "No" if an item is incomplete/deficient. Deficiencies shall be brought to the immediate attention of the drilling subcontractor. Section 3 must be completed for all items checked "No."
  - Check "N/A" if an item is not applicable.
  - Check "N/O" if an item is applicable but was not observed during the assessment.
- Numbers in parentheses indicate where a description of this assessment item can be found in Standard of Practice HS-35.

**PERSONNEL SAFE WORK PRACTICES (3.1)**

	Yes	No	N/A	N/O
1. Only authorized personnel operating drill rig	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Personnel cleared during rig startup	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Personnel clear of rotating parts	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Personnel not positioned under hoisted loads	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Loose clothing and jewelry removed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Personnel instructed not to approach equipment that has become electrically energized	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Smoking is prohibited around drilling operation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Personnel wearing appropriate PPE, per HSP/FSI	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**SECTION I**

Yes No N/A N/O

**SECTION 2**

**GENERAL (3.2.1)**

- 9. Daily safety briefing/meeting conducted with crew
- 10. Daily inspection of drill rig and equipment conducted before use

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**DRILL RIG PLACEMENT (3.2.2)**

- 11. Location of underground utilities identified
- 12. Safe clearance distance maintained from overhead powerlines
- 13. Drilling pad established, when necessary
- 14. Drill rig leveled and stabilized

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**DRILL RIG TRAVEL (3.2.3)**

- 15. Rig shut down and mast lowered and secured prior to rig movement
- 16. Tools and equipment secured prior to rig movement
- 17. Only personnel seated in cab are riding on rig during movement
- 18. Safe clearance distance maintained while traveling under overhead powerlines
- 19. Backup alarm or spotter used when backing rig

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**DRILL RIG OPERATION (3.2.4)**

- 20. Kill switch clearly identified and operational
- 21. All machine guards are in place
- 22. Rig ropes not wrapped around body parts
- 23. Pressurized lines and hoses secured from whipping hazards
- 24. Drill operation stopped during inclement weather
- 25. Air monitoring conducted per HSP/FSI for hazardous atmospheres
- 26. Rig placed in neutral when operator not at controls

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**DRILL RIG MAINTENANCE (3.2.5)**

- 27. Defective components repaired immediately
- 28. Lockout/tagout procedures used prior to maintenance
- 29. Cathed in clean, sound condition
- 30. Drill rig ropes in clean, sound condition
- 31. Fall protection used for fall exposures of 6 feet or greater
- 32. Rig in neutral and augers stopped rotating before cleaning
- 33. Good housekeeping maintained on and around rig

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**DRILLING AT HAZARDOUS WASTE SITES (3.2.6)**

- 34. Waste disposed of according to HSP
- 35. Appropriate decontamination procedures being followed, per HSP

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>





SECTION 2

Yes No N/A N/O

General Electrical Safety (3.2.1)

- 14. All electrical conductors and equipment are approved
- 15. Equipment installed and used in accordance with listings, labels, and certifications
- 16. Equipment intended to break current is sufficient for the current that must be interrupted
- 17. Electric equipment is firmly secured to the surface on which it is mounted
- 18. Electrical equipment is ventilated for cooling as required
- 19. Conductors requiring splicing are spliced with devices and methods designed as such
- 20. Electric equipment that produces sparks is enclosed or separated from combustible material
- 21. Electrical equipment is marked with voltage, current, wattage, or other ratings as necessary

Clearance Requirements and Working on/Adjacent to Exposed Energized Equipment (3.2.2)

- 22. Open conductors conform to the minimum clearances from sidewalks, traffic, etc.
  - 23. Conductors have at least 3 ft. clearance from windows, doors, fire escapes, or similar locations
  - 24. Conductors above roof space accessible to employees maintain minimum clearances
  - 25. Working space is provided about all electric equipment for safe operation and maintenance
  - 26. Working space not less than 30 inches wide in front of electrical equipment
  - 27. Minimum headroom of working space is 6 feet 3 inches
  - 28. Working space around electrical equipment is not used for storage
  - 29. When normally enclosed live parts are exposed for inspection or servicing, guards are provided
  - 30. Exposed live parts of switchboards or MCCs have at least 3 ft. working space in front
  - 31. Live parts of electric equipment at  $\geq 50$  volts are adequately guarded against accidental contact
- Over 600 volts**
- 32. Electrical equipment over 600 volts is accessible to qualified persons only
  - 33. Entrances to buildings, rooms or enclosures containing exposed live parts are locked
  - 34. Exposed energized parts have a minimum clear workspace  $\geq 6$  ft. 6 in. high;  $\geq 3$  ft. wide
  - 35. Workspace permits at least a 90-degree opening of doors or hinged panels
  - 36. Minimum clear workspace in front of electric equipment is  $\geq 3$  ft. or as specified in Table 1
  - 37.  $\geq 30$  in. horizontal work space is provided for rear access to work on de-energized equipment
  - 38. SOP HS-44 and HS-41 have been used to establish clearance requirements for overhead lines

Grounding (3.2.3)

- 39. A GFCI or an assured equipment grounding program is used to protect employees
- 40. All 120 volt, single-phase 15 and 20 ampere receptacle outlets have GFCIs.
- 41. A written description of the assured equipment grounding program is available at the jobsite
- 42. One or more qualified persons is designated to implement the assured equip. grounding program
- 43. Cord sets, plug/receptacle of cord sets, & equipment connected by cord/plug are inspected daily
- 44. Relevant equipment is tested for continuity and correct attachment to grounding conductors
- 45. Tests are performed when necessary but a least at intervals of 3 months
- 46. Records of inspections and testing of each piece of equipment are maintained
- 47. Frames of portable generators are appropriately grounded, where applicable
- 48. Vehicle mounted generators are appropriately grounded, where applicable
- 49. Exposed noncurrent-carrying metal parts of fixed equipment are grounded, where applicable
- 50. Exposed metal parts of cord- and plug-connected equipment are grounded, where applicable
- 51. Cord- and plug-connected equipment are grounded, where applicable
- 52. Cord- and plug-connected portable x-ray equipment and hand lamps are grounded
- 53. Tools used in wet and/or conductive locations are grounded, where applicable
- 54. Metal parts of applicable non-electrical equipment are grounded

**SECTION 2 (continued)**

Yes No N/A N/O

**Temporary and Portable Electrical Equipment (3.2.4)**

- 55. No wiring is installed in ducts used to transport dust, loose stock or flammable vapors
- 56. All requirements for permanent wiring have been applied to temporary wiring installations
- 57. Temporary wiring is removed immediately upon completion of construction or intended use
- 58. All conductors are protected by over-current devices at their ampacity
- 59. Runs of open conductors are located where they will not be subject to physical damage
- 60. Conductors are fastened at intervals not exceeding 10 feet (3.05 m)
- 61. No branch-circuit conductors are laid on the floor
- 62. Branch circuit conductors have separate grounding conductors, where applicable
- 63. Receptacles are of the grounding type
- 64. Receptacles are not installed on branch circuits that supply temp. lighting, where applicable
- 65. Receptacles are not connected to ungrounded conductors or plug connectors are installed properly
- 66. Disconnecting switches or plug connectors are protected from accidental contact or breakage
- 68. Metal-case sockets are grounded
- 69. Temporary lights are not suspended by their electric cords unless designed to do so
- 70. Portable lights used in wet locations shall be operated at 12 volts or less, or use a GFCI
- 71. Flexible cords and cables are protected from damage, sharp edges, and pinch hazards
- 72. Extension cords used with portable electric tools and appliances are of three-wire type
- 73. Conductors entering boxes, cabinets, or fittings are protected.
- 74. All pull boxes, junction boxes, and fittings are provided with covers
- 75. In energized installations, each outlet box has a cover, faceplate or fixture canopy
- 76. Covers of outlet boxes have bushings installed, where applicable
- 77. Over 600 V, pull/junction boxes have a complete enclosure for the contained conductors/cables
- 78. Boxes are closed by covers securely fastened in place
- 79. Covers for boxes are permanently marked "HIGH VOLTAGE."
- 80. Single-throw knife switches are connected so blades are dead in the open position
- 81. Single-throw knife switches are placed so that gravity will not close them
- 82. Single-throw knife switches used in the inverted position have a locking device
- 83. Double-throw knife switches are mounted correctly
- 84. Cabinets, boxes, fittings, etc. in damp locations are installed to prevent moisture or water from entering/accumulating within the enclosures. In wet locations the enclosures are weatherproof
- 85. Switches, breakers, and switchboards in wet locations are enclosed in weatherproof enclosures
- 86. All conductors used for general wiring shall be insulated unless otherwise permitted
- 87. Conductor insulation is of a type suitable for the voltage, operating temp., and location of use
- 88. Insulated conductors are distinguishable by appropriate color or other means, as needed
- 89. Flexible cords and cables are suitable for conditions of use and location
- 90. Flexible cords and cables are used only for applications specified in this SOP
- 91. Flexible cords are used only in continuous lengths without splices
- 92. Flexible cords are connected to devices and fittings so that strain relief is provided
- 93. Flexible cords and cables are protected by bushings where passing through covers, boxes, etc.
- 94. Portable lamps are wired w/flexible cords and plug of the polarized or grounding type
- 95. Portable handlamps with metal shell, paper lined lampholders are not being used
- 96. Handlamps are equipped with an insulated handle and substantial guard
- 97. Metallic guards on handlamps are grounded w/a grounding conductor run within the cord
- 98. Worn or frayed electric cords or cables are not used
- 99. Extension cords are not fastened with staples, hung from nails, or suspended by wire
- 100. All wiring components and equipment in hazardous locations are maintained as appropriate
- 101. Conductors or equipment are only located in the environment they are designed for
- 102. Equipment approved for use in dry locations only are protected from damage by weather

**Personnel Protection (3.2.5)**

- 103. Electrical equipment has been de-energizing and grounded or guarded by insulation
- 104. Where the location of underground power is unknown, insulated gloves are provided

**SECTION 2 (continued)**

Yes No N/A N/O

**Personnel Protection (3.2.5) (continued)**

- 105. Attempts are made to locate all energized electrical circuits before work begins
- 106. Signs are posted and maintained warning employees of electrical hazards
- 107. When energized parts are exposed, barriers or guards are used to prevent accidental contact
- 108. Working space, walkways, and similar are kept clear of cords to prevent tripping hazards
- 109. Controls that are deactivated are locked out and tagged out

**Batteries (3.2.6)**

- 110. Unsealed batteries are located in well ventilated rooms
- 111. Racks and trays used to store batteries are substantial and resistant to electrolytic damage
- 112. Floors are acid resistant or otherwise protected from acid accumulation
- 113. Face shields, aprons, and rubber gloves are provided for workers handling acids or batteries
- 114. Eye wash is provided within 25 feet (7.62 m) of battery handling areas
- 115. Facilities are provided for flushing and neutralizing spilled electrolyte and for fire protection
- 116. Battery charging installations are located in designated areas
- 117. Charging apparatus are protected from damage by trucks
- 118. When batteries are being charged, vent caps are kept in place to avoid electrolyte spray
- 119. Vent caps on batteries are maintained in functioning condition

**Lockout-Tagout (3.2.7)**

- 120. Lockout/tagout procedures are utilized that provide emphasis on verifying de-energization
- 121. De-energization is confirmed using a 3-point testing procedure
- 122. If tagout only is performed, one additional safety measure has been implemented



## H&S Self-Assessment Checklist – HAND AND POWER TOOLS

This checklist shall be used by CH2M HILL personnel **only** and shall be completed at the frequency specified in the project's HSP/FSI.

This checklist is to be used at locations where: 1) CH2M HILL employees are exposed to hand and power tool hazards and/or 2) CH2M HILL provides oversight of subcontractor personnel who are exposed to hand and power tool hazards.

SSC or DSC may consult with subcontractors when completing this checklist, but shall not direct the means and methods of hand and power tool use nor direct the details of corrective actions. Subcontractors shall determine how to correct deficiencies and we must carefully rely on their expertise. Items considered to be imminently dangerous (possibility of serious injury or death) shall be corrected immediately or all exposed personnel shall be removed from the hazard until corrected.

Completed checklists shall be sent to the HS&E Staff for review.

Project Name: \_\_\_\_\_  
 Location: \_\_\_\_\_ PM: \_\_\_\_\_  
 Auditor: \_\_\_\_\_ Title: \_\_\_\_\_ Date: \_\_\_\_\_

This specific checklist has been completed to:

Evaluate CH2M HILL employee exposure to hand and power tool hazards.  
 Evaluate a CH2M HILL subcontractor's compliance with hand and power tool requirements.

Subcontractors Name: \_\_\_\_\_

- Check "Yes" if an assessment item is complete/correct.
  - Check "No" if an item is incomplete/deficient. Deficiencies shall be brought to the immediate attention of the subcontractor.
  - Section 3 must be completed for all items checked "No."
  - Check "N/A" if an item is not applicable.
  - Check "N/O" if an item is applicable but was not observed during the assessment.
- Numbers in parentheses indicate where a description of this assessment item can be found in Standard of Practice HS-50.

**SECTION 1**

**SAFE WORK PRACTICES (3.1)**

	Yes	No	N/A	N/O
1. All tools operated according to manufacturer's instructions and design limitations.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. All hand and power tools maintained in a safe condition and inspected and tested before use.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Defective tools are tagged and removed from service until repaired.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. PPE is selected and used according to tool-specific hazards anticipated.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Power tools are not carried or lowered by their cord or hose.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Tools are disconnected from energy sources when not in use, servicing, cleaning, etc.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Safety guards remain installed or are promptly replaced after repair.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Tools are stored properly.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. Cordless tools and recharging units both conform to electrical standards and specifications.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. Tools used in explosive environments are rated for such use.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11. Knife or blade hand tools are used with the proper precautions.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12. Consider controls to avoid muscular skeletal, repetitive motion, and cumulative trauma stressors.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>





**Applicable Material Safety Data Sheets**

**Attachment 6**

**CH2M HILL HEALTH AND SAFETY PLAN**



**1. Chemical Product and Company Identification**

BOC Gases,  
 Division of,  
 The BOC Group, Inc.  
 575 Mountain Avenue  
 Murray Hill, NJ 07974

BOC Gases,  
 Division of  
 BOC Canada Limited  
 5975 Falbourn Street, Unit 2  
 Mississauga, Ontario L5R 3W6

TELEPHONE NUMBER: (908) 464-8100  
 24-HOUR EMERGENCY TELEPHONE NUMBER: CHEMTREC (800) 424-9300

TELEPHONE NUMBER: (905) 501-1700  
 24-HOUR EMERGENCY TELEPHONE NUMBER: (905) 501-0802

EMERGENCY RESPONSE PLAN NO: 2-0101

PRODUCT NAME: METHANE  
 CHEMICAL NAME: CH<sub>4</sub>  
 COMMON NAMES/SYNONYMS: Methyl Hydride  
 TDG (Canada) CLASSIFICATION: 2.1  
 WHMIS CLASSIFICATION: A, B1

PREPARED BY: Loss Control (908)464-8100/(905)501-1700  
 PREPARATION DATE: 6/1/95  
 REVIEW DATES: 6/1/99

**2. Composition, Information on Ingredients**

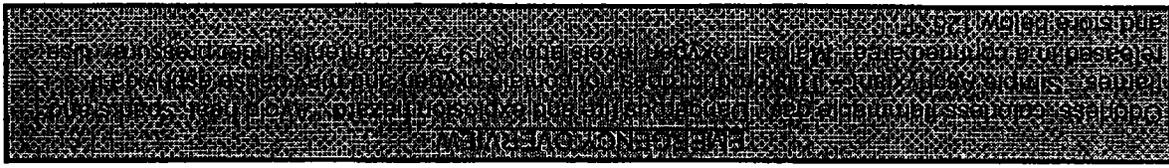
**EXPOSURE LIMITS<sup>1</sup>:**

Methane	100	None Established	Simple Asphyxiant	Not Available
FORMULA: CH <sub>4</sub>				
CAS: 74-82-8				
RTCS #: PA1490000				

<sup>1</sup> Refer to individual state or provincial regulations, as applicable, for limits which may be more stringent than those listed here.  
<sup>2</sup> As stated in 29 CFR 1910, Subpart Z (revised July 1, 1993)  
<sup>3</sup> As stated in the ACGIH 1998-1999 Threshold Limit Values for Chemical Substances and Physical Agents.

OSHA Regulatory Status: This material is classified as hazardous under OSHA regulations.

**3. Hazards Identification**



**PRODUCT NAME: METHANE**

**ROUTE OF ENTRY:**

Skin Contact	No	Skin Absorption	No	Eye Contact	No	Inhalation	Yes	Ingestion	No
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**HEALTH EFFECTS:**

Exposure Limits	No	Irritant	No	Sensitization	No
Teratogen	No	Reproductive Hazard	No	Mutagen	No
Synergistic Effects None reported					

Carcinogenicity: -- NTP: No IARC: No OSHA: No

**EYE EFFECTS:**

None anticipated.

**SKIN EFFECTS:**

None anticipated.

**INGESTION EFFECTS:**

None known. Ingestion is unlikely.

**INHALATION EFFECTS:**

Methane and nitrogen are simple asphyxiants. Exposure to high concentrations of this gas mixture may exclude an adequate supply of oxygen. Oxygen levels should be maintained at greater than 19.5% at normal atmospheric pressure.

Effects of oxygen deficiency resulting from simple asphyxiants may include: rapid breathing, diminished mental alertness, impaired muscular coordination, faulty judgement, depression of all sensations, emotional instability, and fatigue. As asphyxiation progresses, nausea, vomiting, prostration, and loss of consciousness may result, eventually leading to convulsions, coma, and death.

Oxygen deficiency during pregnancy has produced developmental abnormalities in humans and experimental animals.

**MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: None known.**

<b>NFPA HAZARD CODES</b>	<b>HMIS HAZARD CODES</b>	<b>RATINGS SYSTEM</b>
Health: 2 Flammability: 4 Instability: 0	Health: 0 Flammability: 4 Reactivity: 0	0 = No Hazard 1 = Slight Hazard 2 = Moderate Hazard 3 = Serious Hazard 4 = Severe Hazard

**4. First Aid Measures**

**EYES:**

None required.

PRODUCT NAME: MERTANN

**SKIN:**

None required.

**INGESTION:**

Not normally required.

**INHALATION:**

PROMPT MEDICAL ATTENTION IS MANDATORY IN ALL CASES OF OVEREXPOSURE TO THIS PRODUCT. RESCUE PERSONNEL SHOULD BE EQUIPPED WITH SELF-CONTAINED BREATHING APPARATUS. Victims should be assisted to an uncontaminated area and inhale fresh air. Quick removal from the contaminated area is most important. If breathing has stopped administer artificial resuscitation and supplemental oxygen. Further treatment should be symptomatic and supportive. Keep victim warm and quiet.

**5. Fire Fighting Measures**

Conditions of Flammability: Flammable gas		
Flash point:	Method:	Autoignition
-306°F (-188°C)	Closed cup	Temperature: 1076°F (580°C)
LEL(%): 5	UEL(%): 15	
Hazardous combustion products: Carbon dioxide, Carbon monoxide		
Sensitivity to mechanical shock: None		
Sensitivity to static discharge: Not Available		

**FIRE AND EXPLOSION HAZARDS:**

Flammable gas. Cylinder may rupture violently from pressure when involved in a fire situation.

**EXTINGUISHING MEDIA:**

Carbon dioxide, dry chemical or water spray.

**FIRE FIGHTING INSTRUCTIONS:**

If possible, stop the flow of gas. Inerting the atmosphere to reduce oxygen levels may extinguish flame, allowing capping of leaking container. Do not attempt this unless specifically trained. Reduce the rate of flow and inject an inert gas, if possible, before completely stopping the flow to prevent flashback. Do not extinguish the fire until the supply is shut off as otherwise an explosive re-ignition may occur. If the fire is extinguished and the flow of gas continues, use increased ventilation to prevent build-up of explosive atmosphere. Use non-sparking tools to close container valves.

Use water spray to cool surrounding containers. Be cautious of a Boiling Liquid Evaporating Vapor Explosion, BLEVE, if flame is impinging on surrounding containers. Direct 500 GPM water stream onto containers above liquid level with remote monitors. Limit the number of personnel in proximity of fire and evacuate surrounding areas in all directions.

Firefighters should wear respiratory protection (SCBA) and full turnout or bunker gear. Continue to cool fire-exposed cylinders until well after flames are extinguished.

## 6. Accidental Release Measures

Immediately extinguish all ignition sources. No smoking, flames, sparks or flares in hazard area. Evacuate all personnel from affected area. Use appropriate protective equipment. If leak is in user's equipment, be certain to purge piping with inert gas prior to attempting repairs. If leak is in container or container valve, contact the appropriate emergency telephone number listed in Section 1 or call your closest BOC location.

## 7. Handling and Storage

### Electrical Classification:

Not Available

Earth ground and bond all lines and equipment associated with the system. All equipment should be non-sparking or explosion-proof.

Methane is non-corrosive and may be used with any common structural material.

Use only in well-ventilated areas. Valve protection caps must remain in place unless container is secured with valve outlet piped to use point. Do not drag, slide or roll cylinders. Use a suitable hand truck for cylinder movement. Use a pressure regulator when connecting cylinder to lower pressure piping or systems. Do not heat cylinder by any means to increase the discharge rate of product from the cylinder. Use a check valve or trap in the discharge line to prevent hazardous back flow into the cylinder.

Protect cylinders from physical damage. Store in cool, dry, well-ventilated area of non-combustible construction away from heavily trafficked areas and emergency exits. Do not allow the temperature where cylinders are stored to exceed 125°F (52°C). Cylinders should be stored upright and firmly secured to prevent falling or being knocked over. Full and empty cylinders should be segregated. Use a "first in-first out" inventory system to prevent full cylinders from being stored for excessive periods of time. Post "NO SMOKING" signs in use or storage areas. There should be no sources of ignition in areas where this product is being used or stored. Outside or detached storage is preferred.

For additional storage recommendations, consult Compressed Gas Association's Pamphlets P-1, P-14, and Safety Bulletin SB-2.

## 8. Exposure Controls, Personal Protection

### ENGINEERING CONTROLS:

Hood with forced ventilation. Local exhaust to prevent dilution of oxygen levels below 19.5%. Mechanical in accordance with electrical codes.

### EYE/FACE PROTECTION:

Safety goggles or glasses.

### SKIN PROTECTION:

Plastic or rubber gloves made of any suitable material.

### RESPIRATORY PROTECTION:

Positive pressure air line with mask and escape bottle or self-contained breathing apparatus should be available for emergency use.

MSDS: G-56

Revised: 6/1/99

**New Project Task Evaluation Checklist**

**Attachment 7**

**CH2M HILL HEALTH AND SAFETY PLAN**

**New Project Task Evaluation Form**  
**Allegany Ballistics Laboratory Superfund Site**

*This evaluation form should be completed to determine if the current site health and safety plan adequately addresses the hazards of a new or continued project or task at the ABL Site.*

Project Task:	
Project Number:	
Name:	
Project/Task Manager:	
Employee #:	

<b>New Task Evaluation Checklist</b>		
Yes	No	
		1. Has the CH2MHILL staff listed in the original HASP changed?
		2. Has a new subcontractor been added to the project?
		3. Is any chemical or product to be used that is not listed Attachment 2 of the plan?
		4. Have additional tasks been added to the project which were not originally addressed in Section 1.1 of the plan?
		5. Are the Contaminant data HASP out of date or not applicable to the new task?
		6. Are other safety or equipment hazards introduced by the new task that are not addressed in Section 2.1 of the plan?

*If the answer is "YES" to Questions 1-3, an HSP revision is NOT needed. Please take the following actions:*

- ◆ Confirm that staff's medical and training status is current – check training records at <http://www.int.ch2m.com/hands>, or contact Lynn Bong/MKE.
- ◆ Confirm with the project KA that subcontractor safety performance has been reviewed and is acceptable.
- ◆ Confirm with H&S that subcontractor safety procedures have been reviewed and are acceptable.

*If the answer is "YES" to Questions 4-6, a HSP revision MAY BE NEEDED. To determine if HSP revision is needed please contact H&S directly or complete the field project start-up form at <http://www.int.ch2m.com/hsdocgen/fppricing.asp>*