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*Health and Safety Plan*

# Velsicol Chemical/Pine River Superfund Site

St. Louis, Michigan

Prepared for



May 2014



Milwaukee Office:  
135 South 84<sup>th</sup> Street, Suite 400  
Milwaukee, WI 53214

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Attachment 2	Chemical Inventory/Register Form
Attachment 3	Chemical-specific Training Form
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Attachment 9	Agency Inspection Target Zero Bulletin
Attachment 10	Completed CH2M HILL AHAs
Attachment 11	Material Safety Data Sheets

# Approval

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This site-specific Health and Safety Plan (HSP) 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 and identified scope(s) of work and must be amended if those conditions or scope(s) of work change.

By approving this HSP, the Responsible Health and Safety Manager (RHSM) certifies that the personal protective equipment has been selected based on the project-specific hazard assessment.

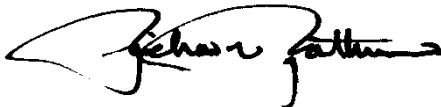
## Original Plan

Written By: Brad Klein / STL

Date: 4/13/99

Approved By: Rich Rathnow, CIH, CSP/MKE

Date: 4/23/99



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## Revisions to Plan

- Updated personnel list, responsibilities and client contact to make current
- Updated emergency contacts in Section 13 to make current
- Edited HSP to include new contract, work assignments, project numbers, personnel changes and GWCS operations and maintenance.
- Converted HSP to new Corporate Template

Revisions Made By: Theo von Wallmenich/LSG

Date: June 26, 2009

Revisions Approved By: Carl Woods/CIN

Date: June 30, 2009

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## Revisions to Plan

- Updated personnel list, responsibilities and client contact to make current
- Updated subcontractor contacts in Section 3 to make current
- Included boating checklist Attachment 4.

Revisions Made By: Theresa Himmer/BOS

Date: October 21, 2009

Revisions Approved By: Carl Woods/CIN

Date: October 22, 2009

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**Revisions to Plan**

- Updated personnel list, responsibilities and client contact to make current

Revisions Made By: Scott Pratt/DET

Date: May 21, 2010

Revisions Approved By: Carl Woods/CIN

Date: June 4, 2010



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**Revisions to Plan**

- Updated subcontractor contact information

Revisions Made By: Scott Pratt/DET

Date: September 28, 2010

Revisions Approved By: Carl Woods/CIN

Date: September 28, 2010



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**Revisions to Plan**

- Routine update

Revisions Made By: Theo von Wallmenich/DET

Date: October 28, 2011

Revisions Approved By:

Date: October 28, 2011



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**Revisions to Plan**

- General annual review, programmatic updates, added soil sampling and soil excavation

Revisions Requested By: Theo von Wallmenich/DET

Date: October 31, 2012

Revisions Approved By:

Date: November 13, 2012



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### Revisions to Plan

- Edited HSP to include sediment/floodplain sampling and fish tissue sampling and processing
- Added working over water, Knife Use AHA, Electro-Shocking AHA

Revisions Requested By: Grant Koster/DET

Date: August 14, 2013

Revisions Approved By: Carl Woods/CIN

Date: August 21, 2013



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### Revisions to Plan

- Edited HSP to include all activities associated with completion of the main plant site remedial design investigation activities
- Added installation of soil boring using roto-sonic drilling techniques, installation of monitoring wells using roto-sonic drilling techniques, completion of test pits, and associated AHAs. Air monitoring requirements were also updated.

Revisions Requested By: Scott Pratt /DET

Date: March 28, 2014

Revisions Approved By: Carl Woods/CIN

Date: April 2, 2014



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### Revisions to Plan

- Updated sections relevant to DBCP exposure

Revisions Requested By: Scott Pratt /DET

Date: May 8, 2014

Revisions Approved By: Mark Orman / KNV

Date: May 13, 2014



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### Revisions to Plan

- Edited HASP per EPA review and comments

Revisions Requested By: Scott Pratt /DET

Date: May 20, 2014

Revisions Approved By: Carl Woods/CIN

Date: May 21, 2014



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# 1.0 Introduction



## Health, Safety and Environment Policy Commitment

Protection of people and the environment is a CH2M HILL core value. It is our vision to create a culture that empowers employees to drive this value into all global operations and achieve excellence in health, safety, and environment (HSE) performance.

CH2M HILL deploys an integrated, enterprise-wide behavior based HSE management system to fulfill our mission and the expectations of our clients, staff, and communities based on the following principles:

- We require all management and supervisory personnel to provide the leadership and resources to inspire and empower our employees to take responsibility for their actions and for their fellow employees to prevent injuries, illnesses, and adverse environmental impacts, and create a safe, healthy, and environmentally-responsible workplace.
- We provide value to clients by tailoring HSE processes to customer needs and requiring CH2M HILL employees and subcontractors to deliver projects that identify HSE requirements and commit to compliance with applicable HSE laws and regulations, company standards, and external requirements.
- We are committed to pollution prevention in conjunction with our Sustainability Policy and by offering our clients sustainable solutions.
- We aspire to continually improve our performance and influence others to redefine world-class HSE excellence.
- We evaluate our design engineering and physical work environment to verify safe work conditions and practices are established, followed, and corrected as needed.
- We assess and continually improve our HSE program to achieve and maintain world-class performance by setting and reviewing objectives and targets, reporting performance metrics, and routinely evaluating our program.
- We expect all employees to embrace our Target Zero culture, share our core value for the protection of people and the environment, understand their obligations, actively participate, take responsibility, and “walk the talk” on and off the job.

The undersigned pledge our leadership, commitment, and accountability for making this Policy a reality at CH2M HILL.

Dated the 11th day of February, 2014

Jacqueline Hinman  
Chief Executive Officer

JoAnn Shea  
Interim Chief Financial Officer

John Madia  
Chief Human Resources Officer

Gregory Nixon  
Chief Legal Officer

Michael McKelvy  
Chief Delivery Officer

Michael Szomjassy  
Chief Operational Excellence Officer

## 1.1 CH2M HILL Policy and Commitment

### 1.1.1 Safe Work Policy

It is the policy of CH2M HILL to perform work in the safest manner possible. Safety must never be compromised. To fulfill the requirements of this policy, an organized and effective safety program must be carried out at each location where work is performed.

CH2M HILL believes that all injuries are preventable, and we are dedicated to the goal of a safe work environment. To achieve this goal, every employee on the project must assume responsibility for safety.

Every employee is empowered to:

- Conduct their work in a safe manner;
- Stop work immediately to correct any unsafe condition that is encountered; and
- Take corrective actions so that work may proceed in a safe manner.

Safety, occupational health, and environmental protection will not be sacrificed for production. These elements are integrated into quality control, cost reduction, and job performance, and are crucial to our success.

### 1.1.2 Health and Safety Commitment

CH2M HILL has embraced a philosophy for health and safety excellence. The primary driving force behind this commitment to health and safety is simple: employees are CH2M HILL's most significant asset and CH2M HILL management values their safety, health, and welfare. Also, top management believes that all injuries are preventable. CH2M HILL's safety culture empowers employees at all levels to accept ownership for safety and take whatever actions are necessary to eliminate injury. Our company is committed to world-class performance in health and safety and also understands that world-class performance in health and safety is a critical element in overall business success.

CH2M HILL is committed to the prevention of personal injuries, occupational illnesses, and damage to equipment and property in all of its operations; to the protection of the general public whenever it comes in contact with the Company's work; and to the prevention of pollution and environmental degradation.

Company management, field supervisors, and employees plan safety into each work task in order to prevent occupational injuries and illnesses. The ultimate success of CH2M HILL's safety program depends on the full cooperation and participation of each employee.

CH2M HILL management extends its full commitment to health and safety excellence.

### 1.1.3 Project-Specific Health, Safety, and the Environment Goals

All management and employees are to strive to meet the project-specific Health, Safety, and the Environment (HSE) goals outlined below. The team will be successful only if everyone makes a concerted effort to accomplish these goals. The goals allow the project to stay focused on optimizing the health and safety of all project personnel and, therefore, making the project a great success.

The Project has established eleven specific goals and objectives:

- Create an injury-free environment;
- Have zero injuries or incidents;

- Provide management leadership for HSE by communicating performance expectations, reviewing and tracking performance, and leading by example;
- Ensure effective implementation of the HSP through education, delegation, and team work;
- Ensure 100 percent participation in HSE compliance;
- Continuously improve our safety performance;
- Maintain free and open lines of communication;
- Make a personal commitment to safety as a value;
- Focus safety improvements on high-risk groups;
- Continue strong employee involvement initiatives; and
- Achieve health and safety excellence.

## 2.0 Applicability

This HSP applies to:

- All CH2M HILL staff, including subcontractors and tiered subcontractors of CH2M HILL working on the site; and
- All visitors to the construction site in the custody of CH2M HILL (including visitors from the Client, the Government, the public, and other staff of any CH2M HILL company).

This HSP does not apply to the third-party contractors, their workers, their subcontractors, their visitors, or any other persons not under the direct control or custody of CH2M HILL.

This HSP defines the procedures and requirements for the health and safety of CH2M HILL staff and visitors when they are physically on the work site. The work site includes the project area (as defined by the contract documents) and the project offices, trailers, and facilities thereon.

This HSP will be kept onsite during field activities and will be reviewed as necessary. The HSP will be amended or revised as project activities or conditions change or when supplemental information becomes available. The HSP adopts, by reference, the Enterprise-wide Core Standards and Standard Operating Procedures (SOPs), as appropriate. In addition, the HSP may adopt procedures from the project Work Plan and any governing regulations. If there is a contradiction between this HSP and any governing regulation, the more stringent and protective requirement shall apply.

All CH2M HILL staff and subcontractors must sign the employee sign-off form included in this document as Attachment 1 to acknowledge review of this document. Copies of the signature page will be maintained onsite by the Safety Coordinator (SC).

## 3.0 General Project Information

### 3.1 Project Information and Background

**Project Number:**

473933 - Long term remedial action (LTRA) Operations, Maintenance and Monitoring Activities (OU1)  
456991 - Velsicol Chemical Corporation Superfund Site Phase 1, Adjacent or Nearby Properties, OU1 RD  
474507 - Velsicol Chemical Corporation Superfund Site - Sediment/Floodplain Remedial Investigation (OU3)  
478783 - Main Plant Site Remedial Design  
462655 - Velsicol Chemical Corporation Superfund Site OU1 RA Phase 1

**Client:**

U.S. Environmental Protection Agency (USEPA)

**Project/Site Name:**

Velsicol Chemical/Pine River

**Site Address:**

324 North Street  
St. Louis, MI 48880

**CH2M HILL Project Managers:**

Theo von Wallmenich/DET  
Scott Pratt/DET  
Tom Hutchinson/DET

**CH2M HILL Office:**

7927 Nemco Way, Suite 120  
Brighton, MI  
48116

**Date HSP Revision Prepared:**

March 2014

**Date(s) of Site Work:**

April 2014 - December 2015

## 3.2 Site Background and Setting

The site is located at 324 North Street. Vehicular access to the site is gained through a gate on North Street (see figures).

### Site Size

The site consists of a 52-acre main plant site, an approximate 12-block neighborhood comprising the Adjacent and Nearby Properties (ANP), and 30-acre river area.

### Site Topography

Relatively flat – gradient towards riverbank.

### Prevailing Weather

The coldest month is January. Temperatures range from lows of 13 degrees Fahrenheit (°F) to highs of 38°F. The mean average temperature is 21°F and the average precipitation is 1.87 inches. The warmest month is July. Temperatures range from lows of 59°F to highs of 84°F. The mean average temperature is 71°F and the average precipitation is 2.7 inches.

### Site History

The Velsicol Chemical Plant operated from 1936 through 1978 and manufactured and distributed fodder feed, dichlorodiphenyl trichloroethane (DDT), and a variety of organic and inorganic chemicals including hexabromobenzene (HBB) and tris (2,3-dibromopropyl) phosphate (TRIS). During its operation, the Velsicol Chemical Company had several permitted outfalls that discharged into the Pine River. Prior to the Velsicol Chemical Company operations, Michigan Chemical Company conducted business at the plant site and was involved in the manufacture of fire retardants using the chemical polybrominated biphenyl (PBB).

Initial remedial measures for the site began in October 1978 with closure of the plant, cessation of discharges to the Pine River, and demolition of structures on the main plant site. Site characterization investigations began in 1978 and continued through 1980. In 1982, USEPA and the State of Michigan entered a Consent Judgment with Velsicol for the site. In the Consent Judgment, Velsicol agreed to contain in place the 52-acre main plant site. A No-Action remedy was selected for the Pine River, and the Consent Judgment released Velsicol from liability for cleanup of the sediments primarily because contaminated sediment removal technologies were not developed at that time. The plant site remedy selected consisted of a 2-foot-thick, low-permeability slurry wall around the 52-acre facility and a 3-foot-thick, low-permeability clay cap. Velsicol completed construction of the containment system in 1984, and the site is now covered with grass and surrounded by a chain link fence.

### Site Description

The Velsicol Chemical site is located along the Pine River in the town of St. Louis, Michigan (Figure 1-1). The site consists of three operable units (OUs). OU1 is an approximately 52-acre parcel that was once occupied by the Velsicol Chemical Company. USEPA, the State of Michigan, and Velsicol agreed to a remedy for OU1 in a 1982 Consent Judgment. This remedy, onsite containment of contaminated soils and groundwater, was implemented by Velsicol in 1984. Recent remedial activities in the river have shown seepage of contaminants from the riverbank along the main plant site. The Michigan Department of Environmental Quality (MDEQ) and their subcontractor, Weston Solutions (Weston) are in the process of completing a remedial investigation/feasibility study (RI/FS) for the main plant site. Eventually, a new remedy will be selected and implemented for the main plant site.

The second operable unit, OU2, consists of contamination in sediments and fish in the Pine River. The Pine River flows past the banks of the former plant and downstream into Mill Pond, where the St. Louis

Municipal Hydroelectric Dam is located. OU2 encompasses about 30 acres of previously DDT-contaminated sediments in the St. Louis Impoundment of the Pine River. The sediments were remediated by mechanical excavation methods from 1999 to 2006. A total of 639,975 cubic yards of sediment containing approximately 222 tons of DDT were excavated and disposed offsite during the sediment removal activities. In addition, 4,355 gallons of dense non-aqueous phase liquid (DNAPL) were removed and incinerated at an offsite facility.

The third operable unit, OU3, consists of contamination in sediments and fish in the Pine River downstream of OU2. OU3 begins at the St. Louis hydroelectric dam and extends down to Pine's confluence with the Chippewa River. No remediation of this reach of river has been conducted to date. The MDEQ and their subcontractor, Weston Solutions (Weston) have conducted a previous investigation into the extent of DDT and PPB contamination in sediments, soils, and fish in this portion of the reach. The site is in a primarily residential area, with houses along the banks of the river and a recreational park bordering the bank of the river to the north. Although the Pine River is navigable, swimming and boating are considered undesirable due to the presence of contaminated sediments and a no consumption fish advisory that has been in effect since 1977.

### **New Site Description/Task (October 2012)**

The Velsicol Chemical Corporation/Pine River Superfund Site is located in St. Louis, Michigan, and encompasses a 52-acre land parcel commonly referred to as the former plant site (FPS) in addition to the ANP. The ANP is an approximately 11-block residential area with a few commercial properties located south of the FPS. A chemical plant once occupied the FPS, which is located in a predominantly residential area. The Pine River flows along the western and northern boundary of the FPS into Mill Pond, where a hydroelectric dam is located (about 0.25-mile east of the FPS). Three nearby properties are also part of the former Velsicol operations and are referred to as the former creamery warehouse, Velsicol property 1, and the former burn area (FBA). The FBA was proposed for the National Priorities List in the early 1980s, but was not placed on the list at that time. The FBA has recently been reevaluated, and was placed on the National Priorities List in March 2010.

The Velsicol Site is composed of three OUs: OU1 includes the FPS and ANP, OU2 includes the sediments and fish in the Pine River adjacent to the FPS and immediately downstream of the FPS (above the hydroelectric dam), and OU3 includes the Pine River downstream of the hydroelectric dam. The boundary of the 52-acre FPS is fenced, and access is controlled through a main gate that remains locked at all times. The City of St. Louis distributes drinking water to the community through the operation of six drinking water wells.

### **3.3 Description of Tasks**

Refer to project documents (i.e., Work Plans) for detailed task information. A health and safety risk analysis (Table 1) 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 (Hawwoper).

### 3.3.1 Hazwoper-Regulated Tasks

- Excavation (Residential Soil, Main Plant Site RD)
- Soil Sampling (Residential, floodplain, Main Plant Site RDI)
- Groundwater and surface water sampling
- Sediment sampling and sediment profile imaging
- Drilling (DPT, Rotasonic)
- Test Pit Excavation
- Pumping of non-aqueous phase liquid (NAPL)
- NAPL/DNAPL characterization and sampling
- Surveying
- Oversight of remediation and construction
- Oversight of material loading for offsite disposal
- Operation and maintenance of groundwater collection system (GWCS) in NAPL collection trench
- Fish tissue sampling
- Geophysical surveying
- Membrane Interface Probe investigation
- Monitoring Well Installation and Well Development
- Waste management activities

### 3.3.2 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 Responsible Health and Safety Manager (RHSM) is required before these tasks are conducted on regulated hazardous waste sites.**

#### **TASKS**

- Utility Locates (non-intrusive)
- Survey services (local roadways)

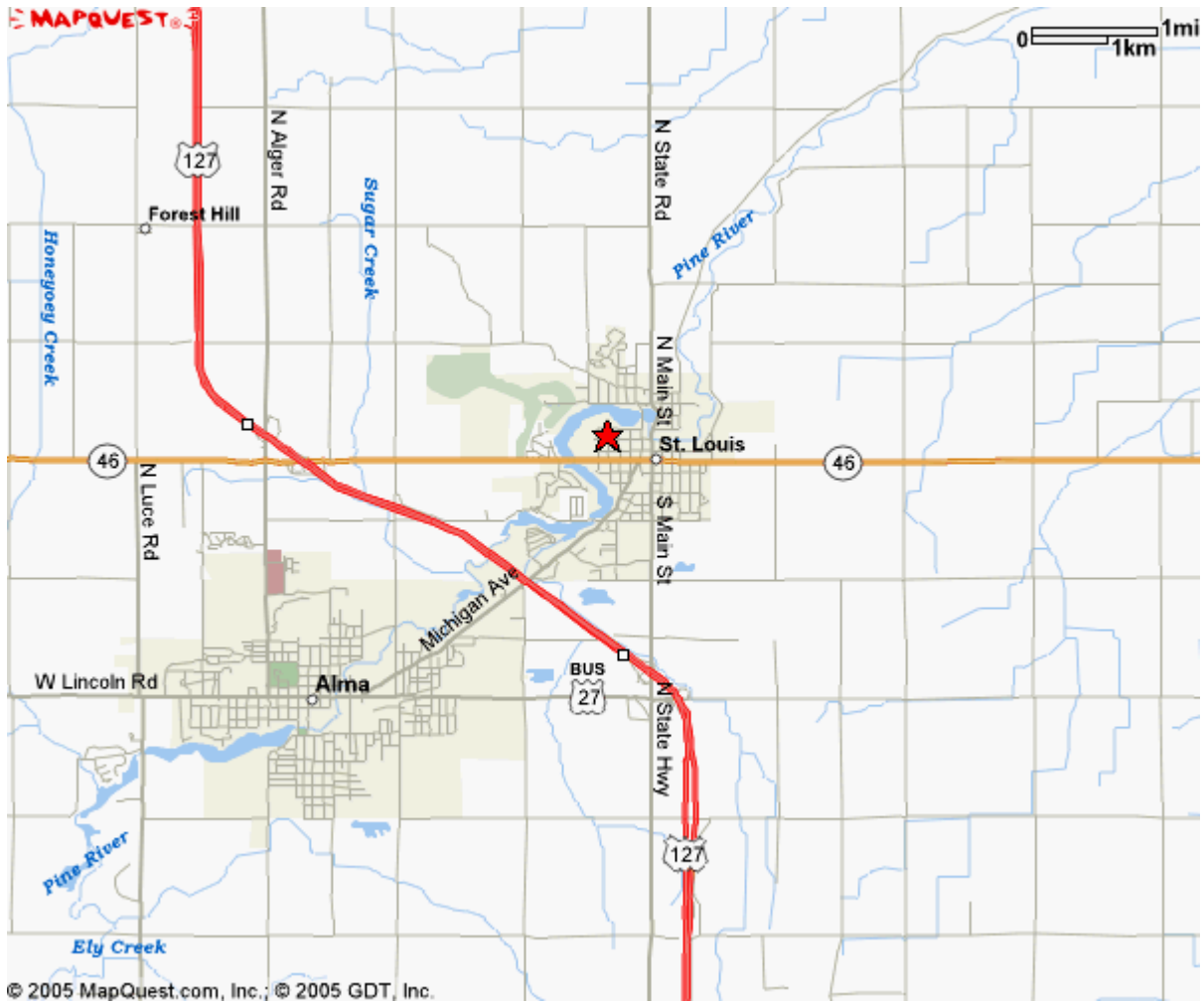
#### **CONTROLS**

- 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)



# Site Map

Figure 1-1 Velsicol Chemical Site Location



Site Map  
Velsicol Chemical/Pine River Site in St. Louis, Michigan  
CH2M HILL Health & Safety Plan



Aerial photo dated October 14, 2002

## 4.0 Project Organization and Responsibilities

### 4.1 Client

Contact Name: Thomas Alcamo, USEPA  
Phone: (312) 886-7278

### 4.2 CH2M HILL

#### 4.2.1 Project Manager

Project Manager Name: Theo Von Wallmenich/DET  
Job Title: Site Manager  
CH2M HILL Office: Brighton, Michigan  
Telephone Number: (989) 289-1515  
Cellular Number: (517) 483-3015

Project Manager Name: Scott Pratt/DET  
Job Title: Project Manager  
CH2M HILL Office: Brighton, Michigan  
Telephone Number: (810) 360-2013  
Cellular Number: (248) 219-7146

Project Manager Name: Tom Hutchinson/DET  
Job Title: Project Manager  
CH2M HILL Office: Brighton, Michigan  
Telephone Number: (989) 828-5237  
Cellular Number: (989) 954-1111

The project manager (PM) is responsible for providing adequate resources (budget and staff) for project-specific implementation of the HSE management process. The PM has overall management responsibility for the tasks listed below. The PM may explicitly delegate specific tasks to other staff, as described in sections that follow, but retains ultimate responsibility for completion of the following in accordance with this document:

- Incorporate standard terms and conditions, and contract-specific HSE roles and responsibilities in contract and subcontract agreements (including flow-down requirements to lower-tier subcontractors).
- Select safe and competent subcontractors by:
  - Choosing potential subcontractors based on technical ability and HSE performance;
  - Implementing the subcontractor prequalification process;
  - Ensuring that acceptable certificates of insurance, including CH2M HILL as named additional insured, are secured as a condition of subcontract award; and
  - Ensuring HSE submittals, subcontract agreements, and appropriate site-specific safety procedures are in place and accepted prior field mobilization.
- Ensure copies of training and medical monitoring records, and site-specific safety procedures are being maintained in the project file accessible to site personnel.
- Provide oversight of subcontractor HSE practices per the site-specific safety plans and procedures.

- Manage the site and interfacing with 3<sup>rd</sup> parties in a manner consistent with the contract and subcontract agreements and the applicable standard of reasonable care.
- Ensure that the overall, job-specific, HSE goals are fully and continuously implemented.
- Provide visible support and motivation for HSE programs, rules, procedures, processes, and training, leading by example and encouraging CH2M HILL employees to take ownership of HSE issues.
- Intervene or stop work when an unsafe condition or behavior is observed, and/or when an environmentally compromising condition is encountered.
- Make available to and require CH2M HILL employees to complete required HSE training within established timelines and provide project numbers for such training.
- Consistently and even-handedly enforce HSE rules, procedures, and requirements at the office and/or on project work sites.
- Promptly report all work-related HSE incidents or near misses.
- Wear any required personal protective equipment.
- Ensure CH2M HILL employees complete required HSE training within established timelines.
- Conduct, cooperate, or assist with HSE incident investigations.
- Consult with the Human Resources Delivery Partner before taking any disciplinary action (other than verbal counseling) associated with CH2M HILL Policy 203 and/or HSE programs rules, procedures, processes and training.

#### 4.2.2 CH2M HILL Responsible Health and Safety Manager

RHSM Name: Carl Woods/CIN CH2M HILL Office: CIN Telephone Number: (513) 889-5771 Cellular Number: (513) 319-5771
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The RHSM is responsible for the following:

- Review and evaluate subcontractor HSE performance using the pre-qualification process;
- Approve HSP and its revisions as well as Activity Hazard Analyses (AHA);
- Review and evaluate subcontractor site-specific safety procedures for adequacy prior to start of subcontractor's field operations;
- Support the oversight (or SC's direct oversight) of subcontractor and tiered subcontractor HSE practices;
- Permit upgrades/ downgrades in respiratory protection after reviewing analytical data;
- Conduct audits as determined by project schedule and coordination with PM; and
- Participate in incident investigations, lessons learned, loss/near loss reporting.

#### 4.2.3 CH2M HILL Project Environmental Manager

EM Name: Ron Utter  
CH2M HILL Office: DET  
Telephone Number: (989) 750-7272  
Cellular Number: (989) 948-5880

The Project EM is responsible for the following:

- Provide environmental program support in areas such as training, auditing, planning, permit tracking, and subcontractor oversight as needed or as specified in the project environmental plan;
- Review and evaluate qualifications for subcontractors with a history of environmental non-compliance and for waste transportation and disposal subcontractors;
- Evaluate any spills, releases, or environmental permit incidents for appropriate follow-up actions, notifications, and recordkeeping requirements; and
- Provide environmental compliance and environmental management expertise and advice to the project team as needed during the course of the project.

#### 4.2.4 CH2M HILL Safety Coordinator

The primary Site Safety Coordinator (SSC) is listed below.

**SC Name: Stephen Chumney/DET**  
Job Title: Site Operations Manager/Technical Task Manager  
CH2M HILL Office: Brighton, MI  
Telephone Number: (810) 360-2047  
Cellular Number: (734) 417-6874

The following lists vital project and field staff and are considered secondary SSCs for the various Velsicol project tasks.

SC Name: Scott Pratt/DET  
Job Title: Project Manager  
CH2M HILL Office: Brighton, MI  
Telephone Number: (810) 360-2013  
Cellular Number: (248) 219-7146

SC Name: Grant Koster/DET  
Job Title: OU3 Assistant Project Manager and Technical Task Manager  
CH2M HILL Office: Brighton, MI  
Telephone Number: (616) 848-7047  
Cellular Number: (517) 755-8267

SC Name: Elizabeth Markham  
Job Title: Field Quality Manager/Technical Task Manager  
CH2M HILL Office: Brighton, MI  
Telephone Number: (586) 980-3355  
Cellular Number: (586) 855-4967

SC Name: Rachel Vaughan  
Job Title: Sample Manager/Field Team Member  
CH2M HILL Office: Brighton, MI  
Telephone Number: (810) 316-2021  
Cellular Number: (906) 281-3539

Hillary Ott  
Job Title: Field Team Member  
CH2M HILL Office: Washington D.C.  
Telephone Number: (703) 376-5165

The SC is responsible for verifying that the project is conducted in a safe manner including the following specific obligations:

- Verify this HSP is current and amended when project activities or conditions change;
- Verify CH2M HILL site personnel and subcontractor personnel read the HSP and sign the Employee Sign-Off Form, prior to commencing field activities;
- Verify CH2M HILL site personnel have completed any required specialty training (for example, fall protection, confined space entry, among others) and medical surveillance as identified in this HSP;
- Verify that project files available to site personnel include copies of executed subcontracts and subcontractor certificates of insurance (including CH2M HILL as named additional insured), bond, contractor's license, training and medical monitoring records, and accepted site-specific safety procedures prior to start of subcontractor's field operations;
- Act as the project "Hazard Communication Coordinator" and perform the responsibilities outlined in the HSP;
- Act as the project "Emergency Response Coordinator" and perform the responsibilities outlined in the HSP;
- Post the Occupational Safety and Health Administration (OSHA) job-site poster; the poster is required at sites where project field offices, trailers, or equipment-storage boxes are established;
- Hold and/or verify that safety meetings are conducted and documented in the project file initially and as needed throughout the course of the project (as tasks or hazards change);
- Verify that project health and safety forms and permits are being used as outlined this HSP;
- Perform oversight and assessments of subcontractor HSE practices per the site-specific safety plan and verify that project activity self-assessment checklists are being used as outlined in the HSP;
- Perform oversight of subcontractor and CH2M HILL decontamination procedures and verify equipment and tools are sufficiently decontaminated prior to removal from established decontamination areas(s) and prior to removal from the site;

- Coordinate with the RHSM regarding CH2M HILL and subcontractor operational performance, and 3<sup>rd</sup> party interfaces;
- Verify appropriate personal protective equipment (PPE) use, availability, and training;
- Ensure that the overall, job-specific, HSE goals are fully and continuously implemented;
- Conduct accident investigations including root cause analysis;
- Calibrate and conduct air monitoring in accordance with the HSP; maintain all air monitoring records in project file;
- Maintain HSE records and documentation;
- Facilitate OSHA or other government agency inspections including accompanying inspector and providing all necessary documentation and follow-up;
- Deliver field HSE training as needed based on project-specific hazards and activities;
- Contact the RHSM and PM in the event of an incident;
- When an apparent imminent danger exists, immediately remove all affected CH2M HILL employees and subcontractors, notify subcontractor safety representative, stop affected work until adequate corrective measures are implemented, and notify the PM and RHSM as appropriate; and
- Document all oral health and safety-related communications in project field logbook, daily reports, or other records.

### 4.3 CH2M HILL Subcontractors

(Reference CH2M HILL SOP HSE-215, *Contracts and Subcontracts*)

Subcontractor: US Ecology  
 Subcontractor Contact Name: Rob Chafin  
 Telephone: 313-571-7141

Subcontractor: Spicer Group Inc.  
 Subcontractor Contact Name: Jeff Wood  
 Telephone: 313-571-7141

Subcontractor: Geosphere Inc.  
 Subcontractor Contact Name: Robert Glaccum  
 Telephone: (989) 662-6149  
 Cellular Phone: (989) 430-2088

Subcontractor: Cascade drilling  
 Subcontractor Contact Name: Dennis Robbins  
 Telephone:

Subcontractor: EFS  
 Subcontractor Contact Name:  
 Telephone: TBD

Subcontractor: Columbia Technologies  
Subcontractor Contact Name:  
Telephone: TBD

Subcontractor: HM Environmental  
Subcontractor Contact Name: Robert Borst  
Telephone: TBD

Subcontractor: Trimatrix Analytical Laboratory  
Subcontractor Contact Name: Gary Wood  
Telephone: TBD

Subcontractor: Residential Excavation Subcontractor  
Subcontractor Contact Name: TBD  
Telephone: TBD

Subcontractors must comply with the following activities, and are responsible to:

- Comply with all local, state, and federal safety standards;
- Comply with project and owner safety requirements;
- Actively participate in the project safety program and either hold or attend and participate in all required safety meetings;
- Provide a qualified safety representative to interface with CH2M HILL;
- Maintain safety equipment and PPE for their employees;
- Maintain and replace safety protection systems damaged or removed by the subcontractor's operations;
- Notify the SC of any accident, injury, or incident immediately and submit reports to CH2M HILL within 24 hours;
- Install contractually required general conditions for safety (for example, handrail, fencing, fall protection systems, floor opening covers);
- Conduct and document weekly safety inspections of project-specific tasks and associated work areas;
- Conduct site-specific and job-specific training for all subcontractor employees, including review of the CH2M HILL HSP, subcontractor HSPs, and subcontractor AHAs and sign appropriate sign-off forms; and
- Determine and implement necessary controls and corrective actions to correct unsafe conditions.



The subcontractors listed above may be required to submit their own site-specific HSP and other plans such as lead or asbestos abatement compliance plans. Subcontractors are responsible for the health and safety procedures specific to their work, and are required to submit their plans to CH2M HILL for review and acceptance before the start of field work.

Subcontractors are also required to prepare AHAs before beginning each activity posing hazards to their personnel. The AHA shall identify the principle steps of the activity, potential health and safety hazards for each step and recommended control measures for each identified hazard. 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.

## **4.4 Employee Responsibilities**

All personnel are assigned responsibility for safe and healthy operations. This concept is the foundation for involving all employees in identifying hazards and providing solutions. For any operation, individuals have full authority to stop work and initiate immediate corrective action or control. In addition, each worker has a right and responsibility to report unsafe conditions or practices. This right represents a significant facet of worker empowerment and program ownership. Through shared values and a belief that all accidents are preventable, our employees accept personal responsibility for working safely.

Each employee is responsible for the following performance objectives:

- Perform work in a safe manner and produce quality results;
- Perform work in accordance with company policies, and report injuries, illnesses, and unsafe conditions;
- Complete work without injury, illness, or property damage;
- Report all incidents immediately to supervisor, and file proper forms with a human resources representative;
- Report all hazardous conditions and/or hazardous activities immediately to supervisor for corrective action; and
- Complete an HSE orientation prior to being authorized to enter the project work areas.

### **4.4.1 Employee Authority**

Each employee on the project has the obligation and authority to shut down any perceived unsafe work and during employee orientation, each employee will be informed of their authority to do so.

## 5.0 Standards of Conduct

All individuals associated with this project must work injury-free and drug-free and must comply with the following standards of conduct, the HSP, and the safety requirements of CH2M HILL. Commonly accepted standards of conduct help maintain good relationships between people. They promote responsibility and self-development. Misunderstandings, frictions, and disciplinary action can be avoided by refraining from thoughtless or wrongful acts.

### 5.1 Standards of Conduct Violations

All individuals associated with this project are expected to behave in a professional manner. Violations of the standards of conduct would include, but not be limited to:

- Failure to perform work;
- Inefficient performance, incompetence, or neglect of work;
- Willful refusal to perform work as directed (insubordination);
- Negligence in observing safety regulations, poor housekeeping, or failure to report on-the-job injuries or unsafe conditions;
- Unexcused or excessive absence or tardiness;
- Unwillingness or inability to work in harmony with others;
- Discourtesy, irritation, friction, or other conduct that creates disharmony;
- Harassment or discrimination against another individual;
- Failure to be prepared for work by wearing the appropriate construction clothing or bringing the necessary tools; or
- Violation of any other commonly accepted reasonable rule of responsible personal conduct.

### 5.2 Disciplinary Actions

The Environmental Services (ES) business group employees, employees working on ES business group projects, and subcontractor employees are subject to disciplinary action for not following HSE rules and requirements. Potential disciplinary action is equally applicable to all employees including management and supervision. Disciplinary action may include denial of access to the worksite, warnings, reprimands, and other actions up to and including termination depending on the specific circumstances.

### 5.3 Subcontractor Safety Performance

CH2M HILL should continuously endeavor to observe subcontractors' safety performance and adherence to their plans and AHAs. 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. CH2M HILL oversight does not relieve subcontractors of their responsibility for effective implementation and compliance with the established plan(s).

### 5.3.1 Observed Hazard Form

When apparent non-compliance or unsafe conditions or practices are observed, notify the subcontractor's supervisor or safety representative verbally, and document using the Observed Hazard Form, included as an attachment to this HSP, and require corrective action.

If necessary, stop subcontractor's work using the Stop Work Order Form until corrective actions is implemented for observed serious hazards or conditions. Update the Observed Hazard Form to document corrective actions have been taken. The subcontractor is responsible for determining and implementing necessary controls and corrective actions.

### 5.3.2 Stop Work Order

CH2M HILL has the authority, as specified in the contract, and the responsibility to stop work in the event any CH2M HILL employee observes unsafe conditions or failure of the subcontractor to adhere to its safe-work practices. This authority and action does not in any way relieve the subcontractor of its responsibilities for the means and methods of the work or, therefore, of any corrective actions. Failure to comply with safe work practices can be the basis for restriction or removal of the subcontractor staff from the job site, termination of the subcontract, restriction from future work, or all three.

When an apparent imminent danger is observed, immediately stop work and alert all affected individuals. Remove all affected CH2M HILL employees and subcontractor staff from the danger, notify the subcontractor's supervisor or safety representative, and do not allow work to resume until adequate corrective measures are implemented. Notify the PM, Contract Administrator (KA) and RHSM.

When repeated non-compliance or unsafe conditions are observed, notify the subcontractor's supervisor or safety representative and stop affected work by completing and delivering the Stop Work Order Form (attached to this HSP) until adequate corrective measures are implemented. Consult the KA to determine what the contract dictates for actions to pursue in event of subcontractor non-compliance including work stoppage, back charges, progress payments, removal of subcontractor manager, monetary penalties, or termination of subcontractor for cause.

## 5.4 Incentive Program

Each project is encouraged to implement a safety incentive program that rewards workers for exhibiting exemplary safety behaviors. Actions that qualify are those that go above and beyond what is expected. Actions that will be rewarded include spotting and correcting a hazard, bringing a hazard to the attention of your foreman, telling your foreman about an incident, coming up with a safer way to get the work done, or stopping a crew member from doing something unsafe. The program will operate throughout the project, covering all workers. The incentive program will be communicated to all employees during the project employee orientation and project safety meetings.

## 5.5 Reporting Unsafe Conditions/Practices

Responsibility for effective health and safety management extends to all levels of the project and requires good communication between employees, supervisors, and management. Accident prevention requires a pro-active policy on near misses, close calls, unsafe conditions, and unsafe practices. All personnel must report any situation, practice, or condition which might jeopardize the safety of our projects. All unsafe conditions or unsafe practices will be corrected immediately. CH2M HILL has zero tolerance of unsafe conditions or unsafe practices.

No employee or supervisor will be disciplined for reporting unsafe conditions or practices. Individuals involved in reporting the unsafe conditions or practices will remain anonymous.

The following reporting procedures will be followed by all project employees:

- Upon detection of any unsafe condition or practice, the responsible employee will attempt to safely correct the condition;
- The unsafe condition or practice will be brought to the attention of the worker's direct supervisor, unless the unsafe condition or practice involves the employee's direct supervisor. If so, the SC needs to be notified at once by the responsible employee;
- Either the responsible employee or responsible employee's direct supervisor is responsible for immediately reporting the unsafe condition or practice to the SC;
- The SC will act promptly to correct the unsafe condition or practice; and
- Details of the incident or situation will be recorded by the SC in the field logbook or use the Observed Hazard Form if subcontractor was involved.

## 6.0 Safety Planning and Change Management

### 6.1 Daily Safety Meetings and Pre-Task Safety Plans

Daily safety meetings are to be held with all project personnel in attendance to review the hazards posed and required HSE procedures and AHAs that apply for each day's project activities. The Pre-Task Safety Plans (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 field team leader (FTL), or designee, completes the PTSP, provided as an attachment to this HSP, 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 HSE procedures, as identified in the HSP and AHA. The use of PTSPs promotes worker participation in the hazard recognition and control process while reinforcing the task-specific hazard and required HSE procedures with the crew each day.

### 6.2 Weekly Quality Meetings and Site-specific Quality Briefing Forms

Weekly quality meetings are to be held with all project personnel in attendance to review quality issues and potential quality hazards involved with project activities. These meetings may be held in conjunction with the daily safety meetings discussed in Section 6.1. The Site-specific Quality Brief will be used to document the quality issues discussed, and hazards to look for. As quality issues arise, additional quality meetings will be held to review and mitigate these issues as necessary.

At the beginning of each work week, the field quality manager (FQM), or designee, completes the site specific Quality Brief, provided as an attachment to this HSP, with input from the field team, during their weekly quality meeting. The day's personnel and tasks are documented, along with quality hazards posed and required mitigation procedures. The use of the Quality Brief promotes worker participation in the quality issue recognition and control process while reinforcing the site-specific quality hazards with the crew each day.

### 6.3 Change Management

This HSP addresses all known activities and associated hazards. As work progresses, if significant changes are identified which could affect health and safety at the site, coordinate with the RHSM to determine whether a HSP update is necessary.

The following are examples of changes that may require a revision to the plan:

- Change in CH2M HILL staff;
- New subcontractor to perform work;
- New chemicals or equipment brought to site for use;
- Change in scope or addition of new tasks;
- Change in contaminants of concern (COCs) or change in concentrations of COCs; and
- New hazards or hazards not previously identified that are not addressed in this HSP.

## 6.4 Agency Inspection Guidance

(Reference CH2M HILL SOP HSE-201, *Agency Inspections and Communications*)

Agency inspections (e.g., OSHA, EPA, other regulatory agencies) are on the rise. CH2M HILL implements safety and environmental programs in order to ensure safety to workers, the public, and the environment. This plan addresses things like labeling containers, completing the hazard communication training using the attachments to this HSP, listing training requirements and PPE requirements, and addressing project-specific hazards. Field personnel need to contact the RHSM to update this plan if hazards are encountered that are not addressed.

Following is some pertinent information regarding OSHA inspections in 2011:

- The number of OSHA inspectors increased by 130;
- A goal has been set to conduct 44,000 workplace inspections, which is up from 36,000;
- The definition for “Repeat Violations” will encompass the past 5 years versus 3 years;
- OSHA directors can only reduce fines by a maximum of 30%;
- Some fines will be increased between \$3,000 and \$4,000 per violation;
- Proposed legislature - Serious fines raised from \$7,000 to \$12,000; and
- Proposed legislature - Willful fines from \$70,000 to \$250,000.

[SOP HSE-201](#) addresses agency inspections in detail, and the attached **Target Zero Bulletin on Agency Inspections** provides a good summary of the inspection process and what to do if an agency such as OSHA or EPA shows up at the site. It is critical immediate notification or the RHSM if an inspector arrives (and EM if it is environmental-related); they can help facilitate and make additional notifications. Please either post the Target Zero Bulletin at your field trailer or keep it with your Health and Safety Plan/Environmental Plan; make it a topic at a safety meeting and keep it readily available in the event of an inspection.

## 7.0 Project Hazard Analysis

A health and safety risk analysis (Table 1) has been performed for each task. In the order listed below, the RHSM considers the various methods for mitigating the hazards. Employees are trained on this hierarchy of controls during their hazardous waste training and reminded of them throughout the execution of projects:

- Elimination of the hazards (use remote sampling methodology to avoid going into a confined space);
- Substitution (reduce exposure to vapors by using of a geoprobe instead of test pitting);
- Engineering controls (ventilate a confined space to improve air quality);
- Warnings (establish exclusion zones to keep untrained people away from hazardous waste work);
- Administrative controls (implement a work-rest schedule to reduce chance of heat stress); or
- Use of PPE (use of respirators when action levels are exceeded).

The hazard controls and safe work practices are summarized in the following sections of this HSP:

- General hazards and controls;
- Project-specific hazards and controls;
- Physical hazards and controls;
- Biological hazards and controls; and
- Contaminants of concern

### 7.1 Activity Hazard Analysis

An 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. The AHA shall identify the work tasks required to perform each activity, along with potential HSE hazards and recommended control measures for each hazard. 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. The following hazard controls and applicable CH2M HILL core standards and SOPs should be used as a basis for preparing AHAs.

AHAs must be prepared for CH2M HILL activities and included as an attachment to this HSP.

### 7.2 Subcontractor Activity Hazard Analysis

CH2M HILL subcontractors are required to provide AHAs specific to their scope of work on the project for acceptance by CH2M HILL. Each subcontractor shall submit AHAs for their field activities, as defined in their scope of work, along with their project-specific safety plan and/or procedures. Additions or changes in field activities, equipment, tools, or material used to perform work or hazards not addressed in existing AHAs requires either a new AHA to be prepared or an existing AHA to be revised.

Table 1 – General Activity Hazard Analysis

Potential Hazard	Excavation	Surface Water and Sediment Sampling Using a Boat or barge	Drilling	NAPL/wastewater Sampling	Pumping of NAPL	Surveying	Oversight of Loading Material for Offsite Disposal	Remediation and Construction Oversight	Operation & Maintenance of GWCS	Sampling Activities (Groundwater and Soil)	Geophysical Surveying	Fish Sampling (Electro-Shocking)	Waste management Activities	MIP Investigation	Test Pitting	Monitoring Well Installation and Well Development
Biological Hazards	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Chemical Hazard		X	X	X	X				X	X			X	X		X
Drilling			X											X		X
Drum Handling				X					X				X		X	X
Drum Sampling									X				X			
Earthmoving Equipment	X						X		X						X	
Electrical Safety	X	X	X		X			X	X	X		X		X	X	X
Electrofishing												X				
Excavations	X							X	X	X					X	
Fall Protection	X	X						X	X							
Field Vehicles	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Fire Prevention	X	X	X	X	X		X	X	X	X	X		X	X	X	X
Forklifts					X		X									
Hand & Power Tools	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Haul Truck Operations							X	X	X							
Hoists			X						X							
Knife Use	X	X	X	X	X		X	X	X	X		X	X	X	X	X
Lockout /Tagout									X							
Manual Lifting	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Noise	X	X	X		X		X	X	X	X					X	X



Potential Hazard	Project Activity	Excavation	Surface Water and Sediment Sampling Using a Boat or barge	Drilling	NAPL/wastewater Sampling	Pumping of NAPL	Surveying	Oversight of Loading Material for Offsite Disposal	Remediation and Construction Oversight	Operation & Maintenance of GWCS	Sampling Activities (Groundwater and Soil)	Geophysical Surveying	Fish Sampling (Electro-Shocking)	Waste management Activities	MIP Investigation	Test Pitting	Monitoring Well Installation and Well Development
Pressurized Lines/Equipment										X							
Pressure Washing Equipment/ Decontamination	X		X						X						X	X	X
Stairways and Ladders										X							
Temperature Extremes	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Traffic Safety	X		X			X			X		X	X		X	X	X	X
Ultraviolet Light exposure (sunburn)	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Utilities (underground/ overhead)	X		X			X	X	X	X	X		X			X	X	X
Vacuum Truck/Pumping Operations					X					X							
Visible Lighting	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Working around Material Handling Equipment								X	X	X							
Work Alone						X				X							
Work Over Water/Boating Safety		X											X				

## 8.0 General Hazards and Controls

This section provides safe work practices and control measures used to reduce or eliminate potential hazards. It is a summarized list of requirements. Always consult the appropriate CH2M HILL SOP to ensure all requirements are implemented.

### 8.1 Bloodborne Pathogens

(Reference CH2M HILL SOP HSE-202, *Bloodborne Pathogens*)

Exposure to bloodborne pathogens may occur when rendering first aid or cardiopulmonary resuscitation (CPR), or when coming into contact with landfill waste or waste streams containing potentially infectious material (PIM).

Employees trained in first-aid/CPR or those exposed to PIM must complete CH2M HILL's 1-hour bloodborne pathogens computer-based training module annually. When performing first-aid/CPR the following shall apply:

- Observe universal precautions to prevent contact with blood or other PIMs. Where differentiation between body fluid types is difficult or impossible, consider all body fluids to be potentially infectious materials;
- Always wash your hands and face with soap and running water after contacting PIMs. If washing facilities are unavailable, use an antiseptic cleanser with clean paper towels or moist towelettes; and
- If necessary, decontaminate all potentially contaminated equipment and surfaces with chlorine bleach as soon as possible. Use one part chlorine bleach (5.25 percent sodium hypochlorite solution) diluted with 10 parts water for decontaminating equipment or surfaces after initially removing blood or other PIMs. Remove contaminated PPE as soon as possible before leaving a work area.

CH2M HILL will provide exposed employees with a confidential medical examination should an exposure to PIM occur. This examination includes the following procedures:

- Documenting the exposure;
- Testing the exposed employee's and the source individual's blood (with consent); and
- Administering post-exposure prophylaxis.

### 8.2 Chemical Storage

The following are general guidelines for storing chemicals and other hazardous materials:

- Keep acids away from bases;
- Keep oxidizers (nitric acid, nitrates, peroxides, chlorates) and organics away from inorganic reducing agents (metals);
- Keep flammables and corrosives in appropriate storage cabinets;
- Do not store paper or other combustibles near flammables;
- Use secondary containment and lipped shelving that is secured; and

- Have a fire suppression system available.

### Storage of Flammable/Combustible Liquids

- Only approved containers and portable tanks shall be used for storage and handling of flammable and combustible liquids.
- Approved safety cans shall be used for the handling and use of flammable liquids in quantities of 5 gallons (19 liters) or less. Do not use plastic gas cans.
- For quantities of 1 gallon (3.78 liters) or less, the original container may be used for storage and use of flammable liquids.
- Flammable or combustible liquids shall not be stored in areas used for stairways or normally used for the passage of people.

### Indoor Storage of Flammable/Combustible Liquids

- No more than 25 gallons (95 liters) of flammable or combustible liquids shall be stored in a room outside of an approved storage cabinet.
- Quantities of flammable and combustible liquids in excess of 25 gallons (95 liters) shall be stored in an acceptable or approved cabinet.
- Cabinets shall be conspicuously lettered: "FLAMMABLE: KEEP FIRE AWAY."
- Not more than 60 gallons (228 liters) of flammable or 120 gallons (456 liters) of combustible liquids shall be stored in any one storage cabinet. Not more than three such cabinets may be located in a single storage area.

### Outside Storage of Flammable/Combustible Liquids

- Storage of containers (not more than 60 gallons [228 liters] each) shall not exceed 1,100 gallons (4180 liters) in any one area. No area shall be within 20 feet (6.1 meters) of any building.
- Storage areas shall be graded to divert spills away from buildings and surrounded by an earthen dike.
- Storage areas may not be located near a storm drain. Overflow and spills must be diverted away from storm drains or surface waters.
- Storage areas shall be free from weeds, debris, and other combustible materials.
- Outdoor portable tanks shall be provided with emergency vent devices and shall not be closer than 20 feet (6.1 meters) to any building.
- Signs indicating no smoking shall be posted around the storage area.

### Storage of Hazardous Waste

- All facilities storing ignitable and combustible liquids and hazardous wastes must be designed, constructed, maintained, and operated to minimize the possibility of a fire, explosion, or any release of hazardous constituents.

- Flammable wastes should be stored more than 50 feet from the property line.

### Storage of Chemical Injection Chemicals/Materials

- When chemical injection remediation technologies are being used at a site, the following storage guidelines must be followed:
- Some injection chemicals, such as strong oxidizers, may have stringent storage requirements per local or National Fire Codes. Verify that appropriate storage provisions are in place prior to starting work.
- **NOTE:** Counties and cities may have requirements specific to storing these chemicals. Also, storage and use of certain chemicals such as potassium permanganate and hydrogen peroxide may be subject to the new Chemical Facility Anti-Terrorism Standards of the Department of Homeland Security – the applicability depends on the chemical, quantity/concentration, and type of facility. Please contact the project Environmental Manager to determine whether chemicals are subject to these standards.
- Injection chemicals must be stored in a designated, secured area with spill prevention capabilities. Review MSDS or other information to determine potential incompatible materials. Incompatible materials shall not be stored together. Ensure all containers are labeled.

## 8.3 Driving Safety

(Reference CH2M HILL HSE Policy 205, Distracted Driving – Wireless Devices, Vehicle Safety Core Standard)

All CH2M HILL employees are prohibited from using Wireless Devices while operating a Motor Vehicle when conducting company business regardless of the location or vehicle ownership and whether or not during regular working hours.

All CH2M HILL contractors and subcontractors are prohibited from using Wireless Devices while operating a CH2M HILL or CH2M HILL client-owned, leased, or rented Motor Vehicle, or while operating any other Motor Vehicle on the project site.

- Prohibited use includes the following:
- Dialing or speed dialing
- Using a hands-free or voice recognition (blue tooth) device to dial or speed dial
- Engaging in conversation or listening to a conversation using a Wireless Device
- Checking emails or surfing the internet using a Wireless Device
- Texting or e-mailing (reading, sending, or screening) with a Wireless Device
- Programming or entering coordinates into a global positioning system (GPS) device (following directions by a GPS is permitted)
- Using a Wireless Device for voice recording or dictation
- Employees, contractors, and subcontractors who need to use a wireless device must pull off the road to a safe location, with the vehicle securely stopped and emergency flashers on, or wait until they reach their destination.

- Avoid distractions from mobile phones, smartphones, voice recognition systems, PDAs, notebook, tablets (or similar devices), or laptops, by turning off or silencing the wireless devices before operating a motor vehicle.

Follow the guidelines below when operating a vehicle:

- Obey speed limits; be aware of blind spots or other hazards associated with low visibility. Practice defensive driving techniques, such as leaving plenty of room between your vehicle and the one ahead of you;
- Do not drive while drowsy. Drowsiness can occur at any time, but is most likely after 18 hours or more without sleep;
- Maintain focus on driving. Eating, drinking, smoking, adjusting controls can divert attention from the road. Take the time to park and perform these tasks when parked rather than while driving; and
- Ensure vehicle drivers are familiar with the safe operation of vehicles of the type and size to be operated. Large vehicles such as full size vans and pick-ups have different vision challenges and handling characteristics than smaller vehicles.

## 8.4 Electrical Safety

(Reference CH2M HILL SOP HSE-206, *Electrical Safety*)

Below are the hazard controls and safe work practices to follow when using electrical tools, extension cords, and/or other electrical-powered equipment or when exposed to electrical hazards. Ensure the requirements of the referenced SOP are followed:

- Only qualified personnel are permitted to work on unprotected energized electrical systems;
- Only authorized personnel are permitted to enter high-voltage areas;
- CH2M HILL employees who might from time to time work in an environment influenced by the presence of electrical energy must complete Awareness Level Electrical Safety Training located on the CH2M HILL Virtual Office;
- 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;
- CH2M HILL has selected Ground Fault Circuit Interrupters (GFCIs) as the standard method for protecting employees from the hazards associated with electric shock;
  - GFCIs shall be used on all 120-volt, single phase 15 and 20-ampere receptacle outlets which are not part of the permanent wiring of the building or structure.
- An assured equipment grounding conductor program may be required under the following scenarios:
  - GFCIs cannot be utilized;

- Client requires such a program to be implemented; or
- Business group decides to implement program in addition to GFCI protection.
- Extension cords must be equipped with third-wire grounding. Cords passing through work areas must be covered, elevated or protected from damage. Cords should not be routed through doorways unless protected from pinching. Cords should not be fastened with staples, hung from nails, or suspended with wire;
- Electrical power tools and equipment must be effectively grounded or double-insulated and Underwriters Laboratory (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 (3 meters) from overhead power lines for voltages of 50 kV or less, and 10 feet (3 meters) plus 0.4 inches (1.0 cm) 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; and
- Protect all electrical equipment, tools, switches, and outlets from environmental elements.

## 8.5 Field Vehicles

- Field vehicles may be personal vehicles, rental vehicles, fleet vehicles, or project vehicles.
- Maintain a first aid kit, bloodborne pathogen kit, and fire extinguisher in the field vehicle at all times.
- Utilize a rotary beacon on vehicle if working adjacent to active roadway.
- Familiarize yourself with rental vehicle features prior to operating the vehicle:
  - Vision Fields and Blind Spots
  - Vehicle Size
  - Mirror adjustments
  - Seat adjustments
  - Cruise control features, if offered
  - Pre-program radio stations and Global Positioning System (GPS), if equipped
- Always wear seatbelt while operating vehicle.
- Adjust headrest to proper position.
- Tie down loose items if utilizing a van or pick-up truck.
- Close car doors slowly and carefully. Fingers can get pinched in doors.

- Park vehicle in a location where it can be accessed easily in the event of an emergency. If not possible, carry a phone.
- Have a designated place for storing the field vehicle keys when not in use.
- Ensure back-up alarms are functioning, if equipped. Before backing a vehicle, take a walk around the vehicle to identify obstructions or hazards. Use a spotter when necessary to back into or out of an area.
- See the Vehicle Accident Guidance attached to this HSP, if a vehicle incident is experienced in a rental or fleet vehicle.

## 8.6 Fire Prevention

(Reference CH2M HILL SOP HSE-403, *Hazardous Material Handling*)

Follow the fire prevention and control procedures listed below.

### Fire Extinguishers and General Fire Prevention Practices

- Fire extinguishers shall be provided so that the travel distance from any work area to the nearest extinguisher is less than 100 feet (30.5 meters). When 5 gallons (19 liters) or more of a flammable or combustible liquid is being used, an extinguisher must be within 50 feet (15.2 meters). 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 (3 meters) from any building.
- Solvent waste and oily rags must be kept in a fire resistant, covered container until removed from the site.
- Keep areas neat. Housekeeping is important.

### Dispensing of Flammable/Combustible Liquids

- Areas in which flammable or combustible liquids are dispensed in quantities greater than 5 gallons (22.7 liters) (shall be separated from other operations by at least 25 feet (7.6 meters).
- Drainage away from storm drains or surface waters or other means of containment shall be provided to control spills.
- Adequate natural or mechanical ventilation shall be provided to maintain the concentration of flammable vapor at or below 10 percent of the lower flammable limit.
- Dispensing of flammable liquids from one container to another shall be done only when containers are electrically interconnected (bonded).

- Dispensing flammable or combustible liquids by means of air pressure on the container or portable tanks is prohibited.
- Dispensing devices and nozzles for flammable liquids shall be of an approved type.

## 8.7 General Practices and Housekeeping

The following are general requirements applicable to all portions of the work:

- Site work should be performed during daylight hours whenever possible;
- 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, 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;
- Review the safety requirements of each job you are assigned to with your supervisor. You are not expected to perform a job that may result in injury or illness to yourself or to others;
- Familiarize yourself with, understand, and follow jobsite emergency procedures;
- Do not fight or horseplay while conducting the firm's business;
- Do not use or possess firearms or other weapons while conducting the firm's business;
- Report unsafe conditions or unsafe acts to your supervisor immediately;
- Report emergencies, occupational illnesses, injuries, vehicle accidents, and near misses immediately;
- Do not remove or make ineffective safeguards or safety devices attached to any piece of equipment;
- Report unsafe equipment, defective or frayed electrical cords, and unguarded machinery to your supervisor;



- Shut down and lock out machinery and equipment before cleaning, adjustment, or repair. Do not lubricate or repair moving parts of machinery while the parts are in motion;
- Do not run in the workplace;
- When ascending or descending stairways, use the handrail and take one step at a time;
- Do not apply compressed air to any person or clothing;
- Do not wear steel taps or shoes with metal exposed to the sole at any CH2M HILL project location;
- Do not wear finger rings, loose clothing, wristwatches, and other loose accessories when within arm's reach of moving machinery;
- Remove waste and debris from the workplace and dispose of in accordance with federal, state, and local regulations;
- Note the correct way to lift heavy objects (secure footing, firm grip, straight back, lift with legs), and get help if needed. Use mechanical lifting devices whenever possible; and
- Check the work area to determine what problems or hazards may exist.

## 8.8 Hazard Communication

(Reference CH2M HILL SOPs HSE-107, *Hazard Communication* and HSE-403, *Hazardous Material Handling*)

The hazard communication coordinator is to perform the following:

- Complete an inventory of chemicals brought onsite by CH2M HILL using the chemical inventory form included as an attachment to this HSP;
- Confirm that an inventory of chemicals brought onsite by CH2M HILL subcontractors is available;
- Request or confirm locations of safety data sheets (SDSs) from the client, contractors, and subcontractors for chemicals to which CH2M HILL employees potentially are exposed;
- Before or as the chemicals arrive onsite, obtain an SDS for each hazardous chemical and include on the chemical inventory sheet (attached to this HSP) and add the SDS to the SDS attachment section of this HSP;
- Label chemical containers with the identity of the chemical and with hazard warnings, and store properly;
- Give employees required chemical-specific HAZCOM training using the chemical-specific training form included as an attachment to this HSP; and
- Store all materials properly, giving consideration to compatibility, quantity limits, secondary containment, fire prevention, and environmental conditions.

## 8.9 Knife Use

Open-bladed knives (for example, box cutters, utility knives, pocket knives, machetes, and multi-purpose tools with fixed blades such as a Leatherman™) are prohibited at worksites except where the following three conditions are met:

- The open-bladed knife is determined to be the best tool for the job;
- An approved AHA or written procedure is in place that covers the necessary safety precautions (work practices, PPE, and training); and
- Knife users have been trained and follow the AHA.

## 8.10 Lighting

Lighting shall be evaluated when conducting work inside buildings, confined spaces, or other areas/instances where supplemental light may be needed (e.g., work before sunrise or after sunset). A light meter can be used to evaluate the adequacy of lighting. The following are common requirements for lighting and the conditions/type of work being performed:

- While work is in progress, outside construction areas shall have at least 33 lux (lx);
- Construction work conducted inside buildings should be provided with at least 55 lux light;
- The means of egress shall be illuminated with emergency and non-emergency lighting to provide a minimum 11 lx measured at the floor. Egress illumination shall be arranged so that the failure of any single lighting unit, including the burning out of an electric bulb will not leave any area in total darkness.

## 8.11 Manual Lifting

(Reference CH2M HILL SOP HSE-112, *Manual Lifting*)

Back injuries are the leading cause of disabling work and most back injuries are the result of improper lifting techniques or overexertion. Use the following to mitigate the hazards associated with lifting:

- When possible, the task should be modified to minimize manual lifting hazards;
- Lifting of loads weighing more than 40 pounds (18 kilograms) shall be evaluated by the SC using the Lifting Evaluation Form contained in SOP HSE-112;
- Using mechanical lifting devices is the preferred means of lifting heavy objects such as forklifts; cranes, hoists, and rigging; hand trucks; and trolleys;
- Personnel shall seek assistance when performing manual lifting tasks that appear beyond their physical capabilities;
- In general, the following steps must be practiced when planning and performing manual lifts: Assess the situation before you lift; ensure good lifting and body positioning practices; ensure good carrying and setting down practices; and
- All CH2M HILL workers must have training in proper manual lifting training either through the New Employee Orientation or through Manual Lifting module located on the VO.

## 8.12 Personal Hygiene

Good hygiene is essential for personal health and to reduce the potential of cross-contamination when working on a hazardous waste site. Implement the following:

- Keep hands away from nose, mouth, and eyes during work;
- Keep areas of broken skin (chapped, burned, etc.) covered; and
- Wash hands with soap and water prior to eating, smoking, or applying cosmetics.

## 8.13 Personal Security

Follow the guidelines below for personal security measures. The RHSM and Firm-Wide Security Office can be contacted if additional, specific measures are needed (e.g., such as evaluating the needs for security service).

### General Safety and Security Guidelines

CH2M Hill Corporate Security Department recommends the following guidelines for workers in the United States:

- Stay alert and be aware of your surroundings. Avoid pre-occupations with mobile devices, while in an unfamiliar area.
- Whenever possible use the buddy system with another employee or client or subcontractor employee.
- Trust your intuition; if a situation appears strange or wrong, it probably is.
- Be confident in your walk or stride; do not give the appearance you are new in town.
- Avoid carrying and displaying large sums of cash.
- If you sense or see dangerous situations along your route, change your route and depart the area quickly. If you feel that you are being followed, go to the nearest police station or safe location and file a complaint with the police. Provide a description of the person, their vehicle, license plate number and any other useful information.
- Only walk short distances that are safe and secure while visiting an unfamiliar city or location.
- Take host approved transportation for long distances.
- "Fight or Flight?" Leaving the possible or dangerous area is always better than staying to fight.
- Always report suspicious activity to the nearest local law enforcement agency.
- Locate emergency exits in your hotel or where you are staying to ensure you know where to go in case of a fire or a natural or man-made disaster.
- Secure your electronic devices when left in your room or take them with you if you are not able to secure them properly.

- If you feel your life is in danger, call 911. Be sure to speak clearly, concisely and give the dispatcher a good description of where you are physically located.

### Operating or Riding in Vehicles

- When waiting for public transportation or a taxi, remain in a store or restaurant as long as possible before catching your ride and never wait by yourself in an isolated area.
- Approach your vehicle with keys firmly in your hand and ready to unlock the car.
- Quickly check your car before entering it to determine damage or presence of an intruder.
- Vulnerable times can be stopping to find your keys to enter your vehicle or stepping out of your vehicle in an isolated area. Be aware of your surroundings before you perform these activities.
- Always keep your doors locked during transit and when the vehicle is parked.
- Never leave your vehicle unlocked, even when performing a quick task such as checking in a hotel, getting gas or going picking up food.
- If confronted by an individual inside a vehicle pointing a weapon at you, run the opposite way from where the vehicle is facing and scream as loud as you can. This evasive action will probably cause the individual to drive away.
- If an individual in a passing car points at your tires or engine to indicate a malfunction, only pull over in a well-lit and populated gas or rest stop. Never pull over in an isolated or dimly lit area. You may have a malfunction or the passing motorist may be attempting to rob you.
- Always park your vehicle in a well-lit and secure area. If your vehicle is parked in a dimly lit or isolated area in a parking garage; ask an attendant or friend to accompany you to your vehicle.
- Secure your valuables in the trunk, or place them out of sight or cover them with a blanket or coat if there is no secure storage area in the vehicle. The would-be-perpetrator likes to see what to steal and not knowing what you have concealed will normally prevent a break in.

### Riding in a Taxi

- Have your host or a designated travel agent suggest or reserve a reputable taxi service for you during your stay.
- Only use a taxi service that was vetted for safety and reliability.
- If possible, place luggage, laptop and personal belongings inside the taxi.
- When you first enter the taxi, check the driver photo identification card, normally located on the driver's visor, with the driver to ensure they match.

### Walking

- If you experience automotive trouble, remain inside the locked vehicle and call for assistance.

- If you can't reach assistance via a mobile phone, only walk for help in a safe area facing the traffic.
- If while walking, you are shadowed or followed by a vehicle, run back in the direction of your vehicle and enter the vehicle if possible. File a police report on the incident as soon as practicable.
- Be aware of your surroundings and those around you while walking and do not be distracted by using electronic devices.
- Regularly change your route if you are walking to and from meetings or conferences and choose only well-lit areas to walk in at night.
- If walking long distances, identify a "safe house, shop, store or restaurant" to duck into if confronted by a perpetrator.

### Jogging or Running

- Always jog or run in an area that is safe, secure, and used for exercising.
- Avoid running along busy roads or highways.
- If you chose to venture out on a jog or run, check the route by vehicle prior to beginning to exercise.
- Let the host or a friend know when you leave, when you plan to return, and the route you will take during exercising.
- Take a photo identification and mobile phone with you for emergencies.
- Avoid physically over-extending yourself since reflexes and decision-making ability can be impaired.

### Clothing and Jewelry

- Dress to blend in with locals, maintain a low profile and avoid drawing attention to yourself.
- Travel with inexpensive clothing and jewelry.
- Avoid wearing CH2M HILL distinctive clothing or using CH2M HILL logos on luggage or laptops.

### Emergency Numbers and Information

- Leave your itinerary and emergency contact numbers where you can be reached with family members and only those that have a need to know.
- Pre-program emergency numbers in the mobile device you are traveling with.
- Carry a list of current medications and specific doses in your purse or wallet.
- Record medical emergency information on a document that can be readily available if you are unable to speak or unconscious.

- Have a photo copy of your driver's license, passport, and credit card information separately in case your wallet or purse is stolen.

## 8.14 Shipping and Transportation of Hazardous Materials

(Reference CH2M HILL SOP HSE-417, *Hazardous Materials Transportation*)

The U.S. Department of Transportation (DOT) has specific regulations governing shipping of hazardous materials (also called dangerous goods). Chemicals brought to the site might be defined as hazardous materials by the U.S. DOT. Hazardous wastes that may be shipped offsite are also defined as hazardous materials by U.S. DOT. Other wastes may also be U.S. DOT hazardous materials. To confirm whether a material or a waste is a U.S. DOT hazardous material, check with the ESG Waste Coordinator (Lisa Schwan/ATL), the project EM, or the CH2M HILL Dangerous Goods Shipping Coordinators (John Blasco/BAO or Rob Strehlow/MKW).

All staff who affect shipment of hazardous materials, including receiving hazardous materials, preparing profiles or manifests, packaging hazardous wastes, labeling, or transporting hazardous materials by road, are called HazMat employees (note CH2M HILL cannot transport hazardous wastes by public road). HazMat employees must receive CH2M HILL online training in shipping dangerous goods. CH2M HILL's online Dangerous Goods Shipping course can be found on the CH2M HILL HSE website.

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. If the material is a product that is being shipped (e.g., calibration gas), use the HazMat ShipRight tool on the CH2M HILL virtual office (under Company Resources - Online Shipping). Contact the Dangerous Goods Shipping coordinators, the ESG Waste Coordinator or the project EM for additional information.

49 CFR 172 requires that all hazmat employees be aware of potential transportation security concerns. Hazardous materials security is addressed in CH2M HILL's Hazardous Materials SOP (HSE-403). The following points are provided as an overview of security measures to increase awareness of this important matter:

- It is essential that each employee understand the security risks involved with transporting hazardous materials;
- All transporters of hazardous materials must be prequalified by a Contracts Administrator who evaluate the carrier's safety rating, security measures, and employee screening procedures;
- When shipping hazardous materials, check driver credentials and ask about shipping details;
- When receiving a hazardous materials shipment, inspect packages for signs of tampering or damage to the contents. Verify the drivers and company information on the form with the driver; and
- If there is suspicious or unusual behavior (e.g., driver without credentials, evasive answers) or any discrepancies identified, do not offer or accept the shipment, and immediately notify the project manager or the RHSM.

Employees responsible for shipping hazard materials must also review the CH2M HILL Transportation Security Plan (HSE-417 Appendix A).

## 8.15 Substance Abuse

(Reference CH2M HILL SOP HSE-105, *Drug-Free Workplace*)

Employees who work under the influence of controlled substances, drugs, or alcohol may prove to be dangerous or otherwise harmful to themselves, other employees, clients, the company, the company's assets and interests, or the public. CH2M HILL does not tolerate illegal drug use, or any use of drugs, controlled substances, or alcohol that impairs an employee's work performance or behavior.

Prohibitions onsite include:

- Use or possession of intoxicating beverages while performing CH2M HILL work;
- Abuse of prescription or nonprescription drugs;
- Use or possession of illegal drugs or drugs obtained illegally;
- Sale, purchase, or transfer of legal, illegal or illegally obtained drugs; and
- Arrival at work under the influence of legal or illegal drugs or alcohol.

Drug and/or alcohol testing is applicable under CH2M HILL Constructors, Inc. and munitions response projects performed in the United States. In addition, employees may be required to submit to drug and/or alcohol testing as required by clients. When required, this testing is performed in accordance with SOP HSE-105, *Drug-Free Workplace*. Employees who are enrolled in drug or alcohol testing are required to complete annual training located on the CH2M HILL Virtual Office (VO).

## 9.0 Project-Specific 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 work or the particular hazard. Each person onsite is required to abide by the hazard controls. Consult the appropriate CH2M HILL SOP to ensure all requirements are implemented. 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 RHSM for clarification.

### 9.1 Arsenic

(Reference CH2M HILL, SOP HSE-501, *Arsenic*)

Site specific data indicate that there no airborne exposure to arsenic, but arsenic is considered a “Confirmed Human Carcinogen” and CH2M HILL is required to control employee exposure to arsenic when exposures are at or above 5.0 micrograms per cubic meter ( $\mu\text{g}/\text{m}^3$ ), or if there is the possibility of skin or eye irritation from arsenic. Therefore, the elements of the CH2M HILL arsenic program are presented here and include the following:

- Exposure monitoring;
- Methods of control, including PPE and respirators;
- Medical surveillance;
- Training on hazards of arsenic and control measures (includes project-specific training and the computer-based training on CH2M HILL’s Virtual Office, *Arsenic Exposure*); and
- Recordkeeping requirements.

If air monitoring indicates there is potential exposure at the action level concentrations, notify the RHSM to ensure the above have been adequately addressed. Full implantation of SOP HSE-501, Arsenic, will be required. Other exposure control measures include:

- Do not enter regulated work areas unless training, medical monitoring, and PPE requirements established by the competent person have been met;
- Do not eat, drink, smoke, chew tobacco or gum, or apply cosmetics in regulated areas;
- Avoid skin and eye contact with liquid and particulate arsenic or arsenic trichloride;
- Respiratory protection and other exposure controls selection shall be based on the most recent exposure monitoring results obtained from the competent person; and
- Review the fact sheet included as an attachment to this HSP.

### 9.2 Benzene

(Reference CH2M HILL SOP HSE-503, *Benzene*)

Site specific data indicate that there no airborne exposure to benzene, but benzene is considered a “Confirmed Human Carcinogen” and CH2M HILL is required to control employee workplace exposure to benzene when personal exposures is at or above 0.5 parts per million (ppm) as an 8-hour time-weighted average (TWA) or above 5.0 ppm short term exposure limit (STEL), by implementing a



program that meets the requirements of the OSHA Benzene standard, 29 CFR 1910.1028. Therefore, the elements of the CH2M HILL benzene program are presented here and include the following:

- Exposure monitoring;
- Methods of control, including personal protective equipment (PPE) and respirators;
- Medical surveillance;
- Training on hazards of benzene and control measures (includes project-specific training and the computer-based training on CH2M HILL's Virtual Office, *Benzene*); and
- Record keeping requirements.

If air monitoring indicates there is potential exposure at the action level concentrations above, notify the RHSM to ensure the above have been adequately addressed. Other exposure control measures include:

- Do not enter regulated work areas unless training, medical monitoring, and PPE requirements established by the competent person have been met;
- Do not eat, drink, smoke, chew tobacco or gum, or apply cosmetics in regulated areas;
- Respiratory protection and other exposure controls selection shall be based on the most recent exposure monitoring results obtained from the competent person; and
- Review the fact sheet included as an attachment to this HSP.

### 9.3 Boating Safety

Personnel who will operate a boat during the course of a project shall first demonstrate to the site manager that they are experienced in operating boats similar to those used for the project and that they are knowledgeable of the U.S. Coast Guard Boating Safety requirements (33 CFR Subchapter S). Project boats shall be operated by experienced boat operators only. Boat operators shall also possess basic mechanical knowledge necessary to troubleshoot common mechanical problems that can and do occur. The boat operator shall be responsible for the safety of all personnel on board the boat he or she is operating and for the integrity of all boat and safety equipment.

Each designated boat operator shall give a safety briefing to all occupants of the boat prior to leaving the shore. Boats are to be occupied during use by not less than one qualified operator plus one additional person.

The boat captain has the final authority with regard to boat safety and navigational safety.

Use the attached boat safety checklist to evaluate and verify necessary equipment prior to leaving shore.

#### Boat Requirements

All project boats will meet or exceed U.S. Coast Guard requirements for safety equipment, as applicable to the operation and type of boat. These requirements are summarized below for small craft (less than forty feet [12 meters] in length).

#### Flame Arresters

All gasoline engines, except outboard motors, installed in a boat must have an approved flame arrestor (backfire preventer) fitted to the carburetor.

## **Sound Signaling Devices**

Boats shall carry at least one air horn or similar sound-signaling device. Radio or cell-phone communication must be in place as well.

## **Navigation Lights**

Navigation lights shall be required for operation at night, dawn, or dusk.

## **Personal Flotation Devices**

All personnel and passengers shall wear an approved personal flotation device (PFD) at all times when operating or being transported in a boat. A positively buoyant wet suit or dry suit may be substituted for a PFD. PFDs shall be Type III or higher (capable of turning its wearer in a vertical or slightly backward position in the water). In addition, each boat shall be equipped with at least one Type IV PFD, designed to be thrown to a person in the water and grasped and held by the user until rescued. A buoyant boat cushion equipped with straps and a float ring is two common examples of a Type IV PFD.

## **Anchors and/or Alternative Propulsion**

Each boat will carry an anchor attached to an anchor line and/or paddles or oars to be used in the event of engine failure. Should engine failure occur, this equipment would be necessary to prevent the boat from going over a dam should a dam be encountered downstream.

## **Fire Extinguishers**

Each boat shall carry at least one Type B-I or B-II fire extinguisher (for use in gasoline, oil and grease fires) approved by Underwriters Laboratories (UL). Each fire extinguisher shall be inspected to ensure that it is sufficiently charged and that the nozzles are free and clear. Discharged fire extinguishers shall be replaced or recharged immediately.

## **Emergency Planning**

As part of the project HSP and AHAs, emergencies and response actions must be addressed for potential emergencies such as fire, sinking, flooding, severe weather, man over-board, hazardous material incidents, etc.

## **Load Capacity**

Boats shall not be loaded (passengers and gear) beyond the weight capacity printed on the U.S. Coast Guard information plate attached to the stern. In addition, several factors must be considered when loading a boat: distribute the load evenly, keep the load low, do not stand up in a small boat or canoe, and do not overload the boat.

## **Tool Kit**

All motorized boats shall carry a tool kit sufficient for the boat operator to troubleshoot common mechanical problems such as fouled spark plugs, flooded carburetor, electrical shorts, etc. Boats operated in remote areas shall also carry appropriate spare parts (propellers, shear pins, patch kits, air pumps, etc). The tool kit shall be maintained by the boat operator and supplies used up shall be replaced immediately.

## **Communications**

All boats operated shall carry a two-way radio or cellular telephone that enables communication back to the field camp or other pre-established location.

## Good Housekeeping

Personnel using a boat shall properly stow and secure all gear and equipment against unexpected shifts when underway. Decks and open spaces must be kept clear and free from clutter and trash to minimize slip, trip, and fall hazards.

## Fuel Management

Personnel shall utilize the "one-third rule" in boating fuel management. Use one-third of the fuel to get to the destination, one-third to return, and keep one-third in reserve.

No smoking is permitted on board vessels or during refueling operations.

## Pollution Control

The Clean Water Act prohibits the discharge of oil, hazardous substances, or other materials or wastes in quantities that may be harmful into U.S. navigable waters. No person may intentionally drain oil or oily wastes from any source into the bilge of any vessel. Larger vessels equipped with toilet facilities must be equipped with a U.S. Coast Guard-approved marine sanitation device.

Employees shall report any significant oil spills to water to the SC and/or supervisor and the RHSM. The procedure for incident reporting and investigation shall be followed when reporting the spill.

## Training

All operators and passengers shall be trained on the requirements outlined above, as well as trained on the HSP/AHA(s), including emergency response actions.

## 9.4 Cadmium

(Reference CH2M HILL SOP HSE-504, *Cadmium*)

Site specific data indicate that there no airborne exposure to cadmium, but cadmium is considered a "Suspected Human Carcinogen" and CH2M HILL is required to control employee workplace exposure to cadmium when personal exposure is at or above 2.5 micrograms per cubic meter ( $\mu\text{g}/\text{m}^3$ ) by implementing a program that meets the requirements of the OSHA Cadmium standard, 29 *Code of Federal Regulations* (CFR) 1926.1127. Therefore, the elements of the CH2M HILL cadmium program are presented here and include the following:

- Exposure monitoring;
- Methods of control, including PPE and respirators;
- Medical surveillance;
- Training on hazards of cadmium and control measures (includes project-specific training and the computer-based training on CH2M HILL's Virtual Office, *Cadmium*); and
- Recordkeeping requirements.

If air monitoring indicates there is potential exposure at the action level concentrations above, notify the RHSM to ensure the above have been adequately addressed. Other exposure control measures include:

- Do not enter regulated work areas unless training, medical monitoring, and PPE requirements established by the competent person have been met;
- Do not eat, drink, smoke, chew tobacco or gum, or apply cosmetics in regulated areas;

- Respiratory protection and other exposure controls selection shall be based on the most recent exposure monitoring results obtained from the competent person; and
- Review the fact sheet included as an attachment to this HSP.

## 9.5 Compressed Gas Cylinders

(Reference CH2M HILL SOP HSE-403, *Hazardous Materials Handling*)

Below are the hazard controls and safe work practices to follow when working around or using compressed gas cylinders. Ensure the requirements in the referenced SOP are followed.

- Cylinders and pressure-controlling apparatus shall be inspected for defects and leakage prior to use. Damaged or defective items shall not be used. If a cylinder is found to be defective, the gas distributor shall be notified and subsequent instructions followed. If a leak should develop at a fuse plug or other safety device, the cylinder shall be removed from the work area.
- Cylinders shall be labeled with the identity of the contents. Cylinders not labeled shall be sent back to the cylinder distributor. The color of the cylinder shall not be used exclusively to identify cylinder contents.
- Valve caps must be in place when cylinders are transported, moved, or stored.
- Cylinders must be secured in an upright position at all times.
- Cylinder valves must be closed when cylinders are not being used and when cylinders are being moved.
- Cylinders must be secured on a cradle, basket, or pallet when hoisted; they may not be hoisted by choker slings.
- Eye protection (safety glasses or goggles) shall be worn when using cylinders.
- Cylinders must be shielded from welding and cutting operations and positioned to avoid being struck or knocked over; contacting electrical circuits; or exposed to extreme heat sources.
- Cylinders inside buildings shall be stored in dry, well-ventilated locations at least 20 feet (6.1 meters) from highly combustible materials. Cylinders should be stored in definitely assigned places away from elevators, stairs, or gangways. Assigned storage areas shall be located where cylinders will not be knocked over or damaged.
- Oxygen cylinders in storage shall be separated from fuel gas cylinders or combustible materials by a minimum of 20 feet (6.1 meters) or by a noncombustible barrier at least 5 feet (1.5 meters) high, having a fire resistance rating of at least 0.5 hour.
- Signs indicating no smoking shall be provided for storage areas containing flammable gas cylinders.
- Complete the self-assessment checklist for compressed gas cylinders are being used.

## 9.6 Confined Space Entry Activities

(Reference CH2M HILL, SOP HSE-203, *Confined Space Entry*)

Confined spaces have NOT been identified for this project. If confined space entry becomes necessary (i.e., breaking the plane of a confined space with any part of the body), contact the RHSM.

A confined space is defined as a space that has all of the following characteristics:

- Large enough to allow personnel to enter the space with their entire body;
- Limited openings for entry and exit; and
- Not designed for continuous human occupancy;

Examples of possible confined spaces include underground vaults, pipelines, ducts, tunnels, storage tanks, sewers, process vessels, and pits.

## 9.7 Crane-Suspended Personnel Platforms

(Reference CH2M HILL SOP HSE-304, *Crane-Suspended Personnel Platforms*)

Below are the hazard controls and safe work practices to follow when working around or using crane-suspended platforms. Ensure the requirements in the referenced SOP are followed.

- Personnel shall not be suspended from cranes unless there is no feasible alternative, such as aerial lifts, ladders, stairways or scaffold to access the elevated work location.
- Personnel shall not enter crane-suspended personnel platforms until all of the requirements of SOP HSE-304, have been verified.
- Personnel shall not ride in crane-suspended personnel platforms while the crane is traveling or otherwise being repositioned.
- Keep all body parts inside the platform during raising, lowering, and positioning.
- Personnel shall remain inside and not leave a crane-suspended personnel platform to access structures.
- Personnel shall stay in view of, or in direct communication with, the operator or signal person.
- Personnel shall wear full-body harness with lanyard attached to the lower load block or overhaul ball, or to a suitable structural member within the personnel platform.
- Hoisting of the personnel platform shall be performed in a slow, controlled, cautious manner with no sudden movements of the crane or derrick, or the platform.
- Load lines shall be capable of supporting, without failure, at least seven times the maximum intended load.
- The crane shall be uniformly level within 1 percent of level grade and located on firm footing.

- Cranes equipped with outriggers shall have them all fully deployed following manufacturer's specifications, insofar as applicable, when hoisting employees.
- The total weight of the loaded personnel platform and related rigging shall not exceed 50 percent of the rated capacity for the radius and configuration of the crane or derrick.
- The personnel platform and suspension system shall be designed by a qualified engineer or a qualified person competent in structural design.
- The personnel platform itself, except the guardrail system and personnel fall arrest system anchorages, shall be capable of supporting, without failure, its own weight and at least five times the maximum intended load.
- Each personnel platform shall be equipped with a guardrail system and shall be enclosed at least from the toeboard to mid-rail with either solid construction or expanded metal having openings no greater than 1/2 inch (1.3 cm).
- A pre-lift meeting attended by the crane or derrick operator, signal person(s), employee(s) to be lifted.
- Complete the self-assessment checklist for crane-suspended personnel platforms whenever they are being used.

## 9.8 Cranes

(Reference CH2M HILL SOP HSE-303, *Cranes*)

Below are the hazard controls and safe work practices to follow when working around or operating cranes. Ensure the requirements in the referenced SOP are followed.

- Crane operators are prohibited from using any wireless device while operating a crane. Equipment must be stopped before using devices such as two way radios or cell phones.
- Cranes shall be operated by a certified crane operator. After November 10, 2014, only operators possessing a certificate from a nationally accredited testing organization, an audited employer training program, or U.S. military or state-issuing agency will be authorized to operate cranes.
- The crane's operations manual and load chart specifically designed for the crane shall be in the crane at all times.
- The crane must have a current annual inspection to include load test certification (within the last 12 months) that meets all state and federal safety standards. Documentation of this inspection must be available for review.
- A competent person will inspect the crane daily to ensure it is in safe operating condition. The daily crane inspection log provided within the crane manufacturer's operations manual shall be used. See also the requirements for monthly inspections, among others, in SOP HSE-303.
- All rigging equipment must be inspected by a competent person prior to use for signs of excessive wear; equipment found to be damaged will be tagged and removed from service.

- A qualified and competent Assembly/Disassembly (A/D) Director shall be assigned when cranes must be assembled onsite. The A/D Director is responsible for ensuring the crane is assembled and disassembled according to manufacturer requirements; performing training for the A/D crew; and ensuring sufficient ground conditions exist for crane placement; among other responsibilities (see SOP HSE-303).
- The assembly/disassembly process must comply with requirements in HSE-303, including having an AHA for the task.
- A critical lift plan shall be prepared when the lift is estimated to be greater than 75% of the crane capacity or when two cranes will be used to make a lift.
- A pre-lift meeting will be conducted to include all parties involved in that day's crane operation.
- Only one qualified person shall be designated to signal the crane operator. This person shall be thoroughly familiar with the ANSI standard method of hand signals and an illustration of these signals shall be posted at the job site.
- No personnel shall be permitted under the load at any time.
- Tag lines shall be attached to every load being made by the crane.
- The swing radius of the rear rotating superstructure (counterweight) of the crane shall be barricaded and no entrance allowed.
- Suspended loads shall not pass over workers or occupied buildings at any time.
- Complete the self-assessment checklist for crane-suspended personnel platforms whenever they are being used.
- CH2M HILL employees exposed to hazards posed by crane operations, must be trained in hazards awareness and control procedures. See requirements for training in HSE-303.

### Power Line Safety

It must be determined whether equipment operations including assembly/disassembly, positioning, and crane operation (including traveling with a load) will occur in proximity to power lines within 20 feet (6.1 meters) for line voltage up to 350 kilo volts (kV), and within 50 feet (15.2 meters) for line voltage between 350 kV to 1000 kV. For power lines over 1000 kV, the distance must be determined by the utility/operator or qualified registered professional engineer in electrical power transmission and distribution.

If equipment operations are within proximity of aforementioned distances to power lines, one of the following options must be implemented to prevent encroachment and electrocution:

- **Option 1:** Deenergize and ground the power. Confirm from the utility/operator that the power line has been deenergized and visibly grounded at the worksite
- **Option 2:** If the voltage is not determined, ensure that no part of the equipment, load line, or load (including rigging and lifting accessories), gets closer than 20 feet (6.1m) by:

- Conduct a planning meeting with the operator and other workers in the area to review the actions that will be taken to prevent encroachment and electrocution. Training requirements for working around energized power lines are described in Section 6.0, Training.
- Use non-conductive tag lines.
- Erect and maintain an elevated warning line, barricade or line of signs in view of the operator, either with flags or other high-visibility markings at 20 feet (1.6m) from the power line. A spotter must be used when the operator does not have clear line of sight to the elevated warning line.
- To prevent encroachment, the operator can use a proximity alarm, or position a dedicated spotter with visual aids to demarcate the encroachment and constant communication access to the operator.

If the line voltage can be determined, and if any part of the equipment, line load or load (including rigging and lifting accessories) would encroach within that specified distance listed in Table 1, then the requirements listed in Option 2 must be implemented.

<b>Voltage (nominal, kV, alternating current)</b>	<b>Minimum Clearance - Feet (meters)</b>
Up to 50	10
Over 50 to 200	15
Over 200 to 350	20
Over 350 to 500	25
Over 500 to 750	35
Over 750 to 1000	45
Over 1000	Established by the utility owner/operator or by a qualified registered professional engineer in electrical power transmission and distribution

For equipment traveling within 20 feet (6.1m), under or near power lines without a load, the clearance distances described in Table 2 must be maintained and the following actions implemented.

- A dedicated spotter is assigned during equipment travel, positioned to effectively gauge the clearance distance, and is in continuous communication with the operator.
- During equipment travel, the boom/mast and support system are sufficiently lowered to ensure clearance distances are maintained, along with taking into consideration of the effects of speed and terrain.



<b>Table 2 - Minimum Clearance Distances While Traveling With No Load</b>	
<b>Voltage (nominal, kV, alternating current)</b>	<b>Minimum Clearance - Feet (meters)</b>
Up to 0.75	4
Over 0.75 to 50	6
Over 50 to 345	10
Over 345 to 750	16
Over 750 to 1000	20
Over 1000	Established by the utility owner/operator or by a qualified registered professional engineer in electrical power transmission and distribution

## 9.9 Drilling Safety

(Reference CH2M HILL SOP HSE-204, *Drilling*)

Below are the hazard controls and safe work practices to follow when working around or performing drilling. Ensure the requirements in the referenced SOP are followed.

- The drill rig is not to be operated in inclement weather.
- The driller is to verify that the rig is properly leveled and stabilized before raising the mast.
- Personnel should be cleared from the sides and rear of the rig before the mast is raised.
- The driller is not to drive the rig with the mast in the raised position.
- The driller must check for overhead power lines before raising the mast. A minimum distance of 10 feet (3 meters) between mast and overhead lines (<50 kV) is recommended. Increased separation may be required for lines greater than 50 kV.
- Personnel should stand clear before rig startup.
- The driller is to verify that the rig is in neutral when the operator is not at the controls.
- Become familiar with the hazards associated with the drilling method used (cable tool, air rotary, hollow-stem auger, etc.).
- Do not wear loose-fitting clothing, watches, etc., that could get caught in moving parts.
- Do not smoke or permit other spark-producing equipment around the drill rig.
- The drill rig must be equipped with a kill wire or switch, and personnel are to be informed of its location.
- Be aware and stand clear of heavy objects that are hoisted overhead.
- The driller is to verify that the rig is properly maintained in accordance with the drilling company's maintenance program.

- The driller is to verify that all machine guards are in place while the rig is in operation.
- The driller is responsible for housekeeping (maintaining a clean work area).
- The drill rig should be equipped with at least one fire extinguisher.
- If the drill rig comes into contact with electrical wires and becomes electrically energized, do not touch any part of the rig or any person in contact with the rig, and stay as far away as possible. Notify emergency personnel immediately.
- Use the drilling self-assessment checklist attached to this HSP to evaluate drilling operations.

## 9.10 Drum and Portable Tank Handling

Below are the hazard controls and safe work practices to follow when overseeing the movement of drums or when handling drums:

- Ensure that personnel are trained in proper lifting and moving techniques to prevent back injuries;
- Ensure drum or tank bungs and lids are secured and are labeled prior to moving;
- Ensure that drums and tanks remain covered except when removing or adding material or waste. Covers and/or lids will be properly secured at the end of each workday;
- Provide equipment to keep the operator removed from the drums to lessen the likelihood of injury. Such equipment might include: a drum grappler attached to a hydraulic excavator; a small front-end loader, which can be either loaded manually or equipped with a bucket sling; a rough terrain forklift; Roller conveyor equipped with solid rollers; drum carts designed specifically for drum handling;
- Make sure the vehicle selected has sufficient rated load capacity to handle the anticipated loads, and make sure the vehicle can operate smoothly on the available road surface;
- Ensure there are appropriately designed Plexiglas cab shields on loaders, backhoes, etc., when handling drums containing potentially explosive materials;
- Equipment cabs should be supplied with fire extinguishers, and should be air-conditioned to increase operator efficiency;
- Supply operators with appropriate respiratory protective equipment when needed;
- Ensure that drums are secure and are not in the operator's view of the roadway;
- Prior to handling, all personnel should be warned about hazards of handling;
- Before moving anything, determine the most appropriate sequence in which the various drums, portable tanks, and other containers should be moved (e.g. small containers may have to be removed first to permit heavy equipment to enter and move the drums);
- Overpack drums and an adequate volume of absorbent should be kept near areas where minor spills may occur;

- Use containers or overpacks that are compatible with the waste or materials;
- Drums containing liquids or hazardous waste will be provided with secondary containment and may not be located near a storm water inlet or conveyance;
- Allow enough aisle space between drum pallets and between drums and other equipment that the drums can be easily accessed (at least 2 to 3 feet) by fire control equipment and similar equipment.; and
- Make sure that a spill kit is available in drum or tank storage areas (or where liquids are transferred from one vessel to another).

## 9.11 Drum Sampling Safety

Personnel are permitted to handle and/or sample drums containing certain types of waste (drilling waste, investigation-derived waste, and waste from known sources) only. Handling or sampling drums with unknown contents requires a plan revision or amendment approved by the RHSM. The following control measures will be taken when sampling drums:

- Minimize transportation of drums;
- Sample only labeled drums or drums from a known waste stream;
- Do not sample bulging or swollen drums. Contact the RHSM;
- If drums contain, or potentially contain, flammable materials, use non-sparking tools to open;
- Use the proper tools to open and seal drums;
- Reseal bung holes or plugs whenever possible;
- Avoid mixing incompatible drum contents;
- Sample drums without leaning over the drum opening;
- Transfer/sample the content of drums using a method that minimizes contact with material;
- Use the PPE and perform air monitoring as specified in the PPE and Site Monitoring sections of this HSP;
- Take precautions to prevent contaminated media from contacting the floor or ground, such as having plastic under the sampling area, having a spill kit accessible during sampling activities; and
- If transferring/sampling drums containing flammable or combustible liquids, drums and liquid transfer equipment should be grounded and bonded to reduce the potential of a static discharge.

## 9.12 Earthmoving Equipment

(Reference CH2M HILL, SOP HSE-306, *Earthmoving Equipment*)

Below are the hazard controls and safe work practices to follow when working around or operating heavy equipment. Ensure the requirements in the referenced SOP are followed.

- CH2M HILL authorizes only those employees qualified by training or previous experience to operate material handling equipment.
- CH2M HILL employees must be evaluated prior to operating earthmoving equipment by a CH2M HILL earthmoving equipment operator evaluation designated person. This evaluation will be documented according to SOP HSE-306, Earthmoving 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. Documentation of this inspection must be maintained onsite at all times (use the Earthmoving Equipment Inspection form if operated by CH2M HILL).
- 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 feet (3 meters) from the powerlines less than 50 kilovolts (kV). Provide an additional 4 feet (1.2 meters) 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; refer to the Utilities (underground) section.
- Operators loading and 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 or 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 or buckets landed and shift lever in neutral.

### 9.13 Electrofishing Safety

Below are the hazard controls and safe work practices to be followed when overseeing or performing electrofishing.

- At least one member of the crew must have current first aid and CPR cards.
- Make sure every member of your crew knows where the nearest hospital is and how to get there or where to go to get help.
- All members of the crew shall have completed an electrofishing safety course.
- Before loading up equipment and heading into the field, make sure every member of the crew know the evacuation routes in case of an accident.
- Check the equipment for damaged or missing parts and for proper operation. Never use an electrofisher that is in poor condition or not working correctly as it can present a severe shock hazard.
- Check the cathodes cable for wear and burrs that may cause injury or tear holes in protective clothing. Check the insulation for damage. Replace the cathode as necessary.
- Check the anode pole for cracks in the fiberglass and handle assembly. Replace as necessary.
- Check the curl cord for cracks and abrasion. Do not use a cracked pole or a pole with a damaged curl cord.
- Check your boots and high voltage gloves for holes. Boots and gloves must be water tight without any holes. Repair as necessary.
- If you are using chest waders you should use a wading belt. A wading belt around your chest will trap air in your waders if you step or fall into a hole.
- Check all batteries for damage. Never use a damaged battery as the gelled electrolyte in these batteries is a strong acid and can cause severe chemical burns and damage clothing and the electrofisher.
- Use only dip nets with non-conductive handles. Never use an anode as a net, as it is extremely dangerous to other members of the crew and can cause severe injury to any fish caught with it.
- Never electrofish alone.
- Never electrofish if you are tired.
- Use only dip nets with insulated handles.
- Wear lineman's gloves, rated 5,000V minimum.

- Never try to reach into deeper pools with the electrodes. If you can't safely wade in an area it cannot be electrofished with a backpack electrofisher.
- Only one person on a crew can order the power for the electrofisher to be turned on, and that person is the crew leader. The crew leader is responsible for the safety of everyone on the crew.
- Any member of the crew can call for or turn off the power to the electrofisher.
- If an accident occurs, stop electrofishing and turn off the power to the unit. The person wearing the backpack unit should leave the water and take the unit to shore. The remaining members of the crew should help or attend to the accident victim. Get help for the injured person if necessary. Evaluate what happened and make the necessary procedural or equipment changes before proceeding.
- Never electrofish with spectators on shore. Electric fields can travel large distances through buried pipes, metal culverts, and metal sheet piling. If spectators show up during electrofishing, stop the operation and go explain what you are doing. Explain the risks to them being there and ask them to please leave for their own safety. If they refuse to leave, stop electrofishing, load your equipment and leave the area.

## Safe Fishing

Electrofishing equipment uses voltages and currents that can be lethal to humans. The operators must always keep in mind that the chance of receiving an electrical shock is multiplied in or near water. Using an electrofisher is like using a firearm: if used properly and with good judgment it is perfectly safe; lose respect for it and you can lose your life.

Electrical equipment used in a moist field environment is always subject to deterioration that could lead to dangerous electrical shock. Field equipment is also subjected to vibration and impact during transporting and while in operation. Often equipment shared by different crews does not receive proper maintenance or a complete checkout. Follow the safety guidelines, and use good common sense to handle unforeseen circumstances.

All personnel involved in electrofishing should be taught the fundamentals of electricity, and have an understanding of the safety requirements.

## Electrical Shock

It is the current that passes through the human body that does the damage. The voltage is relevant, because it is the force that "pushes" the current through the body. Experiments show that 20 to 500 HZ AC current is more dangerous than DC, or higher frequencies of AC.

The voltage used by electrofishing gear cause death by one of the following three means:

**Ventricular Fibrillation** – is uncoordinated contraction of the muscles of the heart. The heart quivers rather than beats. Electrical current through the chest can cause this condition,. Once a person goes into ventricular fibrillation, the only way to stop the quivering is to use a defibrillator that applies a pulse shock to the chest to restore heart rhythm. Cardiopulmonary resuscitation may help to keep a victim alive until he can be defibrillated.

**Respiratory Arrest** – The respiratory center is at the base of the skull. Thus, shock to the head can cause the breathing to stop. Artificial respiratory by the mouth-to-mouth method should be used in this case.

**Asphyxia** – is caused by contraction of the chest muscles. When current is above a certain level, a person cannot let go of an electrically hot wire. Currents above this level may not cause ventricular

fibrillation, but may be enough to cause contraction of the chest muscles. If the current is not stopped, or the victim is not removed from the point of electrical contact, asphyxia will result. Artificial respiration or cardiopulmonary resuscitation may be necessary.

### Preventing Electrical Shock

Electricity needs to have a complete electrical circuit in order for current to flow. The only way that you can get shocked is if you become the electrical conductor to complete the circuit. The current flows from the cathode to the anode through the water. The water is the electrical conductor. If you touched both the anode and the cathode you would become an electrical conductor and complete the circuit path and get a severe electrical shock. If you were to touch only one of the electrodes, you would not complete the electrical circuit and not get shocked.

**WARNING:** Touching any electrode is not recommended. Unless all conductive objects you come into contact with are connected to the same electrode, you will be shocked to find a current path that is not obvious, (e.g., the water or the boat).

Preventing electrical shock means preventing electrical current from entering and flowing through parts of the body. The skin is a partial but variable barrier, because it offers resistance to the passage of electrical current. Tough skin has more resistance than tender skin, and dry skin more than wet skin. But tough dry skin alone does not offer enough protection for electrofishing. Rubber lineman's gloves, rated 5,000V minimum should always be worn.

Even while wearing rubber gloves and waders, never touch an electrode while the circuit is energized. Do not work on electrical system while the generator is running. Do not enter the water while the current is on during boom shocking operations.

A severe electrical shock from electrofishing gear may result in the need for artificial respiration; therefore it is imperative that no one ever works alone.

### Backpack Safety

- Before each operation, check that the frame emergency release is in working order and check that the tilt switch shuts off power if the unit is tipped more than 55 degrees forward.
- Wear hip boots or chest-high waders, with non-skid soles.
- Wear polarized sunglasses to help you detect sub-surface hazards and obstacles. Beware of turbid water that can hide unseen subsurface obstacles and sudden drop-offs.
- Shut off your electrofisher before entering or leaving a stream.
- Do not operate an anode pole when carrying a backpack unit weighing more than 20 pounds (9 kg) when in hazardous conditions.
- If you get water in your boots, waders, or gloves, stop work immediately and get dry clothing.
- Operate slowly and carefully. Footing in most streams is poor, and most falls often occur when operators are in a hurry.

## 9.14 Energized Electrical Work

(Reference CH2M HILL SOP HSE-221, *Energized Electrical*)

Energized electrical work is defined as work performed on or near energized electrical systems or equipment with exposed components operating at 50 volts or greater. Working near energized live parts is any activity inside a Limited Approach Boundary.

All electrical systems shall be considered energized unless lockout/tagout procedures are implemented and verified.

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. When energized electrical work is the only means that work can be performed, all requirements of SOP HSE-221 must be implemented including the following:

- Only qualified personnel are permitted to work on unprotected energized electrical systems. These personnel shall complete Energized Electrical Safety Training.
- An Electrical Hazard Analysis must be performed to identify energized electrical safe work practices before any person approaches exposed live parts within the Limited Approach Boundary (as determined by the shock hazard analysis), by performing both shock hazard analysis and flash hazard analysis, which comprise the electrical analysis.
- The Energized Electrical Work Permit must be completed prior to working on unprotected energized electrical systems.
- CH2M HILL employees designated as qualified persons working on live parts of energized electrical systems 480 volts and above shall implement the buddy system. Working on live parts of energized electrical systems 480 volts and above means actual contact with live parts or working within the Prohibited Approach Boundary, which is one inch (2.54 cm) for 480 volt systems.
- The buddy system requires the presence of an additional qualified person who shall stand by and render assistance, or summon help for the first person, in the event the first person is inadvertently shocked while performing the work. The second person shall not be assigned to additional distracting duties or tasks while the energized electrical work is being performed and shall know the location of the isolation device(s) for the equipment being worked on.
- Workers designated as qualified persons shall wear the required electric shock and arc-flash PPE, as specified by the qualified person responsible for the energized electrical operations.
- Safety signs, safety symbols or accident prevention tags, meeting applicable American National Standards Institute (ANSI) Standards, shall be used where necessary to warn employees about electrical hazards.
- Barricades shall be used in conjunction with safety signs where it is necessary to prevent or limit employee access to work areas containing live parts. Conductive barricades shall not be used where it may cause an electrical hazard. Barricades shall be placed no closer than the Limited Approach Boundary.



- If signs and barricades do not provide sufficient warning and protection from electrical hazards, an attendant shall be stationed to warn and protect unqualified employees. The primary duty and responsibility of an attendant providing manual signaling and alerting shall be to keep unqualified employees outside a work area where the unqualified employee might be exposed to electrical hazards. An attendant shall remain in the area as long as there is a potential for employees to be exposed to the electrical hazards.
- Employees shall not perform tasks near exposed energized parts where lack of illumination or an obstruction precludes observation of the work. Employees shall not reach blindly into areas that may contain energized parts.
- Work shall be performed in accordance with National Fire Protection Association (NFPA) 70E requirements.
- Follow all control measures and procedures identified on the Energized Electrical Work Permit.

#### 9.14.1 Electrical Shock

It is the current that passes through the human body that does the damage. The voltage is relevant, because it is the force that “pushes” the current through the body. Experiments show that 20 to 500 HZ AC current is more dangerous than DC, or higher frequencies of AC.

The voltage used by electrofishing gear cause death by one of the following three means:

**Ventricular Fibrillation** – is uncoordinated contraction of the muscles of the heart. The heart quivers rather than beats. Electrical current through the chest can cause this condition. Once a person goes into ventricular fibrillation, the only way to stop the quivering is to use a defibrillator that applies a pulse shock to the chest to restore heart rhythm. Cardiopulmonary resuscitation may help to keep a victim alive until he can be defibrillated.

**Respiratory Arrest** – The respiratory center is at the base of the skull. Thus, shock to the head can cause the breathing to stop. Artificial respiratory by the mouth-to-mouth method should be used in this case.

**Asphyxia** – is caused by contraction of the chest muscles. When current is above a certain level, a person cannot let go of an electrically hot wire. Currents above this level may not cause ventricular fibrillation, but may be enough to cause contraction of the chest muscles. If the current is not stopped, or the victim is not removed from the point of electrical contact, asphyxia will result. Artificial respiration or cardiopulmonary resuscitation may be necessary.

#### 9.14.2 Preventing Electrical Shock

Electricity needs to have a complete electrical circuit in order for current to flow. The only way that you can get shocked is if you become the electrical conductor to complete the circuit. The current flows from the cathode to the anode through the water. The water is the electrical conductor. If you touched both the anode and the cathode you would become an electrical conductor and complete the circuit path and get a severe electrical shock. If you were to touch only one of the electrodes, you would not complete the electrical circuit and not get shocked.

**WARNING:** Touching any electrode is not recommended. Unless all conductive objects you come into contact with are connected to the same electrode, you will be shocked to find a current path that is not obvious, (e.g., the water or the boat).

Preventing electrical shock means preventing electrical current from entering and flowing through parts of the body. The skin is a partial but variable barrier, because it offers resistance to the passage of

electrical current. Tough skin has more resistance than tender skin, and dry skin more than wet skin. But tough dry skin alone does not offer enough protection for electrofishing. Rubber lineman's gloves, rated 5,000V minimum should always be worn.

Even while wearing rubber gloves and waders, never touch an electrode while the circuit is energized. Do not work on electrical system while the generator is running. Do not enter the water while the current is on during boom shocking operations.

A severe electrical shock from electrofishing gear may result in the need for artificial respiration; therefore it is imperative that no one ever works alone.

## 9.15 Excavation Activities

(Reference CH2M HILL SOP HSE-307, *Excavation and Trenching Safety*)

The requirements in this section shall be followed whenever excavation is being performed. Refer to the Earthmoving Equipment section and SOP for additional requirements applicable to operating/oversight of earthmoving equipment. Below are the hazard controls and safe work practices to follow when working around or performing excavation. Ensure the requirements in the referenced SOP are followed.

- If the project site is suspected of munitions or explosives of concern (MEC) contamination, requirements of the *Explosives Usage and Munitions Response (MR)* SOP HSE-610 shall be followed. MECs include unexploded ordnance (UXO), discarded military munitions, materials that present a potential explosive hazard, chemical warfare materials, munitions constituents, and contaminated soil or groundwater. "Down-hole" avoidance support may be required to prevent accidental contact with UXO. Safety requirements will be based on the risk assessment identified within the MR (safety) ORE (Opportunity Risk Evaluation).
- Do not enter the excavations unless completely necessary, and only after the excavation competent person has completed their daily inspection and has authorized entry. An inspection shall be conducted by the competent person prior to the start of work, as needed throughout the shift, after every rainstorm, and after any hazard increasing occurrence. Documentation of the inspection must be maintained onsite at all times.
- Follow all excavation entry requirements established by the excavation competent person and any excavation permit being used.
- Sloping, benching, shoring, shielding, or other protective systems are required to protect personnel from cave-ins except when the excavation is made entirely in stable rock or is less than 5 feet deep (1.5 meters) and there is no indication of possible cave-in, as determined by the excavation competent person. Protective systems for excavations deeper than 20 feet (6.1 meters) must be designed or approved by a registered professional engineer.
- Trenches greater than 4 feet (1.2 meters) deep shall be provided with a ladder, stairway, or ramp positioned so that the maximum lateral travel distance is no more than 25 feet (7.6 meters).
- The atmosphere of excavations greater than 4 feet (1.2 meters) deep shall be tested prior to entry when a hazardous atmosphere exists or could reasonably be expected to exist, such as excavating landfills, hazardous waste dumps; or areas containing sewer or gas utility systems, petroleum distillates, or areas where hazardous substances are stored nearby.

- Spoil piles, material, and equipment must be kept at least 2 feet (61 centimeters) from the edge of the excavation, or a retaining device must be used to prevent the material from falling into the excavation.
- Excavations shall not be entered when:
  - Protective systems are damaged or unstable;
  - Objects or structures above the work location may become unstable and fall into the excavation;
  - The potential for a hazardous atmosphere exists, unless the air has been tested and found to be at safe levels; or
  - Accumulated water exists in the excavation, unless precautions have been taken to prevent excavation cave-in.
- The excavation self-assessment checklist shall be used to evaluate excavations prior to entry.

## 9.16 Forklift Operations

(Reference CH2M HILL, SOP HSE-309, *Forklifts*)

Below are the hazard controls and safe work practices to follow when working around or operating forklifts. Ensure the requirements in the referenced SOP are followed.

- Forklift operators are prohibited from using any wireless device while operating forklifts.
- A rated lifting capacity must be posted in a location readily visible to the operator.
- A forklift truck must not be used to elevate employees unless a platform with guardrails, a back guard, and a kill switch is provided on the vehicle. When guardrails are not possible, fall arrest protection is required.
- The subcontractor operating the forklift must post and enforce a set of operating rules for forklift trucks.
- Only certified forklift operators shall operate forklifts.
- Stunt driving and horseplay are prohibited.
- Employees must not ride on the forks.
- Employees must never be permitted under the forks (unless forks are blocked).
- The driver must inspect the forklift once a shift and document this inspection.
- The operator must look in the direction of travel and must not move the vehicle until all persons are clear of the vehicle.
- Forks must be carried as low as possible.
- The operator must lower the forks, shut off the engine, and set the brakes (or block the wheels) before leaving the forklift operator's position unless maintenance or safety inspections require the forklift to be running.

- Trucks must be blocked and have brakes set when forklifts are driven onto their beds.
- Extreme care must be taken when tilting elevated loads.
- Every forklift must have operable brakes capable of safely stopping it when fully loaded.
- Forklifts must have parking brakes and an operable horn.
- When the operator is exposed to possible falling objects, industrial trucks must be equipped with overhead protection (canopy).
- If using certified CH2M HILL forklift operators – forklifts must be inspected and documented daily using the forklift inspection form.

## 9.17 Groundwater Sampling/Water Level Measurements

Below are the hazard controls and safe work practices to follow when personnel or subcontractors are performing groundwater sampling and/or water level measurements.

- Full coolers are heavy. Plan in advance to have two people available at the end of the sampling effort to load full coolers into vehicles. If two people won't be available use several smaller coolers instead of fewer large ones.
- Wear the appropriate PPE when sampling, including safety glasses, nitrile gloves, and steel toe boots (see PPE section of this HSP).
- Monitor headspace of wells prior to sampling to minimize any vapor inhalation (refer to the "Site Monitoring" section of this HSP).
- Use caution when opening well lids. Wells may contain poisonous spiders and hornet or wasp nests.
- Use the appropriate lifting procedures (see CH2M HILL SOP HSE-112) when unloading equipment and sampling at each well.
- Avoid sharp edges on well casings.
- If dermal contact occurs with groundwater or the acid used in sample preservation, immediately wash all affected skin thoroughly with soap and water.
- Avoid eating and drinking onsite and during sampling.
- Use ear plugs during sampling if sampling involves a generator.
- Containerize all purge water and transport to the appropriate storage area.
- Use two people to transport full coolers/containers whenever possible. If two people are not available use a dolly to move coolers. If the coolers weigh more than 40 pounds Attachment 1 of the HSE-112, *Manual Lifting*, shall be completed by the SC. If the coolers weigh more than 50 pounds they should never be lifted by one person.

## 9.18 Hand and Power Tools

(Reference CH2M HILL, SOP HSE-210, *Hand and Power Tools*)

Below are the hazard controls and safe work practices to follow when personnel or subcontractors are using hand and power tools. Ensure the requirements in the referenced SOP are followed.

- Tools shall be inspected prior to use and damaged tools will be tagged and removed from service.
- Hand tools will be used for their intended use and operated in accordance with manufacturer's instructions and design limitations;
- Maintain all hand and power tools in a safe condition.
- Use PPE (such as gloves, safety glasses, earplugs, and face shields) when exposed to a hazard from a tool.
- Do not carry or lower a power tool by its cord or hose.
- Portable power tools will be plugged into GFCI protected outlets; and
- Portable power tools will be Underwriters Laboratories (UL) listed and have a three-wire grounded plug or be double insulated.
- Disconnect tools from energy sources when they are not in use, before servicing and cleaning them, and when changing accessories (such as blades, bits, and cutters).
- Safety guards on tools must remain installed while the tool is in use and must be promptly replaced after repair or maintenance has been performed.
- Store tools properly in a place 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 for work in that environment (that is, intrinsically safe, spark-proof, etc.).
- Working with manual and pistol-grip hand tools may involve highly repetitive movement, extended elevation, constrained postures, and/or awkward positioning of body members (for example, hand, wrist, arm, shoulder, neck, etc.). Consider alternative tool designs, improved posture, the selection of appropriate materials, changing work organization, and sequencing to prevent muscular, skeletal, repetitive motion, and cumulative trauma stressors.

### Machine Guarding

- Ensure that all machine guards are in place to prevent contact with drive lines, belts, chains, pinch points or any other sources of mechanical injury.

- Unplugging jammed equipment will only be performed when equipment has been shut down, all sources of energy have been isolated and equipment has been locked/tagged and tested.
- Maintenance and repair of equipment that results in the removal of guards or would otherwise put anyone at risk requires lockout of that equipment prior to work.

## 9.19 Haul Trucks

Below are the hazard controls and safe work practices to follow when working around or operating haul trucks.

- Haul truck operators should be familiar with their equipment and inspect all equipment before use.
- Haul truck operators should ensure all persons are clear before operating truck or equipment. Before moving operators should sound horn or alarm, all equipment should be equipped with a working back up alarm.
- Haulage trucks or equipment with restricted visibility should be equipped with devices that eliminate blind spots.
- Employees should stay off haul roads. When approaching a haul area, employees should make eye contact and communicate their intentions directly with the equipment operator.
- If possible minimize steep grades on haul roads.
- Where grades are steep provide signage indicating the actual grade as well as measures for a runaway truck.
- Trucks are to be operated within the manufacturer's recommendations (for example- retarder charts indicate the combination of loads, grades and speeds that should not be exceeded if the truck's retarder is to work properly – to ensure the truck does not descend grade at speeds greater than listed).
- Haul roads should be well lit, sufficiently wide (at least 50% of the width of the equipment on both sides of road) and equipped with reflectors to indicate access points.
- Haul roads should have adequate right-of-way signs indicating haul directions.

## 9.20 Hoists

(Reference CH2M HILL SOP HSE-315, *Hoists*)

- Below are the hazard controls and safe work practices to follow when working around or operating hoists. Ensure the requirements in the referenced SOP are followed.
- Manufacturer's specifications and limitations applicable to the operation of material hoists shall be followed. Where manufacturer's specifications are not available, the limitations assigned to the equipment shall be based on the determinations of a professional engineer competent in the field.
- Rated load capacities, recommended operating speeds, and special hazard warnings or instructions shall be posted on hoists.

- Hoisting ropes shall be installed in accordance with the wire rope manufacturer's recommendations.
- The installation of live booms on hoists is prohibited.
- Operating rules shall be established and posted at the operator's station of on hoists.
- No person shall be allowed to ride on material hoists except for the purposes of inspection and maintenance.
- All entrances of the hoistways shall be protected by substantial gates or bars, which guard the full width of the landing entrance.
- Overhead protective coverings of 2-inch planking, 3/4-inch plywood, or other solid material of equivalent strength, shall be provided on the top of every material host cage or platform.
- All hoistway entrance bars and gates shall be painted with diagonal contrasting colors, such as black and yellow.
- A qualified hoist operator will operate, inspect, maintain and oversee all hoist operations. The SC or designee shall verify hoist operator qualifications (e.g., operator to provide for the type of hoist being operated--years of experience, training, background).
- CH2M HILL employees who are required to operate hoists shall read the hoist manufacturer's operations and maintenance manual, be evaluated and approved as qualified hoist operators. The CH2M HILL may require operators to complete separate hoist operations training, provided by commercial training specialists.

## 9.21 Lockout/Tagout Activities

(Reference CH2M HILL SOP HSE-310, *Lockout and Tagout*)

Lockout/tagout (LO/TO) shall be performed whenever service or maintenance is necessary on equipment that could cause injury to personnel from the unexpected equipment energizing or start-up or unexpected release of stored energy. Energy sources requiring lockout/tagout may include electrical, pneumatic, kinetic, and potential.

If work on energized electrical systems is necessary – contact the RHSM. Specific training and procedures are required to be followed before any work on energized electrical systems can be performed and are NOT covered in this section. Energized electrical work is defined as work performed **on or near** energized electrical systems or equipment with exposed components operating at 50 volts or greater. Working near energized live parts is any activity inside a Limited Approach Boundary (anywhere from 3.5 feet to 24 feet [1 meter 7.3 meters] depending on voltage). Examples of energized electrical work include using a voltmeter to troubleshoot electrical systems and changing out controllers.

When lockout/tagout is necessary to perform maintenance/repair of a system, all the requirements of SOP HSE-310, Lockout and Tagout, shall be met including the following bulleted items:

- When CH2M HILL controls the work, CH2M HILL must verify that subcontractors affected by the unexpected operation of equipment develop a written lockout/tagout program, provide training on lockout/tagout procedures and coordinate its program with other affected subcontractors. This may include compliance with the owner or facility lockout/tagout program.

- When CH2M HILL personnel are affected by the unexpected operation of equipment they must complete the electrical safety awareness module on the VO. Authorized personnel shall inform the affected personnel of the LO/TO. Affected personnel shall not tamper with LO/TO devices.
- Standard lockout/tagout procedures include the following six steps: 1) notify all personnel in the affected area of the lockout/tagout, 2) shut down the equipment using normal operating controls, 3) isolate all energy sources, 4) apply individual lock and tag to each energy isolating device, 5) relieve or restrain all potentially hazardous stored or residual energy, and 6) verify that isolation and deenergization 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 has been removed and controls positioned in the safe mode prior to lockout removal. Only the individual who applied the lock and tag may remove them.
- CH2M HILL authorized employees shall complete the LO/TO training module on the VO and either the electrical safety training module on the VO or 10-hour construction training. The authorized employee must also be trained and qualified on the system they are working on (e.g., qualified electrician for working on electrical components of a system).
- When equipment-specific LO/TO procedures are not available or when existing procedures are determined to be insufficient, CH2M HILL authorized employees shall also complete the Equipment-Specific LO/TO Procedure Development Form, provided as an attachment to this HSP, to create an equipment-specific lockout/tagout procedure.

## 9.22 Methylene Chloride

(Reference CH2M HILL SOP HSE-509, *Methylene Chloride*)

Methylene chloride has a faint, sweet odor which is not noticeable at dangerous concentrations. Methylene chloride is shipped as liquefied compressed gas and will cause frostbite on contact.

CH2M HILL is required to control employee workplace exposure to methylene chloride when personal exposures are at or above 12.5 parts per million (ppm) as an 8-hour time-weighted average (TWA) or above 125 ppm short-term exposure limit (STEL) by implementing a program that meets the requirements of the OSHA Methylene Chloride standard, *29 Code of Federal Regulations (CFR) 1910.1052*. The elements of the CH2M HILL methylene chloride program include the following:

- Exposure monitoring;
- Methods of control, including personal protective equipment (PPE) and respirators;
- Medical surveillance;
- Training on hazards of methylene chloride and control measures (includes project-specific training and the computer-based training on CH2M HILL's Virtual Office, *Methylene Chloride*) and;
- Recordkeeping requirements.

If air monitoring indicates there is potential exposure at the action level concentrations above, notify the RHSM to ensure the above have been adequately addressed. Other exposure control measures include:



- Do not enter regulated work areas unless training, medical monitoring, and PPE requirements established by the competent person have been met;
- Do not eat, drink, smoke, chew tobacco or gum, or apply cosmetics in regulated areas;
- Respiratory protection and other exposure controls selection shall be based on the most recent exposure monitoring results obtained from the competent person;
- Appropriate air-supplied respirators must be used when methylene chloride exposures exceed PEL or STEL;
- Air supplied to respirators must meet Grade D breathing air requirements; and
- Review the fact sheet included as an attachment to this HSP.

### 9.23 Monitoring Well Installation and Development

Below are the hazard controls and safe work practices to follow when working around or performing monitoring well installation and development. Ensure the requirements in the referenced SOP are followed.

- Wells will be installed in accordance with standard EPA procedures.
- The threaded connections on casing and screen sections will be water-tight.
- A record of the finished well construction details, including types of materials used, depths of top and bottom of screen and casing, depth of top and bottom of any materials added to the annular space between the screen and casing and the well borehole, or any additional casings, etc., will be compiled.
- All soils and liquids generated during well installations will be drummed for proper disposal according to investigative derived waste procedures outlines in site-specific documents (HSP, the Site Management Plan (SMP) and work plans).
- Well screens generally will be constructed of 10-slot or 20-slot Schedule 40 PVC and will be 5 to 10 feet in length depending on saturated thickness of unconsolidated sediments. The exact slot size and length will be determined by the field team leader. Stainless steel may be required under certain contaminant conditions.
- New monitoring wells will be developed by surging and pumping after the well has been completely installed.
- Development water will be handled in accordance with investigative derived waste procedures, and stored in a portable tank in the waste staging area.
- All equipment will be properly decontaminated as needed following decontamination procedures outlined in site-specific documents.
- Only new, sealed materials will be used in constructing wells.
- Care will be taken when making downhole measurements to ensure the proper heights of sand, seal, and grout are achieved.
- Personnel will follow the drilling health and safety procedures outlined in this HSP during well installation and development activities.

### 9.24 Portable Generator Hazards

(Reference CH2M HILL SOP HSE-206, Electrical Safety)

- Portable generators are useful when temporary or remote electric power is needed, but they also can be hazardous. The primary hazards to avoid when using a generator are carbon

monoxide (CO) poisoning from the toxic engine exhaust, electric shock or electrocution, and fire.

- NEVER use a generator indoors or in similar enclosed or partially-enclosed spaces. Generators can produce high levels of carbon monoxide (CO) very quickly. When you use a portable generator, remember that you cannot smell or see CO. Even if you can't smell exhaust fumes, you may still be exposed to CO.
- If you start to feel sick, dizzy, or weak while using a generator, get to fresh air RIGHT AWAY. DO NOT DELAY. The CO from generators can rapidly lead to full incapacitation and death.
- If you experience serious symptoms, get medical attention immediately. Inform project staff that CO poisoning is suspected. If you experienced symptoms while indoors have someone call the fire department to determine when it is safe to re-enter the building.
- Follow the instructions that come with your generator. Locate the unit outdoors and away from doors, windows, and vents that could allow CO to come indoors.
- Ensure the generator is grounded in accordance with the manufacturer's operation manual.
- Keep the generator dry and do not use in rain or wet conditions. To protect from moisture, operate it on a dry surface under an open, canopy-like structure. Dry your hands if wet before touching the generator.
- Plug appliances directly into the generator. Or, use a heavy duty, outdoor-rated extension cord that is rated (in watts or amps) at least equal to the sum of the connected appliance loads. Check that the entire cord is free of cuts or tears and that the plug has all three prongs, especially a grounding pin.
- Most generators come with Ground Fault Circuit Interrupters (GFCI). Test the GFCIs daily to determine whether they are working
- If the generator is not equipped with GFCI protected circuits plug a portable GFCI into the generator and plug appliances, tools and lights into the portable GFCI.
- Never store fuel near the generator or near any sources of ignition.
- Before refueling the generator, turn it off and let it cool down. Gasoline spilled on hot engine parts could ignite.

## 9.25 Pressure Washing Operations

Below are the hazard controls and safe work practices to follow when working around or performing pressure washing.

- Only trained, authorized personnel may operate the high-pressure washer.
- Follow manufacturer's safety and operating instructions.
- Inspect pressure washer before use and confirm deadman trigger is fully operational
- The wand must always be pointed at the work area.

- The trigger should never be tied down
- Never point the wand at yourself or another worker.
- The wand must be at least 42 inches (1.1 meter) from the trigger to the tip and utilize greater than 10 degree tips.
- The operator must maintain good footing.
- Non-operators must remain a safe distance from the operator.
- No unauthorized attachment may be made to the unit.
- Do not modify the wand.
- All leaks or malfunctioning equipment must be repaired immediately or the unit taken out-of-service.
- Polycoated Tyvek or equivalent, 16-inch-high steel-toed rubber boots, safety glasses, hard hat with face shield, and inner and outer nitrile gloves will be worn, at a minimum.

## 9.26 Rigging

(Reference CH2M HILL SOP HSE-316, *Rigging*)

Below are the hazard controls and safe work practices to follow when personnel are overseeing or performing rigging. Ensure the requirements in the referenced SOP are followed.

### 9.26.1 General

- All rigging equipment shall be used only for its intended purpose, inspected by a competent person prior to use, and shall not be loaded in excess of its capacity rating. Defective rigging shall be removed from service.
- When CH2M HILL is in control of rigging operations, CH2M HILL shall provide a rigging competent person that will inspect, maintain oversee all rigging operations. The competent person shall use the appropriate rigging inspection log form to inspect wire rope, synthetic slings and/or shackles.
- Tag lines shall be attached to every load being lifted by a crane.
- Rigging equipment shall be protected from flame cutting and electric welding operations, and or contact avoided with solvents and chemicals.
- Rigging equipment, when not in use, shall be stored in an area free from damage caused by environmental elements, hazardous substances, and other factors that may compromise equipment integrity and performance.
- No modification or addition, which that could affect the capacity and or safe operation of the equipment, shall be made without the manufacturer's written approval.
- Rigging equipment shall not be shortened with knots, bolts or other makeshift devices.

- All rigging equipment shall be load tested at least annually by a competent person and documented.
- Special hoisting devices, slings, chokers, hooks, clamps, or other lifting accessories shall be marked to indicate the safe working loads and shall be proof -tested prior to initial use to 125 percent of their rated load. Vendors or suppliers will provide documentation of proof testing documentation.

### Equipment

- Protruding end strands of wire rope shall be covered or blunted.
- Wire rope shall not be used, if in any length of eight diameters, the number of total number of visible broken wires exceeds 10% percent of the total number of wires, or if the rope shows other signs of excessive wear, corrosion, or defect.
- When inspecting the end fittings of wire rope slings, if more than one wire in a lay is broken in the fitting, do not use the sling.
- Synthetic web slings shall be immediately removed from service if any of the following conditions are present:
  - acid or caustic burns; melting or charring of any part of the sling
  - surface; snags, punctures, tears or cuts; broken or worn stitches; distortion of fittings;
  - discoloration of or rotting; red warning line showing.
- Never use makeshift hooks, links or other fasteners. Job or shop hooks and links, or makeshift fasteners, formed from bolts, rods, etc., or other such attachments, shall not be used.
- Alloy steel chains shall have permanently affixed identification stating size, grade, rated capacity and reach.
- Shackles and hooks shall be constructed of forged alloy steel with the identifiable load rating on the shackle or hook.

### Rigging Use

- Rigging shall not be pulled from under a load when the load is resting on the rigging.
- Place sling(s) in center bowl of hook.
- When attaching slings to the load hoist hook, corners and sharp edges should be “packed” to prevent cutting or damaging the rope or slings.
- Never use nylon, polyester, or polypropylene web slings, or web slings with aluminum fittings shall not be used where fumes, vapors, sprays, mists or liquids of acids, caustics or phenolics are present.
- Natural and synthetic fiber rope slings, except for wet frozen slings, may be used in a temperature range from from minus 20° F to plus 180° F without decreasing the working load limit. For operations outside this temperature range, and for wet frozen slings, the sling manufacturer’s recommendations shall be followed.

- When used for eye splices, the U-bolt shall be installed so that the “U” section is in contact with the dead end of the rope.

## 9.27 Slips, Trips and Falls

### General

- Institute and maintain good housekeeping practices.
- Designate foot traffic paths in and out of sites, when necessary, to ensure paths are kept free from slip, trip, and fall hazards or to deter personnel from taking “shortcuts” where slip, trip, hazards may be.
- Mitigate icy conditions by keeping foot traffic paths clear of ice and snow.
- Watch footing as you walk to avoid trip hazards, animal holes, or other obstacles, especially in tall grassy areas.

### Muddy Conditions

- Muddy conditions present a slipping hazard. Use mats or other similar surface to work from if footing cannot be stabilized.
- Take shortened steps across muddy areas.
- Use a walking staff or other similar means to assist with balance.

### Steep Slopes/Uneven Ground/Rock and Vertical Slopes

- Be aware that escarpments can slough. Avoid these areas.
- Exercise caution in relying on rocks and trees/tree stumps to support yourself – many times they are loose.
- Whenever possible, switchback your way up/down steep areas, and maintain a slow pace with firm footing.
- Employees walking in ditches, swales and other drainage structures adjacent to roads or across undeveloped land must use caution to prevent slips and falls which can result in twisted or sprained ankles, knees, and backs.
- Whenever possible observe the conditions from a flat surface and do not enter a steep ditch or side of a steep road bed.
- If steep terrain must be negotiated coordinate with RHSM to evaluate the need for ladders or ropes to provide stability.

## 9.28 Stairways and Ladders

(Reference CH2M HILL SOP HSE-214, *Stairways and Ladders*)

Below are the hazard controls and safe work practices to follow when using stairways and ladders. Ensure the requirements in the referenced SOP are followed.

- Stairway or ladder is generally required when a break in elevation of 19 inches (48.3 cm) or greater exists.
- Personnel should avoid using both hands to carry objects while on stairways; if unavoidable, use extra precautions.
- Personnel must not use pan and skeleton metal stairs until permanent or temporary treads and landings are provided the full width and depth of each step and landing.
- Ladders must be inspected by a competent person for visible defects prior to each day's use. Defective ladders must be tagged and removed from service.
- Ladders must be used only for the purpose for which they were designed and shall not be loaded beyond their rated capacity.
- Only one person at a time shall climb on or work from an individual ladder.
- User must face the ladder when climbing; keep belt buckle between side rails.
- Ladders shall not be moved, shifted, or extended while in use.
- User must use both hands to climb; use rope to raise and lower equipment and materials.
- Straight and extension ladders must be tied off to prevent displacement.
- Ladders that may be displaced by work activities or traffic must be secured or barricaded.
- Portable ladders must extend at least 3 feet (91.5 cm) above landing surface.
- Straight and extension ladders must be positioned at such an angle that the ladder base to the wall is one-fourth of the working length of the ladder.
- Stepladders are to be used in the fully opened and locked position.
- Users are not to stand on the top two steps of a stepladder; nor are users to sit on top or straddle a stepladder.
- Fixed ladders  $\geq$  24 feet (7.3 meters) in height must be provided with fall protection devices.
- Fall protection should be considered when working from extension, straight, or fixed ladders greater than six feet (1.8 meters) from lower levels and both hands are needed to perform the work, or when reaching or working outside of the plane of ladder side rails.

## 9.29 Traffic Control

(Reference CH2M HILL SOP HSE-216, *Traffic Control*)

The following precautions must be taken when working around traffic, and in or near an area where traffic controls have been established by a sub contractor. Ensure the requirements in the referenced SOP are followed.

- Exercise caution when exiting traveled way or parking along street – avoid sudden stops, use flashers, etc.

- Park in a manner that will allow for safe exit from vehicle, and where practicable, park vehicle so that it can serve as a barrier.
- All staff working adjacent to traveled way or within work area must wear reflective/high-visibility safety vests.
- Eye protection should be worn to protect from flying debris.
- Remain aware of factors that influence traffic related hazards and required controls – sun glare, rain, wind, flash flooding, limited sight-distance, hills, curves, guardrails, width of shoulder (i.e., breakdown lane), etc.
- Always remain aware of an escape route (e.g., behind an established barrier, parked vehicle, guardrail, etc).
- Always pay attention to moving traffic – never assume drivers are looking out for you.
- Work as far from traveled way as possible to avoid creating confusion for drivers.
- When workers must face away from traffic, a “buddy system” should be used, where one worker is looking towards traffic.
- When working on highway projects, obtain a copy of the contractor’s traffic control plan.
- Work area should be protected by a physical barrier – such as a K-rail or Jersey barrier.
- Review traffic control devices to ensure that they are adequate to protect your work area. Traffic control devices should: 1) convey a clear meaning, 2) command respect of road users, and 3) give adequate time for proper traffic response. The adequacy of these devices are dependent on limited sight distance, proximity to ramps or intersections, restrictive width, duration of job, and traffic volume, speed, and proximity.
- Either a barrier or shadow vehicle should be positioned a considerable distance ahead of the work area. The vehicle should be equipped with a flashing arrow sign and truck-mounted crash cushion (TMCC). All vehicles within 40 feet (12.2 meters) of traffic should have an orange flashing hazard light atop the vehicle.
- Except on highways, flaggers should be used when 1) two-way traffic is reduced to using one common lane, 2) driver visibility is impaired or limited, 3) project vehicles enter or exit traffic in an unexpected manner, or 4) the use of a flagger enhances established traffic warning systems.
- Lookouts should be used when physical barriers are not available or practical. The lookout continually watches approaching traffic for signs of erratic driver behavior and warns workers.
- Vehicles should be parked at least 40 feet (12.2 meters) away from the work zone and traffic. Minimize the amount of time that you will have your back to oncoming traffic.
- Traffic control training module on the VO shall be completed when CH2M HILL workers who work in and around roadways and who exposed to public vehicular traffic.

## 9.30 Utilities (underground)

An assessment for underground utilities must be conducted where there is a potential to contact underground utilities or similar subsurface obstructions during intrusive activities. Intrusive activities include excavation, trenching, drilling, hand augering, soil sampling, or similar activities.

The assessment must be conducted before any intrusive subsurface activity and must include at least the following elements:

1. A background and records assessment of known utilities or other subsurface obstructions.
2. Contacting and using the designated local utility locating service.
3. Conducting an independent field survey to identify, locate, and mark potential underground utilities or subsurface obstructions. *Note: This is independent of, and in addition to, any utility survey conducted by the designated local utility locating service above.*
4. A visual survey of the area to validate the chosen location.

When any of these steps identifies an underground utility within 5 feet (1.5 meters) of intrusive work, then non-aggressive means must be used to physically locate the utility before a drill rig, backhoe, excavator or other aggressive method is used.

Aggressive methods are never allowed within 2 feet of an identified high risk utility (see paragraph below).

Any deviation from these requirements must be approved by the Responsible HS Manager and the Project Manager.

### Background and Records Assessment of Known Utilities

Identify any client- or location-specific permit and/or procedural requirements (e.g., dig permit or intrusive work permit) for subsurface activities. For military installations, contact the Base Civil Engineer and obtain the appropriate form to begin the clearance process.

Obtain available utility diagrams and/or as-built drawings for the facility.

Review locations of possible subsurface utilities including sanitary and storm sewers, electrical lines, water supply lines, natural gas lines, fuel tanks and lines, communication lines, lighting protection systems, etc. Note: Use caution in relying on as-built drawings as they are rarely 100 percent accurate.

Request that a facility contact with knowledge of utility locations review and approve proposed locations of intrusive work.

### Designated Local Utility Locating Service

Contact your designated local utility locating service (e.g., Dig-Safe, Blue Stake, One Call) to identify and mark the location of utilities. Call 811 in the US or go to [www.call811.com](http://www.call811.com) to identify the appropriate local service group. Contacting the local utility locating service is a legal requirement in most jurisdictions.

### Independent Field Survey (Utility Locate)

The organization conducting the intrusive work (CH2M HILL or subcontractor) shall arrange for an independent field survey to identify, locate, and mark any potential subsurface utilities in the work area. This survey is in addition to any utility survey conducted by the designated local utility locating service.



The independent field survey provider shall determine the most appropriate instrumentation/technique or combinations of instrumentation/techniques to identify subsurface utilities based on their experience and expertise, types of utilities anticipated to be present, and specific site conditions.

A CH2M HILL or subcontractor representative must be present during the independent field survey to observe the utility locate and verify that the work area and utilities have been properly identified and marked. If there is any question that the survey was not performed adequately or the individual was not qualified, then arrangements must be made to obtain a qualified utility locate service to re-survey the area. Obtain documentation of the survey and clearances in writing and signed by the party conducting the clearance. Maintain all documentation in the project file.

If the site owner (military installation or client) can provide the independent field survey, CH2M HILL or the subcontractor shall ensure that the survey includes:

- Physically walking the area to verify the work location and identify, locate, and mark underground utility locations:
- Having qualified staff available and instrumentation to conduct the locate;
- Agreeing to document the survey and clearances in writing.
- Should any of the above criteria not be met, CH2M HILL or subcontractor must arrange for an alternate independent utility locate service to perform the survey.
- The markings from utility surveys must be protected and preserved until the markings are no longer required. If the utility location markings are destroyed or removed before intrusive work commences or is completed, the PM, SC, or designee must notify the independent utility locate service or the designated local utility locating service to resurvey and remark the area.

### **Visual Assessment before and during Intrusive Activities**

Perform a “360 degree” assessment. Walk the area and inspect for utility-related items such as valve caps, previous linear cuts, patchwork in pavement, hydrants, manholes, utility vaults, drains, and vent risers in and around the dig area.

The visual survey shall include all surface landmarks, including manholes, previous liner cuts, patchwork in pavement, pad-mounted transformers, utility poles with risers, storm sewer drains, utility vaults, and fire hydrants.

If any unanticipated items are found, conduct further research before initiating intrusive activities and implement any actions needed to avoid striking the utility or obstruction.

### **Subsurface Activities within 5 feet of an Underground Utility or if there is Uncertainty**

When aggressive intrusive activities will be conducted within 5 feet (1.5 meters) of an underground utility or when there is uncertainty about utility locations, locations must be physically verified by non-aggressive means such as air or water knifing, hand digging, or human powered hand augering. Non-conductive tools must be used if electrical hazards may be present. If intrusive activities are within 5 feet (1.5 meters) and parallel to a marked existing utility, the utility location must be exposed and verified by non-aggressive methods every 100 feet (30.5 meters). Check to see if the utility can be isolated during intrusive work.

## Intrusive Activities within 2 feet of an Underground Utility

Use non-aggressive methods (hand digging, vacuum excavation, etc.) to perform intrusive activities within 2 feet of a high risk utility (i.e., a utility that cannot be de-energized or would cause significant impacts to repair/replace). Hazardous utilities shall be de-energized whenever possible.

### Spotter

A spotter shall be used to monitor for signs of utilities during advancement of intrusive work (e.g., sudden change in advancement of auger or split spoon, presence of pea gravel or sand in soils, presence of concrete or other debris in soils, refusal of auger or excavating equipment). If any suspicious conditions are encountered stop work immediately and contact the PM or RHSM to evaluate the situation. The spotter must have a method to alert an operator to stop the intrusive activity (e.g., air horn, hand signals).

## 9.31 Utilities (overhead)

### Proximity to Power Lines

No work is to be conducted within 50 feet (15.2 meters) of overhead power lines without first contacting the utility company to determine the voltage of the system. No aspect of any piece of equipment is to be operated within 50 feet (15.2 meters) of overhead power lines without first making this determination.

**Operations adjacent to overhead power lines are PROHIBITED unless one of the following conditions is satisfied:**

- Power has been shut off, positive means (such as lockout) have been taken to prevent the lines from being energized, lines have been tested to confirm the outage, and the utility company has provided a signed certification of the outage.
- The minimum clearance from energized overhead lines is as shown in the table below, or the equipment will be repositioned and blocked to ensure that no part, including cables, can come within the minimum clearances shown in the table.

**MINIMUM DISTANCES FROM POWERLINES**

Powerlines Nominal System Kv	Minimum Required Distance, Feet (Meters)
0-50	10 (3.0)
51-100	12 (3.7)
101-200	15 (4.6)
201-300	20 (6.1)
301-500	25 (7.6)
501-750	35 (10.7)
751-1000	45 (13.7)

*(These distances have been determined to eliminate the potential for arcing based on the line voltage.)*

- The power line(s) has been isolated through the use of insulating blankets which have been properly placed by the utility. If insulating blankets are used, the utility will determine the minimum safe operating distance; get this determination in writing with the utility representative's signature.
- All inquiries regarding electric utilities must be made in writing and a written confirmation of the outage/isolation must be received by the PM prior to the start of work.

## 9.32 Vacuum Trucks

When CH2M HILL personnel are exposed to vacuum truck operations, the following safe work practices/hazard controls shall be implemented.

- A pre-operational check should be performed on the vacuum truck before use. Operators must be familiar with the operator's manual.
- Operators of vacuum trucks should be trained and familiar with the equipment. At least one person should be operating the boom and one person signaling and assisting the boom operator.
- Before use the hoses and lines should be checked for fraying and connections checked for leakage. Proper selection of hose diameter and type of hose (smooth bore hose vs. corrugated hose) is vital before the job is performed.
- The amount of force produced by a vacuum truck can kill hose operators. If an eight-inch hose gets stuck to your body at 27 inches Hg, it can be fatal. All trucks should be equipped with an emergency release the hose operator or assistant can initiate if a worker gets sucked into a hose. A remote release, manual release near the truck and an inline "T" should be present on the truck. The inline "T" should be installed between the very last section of hose and the working section of hose. The cord that releases the in-line relief should be tethered to the hose handlers belt or a watch buddy should be nearby holding the cord and ready to relieve in the event of an emergency. Operators should never attempt to vacuum hose with any part of their body to check for suction.
- Tanks on vacuum trucks are a confined space. Before the tank is opened and anyone enters a confined space assessment should be performed.
- The truck should always be grounded before use. The static electricity produced when sucking materials into the system can produce a spark and ignite anything in the tank or hose. Use of a grounding wire will prevent static electric explosions. Vacuum trucks should not be used to pump mixtures with a flash point less than 140 degrees or less - this is an accepted industry standard - refer to the operators manual for more information.
- When positioning truck to work, be extra cautions of personnel and other equipment located next to truck.
- Wet and dry material should not be mixed in the tank.
- When swinging the boom, change directions slowly.
- Do not load dump body beyond rated capacity. Be aware of possible load surge when turning or braking.

## 9.33 Vinyl Chloride

(Reference CH2M HILL, SOP HSE-512, *Vinyl Chloride*)

Vinyl Chloride is considered a "Confirmed Human Carcinogen." Vinyl Chloride has a mild, sweet, chloroform-like odor.

CH2M HILL is required to control employee workplace exposure to vinyl chloride when personal exposures are at or above 1.0 ppm as an 8-hour time-weighted average (TWA) or above 5.0 ppm short

term exposure limit (STEL), by implementing a program that meets the requirements of the Occupational Safety and Health Administration (OSHA) Vinyl Chloride standard, 29 CFR 1910.1017. The elements of the CH2M HILL vinyl chloride program include the following:

- Exposure monitoring
- Methods of control, including personal protective equipment (PPE) and respirators
- Medical surveillance
- Training on hazards of vinyl chloride and control measures (includes project-specific training and the computer-based training on CH2M HILL's Virtual Office, *Vinyl Chloride*)
- Record keeping requirements

If air monitoring indicates there is potential exposure at the action level concentrations above, notify the RHSM to ensure the above have been adequately addressed. Other exposure control measures include:

- Do not enter regulated work areas unless training, medical monitoring, and PPE requirements established by the competent person have been met.
- Do not eat, drink, smoke, chew tobacco or gum, or apply cosmetics in regulated areas.
- Respiratory protection and other exposure controls selection shall be based on the most recent exposure monitoring results obtained from the competent person.
- Review the fact sheet included as an attachment to this HSP.

### 9.34 Visible Lighting

Lighting shall be evaluated when conducting work inside buildings, confined spaces, or other areas/instances where supplemental light may be needed (e.g., work before sunrise or after sunset). A light meter can be used to evaluate the adequacy of lighting. The following are common requirements for lighting and the conditions/type of work being performed.

- While work is in progress outside construction areas shall have at least 33 lux (lx).
- Construction work conducted inside buildings should be provided with at least 55 lux light.
- The means of egress shall be illuminated with emergency and non-emergency lighting to provide a minimum 11 lx measured at the floor. Egress illumination shall be arranged so that the failure of any single lighting unit, including the burning out of an electric bulb will not leave any area in total darkness.

### 9.35 Working Around Material Handling Equipment

When CH2M HILL personnel are exposed to material handling equipment, the following safe work practices/hazard controls shall be implemented:

- 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 of the swing and turning radius.

- Maintain distance from pinch points of operating equipment.
- Never turn your back on any operating equipment.
- Never climb onto operating equipment or operate contractor/subcontractor equipment.
- Never ride contractor/subcontractor equipment unless it is designed to accommodate passengers and equipped with firmly attached passenger seat.
- Never work or walk under a suspended load.
- Never use equipment as a personnel lift; do not ride excavator buckets or crane hooks.
- Always stay alert and maintain a safe distance from operating equipment, especially equipment on cross slopes and unstable terrain.

### 9.36 Working Alone

(Reference CH2M HILL Core Standard, *Working Alone*)

Personnel can only be tasked to work alone by the Project Manager who shall assess potential hazards and appropriate control measures, with assistance from the Responsible Health and Safety Manager (RHSM).

“Lone workers” with an accountability system in place is permitted, depending on the hazards presented during the execution of the task. Reference the “Lone Worker Protocol” included as an attachment to this HSP.

The employee shall at all times be equipped with a working voice communication device such as a cellular phone or two-way radio to check-in to their project contact (s) at pre-determined times.

Call in contact name:	• Scott Pratt
Phone numbers (office and cell):	• 810 360 2013 (office) • 248 219 7146 (cell)

Check-in or contact times must be based on the risk associated with the task, or the timeframe expected to complete the task, but at a minimum of at least two times during an 8 hour work shift.

Call in contact Form shall be completed by lone worker and given to call in contact prior to going into the field. Refer to the “Lone Worker Protocol” attached to this HSP.

Work tasks will cease if communication is lost during work day. Work may resume when communication is re-established.

### 9.37 Working Over Water

If any activities pose a risk to drowning implement the following during the activity:

- 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 a life jacket, shall be worn.

- Provide employees with an approved (USCG for U.S. operations) life jacket or buoyant work vest.
  - Employees should inspect life jackets or work vests daily before use for defects. Do not use defective jackets or vests.
- Post ring buoys with at least 90 feet (27.4 meters) of 3/8-inch solid-braid polypropylene (or equal) line next to the work area. If the work area is large, post extra buoys 200 feet (61 meters) or less from each other.
- Provide at least one life saving skiff, immediately available at locations where employees are working over or adjacent to water.
  - Ensure the skiff is in the water and capable of being launched by one person and is equipped with both motor and oars.
- Designate at least one employee onsite to respond to water emergencies and operate the skiff at times when there are employees above water.
  - If the designated skiff operator is not within visual range of the water, provide him or her with a radio or provide some form of communication to inform them of an emergency.
  - Designated employee should be able to reach a victim in the water within three to four minutes.
- Ensure at least one employee trained in CPR and first aid is onsite during work activities.

# 10.1 Physical Hazards and Controls

## 10.1 Noise

(Reference CH2M HILL SOP HSE-108, *Hearing Conservation*)

CH2M HILL is required to control employee exposure to occupational noise levels of 85 decibels, A-weighted, (dBA) and above by implementing a hearing conservation program that meets the requirements of the OSHA Occupational Noise Exposure standard, 29 CFR 1910.95. A noise assessment may be conducted by the RHSM or designee based on potential to emit noise above 85 dBA and also considering the frequency and duration of the task.

- Areas or equipment emitting noise at or above 90dBA shall be evaluated to determine feasible engineering controls. When engineering controls are not feasible, administrative controls can be developed and appropriate hearing protection will be provided.
- Areas or equipment emitting noise levels at or above 85 dBA, hearing protection must be worn.
- Employees exposed to 84 dBA or a noise dose of 50% must participate in the Hearing Conservation program including initial and annual (as required) audiograms.
- The RHSM will evaluate appropriate controls measures and work practices for employees who have experienced a standard threshold shift (STS) in their hearing.
- Employees who are exposed at or above the action level of 85 dBA are required to complete the online Noise Training Module located on CH2M HILL's virtual office.
- Hearing protection will be maintained in a clean and reliable condition, inspected prior to use and after any occurrence to identify any deterioration or damage, and damaged or deteriorated hearing protection repaired or discarded.
- In work areas where actual or potential high noise levels are present at any time, hearing protection must be worn by employees working or walking through the area.
- Areas where tasks requiring hearing protection are taking place may become hearing protection required areas as long as that specific task is taking place.
- High noise areas requiring hearing protection should be posted or employees must be informed of the requirements in an equivalent manner.

## 10.2 Ultraviolet Radiation (sun exposure)

Health effects regarding ultraviolet (UV) radiation are confined to the skin and eyes. Overexposure can result in many skin conditions, including erythema (redness or sunburn), photoallergy (skin rash), phototoxicity (extreme sunburn acquired during short exposures to UV radiation while on certain medications), premature skin aging, and numerous types of skin cancer. Implement the following controls to avoid sunburn.

### Limit Exposure Time

- Rotate staff so the same personnel are not exposed all of the time.

- Limit exposure time when UV radiation is at peak levels (approximately 2 hours before and after the sun is at its highest point in the sky).
- Avoid exposure to the sun, or take extra precautions when the UV index rating is high.

### Provide Shade

- Take lunch and breaks in shaded areas.
- Create shade or shelter through the use of umbrellas, tents, and canopies.
- Fabrics such as canvas, sailcloth, awning material and synthetic shade cloth create good UV radiation protection.
- Check the UV protection of the materials before buying them. Seek protection levels of 95 percent or greater, and check the protection levels for different colors.

### Clothing

- Reduce UV radiation damage by wearing proper clothing; for example, long sleeved shirts with collars, and long pants. The fabric should be closely woven and should not let light through.
- Head protection should be worn to protect the face, ears, and neck. Wide-brimmed hats with a neck flap or “Foreign Legion” style caps offer added protection.
- Wear UV-protective sunglasses or safety glasses. These should fit closely to the face. Wrap-around style glasses provide the best protection.

### Sunscreen

- Apply sunscreen generously to all exposed skin surfaces at least 20 minutes before exposure, allowing time for it to adhere to the skin.
- Re-apply sunscreen at least every 2 hours, and more frequently when sweating or performing activities where sunscreen may be wiped off.
- Choose a sunscreen with a high sun protection factor (SPF). Most dermatologists advocate SPF 30 or higher for significant sun exposure.
- Waterproof sunscreens should be selected for use in or near water, and by those who perspire sufficiently to wash off non-waterproof products.
- Check for expiration dates, because most sunscreens are only good for about 3 years. Store in a cool place out of the sun.
- No sunscreen provides 100 percent protection against UV radiation. Other precautions must be taken to avoid overexposure.

## 10.3 Temperature Extremes

(Reference CH2M HILL SOP HSE-211, *Heat and Cold Stress*)

Each employee is responsible for the following:



- Recognizing the symptoms of heat or cold stress;
- Taking appropriate precautionary measures to minimize their risk of exposure to temperature extremes (see following sections); and
- Communicating any concerns regarding heat and cold stress to their supervisor or SC.

### 10.3.1 Heat

Heat-related illnesses are caused by more than just temperature and humidity factors.

**Physical fitness** influences a person's ability to perform work under heat loads. At a given level of work, the more fit a person is, the less the physiological strain, the lower the heart rate, the lower the body temperature (indicates less retrained body heat—a rise in internal temperature precipitates heat injury), and the more efficient the sweating mechanism.

**Acclimatization** is a gradual physiological adaptation that improves an individual's ability to tolerate heat stress. Acclimatization requires physical activity under heat-stress conditions similar to those anticipated for the work. With a recent history of heat-stress exposures of at least two continuous hours per day for 5 of the last 7 days to 10 of the last 14 days, a worker can be considered acclimatized. Its loss begins when the activity under those heat-stress conditions is discontinued, and a noticeable loss occurs after 4 days and may be completely lost in three to four weeks. Because acclimatization is to the level of the heat-stress exposure, a person will not be fully acclimatized to a sudden higher level; such as during a heat wave.

**Dehydration** reduces body water volume. This reduces the body's sweating capacity and directly affects its ability to dissipate excess heat.

The ability of a body to dissipate heat depends on the ratio of its surface area to its mass (surface area/weight). **Heat dissipation** is a function of surface area, while heat production depends on body mass. Therefore, overweight individuals (those with a low ratio) are more susceptible to heat-related illnesses because they produce more heat per unit of surface area than if they were thinner. Monitor these persons carefully if heat stress is likely.

When wearing **impermeable clothing**, the weight of an individual is not as important in determining the ability to dissipate excess heat because the primary heat dissipation mechanism, evaporation of sweat, is ineffective.

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

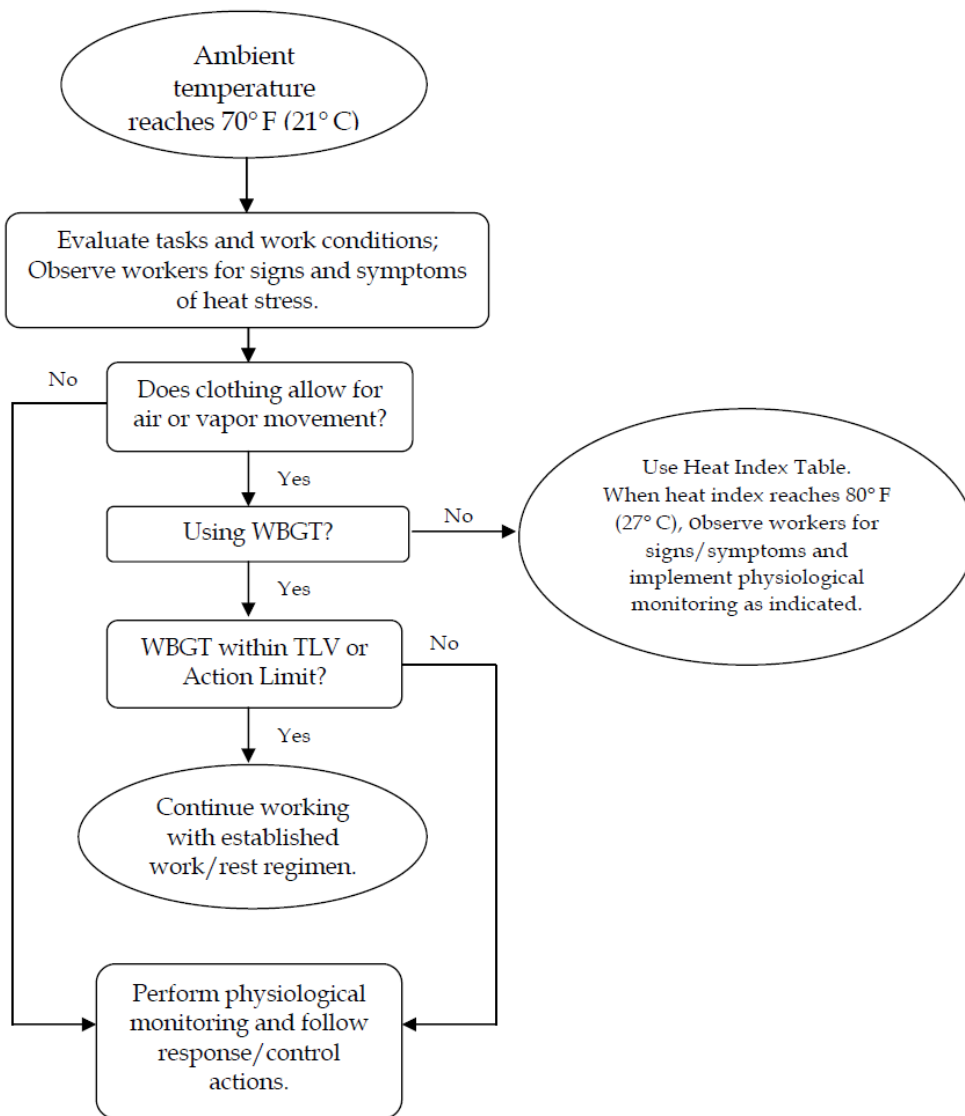
### Precautions

- Drink 16 ounces of water before beginning work. Disposable cups and water maintained at 50°Fahrenheit (10 degrees Celsius [C]) to 60°Fahrenheit (F) (15.6 degrees C) should be available. Under severe conditions, drink 1 to 2 cups every 20 minutes, for a total of 1 to 2 gallons (7.5 liters) per day. Remind employees to drink water throughout their work shift.
- 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 to site work conditions by slowly increasing workloads; for example, do not begin site work with extremely demanding activities. Closely monitor employees during their first 14 days of work in the field.
- Supervisors and SCs must continually observe employees throughout the work shift for signs and symptoms of heat stress or illness. Employees must monitor themselves for heat stress as well as observe their co-workers.
- Effective communication must be maintained with employees throughout the work shift either by voice, observation, or electronic device.
- 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 shade to protect personnel against radiant heat (sun, flames, hot metal).

- Use portable fans for convection cooling or in extreme heat conditions, an air-conditioned rest area when needed.
- In hot weather, rotate shifts of workers.
- Maintain good hygiene standards by frequent changes of clothing and showering. Clothing should be permitted to dry during rest periods. Persons who notice skin problems should consult medical personnel.
  - Brief employees initially before the project work begins and routinely as part of the daily safety briefing, on the signs and symptoms, of heat-relatedness illnesses, precautions to measures and emergency procedures to follow as described in this plan.
- Observe one another for signs of heat stress. PREVENTION and communication is key.

## Thermal Stress Monitoring

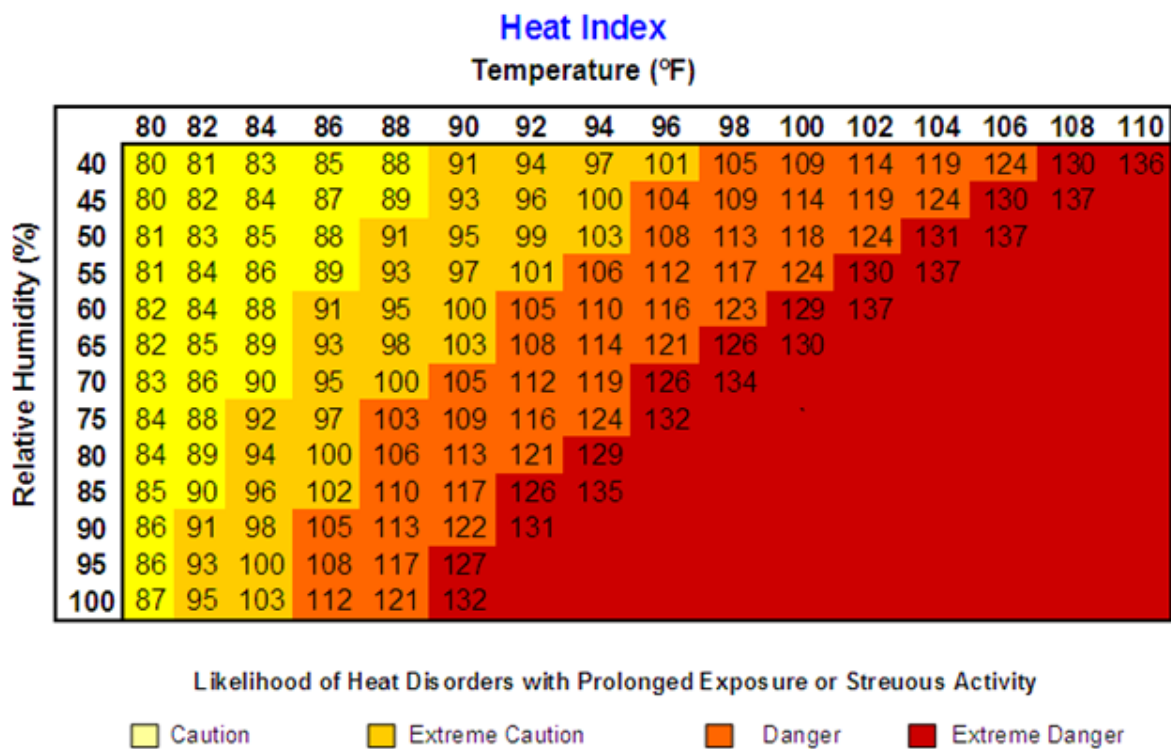
### Thermal Stress Monitoring Flow Chart



## Thermal Stress Monitoring – Permeable or Impermeable Clothing

When **permeable work clothes** are worn (street clothes or clothing ensembles over street clothes), regularly observe workers for signs and symptoms of heat stress and implement physiological monitoring as indicated below. This should start when the heat index reaches 80° F (27° C) [see Heat Index Table below], or sooner if workers exhibit symptoms of heat stress indicated in the table above. These heat index values were devised for shady, light wind conditions; exposure to full sunshine can increase the values by up to 15° F (8° C). Also, strong winds, particularly with very hot, dry air, can be extremely hazardous.

When wearing **impermeable clothing** (e.g., clothing doesn't allow for air or water vapor movement such as Tyvek), physiological monitoring as described below shall be conducted when the ambient temperature reaches 70° F (21° C) or sooner when climatic conditions may present greater risk of heat stress combined with wearing unique variations of impermeable clothing, or workers exhibit symptoms of heat stress



Heat Index	Possible Heat Disorders	Minimum Frequency of Physiological Monitoring
80°F - 90°F (27°C - 32°C)	Fatigue possible with prolonged exposure and/or physical activity	Conduct initial monitoring as baseline and observe workers for signs of heat stress and implement physiological monitoring if warranted.
90°F - 105°F (32°C - 41°C)	Sunstroke, heat cramps, or heat exhaustion possible with prolonged exposure and/or physical activity	Conduct initial monitoring as baseline, then at least every hour, or sooner, if signs of heat stress are observed.
105°F - 130°F (41°C - 54°C)	Sunstroke, heat cramps, or heat exhaustion likely, and heat stroke possible with prolonged exposure and/or physical activity.	Conduct initial monitoring as baseline, then every 30 minutes or sooner if signs of heat stress are observed.
130°F or Higher (54°C or Higher)	Heat/Sunstroke highly likely with continued exposure.	Conduct initial monitoring as baseline, then every 15 minutes or sooner if signs of heat stress are observed.

Source: National Weather Service

### Physiological Monitoring and Associated Actions

For employees wearing permeable clothing, follow the minimum frequency of physiological monitoring listed in the Heat Index Table.

For employees wearing impermeable clothing, physiological monitoring should begin initially at a 15 minute interval, then if the employee’s heart rate or body temperature is within acceptable limits, conduct the subsequent physiological monitoring at 30 minutes, and follow the established regimen protocol below.

When physiological monitoring is required, use either radial pulse or aural temperature and follow actions below:

- The sustained heart rate during the work cycle should remain below 180 beats per minute (bpm) minus the individual’s age (e.g. 180 - 35 year old person = 145 bpm). The sustained heart rate can be estimated by measuring the heart rate at the radial pulse for 30 seconds as quickly as possible prior to starting the rest period.
- The heart rate after one minute rest period should not exceed 120 beats per minute (bpm).
- If the heart rate is higher than 120 bpm after the FIRST minute into the rest period, 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 120 bpm at the beginning of the next rest period, the following work cycle should be further shortened by 33 percent.
- Continue this procedure until the rate is maintained below 120 bpm after the FIRST minute into the rest period.

Alternately, the body temperature can be measured, either oral or aural (ear), before the workers have something to drink.

- If the oral or aural temperature exceeds 99.6° F (37.6 ° F) at the beginning of the rest period, the following work cycle should be shortened by 33 percent.
- Continue this procedure until the oral or aural (ear) temperature is maintained below 99.6 ° F (37.6° C). While an accurate indication of heat stress, oral temperature is difficult to measure in the field, however, a digital aural (aural) thermometer is easy to obtain and inexpensive to purchase.
- Use the form attached to this HSP to track workers' measurements and actions taken.

### Procedures for when Heat Illness Symptoms are Experienced

- **Always** contact the RHSM when any heat illness related symptom is experienced so that controls can be evaluated and modified, if needed.
- In the case of cramps, reduce activity, increase fluid intake, move to shade until recovered.
- In the case of all other heat-related symptoms (fainting, heat rash, heat exhaustion), and if the worker is a CH2M HILL worker, contact the occupational physician at 1-866-893-2514 and immediate supervisor.
- In the case of heat stroke symptoms, call 911, have a designee give location and directions to ambulance service if needed, follow precautions under the emergency medical treatment of this HSP.
- Follow the Incident Notification, Reporting, and Investigation section of this HSP.

### 10.3.2 Cold

#### General

Low ambient temperatures increase the heat lost from the body to the environment by radiation and convection. In cases where the worker is standing on frozen ground, the heat loss is also due to conduction.

Wet skin and clothing, whether because of water or perspiration, may conduct heat away from the body through evaporative heat loss and conduction. Thus, the body cools suddenly when chemical protective clothing is removed if the clothing underneath is perspiration soaked.

Movement of air across the skin reduces the insulating layer of still air just at the skin's surface. Reducing this insulating layer of air increases heat loss by convection.

Non-insulating materials in contact or near-contact with the skin, such as boots constructed with a metal toe or shank, conduct heat rapidly away from the body.

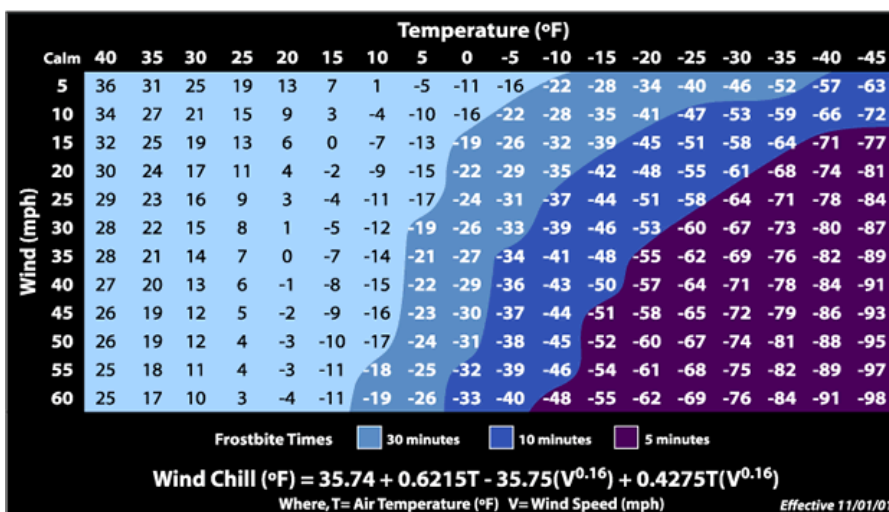
Certain common drugs, such as alcohol, caffeine, or nicotine, may exacerbate the effects of cold, especially on the extremities. These chemicals reduce the blood flow to peripheral parts of the body, which are already high-risk areas because of their large surface area to volume ratios. These substances may also aggravate an already hypothermic condition.

#### Precautions

- 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 wet 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 (below) 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.
- Persons who experience initial signs of immersion foot, frostbite, and/or hypothermia should report it immediately to their supervisor/PM 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
Signs and Symptoms	Feet discolored and painful; infection and swelling present.	Blanched, white, waxy skin, but tissue resilient; tissue cold and pale.	Shivering, apathy, sleepiness; rapid drop in body temperature; glassy stare; slow pulse; slow respiration.
Treatment	Seek medical treatment immediately.	Remove victim to a warm place. Re-warm area quickly in warm—but <b>not</b> hot—water. Have victim drink warm fluids, but <b>not</b> coffee or alcohol. Do not break blisters. Elevate the injured area, and get medical attention.	Remove victim to a warm place. Have victim drink warm fluids, but <b>not</b> coffee or alcohol. Get medical attention.



## 10.4 Radiological Hazards

Refer to CH2M HILL's Core Standard, Radiological Control and Radiological Controls Manual for additional requirements.

<b>Hazards</b>	<b>Controls</b>
Drilling next to buried waste that has been capped and identified on the site map	Rad Meter



## 11.0 Biological Hazards and Controls

Biological hazards are everywhere and change with the region and season. If you encounter a biological hazard that has not been identified in this plan, contact the RHSM so that a revision to this plan can be made. Whether it is contact with a poisonous plant, a poisonous snake, or a bug bite, do not take bites or stings lightly. If there is a chance of an allergic reaction or infection, or to seek medical advice on how to properly care for the injury, contact the occupational nurse at 1-866-893-2514.

### 11.1 Bees and Other Stinging Insects

Bees 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 your supervisor and/or a buddy. If you are stung, contact the occupational nurse at 1-866-893-2514. If a stinger is present, remove it carefully with tweezers. Wash and disinfect the wound, cover it, and apply ice. Watch for an allergic reaction if you have never been stung before. Call 911 if the reaction is severe.

### 11.2 Coyotes

While far from domesticated, coyotes show little fear of humans and have become comfortable living in close proximity to our communities. Although they tend to do most of their hunting after dusk, coyotes can be active at any time. Under normal circumstances, a coyote is not a danger to humans. They are, however, territorial and will respond aggressively if they or their family are threatened.

If you encounter a coyote that behaves aggressively, you have probably gotten too close to its prey or its family. Try to scare the coyote by yelling and waving your arms. Throw rocks, sticks or other objects. Do not turn away and run.

### 11.3 Feral Dogs

Avoid all dogs – both leashed and stray. Do not disturb a dog while it is sleeping, eating, or caring for puppies. If a dog approaches to sniff you, stay still. An aggressive dog has a tight mouth, flattened ears and a direct stare. If you are threatened by a dog, remain calm, do not scream and avoid eye contact. If you say anything, speak calmly and firmly. Do not turn and run, try to stay still until the dog leaves, or back away slowly until the dog is out of sight or you have reached safety (e.g. vehicle). If attacked, retreat to vehicle or attempt to place something between you and the dog. If you fall or are knocked to the ground, curl into a ball with your hands over your head and neck and protect your face. If bitten, contact the occupational nurse at 1-866-893-2514. Report the incident to the local authorities.

### 11.4 Mosquito Bites

Due to the recent detection of the West Nile Virus in the southwestern United States it is recommended that preventative measures be taken to reduce the probability of being bitten by mosquitoes whenever possible. Mosquitoes are believed to be the primary source for exposure to the West Nile Virus as well as several other types of encephalitis. The following guidelines should be followed to reduce the risk of these concerns for working in areas where mosquitoes are prevalent:

- Stay indoors at dawn, dusk, and in the early evening;
- Wear long-sleeved shirts and long pants whenever you are outdoors;
- Spray clothing with repellents containing permethrin or N,N-diethyl-meta-toluamide (DEET) since mosquitoes may bite through thin clothing;

- Apply insect repellent sparingly to exposed skin. An effective repellent will contain 35% DEET. Repellents may irritate the eyes and mouth, so avoid applying repellent to the hands; and
- Whenever you use an insecticide or insect repellent, be sure to read and follow the manufacturer's DIRECTIONS FOR USE, as printed on the product.

Vitamin B and "ultrasonic" devices are NOT effective in preventing mosquito bites.

### Symptoms of Exposure to the West Nile Virus

Most infections are mild, and symptoms include fever, headache, and body aches, occasionally with skin rash and swollen lymph glands. More severe infection may be marked by headache, high fever, neck stiffness, stupor, disorientation, coma, tremors, convulsions, muscle weakness, paralysis, and, rarely, death.

The West Nile Virus incubation period is from 3 to 15 days.

Contact the project RHSM with questions, and immediately report any suspicious symptoms to your supervisor, PM, and contact the occupational nurse at 1-866-893-2514.

### 11.5 Poison Ivy, Poison Oak, and Poison Sumac

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. Shrubs are usually 12 to 30 inches high, or can also be a tree-climbing vine, with triple leaflets and short, smooth hair underneath. Plants are red and dark green in spring and summer, with yellowing leaves anytime especially in dry areas. Leaves may achieve bright reds in fall, but plants lose its (yellowed, then brown) leaves in winter, leaving toxic stems. All parts of the plant remain toxic throughout the seasons. These plants contain urushiol a colorless or pale yellow oil that oozes from any cut or crushed part of the plant, including the roots, stems and leaves and causes allergic skin reactions when contacted. The oil is active year round.

Become familiar with the identity of these plants (see below). 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.

*Poison Ivy*



*Poison Sumac*



*Poison Oak*



Contamination with poison ivy, sumac or oak can happen through several pathways, including:

- Direct skin contact with any part of the plant (even roots once above ground foliage has been removed).

- Contact with clothing that has been contaminated with the oil.
- Contact from removing shoes that have been contaminated (shoes are coated with urushiol oil).
- Sitting in a vehicle that has become contaminated.
- Contact with any objects or tools that have become contaminated.
- Inhalation of particles generated by weed whacking, chipping, vegetation clearing.

If you must work on a site with poison ivy, sumac or oak the following precautions are necessary:

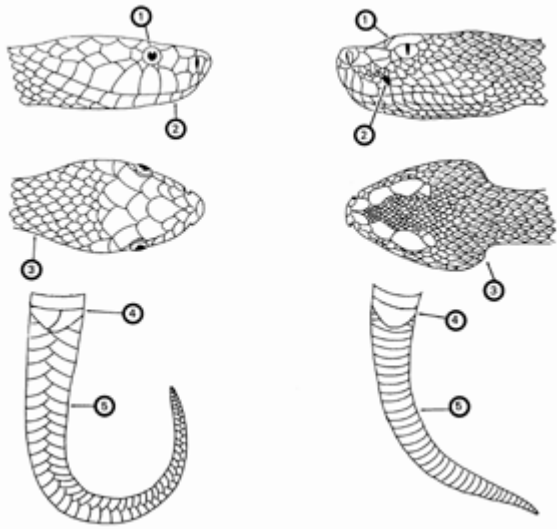
- Do not drive vehicles onto the site where it will come into contact with poison ivy, sumac or oak. Vehicles which need to work in the area, such as drill rigs or heavy equipment must be washed as soon as possible after leaving the site.
- All tools used in the poison ivy, sumac or oak area, including those used to cut back poison oak, surveying instruments used in the area, air monitoring equipment or other test apparatus must be decontaminated before they are placed back into the site vehicle. If on-site decontamination is not possible, use plastic to wrap any tools or equipment until they can be decontaminated.
- Personal protective equipment, including Tyvek coveralls, gloves, and boot covers must be worn. PPE must be placed into plastic bags and sealed if they are not disposed immediately into a trash receptacle.
- As soon as possible following the work, shower to remove any potential contamination. Any body part with suspected or actual exposure should be washed with Zanafel, Tecnu or other product designed for removing urushiol. If you do not have Zanafel or Tecnu wash with cold water. Do not take a bath, as the oils can form an invisible film on top of the water and contaminate your entire body upon exiting the bath.
- Tecnu may also be used to decontaminate equipment.
- Use IvyBlock or similar products to prevent poison oak, ivy and sumac contamination. Check with the closest CH2M HILL warehouse to see if these products are available. Follow all directions for application.

If you do come into contact with one of these poisonous plants and a reaction develops, contact your supervisor and the occupational nurse 1-866-893-2514.

## 11.6 Snakes

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 bitten by a snake, wash and immobilize the injured area, keeping it lower than the heart if possible. Call the occupational nurse at 1-866-893-2514 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. Below is a guide to identifying poisonous snakes from non-poisonous snakes.

## Identification of Poisonous Snakes

Major Identification Features Non-venomous Snake	Major Identification Features Venomous Snake
<ol style="list-style-type: none"> <li>1. Round pupils</li> <li>2. No sensing pit</li> <li>3. Head slightly wider than neck</li> <li>4. Divided anal plate</li> <li>5. Double row of scales on the underside of the tail</li> </ol>	<ol style="list-style-type: none"> <li>1. Elliptical pupils</li> <li>2. Sensing pit between eye and nostril</li> <li>3. Head much wider than neck</li> <li>4. Single anal plate</li> <li>5. Single scales on the underside of the tail</li> </ol>
	

### 11.7 Spiders - Brown Recluse and Widow

The Brown Recluse spider can be found most anywhere in the United States. It varies in size in shape, but the distinguishing mark is the violin shape on its body. They are typically non-aggressive. Keep an eye out for irregular, pattern-less webs that sometimes appear almost tubular built in a protected area such as in a crevice or between two rocks. The spider will retreat to this area of the web when threatened.

The Black Widow, Red Widow and the Brown Widow are all poisonous. Most have globose, shiny abdomens that are predominantly black with red markings (although some may be pale or have lateral stripes), with moderately long, slender legs. These spiders are nocturnal and build a three-dimensional tangled web, often with a conical tent of dense silk in a corner where the spider hides during the day.

#### Hazard Controls

- Inspect or shake out any clothing, shoes, towels, or equipment before use.
- Wear protective clothing such as a long-sleeved shirt and long pants, hat, gloves, and boots when handling stacked or undisturbed piles of materials.
- Minimize the empty spaces between stacked materials.
- Remove and reduce debris and rubble from around the outdoor work areas.
- Trim or eliminate tall grasses from around outdoor work areas.

- Store apparel and outdoor equipment in tightly closed plastic bags.
- Keep your tetanus boosters up-to-date (every 10 years). Spider bites can become infected with tetanus spores.

If you think you have been bit by a poisonous spider, immediately call the occupational nurse at 1-866-893-2514 and follow the guidance below:

- Remain calm. Too much excitement or movement will increase the flow of venom into the blood;
- Apply a cool, wet cloth to the bite or cover the bite with a cloth and apply an ice bag to the bite;
- Elevate the bitten area, if possible;
- Do not apply a tourniquet. Do not try to remove venom; and
- Try to positively identify the spider to confirm its type. If the spider has been killed, collect it in a plastic bag or jar for identification purposes. Do not try to capture a live spider – especially if you think it is a poisonous spider.

- 

Black Widow



Red Widow



Brown Widow



Brown Recluse



## 11.8 Ticks

Every year employees are exposed to tick bites at work and at home putting them at risk of illness. 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 (6.4 mm) in size.

In some geographic areas exposure is not easily avoided. Wear tightly woven light-colored clothing with long sleeves and pant legs tucked into boots; spray only outside of clothing with permethrin or permanone and spray skin with only DEET; and check yourself frequently for ticks.

Where site conditions (vegetation above knee height, tick endemic area) or when tasks (e.g., having to sit or kneel in vegetation) diminish the effectiveness of the other controls mentioned above, bug-out suits (check with your local or regional warehouse) or Tyvek shall be used. Bug-out suits are more breathable than Tyvek.

Take precautions to avoid exposure by including pre-planning measures for biological hazards prior to starting field work. Avoid habitats where possible, reduce the abundance through habitat disruption or application of acaricide. If these controls aren't feasible, contact your local or regional warehouse for preventative equipment such as repellants, protective clothing and tick removal kits. Use the buddy system and perform tick inspections prior to entering the field vehicle. If ticks were not planned to be encountered and are observed, do not continue field work until these controls can be implemented.

See Tick Fact Sheet attached to this HSP for further precautions and controls to implement when ticks are present. If bitten by a tick, follow the removal procedures found in the tick fact sheet, and call the occupational nurse at 1-866-893-2514.

Be aware of the symptoms of Lyme disease or Rocky Mountain spotted fever (RMSF). Lyme disease is a rash that might appear that looks like a bullseye with a small welt in the center. RMSF is a rash of red spots under the skin 3 to 10 days after the tick bite. In both RMSF and Lyme disease, chills, fever, headache, fatigue, stiff neck, and bone pain may develop. If symptoms appear, again contact the occupational nurse at 1-866-893-2514.

Be sure to complete an Incident Report (either use the Hours and Incident Tracking System [HITS] system on the VO) if you do come in contact with a tick.

## 12.0 Contaminants of Concern

The table below summarizes the potential contaminants of concern (COC) and their occupational exposure limit and signs and symptoms of exposure. The table also includes the maximum concentration of each COC and the associated location and media that was sampled (groundwater, soil boring, surface soil). These concentrations were used to determine engineering and administrative controls described in the "Project-Specific Hazard Controls" section of this HSP, as well as PPE and site monitoring requirements.

<b>Contaminants of Concern</b>					
Contaminant	Location and Maximum <sup>a</sup> Concentration (ppm)	Exposure Limit <sup>b</sup>	IDLH <sup>c</sup>	Symptoms and Effects of Exposure	PIP <sup>d</sup> (eV)
<b>NAPL/DBCP AREA 1 &amp; 2</b>					
Bromine	Potential 0.2 ppm (A-N)	0.1 ppm	3 ppm	Dizziness, headache, tearing eyes, nosebleed, cough, feeling of oppression, fluid in the lungs, pneumonia, abdominal pain, diarrhea, measles-like eruptions, eye and skin burns.	10.55
1,1,1-trichloroethane	33.6	350 ppm	700 ppm	Eye and skin irritant, headache, lassitude, CNS depression, poor equilibrium, dermatitis, irregular heartbeat, liver damage.	11.00
1,2-dichloroethane	7,300 230 ppm (A-N)	1	50 Ca	CNS depression, nausea, vomiting, dermatitis, eye irritation, liver, kidney, and CNS damage; corneal opacity.	11.05
Benzene	1,580 56 ppm (A-N)	0.5 ppm	500 Ca	Eye, nose, skin, and respiratory irritation; headache; nausea; dermatitis; fatigue; giddiness; staggered gait; bone marrow depression.	9.24
Bromoform	65	0.5	850	Eye, skin, and respiratory irritation; CNS depression, liver and kidney damage.	10.48
Carbon tetrachloride	43,400 180 ppm (A-N)	2	200 Ca	CNS depression, nausea, vomiting, eye and skin irritation, liver and kidney injury, drowsiness, dizziness.	11.47
Chloroform	5,590 190 ppm (A-N)	2 ppm	500 Ca	Dizziness, mental dullness, nausea, confusion, disorientation, headache, fatigue, eye and skin irritation, anesthesia, enlarged liver.	11.42
DBCP	87500 ug/L	1 ppb	UK	Acute: eye, nose and throat irritation, drowsiness, vomiting, pulmonary edema. Chronic: Liver, kidney damage, sterility, suspect human carcinogen.	UK
Methylene chloride	42.4 18 ppm (A-N)	25	2,300 Ca	Eye and skin irritation, fatigue, weakness, sleeplessness, light-headedness, numbness, tingling limbs, nausea.	11.32

DDT and isomers	Hot Spot Cell NAPL 820,000 mg/kg	0.5 mg/m <sup>3</sup>	500 Ca	Paresthesia of tongue, lips, hand, and face; tremors; dizziness; confusion; headache; fatigue; convulsion; eye and skin irritation; vomiting.	UK
polybrominated biphenyl (PBB)	1.9 mg/kg	UK	UK	Studies in animals exposed to large amounts of PBBs for a short period or to smaller amounts over a longer period show that PBBs can cause weight loss, skin disorders, nervous and immune systems effects, as well as effects on the liver, kidneys, and thyroid gland.  The United States Department of Health and Human Services has determined that PBBs may reasonably be anticipated to be carcinogens.	UK
hexabromobenzene (HBB)	1.4 mg/kg	UK	UK	Fire Retardant Toxicology Harmful if swallowed, inhaled or absorbed through the skin. Skin, eye and respiratory irritant.	UK
Chlorobenzene	280,000 mg/kg	10 ppm	1,000	Eye nose and throat irritation drowsiness, uncoordination, CNS depression.	9.07

<b>Potential Source Areas 1 and 2</b>					
Chlorobenzene	280,000 mg/kg	10 ppm	1,000	Eye nose and throat irritation drowsiness, uncoordination, CNS depression.	9.07
Xylene	PSA-1 350 mg/kg	100 ppm	900 ppm	Eye, nose and throat irritation; upper respiratory tract irritation; skin rash; liver enlargement; narcosis; mild anemia; reversible kidney and liver damage; dizziness; drowsiness; difficult breathing	UK
tris (2,3-dibromopropyl) phosphate (TRIS)	PSA-2 88 mg/kg	UK	UK	Fire Retardant Toxicology Harmful if swallowed, inhaled or absorbed through the skin. Skin, eye and respiratory irritant.	UK

<b>Potential Source Areas 3 and 4 – Groundwater</b>					
bis (2-ethylhexyl) phthalate	PSA-4 GW 340 ug/L	5 mg/m <sup>3</sup>	5,000 mg/m <sup>3</sup>	Potential occupational carcinogen Mild irritation of eyes, nose and throat; eye and mucous membrane irritation; potential liver damage; teratogenic effects.  Affected organs include eyes, respiratory system, central nervous system, liver, reproductive system, and GI tract	UK



DDT and isomers	PSA-3 GW 25 ug/L	0.5 mg/m <sup>3</sup>	500 Ca	Paresthesia of tongue, lips, hand, and face; tremors; dizziness; confusion; headache; fatigue; convulsion; eye and skin irritation; vomiting.	UK
hexabromobenzene (HBB)	PSA-3 GW 0.17 ppb	UK	UK	Fire Retardant Toxicology Harmful if swallowed, inhaled or absorbed through the skin. Skin, eye and respiratory irritant.	UK

# 13.0 Site Monitoring

## Air Monitoring Specifications – All areas outside NAPL/DBCP Areas 1 & 2 Former Plant Site

The minimum following precautions will be taken for intrusive work completed at all areas of the site outside of NAPL/DBCP Areas 1 & 2:

- Work may be initiated in Level D protection with the following work practice controls in place.
  - Only site personnel who must be present for the activity may be within 15 feet of the drill or sample location.
  - All personnel must work upwind of the drill or sample location.
  - A fan must be used to direct vapors away from the work area at all times.

Breathing zone air monitoring will be completed during completion of all tasks and PPE levels will be managed as presented below:

### All areas outside NAPL/DBCP Areas 1 & 2 - Former Plant Site

Instrument	Tasks	Action Levels a		Frequency b	Calibration
<b>PID:</b> MultiRAE with 11.7eV lamp or <b>FID</b>	All new areas or activities, or where readings above background have been demonstrated.	< Background to 5 ppm	Level D	Initially and periodically during task	Daily
		5 ppm to 50 ppm →	Level C		
		> 50 ppm →	Level B		
<b>CGI:</b> MultiRAE or equivalent	Same as above.	0-10% : →	No explosion hazard.	Continuous during advancement of boring or trench	Daily
		10-25% LEL: →	Potential explosion hazard.		
		>25% LEL: →	Explosion hazard; evacuate or vent.		
<b>O2Meter:</b> MultiRAE or equivalent	Same as above.	>25% <sup>c</sup> O <sub>2</sub> : →	Explosion hazard; evacuate or vent.	Continuous during advancement of boring or trench	Daily
		20.9% <sup>c</sup> O <sub>2</sub> : →	Normal O <sub>2</sub> .		
		<19.5% <sup>c</sup> O <sub>2</sub> : →	O <sub>2</sub> deficient; vent or use SCBA		
<b>Toxic/Bromine:</b> MultiRAE with CL2 sensor	Same as above.	Background →	Level D	Continuous during advancement of boring or trench	Per manuf. instructions
		Background to 3 ppm	Level C		
		> 3 ppm	Level B		
<b>Radiation Meter d:</b> Ludlum Model 2 with GM probe model 44-9, or equivalent	Drilling.	Background: →	Continue work.	Initially, periodically, and at end of task	Daily
		>3x Background: →	Consult RHM.		
		>2 mR/Hr: →	Establish REZ.		

<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 SC-HW; 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> If the measured percent of O<sub>2</sub> is less than 10, an accurate LEL reading will not be obtained. Percent LEL and percent O<sub>2</sub> action levels apply only to ambient working atmospheres, and not to confined-space entry. More stringent percent LEL and O<sub>2</sub> action levels are required for confined-space entry (refer to Section 4).

<sup>d</sup> Refer to SOP HS-10 for instructions and documentation on radiation monitoring and screening.

## **DBCP Compliance Plan**

### **Air Monitoring Specifications –NAPL/DBCP Areas 1 & 2 Former Plant Site**

NAPL encountered at the site represents a potential hazard for intrusive work. DBCP, as well as benzene, methylene chloride, and 1,2-dichloroethane are known to be present within defined areas of the site previously referred to as the DBCP control areas. To ensure worker safety all intrusive work completed within NAPL/DBCP Areas 1 & 2 will be performed in Level B with the following additional precautions:

- Drilling and test pitting within the NAPL/DBCP Areas 1 &2 will be initiated at the worst known locations and will be completed in Level B.
- Only site personnel who must be present for the activity may be within 15 feet of the drilling or test pitting location.
- All personnel must work upwind of the drilling or test pitting location. Specifically the work area will be staged such that the driller, driller’s assistants, and test pit operator perform all intrusive tasks while remaining upwind of the borehole.
- A fan must be used to direct vapors away from areas where work is being completed. At a minimum vent fans will be used to direct subsurface vapors away from drill platforms, excavation equipment operators, and sample handling areas at all times.
- All drill cuttings will be immediately placed into drums and covered whenever cuttings are not being produced. Drummed drill cuttings will be transported to the waste staging pad for future offsite disposal.
- Training - All employees and Subcontractors must read and document DBCP-specific training in accordance with CH2M HILL’s site-specific H&S plan.
- Exposure Monitoring will be conducted for all tasks that take place in the NAPL/DBCP Areas 1&2. Air from the breathing zone of an employee completing each task while working in the DBCP control area will be sampled. If any sample is above the PEL, a DBCP/ regulated area will be established. Air sampling will be conducted on a regular basis for all employees and all tasks.

Breathing zone air monitoring will be completed during completion of all tasks and PPE levels will be managed as presented below:

**NAPL/DBCP Area 1 and 2** - Air monitoring will be conducted utilizing personnel sampling pumps (DBCP) and badge monitoring (benzene, methylene chloride, and 1,2-dichloroethane). Subcontractors and CH2M HILL will be responsible for furnishing and conducting required air monitoring for the employee whose task is representative of worst case exposure. Sampling will be conducted for the 3 days representative of possible worst case exposure to subcontractor and geologist. A minimum of 2 DBCP samples per day will be collected in accordance with section 13.2 below.

### **Air Monitoring Specifications –Adjacent and Neighboring Properties**

Real-time dust monitoring will be performed using MIE DataRAM 4000 dust monitors, or equivalent, throughout the duration of intrusive activities beginning with excavation and continuing through backfill and topsoil placement at each residential property at the Velsicol Site. Each day, a DataRAM will be placed in a location representative of possible worst case exposure potential for employees. At the discretion of the site safety coordinator (SSC), a DataRAM will also be placed at a location to verify effectiveness of engineering controls in minimizing dust generation that may potentially leave the construction activity exclusion zone (EZ) . The SSC, or designee, will record the DataRAM readings every 30 minutes, along with a brief description of the activity taking place. Additionally, the DataRAM

results will be downloaded each day so that the fluctuations in total dust concentrations can be observed. Alarm will be set at 0.150 milligrams per cubic meter (mg/m<sup>3</sup>) and at no time will exceed 1.5 mg/m<sup>3</sup>.

<b>Dust Monitor:</b> Miniram model PDM-3 or equivalent	During excavation if dusty conditions.	< 1.0 mg/m <sup>3</sup> →	Level D—Use Dust Suppression Techniques	Initially and periodically during tasks	Zero Daily
		> 1.0 mg/m <sup>3</sup> →	Level B, Stop Work and contact HSM		

- <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 SC-HW; 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> If the measured percent of O<sub>2</sub> is less than 10, an accurate LEL reading will not be obtained. Percent LEL and percent O<sub>2</sub> action levels apply only to ambient working atmospheres, and not to confined-space entry. More stringent percent LEL and O<sub>2</sub> action levels are required for confined-space entry (refer to Section 4).
- <sup>d</sup> Refer to SOP HS-10 for instructions and documentation on radiation monitoring and screening.
- <sup>e</sup> Noise monitoring and audiometric testing also required.

Additionally sampling pumps will be staged at the CH2M HILL trailer or location most representative of downwind exposure for 3 days collecting a minimum of 2 samples per day representative of possible worst case exposure.

### 13.1 Calibration Specifications

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

<b>Instrument</b>	<b>Gas</b>	<b>Span</b>	<b>Reading</b>	<b>Method</b>
<b>PID:</b> OVM, 11.7 eV bulb	100 ppm isobutylene	RF = 1.0	100 ppm	1.5 lpm reg T-tubing
<b>PID:</b> MiniRAE, 11.7 eV bulb	100 ppm isobutylene	CF = 100	100 ppm	1.5 lpm reg T-tubing
<b>PID:</b> TVA 1000	100 ppm isobutylene	CF = 1.0	100 ppm	1.5 lpm reg T-tubing
<b>FID:</b> OVA	100 ppm methane	3.0 ± 1.5	100 ppm	1.5 lpm reg T-tubing
<b>FID:</b> TVA 1000	100 ppm methane	NA	100 ppm	2.5 lpm reg T-tubing
<b>Dust Monitor:</b> Miniram-PDM3	Dust-free air	Not applicable	0.00 mg/m <sup>3</sup> in “Measure” mode	Dust-free area OR Z- bag with HEPA filter
<b>CGI:</b> MSA 260, 261, 360, or 361	0.75% pentane	N/A	50% LEL ± 5% LEL	1.5 lpm reg direct tubing
<b>Personnel sampling pumps</b>	NA	NA	Flow rate per described method	

Calibrate air monitoring equipment daily (or prior to use) in accordance with the instrument's instructions. Document the calibration in the field logbook (or equivalent) and include the following information:

- Instrument name
- Serial Number
- Owner of instrument (for example, CH2M HILL, HAZCO)
- Calibration gas (including type and lot number)
- Type of regulator (for example, 1.5 lpm)
- Type of tubing (for example, direct or T-tubing)
- Ambient weather condition (for example, temperature and wind direction)
- Calibration/instrument readings
- Operator's name and signature
- Date and time

## 13.2 Integrated Personal Air Sampling

Benzene, methylene chloride, 1,2-dichloroethane, and DBCP are present in NAPL/DBCP Areas 1&2 NAPL at levels which trigger air sampling requirements to verify work practice controls and PPE are adequate. Air sampling is required for staff who:

- Collect boring/split spoon samples of NAPL or NAPL-contaminated media.
- Work near a test pit with exposed NAPL

Intrusive work conducted in the NAPL/DBCP Areas 1 &2 will require personnel air sampling for these parameters during the initial 3 days of intrusive work in areas selected to represent worst case employee exposure. A minimum of 2 DBCP samples per day will be collected by subcontractor present and CH2M HILL (one employee each w/greatest exposure potential). The SSC is responsible for determining the person at highest risk of exposure during intrusive tasks and ensuring that air monitoring samples are collected.

Breathing zone air sampling data collected by subcontractors might be valid for assessing exposure for CH2M HILL staff. Contact the HSM before using subcontractor data to satisfy the requirements of this section.

Collection of breathing zone air monitoring samples will be completed in conjunction with groundwater sampling, well drilling and installation, geoprobe soil sampling, and other intrusive work in NAPL/DBCP Areas 1 &2 initially and every 6 months during active work, per OSHA requirements (1910.1044(f)(3)) assuming results are below PEL.

### Method Description

Samples must be collected using National Institute of Occupational Safety and Health (NIOSH) Manual of Analytic Methods, or an equivalent method performed by a laboratory accredited by AIHA. Method 1501 (or equivalent) is the standard for benzene Method 1003 (or equivalent) is the standard for 1,2-dichloroethane, and Method 1005 (or equivalent) is the standard for methylene chloride. The GC/ECD

method in conjunction with Anasorb 747 collection media (or equivalent) will be used for DBCP. 2 day turnaround for subcontractor and CH2M HILL samples will be utilized.

Alternate collection methods using passive sample collection devices are acceptable with the approval of the HSM and the analytic laboratory.

### **Personnel and Areas**

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

RHSM: Carl Woods/CIN & Mark Orman

## 14.0 Personal Protective Equipment

(Reference CH2M HILL- SOP HSE-117, *Personal Protective Equipment*)

### 14.1 Required Personal Protective Equipment

PPE must be worn by employees when actual or potential hazards exist and engineering controls or administrative practices cannot adequately control those hazards.

A PPE assessment has been conducted by the RHSM based on project tasks (see PPE specifications below). Verification and certification of assigned PPE by task is completed by the RHSM that approved this plan. Below are items that need to be followed when using any form of PPE:

- Employees must be trained to properly wear and maintain the PPE;
- In work areas where actual or potential hazards are present at any time, PPE must be worn by employees working or walking through the area;
- Areas requiring PPE should be posted or employees must be informed of the requirements in an equivalent manner;
- PPE must be inspected prior to use and after any occurrence to identify any deterioration or damage;
- PPE must be maintained in a clean and reliable condition;
- Damaged PPE shall not be used and must either be repaired or discarded; and
- PPE shall not be modified, tampered with, or repaired beyond routine maintenance.

The table below outlines PPE to be used according to task based on project-specific hazard assessment. If a task other than the tasks described in this table needs to be performed, contact the RHSM so this table can be updated.

## Project-Specific Personal Protective Equipment Requirements<sup>a</sup>

Task	Level	Body	Head	Respirator <sup>b</sup>
General Site Entry Surveying Observation of material loading for offsite disposal Oversight of remediation and construction	D	Work clothes; safety toed leather work boots and gloves	Hardhat <sup>c</sup> Safety glasses with side shields Ear protection <sup>d</sup>	None required
Surface water sampling Air Sampling Sediment sampling Passive soil gas sampling	Modified D	Work clothes or cotton coveralls <b>Boots:</b> Safety-toe, chemical-resistant boots OR Safety -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 with side shields Ear protection <sup>d</sup>	None required
Residential excavation Drilling (outside NAPL/DBCP Areas) Soil & groundwater sampling (outside NAPL/DBCP Areas)	Modified D	Work clothes or cotton coveralls <b>Boots:</b> Safety-toe, chemical-resistant boots OR Safety -toe, leather work boots with outer rubber boot covers <b>Gloves:</b> Inner surgical-style nitrile & outer chemical-resistant nitrile gloves.  OR Work Clothes or Coveralls. SC to determine body protection based on potential contact with site contaminants. If outer layer of personal clothing cannot be kept clean, then outer cotton coveralls or uncoated Tyvek coveralls shall be worn. (Polycoated Tyvek when there is potential to contact contaminated groundwater or free liquids from drums.).	Hardhat <sup>c</sup> Splash shield <sup>c</sup> Safety glasses with side shields Ear protection <sup>d</sup>	None required.
Work near water (within 3 feet) or when performing Sediment sampling/floodplain sampling,	D	Use of Coast Guard approved personal floatation device and if entering water-- waders and associated footwear for wading	Hardhat <sup>c</sup> Safety glasses with side shields Ear protection <sup>d</sup>	None required
Work near vehicular traffic ways or earth moving equipment.	All	Appropriate level of ANSI/ISEA 107-2004 high-visibility safety vests.	Work near vehicular traffic ways or earth moving equipment.	
Equipment decontamination if using pressure washer Note: upgrade to Level B required if decontaminating drill pipe or excavating equipment used in NAPL/DBCP Areas	Modified D with splash protection	<b>Coveralls:</b> Polycoated Tyvek® <b>Boots:</b> 16-inch-high steel-toed rubber boots <b>Gloves:</b> Inner surgical-style nitrile & outer chemical-resistant nitrile gloves.	Hardhat <sup>c</sup> Splash shield <sup>c</sup> over safety glasses with side shields or splash goggles Ear protection <sup>d</sup>	None required.
Tasks requiring upgrade	C	<b>Coveralls:</b> Polycoated Tyvek® <b>Boots:</b> Safety -toe, chemical-resistant boots OR Safety -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; [GME Cartridge/NIOSH Approved] <sup>e</sup> .



Intrusive work and sampling in NAPL/DBCP Areas 1 & 2: Drilling, test pitting Soil & groundwater sampling NAPL pumping/removal Equipment decontamination	B	<b>Coveralls:</b> Polycoated Tyvek® <b>Boots:</b> Safety -toe, chemical-resistant boots OR Safety -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 supplied air respirator w/5 minute escape pack.
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## Reasons for Upgrading or Downgrading Level of Protection (with approval of the RHSM)

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 in the "Site Monitoring" section 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 decrease 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 SC.

<sup>d</sup> Ear protection should be worn when conversations cannot be held at distances of 3 feet (1 meter) or less without shouting.

<sup>e</sup> See cartridge change-out schedule.

<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 RHSM, and an SC qualified at that level is present.

## 14.2 Respiratory Protection

(Reference CH2M HILL SOP HSE-121, *Respiratory Protection*)

Implement the following when using respiratory protection:

- Respirator users must have completed appropriate respirator training within the past 12 months. Level C training is required for air-purifying respirators (APR) use and Level B training is required for supplied-air respirators (SAR) and self-contained breathing apparatus (SCBA) use. Specific training is required for the use of powered air-purifying respirators (PAPR).
- Respirator users must complete the respirator medical monitoring protocol and been approved for the specific type of respirator to be used.
- Tight-fitting facepiece respirator (negative or positive pressure) users must have passed an appropriate fit test within past 12 months.
- Respirator use shall be limited to those activities identified in this plan. If site conditions change that alters the effectiveness of the specified respiratory protection, the RHSM shall be notified to amend the written plan.
- Tight-fitting facepiece respirator users shall be clean-shaven and shall perform a user seal check before each use.
- Canisters/cartridges shall be replaced according to the change-out schedule specified in this plan. Respirator users shall notify the SC or RHSM of any detection of vapor or gas breakthrough. The SC shall report any breakthrough events to the RHSM for schedule upgrade.
- Respirators in regular use shall be inspected before each use and during cleaning

- Respirators in regular use shall be cleaned and disinfected as often as necessary to ensure they are maintained in a clean and sanitary condition.
- Respirators shall be properly stored to protect against contamination and deformation.
- Field repair of respirators shall be limited to routine maintenance. Defective respirators shall be removed from service.
- When breathing air is supplied by cylinder or compressor, the SC or RHSM shall verify the air meets Grade D air specifications.
- The SC or designee shall complete the H&S Self-Assessment Checklist – Respiratory Protection included in as attachment to this plan to verify compliance with CH2M HILL’s respiratory protection program.

### Respirator Change-Out Schedule

Contaminant	Change-Out Schedule
Benzene	End-of-service life or end of shift (whichever occurs first)
Methylene Chloride	Canisters may only be used for emergency escape and must be replaced after use

## 15.0 Worker Training and Qualification

### 15.1 CH2M HILL Worker Training

(Reference CH2M HILL SOP HSE-110, *Training*)

#### 15.1.1 Hazardous Waste Operations Training

All employees engaging in hazardous waste operations or emergency response shall receive appropriate training as required by 29 CFR 1910.120 and 29 CFR 1926.65. At a minimum, the training shall have consisted of instruction in the topics outlined in 29 CFR 1910.120 and 29 CFR 1926.65. Personnel who have not met these training requirements shall not be allowed to engage in hazardous waste operations or emergency response activities.

##### Initial Training

General site workers engaged in hazardous waste operations shall, at the time of job assignment, have received a minimum of 40 hours of initial health and safety training for hazardous waste site operations, unless otherwise noted in the above-referenced standards.

Employees who may be exposed to health hazards or hazardous substances at treatment, storage, and disposal (TSD) operations shall receive a minimum of 24 hours of initial training to enable the employee to perform their assigned duties and functions in a safe and healthful manner.

Employees engaged in emergency response operations shall be trained to the level of required competence in accordance with 29 CFR 1910.120.

##### Three-Day Actual Field Experience

General site workers for hazardous waste operations shall have received three days of actual experience (on-the-job training) under the direct supervision of a trained, qualified supervisor and shall be documented. If the field experience has not already been received and documented at a similar site, this supervised experience shall be accomplished and documented at the beginning of the assignment of the project.

##### Refresher Training

General site workers and TSD workers shall receive 8-hours of refresher training annually (within the previous 12-month period) to maintain qualifications for fieldwork. Employees engaged in emergency response operations shall receive annual refresher training of sufficient content and duration to maintain their competencies or shall demonstrate competency in those areas at least annually.

##### Eight-Hour Supervisory Training

Onsite management or supervisors who will be directly responsible for, or supervise employees engaged in hazardous waste site operations, will have received at least 8 hours of additional specialized training on managing such operations. Employees designated as Safety Coordinator – Hazardous Waste are considered 8-hour HAZWOPER Site Safety Supervisor trained.

##### First Aid/Cardiopulmonary Resuscitation

First aid and CPR training consistent with the requirements of a nationally recognized organization such as the American Red Cross Association or National Safety Council shall be administered by a certified trainer. A minimum of two personnel per active field operation will have first aid and CPR training. Bloodborne pathogen training located on CH2M HILL's Virtual Office is also required for those designated as first aid/CPR trained.

The employees listed 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 "SC" have completed a 12-hour site safety coordinator course, and have documented requisite field experience. An SC 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- SOP HSE-120, *Reproductive Health*, including obtaining a physician's statement of the employee's ability to perform hazardous activities before being assigned fieldwork.

<b>Employee Name</b>	<b>Office</b>	<b>Responsibility</b>	<b>SC/FA-CPR</b>
Regina Bayer	MKE	Review Team Leader	HAZWOPER Trained
Theo von Wallmenich	DET	Site Manager/Project Manager	HAZWOPER Trained/HAZCOM
Rob Stryker	MKE	Project Engineer/Design Manager	SC-HW(C)/FA-CPR
Scott Pratt	DET	Project Manager/Site Safety Coordinator	SC-HW/FA-CPR
Tom Hutchinson	DET	Project Manager	SC-HW/FA-CPR
Steve Chumney	DET	Site Operations Manager/Field Team Leader	SC-HW(C)/FA-CPR
Jim Eluskie	DET	Construction Manager	SC-HW(C)/FA-CPR
Grant Koster	DET	Field Team Leader	SC-HW(C)/FA-CPR
Liz Markham	DET	Field Quality Manager/Field Team Leader	SC-HW(C)/FA-CPR
Rachel Vaughan	DET	Field Team Member	SC-HW/FA-CPR
Hillary Ott	WDC	Field Team Member	SC-HW/FA-CPR
Travis Pendry	FER	Site Operator/Field Team Member	HAZWOPER Trained Member
Shannon Olson	MKE	Project Chemist/Field Team Member	SC-HW(C)/FA-CPR
Dave Shekoski	MKE	Field Team Member	SC-HW(C)

### 15.1.2 Safety Coordinator Training

SCs are trained to implement the HSE program on CH2M HILL field projects. A qualified SC is required to be identified in the site-specific HSP for CH2M HILL field projects. SCs must also meet the requirements of the worker category appropriate to the type of field project (construction or hazardous waste). In addition, the SCs shall have completed additional safety training required by the specific work activity on the project that qualifies them to implement the HSE program (for example, fall protection, excavation).

### 15.1.3 Site-Specific Training

Prior to commencement of field activities, all field personnel assigned to the project will have completed site-specific training that will address the contents of applicable HSPs, including the activities, procedures, monitoring, and equipment used in the site operations. Site-specific training will also include site and facility layout, potential hazards, risks associated with identified emergency response actions, and available emergency services. This training allows field workers to clarify anything they do not understand and to reinforce their responsibilities regarding safety and work operations for their particular activity.

### 15.1.4 Project-Specific Training Requirements

Project-specific training for this project includes:

- Training on this HSP and AHAs
- Training Subcontractor AHAs
- Qualified Excavator operator (Subcontractor)
- Qualified Boat Operator (Captain's License)
- If respirators are necessary, personnel must be current with and have documentation of respirator training within the past 12 months and current fit test for make and model of respirator to be worn. Level B qualified/trained personnel if Level B upgrade is required

The training listed below is the required computer-based training located on CH2M HILL's Virtual Office (VO) for all site personnel. Additional training may be required depending on activities being performed onsite.

- Arsenic, Benzene, Methylene Chloride training
- Behavior Based-Loss Prevention System (BBLPS) training
- Fire Extinguisher training
- Globally Harmonized Systems training
- Hand Safety training
- Manual Lifting training (part of new employee orientation training)
- Noise training
- Personal Protection Equipment (PPE) training
- Safe Behavior Observation training

- Vinyl Chloride training
- Waste Management training

## **16.0 Medical Surveillance and Qualification**

All site workers participating in hazardous waste operations or emergency response (HAZWOPER) will maintain an adequate medical surveillance program in accordance with 29 CFR 1910.120 or 29 CFR 1926.65 and other applicable OSHA standards. Documentation of employee medical qualification (e.g., physician's written opinion) will be maintained in the project files and made available for inspection.

### **16.1 Hazardous Waste Operations and Emergency Response**

CH2M HILL personnel expected to participate in onsite HAZWOPER tasks are required to have a current medical qualification for performing this work. Medical qualification shall consist of a qualified physician's written opinion regarding fitness for duty at a hazardous waste site, including any recommended limitations on the employee's assigned work. The physician's written opinion shall state whether the employee has any detected medical conditions that would place the employee at increased risk of material impairment of the employee's health from work in hazardous waste operations or emergency response, or from respirator use.

### **16.2 Job or Site-Specific Medical Surveillance**

Due to the nature of hazards for a particular job or work site, specialized medical surveillance may be necessary. This surveillance could include biological monitoring for specific compounds, or specialized medical examinations.

No site-specific medical surveillance is required at this time.

### **16.3 Respirator User Qualification**

Personnel required to wear respirators must have a current medical qualification to wear respirators. Medical qualification shall consist of a qualified physician's written opinion regarding the employee's ability to safely wear a respirator in accordance with 29 CFR 1910.134.

### **16.4 Hearing Conservation**

Personnel working in hazardous waste operations or operations that fall under 29 CFR 1910.95 and exposed to noise levels in excess of the 85dBA time-weighted average shall be included in a hearing conservation program that includes annual audiometric testing.

## 17.0 Site-Control Plan

### 17.1 Site-Control Procedures

(Reference CH2M HILL SOP HSE-218, *Hazardous Waste Operations*)

Site control is established to prevent the spread of contamination throughout the site and to ensure that only authorized individuals are permitted into potentially hazardous areas.

The SC will implement site control procedures including the following bulleted items.

- Establish support, contamination reduction, 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; and
  - Two-way radio or cellular telephone if available.
- Establish offsite communication.
- Establish and maintain the “buddy system.”

### 17.2 Remediation Work Area Zones

(Reference CH2M HILL SOP HSE-218 Hazardous Waste Operations)

A three-zone approach will be used to control areas where site contaminants exist. Access will be allowed only after verification of appropriate training and medical qualification. The three-zone approach shall include an EZ, Contamination Reduction Zone (CRZ) and a Support Zone (SZ). The three-zone approach is not required for construction work performed outside contaminated areas where control of site contamination is not a concern.

Specific work control zones shall be established as necessary during task planning. Site work zones should be modified in the field as necessary, based on such factors as equipment used, air monitoring results, environmental conditions, or alteration of work plans. No eating, drinking, or smoking is permitted in contaminated areas and in exclusion or decontamination zones. The SC should establish areas for eating, drinking, and smoking. The following guidelines shall be used for establishing and revising these preliminary zone designations.

#### Support Zone

The SZ is an uncontaminated area (trailers, offices, field vehicles, etc.) that will serve as the field support area for most operations. The SZ provides field team communications and staging for emergency response. Appropriate sanitary facilities and safety and emergency response equipment will be located in this zone. Potentially contaminated personnel/materials are not allowed in this zone. The only exception will be appropriately packaged and decontaminated materials, or personnel with medical emergencies that cannot be decontaminated.

#### Contamination Reduction Zone

The CRZ is established between the EZ and the SZ, upwind of the contaminated area where possible. The CRZ provides an area for decontamination of personnel, portable handheld equipment and tools,



and heavy equipment. In addition, the CRZ serves as access for heavy equipment and emergency support services.

### **Exclusion Zone**

The EZ is where activities take place that may involve exposure to site contaminants and/or hazardous materials or conditions. This zone shall be demarcated to prevent unauthorized entry. More than one EZ may be established if there are different levels of protection to be employed or different hazards that exist in the same work area. The EZ shall be large enough to allow adequate space for the activity to be completed, including field personnel and equipment, as well as necessary emergency equipment.

The EZ shall be demarcated with some form of physical barrier or signage. The physical barrier or signage shall be placed so that they are visible to personnel approaching or working in the area. Barriers and boundary markers shall be removed when no longer needed.

### **Other Controlled Areas**

Other work areas may need to be controlled due to the presence of an uncontrolled hazard, to warn workers of requirements, or to prevent unauthorized entry. Examples include general construction work areas, open excavations, high noise areas, vehicle access areas, and similar activities or limited access locations. These areas shall be clearly demarcated with physical barriers (fencing, cones, reinforced caution tape or rope) as necessary and posted with appropriate signage.

# 18.0 Decontamination

(Reference CH2M HILL SOP HSE-218, *Hazardous Waste Operations*)

Decontamination areas will be established for work in potentially contaminated areas to prevent the spread of contamination. Decontamination areas should be located upwind of the exclusion zone where possible and should consider any adjacent or nearby projects and personnel. The SC must establish and monitor the decontamination procedures and their effectiveness. Decontamination procedures found to be ineffective will be modified by the SC. The SC must ensure that procedures are established for disposing of materials generated on the site.

No eating, drinking, or smoking is permitted in contaminated areas and in exclusion or decontamination zones. The SC should establish areas for eating, drinking, and smoking.

## 18.1 Contamination Prevention

Preventing or avoiding contamination of personnel, tools, and equipment will be considered in planning work activities at all field locations. Good contamination prevention and avoidance practices will assist in preventing worker exposure and result in a more efficient decontamination process. Procedures for contamination prevention and avoidance include the following:

- Do not walk through areas of obvious or known contamination;
- Do not directly handle or touch contaminated materials;
- Make sure there are no cuts or tears in PPE;
- Fasten all closures in suits and cover them with duct tape, if appropriate;
- Take particular care to protect any skin injuries;
- Stay upwind of airborne contamination, where possible;
- Do not eat or drink in contaminated work areas;
- Do not carry food, beverages, tobacco, or flame-producing equipment into contaminated work areas;
- Minimize the number of personnel and amount of equipment in contaminated areas to that necessary for accomplishing the work;
- Choose tools and equipment with nonporous exterior surfaces that can be easily cleaned and decontaminated;
- Cover monitoring and sampling equipment with clear plastic, leaving openings for the sampling ports, as necessary; and
- Minimize the amount of tools and equipment necessary in contaminated areas.

## 18.2 Personnel and Equipment Decontamination

Personnel exiting an EZ must ensure that they are not spreading potential contamination into clean areas or increasing their potential for ingesting or inhaling potential contaminants. Personal decontamination may range from removing outer gloves upon exiting the EZ, to proceeding through an outer layer doffing station including a boot and glove wash and rinse.

Equipment that has come into contact with contaminated media must also be cleaned/decontaminated when it is brought out of the EZ. Heavy equipment will include drill rigs, drill pipe, support vehicles, excavators, and other earth moving equipment. Smaller equipment will consist of various items including drill rig tooling and hand tools. A bermed and high-density polyethylene (HDPE)-lined decontamination pad of sufficient size will be constructed inside the CRZ to support decontamination of this equipment. Decontamination of heavy equipment will be performed through the use of hot water pressure washing equipment. Smaller items will be decontaminated by utilizing a scrub brush and Liquinox™ wash solution followed by rinsing with potable water. Following decontamination, equipment shall be inspected and verified free of contaminated media prior to exiting the CRZ.

Personnel performing decontamination duties must be wearing at a minimum a full face splash guard, polycoated Tyvek® suit, 16-inch high steel-toed rubber boots, and inner surgical-style nitrile and outer chemical resistant nitrile gloves prior to commencing these duties. At times, certain equipment (e.g. drill pipe and excavator bucket) may be grossly contaminated, if this contamination originated in NAPL/DBCP Area 1&2 Level B PPE must be worn during decontamination activities. Refer to Section 14.0 for detailed PPE requirements.

Liquids and solid materials generated from decontamination activities must be contained within the decontamination pad while decontamination is occurring. Following equipment decontamination, liquids will be pumped from the decontamination pad to specially designated on site liquid IDW holding tanks. Solid materials such as excess soil will be placed into designated 55-gallon steel IDW drums for solids.

## 18.3 Decontamination During Medical Emergencies

Standard personnel decontamination practices will be followed whenever possible. For emergency life saving first aid and/or medical treatment, normal decontamination procedures may need to be abbreviated or omitted. In this situation, site personnel shall accompany contaminated victims to advise emergency response personnel on potential contamination present and proper decontamination procedures.

Outer garments may be removed if they do not cause delays, interfere with treatment, or aggravate the problem. Protective clothing can be cut away. If the outer garments cannot be safely removed, a plastic barrier between the individual and clean surfaces should be used to help prevent contaminating the inside of ambulances or medical personnel. Outer garments can then be removed at the medical facility.

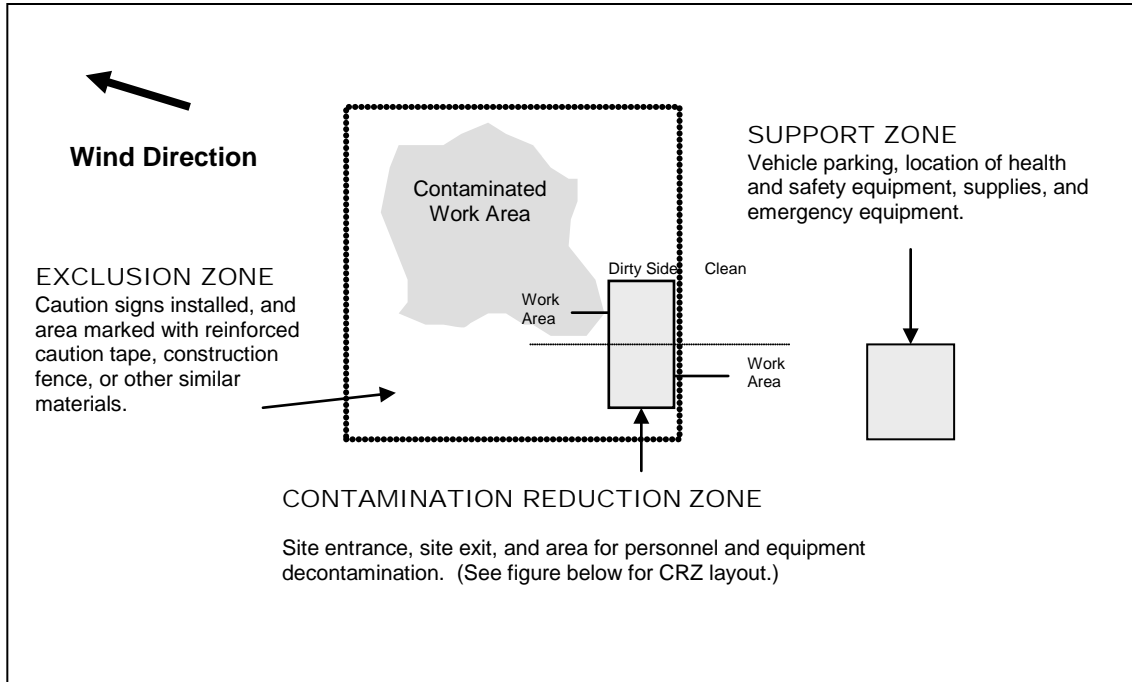
## 18.4 Waste Collection and Disposal

All contaminated material generated through the personnel and equipment decontamination processes (e.g., contaminated disposable items, gross debris, liquids, sludges) will be properly containerized and labeled, stored at a secure location, and disposed in accordance with the project plans.

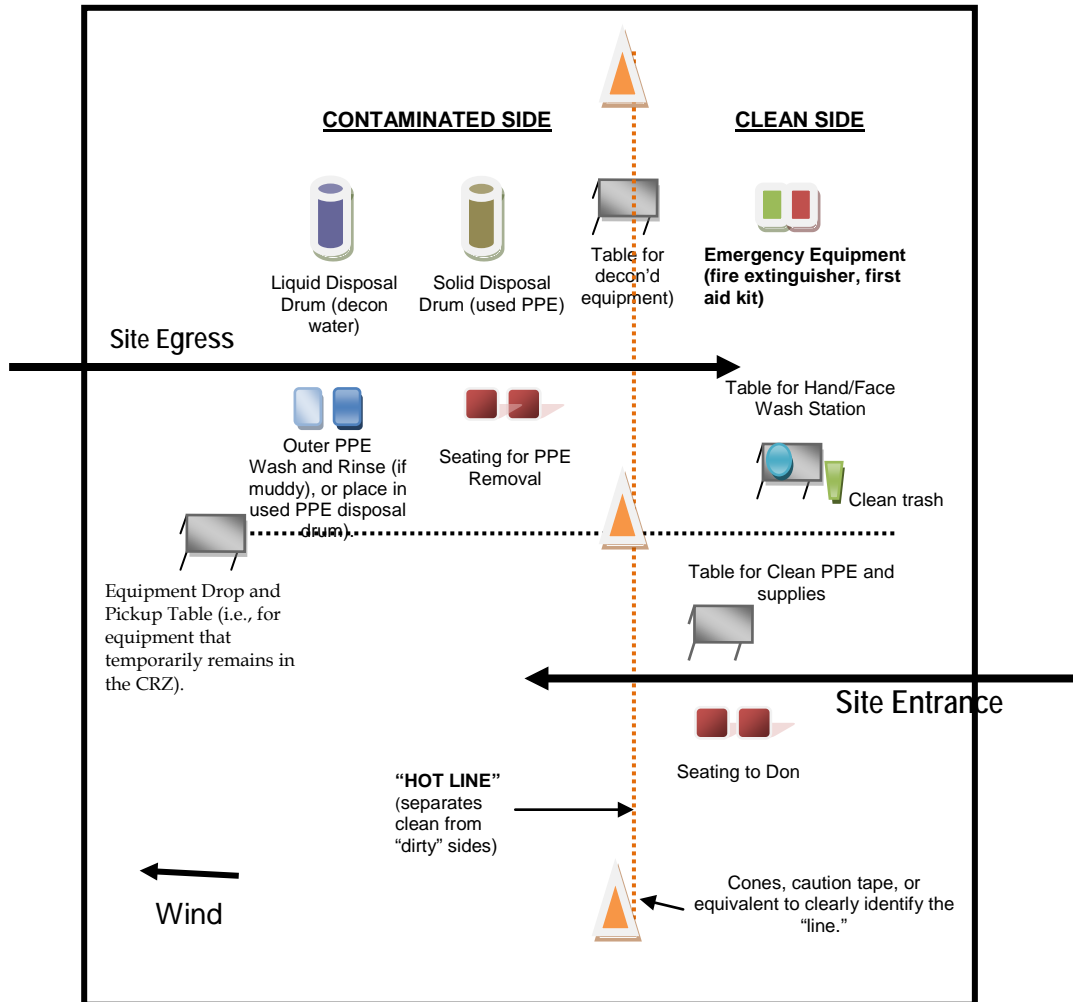
## 18.5 Diagram of Personnel-Decontamination Line

The following figure illustrates a conceptual establishment of work zones, including the decontamination line. Work zones are to be modified by the SC to accommodate task-specific requirements

.Work Area - Set up appropriately based on wind direction



### Typical Contamination Reduction Zone



# 19.0 Emergency Response Plan

(Reference CH2M HILL SOP HSE-106, *Emergency Planning*)

## 19.1 Pre-Emergency Planning

- The Emergency Response Coordinator (ERC), typically the SC or designee, 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. Pre-Emergency Planning activities performed by the ERC include:
  - 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 the “Emergency Contacts” page and route to the hospital located in this section in project trailer(s) and keep a copy in field vehicles along with evacuation routes and assembly areas. Communicate the information to onsite personnel and keep it updated.
  - 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. Drills should take place periodically but no less than once a year.
  - Brief new workers on the emergency response plan.
- The ERC will evaluate emergency response actions and initiate appropriate follow-up actions.

**DBCP Emergency response plan** – given that no free product will be encountered and historical sampling data from soil/groundwater no additional emergency procedures will be required beyond those typically enacted on a hazwoper job in relation to PPE and size/implementation of 3 zone approach. In the unlikely event that initial personnel integrated sampling results indicate exposure at or above the PEL or personnel exhibit signs or symptoms of possible exposure this section will be amended prior to work resuming.

## 19.2 Emergency Equipment and Supplies

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

<b>Emergency Equipment and Supplies</b>	<b>Location</b>
Fire extinguishers (A, B, and C classes)	Command Post, Decon zone, and EZ
First aid kit	Command Post/Decon zone/Field Vehicle
Eye wash	Command Post/Support & Decon Zone/Field Vehicle
Potable water	Command Post/Support & Decon Zone/Field Vehicle
Bloodborne-pathogen kit	Command Post/Support Zone/Field Vehicle
Absorbent booms/pads and dry absorbent	Decon zone and EZ
Two-way radios	Command Post/Decon zone & EZ

## 19.3 Incident Response

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

- Notify appropriate response personnel.
- Shut down CH2M HILL operations and evacuate the immediate work area.
- Account for personnel at the designated assembly area(s).
- Assess the need for site evacuation, and evacuate the site as warranted.
- Implement HSE-111, Incident Notification, Reporting and Investigation.
- Notify and submit reports to clients as required in contract.

Small fires or spills posing minimal safety or health hazards may be controlled with onsite spill kits or fire extinguishers without evacuating the site. When in doubt evacuate. Follow the incident reporting procedures in the “Incident Notification, Reporting, and Investigation” section of this HSP.

## 19.4 Emergency Medical Treatment

Emergency medical treatment is needed when there is a life-threatening injury (such as severe bleeding, loss of consciousness, breathing/heart has stopped). When in doubt if an injury is life-threatening or not, treat it as needing emergency medical treatment.

- Notify 911 or other appropriate emergency response authorities as listed in the “Emergency Contacts” page located in this section.
- The ERC 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, perform decontamination (if applicable) where feasible; lifesaving and first aid or medical treatment takes priority.
- Initiate first aid and CPR where feasible.
- Notify supervisor and if the injured person is a CH2M HILL employee, the supervisor will call the occupational nurse at 1-866-893-2514 and make other notifications as required by HSE SOP-111, *Incident Notification, Reporting and Investigation*.
- Make certain that the injured person is accompanied to the emergency room.
- Follow the Serious Incident Reporting process in HSE SOP-111, *Incident Notification, Reporting and Investigation*, and complete incident report using the HITS system on the Virtual Office or if not feasible, use the hard copy forms provided as an attachment to this HSP.
- Notify and submit reports to client as required in contract.

## 19.5 Evacuation

- Evacuation routes, assembly areas, and severe weather shelters (and alternative routes and assembly areas) are to be specified on the site map.
- Evacuation route(s) and assembly area(s) will be designated by the ERC or designee before work begins.
- Personnel will assemble at the assembly area(s) upon hearing the emergency signal for evacuation.
- The ERC 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 ERC will account for all personnel in the onsite assembly area.
- A designated person will account for personnel at alternate assembly area(s).
- The ERC will follow the incident reporting procedures in the “Incident Notification, Reporting and Investigation” section of this HSP.

## 19.6 Evacuation Signals

<b>Signal</b>	<b>Meaning</b>
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.

## 19.7 Inclement Weather

Sudden inclement weather can rapidly encroach upon field personnel. Preparedness and caution are the best defenses. Field crew members performing work outdoors should carry clothing appropriate for inclement weather. Personnel are to take heed of the weather forecast for the day and pay attention for signs of changing weather that indicate an impending storm. Signs include towering thunderheads, darkening skies, or a sudden increase in wind. If stormy weather ensues, field personnel should discontinue work and seek shelter until the storm has passed.

Protective measures during a lightning storm include seeking shelter; avoiding projecting above the surrounding landscape (don't stand on a hilltop--seek low areas); staying away from open water, metal equipment, railroad tracks, wire fences, and metal pipes; and positioning people several yards apart. Some other general precautions include:

- Know where to go and how long it will take to get there. If possible, take refuge in a large building or vehicle. Do not go into a shed in an open area. For the Velsicol site, most work will be completed within ½ mile of the field project trailer. In the event of severe weather that does not involve a tornado warning, seek shelter inside the trailer.
- The inclination to see trees as enormous umbrellas is the most frequent and most deadly mistake. Do not go under a large tree that is standing alone. Likewise, avoid poles, antennae and towers.
- If the area is wide open, go to a valley or ravine, but be aware of flash flooding.
- If you are caught in a level open area during an electrical storm and you feel your hair stand on end, drop to your knees, bend forward and put your hands on your knees or crouch. The idea is to make yourself less vulnerable by being as low to the ground as possible and taking up as little ground space as possible. Lying down is dangerous, since the wet earth can conduct electricity. Do not touch the ground with your hands.
- Do not use telephones during electrical storms, except in the case of emergency

Remember that lightning may strike several miles from the parent cloud, so work should be stopped/restarted accordingly. The lightning safety recommendation is 30-30: Seek refuge when thunder sounds within 30 seconds after a lightning flash; and do not resume activity until 30 minutes after the last thunder clap.

High winds can cause unsafe conditions, and activities should be halted until wind dies down. High winds can also knock over trees, so walking through forested areas during high-wind situations should be avoided. If winds increase, seek shelter or evacuate the area. Proper body protection should be worn in case the winds hit suddenly, because body temperature can decrease rapidly.

### Tornado Safety

Recognizing imminent tornado signs include seeing an unusually dark sky, possibly with some green or yellow clouds. You may hear a roaring or rumbling sound like a train, or a whistling sound like a jet. Large hail may also be falling. You may be able to see funnels, or they may be hidden by rain or hail.

Listen to your radio for tornado warnings during bad thunderstorms. If a tornado warning is issued, don't panic. Instead, listen and look. Quickly but calmly follow directions for getting to shelter.



Take cover. Staff working at the Velsicol site should evacuate the site to designated refuge areas in the lodging facilities that have been arranged. Once indoors, follow the direction of hotel staff regarding designated shelter areas within the structure. Indoors you should generally go to the basement and crouch down under the stairs, away from windows. Do not take an elevator. If you can't get to a basement, go into a closet or bathroom and pull a mattress over you or sit underneath a sturdy piece of furniture on the ground floor near the center of the building. Pull your knees up under you and protect your head with your hands.

A bad place to be in a tornado is in a building with a large freestanding roof such as a gymnasium, arena, auditorium, church or shopping mall. If you are caught in such a building, take cover under something sturdy.

More than half of tornado deaths occur in mobile homes. If a tornado threatens, get out and go to a building with a good foundation, or lay down in a ditch away from vehicles and other objects.

If you are driving, get to a shelter, lie down in a ditch or seek cover up under the girders of an overpass or bridge. Stay as close to the ground as you can. Protect your head and duck flying debris.

Stay away from metal and electrical equipment because lightning accompanies tornadoes.

If you have time before the tornado strikes, secure objects such as garbage cans and lawn furniture which can injure people. While most tornado damage is a result of the violent winds, most injuries and deaths actually result from flying debris.

## Emergency Contacts

**24-hour CH2M HILL Injury Reporting– 1-866-893-2514**  
**24-hour CH2M HILL Serious Incident Reporting Contact – 720-286-4911**

<p><b>Medical Emergency -- 911</b>  <b>Facility Medical Response #:</b>  <b>Local Ambulance #:</b></p>	<p><b>CH2M HILL- Medical Consultant</b>                  WorkCare                  Dr. Peter Greaney M.D.                  300 S. Harbor Blvd, Suite 600                  Anaheim , CA 92805                  800-455-6155                  714-978-7488</p>
<p><b>Urgent Care Facility</b>                  Gratiot Community Hospital                  300 Warwick Drive,                  Alma, MI 48801                  Hospital Phone: 989-463-1101</p>	<p><b>CH2M HILL Director – Health, Safety, Security &amp; Environment</b>                  Andy Strickland/DEN                  (720) 480-0685 (cell) or (720) 286-2393 (office)</p>
<p><b>Fire/Spill Emergency – 911 (St. Louis Fire Dept)</b>  <b>Facility Fire Response #:</b>  <b>Local Fire Dept #:</b> (989) 681-3111</p>	<p><b>Responsible Health and Safety Manager (RHSM)</b>                  Name: Carl Woods/CIN                  Phone: (513) 889-5771 (office) or (513) 319-5771 (cell)</p>
<p><b>Security &amp; Police – 911 (St. Louis Police Dept)</b>  <b>Facility Security #:</b>  <b>Local Police #:</b> (989) 681-3842</p>	<p><b>Human Resources Department</b>                  Name: Sherri Huntley                  Phone: 703-376-5192</p>
<p><b>Utilities Emergency Phone Numbers</b>                  Water: (989) 681-3567                  Gas: (800) 477-5050                  Electric: (989) 681-3351</p>	<p><b>CH2M HILL Human Resources Department</b>                  Phone: Employee Connect toll-free number                  1-877-586-4411                  (U.S. and Canada)</p>
<p><b>Safety Coordinator (SC)</b>                  Name: Steve Chumney                  Phone: (734) 417-6874</p>	<p><b>CH2M HILL Worker’s Compensation:</b>                  Contact Business Group HR dept. to have form completed or contact Jennifer Rindahl after hours:                  (720)891-5382</p>
<p><b>Project Managers</b>                  Name: Theo von Wallmenich/DET                  Phone: (989) 285-1515                  Name: Scott Pratt/DET                  Phone: (810) 360-2012                  Name: Tom Hutchinson/DET                  Phone: (989) 828-5237</p>	<p><b>Media Inquiries Corporate Strategic Communications</b>                  Name: John Corsi                  Phone: (720) 286-2087</p>
<p><b>CH2M HILL Project Environmental Manager</b>                  Name: Ron Utter                  Phone: 989-948-5880</p>	<p><b>Automobile Accidents</b>                  Rental: Jennifer Rindahl/DEN: 720-286-2449                  CH2M HILL owned vehicle: Linda George/DEN:                  720-286-2057</p>
<p><b>Federal Express Dangerous Goods Shipping</b>                  Phone: 800/238-5355</p>	<p><b>CHEMTEL (hazardous material spills)</b>  <b>Phone: 800/255-3924</b></p>
<p>Facility Alarms:                  -3 horn blasts from car</p>	<p>Evacuation Assembly Area(s):                   TBD</p>

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Facility/Site Evacuation Route(s):

TBD upon site arrival

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## Local Hospital Information/Directions

Gratiot Community Hospital

300 Warwick Drive,

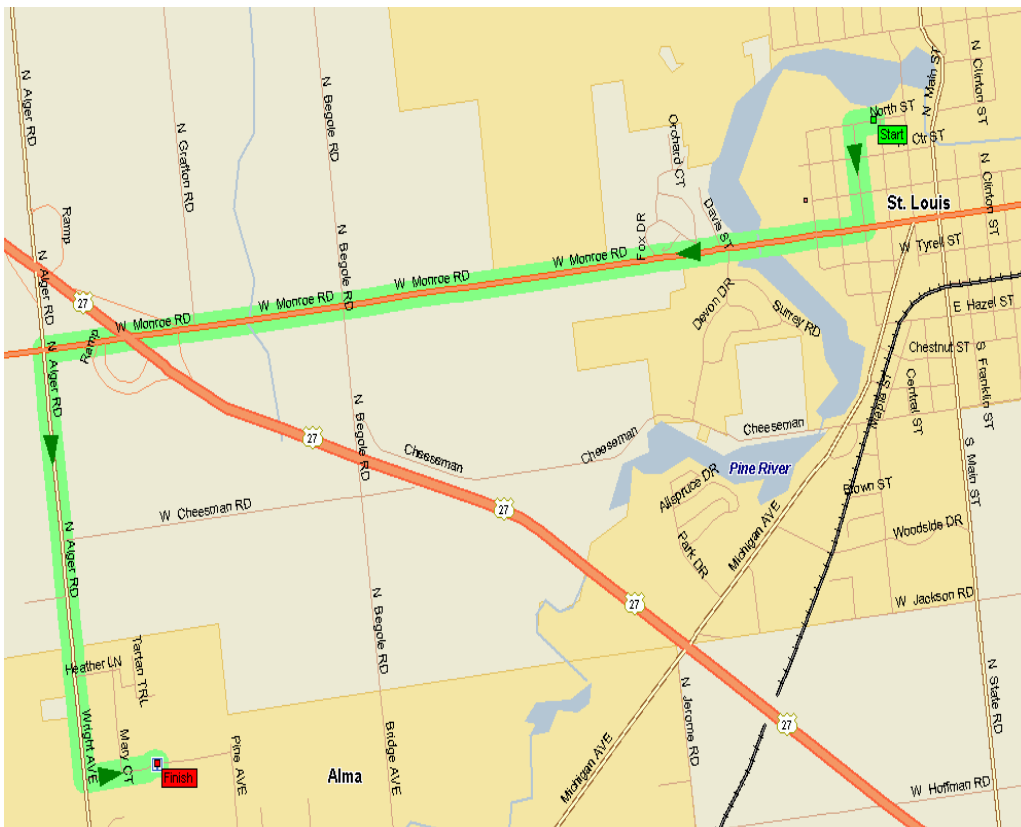
Alma, MI 48801

Hospital Phone: 989-463-1101

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### **Directions/Map:**

- |   |           |
|---|-----------|
| 1. Travel West on North Street                | 0.1 mile  |
| 2. Turn left on North Delaware Street         | 0.1 mile  |
| 3. Turn right on Washington Street (BR27/M46) | 2.5 miles |
| 4. Turn left on North Alger Road              | 1.1 miles |
| 5. Turn left on Warwick                       | 0.1 mile  |



## 20.0 Spill Containment Procedures

CH2M HILL and subcontractor personnel working at the project site shall be knowledgeable of the potential health, safety and environmental concerns associated with petroleum and other hazardous substances that could potentially be released at the project site.

The following is a list of criteria that must be addressed in CH2M HILL's or the subcontractor's plans in the event of a spill or release. In the event of a large quantity spill notify emergency services. Personnel discovering a spill shall (only if safe to do so):

- Stop the spill immediately (if possible) or note source. If unsafe conditions exist, then leave the area, call emergency services, inform nearby personnel, notify the site supervisors, and initiate incident reporting process. The SC shall be notified immediately.
- Extinguish sources of ignition (e.g., flames, sparks, hot surfaces, cigarettes, etc.)
- Clear personnel from the spill location and barricade the area.
- Utilize available spill control equipment in an effort to ensure that fires, explosions, and releases do not occur, recur, or spread.
- Use sorbent materials to control the spill at the source.
- Construct a temporary containment dike of sorbent materials, cinder blocks, bricks or other suitable materials to help contain the spill.
- Attempt to identify the character, exact source, amount, and extent of the released materials. Identification of the spilled material should be made as soon as possible so that the appropriate cleanup procedure can be identified.
- Assess possible hazards to human health or the environment as a result of the release, fire or explosion.
- A Spill Report shall be completed, including a description of the event, root causes, and corrective actions.

# 21.0 Inspections

## 21.1 Management Health, Safety, Security, and Environment Inspections

The Management Inspection Checklist (attached to this plan) is intended to facilitate PM leadership, provide an opportunity for PM's to mentor field staff on HSE and identify any big picture actions that need to be addressed. Observations that would improve global HSE program should also be included on the form. This Checklist does NOT take the place of a formal HSE audit. The PM shall:

- Complete one checklist per month during field work when visiting the site. The PM may delegate completion to the task lead, field team leader, or construction manager if the project is short duration and a visit is not planned for.
- Complete applicable sections of the checklist (can be typed or hand-written). Address issues with the field team, taking the opportunity to mentor staff by identifying the "root cause" of observation (e.g., why are SBOs not being completed, had this hazard been noted by any other team members?).
- Send completed form to Project Delivery Manager, Sector HSE Lead, and RHSM for tracking and review. Original should be kept in the project files.

## 21.2 Project Activity Self-Assessment Checklists

In addition to the hazard controls specified in this document, Project Activity Self-Assessment Checklists are contained as an attachment to this HSP. The Project-Activity Self-Assessment Checklists are based upon minimum regulatory compliance and some site-specific requirements may be more stringent. The objective of the self-assessment process is to identify gaps in project safety performance, and prompt for corrective actions in addressing these gaps. The self-assessment checklists, including documented corrective actions, shall be made part of the permanent project records and maintained by the SC.

The self-assessment checklists will also be used by the SC in evaluating the subcontractors and any client contractors' compliance onsite.

The self-assessment checklists for the following tasks and exposures are required when the task or exposure is initiated and weekly thereafter while the task or exposure is taking place. The checklists shall be completed by the SC or other CH2M HILL representative and maintained in project files.

- Confined Space Entry
- Drilling
- Earthmoving Equipment
- Electrical Safety
- Excavation
- Hand and Power Tools
- Hazardous Materials Handling
- Hearing Conservation
- Hoists

- Lockout/Tagout
- Lone Worker
- Manual Lifting
- Open Water Work (Boats and Barges)
- PPE
- Respiratory Protection
- Rigging
- Subcontracting
- Traffic Control
- Waste - Non Hazardous
- Waste Management Analysis and Characterization

### 21.3 Safe Behavior Observations

Safe Behavior Observations (SBOs) 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.

The SC or designee shall perform at least one SBO each week for any field work performed by subcontractors or when there are at least two CH2M HILL personnel performing field work.

The SC or designee shall complete the SBO form (attached to this HSP) for the task/operation being observed and submit them weekly.

For Federal projects, SBOs may be submitted electronically by e-mailing them to the address, "CH2M HILL ES FED Safe Behavior Observations" when connected to the network or at [CH2MHILLESFEDSafeBehaviorObservation@ch2m.com](mailto:CH2MHILLESFEDSafeBehaviorObservation@ch2m.com).

## 22.0 Incident Notification, Reporting, and Investigation

(Reference CH2M HILL SOP HSE-111, *Incident Notification, Reporting and Investigation*)

### 22.1 General Information

This section applies to the following:

- All injuries involving employees, third parties, or members of the public
- Damage to property or equipment
- Interruptions to work or public service (e.g., hitting a utility)
- Incidents which attract negative media coverage
- Near misses
- Spills, leaks, or regulatory violations
- Motor vehicle accidents

Documentation, including incident reports, investigation, analysis and corrective measure taken, shall be kept by the SC and maintained onsite for the duration of the project.

### 22.2 Section Definitions

**Incident:** an undesired event which results or could have resulted in loss through injury, damage to assets or environmental harm. This includes all of the definitions below.

**Accident:** an incident involving actual loss through injury, damage to assets, or environmental harm.

**Near Miss:** an unsafe act or incident which, in other circumstances, could have resulted in loss through injury, damage to assets, or environmental harm.

**Serious Incident:**

- All fatalities including contractors, subcontractors, third parties, or members of the public
- Kidnap/Missing Person
- Event that involves a fire, explosion, or property damage that requires a site evacuation or is estimated to result in greater than \$ 500,000 in damage.
- Acts or threats of terrorism
- Spill or release of hazardous materials or substances that involves a significant threat of imminent harm to site workers, neighboring facilities, the community or the environment.

### 22.3 Reporting Requirements

All employees and subcontractors' employees shall immediately report any incident (including "near misses," as defined in the section above) in which they are involved or witness to their supervisor.

The CH2M HILL or Subcontractor supervisor, upon receiving an incident report, shall inform his immediate superior and the CH2M HILL SC.

The SC shall immediately report the following information to the RHSM and PM by phone and e-mail:

- Project Name and Site Manager;
- Date and time of incident;
- Description of incident;
- Extent of known injuries or damage;
- Level of medical attention; and
- Preliminary root cause/corrective actions

**If the incident was an environmental permit issue (potential permit non-compliance, other situation that result in a notice of violation) or a spill or release, contact the Project EM immediately so evaluation of reportable quantity requirements and whether agency reporting is required;**

The CH2M HILL team shall comply with all applicable statutory incident reporting requirements such as those to OSHA, the police, or state or Federal environmental agency.

Be aware that many OSHA-designated states require reporting to the area OSHA office if one person is admitted to the hospital (e.g., California and Washington); whereas Federal OSHA requires it if three or more are admitted.

## 22.4 HITS System and Incident Report Form (IRF)

It is the policy of CH2M HILL to maintain a HITS entry and/or Incident Report Form (IRF) for all work-related injuries and illnesses sustained by its employees in accordance with recordkeeping and insurance requirements. A HITS entry and/or IRF will also be maintained for other incidents (property damage, fire or explosion, spill, release, potential violation, and near misses) as part of our loss prevention and risk reduction initiative.

## 22.5 Injury Management/Return-to-Work (for CH2M HILL Staff Only)

(Reference CH2M HILL, SOP HSSE-124, Injury Management/Return-to-Work)

### 22.5.1 Background

The Injury Management Program has been established to provide orderly, effective and timely medical treatment and return-to-work transition for an employee who sustains a work-related injury or illness. It also provides guidance and assistance with obtaining appropriate treatment to aid recovery, keep supervisors informed of employee status, and to quickly report and investigate work-related injury/illnesses to prevent recurrence.

To implement the Injury Management/Return-to-Work Program successfully, supervisors and/or SC should:

- Ensure employees are informed of the Injury Management/Return-to-Work Program.
- Become familiar with the Notification Process (detailed below).
- Post the Injury Management/Return-to-Work Notification Poster.

### 22.5.2 The Injury Management/Return-to-Work Notification Process:

- Employee informs their Supervisor.



- Employee calls the Injury Management Program toll free number 1-866-893-2514 immediately and speaks with the Occupational Injury Nurse. This number is operable 24 hours per day, 7 days a week.
- Supervisor ensures employee immediately calls the Injury Management Program number. Supervisor makes the call with the injured worker or for the injured worker if needed.
- Nurse assists employee with obtaining appropriate medical treatment, as necessary schedules clinic visit for employee (calls ahead, and assists with any necessary follow up treatment) with the supervisor or SC accompany the employee if a clinic visit is necessary to ensure that employees receive appropriate and timely care.
- Supervisor/SC completes the HITS entry or Incident Report Form immediately (within 24 hours) and forwards it to the Project Manager and RHSM.
- Nurse notifies appropriate CH2M HILL staff by e-mail (supervisor, Health & Safety, Human Resources, Workers' Compensation).
- Nurse communicates and coordinates with and for employee on treatment through recovery.
- Supervisor ensures suitable duties are identified and available for injured/ill workers who are determined to be medically fit to return to work on transitional duty (temporary and progressive).
- Supervisor ensures medical limitations prescribed (if any) by physician are followed until the worker is released to full duty.

## 22.6 Serious Incident Reporting Requirements

(Reference CH2M HILL SOP HSE-111, *Incident Reporting, Notification and Investigation*)

The Serious Incident Reporting Requirements ensures timely notification and allows for positive control over flow of information so that the incident is handled effectively, efficiently, and in conjunction with appropriate corporate entities. This standard notification process integrates Health, Safety, and Environment (HSE) and Firm Wide Security Operations (FWSO) requirements for the consistent reporting of and managing of serious events throughout our operations.

### 22.6.1 Serious Incident Determination

The following are general criteria for determining whether an incident on CH2M HILL owned or managed facilities or program sites is considered serious and must be immediately reported up to Group President level through the reporting/notification process:

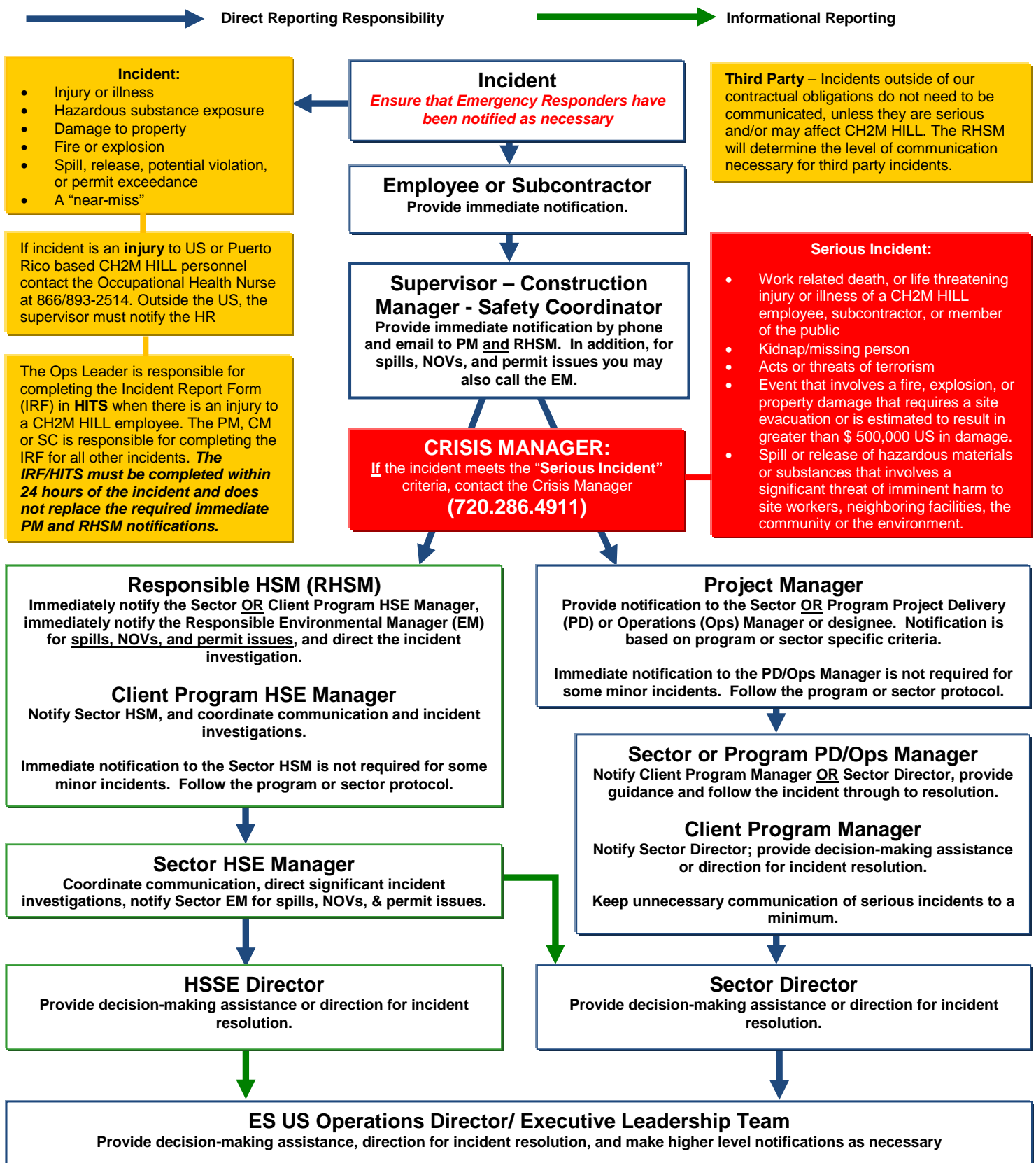
- Work related death, or life threatening injury or illness of a CH2M HILL employee, subcontractor, or member of the public
- Kidnap/missing person
- Acts or threats of terrorism
- Event that involves a fire, explosion, or property damage that requires a site evacuation or is estimated to result in greater than \$ 500,000 in damage.
- Spill or release of hazardous materials or substances that involves a significant threat of imminent harm to site workers, neighboring facilities, the community or the environment.

## 22.6.2 Serious Incident Reporting

*If an incident meets the "Serious Incident" criteria, the Project Manager is to immediately contact the Crisis Manager at 720-286-4911, then follow the standard incident reporting procedure.*

For all serious incidents this standard reporting process is implemented immediately so as to ultimately achieve notification to the Business Group President within 2 hours of incident onset or discovery, and notification to appropriate corporate Crisis Management Support Team.

# ESBG US Operations Incident Reporting Flow Diagram



**Third Party** – Incidents outside of our contractual obligations do not need to be communicated, unless they are serious and/or may affect CH2M HILL. The RHSM will determine the level of communication necessary for third party incidents.

**Serious Incident:**

- Work related death, or life threatening injury or illness of a CH2M HILL employee, subcontractor, or member of the public
- Kidnap/missing person
- Acts or threats of terrorism
- Event that involves a fire, explosion, or property damage that requires a site evacuation or is estimated to result in greater than \$ 500,000 US in damage.
- Spill or release of hazardous materials or substances that involves a significant threat of imminent harm to site workers, neighboring facilities, the community or the environment.

**Post-emergency incident communications regarding serious incidents at a CH2M HILL office or project (regardless of the party involved) shall be considered sensitive in nature and must be controlled in a confidential manner.**

## 22.7 Incident Root Cause Analysis

The accident analysis is essential if all causes of the incident are to be identified for the correct remedial actions to be taken to prevent the same and similar type of incident from recurring. The investigation team will consist of the SC (with support from RHSM), appropriate subcontractor personnel as necessary, the PM, and the responsible supervisor. More participants may be involved as needed to complete the investigation.

The Root Cause Analysis Form must be completed for all Loss Incidents and Near Loss Incidents. This form must be submitted to the investigation team for review.

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, determine the root cause, and 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."

### 22.7.1 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 there is no personal benefit to always doing the job according to standards

### 22.7.2 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.

### 22.7.3 Corrective Actions

Include all corrective actions taken or those that should be taken to prevent recurrence of the incident. Include the specific actions to be taken, the employer and personnel responsible for implementing the actions, and a timeframe for completion. Be sure the corrective actions address the causes.

Once the investigation report has been completed, the PM shall hold a review meeting to discuss the incident and provide recommendations. The responsible supervisors shall be assigned to carry out the recommendations, and shall inform the SC upon successful implementation of all recommended actions.

- The RHSM will inform the Responsible Environmental Manager (REM) of any environmental incidents.
- Evaluation and follow-up of the IRF will be completed by the type of incident by the RHSM, REM, or FWSO. The Business Group (BG) HSE Lead will review all BG incidents and modify as required.
- Incident Investigations must be initiated and completed as soon as possible but no later than 72 hours after the incident.

## 23.0 Records and Reports

An organized project filing system is essential for good documentation and recordkeeping. There are many benefits to an organized filing system:

- Other CH2M HILL employees can easily and quickly find documents
- Records are readily available for review
- Records may be needed during OSHA investigations, audits, or other legal matters
- Records may be needed on short notice in case of an accident, illness or other emergency
- Systematic recordkeeping aids in overall project organization

The project filing system shall be established at the beginning of the project and maintained throughout all phases of construction and archived in accordance with CH2M HILL's Records Retention Policy. The information contained in the filing system shall be updated regularly and/or as specified in this document. The PM and SC are responsible for collecting documentation, including subcontractor documentation, and maintaining a complete and organized filing system.

Below are examples of records that must be maintained as the project progresses:

- Exposure records includes air monitoring data (including calibration records), MSDSs, exposure modeling results.
- Physical hazard exposure records include noise, ionizing radiation, non-ionizing radiation, vibration, and lasers exposure assessments and measurements.
- Respiratory Fit Test Records
- Training Records
- Injury/illness reports and investigations
- Federal or State Agency Inspection Records
- Other Records
  - Ergonomic evaluations
  - HSE audits and assessments
  - Project-Specific HSE Plans
  - Confined Space Entry Permits
  - Equipment inspections
  - Equipment maintenance
  - SBOs
  - Self-Assessment Checklists

- The RHSM shall coordinate with the PM or designee to ensure that final project-specific HSE records described in this section, including negative exposure determinations, are maintained with the project files in accordance with the CH2M HILL records retention schedule, or forwarded to the Medical Surveillance Program Administrator, as appropriate. Records retention requirements are detailed in the Recordkeeping and Access to Records SOP, HSE-119.

**CH2M HILL Health and Safety Plan  
Attachment 1**

**Health and Safety Plan Employee Sign-off Form**





**CH2M HILL Health and Safety Plan**  
**Attachment 2**

**Chemical Inventory/Register Form**

## CHEMICAL INVENTORY/REGISTER FORM

Refer to SOP HSE-107, Attachment 1, for instructions on completing this form.

<p>This form must be completed prior to performing activities that expose personnel to hazardous chemicals products. Upon completion of this form, the SC-HW 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.</p>		
<p><b>Project Name:</b> Velsicol / Pine River</p>		<p><b>Project Numbers:</b> 478783</p>
<p><b>MSDSs will be maintained at the following location(s):</b></p>	<p>Attached to Health and Safety Plan; maintained at the Command Post in the Health and Safety Binder</p>	
<p><b>Hazardous Chemical Products Inventory</b></p>		
Chemical	Quantity	Location
pH buffers (calibration standard)	< 500 ml	Support Zone
Isobutylene (calibration gas)	1 liter, compressed	Support Zone
Pentane/CO/H2S/O2 in N2 (calibration gas)	1 liter, compressed	Support Zone
Methanol (equipment decon.)	< 1 gallon	Support/Decon Zones
MSA Sanitizer (respirator cleaner)	< 1 liter	Support/Decon Zones
Alconox/Liquinox (detergent)	< 1liter	Support/Decon Zones
<p>Refer to SOP HSE-107 <i>Hazard Communication</i> for more detailed information.</p>		

**CH2M HILL Health and Safety Plan**  
**Attachment 3**

**Chemical-Specific Training Form**

**CHEMICAL-SPECIFIC TRAINING FORM**

Refer to SOP HSE-107 Attachment 1 for instructions on completing this form.

Location:	Project # :
HCC:	Trainer:

**TRAINING PARTICIPANTS:**

NAME	SIGNATURE	NAME	SIGNATURE

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


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

- 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.)

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.

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.

# CH2M HILL Health and Safety Plan

## Attachment 4

### Project Activity Self-Assessment Checklists/Permits/Forms

Arsenic  
Benzene  
Cadmium  
Confined Space Entry  
Cranes  
Drilling  
Forklifts  
Earthmoving Equipment  
Electrical  
Energized Electrical  
Excavations  
Formaldehyde  
Hand and Power Tools  
Hazardous Materials Handling  
Hexavalent Chromium  
Hoists  
Lead  
Lockout/Tagout  
Lone Worker  
Manual Lifting  
Methylene Chloride  
Open Water Work (Boats and Barges)  
Personal Protective Equipment  
Respiratory Protection  
Rigging  
Stairways & Ladders  
Traffic Control  
Vinyl Chloride

# CH2M HILL Health and Safety Plan

## Attachment 4

### Project Activity Self-Assessment Checklists/Permits/Forms

Arsenic  
Benzene  
Cadmium  
Confined Space Entry  
Cranes  
Drilling  
Forklifts  
Earthmoving Equipment  
Electrical  
Energized Electrical  
Excavations  
Formaldehyde  
Hand and Power Tools  
Hazardous Materials Handling  
Hexavalent Chromium  
Hoists  
Lead  
Lockout/Tagout  
Lone Worker  
Manual Lifting  
Methylene Chloride  
Open Water Work (Boats and Barges)  
Personal Protective Equipment  
Respiratory Protection  
Rigging  
Stairways & Ladders  
Traffic Control  
Vinyl Chloride

# Attachment 3: HS&E Self-Assessment Checklist—Permit-Required Confined Space Entry

## CH2MHILL

### HS&E Self-Assessment Checklist – PERMIT-REQUIRED CONFINED SPACE ENTRY Page 1 of 4

This checklist shall be used by CH2M HILL personnel **only** and shall be completed at the frequency specified in the project’s Health and Safety Plan/Field Safety Instruction (HSP/FSI).

This checklist is to be used at locations where: 1) CH2M HILL employees will enter confined spaces, and/or 2) CH2M HILL provides oversight of a subcontractor performing confined space entry.

Site Safety Coordinator (SSC) may consult with subcontractors performing confined space entry when completing this checklist, but shall not direct the means and methods of forklift operations nor direct the details of corrective actions. Subcontractors performing confined space entry 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 (check only one of the boxes below):

- Evaluate CH2M HILL performance of confined space entries
  - Evaluate a CH2M HILL subcontractor’s compliance with its confined space entry program
- Subcontractor’s Name: \_\_\_\_\_

- Check “Yes” if an assessment item is complete or correct.
- Check “No” if an item is incomplete or deficient. Section 2 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-203.

<u>SECTION 1</u>	<u>Yes</u>	<u>No</u>	<u>N/A</u>	<u>N/O</u>
<b>CONFINED SPACE EVALUATION (5.2.3)</b>				
1. Personnel informed of location and hazards of existing confined spaces (danger signs, verbal)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Determination made that work cannot be completed without entering the confined space	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Information obtained regarding the space (blueprints, potential hazards, energy sources)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Spaces classified as permit-required, alternative-procedure, or nonpermit confined spaces	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>TRAINING (6.0)</b>				
5. Entrants, Attendants, and Entry Supervisor have completed confined space entry training	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Employees performing lockout/tagout (LOTO) procedures have completed LOTO training	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Employees required to wear respirators have completed respiratory-protection training	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>CONFINED SPACE ENTRY (5.4)</b>				
8. Completed permit or certificate posted at space entrance	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. Pre-entry briefing conducted	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. Entrants/Attendants verify that Entry Supervisor has authorized entry	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11. Entrants/Attendants verify that all requirements of the permit or certificate have been satisfied	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12. Atmospheric monitoring is conducted at frequency provided on the permit or certificate	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13. Entry not permitted if an atmospheric hazard is detected above acceptable safe levels	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14. Entrants evacuate space upon orders of the Attendant or Entry Supervisor, when an alarm is sounded, or when a prohibited condition or dangerous situation is recognized	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15. Entrants/Attendant informs Entry Supervisor of hazards confronted or created in the space, or any problems encountered during entry.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
16. Entry Supervisor informs the owner of such issues in item 15 above	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



<u>SECTION 1 (continued)</u>	<u>Yes</u>	<u>No</u>	<u>N/A</u>	<u>N/O</u>
<b>ENTRY UNDER A CONFINED SPACE ENTRY PERMIT (CSEP) (5.4.1)</b>				
17. CSEP completed by Entry Supervisor	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
18. All expected hazards listed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
19. Entry Supervisor and Attendant assigned	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
20. Communication methods established between entrants and the Attendant (5.5.1)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
21. Cleaning requirements identified (5.5.2)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
22. Isolation requirements identified (5.5.3)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
23. Ventilation requirements identified (5.5.4)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
24. Protective equipment requirements identified (5.5.5)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
25. Rescue equipment requirements identified (5.5.6)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
26. Other requirements identified (5.5.7)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
27. Rescue and emergency procedures identified (5.5)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
28. Atmospheric monitoring requirements identified	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
29. HS&E manager approved use by signing (CH2M HILL CSEP only)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
30. Entry Supervisor authorized entry by signing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
31. Authorized entrants have completed CSE training and attended pre-entry briefing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
32. Only Authorized Entrants permitted to enter the space	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
33. Entry Supervisor signed the CSEP indicating its cancellation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
34. Problems encountered during the entry listed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>ENTRY UNDER AN ALTERNATE PROCEDURE CERTIFICATE (APC) (5.4.2)</b>				
35. APC completed by Entry Supervisor	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
36. All expected atmospheric hazards listed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
37. Entry Supervisor and Attendant assigned	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
38. Entry Supervisor verifies that nonatmospheric hazards do not exist	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
39. Communication methods established between entrants and the Attendant	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
40. Covers removed safely	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
41. Openings guarded from both fall hazards and from objects entering the space	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
42. Continuous forced-air ventilation positioned to ventilate the immediate areas where employees are working and continue until they have left the space	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
43. Ventilation from a clean source of air	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
44. Atmospheric monitoring requirements identified	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
45. Entry Supervisor authorized entry by signing APC	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
46. Authorized Entrants have completed CSE training and attended pre-entry briefing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
47. Only Authorized Entrants permitted to enter the space	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
48. Entry Supervisor signed the APC indicating its cancellation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
49. Problems encountered during the entry listed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>ENTRY UNDER A NONPERMIT CERTIFICATE (NPC) (5.4.3)</b>				
50. NPC completed by Entry Supervisor	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
51. Entry Supervisor assigned	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
52. Attendant or buddy assigned	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
53. Buddy remains in the space with the entrant	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
54. Entry Supervisor verifies nonatmospheric hazards do not exist	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
55. Communication methods established between entrants and Attendant or buddy	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
56. Entrants informed to exit the space immediately if hazards are observed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
57. Atmospheric monitoring requirements identified	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
58. Entry Supervisor authorized entry by signing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
59. Authorized Entrants have completed CSE training and attended pre-entry briefing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
60. Only Authorized Entrants permitted to enter the space	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
61. Entry Supervisor signed the NPC indicating its cancellation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
62. Problems encountered during the entry listed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

<u>SECTION 1 (continued)</u>	<u>Yes</u>	<u>No</u>	<u>N/A</u>	<u>N/O</u>
<b>RESCUE (5.6)</b>				
63. Entrants wearing body harness with attached retrieval line (lifeline)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
64. Other end of lifeline attached to retrieval device (when required) or fixed point outside space	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
65. Mechanical retrieval device positioned at access point for vertical-type spaces > 5 feet deep	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
66. Rescue team established	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
67. Team members have completed confined space entry training	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
68. Team members informed of the hazards that they may confront during rescue operations	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
69. PPE and rescue equipment necessary to conduct safe entry-rescue provided & readily available	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
70. Team members trained on rescue duties and proper use of PPE and rescue equipment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
71. All team members trained in first aid & CPR, at least one member holding a current certification	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
72. Team has made simulated rescue from a space of similar configuration within last 12 months	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
73. Communication established & tested between the team & entrants, and emergency provider	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
74. Local emergency medical provider notified in advance of entries into PRCS	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>ATMOSPHERIC MONITORING (5.7)</b>				
75. Qualified individual conducts atmospheric monitoring	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
76. Monitoring results documented on permit or certificate	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
77. Entrants do not enter until all monitoring requirements are completed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
78. Monitoring equipment calibrated prior to use	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
79. Monitoring conducted for oxygen, flammability, and toxic air contaminants	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
80. Monitoring conducted bottom to top at 5-foot intervals	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>PRE-ENTRY BRIEFING (5.8)</b>				
81. Entry Supervisor conducts the briefing and discusses the following items:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
82. Explanation of the work to be performed and limitations	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
83. Explanation of actual and potential hazards, including the possible behavioral effects and signs, symptoms, and consequences of exposure	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
84. Review of the control measure and atmospheric monitoring requirements, as specified on permit or certificate	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
85. Review of entrant and attendant responsibilities	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
86. Hands-on training provided on unfamiliar equipment.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>





# CH2MHILL

## HSE Self-Assessment Checklist— - CRANES

This checklist shall be used by CH2M HILLCH2M 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 HILLCH2M HILL employees are exposed to crane hazards (complete Section 1) and/or (2) CH2M HILLCH2M HILL provides oversight of subcontractor personnel who are exposed to crane hazards (complete entire checklist).

SC 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.

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

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

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

This specific checklist has been completed to:

Evaluate CH2M HILLCH2M HILL employee exposure to crane, hoist and rigging hazards

Evaluate a CH2M HILLCH2M 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 HSE-303.

		<u>Yes</u>	<u>No</u>	<u>N/A</u>	<u>N/O</u>
<b><u>SECTION 1</u></b>					
<b>Ground Conditions</b>					
1.	Ground conditions are firm, drained and graded	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.	Supporting materials (mats, blocking, cribbing, marsh buggies, etc) being used	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.	Underground hazards researched by “Controlling Entity” and communicated with operator	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b><u>SECTION 2</u></b>					
<b>Assembly/Disassembly</b>					
4.	A competent and qualified Assembly/Disassembly (A/D) Director has been assigned	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5.	A/D Director has reviewed and understands either the manufacturer and/or employer procedures	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6.	A/D Director has verified that the crew understands their tasks and hazards associated with A/D	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7.	All A/D crew members in visible line-of-sight of the operator during A/D tasks	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8.	If “No” to #7, is there a pre-determined communication system established prior to maneuvering crane	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9.	Are A/D crew under boom, jib, or other components when pins (or similar) are being removed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10.	Have boom sections and boom suspension systems been rigged or supported during pin removal	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11.	Have rated capacity limits been verified as not to be exceeded on equipment during A/D	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12.	Have suitable points of attachment of rigging to boom and jib been established to prevent damage	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

13.	Has the center of gravity been established for all loads	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14.	When using outriggers, they are fully extended or deployed as per the load chart	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15.	Synthetic slings are protected with padding to prevent distortion from sharp, abrasive or acute edges	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
16.	The A/D Director has inspected the crane after assembly and prior to use.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
17.	A/D crew protected from unintentional movement from inadequately supported counterweights	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
18.	The weight of each component is known and readily available	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
19.	Reusable shipping pins, straps, links and similar equipment is removed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
20.	Outriggers are fully extended, or if manufacturer procedures permit, deployed as specified on load chart	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
21.	The A/D Director has completed a post-assembly inspection	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
22.	Equipment used for pile driving must have a jib attachment during pile driving operations	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
23.	All rigging work during assembly/disassembly performed by a qualified rigger	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**SECTION 3**

**Power line safety (up to 350kV)- Assembly/Disassembly**

		<b>Yes</b>	<b>No</b>	<b>N/A</b>	<b>N/O</b>
24.	Is crane, load, and load line >20ft from overhead power lines? (If "Yes" no further action)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
25.	If "No" to #24, are the power lines de-energized and grounded? (If "Yes" no further action)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
26.	If "No" to #24 & #25, has the voltage been verified & safe distances found in table A maintained (>10ft)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
27.	If "No" to #24 & #25, has a planning meeting occurred with A/D crew	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
28.	If "No" to #24 & #25, have elevated warning lines, barricades or signs been placed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
29.	If "No" to #24 & #25, are proximity alarms, spotters, warning devices or insulated links used	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
30.	Non-conductive tag lines used	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
31.	Intentional operation of crane closer than Table A allowable clearances prohibited- consult RHSM	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
32.	Is there at least two electrocution hazard warnings conspicuously posted outside equipment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
33.	Is there at least one electrocution hazard warning conspicuously posted in side cab of crane	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**SECTION 4**

**General**

34.	Individuals operating cranes of any type are qualified or certified operators	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
35.	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"/>
36.	Swing radius of cranes are guarded and barricaded	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
37.	Competent person inspects crane daily and weekly	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
38.	Crane ropes and hooks have been inspected by an authorized person	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
39.	Pre-lift meetings conducted with all parties involved in crane operations	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
40.	Cranes used to lift vertically only	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
41.	Adequate distance maintained between cranes parts and overhead power lines (<10ft)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
42.	Dedicated and qualified signal person assigned to signal operator	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
43.	Cranes do not swing over live roadways, railways, processes, or occupied buildings	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
44.	Critical lifts (>75% load capacity of crane, tandem lift, >20 tons) have written lifting/rigging plan	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
45.	No personnel permitted on or under loads lifted by crane.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
46.	Tag lines used to control load	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
47.	Manufacturers specifications and limitations for hoists followed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
48.	Personnel not permitted to ride on material hoists	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
49.	Weather conditions considered when lifting operations performed (winds >25MPH)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
50.	Air monitoring conducted when combustion engine cranes operated in enclosed spaces	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
51.	All guards and safety devices are installed and equipment removed after maintenance	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
52.	A load-rating chart is easily visible to the seated operator	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
53.	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"/>
54.	Hand signals to crane operators are those prescribed by ANSI	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
55.	All outriggers are deployed and seated	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
56.	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"/>
57.	Cranes are equipped with load limiting devices and boom angle indicator	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
58.	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"/>
59.	Cranes are equipped with a 5 BC or higher fire extinguisher	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
60.	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"/>
61.	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"/>

62. Moving parts on the crane that employees are exposed to are guarded	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
63. Is there at least one electrocution hazard warning conspicuously posted in cab of crane?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
64. 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"/>
65. Adequate clearance must be maintained between a crane and obstructions	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
66. The crane is level and blocked properly	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
67. Swing radius of crane has been barricaded to prevent exposure to struck against/crush hazards	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
68. Exhaust pipes are guarded from employee contact	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
69. Adequate clearance must be maintained between a crane and an obstruction	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**SECTION 5**

	<b><u>Yes</u></b>	<b><u>No</u></b>	<b><u>N/A</u></b>	<b><u>N/O</u></b>
<b>CRANES: OPERATION (5.2.3)</b>				
70. Manufacturer procedures applicable to equipment & attachments are readily accessible to operator	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
71. Operator not engaged in any other activity that diverts attention while operating equipment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
72. Equipment not be left unattended while load is suspended	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
73. Equipment is Tagged Out of Service when repair is needed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
74. Equipment secured per manufacturer recommendations during storm warnings	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
75. Load weight has been verified by operator prior to lift	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
76. Traveling with a load is prohibited	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
77. Operator understands he/she has authority to stop any pick deemed unsafe	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
78. Operator tests brakes when load is near rated capacity of lift	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
79. Sheaves are guarded or warning sign provided to identify hazard	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
80. 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"/>
81. 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"/>
82. Cranes not operated without full amount of ballast or counterweight	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
83. Tag lines are used to control suspended load	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
84. Sudden acceleration or deceleration of load is avoided	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
85. Loads are not to be passed over personnel or facilities	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
86. No personnel are allowed to ride the load	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
87. Suspended loads are not left unattended	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
88. Lines are not allowed to twist around each other	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**SECTION 6**

**Signals**

89. A signal person is provided when the load travel is not in full view of the operator	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
90. A signal person is provided when the crane is traveling, and the view is obstructed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
91. A signal person is provided when there are site specific safety concerns	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
92. Only qualified personnel deliver hand signals to operator	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
93. Only Standard Method signals are used (unless signal person, operator and lift director agree otherwise)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
94. Hand, voice, audible or new signals are suitable for site conditions	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
95. Hand signal charts are posted on the equipment or conspicuously posted in the vicinity of hoisting	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
96. When tandem lifts are performed, signal person must identify which crane the signal is for	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
97. When electronic equipment is used for signaling must be tested before beginning operation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
98. When electronic equipment is used for signaling it must be through a dedicated channel	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
99. When electronic equipment is used for signaling, the operators reception must be hands-free	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
100. When electronic equipment is used for signaling, the operator, signal person and lift director have met and agree on what signals will be used and what they mean	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
101. Signal person has been qualified through examination and practical testing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>





## Attachment 2: HSE Self-Assessment Checklist - Drilling

This checklist shall be used by CH2M HILL personnel **only** and shall be completed at the frequency specified in the project's written safety plan.

This checklist is to be used at locations where: 1) CH2M HILL employees are potentially exposed to drilling hazards, 2) CH2M HILL staff are providing support function related to drilling activities, and/or 3) CH2M HILL oversight of a drilling subcontractor is required.

Safety Coordinator 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 being 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 drilling hazards (complete Section 1).
- Evaluate CH2M HILL support functions related to drilling activities (complete Section 2)
- Evaluate a CH2M HILL subcontractor's compliance with drilling 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 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 SOP HSE-204.

<b>SECTION 1 - SAFE WORK PRACTICES - 5.1</b>				
	<b>Yes</b>	<b>No</b>	<b>N/A</b>	<b>N/O</b>
1. Personnel cleared during rig start-up, positioning and setup	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Personnel clear of rotating parts	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Personnel not positioned under hoisted loads	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Loose clothing and jewelry removed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Smoking is prohibited around drilling operation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Personnel wearing appropriate personal protective equipment (PPE), per HSP or FSI	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Personnel instructed not to approach equipment that has become electrically energized	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>SECTION 2 - SUPPORT FUNCTIONS - 5.2</b>				
<b>AQUIFER DESIGNATIONS (5.2.1)</b>				
8. Aquifer designations determined and BGEM consulted when required.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>LOCATION OF UTILITIES (5.2.2)</b>				
9. Location of underground and overhead utilities and structures identified	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. Utility company contacted to de-energize/ground power lines due to clearance	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



<b>SUPPORT FUNCTIONS – 5.2 (Continued)</b>				
<b>WASTE MANAGEMENT (5.2.3)</b>	<b>Yes</b>	<b>No</b>	<b>N/A</b>	<b>N/O</b>
11. Drill cuttings and purge water managed and disposed properly	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12. Wastes generated evaluated for proper disposal	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13. Appropriate decontamination procedures being followed, per project’s written safety plan	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>DRILLING AT ORDNANCE EXPLOSIVES OR UNEXPLODED ORDNANCE SITES (5.2.4)</b>				
14. MEC plan prepared and approved	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15. MEC avoidance provided, routes and boundaries cleared and marked	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
16. Initial pilot hole established by UXO technician with hand auger	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
17. Personnel remain inside cleared areas	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>SECTION 3 - DRILLING SAFETY REQUIREMENTS -5.3</b>				
<b>GENERAL (5.3.1)</b>				
18. Only authorized personnel operating drill rigs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
19. Daily safety briefing/meeting conducted with crew	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
20. Daily inspection of drill rig and equipment conducted before use	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
21. Good housekeeping maintained on and around rig	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>SAFETY EQUIPMENT (5.3.2)</b>				
22. Safety-toed boots, hardhats, safety glasses w/side shields, gloves and hearing protection worn	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
23. Drill rig equipped with fire extinguisher	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
24. Air monitoring instruments provided when required	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
25. Reflective/high visibility vests worn when required	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
26. PPE for protection from chemical hazards worn if required	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>BURIED UTILITY AND OVERHEAD CLEARANCE (5.3.3)</b>				
27. Location of underground utilities and structures identified, including third party locate	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
28. 360° visual observation conducted	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
29. Hand digging, air knifing conducted to expose utilities before drilling	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
30. Safe clearance distance maintained from overhead power lines	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
31. Power lines de-energized and grounded when safe distances cannot be maintained	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>DRILL RIG PLACEMENT (5.3.4)</b>				
32. Drilling pad established, when necessary	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
33. Drill rig leveled and stabilized	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
34. Additional precautions taken when drilling in restricted areas	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
35. In Karst topography use remote sensing or geologist review for sinkholes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>DRILL RIG TRAVEL (5.3.5)</b>				
36. Rig shut down and mast lowered and secured prior to rig movement	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
37. Tools and equipment secured prior to rig movement	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
38. Only personnel seated in cab wearing a seat belt are riding on rig during movement	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
39. Backup alarm or spotter used when backing rig	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
40. Spotter used when backing rig in tight or restricted areas or when low clearances exist	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
41. Safe clearance distance maintained while traveling under overhead power lines	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>EMERGENCY – CONTACT WITH OVERHEAD OR UNDERGROUND ELECTRICAL LINES (5.3.6)</b>				
42. Personnel understand emergency procedures in the event of contact with overhead or underground electrical lines	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>DRILL RIG OPERATION (5.3.7)</b>				
43. Drill rig operated in accordance with operators’ manual	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
44. Personnel clear while mast is being raised	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
45. Kill switch clearly identified, operational, and in reach of the operator control station	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**SECTION 3 - DRILLING SAFETY REQUIREMENTS - 5.3 (Continued)**

46.	All machine guards are in place	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
47.	Rig ropes never wrapped around any part of the body	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
48.	Pressurized lines and hoses secured to prevent whipping hazards	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
49.	Drilling operation stopped during inclement weather	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
50.	Air monitoring conducted per written safety plan for hazardous atmospheres	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
51.	Rig gear boxes placed in neutral when operator not at controls	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
52.	Operator shuts rig engine down prior to leaving the drill rig vicinity	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>DRILL RIG SITE CLOSURE (5.3.8)</b>					
53.	Ground openings/holes filled or barricaded	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
54.	Equipment and tools properly stored	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
55.	All vehicles locked and keys removed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>DRILL RIG MAINTENANCE (5.3.9)</b>					
56.	Rig properly maintained per drilling company's maintenance program and records on-site/available for review	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
57.	Defective components repaired immediately	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
58.	Lockout/tagout procedures used prior to maintenance	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
59.	Cathead in clean, sound condition	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
60.	Drill rig ropes in clean, sound condition	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
61.	Fall protection used for fall exposures of 6 feet (U.S.) 1.5 m or greater	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
62.	Rig in neutral and augers stopped rotating before cleaning	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
63.	Good housekeeping maintained on and around rig	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>FORMS/PERMITS AND CHECKLISTS (7.0)</b>					
64.	Driller license/certification obtained	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
65.	Well development/abandonment notifications and logs submitted and in project files	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
66.	Groundwater withdrawal permit obtained where required	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
67.	Dig permit obtained where required	<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 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-306.

SAFE WORK PRACTICES (5.1)	<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 (5.2.1)</b>	<b><u>SECTION 2</u></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 (5.2.2)</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 (5.2.3)</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 (5.2.4)</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"/>





# HS&E Self-Assessment Checklist – Electrical Safety

This checklist shall be used by CH2M HILL personnel **only** and shall be completed at the frequency specified in the project’s written safety plan.

This checklist is to be used at locations when: (1) CH2M HILL employees are required to use electrical appliances, are exposed to electrical hazards, or are working on or near exposed energized electrical equipment; and/or (2) CH2M HILL provides oversight of an electrical subcontractor.

The Safety Coordinator (SC) may consult with electrical subcontractors when completing this checklist, but shall not direct the means and methods of electrical operations nor direct the details of corrective actions. Subcontractors shall determine how to correct deficiencies, and CH2M HILL must carefully rely on their expertise. Items or conditions 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: \_\_\_\_\_ Project Manager: \_\_\_\_\_

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

This specific checklist has been completed to:

Evaluate CH2M HILL employee exposure to electrical hazards (Complete Section 1)

Evaluate a CH2M HILL subcontractor’s compliance with electrical safety requirements (Complete entire checklist)

Subcontractor’s 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 HSE-206.

**SECTION 1 – SAFE WORK PRACTICES**

<b>General Requirements (5.1)</b>	<b>Yes</b>	<b>No</b>	<b>N/A</b>	<b>N/O</b>
1. Personnel have completed electrical safety training.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Attempts are made to locate all energized electrical circuits before work begins.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Installation/repair areas sufficiently guarded with barriers and signs to prevent unauthorized entry.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Only qualified employees installing or working with electrical equipment.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Electrical circuits that may be contacted are de-energizing and grounded or guarded.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Lockout/Tagout procedures when required verified using the checklist provided in HSE-307.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Only qualified electrical workers defeating electrical safety interlocks.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Where the location of underground power lines is unknown, insulated gloves are used.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Electrical Power Tools and Extension Cords (5.3)</b>				
9. Electric power tools and extension cords inspected prior to use. Damaged equipment not used.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. Extension cords supplying power tools provided with Ground Fault Circuit Interrupters (GFCI).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11. Electric power tools operated and maintained according to manufacturer’s instructions.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12. Electric power tools effectively grounded or double-insulated.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13. Extension cords grounded and designed for heavy duty or industrial grade.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14. Extension cords not substituted for fixed wiring.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15. Extension cords covered, elevated, or protected when passing through work areas.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
16. Extension cords passing through doorways or other pinch points protected from damage.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
17. Extension cords not concealed or run through walls, ceilings, or floors.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
18. Extension cords not fastened with staples, hung from nails, or suspended with wire.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
19. Working space, walkways, and similar areas are kept clear of cords to prevent tripping hazards.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

<b><u>SECTION 1 – SAFE WORK PRACTICES (Continued)</u></b>				
	<b>Yes</b>	<b>No</b>	<b>N/A</b>	<b>N/O</b>
<b>Portable Lighting (5.4)</b>				
20. Portable lamps wired with flexible cord with grounded plugs.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
21. Portable lights not suspended by their electric cords unless designed for suspension.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
22. Portable lights protected from contact or breakage.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
23. Portable lights used in wet locations operated at 12 volts or less or used with GFCI.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Overhead Power Lines (5.5)</b>				
24. Lines de-energized and grounded, insulated, or safe clearance distance maintained.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
25. Personnel stay clear of grounding point of equipment intentionally grounded.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
26. Personnel do not touch or approach equipment that has become energized.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b><u>SECTION 2 – ELECTRICAL SAFETY REQUIREMENTS</u></b>				
<b>General Installation Requirements (5.7)</b>				
35. Competent person overseeing electrical activities, including inspections.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
36. Subcontractor personnel using appropriate safety and protective equipment.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
37. Electrical equipment free from recognized hazards.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
38. Equipment approved for intended use and installed according to approvals.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
39. Manufacturer's name, trademark, or other descriptive marking placed on equipment.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
40. Energized parts > 50 volts guarded against accidental contact.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
41. Electrical equipment > 600 volts placed in a vault, room, closet, or protected area.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
42. Sufficient access and working clearances provided and maintained for all electric equipment.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
43. Means provided to disconnect conductors from the service-entrance conductors.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
44. Circuit breakers sufficient for system current load.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
45. Over-current protection devices readily accessible and legibly marked to indicate purpose.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
46. Equipment firmly secured to surface on which it is mounted.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
47. Electrical equipment ventilated for cooling as required.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
48. Electrical equipment protected from damage by environmental conditions.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
49. Equipment in hazardous locations maintained in a dust-tight, ignition-proof condition.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
50. Equipment producing arcs, sparks, flames, enclosed or separated from combustible material.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
51. Conductors spliced or joined properly and free ends covered with insulation.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
52. Equipment grounding provided on all equipment requiring such grounding.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Ground-fault Protection (5.6)</b>				
53. GFCIs used or an assured equipment-grounding conductor (AEGC) program implemented.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
54. When GFCIs used, installed on all 120-volt, 15- and 20-ampere temporary receptacle outlets.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
55. When AEGC program used, covers all extension cords and temporary receptacles.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
56. AEGC program also covers all equipment connected by cord and plug.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
57. Under AEGC program, equipment visually inspected for external defects before each day's use.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
58. Under AEGC program, continuity and grounding testing performed at least every 3 months.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
59. Records maintained for all AEGC program testing.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



# CH2MHILL

## Attachment 2: HS&E Self-Assessment Checklist – Energized Electrical

This checklist shall be used by CH2M HILL personnel **only** and shall be completed at the frequency specified in the project’s written safety plan.

This checklist is to be used at locations when: 1) CH2M HILL employees are working on or near exposed energized electrical equipment; and/or 2) CH2M HILL provides oversight of an electrical subcontractor.

Project Name: _____	Project No.: _____	
Location: _____	PM: _____	
Auditor: _____	Title: _____	Date: _____
This specific checklist has been completed to:		
<input type="checkbox"/>	Evaluate CH2M HILL employee exposure to electrical hazards (Complete Section 1)	
<input type="checkbox"/>	Evaluate a CH2M HILL subcontractor’s compliance with electrical safety requirements (Complete entire checklist)	
	Subcontractor’s 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 2 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.

<b>SECTION 1 – SAFE WORK PRACTICES</b>				
<b>General Requirements</b>	<b>Yes</b>	<b>No</b>	<b>N/A</b>	<b>N/O</b>
1. Qualified Persons have been designated	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Work on energized equipment only performed when de-energizing is unsafe or infeasible.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Only qualified persons working on energized electrical equipment.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. CH2M HILL Energized Electrical Work Permit is completed, approved, and followed.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Approach limits established around energized electrical work area.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Buddy system implemented; CPR trained personnel available for response, when required.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Adequate illumination provided.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Conductive articles of jewelry and clothing not worn.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. Safety and protective equipment used as specified in permit.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



# Attachment 2: HS&E Self-Assessment Checklist—Excavations

This checklist shall be used by CH2M HILL personnel only and shall be completed at the frequency specified in the project’s Health and Safety Plan/Field Safety Instruction (HSP/FSI).

This checklist is to be used at locations where: 1) CH2M HILL employees enter excavations (complete Sections 1 and 3), and/or 2) CH2M HILL oversight of an excavation subcontractor is required (complete entire checklist).

The SSC may consult with excavation subcontractors when completing this checklist, but shall not direct the means and methods of excavation operations nor direct the details of corrective actions. Excavation subcontractors shall determine how to correct deficiencies and we must rely on their expertise. Conditions considered imminently dangerous (possibility of serious injury or death) shall be corrected immediately or all exposed personnel shall be removed from the hazardous area until the situation is corrected.

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

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

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

This specific checklist has been completed to:

Evaluate CH2M HILL employee exposures to excavation hazards

Evaluate a CH2M HILL subcontractor’s compliance with excavation HS&E requirements

Subcontractor 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 excavation 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.

<u>SECTION 1</u>	<u>Yes</u>	<u>No</u>	<u>N/A</u>	<u>N/O</u>
<b>EXCAVATION ENTRY REQUIREMENTS (4.1)</b>				
1. Personnel have completed excavation safety training	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Competent person has completed daily inspection and has authorized entry	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Personnel are aware of entry requirements established by competent person	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Protective systems are free from damage and in stable condition	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Surface objects/structures secured from falling into excavation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Potential hazardous atmospheres have been tested and found to be at safe levels	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Precautions have been taken to prevent cave-in from water accumulation in the excavation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Personnel wearing appropriate, PPE per HSP/SI	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

<b>SECTION 2</b>	<b>Yes</b>	<b>No</b>	<b>N/A</b>	<b>N/O</b>
<b>GENERAL (4.2.1)</b>				
9. Daily safety briefing/meeting conducted with personnel	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. Excavation and protective systems adequately inspected by competent person	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11. Defective protective systems or other unsafe conditions corrected before entry	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12. Guardrails provided on walkways over excavation 6 ft (1.8m) or deeper	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13. Barriers provided at excavations 6 ft or deeper when excavation not readily visible	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14. Barriers or covers provided for wells, pits, shafts, or similar excavation 6 ft (1.8 m) or deeper	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15. Earthmoving equipment operated safely (use earthmoving equipment checklist in HSE-306)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>PRIOR TO EXCAVATING (4.2.2)</b>				
16. Dig Permit obtained where required by client/facility	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
17. Location of underground utilities and installations identified	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>EXCAVATING ACTIVITIES (4.2.3)</b>				
26. Rocks, trees, and other unstable surface objects removed or supported	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
27. Exposed underground utility lines supported	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
28. Undermined surface structures supported or determined to be in safe condition	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
29. Warning system used to remind equipment operators of excavation edge	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>EXCAVATION ENTRY (4.2.4)</b>				
32. Trenches > 4 ft (1.2 m) deep provided with safe means of egress within 25 ft (7.6 m)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
33. Structure ramps designed and approved by competent person	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
34. Potential hazardous atmospheres tested prior to entry	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
35. Rescue equipment provided where potential for hazardous atmosphere exists	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
36. Ventilation used to control hazardous atmosphere and air tested frequently	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
37. Appropriate respiratory protection used when ventilation does not control hazards	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
38. Precautions taken to prevent cave-in resulting from water accumulation in excavation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
39. Precautions taken to prevent surface water from entering excavation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
40. Protection provided from falling/rolling material originating from excavation face	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
41. Spoil piles, equipment, materials restrained or kept at least 2 ft (61 cm) from excavation edge	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>EXCAVATION PROTECTIVE SYSTEMS (4.2.5)</b>				
42. Protective systems used for excavations 5 ft (1.5 m) or deeper, unless in stable rock	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
43. Protective systems for excavation deeper than 20 ft (6.1 m) designed by registered PE	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
44. If soil unclassified, maximum allowable slope is 34 degrees	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
45. Protective systems free from damage	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
46. Protective system used according to manufacturer's recommendations and not subjected to loads exceeding design limits	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
47. Protective system components securely connected to prevent movement or failure	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
48. Cave-in protection provided while entering/exiting shielding systems	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
49. Personnel removed from shielding systems when installed, removed, or if vertical movement	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Yes      No      N/A      N/O</b>				
<b>PROTECTIVE SYSTEM REMOVAL AND BACKFILLING (4.2.6)</b>				
50. Protective system removal starts and progresses from excavation bottom	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
51. Protective systems removed slowly and cautiously	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
52. Temporary structure supports used if failure of remaining components observed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
53. Backfilling takes place immediately after protective system removal	<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 potentially exposed to hazards associated with forklift operations, 2) CH2M HILL employees are operating forklifts, and/or 3) CH2M HILL provides oversight of a subcontractor operating forklifts.

SC may consult with subcontractors using forklifts when completing this checklist, but shall not direct the means and methods of forklift operations nor direct the details of corrective actions. Subcontractors using forklifts 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 forklift hazards (Complete Section 1).
- Evaluate CH2M HILL employees operating forklifts (Complete entire checklist).
- Evaluate a CH2M HILL subcontractor’s compliance with forklift safety requirements (Complete entire checklist).  
Subcontractor’s 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-48.

**SAFE WORK PRACTICES (5.1)**

**SECTION 1**

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

1. Personnel maintaining safe distance from operating forklifts.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Positioning personnel in proximity to operating forklifts is avoided.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Personnel wearing high-visibility vests when close to operating forklifts.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Personnel approach operating forklifts safely.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Personnel only riding in seats equipped with seat belts.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Personnel not lifted or lowered by forklift unless approved for such use.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Personnel not positioned under elevated loads or forks.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Personnel do not place body between mast uprights or outside running lines during operation.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. Personnel do not touch or approach forklift that has become electrically energized.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**FORKLIFT SAFETY REQUIREMENTS**

**SECTION 2**

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

**PRIOR TO OPERATING FORKLIFT (5.2.1)**

- 10. Only certified personnel operating forklifts.
- 11. Daily safety briefing/meeting conducted with forklift operators.
- 12. Daily inspection of forklift conducted and documented.
- 13. Rated capacity of forklift visible to operator.
- 14. Modifications and attachments used approved by forklift manufacturer.
- 15. High-lift forklifts have load backrest and overhead guard.
- 16. Seat belts are provided and used.
- 17. Backup alarm or spotter used when backing forklift.
- 18. Operational horn provided and used as necessary.
- 19. Braking system capable of stopping capacity load.
- 20. Forklifts equipped with lights for low-light operations.
- 21. Carbon monoxide concentrations below PEL (50 ppm).
- 22. At least one fire extinguisher available at the forklift operating area.

**DESIGNATIONS AND LOCATIONS (5.2.2)**

- 23. Atmosphere/locations classified as hazardous or non-hazardous.
- 24. Only properly designated forklifts used in hazardous locations.

**FORKLIFT LOADING/UNLOADING (5.2.3)**

- 25. Operator handles only loads within rated capacity, adjusts for long or tall loads.
- 26. Loads are stabilized before forklift travel.
- 27. Operator using proper tilt to stabilize load, uses caution when tilting elevated loads.
- 28. When two forklifts lift a load in unison, operators stay in close communication.
- 29. Trucks, trailers, railroad cars secured from movement before entering with forklift.
- 30. Dockplates/bridgeplates secured before use; capacity not exceeded.
- 31. Truck, trailer, railroad car flooring checked for weakness before forklift boarding.
- 32. Personnel platforms secured to forklift and shut off means provided on platform.

**FORKLIFT TRAVEL (5.2.4)**

- 33. Forklift operated on safe roadways and grades.
- 34. Grades ascended/descended properly.
- 35. Forklift operated at safe speed, kept under control at all times
- 36. Operators slow down and use horn at areas with obstructed vision.
- 37. Forklifts operating in reverse when load obstructs vision.
- 38. Operator keeping clear view of path of travel.
- 39. Forklifts do not pass other stopped vehicles at areas with obstructed vision.
- 40. Operators maintain safe distance from edge of ramps and platforms.
- 41. Overhead clearance maintained from installations.
- 42. Forklifts not parked within 8 feet of center of railroad tracks. Tracks crossed diagonally.
- 43. Forklift parked correctly when operator is dismounted.

**FORKLIFT MAINTENANCE (5.2.5)**

- 44. Forklifts with unsafe conditions removed from service and tagged as such to prevent use.
- 45. Forklifts repaired in designated, non-hazardous locations by authorized personnel.
- 46. Battery disconnected when repairing electrical systems.
- 47. Additions or omissions of parts not performed without manufacturer's approval.
- 48. Good housekeeping maintained on and around forklift.
- 49. Water mufflers checked daily, kept at 75% full.
- 50. Forklifts removed from service if sparks, flames, or elevated operating temperatures occur.
- 51. Suspended forklifts or components are supported prior to work under or between.
- 52. Fueling/battery charging conducted in designated, well-ventilated area.
- 53. Fueling/battery charging areas properly equipped for task.
- 54. No smoking in fueling/battery charging areas.
- 55. Spillage of fuel properly cleaned up before starting forklift.



# CH2MHILL

## HSE Self-Assessment Checklist—Formaldehyde

This checklist shall be used by CH2M HILL personnel **only** and shall be completed at the frequency specified in the project’s Health and Safety Plan/Federal Safety Instructions (HSP/FSI). This checklist is to be used at locations where CH2M HILL employees are exposed to formaldehyde, or are required to perform oversight of a subcontractor whose personnel are exposed to formaldehyde.

CH2M HILL staff shall not direct the means and methods of subcontractor lead activities nor direct the details of appropriate corrective actions. The subcontractor must determine how to correct deficiencies, and CH2M HILL staff must carefully rely on their expertise. Conditions considered to be imminently dangerous (such as, a possibility of serious injury or death) must be corrected immediately or all exposed personnel must be removed from the hazard until corrected.

Project Name: _____	Project No.: _____
Location: _____ Project Manager: _____	
Auditor: _____ Title: _____ Date: _____	
This specific checklist has been completed for the following:	
<input type="checkbox"/> Evaluate CH2M HILL compliance with its Lead Program (SOP HSE-507)	
<input type="checkbox"/> Evaluate a CH2M HILL subcontractor’s compliance with its Formaldehyde Program	
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.

<u><b>SECTION 1</b></u>	<u><b>Yes</b></u>	<u><b>No</b></u>	<u><b>N/A</b></u>	<u><b>N/O</b></u>
<b>PERSONNEL SAFE WORK PRACTICES (5.1)</b>				
<b>COMPLIANCE PROGRAM (5.1.1)</b>				
1. A written compliance program is established for work above the PEL.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. The compliance program includes a schedule for development and implementation of the engineering and work practice controls.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. The compliance program is based on the most recent air monitoring results.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. A written compliance program is available to all affected employees.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Waste generated must be determined if considered hazardous waste.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>EMPLOYEE INFORMATION (5.1.2)</b>				
6. CH2M HILL personnel have completed the Formaldehyde Training Module.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Training on the Fact Sheet, HSP/FSI, and OSHA Standard has been met.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. The selection of the appropriate respirator is based on the airborne formaldehyde concentration.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. Written or verbal notification is given to owners, contractors, or other personnel working in the area of formaldehyde work activities.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. Storage or shipping containers have been properly labeled.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

	<u>Yes</u>	<u>No</u>	<u>N/A</u>	<u>N/O</u>
<b>REGULATED AREAS (5.1.3)</b>				
11. Personnel do not enter regulated areas, unless they meet training, medical, and PPE requirements.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12. Entrances and approaches to regulated areas have been identified and posted.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Exposure Assessment (5.2)</b>				
13. Initial air monitoring (TWA and STEL) is conducted over full shift for each job classification.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14. Air monitoring has been repeated when a change in production or controls occurred.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15. Personnel exhibiting signs of exposure have been monitored.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
16. Air monitoring results above the AL have been remonitored in the last 6 months.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
17. Air monitoring results above the STEL/Ceiling have been remonitored in the last year.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
18. Employees are given opportunities to observe monitoring.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
19. Relevant employees are notified within 5 days in writing of the results of monitoring.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>CONTROL METHODS (5.3)</b>				
<b>ENGINEERING AND WORK PRACTICE CONTROLS (5.3.1)</b>				
20. Engineering controls and work practices are implemented in areas above the PEL.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
21. Engineering and work practices are implemented to achieve the lowest feasible exposures.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
22. Provisions have been made to detect leaks and spills where required.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
23. Preventative maintenance of equipment is performed, where required.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
24. Employees are not allowed to eat, drink, or smoke in regulated areas.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
25. Action plans have been developed to respond to spills.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
26. Employees responding to spills have been trained and supplied with PPE.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
27. Formaldehyde-contaminated waste is properly handled.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>RESPIRATORY PROTECTION (5.3.2)</b>				
28. Respirators are used in areas where $EL \geq PEL$ .	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
29. A written respiratory protection program is in place where respirators are used.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
30. Respirator cartridges are replaced after 3 hours of use, unless they are approved ESLI.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Personal Protective Equipment (PPE) (5.3.3)</b>				
31. PPE is provided by the employer at no cost to employees.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
32. PPE is selected based on the materials, conditions, and hazards present.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
33. Impervious chemical clothing, goggle, and face shields are worn with solutions of >1%.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
34. Full-body protection is worn when air concentrations exceed 100 ppm.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
35. Protective clothing is provided clean and dry for each use.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
36. Personnel who clean or launder protective clothing are informed in writing of the hazards.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
37. All workplace PPE is left at the jobsite.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
38. Change rooms are provided when personnel are required to change from work clothing to PPE.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
39. Quick-drench showers are available when solutions $\geq 1\%$ are used.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
40. Eyewash facilities are available when solutions $\geq 0.1\%$ are used.	<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 hand and power tool hazards and/or (2) CH2M HILL provides oversight of subcontractor personnel who are exposed to hand and power tool hazards.

SC 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.

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 HSE-210.

**SECTION 1**

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

**SAFE WORK PRACTICES (5.1)**

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 (5.2.2)**

- 13. PPE is selected and used according to tool-specific hazards anticipated.
- 14. Tools are tested daily to assure safety devices are operating properly.
- 15. Damaged tools are removed from service until repaired.
- 16. Power operated tools designed to accommodate guards have guards installed.
- 17. Rotating or moving parts on tools are properly guarded.
- 18. Machines designed for fixed locations are secured or anchored.
- 19. Floor and bench-mounted grinders are provided with properly positioned work rests.
- 20. Guards are provided at point of operation, nip points, rotating parts, etc.
- 21. Fluid used in hydraulic-powered tools is approved fire-resistant fluid.

**ELECTRIC-POWERED TOOLS (5.2.3)**

- 22. Electric tools are approved double insulated or grounded and used according to SOP HSE-206.
- 23. Electric cords are not used for hoisting or lowering tools.
- 24. Electric tools are used in damp/ wet locations are approved for such locations or GFCI installed.
- 25. Hand-held tools are equipped with appropriate on/off controls appropriate for the tool.
- 26. Portable, power-driven circular saws are equipped with proper guards.

**ABRASIVE WHEEL TOOLS (5.2.4)**

- 27. All employees using abrasive wheel tools are wearing eye protection.
- 28. All grinding machines are supplied with sufficient power to maintain spindle speed.
- 29. Abrasive wheels are closely inspected and ring-tested before use.
- 30. Grinding wheels are properly installed.
- 31. Cup-type wheels for external grinding are protected by the proper guard or flanges.
- 32. Portable abrasive wheels used for internal grinding are protected by safety flanges.
- 33. Safety flanges are used only with wheels designed to fit the flanges.
- 34. Safety guards on abrasive wheel tools are mounted properly and of sufficient strength.

**PNEUMATIC-POWERED TOOLS (5.2.5)**

- 35. Tools are secured to hoses or whip by positive means to prevent disconnection.
- 36. Safety clips or retainers are installed to prevent attachments being expelled.
- 37. Safety devices are installed on automatic fastener feed tools as required.
- 38. Compressed air is not used for cleaning unless reduced to < 30 psi, with PPE, and guarded.
- 39. Manufacturer’s safe operating pressure for hoses, pipes, valves, etc. are not exceeded.
- 40. Hoses are not used for hoisting or lowering tools.
- 41. All hoses >1/2-inch diameter have safety device at source to reduce pressure upon hose failure.
- 42. Airless spray guns have required safety devices installed.
- 43. Blast cleaning nozzles are equipped with operating valves, which are held open manually.
- 44. Supports are provided for mounting nozzles when not in use.
- 45. Air receiver drains, handholes, and manholes are easily accessible.
- 46. Air receivers are equipped with drainpipes and valves for removal of accumulated oil and water.
- 47. Air receivers are completely drained at required intervals.
- 48. Air receivers are equipped with indicating pressure gauges.
- 49. Safety, indicating, and controlling devices are installed as required.
- 50. Safety valves are tested frequently and at regular intervals to assure good operating condition.



**SECTION 2 (continued)**

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

**LIQUID FUEL-POWERED TOOLS (5.2.6)**

- 51. Liquid fuel-powered tools are stopped when refueling, servicing, or maintaining.
- 52. Liquid fuels are stored, handled, and transported in accordance with SOP HSE-403
- 53. Liquid fuel-powered tools are used in confined spaces in accordance with SOP HSE-203.
- 54. Safe operating pressures of hoses, valves, pipes, filters, and other fittings are not exceeded.

**POWDER-ACTUATED TOOLS (5.2.7)**

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

**JACKING TOOLS (5.2.8)**

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

**HAND TOOLS (5.2.9)**

- 75. Wrenches are not used when jaws are sprung to the point of slippage.
- 76. Impact tools are kept free of mushroomed heads.
- 77. Wooden handles of tools are kept free of splinters or cracks and are tightly fitted in tool.

**CHAIN SAWS (5.2.10)**

- 78. Chainsaw equipped with spark arrestor and fully functioning chain brake
- 79. Chainsaw operator’s manual readily available
- 80. Fully stocked first aid kit and multipurpose fire extinguisher available
- 81. Appropriate personal protective equipment available and worn
- 82. Clothing free of loose edges that could become entangled in the saw
- 83. Chainsaw handles kept dry, clean, and free of oil or fuel mixture
- 84. Chainsaws held firmly with both hands and used right-handed
- 85. Operator standing to the left of the saw out of the plane of the chain
- 86. Saw used between the waist and mid-chest level
- 87. Full throttle maintained while cutting
- 88. Operator aware of position of guide bar tip, does not contact tip with anything being cut
- 89. Bumper spikes maintained as close to the object as possible
- 90. Operator aware of what is in the saw’s downward path after the cut
- 91. No attempt to made to cut material that is larger than the guide bar of the saw
- 92. Cuts avoided that will cause chain to jam
- 93. Non-metallic wedges used to prevent compression cuts from jamming the blade
- 94. Bystanders and helpers kept at a safe distance from operation
- 95. Chainsaw not operated when fatigued
- 96. Fire extinguisher present when operating the chainsaw in forest or brushy areas





This checklist is provided as a method of verifying compliance with regulations pertaining to the handling of hazardous materials. It shall be used at locations where CH2M HILL employees handle hazardous materials, or are required to perform oversight of subcontractor personnel handling hazardous materials, or both.

CH2M HILL staff shall not direct the means and methods of subcontractor operations nor direct the details of corrective actions. The subcontractor must determine how to correct deficiencies, and CH2M HILL staff must carefully rely on the subcontractor's expertise. Items considered imminently dangerous (possibility of serious injury or death) must be corrected immediately, or all exposed personnel must be removed from the hazard until it is corrected.

Completed checklists must be sent to the appropriate regional health and safety program manager for review.

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

This specific checklist has been completed to (check only one of the boxes below):

- Evaluate CH2M HILL compliance with hazardous material handling requirements (SOP HSE-403)
- Evaluate a CH2M HILL subcontractor's compliance with hazardous material requirements  
 Subcontractor's Name: \_\_\_\_\_

- Check "Yes" if an assessment item is complete or correct.
- Check "No" if an item is incomplete or deficient. Section 2 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-403.

<u>SECTION 1</u>	<u>Yes</u>	<u>No</u>	<u>N/A</u>	<u>N/O</u>
<b>PROCEDURES FOR HAZARDOUS MATERIAL HANDLING (6.0)</b>				
<b>GENERAL GUIDELINES (6.1)</b>				
1. Acids are stored away from bases.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Oxidizers and organics are stored away from inorganic reducing agents.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Flammables and corrosives are stored in appropriate storage cabinets.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Paper and other combustibles are not stored near flammables.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Secondary containment and lipped shelving are in place in storage areas.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. A fire suppression system is available.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>SPILL CONTROL/CLEANUP (6.2)</b>				
7. Spill control materials are located on the project site.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>HAZARDOUS CHEMICAL INVENTORY REPORTING (6.3)</b>				
8. Reporting is required if the project site handles and stores 10,000 lb or more of a hazardous chemical.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. Or 500 lb or the threshold planning quantity (TPQ) of an extremely hazardous substance.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. Regional ECC has been consulted for hazardous chemical inventory reporting.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>TOXIC CHEMICAL RELEASE REPORTING</b>				
11. Reporting requirements for toxic chemical release reporting have been followed.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

<u>SECTION 1 (continued)</u>	<u>Yes</u>	<u>No</u>	<u>N/A</u>	<u>N/O</u>
<b>FLAMMABLE AND COMBUSTIBLE LIQUIDS (6.5)</b>				
<b>GENERAL STORAGE (6.5.1)</b>				
12. Only approved containers/portable tanks used to store flammable and combustible liquids.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13. Approved safety cans used for handling flammable liquids in quantities 1-5 gallons.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14. For quantities of one gallon or less, the original container must be used for storage.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15. Flammable or combustible liquids are not stored in stairways or personnel passageways.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>INDOOR STORAGE (6.5.2)</b>				
16. Quantities of flammable or combustible liquids > 25 gallons stored in approved storage cabinet.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
17. No more than 25 gallons of flamm. or comb. liquids can be stored outside an approved cabinet.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
18. Cabinets are labeled with "FLAMMABLE: KEEP FIRE AWAY."	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
19. No more than 60 gallons of flamm. or 120 gallons of comb. liquids stored in one storage cabinet.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
20. Not more than three cabinets located in a single storage area.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>OUTSIDE STORAGE (6.5.3)</b>				
21. Storage of containers (not more than 60 gallons each) do not exceed 1,100 gallons in any area.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
22. Storage areas are not within 20 feet of any building.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
23. Storage areas graded to divert spills away from buildings and surrounded by an earth dike.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
24. Storage areas are free from weeds, debris, and other combustible materials.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
25. Outdoor portable tanks are provided with emergency vent devices.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
26. Outdoor portable tanks are no closer than 20 feet from any building.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
27. Signs indicating no smoking are posted around the storage area.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>DISPENSING (6.5.4)</b>				
28. Areas where liquids are dispensed in >5-gal quantities are separated from other operations by 25'.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
29. Drainage or other means provided to control spills.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
30. Adequate natural or mechanical ventilation provided to maintain concentration of flammable vapor < 10% of the lower flammable limit.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
31. Dispensing of flammable liquids from one container to another is done only when containers are electrically interconnected (bonded).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
32. Dispensing flammable or combustible liquids by means of air pressure on the container or portable tanks prohibited.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
33. Dispensing devices and nozzles for flammable liquids are of an approved type.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>USE (6.5.5)</b>				
34. Flammable liquids are kept in closed containers when not in actual use.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
35. Leakage or spillage of flammable or combustible liquids is disposed of promptly and safely.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
36. Sources of ignition are kept at least 50 feet from flammable liquids.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>LIQUID PETROLEUM GAS (6.6)</b>				
37. LPG containers meet DOT requirements.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
38. Each container or system has a safety relief device or valve in good working order.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
39. Portable heaters using LPG have an automatic shutoff device in the event of flame failure.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
40. Storage of LPG within buildings is prohibited.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
41. LPG storage location has at least one portable fire extinguisher rated not less than 20-B:C.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

<u>SECTION 1 (continued)</u>	<u>Yes</u>	<u>No</u>	<u>N/A</u>	<u>N/O</u>
<b>COMPRESSED GAS CYLINDERS (6.7)</b>				
<b>GENERAL (6.7.1)</b>				
42. Cylinders and apparatus inspected for defects and leakage prior to use. Damaged items not used.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
43. Gas distributor notified and subsequent instructions followed for defective cylinders.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
44. Leaking cylinders removed from the work area.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
45. Cylinder users do not modify, tamper, or attempt repair on cylinders or apparatus.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
46. Only cylinder owners or authorized agent refill cylinders or attempt to mix gases in a cylinder.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
47. Cylinders labeled with the identity of the contents.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>TRANSPORTING (6.7.2)</b>				
48. Cylinders not rolled in the horizontal position or dragged; suitable material-handling device used.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
49. Cylinders being transported have valve protection caps installed.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
50. Cylinders in vertical position when transported by motor vehicle, hoisted, or carried.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
51. Cylinders hoisted by a cradle or pallet designed for such use, and not by magnets, slings, or their valve protection caps.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>STORAGE (6.7.3)</b>				
52. Cylinders are stored in the vertical position with valve protection caps installed.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
53. Cylinders are secured from being knocked over by a chain or other stabilizing device.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
54. Cylinders are stored away from readily ignitable substances.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
55. Cylinders are protected from exposure to temperature extremes.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
56. Oxygen cylinders in storage are separated from fuel gas cylinders or combustible materials > 20' or by a ½-hour fire-resistant barrier at least 5' high.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
57. Cylinders inside buildings are stored in dry, well-ventilated locations > 20' from comb. materials.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
58. Cylinders are stored in definitely assigned places away from elevators, stairs, or gangways.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
59. Signs indicating no smoking are provided for storage areas containing flammable gas cylinders.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>PLACEMENT FOR USAGE (6.7.4)</b>				
60. Cylinders are located where they will not be knocked over or damaged.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
61. Cylinders are secured in the vertical position.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
62. Cylinders are not placed where they can become part of an electrical circuit.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
63. Cylinders are kept far enough away from welding and cutting operations to prevent sparks, hot slag, or flames from reaching them. When impractical, fire resistant shields are provided.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
64. Cylinders are not taken into confined spaces.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>CYLINDER CONNECTIONS (6.7.5)</b>				
65. Pressure-controlling apparatus is compatible with the particular gas used.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
66. Cylinders and pressure-controlling apparatus are kept free of oil and grease.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
67. Pressure-controlling apparatus is kept gastight to prevent leakage.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
68. Cylinders not attached to process where backflow could occur unless check valves or traps used.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
69. Manifolds designed for product used at the appropriate temperatures, pressures, and flow rates.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
70. Manifolds are labeled and placed in well-ventilated and accessible locations.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
71. Cylinders are not cross-connected with plant air lines.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
72. Flash arrestors or reverse flow check valves are installed on all flammable gas cylinders.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>USAGE (6.7.6)</b>				
73. Eye protection (safety glasses or goggles) is worn when using cylinders.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
74. Cylinder valve and regulator are inspected for foreign material before connecting.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
75. If cylinders are frozen, warm (not boiling) water is used to thaw cylinders.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
76. Cylinder valve remains closed except when the cylinder is in use.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
77. Fuel gas cylinder valves are not opened more than 1½ turns, for quick closing.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
78. If a special wrench is used to open a cylinder valve, it is left in position on the valve.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

<u>SECTION 1 (continued)</u>	<u>Yes</u>	<u>No</u>	<u>N/A</u>	<u>N/O</u>
<b>USAGE (continued) (6.7.6)</b>				
79. Acetylene cylinders are used in the vertical position.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
80. Acetylene cylinders are not used > 15 psig or > 30 psia.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
81. Copper pipe or fittings are not used with acetylene systems.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
82. Compressed gas is not used to dust off clothing.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
83. Cylinder valve closed and regulator relieved of internal pressure before regulators are removed.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>EXPLOSIVES (6.8)</b>				
84. Written authorization provided by Munitions Market Segment Leader designating individuals who can store or use high explosives under the authority of the CH2M HILL BATF Type 33 User of High Explosives License/permit.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
85. Written authorization provided by Munitions Market Segment Leader designating individuals who can manufacture high explosives under the authority of the CH2M HILL BATF Type 20 Manufacturer of High Explosives License/permit.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
86. Approved Explosive Siting Plan (ESP).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
87. Approved Explosive Management Plan (EMP).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
88. Sources of ignition are not brought in or near storage magazines, or within 50' of an area where explosives are being handled, transported, or used.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
89. Radio transmitting or receiving equipment is not brought within 1,000' of blasting activities.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
90. Transportation and storage of explosives comply with local, state, and federal regulations.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
91. Vehicles transporting explosives are placarded and displayed according to DOT regulations.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
92. Detonators or blasting caps are not stored with explosive charges.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
93. Explosives are stored in storage magazines as required by local, state, and federal regulations.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
94. Contact the Munitions Response market Segment Leader for additional instructions	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>PROCEDURES FOR HAZARDOUS MATERIALS SHIPPING (7.0)</b>				
1. Only dangerous goods shippers are permitted to ship dangerous goods (CH2M HILL only).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Dangerous goods are shipped or transported in accordance with CH2M HILL's procedures.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. All personnel shipping dangerous goods have completed the computer-based training (CH2M HILL only)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Dangerous goods are stored only in the equipment warehouse prior to shipping.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Written authorization provided by Munitions Market Segment Leader designating individuals who can "offer explosives for shipment" under the authority of the CH2M HILL Department of Transportation Hazardous Materials Certificate of Registration	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>SHIPPING BY AIR (7.1)</b>				
5. Shipments for Federal Express meet IATA requirements for dangerous goods.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Before shipping, packages are clearly identified, packed, marked, labeled, and documented.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. The quantity does not exceed IATA regulations.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Packaging meets IATA requirements and withstand transport by air.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. Shipper classifies each item into one of the 9 hazard classes.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. Inner packages are packed to prevent breaking or leaking during shipping.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11. Absorbent or cushioning material does not react with the contents of the inner package.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12. Outer packages in fiberboard, a plastic case, or other sturdy container.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13. Package is capable of withstanding 4' drop test with no damage.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14. Package is marked with: proper shipping name of contents, technical name, UN number, total net. quantity, and the name and address of the shipper and recipient.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15. Irrelevant labels have been removed from package.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
16. Hazard label and handling label are secured in correct locations.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
17. Dangerous goods airbill has been completed.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

18. Dangerous goods are not shipped via UPS.

**SECTION 1 (continued)**

**SHIPPING BY HIGHWAY (7.2)**

19. Use Federal Express packaging and paperwork requirements that comply with DOT regs for ground transportation of dangerous goods.

20. Consult with local state highway police if route includes vehicular tunnels.

21. Inner packaging prevents breakage or leakage under normal conditions of transport.

22. Absorbent/cushioning material does not react with contents of the package.

23. Labels for highway transportation are the same as those for air transportation.

24. Engine turned off, brake set during loading and unloading.

**Yes    No    N/A    N/O**

**EMERGENCY RESPONSE (7.3)**

25. Appropriate emergency response information available not on the package, within reach of driver.

26. Information includes copy of pages from *Emergency Response Guidebook* for each item.

27. An MSDS for each item must also be included.

28. Emergency response information must also include the information found on the shipping papers.

29. CH2M HILL's 24-hour EMERGENCY RESPONSE TELEPHONE NUMBER, (800) 255-3954, is included, as required.

30. In the event of an accident, keep other individuals, except response workers, from the vicinity.

31. In case of breakage, spillage, or leakage, use means to prevent spreading and contain the spill.

32. Care taken during the handling of cargo to minimize hazards.

33. MSDS is consulted for safe handling procedures.

34. Wash the area of the vehicle where the dangerous goods may have spilled.

35. Consult your supervisor in the event of a spill.

36. Ask your supervisor to call CHEM-TEL of the local HAZMAT unit if the spill poses a danger.







# CH2MHILL

## HS&E Self-Assessment Checklist— HOISTS

This checklist shall be used by CH2M HILLCH2M 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 HILLCH2M HILL employees are exposed to hoist hazards (complete Section 1) and/or (2) CH2M HILLCH2M HILL provides oversight of subcontractor personnel who are exposed to hoist hazards (complete entire checklist).

SC 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.

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

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

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

This specific checklist has been completed to:

Evaluate CH2M HILLCH2M HILL employee exposure to crane, hoist and rigging hazards

Evaluate a CH2M HILLCH2M 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 HSE-303.

<b><u>SECTION 1</u></b>				
	<b><u>Yes</u></b>	<b><u>No</u></b>	<b><u>N/A</u></b>	<b><u>N/O</u></b>
<b>SAFE WORK PRACTICES (5.1)</b>				
1. Manufacturers specifications and limitations for hoists followed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Personnel not permitted to ride on material hoists	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Weather conditions considered when lifting operations performed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

<b><u>SECTION 2</u></b>				
<b>HOISTS: GENERAL (5.2.1)</b>				
4. Manufacturer’s specifications and limitations are followed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. 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"/>
6. Hoist ropes are installed in accordance with the wire rope manufacturers’ recommendations	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Live booms are not installed on hoists	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Operating rules are and posted at the operator’s station of hoists	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. No person will ride on material hoists except for inspection and maintenance	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. All entrances of the hoistways are protected by substantial gates or bars	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11. Overhead protective coverings is are provided on the top of every material host cage/platform	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12. All hoistway entrance bars and gates are painted with diagonal contrasting colors	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



# CH2MHILL

## Arsenic

### Standard of Practice HSE-501

## Arsenic Fact Sheet

### Uses and Occurrences

The manufacture and transportation of arsenic compounds; used in the manufacture of herbicide, pesticide, fungicides, and defoliants; used in the manufacture and handling of calcium arsenate; used in the manufacture of electrical semiconductors, diodes, and solar batteries; used as an additive for food and drinking water for animals; used as a preharvest desiccant, sugarcane ripener, soil sterilant, or for timber thinning; used as a bronzing or decolorizing addition in glass manufacturing; used in the production of opal glass and enamels; used as an addition to alloys to increase hardening and heat resistance; used during smelting of ores; used during the cleanup of soil contaminated with arsenic; used military applications; and used in the general handling, storage, and use of arsenic.

### Physical Characteristics

Appearance:	Gray metal or white powder
Odor:	Odorless solid, garlic-like when heated
Flammable:	None
Flash Point:	None
Flammable Range:	None
Specific Gravity:	5.73 for arsenic metal, 3.74 for arsenic trioxide
Stability:	Stable
Incompatibilities:	Heat, hydrogen gas, and oxidizing agents
Melting Point:	Sublimes at 613°C (1135°F); 315°C (599°F) for arsenic trioxide
Boiling Point:	Sublimes at 613°C (1135°F); 465°C (869°F) for arsenic trioxide

### Signs and Symptoms of Exposure

Short-term (Acute): Nausea, vomiting, diarrhea, weakness, loss of appetite, cough, chest pain, giddiness, headache, and breathing difficulty.

Long-term (Chronic): Numbness and weakness in the legs and feet, skin and eye irritation, hyperpigmentation, thickening of palms and soles (hyperkeratosis), contact dermatitis, skin sensitization, warts, ulceration, perforation of the nasal septum, and lung and lymphatic cancer.

## Modes of Exposure

Inhalation: Dusts and Vapors  
Absorption: Liquid  
Ingestion: Dusts and Liquid

## Exposure Limits

Action level (AL) 5 µg/m<sup>3</sup>  
PEL 10 µg/m<sup>3</sup>  
STEL None  
TLV 10 µg/m<sup>3</sup>

## Exposure Level vs. Regulatory Requirements

EXPOSURE LEVEL (EL)	REGULATORY REQUIREMENTS
EL < AL	Maintain exposure as low as reasonably achievable.
AL > EL, EL < PEL	Implement portions of the OSHA Arsenic Standard and training.
EL > PEL	Implement all portions of the OSHA Arsenic Standard, including training, medical surveillance, engineering controls, establishment of work areas, etc.

## PPE

Eye: Safety glasses; contact lenses should **not** be worn.  
Skin: Chemical protective gloves and body protection.  
Respiratory: Air purifying respirators and supplied air respirators, depending on the exposure.

## First Aid

Inhalation: Move to fresh air; seek medical attention promptly.  
Skin: Quick drenching with water; wash skin with soap and water; seek medical attention promptly.  
Eyes: Flush with water for 15 minutes, lifting the lower and upper lids occasionally; seek medical attention promptly.  
Ingestion: Seek medical attention promptly.

# CH2MHILL

## Benzene Fact Sheet

**Uses and Occurrences:** Found in gasoline and other fuels, and used in the manufacture of plastics, detergents, pesticides, and other chemicals.

### Physical Characteristics:

Appearance:	Clear, colorless liquid
Odor:	Sweet, aromatic odor
Flammable:	Class IB; NFPA Rating: 3
Flash Point:	11°C (52°F)
Flammable Range:	1.3% to 7.5%
Specific gravity:	0.879; (water = 1.0)
Stability:	Stable
Incompatibilities:	Heat and Oxidizing Agents
Melting Point:	5.5°C (42°F)
Boiling Point:	80.1°C (176°F)

### Signs and Symptoms of Exposure:

Inhalation:	<u>Short term:</u> headaches, nausea, dizziness, respiratory irritation, convulsions, and respiratory paralysis. <u>Long term:</u> fatigue, nervousness, irritability, blurred vision, and bone marrow depression (leukemia)
Skin and Eye:	<u>Short term:</u> dermatitis, irritation. <u>Long term:</u> redness, blistering, and dry, scaly dermatitis
Ingestion:	Gastrointestinal irritation

### Modes of Exposure:

Inhalation:	Vapors
Absorption:	Liquid
Ingestion:	Liquid

### Exposure Limits:

Action level (AL):	0.5 ppm
PEL:	1 ppm
STEL:	5 ppm
PEL-C:	None
TLV:	0.5 ppm
TLV-STEL	2.5 ppm

## Exposure Level vs. Regulatory Requirements

EXPOSURE LEVEL (EL)	REGULATORY REQUIREMENTS
EL < AL	Maintain exposure as low as reasonably achievable
AL > EL, EL < PEL	Implement portions of the OSHA Benzene standard and Training
EL > PEL	Implement all portions of the OSHA Benzene Standard including training, medical surveillance, engineering controls, establishment of work areas, etc.

### PPE

Eye: Safety Glasses; contact lenses should **not** be worn

Skin: Chemical protective clothing and gloves

Respiratory: Air purifying respirators and supplied air respirators, depending on the exposure.

### First Aid

Inhalation: Move to fresh air; contact a physician

Skin: Quick drenching of body; wash with soap and water

Eyes: Flush with water for 15 minutes, lifting lower and upper lids occasionally; seek medical attention immediately

Ingestion: **DO NOT INDUCE VOMITING**; seek medical attention immediately



## Cadmium Fact Sheet

### Uses and Occurrences

The manufacture and transportation of cadmium compounds; coatings on metals; nickel-cadmium storage batteries; nickel plating, power transmission wire; pigments in ceramic glazes, enamels, and fungicides; corrosion-resistant coatings on marine, aircraft, and motor vehicles; manufacture of nuclear reactor rods; and welding electrodes and solder.

### Physical Characteristics

Appearance:	Soft, blue-white, malleable, lustrous metal or grayish-white powder; some compounds may appear as a brown, yellow, or red powdery substance
Odor:	Odorless
Flammable:	Severe fire hazard, such as dust
Flash Point:	Not Applicable
Flammable Range:	Not Applicable
Specific Gravity:	8.64 (metal dust)
Stability:	Very stable
Incompatibilities:	Nitric acid, boiling concentrated hydrochloric and sulfuric acids; contact of cadmium metal dust with strong oxidizers or with elemental sulfur, selenium, and tellurium may cause fires and explosion.
Melting Point:	321°C (610°F)
Boiling Point:	765°C (1,409°F)

### Signs and Symptoms of Exposure

Short-Term (Acute):	<u>Dust and Fume</u> : Irritation of nose and throat; inhalation may cause a delayed onset of cough, chest pain, sweating, chills, shortness of breath, and weakness. Death may occur. <u>Dust</u> : Ingestion may cause nausea, vomiting, diarrhea, and abdominal cramps.
Long-Term (Chronic):	<u>Dust and Fume</u> : Repeated or prolonged exposure may cause loss of sense of smell, ulceration of the nose, shortness of breath (emphysema), kidney damage, and mild anemia. Exposure to cadmium has been reported to cause an increase incidence of lung cancer.

## Modes of Exposure

Inhalation:	Dusts and fumes
Absorption:	None
Ingestion:	Dusts and solids

## Exposure Limits

Action level (AL)	2.5 µg/m <sup>3</sup>
PEL	5 µg/m <sup>3</sup>
STEL	None
TLV	10 µg/m <sup>3</sup> , 2µg/m <sup>3</sup> (respirable)

## Exposure Level versus Regulatory Requirements

EXPOSURE LEVEL (EL)	REGULATORY REQUIREMENTS
EL < AL	Maintain exposure as low as reasonably achievable
AL > EL, EL < PEL	Implement portions of the OSHA Cadmium standard and Training
EL > PEL	Implement all portions of the OSHA Cadmium Standard including training, medical surveillance, engineering controls, establishment of work areas, etc.

## PPE

Eye:	Splash-proof or dust-resistant goggles; face shield
Skin:	Protective coveralls, gloves, and footwear
Respiratory:	Air-purifying respirators and supplied air respirators, depending on the exposure

## First Aid

Inhalation:	Move to fresh air; seek medical attention immediately.
Skin:	Remove clothing and shoes; wash with large amounts of water.
Eyes:	Flush with water immediately, lifting the upper and lower eyelids; seek medical attention immediately.
Ingestion:	DO NOT INDUCE VOMITING; seek medical attention immediately.

# CH2MHILL

## Lead

### Standard of Practice HSE-508

## Lead Fact Sheet

### Uses and Occurrences

Lead can be found in the following: construction materials for tank linings and piping; component of lead-acid storage batteries; lead solder; plastics; steel; and pigments for paints. Lead can also be found in waste rock associated with mining activities, wood debris or stock used for electrical co-generation activities, and soil and waste associated with manufacturing activities. Elevated levels of naturally occurring lead may also be found in the soil in certain parts of this country.

### Physical Characteristics

Appearance:	Bluish-white, silvery, gray metal. Very soft and easily malleable
Odor:	None
Flammable:	Noncombustible
Flash Point:	Not Applicable
Flammable Range:	Not Applicable
Specific gravity:	11.35
Stability:	very stable
Incompatibilities:	hot nitric acid, boiling concentrated hydrochloric and sulfuric acids
Melting Point:	327°C

### Signs and Symptoms of Exposure

Skin and Eye: Irritation

Ingestion and Inhalation (Acute Overexposure): Lead is a potent, systemic poison that serves no known useful function once absorbed by your body. Taken in large enough doses, lead can kill you in a matter of days. A condition affecting the brain called acute encephalopathy may arise that develops quickly to seizures, coma, and death from cardio-respiratory arrest. A short term dose of lead can lead to acute encephalopathy. Short term occupational exposures of this magnitude are highly unusual, but not impossible. Similar forms of encephalopathy may, however, arise from extended, chronic exposure to lower doses of lead. There is no sharp dividing line between rapidly developing acute effects of lead, and chronic effects that take longer to acquire. Lead adversely affects numerous body systems, and causes forms of health impairment and disease that arise after periods of exposure as short as days or as long as several years.

Ingestion and Inhalation (Chronic Overexposure): Chronic overexposure to lead may result in severe damage to your blood-forming, nervous, urinary and reproductive systems. Some common symptoms of chronic overexposure include loss of appetite, metallic taste in the

mouth, anxiety, constipation, nausea, pallor, excessive tiredness, weakness, insomnia, headache, nervous irritability, muscle and joint pain or soreness, fine tremors, numbness, dizziness, hyperactivity and colic. In lead colic, there may be severe abdominal pain.

## Modes of Exposure

Inhalation: Dusts and fumes  
 Skin Absorption: None  
 Ingestion: Dusts and solids

## Exposure Limits

Action level 0.03 mg/m<sup>3</sup>  
 PEL 0.05 mg/m<sup>3</sup>  
 STEL None  
 PEL-C None  
 TLV 0.05 mg/m<sup>3</sup>

## Exposure Level vs. Regulatory Requirements

EXPOSURE LEVEL (EL)	REGULATORY REQUIREMENTS
EL less than Action Level (AL)	Maintain exposure as low as reasonably achievable
EL greater than AL and less than PEL	Implement portions of the OSHA Lead Standard (i.e., initial medical monitoring) and Training
EL greater than PEL	Implement all portions of the OSHA Lead Standard including training, medical surveillance, engineering controls, establishment of work areas, etc.

## PPE

Eye: Safety Glasses  
 Skin: Coveralls or disposable coveralls to keep lead off clothing and to prevent the spread of lead contamination.  
 Respiratory: Air purifying respirators and supplied air respirators, depending on the exposure.

## First Aid

Inhalation: Move to fresh air, contact a physician  
 Skin: Wash with water  
 Eyes: Flush with water  
 Ingestion: Contact a physician

## Methylene Chloride Fact Sheet

**Uses and Occurrences:** Used in paint stripping, polyurethane foam manufacturing as a blowing agent, cleaning and degreasing, and chemical sample extraction. Solvent good for fats, oils, waxes, resins, and rubber. Used in propellant mixtures for aerosol cans. An extraction agent in the pharmaceutical industry.

### Physical Characteristics:

Appearance:	Colorless liquid
Odor:	Chloroform-like odor; poor warning property
Flammable:	Combustible Liquid
Flash Point:	N/A
Flammable Range:	13% to 23%
Specific Gravity:	1.33; (water = 1.0)
Stability:	Stable under ordinary conditions of use and storage
Vapor Pressure:	350 mm Hg at 20 °C (68°F)
Incompatibilities:	Strong oxidizers; caustics; chemically active metals such as aluminum, magnesium powders, potassium and sodium; concentrated nitric acid
Melting Point:	-97 °C (-143°F)
Boiling Point:	39.8 °C (104°F)

### Signs and Symptoms of Exposure:

Inhalation:	<p><u>Short Term:</u> Causes irritation to respiratory tract. Has a strong narcotic effect with symptoms of mental confusion, light-headedness, fatigue, nausea, vomiting, and headache. Causes formation of carbon monoxide in blood, which affects cardiovascular system and central nervous system. Continued exposure may cause increased light-headedness, staggering, unconsciousness, and even death. Exposure may make the symptoms of angina (chest pains) worse.</p> <p><u>Long Term:</u> Can cause headache, mental confusion, depression, liver effects, kidney effects, bronchitis, loss of appetite, nausea, lack of balance, and visual disturbances.</p>
Skin Contact:	<p><u>Short Term:</u> Causes irritation, redness, and pain. Prolonged contact can cause burns. Liquid degreases the skin. May be absorbed through skin.</p> <p><u>Long Term:</u> Dermatitis</p>
Eye Contact:	Vapors can cause eye irritation. Contact can produce pain, inflammation, and temporal eye damage.

Ingestion: May cause irritation of the gastrointestinal tract with vomiting. If vomiting results in aspiration, chemical pneumonia could follow. Absorption through gastrointestinal tract may produce symptoms of central nervous system depression ranging from light-headedness to unconsciousness.

**Modes of Exposure:**

Inhalation: Vapor  
Absorption: Solution  
Ingestion: Ingestion of solution  
Skin and Eye Contact: Solution

**Exposure Limits:**

Action Level: 12.5 ppm  
PEL: 25 ppm  
STEL: 125 ppm  
PEL-C: None  
TLV: 50 ppm

**Exposure Level versus Regulatory Requirements**

EXPOSURE LEVEL (EL)	REGULATORY REQUIREMENTS
EL < AL	Maintain exposure as low as reasonably achievable. Maintain records of initial determination, and provide training.
EL > AL, EL < PEL/STEL	Ongoing monitoring, as required. Medical surveillance.
EL > PEL/STEL	All remaining requirements apply.

**PPE:**

Eye: Splash goggles; face shield.  
Skin: Inner glove of polyethylene/ethylene vinyl alcohol, outer glove nitrile or neoprene, Tyvek or other full-body clothing.  
Respiratory: Supplied air respirators are required.

**First Aid:**

- Inhalation: Move to fresh air; seek medical attention immediately. If breathing has stopped, perform artificial respiration.
- Skin: Promptly wash the contaminated skin with soap and water. If this chemical penetrates the clothing, promptly remove the clothing and wash the skin with soap and water. Get medical attention immediately.
- Eyes: Immediately irrigate the eyes with large amount of water, occasionally lifting the lower and upper lids. Get medical attention immediately.
- Ingestion: Seek medical attention immediately.

# CH2MHILL

## H&S Self-Assessment Checklist – Open Water Work (Boats, Ships and Barges)

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 open water hazards aboard a boat, ship or barge (complete Section 1 and 3) and/or 2) CH2M HILL provides oversight of subcontractor personnel who are exposed to open water hazards aboard a boat, ship or barge (complete entire checklist).

SSC or DSC may consult with subcontractors when completing this checklist, but shall not direct the means and methods of boat, ship or barge 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 open water hazards on boat, ship or barge
  - Evaluate a CH2M HILL subcontractor’s compliance with boat, ship or barge 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.

### SECTION 1

	<u>Yes</u>	<u>No</u>	<u>N/A</u>	<u>N/O</u>
<b>SAFE WORK PRACTICES</b>				
1. Individuals working aboard ship can swim.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. All ship-board personnel are wearing an OSHA-certified Personal Flotation Device	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Individuals operating boats larger than state/federal minimum are certified operators	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Ship is properly licensed for waterway site work	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Competent person inspects ship’s operational and navigational systems daily	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Pre-Launch safety meetings conducted with all parties involved in ship operations	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Adequate distance maintained between ship and overhead power lines, bridges, overpasses	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Adequate distance maintained between ship other ships on waterways	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. Equipment is properly secured from shifting, sliding while aboard ship.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11. No unqualified personnel permitted near ship’ rigging or spuds during operation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12. Manufacturers specifications and limitations for weight allowance and distribution on ship are followed at all times during operation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13. All ship-board personnel are wearing an OSHA-certified Personal Flotation Device	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14. Weather conditions considered monitored continuously via maritime radio	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15. Procedures in place for distress communications should vessel lose power/motor failure	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
16. All rigging used as intended, inspected, stored, protected and supervised.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
17. Rescue flotation devices are visibly marked and available, and in good working order	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
18. Ship is operated at speeds at appropriate for the waterway, or less than posted speeds	<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>
19. The competent person inspects all spuds, hoists, anchors, and rigging prior to use	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
20. Frequent and periodic inspections of the any necessary bilge pumps are recorded and available for review	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
21. All guards and safety devices are installed and equipment removed after maintenance	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
22. The ship's operator is aware of deck activities via direct view or two-way radio communications during drilling and/or sampling	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
23. The ships navigational system (such as GPS, Sonar or a combination thereof) can be used when vision is obstructed (such as in the early morning/evening, or due to fog or times of heavy precipitation)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
24. Navigational maps are in use and available ship's operator	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
25. Navigational traverse routes best suited to the ship's capabilities are discussed prior to each daily launch	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
26. Seating or handholds are available for crew when ship is in transit	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
27. All work areas are kept clean of loose tools, cans, and waste	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
28. The ship has proper entrance and egress to shore for all crew and equipment.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
29. Ship is equipped with a certified 5 ABC or higher fire extinguisher	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
30. Ship is equipped with rest areas for crew during events held during extreme heat or cold conditions or during periods of heavy precipitation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
31. All decking has stable railings that meet OSHA standards	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
32. Any fuel aboard ship is kept away from engine as well as sampling equipment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
33. A clearly marked exclusion zone is designated for drilling and sampling	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>ON BOARD DRILLING EQUIPMENT: POSITIONING</b>				
33. Any drilling equipment operated near live power lines will maintain minimum distance from the lines	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
34. Adequate clearance must be maintained between a ship and obstructions both visible and submerged, including utility lines	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
35. Any drilling equipment aboard is level secured and blocked properly during both operation and transport to ensure no rapid load shifts.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
36. Exhaust pipes are guarded from employee contact and vented away from exclusion zone	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**CH2MHILL**  
**H&S Self-Assessment Checklist – Open Water Work (Boats and Barges)**

**SECTION 3**

Complete this section for all items checked “No” in Sections 1 or 2. Deficient items must be corrected in a timely manner.

<b>Item #</b>	<b>Corrective Action Planned/Taken</b>	<b>Date Corrected</b>

Auditor: \_\_\_\_\_ Project Manager: \_\_\_\_\_

## Enterprise Standard Operating Procedure HSE-512

### Vinyl Chloride Fact Sheet

**Uses and Occurrences** – Polyvinyl chloride and copolymers, organic synthesis, adhesives for plastics, and as a precursor in the production of the common plastic polyvinyl chloride (PVC). It is often a degradation product of a number of chlorinated compounds, including tetra-chloroethylene and trichloroethylene, at hazardous waste sites in soils and groundwater. It can also be a breakdown product of the combustion of PVC or other chlorinated compounds.

#### Physical Characteristics

Appearance:	Colorless gas
Odor:	Sweet; Odor threshold: 3,000 ppm
Flammable:	Class IA Flammable Liquid Gas; NFPA Rating: 4
Flash Point:	-78 °C (-108°F)
Flammable Limits:	3.6% - 33.0% (% by volume in air)
Specific gravity:	0.91; (water = 1.0)
Stability:	Stable under ordinary conditions of use and storage
Vapor Pressure:	2300 mm Hg (at 20 °C)
Incompatibilities:	Atmospheric oxygen and strong oxidizers may react to produce peroxide, which can initiate a violent polymerization reaction
Melting Point:	-155.7 °C (-248°F)
Boiling Point:	-14 °C ( 7°F)

#### Signs and Symptoms of Exposure

Inhalation:	<u>Short Term</u> : Dizziness, light-headedness, nausea, dullness of visual and auditory responses, drowsiness, and unconsciousness <u>Long Term</u> : Thickening of skin, contact and allergic dermatitis, fatigue, coughing and sneezing, abdominal pain, gastrointestinal bleeding, nausea, vomiting, indigestion, diarrhea, jaundice, weight loss, anorexia, and cold and tingling sensations of the hands and feet, carcinogen.
Skin contact:	<u>Short Term</u> : Skin contact with liquid can cause frostbite. <u>Long Term</u> : Dermatitis
Eye contact:	Vapors can cause eye irritation. Contact can produce pain, inflammation and temporal eye damage.

## Modes of Exposure

Inhalation:	Vapor
Absorption:	Liquid causes frostbite
Ingestion:	Ingestion of contaminated water

## Exposure Limits

Action level	0.5 ppm
PEL	1 ppm
STEL	None
PEL-C	5 ppm
TLV	1 ppm

## Exposure Level vs. Regulatory Requirements

EXPOSURE LEVEL (EL)	REGULATORY REQUIREMENTS
EL < AL	Maintain exposure as low as reasonably achievable
EL > AL, EL < PEL	Implement portions of the OSHA Vinyl chloride standard and Training
EL > PEL	Implement all portions of the OSHA Vinyl Chloride Standard including training, medical surveillance, engineering controls, establishment of work areas, etc.

## PPE

Eye:	Safety glasses, chemical goggles, face shield
Skin:	Tychem SL or other full-body clothing, depending on the exposure. Nitrile, Viton or laminated film gloves.
Respiratory:	Air purifying respirators and supplied air respirators, depending on the exposure.

## First Aid

Inhalation:	Move to fresh air, begin rescue breathing if breathing has stopped and CPR if heart action has stopped, transfer promptly to a medical facility.
Skin:	Immerse affected part in warm water. Seek medical attention.
Eyes	Flush with large amounts of water for at least 15 minutes. Seek medical attention immediately.
Ingestion:	Contact a physician.

# Cr VI Fact Sheet

## Uses and Occurrences

Chromium is a naturally occurring element in rocks, animals, plants, soil, and volcanic gases. Chromium occurs in the environment predominantly in one of two valence states:

- Trivalent (Cr III), which occurs naturally and is an essential nutrient, and
- Hexavalent chromium (Cr VI), which, along with the less common metallic chromium (Cr 0), is most commonly produced in plating processes

The major industrial sources of Cr VI compounds are chromate pigments in dyes, paints, inks, and plastics; chromates added as anti-corrosive agents to paints, primer, and other surface coatings; chrome plating by depositing chromium metal onto an item's surface using a solution of chromic acid; particles released during smelting of ferro-chromium ore; fumes from welding stainless steel or nonferrous chromium alloys; and as an impurity in Portland cement.

## Physical Characteristics

Appearance:	Dark red flakes or powder
Odor:	None
Flammable:	Non-combustible solid, but will accelerate the burning of combustible materials
Flash Point:	None
Flammable Range:	None
Specific gravity:	2.7 for Cr VI
Stability:	Stable
Incompatibilities:	Reducing and oxidizing agents, acetic acid
Melting Point:	1907°C or 3465°F for Cr
Boiling Point:	2671°C or 4840°F for Cr

## Signs and Symptoms of Exposure

Short term (Acute): Coughing,, sneezing, chest pain, breathing difficulty, itching and burning sensation to skin and lungs.

Long term (Chronic): Allergic (asthma like symptoms) respiratory reaction, skin and eye irritation, nosebleeds, contact dermatitis, allergic like skin reaction, ulceration and perforation of the nasal septum

## Modes of Exposure

Inhalation: Dusts and fumes  
Skin Absorption: Liquid  
Ingestion: Dusts and liquid

## Exposure Limits

Action level 2.5 micrograms per cubic meter ( $\mu\text{g}/\text{m}^3$ )  
PEL 5  $\mu\text{g}/\text{m}^3$   
STEL None  
TLV 5  $\mu\text{g}/\text{m}^3$

## Exposure Level vs. Regulatory Requirements

EXPOSURE LEVEL (EL)	REGULATORY REQUIREMENTS
EL < AL	Maintain exposure as low as reasonably achievable
AL > EL, EL < PEL	Implement portions of the OSHA Cr VI standard and Training
EL > PEL	Implement all portions of the OSHA Cr VI Standard including training, medical surveillance, engineering controls, establishment of work areas, etc.

## PPE

Eye: Safety glasses;  
Skin: Chemical protective gloves and body protection  
Respiratory: Air-purifying respirators and supplied-air respirators, depending on the exposure, and a PAPR if requested by the worker

## First Aid

Inhalation: Move to fresh air; seek medical attention promptly  
Skin: Quick drenching with water; wash skin with soap and water; seek medical attention promptly  
Eyes: Flush with water for 15 minutes, lifting the lower and upper lids occasionally; seek medical attention promptly  
Ingestion: Seek medical attention promptly

# CH2MHILL

## HSE Self-Assessment Checklist—Lifting

This checklist shall be used **only** by CH2M HILL personnel 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 perform manual lifting activities (office or projects), and/or (2) CH2M HILL provides oversight of a subcontractor performing manual lifting activities. SC or Office Safety Coordinators/Committee members may consult with subcontractors (if applicable) when completing this checklist but shall not direct the means and methods of activities nor direct the details of corrective actions. Subcontractors shall determine how to correct deficiencies, and we must carefully rely on their expertise. Conditions considered imminently dangerous (possibility of serious injury or death) shall be corrected immediately or all exposed personnel shall be removed from the hazardous area until corrected.

Complete the appropriate project or office information:

<b>Project Information</b>					
Project Name: _____		Project No.: _____			
Location: _____		PM: _____			
Auditor: _____		Title: _____		Date: _____	
<b>Office Information</b>					
Office Location: _____		Date: _____			
Auditor: _____		Title: _____		Date: _____	
<p>This specific checklist has been completed to:</p> <input type="checkbox"/> Evaluate CH2M HILL employee manual lifting activities. <input type="checkbox"/> Evaluate a CH2M HILL subcontractor's manual lifting activities. Subcontractor Name: _____					
<ul style="list-style-type: none"> <li>• Check "Yes" if an assessment item is complete/correct.</li> <li>• Check "No" if an item is incomplete/deficient. Deficiencies shall be brought to the immediate attention of the subcontractor.</li> <li>• Check "N/A" if an item is not applicable.</li> <li>• Check "N/O" if an item is applicable but was not observed during the assessment.</li> </ul>					
Numbers in parentheses indicate where a description of this assessment item can be found in Standard of Practice HSE-112.					
<b>Planning Activities</b>		<u>Yes</u>	<u>No</u>	<u>N/A</u>	<u>N/O</u>
1.	Efforts have been made to inquire about receiving equipment or supplies in containers weighting less than 50 pounds (23 kilograms).	o	o	o	o
2.	Equipment or supplies are being delivered as close as possible to their use point.	o	o	o	o
3.	Heavy equipment or supplies are being stored off the ground and no lower than knee height.	o	o	o	o
4.	Adequate space has been provided to access and lift equipment or supplies without reaching or twisting.	o	o	o	o
<b>Safe Work Practices (5.1)</b>		<u>Yes</u>	<u>No</u>	<u>N/A</u>	<u>N/O</u>
5.	Tasks or activities have been modified to reduce or minimize manual lifting.	o	o	o	o
6.	All employees performing manual lifting have received training on how to lift safely.	o	o	o	o

7.	Manual lifting control measures are evaluated during assessments.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
8.	Manual lifting incidents are reviewed as part of the HSE Program reviews.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
9.	Manual lifting incidents are reviewed as part of the HSE Program reviews.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>Office Environments (5.1.1)</b>		<u>Yes</u>	<u>No</u>	<u>N/A</u>	<u>N/O</u>
10.	Employees have received lifting training.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
11.	Mechanical devices are readily available to employees handling equipment or supplies weighing more than 40 pounds (18 kilograms).	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>Field Projects (5.1.2)</b>		<u>Yes</u>	<u>No</u>	<u>N/A</u>	<u>N/O</u>
12.	All manual lifting tasks or activities have been addressed in the written site safety plan.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
13.	Employees have received safe lifting training as required by the written site safety plan.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>Mechanical Lifting (5.2)</b>		<u>Yes</u>	<u>No</u>	<u>N/A</u>	<u>N/O</u>
14.	Hand trucks and trolleys are visually inspected before use.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
15.	Hand trucks and trolleys do not have any broken or damaged parts.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
16.	Hand truck and trolley paths are free of uneven surfaces, water, oil, or cracks and holes.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
17.	Loads carried by hand trucks are balanced and sturdy.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
18.	Hand trucks or dollies are being pushed when on level ground.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
19.	When going up or down a slope using a hand truck or trolley, the load is downslope of the person.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
20.	Employees using hand trucks or dollies are moving slowly and cautiously.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
21.	Employees using hand trucks or trolleys are able to see over the load.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>Assisted Lifting (5.3)</b>		<u>Yes</u>	<u>No</u>	<u>N/A</u>	<u>N/O</u>
22.	Personnel are not performing manual lifting beyond their physical capabilities.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
23.	Loads are evenly distributed when being handled by multiple people.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>Manual Lifting (5.4)</b>		<u>Yes</u>	<u>No</u>	<u>N/A</u>	<u>N/O</u>
24.	Before the lift, the load and path was assessed.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
25.	Loads being lifted are free of sharp edges, slivers, or wet or greasy spots.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
26.	Gloves are used for manual lifts of loads with sharp or splintered edges.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
27.	Employees performing manual lifts use the proper lifting techniques.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
28.	Special tools fabricated for lifting grates or manhole covers are used.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>





This checklist shall be used by CH2M HILL personnel **only** and shall be completed at the frequency specified in the project’s written safety plan.

This checklist is to be used when: 1) CH2M HILL staff are exposed to lockout/tagout hazards (complete Section 1), 2) CH2M HILL staff are self-performing lockout/tagout activities (completed Section 2), or 3) CH2M HILL provides oversight of subcontractor personnel who are performing lockout/tagout activities (complete Sections 1 and 2).

Safety Coordinator may consult with subcontractors when completing this checklist, but shall not direct the means and methods of lockout/tagout 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:	
<input type="checkbox"/> Evaluate CH2M HILL affected employee exposure to equipment during lockout/tagout	
<input type="checkbox"/> Evaluate CH2M HILL authorized employee exposure to equipment requiring lockout/tagout	
<input type="checkbox"/> Evaluate a CH2M HILL subcontractor’s compliance with lockout/tagout 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 HSE-33.

<u><b>SECTION 1</b></u>	<u><b>Yes</b></u>	<u><b>No</b></u>	<u><b>N/A</b></u>	<u><b>N/O</b></u>
<b>SAFE WORK PRACTICES (5.4)</b>				
1. Only trained and authorized personnel are performing lockout/tagout activities	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. All affected employees notified prior to lockout/tagout activities	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Equipment has been shutdown using normal operating controls	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Employees do not attempt to start, energize or use equipment that is locked out or tagged	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Employees do not remove locks or tags placed on equipment by other personnel	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Affected employees are notified after lockout/tagout is completed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Employees verify that all safe guards have been replaced prior to equipment start-up	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

<u>SECTION 2</u>	<u>Yes</u>	<u>No</u>	<u>N/A</u>	<u>N/O</u>
<b>GENERAL (5.5.1)</b>				
8. Only trained and authorized personnel are performing lockout/tagout activities	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. Daily safety briefing/meeting conducted with affected and authorized employees	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. Employees made aware of any equipment-specific lockout/tagout procedures	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11. Authorized employees provided with lockout devices, locks, tags and other isolation devices	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12. New or modified equipment designed to accept lockout devices	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>EQUIPMENT-SPECIFIC LOCKOUT/TAGOUT PROCEDURES (5.5.2)</b>				
13. LOTO procedures available when required to be documented	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14. Equipment-specific LOTO procedures developed when not available from the facility	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15. Affected employees notified that equipment will be shut down for LOTO	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
16. Energy sources, hazards, and control measures determined	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
17. Orderly shutdown of equipment is conducted that does not increase hazards	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
18. Energy isolating devices operated to isolate energy sources	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
19. Authorized employees apply personal lockout devices and tags to energy isolating device	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
20. Lockout devices are applied to secure equipment in the “off” position	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
21. Lockout tags applied to clearly indicate that operating the equipment is prohibited	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
22. Tags are located as close to or at the energy isolating device	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
23. All hazardous stored or residual energy is relieved, disconnected or restrained.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
24. Isolation of energy sources has been verified (tested) prior to of work on equipment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
25. Lockout tags are used alone only where lockout devices cannot be applied	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>LOCKOUT DEVICES AND TAGS (5.5.4)</b>				
26. Lockout devices and tags only used to isolate energy sources	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
27. Lockout devices and tags are standardized by color, shape, size, print, and format	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
28. Lockout devices and tags indicate identity of employee applying the devices	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
29. Lockout devices and tags capable of withstanding anticipated environmental conditions of use	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
30. Lockout devices are substantial enough to prevent removal without the use of excessive force	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
31. Tags and their means of attachment are substantial enough to prevent inadvertent removal	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
32. Tags are legible and understandable by all employees	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
33. Tags warn against hazardous conditions if equipment is energized	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>RELEASING LOTO CONTROL (5.5.5)</b>				
34. Work area inspected prior to removing LOTO devices and reenergization	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
35. LOTO devices only removed by authorized employees who applied the device	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
36. If employee not available to remove LOTO devices, steps in Section 4.2.4 of SOP followed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
37. All affected employees notified prior to starting equipment previously locked or tagged out	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>GROUP LOTO (5.5.6)</b>				
38. Group LOTO procedures followed when more than one employees is to work on equipment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
39. Primary authorized person assigned to coordinate LOTO process	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
40. Normal steps for initiating LOTO control completed as above	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
41. Primary authorized person applies own lockout device and tag	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
42. Each authorized person applies own lockout device and tag	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
43. Primary authorized person removes LOTO devices after all other LOTO devices are removed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>SPECIAL CONDITIONS (5.5.7)</b>				
44. Shift or personnel changes coordinated to ensure LOTO protection is always provided	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
45. Procedures followed when LOTO devices are temporarily removed to test or reposition	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**SECTION 3**

Complete this section for all items checked “No” in Sections 1 or 2. Deficient items must be corrected in a timely manner.

<b>Item #</b>	<b>Corrective Action Planned/Taken</b>	<b>Date Corrected</b>

Auditor: \_\_\_\_\_ Project Manager: \_\_\_\_\_

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Working Alone

CALL - IN CONTACT FORM

Date of site work: \_\_\_\_\_ Expected start time: \_\_\_\_\_

Name of CH2M HILL employee in the field: \_\_\_\_\_

Name of CH2M HILL employee responsible to receive contact:

Client Emergency Contact (if any):

CH2M HILL employee's contact numbers:

Radio # \_\_\_\_\_

Cell Phone # \_\_\_\_\_

Address and Location of work: \_\_\_\_\_

Directions/Map:

Planned Activity: \_\_\_\_\_

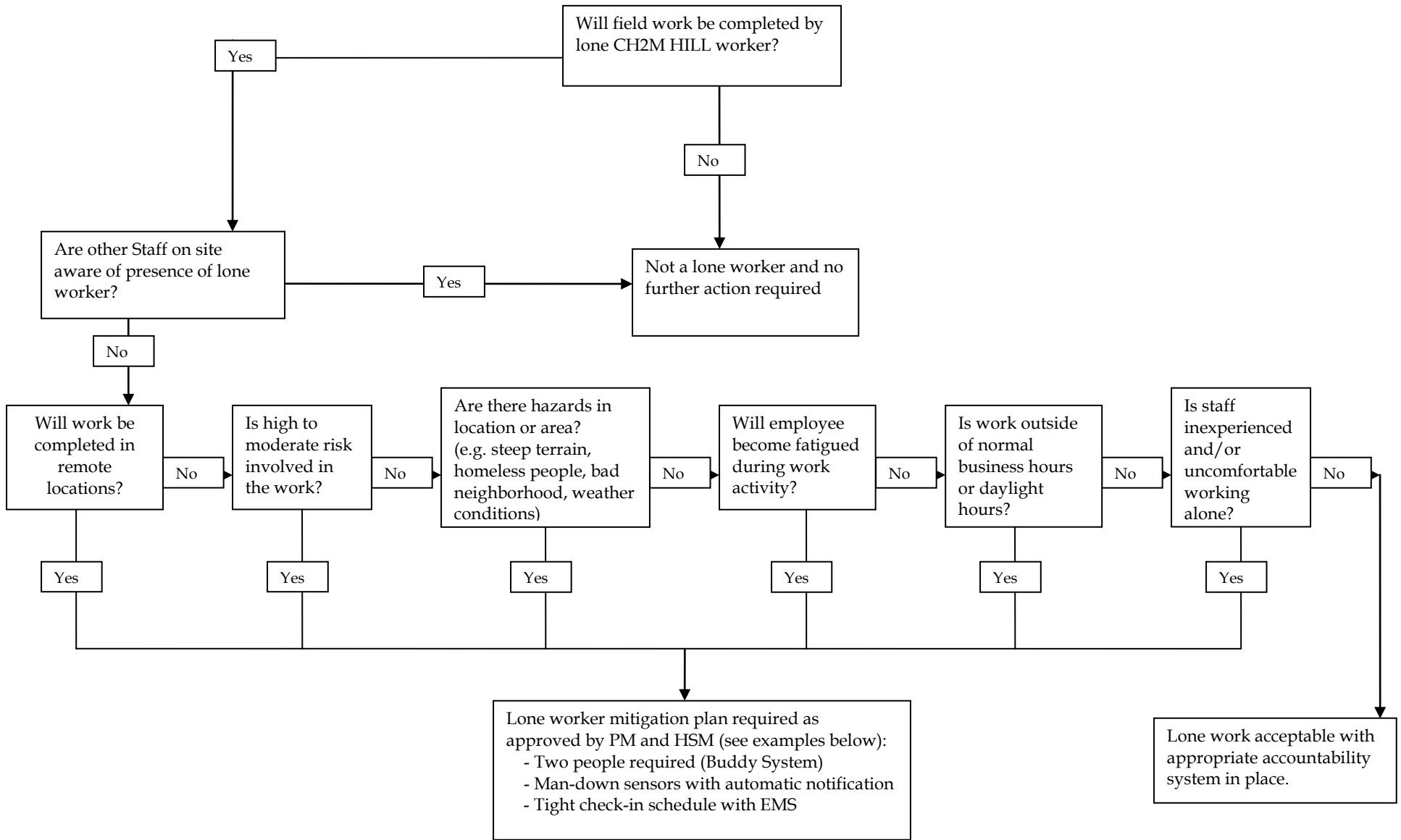
Specified Frequency and time for call in: \_\_\_\_\_

Time	Verified	Location

If lone worker fails to call in at specified frequency/time:

- 1) Call worker's radio and cell to determine if an emergency exists.
- 2) If no reply, immediately call Client security/emergency service if there is one at the site.
- 3) If there is no client security call Emergency Services (911). Inform the dispatcher there is a lone worker that cannot be contacted and there may be an emergency on site. Provide the lone worker's name, their last known location, and your contact information.
- 4) After Emergency Services have been contacted, call the other emergency contacts, Project Manager, and Health and Safety Manager.

# Working Alone Determination Flowchart



# CH2MHILL

## HS&E Self-Assessment Checklist: PPERSONAL PROTECTIVE EQUIPMENT

Page 1 of 3

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 CH2M HILL employees are required to wear PPE or are required to perform oversight of a subcontractor using PPE or both.

CH2M HILL staff shall not direct the means and methods of subcontractor use of PPE nor direct the details of corrective actions. The subcontractor must determine how to correct deficiencies and CH2M HILL staff must carefully rely on their expertise. Conditions considered to be imminently dangerous (possibility of serious injury or death) must be corrected immediately or all exposed personnel must be removed from the hazard until corrected.

Project Name: _____	Project No.: _____
_____	
Location: _____	PM: _____
_____	
Auditor: _____	Title: _____ Date: _____
_____	
This specific checklist has been completed to (check only one of the boxes below):	
<input type="checkbox"/> Evaluate CH2M HILL compliance with its PPE program (SOP HSE-117) <input type="checkbox"/> Evaluate a CH2M HILL subcontractor's compliance with its PPE program Subcontractor's Name: _____	
Check the appropriate box, as follows:	
<ul style="list-style-type: none"> <li>• Check "Yes" if an assessment item is complete or correct.</li> <li>• Check "No" if an item is incomplete or deficient. Section 2 must be completed for all items checked "No."</li> <li>• Check "N/A" if an item is not applicable.</li> <li>• Check "N/O" if an item is applicable but was not observed during the assessment.</li> </ul>	
Numbers in parentheses indicate where a description of this assessment item can be found in Standard of Practice HSE-121.	
<b>SECTION 1</b>	<b>Yes    No    N/A    N/O</b>
<b>GENERAL</b>	
1. Required PPE listed in HSP FSI or AHA.	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
2. PPE available for use by employees.	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
3. PPE cleaning supplies available for use.	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
4. PPE stored appropriately to prevent deformation or distortion.	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
5. PPE written certification has been completed.	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
<b>EYEWEAR (Glasses/Goggles/Face Shields)</b>	
6. Eyewear cleaning supplies available.	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
7. Safety glasses in good condition and lenses free of scratches.	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
8. Goggles adjustment strap not cracked or frayed, not deformed, or lenses not scratched.	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
9. Face shields in good condition, including adjustment band, and free of scratches or chips.	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>

**CH2MHILL**

**HS&E Self-Assessment Checklist: PERSONAL PROTECTIVE EQUIPMENT**

**SECTION 1 (Continued)**

**HEAD PROTECTION**

	<b>Yes</b>	<b>No</b>	<b>N/A</b>	<b>N/O</b>
10. Hard hat bill and suspension attached as allowed by manufacturer.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11. Shell is pliable, free of dents, cracks, nicks, or any damage due to impact.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12. Suspension maintained at 1.25 inches from inside of shell.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13. Suspension free of cuts or fraying, torn headband, adjustment strap workable.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14. Electrical hard hat matched to hazard classification.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15. Dated to determine whether within manufacturer's allowable 5-year use time period.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**HAND PROTECTION**

16. Available in sizes matched to employee.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
17. Gloves free of rips tears, abrasions, or holes.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
18. Matched to manufacturer's specification for chemicals used onsite.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
19. Electrical gloves matched to hazard and periodically inspected for insulating rating.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
20. Maintained in a clean and sanitary condition, decontaminated or disposed properly.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**BODY PROTECTION**

21. Available in sizes matched to employee.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
22. Maintained in a clean and sanitary condition, decontaminated or disposed properly.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
23. Vapor-tight fully encapsulated suits tested at required periodic intervals.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
24. Flame-resistant clothing matched to electrical hazard and arc flash rating.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
25. Welding gear matched to degree of hazard and free of cuts, tears or burn holes.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
26. Flotation gear available for work near or on water and in good condition.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**HOT AND COLD BODY PROTECTION**

27. Cooling gear available based on degree of heat stress hazard.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
28. Cooling gear in operable, clean, and sanitary condition.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
29. Cold-weather gear provided based on needs assessment.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
30. Cold-weather gear available in sizes to match employees.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
31. Cold-weather gear is in free of tears, rips, or holes and in maintained in a clean condition.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**TRAINING**

32. Initial PPE training completed by employees.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
33. Training conducted when new types or styles of PPE are issued.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
34. PPE selection, use, and maintenance reviewed at daily safety briefings.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>





# CH2MHILL

## Respiratory Protection

### Standard Operating Procedure HSEQ-121

#### H&S Self-Assessment Checklist: RESPIRATORY PROTECTION

This checklist is provided as a method of verifying compliance with the OSHA respiratory protection standard. It shall be used at locations where CH2M HILL personnel are using respiratory protection, or as a tool to assess subcontractors when CH2M HILL is required to perform oversight of a subcontractor using respiratory protection.

CH2M HILL staff shall not direct the means and methods of subcontractor use of respiratory protection nor direct the details of corrective actions. The subcontractor must determine how to correct deficiencies and CH2M HILL staff must carefully rely on their expertise. Items considered to be imminently dangerous (i.e., possibility of serious injury or death) must be corrected immediately or all exposed personnel must be removed from the hazard until corrected.

Completed checklists must be sent to the Responsible Health and Safety Manager (RHSM) for review.

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

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

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

This specific checklist has been completed to (check only one of the boxes below):

- Evaluate CH2M HILL compliance with its respiratory protection program (SOP HSEQ-121)
- Evaluate a CH2M HILL subcontractor's respiratory protection program  
Subcontractor's Name: \_\_\_\_\_

Check the appropriate box, as follows:

- Check "Yes" if an assessment item is complete or correct.
- Check "No" if an item is incomplete or deficient. Section 2 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-121.

#### SECTION 1

Yes No N/A N/O

#### **TRAINING (6.0)**

- |  |                          |                          |                          |                          |
|--|--------------------------|--------------------------|--------------------------|--------------------------|
| 1. Respirator users have completed appropriate training on the respirator to be used.  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2. Training is current within the past 12 months.                                      | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3. Attachment 1 of SOP HSE-121 distributed to employees using respirators voluntarily. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

#### **MEDICAL EVALUATION (5.2)**

- |   |                          |                          |                          |                          |
|---|--------------------------|--------------------------|--------------------------|--------------------------|
| 4. Respirator users completed medical evaluation protocol.                                  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 5. Respirator use does not exceed any physician's written recommendation limitations.       | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 6. Respirator users know to report any medical signs or symptoms related to respirator use. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

#### **FIT TESTING (5.3)**

- |   |                          |                          |                          |                          |
|---|--------------------------|--------------------------|--------------------------|--------------------------|
| 7. Respirator users of tight-fitting facepieces have passed a fit test.                       | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 8. Fit test is current within the past 12 months.   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 9. Respirator users know to have new fit test performed if any change affects respirator fit. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

<u>SECTION 1 (Continued)</u>	<u>Yes</u>	<u>No</u>	<u>N/A</u>	<u>N/O</u>
<b>RESPIRATOR SELECTION (5.4)</b>				
10. All feasible engineering controls have been considered in reducing exposure levels.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11. Appropriate respiratory protection and limitations are specified in HSP/FSI.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12. Cartridge or canister change-out schedule is specified in HSP/FSI.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>RESPIRATOR USE (5.5)</b>				
13. Respirator uses are limited to those specified in HSP/FSI.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14. HSM notified of changes in site conditions that may alter effectiveness of specified respirators.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15. Respirator users of tight-fitting facepieces are cleanly shaven.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
16. Respirator users of tight-fitting facepieces perform user seal check before each use.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
17. Cartridges or canisters replaced according to change-out schedule in HSP/FSI.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
18. Respirator users informed to report any gas or vapor breakthrough to SSC/RHSM.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
19. SC reports any gas or vapor breakthrough to RHSM.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
20. Personnel not entering IDLH areas until standby-person established with appropriate equipment.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>RESPIRATOR INSPECTION (5.6)</b>				
21. Respirators in regular use are inspected before each use and during cleaning.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
21. Emergency response respirators are inspected and documented monthly.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
22. Defective respirators are taken out of service or repaired.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>RESPIRATOR CLEANING AND DISINFECTING (5.7)</b>				
23. Respirators in regular use are cleaned and disinfected as necessary.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
24. Emergency and transferred respirators are cleaned and disinfected after use.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>RESPIRATOR STORAGE (5.8)</b>				
25. Respirators are properly stored to prevent contamination and deformation.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
26. Emergency respirators are accessible and clearly marked as emergency respirators.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>RESPIRATOR REPAIRS (5.9)</b>				
27. Respirator repair is limited to routine maintenance.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
28. Respirators beyond routine repair are removed from service.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>BREATHING AIR SUPPLIED BY CYLINDER (5.10.1)</b>				
29. Cylinders are marked with NIOSH-approval label.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
30. Certificate of analysis meets Grade D specifications.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
31. Certificate of analysis is kept onsite.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>BREATHING AIR SUPPLIED BY COMPRESSOR (5.10.2)</b>				
32. Breathing air meets Grade D specifications.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
33. Compressor intake is located away from exhaust gases.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
34. Compressor is provided with sorbent filters.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
35. Sorbent filter change-out documentation is kept on the compressor.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
36. High-temperature or carbon monoxide alarm provided on oil-lubricated compressors.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
37. If high-temperature alarm is used alone, carbon monoxide levels are monitored.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
38. Practical measures taken to control carbon monoxide levels on non oil-lubricated compressors.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>







This checklist shall be used by CH2M HILLCH2M 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 HILLCH2M HILL employees are exposed to rigging hazards (complete Section 1) and/or (2) CH2M HILLCH2M HILL provides oversight of subcontractor personnel who are exposed to hoist hazards (complete entire checklist).

SC 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.

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

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

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

This specific checklist has been completed to:

Evaluate CH2M HILLCH2M HILL employee exposure to crane, hoist and rigging hazards

Evaluate a CH2M HILLCH2M 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 HSE-303.

**SECTION 1**

	<u>Yes</u>	<u>No</u>	<u>N/A</u>	<u>N/O</u>
<b>SAFE WORK PRACTICES (5.1)</b>				
1. All rigging used as intended, inspected, stored, protected and supervised.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. 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>RIGGING: GENERAL (5.2.1)</b>				
3. 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"/>
4. 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"/>
5. 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"/>
6. 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"/>
7. Rigging equipment, when not in use, is removed from the work area	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. 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"/>
9. 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"/>
10. 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"/>

**SECTION 2 (continued)**

**RIGGING: EQUIPMENT (5.2.2)**

- |   |                          |                          |                          |                          |
|---|--------------------------|--------------------------|--------------------------|--------------------------|
| 11. Protruding end strands of wire rope have been covered or blunted                            | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 12. 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"/> |
| 13. No wire rope slings is 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"/> |
| 14. 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"/> |
| 15. Synthetic web slings removed from service if showing any sign of damage                     | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 16. 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"/> |
| 17. Alloy steel chains have identification stating size, grade, rated capacity and reach        | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 18. 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"/> |
| 19. 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"/> |

**RIGGING: USE (5.2.3)**

- |  |                          |                          |                          |                          |
|--|--------------------------|--------------------------|--------------------------|--------------------------|
| 20. Rigging not pulled from under a resting load   |                          |                          |                          |                          |
| 21. Sling(s) is placed in center bowl of hook.   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 22. 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"/> |
| 23. 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"/> |
| 24. Natural or synthetic fiber rope slings used within acceptable operating temperature  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 25. 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"/> |
| 26. 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"/> |
| 27. 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"/> |





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 using stairways and ladders and/or (2) CH2M HILL provides oversight of subcontractor personnel who are using stairways and ladders.

SC may consult with subcontractors when completing this checklist, but shall not direct the means and methods of stairway and ladder 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 use of stairways and ladders  
 Evaluate a CH2M HILL subcontractor’s compliance with stairway and ladder 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 HSE-214.

<u><b>SECTION 1</b></u>		<u><b>Yes</b></u>	<u><b>No</b></u>	<u><b>N/A</b></u>	<u><b>N/O</b></u>
<b>PERSONNEL SAFE WORK PRACTICES (3.1)</b>					
1.	CH2M HILL employees have completed stairway and ladder training	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.	Carrying objects on stairs with both hands is avoided	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.	Pan and skeleton metal stairs not used until permanent or temporary treads/landings provided	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.	Ladders periodically inspected for defects by competent person	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5.	Defective ladders tagged and removed from service until repaired	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6.	Ladders used only for purpose for which they were designed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7.	Ladders not loaded beyond their rated capacity	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8.	Only one person simultaneously climbing or working from an individual ladder	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9.	Personnel face ladder when climbing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10.	Personnel climbing ladders maintain 3 points of contact with ladder	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11.	Personnel not carrying tools, materials, or equipment while climbing. Tag lines used.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12.	Ladders not moved, shifted or extended while in use	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13.	Stepladders used in open and locked position only	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14.	Stepladders top and top step not used as a step	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15.	Stepladders cross-bracing not used for climbing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
16.	Fall protection considered when working from ladders over 6’	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

<u>SECTION 2</u>	<u>Yes</u>	<u>No</u>	<u>N/A</u>	<u>N/O</u>
<b>STAIRWAYS AND LADDERS: GENERAL (3.2.1)</b>				
17. Stairways or ladders provided at breaks in elevation ≥ 19 inches	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
18. At least one clear access point provided to elevated levels	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>STAIRWAY: DESIGN AND CONSTRUCTION (3.2.2)</b>				
19. Stairways maintained free of slippery conditions and dangerous projections	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
20. Stairways installed between 30 - 50 degrees with uniform risers and treads	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
21. Landings (30" deep x 22" wide) provided every 12' of vertical rise.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
22. Landings extend ≥ 20" beyond swing of any doors	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
23. Adequate stair rails installed at each unprotected side or edge	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
24. Handrails installed as handhold for support	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
25. Mid-rails, screens, mesh, or intermediate members installed between top rail and treads	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
26. Adequate guardrails installed at each unprotected side or edge of a landing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>LADDERS: GENERAL (3.2.3)</b>				
27. Ladder components surfaced to prevent injury from puncture, laceration, or snagging clothing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
28. Ladders maintained free of oil, grease, and other slipping hazards	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
29. The area around the top and bottom of ladders kept free of obstructions	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>PORTABLE LADDERS: DESIGN AND CONSTRUCTION (3.2.4)</b>				
30. Only ANSI approved portable ladders used	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
31. Rungs and steps are parallel, level, and uniformly spaced	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
32. Ladders not tied or fastened together to create longer sections unless designed for such use	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
33. Ladders with non-conductive side rails used near energized electrical equipment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
34. Extension ladders equipped with positive section stops	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
35. Stepladders provided with metal spreader or locking device to hold open when in use	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
36. Wood ladders not coated with opaque covering	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
37. Double-cleated or two ladders provided if > 25 personnel use ladders as only means of access, or when ladder serves simultaneous two-way traffic	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
38. Two or more ladders used to reach elevated work areas offset with platform or landing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>PORTABLE LADDER: POSITIONING (3.2.5)</b>				
39. Ladders used only on stable, level, surfaces unless secured to prevent movement	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
40. Ladders placed in areas where they can be displaced by work activities, secured or barricaded	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
41. Extension ladder section overlap adequate distance	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
42. Extension and straight ladders placed with both side rails supported equally	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
43. Extension and straight ladders positioned at approximately 75 degree angle	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
44. Ladders extend 3' above upper landings or are secured at top	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>FIXED LADDERS: DESIGN AND CONSTRUCTION (3.2.6)</b>				
45. Adequate clearances from obstructions maintained behind, in front, and to side of ladder rungs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
46. Ladder step across distance at access point 7-12"	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
47. Side rails extend 42" above landing platform	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
48. Cages, wells, ladder safety devices, or self-retracting lifelines used for ladders > 24'	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
49. Ladder safety devices operate without the use of hands	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
50. Ladder safety devices activate within 2' after a fall	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
51. Connection between lifeline and harness attachment point ≤ 9"	<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 traffic hazards and/or (2) CH2M HILL provides oversight of subcontractor personnel who are exposed to traffic hazards.

SC may consult with subcontractors when completing this checklist, but shall not direct the means and methods of traffic control 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 traffic hazards.

Evaluate a CH2M HILL subcontractor's compliance with traffic control 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 HSE-216.

<u><b>SECTION 1</b></u>		<u>Yes</u>	<u>No</u>	<u>N/A</u>	<u>N/O</u>
<b>SAFE WORK PRACTICES (3.1)</b>					
1.	Personnel working on/adjacent to active roadways or in control zones are wearing safety vests.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.	Traffic control plan (TCP) is consistent with roadway, traffic, and working conditions.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.	TCP has been approved by regulatory or contractual authority prior to work.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.	TCP considers all factors that may influence traffic related hazards and controls.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5.	Work areas are protected by rigid barriers.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6.	Lookouts are used when applicable.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7.	Vehicles are parked 40 feet away from work zone or are equipped with hazard beacon/strobe.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8.	TMCC or TMA vehicle is used where appropriate.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9.	All CH2M HILL traffic control devices conform to MUTCD standards.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10.	Traffic control devices are inspected continuously.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11.	Flagging is only used when other means of traffic control are inadequate.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12.	Additional traffic control zone controls have been implemented.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13.	Cranes do not swing loads/booms over nor do workers enter/cross live roadways (as defined).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

<u>SECTION 2</u>	<u>Yes</u>	<u>No</u>	<u>N/A</u>	<u>N/O</u>
<b>GENERAL (3.2.1)</b>				
14. Lane closings are performed when required by this SOP.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15. Traffic control configurations are based on an engineering study of the location.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
16. If no study, traffic control is performed with approval of the authority having jurisdiction.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
17. TCP has been prepared and understood by all responsible parties prior to work.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
18. Special preparation/coordination with external parties has been conducted where applicable.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
19. All contractor traffic control devices conform to MUTCD standards.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
20. Traffic movement and flow are inhibited or disrupted as little as possible.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
21. Supplemental equipment and activities do not interfere with traffic.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
22. Drivers and pedestrians are considered when entering and traversing traffic control zone.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>TRAFFIC CONTROL ZONES (3.2.2)</b>				
23. Traffic control zones are divided into the necessary five areas.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
24. Advances warning area is designed based on conditions of speed, roadways, and driver needs.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
25. Advanced warning signage is spaced according to roadway type and conditions.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
26. Transition areas are used to channelize traffic around the work area.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
27. Buffer areas are used to provide a margin of safety for traffic and workers.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
28. The buffer area is free of equipment, workers, materials, and worker vehicles.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
29. The length of the buffer area is two times the posted speed limit in feet.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
30. All work is contained in the work area and is closed to all traffic.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
31. A termination area is used to provide traffic to return to normal lanes.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
32. A downstream taper is installed in the termination area.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>DEVICE INSTALLATION AND REMOVAL (3.2.3)</b>				
33. All vehicles involved with device installation/removal have hazard beacons/strobes.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
34. Devices are installed according to the order established by this SOP.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
35. Devices are removed in the opposite order of installation.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
36. Tapers are used to move traffic out of its normal path.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
37. Tapers are created using channelizing devices.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
38. The length of taper is determined by posted speed and width of lane to be closed (see formula).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
39. Local police or highway patrol assist during taper installation and removal.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
40. TMCC/ TMA vehicles are used to protect personnel during installation and removal of devices.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
41. Cone trucks are equipped with platforms and railings.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
42. Cones are the appropriate height for the specific roadway and are reflectorized.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
43. Temporary sign supports are secured using sandbags to prevent movement.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
44. Arrow panels are used on lane closures where required.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
45. Concrete barriers are used where required.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
46. Barrels, crash cushions, or energy absorbing terminals are used to protect traffic as required.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
47. Changeable message signs (CMS) are used as required.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
48. CMS are not used to replace required signage.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
49. No more than two message panels are used in any message cycle on CMS.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>FLAGGING (3.2.4)</b>				
50. Flagging is used only when other traffic control methods are inadequate.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
51. Only approved personnel with current certification are allowed to be used as flaggers.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
52. Flaggers are located off the traveled portion of the roadway.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
53. A communication system is established when more than one flagger is used.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
54. Hand signaling by flaggers is by means of red flags, sign paddles, or red lights.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
55. Flaggers are alert, positioned close enough to warn work crews, and easily identified from crew.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
56. An escape plan is established by crew and flaggers prior to traffic control set up.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
57. Signs indicating a flagger is present are used and removed as required.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

<u>SECTION 2</u>	<u>Yes</u>	<u>No</u>	<u>N/A</u>	<u>N/O</u>
<b>INSPECTION AND MAINTENANCE (3.2.5)</b>				
58. Traffic control zones are monitored to determine their effectiveness under varying conditions.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
59. Traffic control devices are inspected at the beginning and continuously during work shift.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
60. Traffic control devices are restored to their proper position immediately and continuously.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
61. Damaged, old, or ineffective devices are removed and replaced immediately and continuously.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
62. Devices using reflected light for illumination are cleaned and monitored continuously.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>





# **CH2M HILL Health and Safety Plan**

## **Attachment 5**

### **Key Target Zero Program Elements**

**(blank forms for field use)**

**Activity Hazard Analysis**

**Pre-Task Safety Plans**

**Quality Brief**

**Safe Behavior Observation**

**Incident Report and Investigation**

**(use electronic form when possible)**

[HITS](#)

**Lessons Learned Template**

## ACTIVITY HAZARD ANALYSIS

<b>Activity:</b>	<b>Date:</b>
<b>Description of the work:</b>	<b>Project Name:</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)

## ACTIVITY HAZARD ANALYSIS

Work Activity Sequence (Identify the principal steps involved and the sequence of work activities)	Potential Health and Safety Hazards (Analyze each principal step for potential hazards)	Hazard Controls (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)

**ACTIVITY HAZARD ANALYSIS**

PRINT NAME

SIGNATURE

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

\_\_\_\_\_

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

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

\_\_\_\_\_

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

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

\_\_\_\_\_

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

\_\_\_\_\_

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

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

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

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

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

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

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

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\_\_\_\_\_

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

**Pre-Task Safety Plan (PTSP) and Safety Meeting Sign-in Sheet**

Project: \_\_\_\_\_ Location: \_\_\_\_\_ Date: \_\_\_\_\_  
Supervisor: \_\_\_\_\_ Job Activity: \_\_\_\_\_  
\_\_\_\_\_

Attendees:	Print Name	Sign Name
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

List Tasks and verify that applicable AHAs have been reviewed:  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Tools/Equipment Required for Tasks (ladders, scaffolds, fall protection, cranes/rigging, heavy equipment, power tools):  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

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 feet	<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
<input type="checkbox"/> Underground Utilities	<input type="checkbox"/> Security	<input type="checkbox"/> Poor communications

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 <input type="checkbox"/> Hard Hat <input type="checkbox"/> Safety-Toed Boots	<b>Protective Systems</b> <input type="checkbox"/> Sloping <input type="checkbox"/> Shoring <input type="checkbox"/> Trench box <input type="checkbox"/> Barricades <input type="checkbox"/> Competent person <input type="checkbox"/> Locate buried utilities <input type="checkbox"/> Daily inspections <input type="checkbox"/> Entry Permits/notification	<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	<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"/> Overhead line clearance <input type="checkbox"/> Underground utils ID'd
<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"/> No visible dust <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 with 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	<b>Medical/ER</b> <input type="checkbox"/> First-aid kit <input type="checkbox"/> Eye wash <input type="checkbox"/> FA-CPR trained personnel <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 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	<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"/> Drill rigs/geoprobe rigs <input type="checkbox"/> Cranes and rigging <input type="checkbox"/> Utilities marked	<b>Training:</b> <input type="checkbox"/> Hazwaste (current) <input type="checkbox"/> Construction <input type="checkbox"/> Competent person <input type="checkbox"/> Task-specific <input type="checkbox"/> FA/CPR <input type="checkbox"/> Confined Space <input type="checkbox"/> Hazcom
<b>Underground Utilities</b> <input type="checkbox"/> Dig alert called <input type="checkbox"/> 3 <sup>rd</sup> Party locater <input type="checkbox"/> As-builts reviewed <input type="checkbox"/> Interview site staff <input type="checkbox"/> Client review <input type="checkbox"/> soft locate necessary?	<b>Incident Communications</b> <input type="checkbox"/> Work stops until cleared by TM/CM <input type="checkbox"/> Immediate calls to TM/CM <input type="checkbox"/> Client notification <input type="checkbox"/> 24 hour notification setup <input type="checkbox"/> Clear communications	<b>AHA' s</b> <input type="checkbox"/> reviewed and approved by HSM <input type="checkbox"/> on site and current <input type="checkbox"/> applicable for this day's work <input type="checkbox"/> Communication and incident processes included?	
<b>Field Notes (including observations from prior day, etc.):</b> <hr/> <hr/> <hr/>			

Name (Print): \_\_\_\_\_

Signature: \_\_\_\_\_

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

# VELSICOL QUALITY BRIEFING

Project Number: \_\_\_\_\_ Location: \_\_\_\_\_ Date: \_\_\_\_\_  
Project Manager: \_\_\_\_\_ Field Quality Manager: \_\_\_\_\_  
Job Activity: \_\_\_\_\_

Onsite Personnel:

Quality Briefing Summary:

Quality Lessons Learned (as applicable):

Documentation Required for Today's Onsite Activities – Verify that documentation is available onsite and properly filled out		
<input type="checkbox"/> Pre-Task Safety Plan (PTSP)	<input type="checkbox"/> Daily Report	<input type="checkbox"/> Site- and Task-Specific Documentation (describe below as necessary for project work)
<input type="checkbox"/> Self-Assessment Checklists (specify): _____ _____	<input type="checkbox"/> Work Plan	
<input type="checkbox"/> Field Logbook Entry	<input type="checkbox"/> Project Instructions	
<input type="checkbox"/> Safe Behavior Observation	<input type="checkbox"/> Site Management Plan	
<input type="checkbox"/> Daily Inspection Form <input type="checkbox"/> Weekly Data Sheet <input type="checkbox"/> Site Inspection Form <input type="checkbox"/> Sample Processing Log <input type="checkbox"/> Shoreline Inspection Form <input type="checkbox"/> Other: _____	<input type="checkbox"/> Quality Management Plan <input type="checkbox"/> CQMP <input type="checkbox"/> PQMP <input type="checkbox"/> DQMP <input type="checkbox"/> Other: _____	
<input type="checkbox"/> Daily Briefing Form	<input type="checkbox"/> Health & Safety Plan	
<input type="checkbox"/> Photographs/Photograph Log	<input type="checkbox"/> QAPP	
<input type="checkbox"/> HSSE Management Inspection	<input type="checkbox"/> Field Sampling Plan	
<input type="checkbox"/> Sample Management Documentation <input type="checkbox"/> Excel Tracking Tool <input type="checkbox"/> Scribe Database <input type="checkbox"/> Other: _____	<input type="checkbox"/> Environmental Management Plan	
Other Potential Quality Issues (Describe): _____ _____ _____ _____ _____ _____ _____ _____ _____ _____ _____ _____ _____ _____ _____		

Preparer's Name (Print): \_\_\_\_\_

Preparer's Signature: \_\_\_\_\_

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

Field Quality Manager Name (Print): \_\_\_\_\_

Field Quality Manager Signature: \_\_\_\_\_

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



<b>Safe Behavior Observation Form</b>			
<input type="checkbox"/> Federal <input type="checkbox"/> Commercial    (check one)		<input type="checkbox"/> Construction or <input type="checkbox"/> Consulting (check one)	
<input type="checkbox"/> International			
Project Number (required):		Client/Program:	
Project Name:		Observer:	Date:
Position/Title of worker observed:		Background Information/ comments:	
Task/Observation Observed: _____			
<ul style="list-style-type: none"> <li>❖ Identify and reinforce safe work practices/behaviors</li> <li>❖ Identify and improve on at-risk practices/acts</li> <li>❖ Identify and improve on practices, conditions, controls, and compliance that eliminate or reduce hazards</li> <li>❖ Proactive PM support facilitates eliminating/reducing hazards (do you have what you need?)</li> <li>❖ Positive, corrective, cooperative, collaborative feedback/recommendations</li> </ul>			
Actions & Behaviors	Safe	At-Risk	Observations/Comments
Current & accurate Pre-Task Planning/Briefing (Project safety plan, STAC, AHA, PTSP, tailgate briefing, etc., as needed)			<b>Positive Observations/Safe Work Practices:</b>
Properly trained/qualified/experienced			
Tools/equipment available and adequate			
Proper use of tools			<b>Questionable Activity/Unsafe Condition Observed:</b>
Barricades/work zone control			
Housekeeping			
Communication			
Work Approach/Habits			
Attitude			
Focus/attentiveness			<b>Observer's Corrective Actions/Comments:</b>
Pace			
Uncomfortable/unsafe position			
Inconvenient/unsafe location			
Position/Line of fire			<b>Observed Worker's Corrective Actions/Comments:</b>
Apparel (hair, loose clothing, jewelry)			
Repetitive motion			
Other...			

For ES Federal Sector projects please email completed forms to: [CH2M HILL ES FED Safe Behavior Observation](mailto:CH2MHILL.ES.FED.Safe.Behavior.Observation@ch2m.com)  
 For ES Commercial Sector projects please email completed forms to: [CH2M HILL ES COM Safe Behavior Observation](mailto:CH2MHILL.ES.COM.Safe.Behavior.Observation@ch2m.com)  
 For CNR ES staff please email completed forms to: [cnressafe@ch2m.com](mailto:cnressafe@ch2m.com)  
 For International ES projects please e-mail completed forms to: [ESINTLSafeBehaviorObservation@ch2m.com](mailto:ESINTLSafeBehaviorObservation@ch2m.com)

# HITS Incident Report Hardcopy (Phase 1 – Initial Entry)

## Phase 1 – Initial Entry

### Type of Incident (May select more than one)

- |  |   |                                    |
|--|---|------------------------------------|
| <input type="checkbox"/> Injury/Illness  | <input type="checkbox"/> Spill/Release      | <input type="checkbox"/> Near Miss |
| <input type="checkbox"/> Property Damage | <input type="checkbox"/> Environment/Permit | <input type="checkbox"/> Other     |

### General Information Section

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

Date of Incident: \_\_\_\_\_ Time of Incident: \_\_\_\_\_ AM / PM

What Business Group is accountable for this incident: \_\_\_\_\_

What Business Group SubGroup is accountable for this incident: \_\_\_\_\_

What CH2M HILL Company is accountable for this incident: \_\_\_\_\_

#### Where did the Incident occur?

- United States, Geographic Region: \_\_\_\_\_
- Canada, Province/Territory: \_\_\_\_\_
- International, County: \_\_\_\_\_

### Location of Incident?

- Company Premises, CH2M HILL Office (use 3 letter office code if available): \_\_\_\_\_
- Project, Project name: \_\_\_\_\_
- In Transit
- Traveling from: \_\_\_\_\_
- Traveling to: \_\_\_\_\_
- At Home
- Other, Specify: \_\_\_\_\_

Describe the incident: \_\_\_\_\_

Describe how this event could have been prevented: \_\_\_\_\_

#### Provide Witness Information:

Name: _____	Phone: _____
Name: _____	Phone: _____
Name: _____	Phone: _____

#### Personnel Notified of Incident (Provide name, date and time):

CH2M HILL Personnel:

Client Personnel:

#### Additional Comments:

### Injury/Illness Section [Complete only if Injury/Illness Incident type selected]

#### Who was injured?

- CH2M HILL Employee or CH2M HILL Temp Employee
- Subcontractor to CH2M HILL (Non-LLC Joint Venture Project)
- LLC Joint Venture Partner Employee
- LLC Joint Venture Project Subcontractor/Contractor
- Other

Name of Injured: \_\_\_\_\_ Job Title: \_\_\_\_\_

Employer Name: \_\_\_\_\_ Supervisor of Employee: \_\_\_\_\_

#### Complete for CH2M HILL Employee Injuries

Business Group of Injured Employee: \_\_\_\_\_

#### Has the employee called the Injury Management Administrator (1-866-893-2514)?

Yes  No  Not Sure

#### Has the injured employee's supervisor been notified of this incident?

Yes  No  Not Sure

**Complete for Non-CH2M HILL Employee Injuries**

Has the project safety coordinator been notified of this incident?

Yes  No  Not Sure

Project Safety Coordinator: \_\_\_\_\_

Body Part Affected: \_\_\_\_\_

Injury/Illness (Result): \_\_\_\_\_

Describe treatment provided (if medication provided, identify whether over-the-counter or prescription): \_\_\_\_\_

Describe any work restriction prescribed (include dates and number of days): \_\_\_\_\_

**Physician/Health Care Provider Information**

Name: \_\_\_\_\_ Phone: \_\_\_\_\_

Was treatment provided away from the worksite?

No  
 Yes

Facility Name: \_\_\_\_\_

Address: \_\_\_\_\_

City: \_\_\_\_\_ Phone Number: \_\_\_\_\_

Was injured treated in an emergency room?

No  Yes

Was injured hospitalized overnight as an in-patient?

No  Yes

**General Information Environmental Section [Complete only if Environment/Permit or Spill/Release Incident type selected]**

Who had control of the area during the incident?

- CH2M HILL, Company: \_\_\_\_\_
- Subcontractor, Company: \_\_\_\_\_
- Joint Venture Partner/Contractor/Subcontractor, Company: \_\_\_\_\_
- Other, Company: \_\_\_\_\_  
Relationship to CH2M HILL: \_\_\_\_\_

**Property Damage Section [Complete only if Property Damage Incident type selected]**

Property Damaged: \_\_\_\_\_

Property Owner: \_\_\_\_\_

Damage Description: \_\_\_\_\_

Estimated US Dollar Amount: \_\_\_\_\_

**Spill or Release Section [Complete only if Spill/Release Incident type selected]**

Substance: \_\_\_\_\_

Estimated Quantity: \_\_\_\_\_

Did the spill/release move off the property?: \_\_\_\_\_

Spill/Release From: \_\_\_\_\_

Spill/Release To: \_\_\_\_\_

**Environment/Permit Section [Complete only if Environment/Permit Incident type selected]**

Describe Environmental or Permit Issue: \_\_\_\_\_

Permit Type: \_\_\_\_\_

Permitted Level or Criteria (e.g., discharge limit): \_\_\_\_\_

Permit Name and Number (e.g., NPDES No. ST1234): \_\_\_\_\_

Substance and Estimated Quantity: \_\_\_\_\_

Duration of Permit Exceedence: \_\_\_\_\_



# Lessons Learned

[Date] ESBG LL-11-xx

<b>Subject</b>	[Insert Descriptive Name of Lessons Learned]
<b>CH2M HILL Project?</b>	[Yes or No]
<b>Situation</b>	[Describe incident or situation that occurred in general terms. Try to be brief and avoid unnecessary details such as names of people or projects, business groups, divisions, dates, location, etc.]
<b>Lessons Learned (Recommendations and Comments)</b>	<ul style="list-style-type: none"><li>• Bullet out any lessons learned, recommendations or other important “take away” information that would benefit others. Tie the recommendations to the incident or event, and avoid including information that is not directly tied to the event.</li></ul>
<b>Submitted By</b>	[Name/Office Location/Phone]
<b>Additional Information Contact</b>	[Name/Office Location/Phone]
<b>Keywords/Categories</b>	[Insert any keywords or incident categories that would aid in a search for this lessons learned]

Send completed Lessons Learned to the ESBG HSSE Director for posting and distribution. Please include a recommended distribution list.

**CH2M HILL Health and Safety Plan**  
**Attachment 6**

**Fact Sheets**  
**Tick Fact Sheet**  
**Vehicle Accident Guidance**  
**Working Alone**

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## Tick-Borne Pathogens — A Fact Sheet

Most of us have heard of Lyme disease or Rocky Mountain Spotted Fever (RMSF), but there are actually six notifiable tick-borne pathogens that present a significant field hazard. In some areas, these account for more than half of our serious field incidents. The following procedures should be applied during any field activity—even in places that are predominantly paved with bordering vegetation.

### Hazard Recognition

An important step in controlling tick related hazards is understanding how to identify ticks, their habitats, their geographical locations, and signs and symptoms of tick-borne illnesses.

### Tick Identification

There are five varieties of hard-bodied ticks that have been associated with tick-borne pathogens. These include:

- Deer (Black Legged) Tick (eastern and pacific varieties)
- Lone Star Tick
- Dog Tick
- Rocky Mountain Wood Tick

These varieties and their geographical locations are illustrated on the following page.

### Tick Habitat

In eastern states, ticks are associated with deciduous forest and habitat containing leaf litter. Leaf litter provides a moist cover from wind, snow, and other elements. In the north-central states, is generally found in heavily wooded areas often surrounded by broad tracts of land cleared for agriculture.

On the Pacific Coast, the bacteria are transmitted to humans by the western black-legged (deer) tick and habitats are more diverse. For this region, ticks have been found in habitats with forest, north coastal scrub, high brush, and open grasslands. Coastal tick populations thrive in areas of high rainfall, but ticks are also found at inland locations.

### Illnesses and Signs & Symptoms

There are six notifiable tick-borne pathogens that cause human illness in the United States. These pathogens may be transmitted during a tick bite—normally hours after attachment. The illnesses, presented in approximate order of most common to least, include:

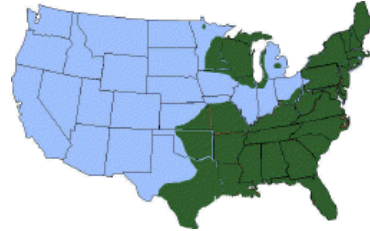
- Lyme (bacteria)
- RMSF (bacteria)
- Ehrlichiosis (bacteria)
- STARI (Southern Tick-Associated Rash Illness) (bacteria)
- Tularemia (Rabbit Fever) (bacteria)
- Babesia (protozoan parasite)

Symptoms will vary based on the illness, and may develop in infected individuals typically between 3 and 30 days after transmission. Some infected individuals will not become ill or may develop only mild symptoms. These illnesses present with some or all of the following signs & symptoms: fever, headache, muscle aches, stiff neck,

joint aches, nausea, vomiting, abdominal pain, diarrhea, malaise, weakness, small solid, ring-like, or spotted rashes. The bite site may be red, swollen, or develop ulceration or lesions. For Lyme disease, the bite area will sometimes resemble a target pattern. A variety of long-term symptoms may result if the illness is left untreated, including debilitating effects and death.



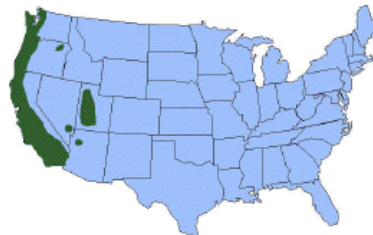
Deer Tick



Distribution of Deer Tick (dark green)



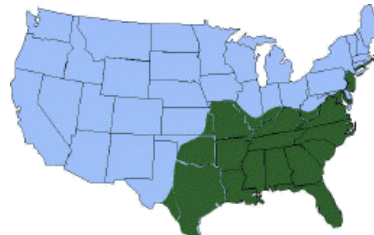
From Left: adult female, adult male, nymph, and larva Deer Tick (cm scale)



Distribution of Pacific Deer Tick (dark green)



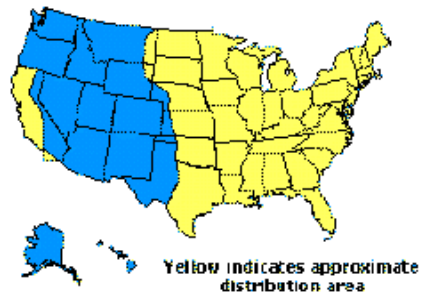
Lone Star Tick



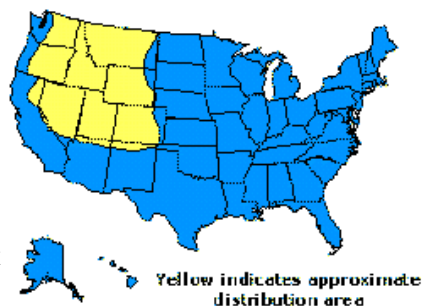
Distribution of Lone Star Tick (Green)



Dog Tick



Rocky Mountain Wood Tick



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### Hazard Control

The methods for controlling exposure to ticks include, in order of most- to least-preferred:

- Avoiding tick habitats and ceasing operations in heavily infested areas
- Reducing tick abundance through habitat disruption or application of acaricide
- Personal protection through use of repellants and protective clothing
- Frequent tick inspections and proper hygiene

Vaccinations are not available and preventative antibiotic treatment after a bite is generally not recommended.

### Avoidance and Reduction of Ticks

To the extent practical, tick habitats should be avoided. In areas with significant tick infestation, consider stopping work and withdrawing from area until adequate tick population control can be achieved. Stopping and withdrawing should be considered as seriously as entering an area without proper energy control or with elevated airborne contaminants—tick-borne pathogens present risk of serious illness!

In areas where significant population density or infestation exists, tick reduction should be considered. Tick reduction can be achieved by disrupting tick habitats and/or direct population reduction through the use of tick-toxic pesticides (Damminix, Dursban, Sevin, etc.).

Habitat disruption may include only simple vegetative maintenance such as removing leaf litter and trimming grass and brush. Tick populations can be reduced by between 72 and 100 percent when leaf litter alone is removed. In more heavily infested areas, habitat disruption may include grubbing, tree trimming or removal, and pesticide application (Damminix, Dursban, Sevin, etc.). This approach is practical in smaller, localized areas or perimeter areas that require occasional access. Habitat controls are to be implemented with appropriate health and safety controls, in compliance with applicable environmental requirements, and may be best left to the property owner or tenant or to a licensed pesticide vendor. Caution should be exercised when using chemical repellents or pesticides in or around areas where environmental or industrial media samples will be collected for analysis.

### Personal Protection

After other prevention and controls are implemented, personal protection is still necessary to control exposure to ticks. Personal protection must include all of the following steps:

- So that ticks may be easily seen, wear light-colored clothing. Full-body New Tyvek (paper-like disposable coveralls) may also be used
- To prevent ticks from getting underneath clothing tuck pant legs into socks or tape to boots
- Wear long-sleeved shirts, a hat, and high boots
- Apply DEET repellent to exposed skin or clothing per product label
- Apply permethrin repellent to the outside of boots and clothing before wearing, per product label



- Frequently check for ticks and remove from clothing
- At the end of the day, search your entire body for ticks (particularly groin, armpits, neck, and head) and shower
- To prevent pathogen transmission through mucous membranes or broken/cut skin, wash or disinfect hands and/or wear surgical-style nitrile gloves any time ticks are handled

Pregnant individuals and individuals using prescription medications should consult with their physician and/or pharmacists before using chemical repellents. Because human health effects may not be fully known, use of chemical repellents should be kept to a minimum frequency and quantity. Always follow manufacturers' use instructions and precautions. Wash hands after handling, applying, or removing protective gear and clothing. Avoid situations such as hand-to-face contact, eating, drinking, and smoking when applying or using repellents.

Remove and wash clothes per repellent product label. Chemical repellents should not be used on infants and children.

Vaccinations are generally not available for tick-borne pathogens. Although production of the LYMERix™ Lyme disease vaccination has been ceased, vaccination may still be considered under specific circumstances and with concurrence from the consulting physician.

#### Tick Check

A tick check should be performed after field survey before entering the field vehicle (you do not want to infest your field vehicle with ticks). Have your field partner check your back; the backs of your legs, arms, and neck; and your hairline. Shake off clothing as thorough as possible before entering the vehicle. Once the field day is complete, repeat this procedure and perform a thorough self check.

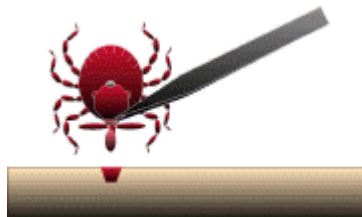
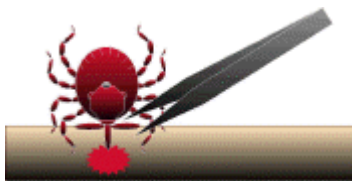
If a tick has embedded itself into the skin, remove the tick as described below.

#### Tick Removal

1. Use the tick removal kit obtained through the CH2M HILL Milwaukee warehouse, or a fine-tipped tweezers or shield your fingers with a tissue, paper towel, or nitrile gloves.

**Error! Objects cannot be created from editing field codes.**

2. Grasp the tick as close to the skin surface as possible and pull upward with steady, even pressure. Do not twist or jerk the tick; this may cause the mouthparts to break off and remain in the skin. If this happens, remove mouthparts with tweezers. Consult your healthcare provider if infection occurs.



3. Avoid squeezing, crushing or puncturing the body of the tick because its fluids (saliva, hemolymph, gut contents) may contain infectious organisms. Releasing these organisms to the outside of the tick's body or into the bite area may increase the chance of infectious organism transmission.

4. Do not handle the tick with bare hands because infectious agents may enter through mucous membranes or breaks in the skin. This precaution is particularly directed to individuals who remove ticks from domestic

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animals with unprotected fingers. Children, elderly persons, and immunocompromised persons may be at greater risk of infection and should avoid this procedure.

5. After removing the tick, thoroughly disinfect the bite site and wash your hands with soap and water.

6. Should you wish to save the tick for identification, place it in a plastic bag, with the date of the tick bite, and place in your freezer. It may be used at a later date to assist a physician with making an accurate diagnosis (if you become ill).

**Note:** Folklore remedies such as petroleum jelly or hot matches do little to encourage a tick to detach from skin. In fact, they may make matters worse by irritating the tick and stimulating it to release additional saliva, increasing the chances of transmitting the pathogen. These methods of tick removal should be avoided. In addition, a number of tick removal devices have been marketed, but none are better than a plain set of fine tipped tweezers.

#### First-Aid and Medical Treatment

Tick bites should always be treated with first-aid. Clean and wash hands and disinfect the bite site after removing embedded tick. Individuals previously infected with Lyme disease does not confer immunity—re-infection from future tick bites can occur even after a person has contracted a tick-borne disease.

The employee should contact the Injury Management/Return To Work provider (IMRTW), WorkCare using the toll-free number 866-893-2514 to report the tick bite. WorkCare will follow-up with each CH2M Hill employee who reports a tick bite and is at risk of developing Lyme disease by monitoring for symptoms up to 45 days, and will refer the employee to a medical provider for evaluation and treatment as necessary.



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## 2011 Vehicle Accident Guidance – ESBG

Remember that if you are **renting** a non-CH2M HILL owned vehicle (short-term rental) in the U.S., you should carry the [insurance card](#) from the state where your driver's license is issued.

If you operate a **fleet vehicle**, carry the [insurance card](#) where the vehicle is registered.

### **For ALL Vehicles if you are in an accident:**

1. If you are injured, call 911 for emergency medical treatment or 1-866-893-2514 to contact the CH2M HILL Occupational Nurse/Physician for minor injuries. If you feel you have not been injured, contact the RHSM for guidance on whether calling the CH2M HILL Occupation Nurse/Physician is applicable.
2. **Call the Police**--For any vehicle accident/damage, it is recommended that the local police (or site security/emergency services if working on a client site that provides such services) be called to determine if a report needs to be filed. In some instances, a report may not be required (during accident alerts, or in public parking lots). Document that the authorities were called and follow up with any guidance they give you. State requirements vary. If a report is filed, obtain a copy.
3. Notify Supervisor, (and PM/RHSM if working on a project site)
4. Complete a HITS report on the VO.

### **Additional Steps**

To report an auto accident, and before a claim can be taken by telephonic reporting, have available your name (the company name alone is no longer accepted, a driver's name must be provided even for fender benders), location of accident and your office address if different than the accident location, business group and project number. A claim cannot be taken without your name, address, business group and your project number. By location the state where the accident occurred, and which office you are aligned to, i.e., accident occurs in Idaho, but you are out of the Denver office. Advise the claim recorder the accident occurred in ID, but that your office location is Denver. This will assist the claim intake person in identifying location coding for the claims.

### **Auto accidents involve two different sections of an Auto policy:**

- 1) Liability to others due to Bodily Injury and Property Damage
- 2) Physical Damage - Comprehensive and Collision - damage to the vehicle CH employee is driving

CH2M Hill has Liability coverage for any auto - our policy will respond on either a primary or excess basis.

Refer to the table below for additional notifications to make based on the type of accident experienced and type of vehicle being used.



### Liability - Bodily Injury or Property Damage to Others

Scenario	Which Coverage Responds	What to do if in an accident
CH2M Hill fleet, pool or project vehicle - long term lease - lower 48	CH2M Hill - Primary	Contact Broadspire (1-800-753-6737); Jennifer Rindahl/DEN (720-286-2449); Linda George/DEN (720-286-2057)
CH2M Hill fleet, pool or project vehicle - long term lease - Alaska (North Slope)	CH2M Hill - Primary	Contact Jennifer Rindahl/DEN (720-286-2449)
Client vehicle driven by CH2M Hill employee	Client's auto policy unless client has made CH2M Hill responsible for vehicle	Contact Broadspire (1-800-753-6737); Contact Jennifer Rindahl/DEN (720-286-2449); contact client;
Short term lease (30 days or less)	Rental car company if rented through Enterprise, Budget or Hertz; CH2M Hill excess	Contact Broadspire (1-800-753-6737); Contact local branch of rental car company where vehicle leased (ERAC includes 24 hour roadside assistance) and Jennifer Rindahl/DEN (720-286-2449)
Short term lease (30 days or less)	CH2M Hill - Primary if rented through company other than our national agreements; \$100,000 deductible	Contact Broadspire (1-800-753-6737); Contact rental car company and Jennifer Rindahl/DEN (720-286-2449)
Personal vehicle used on business	Employee's personal auto policy; CH2M Hill on an excess basis	Contact personal auto insurance company; contact Jennifer Rindahl/DEN (720-286-2449)

### Physical Damage - damage to vehicle CH employee was driving

Scenario	Which Coverage Responds	What to do if in an accident
CH2M Hill fleet, pool or project vehicle - long term lease - lower 48	CH2M Hill ONLY if vehicle is scheduled on policy - \$5,000 deductible	Contact Broadspire (1-800-753-6737); Jennifer Rindahl/DEN (720-286-2449); Linda George/DEN (720-286-2057)
CH2M Hill fleet, pool or project vehicle - long term lease - Alaska (North Slope)	CH2M Hill Equipment Schedule if scheduled on policy	Contact Jennifer Rindahl/DEN (720-286-2449)
CH2M Hill fleet, pool or project vehicle - long term lease	ARI if physical damage coverage purchased - \$500 deductible	Contact Jennifer Rindahl/DEN 720.286.2449; call ARI at 1-800-221-1645 give them Client Code and ARI fleet vehicle number; and notify Linda George/DEN - Fleet Coordinator - 720-286-2057
Client vehicle CH2M Hill Employee is driving	Client's auto policy unless client has made CH2M Hill contractually responsible for vehicle	Contact Jennifer Rindahl/DEN (720-286-2449); contact client; contact Broadspire (1-800-753-6737)
Short term lease (30 days or less) using corporate VISA	VISA if corporate credit card used and vehicle is not a pickup, truck, cargo van or used off-road	Contact VISA - 1-800-847-2911 or <a href="http://www.visa.com/eclaim">http://www.visa.com/eclaim</a>
Short term lease (30 days or less) through Enterprise (ERAC) and vehicle is used off-road and physical damage coverage included when vehicle leased	ERAC up to \$3,000 in damage; CH2M Hill's coverage is excess	Notify Rental Car Company; contact Jennifer Rindahl/DEN (720-286-2449) if damage over \$5,000
Short term lease (30 days or less) did <b>not</b> use corporate VISA	CH2M Hill - \$5,000 deductible (project responsibility)	Contact Broadspire (1-800-753-6737); Contact Jennifer Rindahl/DEN 720-286-2449; contact VISA - 1-800-847-2911 or <a href="http://www.visa.com/eclaim">http://www.visa.com/eclaim</a>
Personal vehicle used on business	CH will reimburse the amount of the deductible carried on the employee's policy up to \$500 whichever is less	Contact Jennifer Rindahl/DEN (720-286-2449); contact client; contact Broadspire (1-800-753-6737)

Details for reporting a claim on the CH2M Hill VO are accessed by going to the VO home page and clicking:

GLOBAL ENTERPRISE SERVICES/INSURANCE & BONDING/CLAIMS REPORTING

HOW DO I REPORT A CLAIM TAB or access the following URL:

<https://www.int.ch2m.com/intrnl/voffice/corp/insurance/claims/report.asp?Menu=menu3h>



**Insurance & Bonding**

**How Do I Report a Claim?**

**Domestic**

**Definitions of Physical Damage and Auto Liability**

**Physical Damage** = Comprehensive and Collision – damage to the vehicle the CH employee is driving. CH2M Hill has Liability coverage for any auto – our policy will respond on either a primary or excess basis.

**Auto Liability** = Liability to others due to Bodily Injury and/or Property Damage.

Auto accidents prior to 5/1/11 – complete Automobile Loss Notice form and report to Zurich; form on the VO, (GLOBAL ENTERPRISE SERVICES/INSURANCE AND BONDING/CLAIMS REPORTING/HOW DO I REPORT A CLAIM/BUSINESS AUTO-ALL).

Phone: +1 (877) 246-3478 or +1 (800) 987-3373  
Fax: +1 (877) 962-2567

Accidents that occur after 5/1/11, follow reporting instructions below.

**Business Auto-Owned by Leasing Company, Rental Agency, for Physical Damage**

**Initial Report:** Employee involved in auto accident reports claim as soon as possible, per instructions in Special Reporting Section, to owner of vehicle (i.e., Enterprise, Hertz, Budget, ARI, etc.)

**Copy:** Jennifer Rindahl/DEN/Legal & Insurance Department

**Backup:** Carol Dietz/DEN/Legal & Insurance Department

**Copy:** Broadspire involving any injury or damage to a third party; you will need to call in the claim using the 1-800 number below and advise this is an auto claim involving a rental agency vehicle.

**Insurer:** Greenwich Insurance Co (an XL company)

**TPA:** Broadspire

**Phone:** 800-753-6737 (telephonic reporting for all auto claims, manned 24/7, 365 per year)

**For Personally Owned Vehicles (POVs):**

CH2M HILL does not provide auto insurance for POVs, it is responsibility of the owner. If you are in a vehicle accident conducting company business, contact the police as above, supervisor, and 911 or CH2M HILL’s occupational nurse/physician as stated above. Complete a HITS report. Contact Jennifer Rindahl/DEN for assistance for meeting personal insurance deductibles (up to \$500) with proof of insurance and deductible.

If using your POV for extended project use, notify the PM to make sure a rental car is not needed. Check your insurance policy for guidance on using the POV for business use.

**Additional Resources:**

[Claims Resource Manual](#)

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**WORKING ALONE PROTOCOL  
CALL - IN CONTACT FORM**

Date of site work: \_\_\_\_\_ Expected start time: \_\_\_\_\_

Name of CH2M HILL employee in the field: \_\_\_\_\_

Name of CH2M HILL employee responsible to receive contact:

Client Emergency Contact (if any):

CH2M HILL employee's contact numbers:

Radio # \_\_\_\_\_

Cell Phone # \_\_\_\_\_

Address and Location of work: \_\_\_\_\_

Directions/Map:

Planned Activity: \_\_\_\_\_

Specified Frequency and time for call in: \_\_\_\_\_

Time

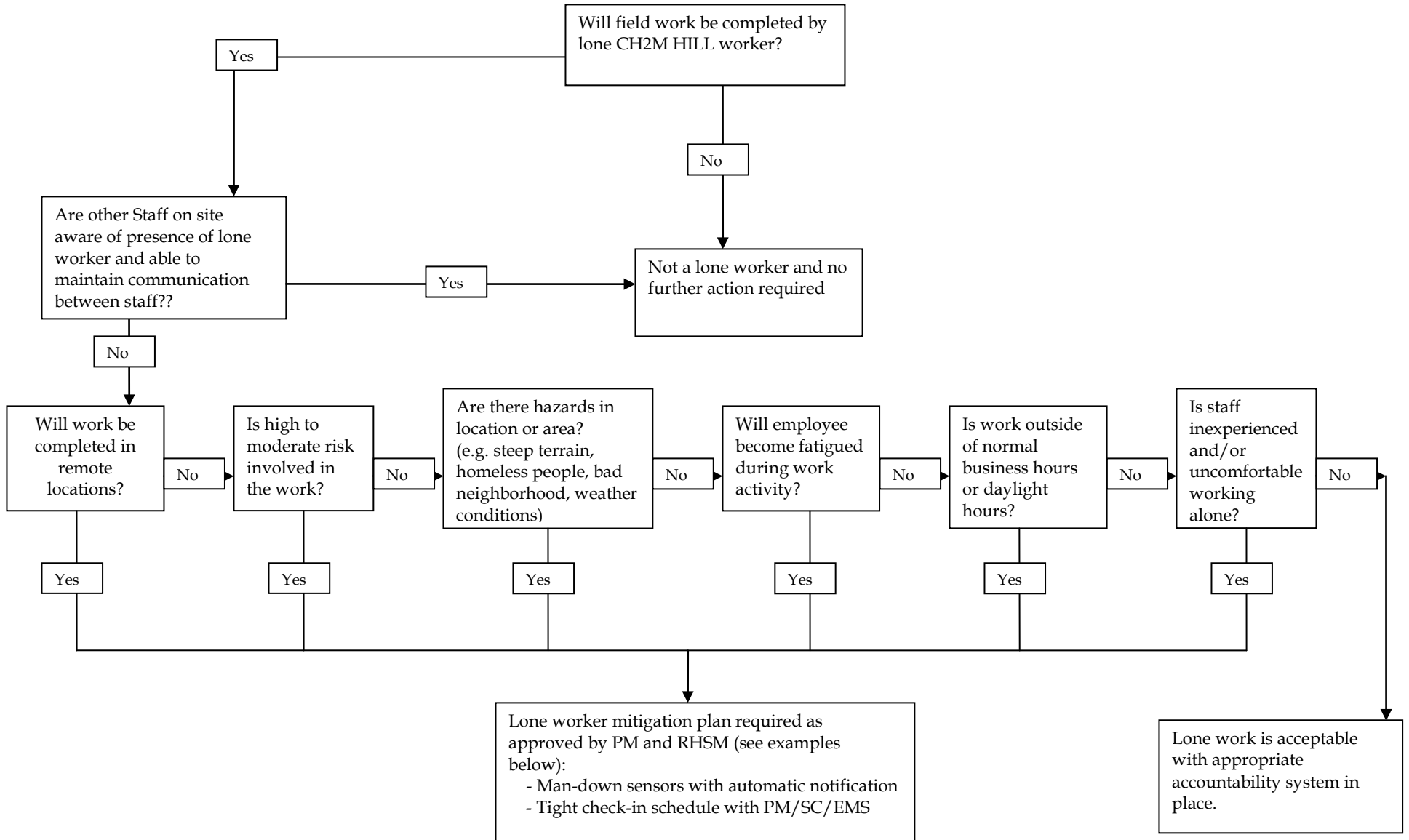
Verified

Location

If lone worker fails to call in at specified frequency/time:

- 1) Call worker's radio and cell to determine if an emergency exists.
- 2) If no reply, immediately call Client security/emergency service if there is one at the site.
- 3) If there is no client security call Emergency Services (911). Inform the dispatcher there is a lone worker that cannot be contacted and there may be an emergency onsite. Provide the lone worker's name, their last known location, and your contact information.
- 4) After Emergency Services have been contacted, call the other emergency contacts, Project Manager, and Responsible Health and Safety Manager.

# Lone Worker Protocol



# **CH2M HILL HEALTH AND SAFETY PLAN**

## **Attachment 7**

### **Observed Hazard Form**



**OBSERVED HAZARD FORM**

Name/Company of Observer (*optional*):

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

Time reported: \_\_\_\_\_

Contractor/s performing unsafe act or creating unsafe condition:

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_

Unsafe Act or Condition:

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Location of Unsafe Act or Condition:

---

\_\_\_\_\_

Corrective Actions Taken: \_\_\_\_\_ Date: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Project Safety Committee Evaluation: \_\_\_\_\_ Date: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**CH2M HILL HEALTH AND SAFETY PLAN**  
**Attachment 8**

**Stop Work Order Form**

# Stop Work Order

**REPORT PREPARED BY:**

Name:	Title:	Signature:	Date:

---

**ISSUE OF NONPERFORMANCE:**

Description:	Date of Nonperformance:

**SUBCONTRACTOR SIGNATURE OF NOTIFICATION:**

Name:	Title:	Signature:	Date:

---

*\* Corrective action is to be taken immediately. Note below the action taken, sign and return to CCI.\* Work may not resume until authorization is granted by CH2M HILL Constructors, Inc. Representative,*

**SUBCONTRACTOR'S CORRECTIVE ACTION**

Description:	Date of Nonperformance:

**SUBCONTRACTOR SIGNATURE OF CORRECTION**

Name:	Title:	Signature:	Date:

# **CH2M HILL HEALTH AND SAFETY PLAN**

## **Attachment 9**

### **Agency Inspection Target Zero Bulletin**

# TARGET ZERO Bulletin

## Subject: HSSE Agency Inspections (OSHA, EPA, DOT, State Health Department)

### Do you know what YOU would do if an agency inspector arrived at your site unannounced?

Recently, a State Occupational Safety and Health Administration (OSHA) inspector made an unannounced visit to one of our Federal project sites. OSHA, U.S. Environmental Protection Agency (EPA), and authorized state or local agencies have authority to inspect any facility that is subject to health, safety, and environmental legislation. Inspections may be announced or unannounced. This particular inspector indicated that the project was targeted for an inspection because the work was funded by the American Recovery and Reinvestment Act (ARRA).

Enterprise Standard Operating Procedure (SOP) HSE-201, *Agency Inspections and Communications*, describes the responsibilities, procedures, and requirements associated with inspections conducted by external regulatory agencies, as well as the methods for communicating information to key individuals. This Target Zero Bulletin is a brief summary of what to do in the event of an agency inspection at your site. Refer to the SOP for more specific guidance.

### Notification of Inspections

- If the inspection is an announced regulatory agency inspection, the Project Manager (PM) should notify the Responsible Health and Safety Manager (RHSM) and Responsible Environmental Manager (REM) well in advance of the inspection.
- If an unannounced agency inspector visits one of our projects, Field personnel must immediately notify the project Emergency Response Coordinator (ERC). Typically the ERC is the Safety Coordinator (SC).
- The **ERC must immediately notify the RHSM/REM**, as appropriate, of unannounced inspections, or designate someone to call the RHSM/REM. The RHSM/REMs can provide guidance to the field staff and PM.

### Inspector Credential Verification

- Upon arrival, the ERC must request the inspector to provide official credentials. Record the inspector's name and office phone number or obtain the inspector's business card.
- The inspector shall sign the visitors log and be given a site-specific health, safety, and environmental protection briefing.
- The inspector shall meet any site access requirements associated with security clearances, specialized training, and medical monitoring. The CH2M HILL representative shall verify that the inspector possesses these requirements; access will only be granted to those areas where appropriate access requirements are met. Some inspectors have the authority to gain access to any work area at any time, such as an inspector with a search warrant. In these cases, we can stop work operations as necessary to protect the safety of the inspector(s).

### Opening Conference

- The CH2M HILL Project Manager, ERC, RHSM, or REM, and the inspector shall determine attendees for the opening conference. The RHSM (for OSHA and other worker health and safety inspections) or REM (for environmental inspections) shall join the opening conference via conference call.
- The inspector shall inform CH2M HILL of the purpose of the inspection and provide a copy of the complaint, if applicable.
- The inspector shall outline the scope of the inspection, including employee interviews conducted in private, physical inspection of the workplace and records, possible referrals, discrimination complaints, and the closing conference(s).

### Requests for OSHA Logs

- An OSHA inspector may request to review the project OSHA Injury/Illness log, better known as the OSHA 300 Log. Contact your RHSM for assistance in obtaining the OSHA 300 Log.

- Field projects with a continuous duration of one year or longer are considered to be separate establishments and are required to maintain an OSHA 300 log specific to the project. The project OSHA 300 log should be maintained onsite and kept current.
- Recordable injuries and illnesses sustained on field projects less than one year in duration are maintained on the CH2M HILL office log where the injured employee is based.

### The Inspection

- The scope of the inspection shall be limited to that indicated by the inspector in the opening conference. The inspector shall be escorted to relevant areas only. The ERC or other designated by the RHSM or REM must accompany the inspector during the inspection.
- Ensure that the inspection is limited to the scope that the inspector disclosed during the opening conference. The ERC should always take notes which identify: areas inspected, machinery or equipment and materials examined, employees or other persons interviewed, and photographs taken by the inspector.
- The inspector will observe safety, health, and environmental conditions and practices and document the inspection process. The inspector may also take photos and instrument readings, examine records, collect air samples, measure noise levels, survey existing engineering controls, and monitor employee exposure to toxic vapors, gases, and dusts.
- CH2M HILL should gather duplicate information (photographs, readings, samples) in the same manner and condition as the inspector. If the equipment needed to take duplicate samples is not onsite, ask the inspector if the sampling can wait until the equipment is available. If samples are taken, request a description of the tests that the agency intends to perform on the samples and request results as soon as they are available.
- Employees may be questioned during the inspection tour. The employee can refuse to speak to an inspector, can speak to the inspector with a company representative (including management) present, or can speak to the inspector privately. It is CH2M HILL policy that employees who wish to speak to the inspector are not discriminated against, intimidated, or otherwise mistreated for exercising their rights during compliance inspections.
- Copies of documents should not be provided to the inspector without the approval of the RHSM or REM or Legal Insurance Department (LID). **DO NOT** voluntarily release documents. Respond only to inspection team requests.
- During the course of the inspection, the inspector may point out violations. For each violation, the CH2M HILL representative should ask the inspector to discuss possible corrective action. Where possible, violations detected by the inspector should be corrected immediately and noted by the inspector as corrected.
- For those items which cannot be corrected immediately, an action plan shall be formulated for timely correction. In any instance, employees exposed to hazards shall be removed from the area.

### Closing Conference

After the inspection, a closing conference is normally held as follows:

- The CH2M HILL PM, ERC, RHSM or REM shall be involved via conference call in the closing conference, at a minimum;
- The inspector shall describe the apparent violations found during the inspection and other pertinent issues as deemed necessary by the inspector. CH2M HILL shall be advised of their rights to participate in any subsequent conferences, meetings or discussions. Any unusual circumstances noted during the closing conference shall be documented by the ERC;
- The inspector shall discuss violations observed during the inspection and indicate for which violations a citation and a proposed penalty may be issued or recommended;
- The ERC shall request receipts for all samples and approved documents photocopied by the inspector, request a photocopy of the inspector's photograph log, and request a copy of the final inspection report; and
- Any documentation from an agency inspection must be transmitted immediately to the RHSM or REM, and LID.

**Unannounced regulatory agency inspections may happen at any time on our projects -**

**Get your RHSM/REM and PM involved immediately if an Inspector arrives.**

# **CH2M HILL HEALTH AND SAFETY PLAN**

## **Attachment 10**

**Completed CH2M HILL AHAs**

<b>Date:</b> October 18, 2013		Task Risk Assessment Code (RAC):	<b>Medium</b>					
<b>Job/Activity:</b> Observation of drilling								
<b>Project:</b> 456991 – Velsicol WA164		E = Extremely High Risk H = High Risk M = Moderate Risk L = Low	<b>Probability</b>					
<b>Prepared by:</b> Elizabeth Johnson			<b>Frequent</b>	<b>Likely</b>	<b>Occasional</b>	<b>Seldom</b>	<b>Unlikely</b>	
<b>Reviewed by (PM/Site Supervisor/H&amp;S):</b> Scott Pratt			<b>Catastrophic</b>	E	E	H	H	M
<b>Description of the work:</b> Observe drilling activities			<b>Critical</b>	E	H	H	M	L
			<b>Marginal</b>	H	M	M	L	L
		<b>Negligible</b>	M	L	L	L	L	
<b>Severity</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)						
Preparing for activities outdoors	Cool/cold weather/sun exposure, dehydration  Biological Hazards (Insects/Ticks-Lime Disease, Bees and Wasps, gnats, poisonous plants)  Severe Weather/Evacuation	<ul style="list-style-type: none"> <li>• Keep exposed skin covered or use sun block, drink plenty of water, avoid caffeinated beverages.</li> <li>• Follow temperature extremes section of HSP. Acclimatize to cold weather work.</li> <li>• Wear proper warm clothing for cold weather work – wear layers, Carhart-type coveralls, etc.</li> <li>• Be conscious of your individual tolerance to work in hot weather and monitor yourself and co-workers for signs and symptoms of cold stress.</li> <li>• Stay hydrated; take breaks as needed in heated area (vehicle or trailer) to warm up.</li> <li>• Inspect work area for potential biological hazards including poisonous plants, bee hives or nests, ticks, gnats, etc.</li> <li>• Follow the biological hazard precautions, guidelines, and fact sheets in the safety plan for, ticks, snakes, hazardous plants, etc. If a biological hazard is identified that is not in</li> </ul>						



		<p>the safety plan, contact the RHSM.</p> <ul style="list-style-type: none"> <li>• For ticks: wear light-colored long sleeved shirt and pants; tuck pant legs into socks; spray only outside of clothing with permethrin or permanone; spray skin with only DEET; and check yourself frequently for ticks. If these control measures don't seem to be deterring ticks from getting on you, consider wearing PPE (e.g., Tyvek) or Bug-out suits.</li> <li>• Follow emergency and evacuation procedures detailed in the HASP.</li> <li>• Take time to review where the closest structure that can be used when severe weather occurs and what route will be used to get there. Listen to weather reports and plan for severe weather. Designate an emergency evacuation assembly area and evacuation routes for non-weather related emergencies (fire, etc.). Keep a copy of the Emergency Contact page from the HSP accessible.</li> </ul>
<p>Mobilizing to location</p>	<p>Vehicle Break-down                      High foot and vehicle traffic on site                      Restricted access areas/unauthorized personnel                      Slips/trips/falls at work location                      Strains/sprains from lifting</p>	<ul style="list-style-type: none"> <li>• Perform a visual of inspection of vehicle prior to use, including looking underneath the vehicle.</li> <li>• Follow all posted speed limits and follow traffic patterns/haul routes.</li> <li>• Always wear your seatbelt.</li> <li>• Drive defensively.</li> <li>• Use a spotter to maneuver in tight areas.</li> <li>• Be aware of all restricted areas and obey rules regarding access to those areas. In general, avoid restricted areas whenever possible.</li> <li>• Perform a visual inspection of the site, identify and remove potential trip hazards, verify walkways are clear and necessary equipment and safety supplies are readily available</li> <li>• Use a buddy when necessary to haul equipment and supplies</li> <li>• Follow the controls of the lifting section of the safety plan. In general, use your legs and not your back to lift, don't twist with a load, and plan your route before you unload to avoid slip/trip hazards. If over 40 pounds or is awkward use a</li> </ul>

		<p>buddy to help. Use material handling devices such as a dolly or the like whenever possible to reduce manual lifting.</p> <ul style="list-style-type: none"> <li>• Ensure a spill kit, eye-wash unit, first aid and bloodborne pathogen kit, and fire extinguisher are at the location.</li> </ul>
Observation of drilling	Slips, trips, and falls	<ul style="list-style-type: none"> <li>• Inspect area for tripping hazards—mark or remove obstructions.</li> <li>• Wear safety-toed boots, with good tread.</li> <li>• Use good housekeeping practices, keeping the work area clear of potential tripping hazards.</li> </ul>
	Fire/explosion/Spills	<ul style="list-style-type: none"> <li>• Contractor to have spill materials and fire extinguisher in the area.</li> <li>• Keep ignition sources away from the work area.</li> <li>• No smoking in the area.</li> </ul>
	Noise, flying debris, and entanglement with equipment.	<ul style="list-style-type: none"> <li>• Personnel conducting oversight duties shall wear hearing protection if it is not possible to communicate with another person standing next to you using your normal voice.</li> <li>• Personnel shall maintain a safe distance from the drilling equipment.</li> <li>• Personnel shall wear eye protection and hard hats at all times when at the worksite.</li> <li>• Personnel shall not wear loose fitting clothing to avoid the potential for entanglement.</li> <li>• Operator should be verifying equipment condition daily before work start using equipment specific checklist, demonstrate emergency stop switch operability.</li> <li>• Be aware and stand clear of heavy objects that are hoisted overhead.</li> </ul>
	Underground/overhead utilities	<ul style="list-style-type: none"> <li>• CH2M HILL protocol for underground utilities include: a background/records assessment or known utilities or other subsurface obstructions; contacting the designated local utility locating service (e.g., MISS DIG); conducting an independent field survey to locate, identify and mark utilities/obstructions; and a visual survey of the area to validate the chosen location (see safety plan for details).</li> <li>• If drilling will be conducted within 5 feet of an underground</li> </ul>

		<p>utility (or when there is uncertainty about location), locations must be physically verified with non-aggressive means such as with air or water knifing, hand digging/augering.</p> <ul style="list-style-type: none"> <li>• Aggressive methods are never allowed within 2 feet of an identified high risk utility (utility that can't be de-energized or would cause significant impacts if damaged).</li> <li>• Deviation from these requirements must be approved by RHSM.</li> <li>• Ensure that all overhead utility lines are at least 10 feet away.</li> <li>• If an obstruction is encountered, suspend work and determine what it is. If it cannot be determined, contact the RHSM/client.</li> </ul>
	<p>Strains from manually moving materials, equipment, and drums.</p>	<ul style="list-style-type: none"> <li>• Personnel shall be directed to use proper lifting techniques such as keeping back straight, lifting with legs, limiting twisting, and getting help in moving bulky/heavy materials and equipment.</li> <li>• Mechanical equipment shall be used as much as possible to minimize manual lifting.</li> <li>• Follow controls in the HSP and SOP HSE-121, Lifting</li> </ul>
	<p>Exposure to site contaminants</p>	<ul style="list-style-type: none"> <li>• Contractor to set up work zones, wear PPE, and perform equipment/personal decontamination in accordance with HSP.</li> <li>• PPE includes minimum PPE (hard hat, safety-toed boots, safety glasses with sideshields, tyvek/coveralls to keep personal clothing clean, booties/nitrile gloves)</li> <li>• Site contaminants are PBB/DDT—primary exposure route is ingestion. Emphasize good PPE doffing procedures including properly removing PPE and washing hands and face after leaving the EZ, no smoking, drinking, eating in the EZ or CRZ.</li> <li>• Dust control will be implemented to “no visible dust”. If dust cannot be controlled to this level, contact the RHSM.</li> </ul>
	<p>Traffic hazards</p>	<ul style="list-style-type: none"> <li>• Wear high visibility traffic vests near heavy equipment or traffic.</li> <li>• Contractor to utilize traffic control equipment (cones, delineators, etc.) to route traffic around work area, as needed.</li> </ul>

<p align="center"><b>Equipment to be used</b> (List equipment to be used in the work activity)</p>	<p align="center"><b>Inspection Requirements</b> (List inspection requirements for the work activity)</p>	<p align="center"><b>Training Requirements</b> (List training requirements including hazard communication)</p>
<ul style="list-style-type: none"> <li>· Hand and power tools, if needed</li> <li>· Fire Extinguisher (present in area)</li> <li>· Eye Wash (present in area)</li> <li>· First Aid Kit (present in area)</li> <li>· PPE</li> </ul>	<ul style="list-style-type: none"> <li>· Inspect all vehicles, equipment, tools, and PPE prior to each use (remove from service any defective equipment)</li> <li>· Use applicable Self-Assessment Checklists in HSP.</li> </ul>	<ul style="list-style-type: none"> <li>· OSHA 40-hour HAZWOPER initial training, 3-day OJT, current refresher and medical clearance.</li> <li>· Training on CH2M HILL HSP and applicable AHAs.</li> <li>· Qualified CH2M HILL Safety Coordinator-HW.</li> <li>· Hazard Communication training (see hazard communication section of HSP) for any chemicals brought onsite.</li> </ul>

PRINT NAME

SIGNATURE

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

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

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

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**ACTIVITY HAZARD ANALYSIS**

<b>Date:</b> May through October 2014		Task Risk Assessment Code (RAC):	<b>Low</b>					
<b>Job/Activity:</b> Excavation and Backfill Oversight								
<b>Project:</b> Velsicol Phase 2 ANP, St. Louis, Michigan		E = Extremely High Risk H = High Risk M = Moderate Risk L = Low  <b>Severity</b>	<b>Probability</b>					
<b>Prepared by:</b> James A. Eluskie			<b>Frequent</b>	<b>Likely</b>	<b>Occasional</b>	<b>Seldom</b>	<b>Unlikely</b>	
<b>Reviewed by (Construction Quality Manager):</b> Elizabeth Markham			<b>Catastrophic</b>	E	E	H	H	M
<b>Description of the work:</b> Observe excavation and backfilling activities of subcontractor at residential properties.			<b>Critical</b>	E	H	H	M	L
			<b>Marginal</b>	H	M	M	L	L
<b>Negligible</b>		M	L	L	L	L		
<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)						
Preparing for activities outdoors	Weather conditions (cold/hot temperature extremes) Sunburn Frostbite Slip, trips and falls Severe Weather/Evacuation	<ul style="list-style-type: none"> <li>• Keep exposed skin to a minimum. Wear light layers such as long sleeves and long pants for hot weather work, and appropriate cold weather gear when necessary.</li> <li>• Dress properly in cold weather gear, including hats, gloves and insulated boots. Boots should be waterproof so feet do not get wet. Modify clothing, if necessary.</li> <li>• Wear sunblock on exposed areas of skin and reapply as necessary throughout the day.</li> <li>• Follow temperature extremes section of HSP. Acclimatize to cold and hot weather work. Be familiar with initial signs of frostbite, heat stress, and other heat related illness.</li> <li>• Walk carefully in areas that may be icy, and avoid if possible.</li> <li>• Stay hydrated, take breaks as needed in vehicle or designated rest area to warm up or cool down. In cold weather drink warm fluids and water.</li> <li>• Take time to review where the closest structure that can be used when severe weather occurs. Listen to weather reports and plan for severe weather. Designate an</li> </ul>						

**ACTIVITY HAZARD ANALYSIS**

		<p>emergency evacuation assembly area and evacuation routes. Keep a copy of the Emergency Contact page from the HSP accessible.</p>
<p>Mobilizing to location</p>	<p>Vehicle Break-down. High foot and vehicle traffic on site. Restricted access areas/unauthorized personnel.</p>	<ul style="list-style-type: none"> <li>• Perform a visual of inspection of vehicle prior to use, including looking underneath the vehicle.</li> <li>• Follow all posted speed limits and follow traffic patterns/haul routes.</li> <li>• Always wear your seatbelt.</li> <li>• Drive Defensively.</li> <li>• Only drive on designated roadways onsite to avoid contact with pedestrians and other vehicles onsite.</li> <li>• Use a spotter to maneuver in tight areas.</li> <li>• Be aware of all restricted areas and obey rules regarding access to those areas. In general, avoid restricted areas whenever possible.</li> <li>• Perform a visual inspection of the site, identify and remove potential trip hazards, verify walkways are clear and necessary equipment and safety supplies are readily available</li> <li>• Use a buddy when necessary to haul equipment and supplies</li> </ul>
<p>Arrive on site</p> <p>Complete HSP, AHA review Complete Pre-Task Safety Plan Complete Excavation Self Assessment checklist (for observing only)</p>	<p>Vehicle congestion, traffic flow/control, access difficulties, visibility hazards working around heavy equipment</p>	<ul style="list-style-type: none"> <li>• Wear proper PPE as specified in HSP including safety glasses with side shields, hard hat, hearing protection, safety boots, work gloves, and high visibility traffic vest.</li> <li>• Determine appropriate locations for heavy equipment and support vehicles and ensure that roadways are clear for travel</li> <li>• Use cones or barricades as necessary to identify and control site boundaries and access.</li> </ul>
<p>Review, inspect and locate safety equipment incl. Fire extinguisher, first aid kit, insect repellent, ice melt, PPE, etc.</p>	<p>Remote areas, biohazards associated with wells in remote areas.</p> <p>Weather related issues (heat and/or cold stress).</p>	<ul style="list-style-type: none"> <li>• Check area for heavy equipment accessibility (i.e. clearances, solid ground). Verify a minimum of 10 feet of clearance during transit for 50kV line, check heavy equipment protocol for clearances.</li> <li>• Staff should understand and be able to recognize the signs and/or symptoms of cold and hot weather related illnesses.</li> </ul>

**ACTIVITY HAZARD ANALYSIS**

	Unauthorized Visitors	<ul style="list-style-type: none"> <li>• Watch for animal hazards in wooded and high grassy areas (i.e. snakes, rabid raccoons, etc.).</li> <li>• Follow the biological hazard precautions, guidelines, and fact sheets in the HSP for ticks, rodents, spiders, snakes, hazardous plants, etc.</li> <li>• If near waterways watch for snakes, slippery surfaces, uneven walkways. Wear sturdy, steel-toe boots.</li> <li>• Wear and use proper clothing and sprays to protect against ticks, mosquitoes, poison ivy, and other biological hazards.</li> <li>• Personnel should dress appropriately for ambient temperatures which would include but not limited to dry layered clothing.</li> <li>• For cold weather, work schedules should be adjusted to provide sufficient break periods in a heated area</li> <li>• For hot weather, work schedules may need to be adjusted to provide time intervals for replenishing fluids and which is free of contamination.</li> <li>• Review/Inspect safety equipment prior to starting work. Ensure fire extinguisher, spill kit, eye wash unit, and first aid kits are at the location.</li> <li>• Check the fire extinguisher on heavy equipment to verify inspection and charge.</li> <li>• Know where the kill switch is located on equipment in case an emergency shut-down is necessary.</li> <li>• Set-up and maintain exclusion zone around work area to prevent unauthorized access. Work zone should consist of barricades and warning tape surrounding the work zone.</li> </ul>
Observation of excavating and backfilling activities	Slips, trips, and falls	<ul style="list-style-type: none"> <li>• Inspect area for tripping hazards—mark or remove obstructions.</li> <li>• Wear safety-toed boots, with good tread.</li> <li>• Use good housekeeping practices, keeping the work area clear of potential tripping hazards.</li> </ul>
	Struck By/ Against Heavy Equipment	<ul style="list-style-type: none"> <li>• Wear reflective warning vests or high visibility clothing.</li> <li>• Isolate equipment swing areas</li> <li>• Make/maintain eye contact with operators before approaching equipment. Do not approach equipment from rear or from blind spot of operator</li> </ul>



**ACTIVITY HAZARD ANALYSIS**

		<ul style="list-style-type: none"> <li>• Understand and review hand signals</li> <li>• Ensure equipment has operable back-up alarms</li> <li>• Follow hand signals of ground workers for equipment manipulation when placing/loading equipment into bucket.</li> <li>• Step away from equipment when bucket adjustments are made</li> <li>• Ensure heavy equipment operator has spotter for obstructed views and backing up</li> <li>• Avoid positioning between fixed objects and operating equipment</li> <li>• Ground personnel may not enter equipment work zones until the operator’s attention has been gained, the operator idles the equipment, grounds all buckets or other extensions and gives ground personnel permission to enter the area.</li> </ul>
	<p>Cave-ins/falls</p>	<ul style="list-style-type: none"> <li>• Open excavations will be secured with fence panels and Danger do not enter signs when not attended.</li> <li>• A detailed inspection will be performed if changes in soils conditions or weather exists</li> <li>• Equipment will be positioned no greater than 2 feet towards the excavation.</li> <li>• Sloping and shoring protocols must be followed.</li> <li>• Entry into excavations will be prohibited until inspection and a “Competent Person” provides authorization.</li> <li>• Evacuations &gt; 5 feet shall be properly sloped, benched or shored prior to entry.</li> <li>• Excavations &gt; 4 feet in depth will require ladders for entry.</li> <li>• Ladders will be placed at 25-foot intervals for large excavations.</li> <li>• Surface water will be diverted from all open excavations.</li> <li>• All standing water will be removed prior to employee entrance</li> <li>• Fence or Barricade all excavations when not in the work-zone</li> </ul>
	<p>Excavation entry hazards, collapse, hazardous atmospheres</p>	<ul style="list-style-type: none"> <li>• All excavations shall be inspected by a competent person throughout the workday and/or after rain or any other change in soil conditions.</li> <li>• Personnel are aware of entry requirements established by competent person</li> <li>• If excavation is over 4 ft deep, means of exit must be placed</li> </ul>

**ACTIVITY HAZARD ANALYSIS**

		<p>within 25 feet of workers. Also, air monitoring must be conducted on excavations over 4 feet deep.</p> <ul style="list-style-type: none"> <li>• Protective systems are not required for excavations under 5 ft deep (provided competent person authorizes entry).</li> <li>• Spoils piles, equipment, and materials setback of at least 2 feet from edge of excavation must be maintained.</li> <li>• Excavations shall be barricaded or adequate warning placed around pit/trench to warn of potential fall hazard if left open/unattended.</li> <li>• Surface objects/structures secured from falling into excavation.</li> <li>• Potential hazardous atmospheres have been tested and found to be at safe levels.</li> <li>• Rescue equipment provided where potential for hazardous atmosphere exists.</li> <li>• Precautions have been taken to prevent cave-in from water accumulation in the excavation</li> <li>• Ventilation used to control hazardous atmosphere and air tested frequently.</li> <li>• If soil unclassified, maximum allowable slope is 34 degrees.</li> <li>• Contact RHSM prior to entering any excavations over 4 ft deep, or if air monitoring of excavation detects hazardous atmosphere.</li> </ul>
	<p>Fire/explosion/Spills</p>	<ul style="list-style-type: none"> <li>• Contractor to have spill materials and fire extinguisher in the area.</li> <li>• Keep ignition sources away from the work area.</li> <li>• No smoking in the area.</li> </ul>
	<p>Noise, flying debris, and entanglement with equipment.</p>	<ul style="list-style-type: none"> <li>• Personnel conducting oversight duties shall wear hearing protection if it is not possible to communicate with another person standing next to you using your normal voice.</li> <li>• Personnel shall maintain a safe distance from the excavating equipment, especially in the swinging radius of the excavator arm.</li> <li>• Personnel shall wear eye protection and hard hats at all times when excavating operations are being conducted.</li> <li>• Personnel shall not wear loose fitting clothing to avoid the potential for entanglement.</li> </ul>

**ACTIVITY HAZARD ANALYSIS**

		<ul style="list-style-type: none"> <li>Operator should be verifying equipment condition daily before work start using equipment specific checklist, demonstrate emergency stop switch operability.</li> <li>Be aware and stand clear of heavy objects that are hoisted overhead.</li> </ul>
	Underground/overhead utilities	<ul style="list-style-type: none"> <li>Have property cleared by a licensed utility locator prior to beginning work, both 3<sup>rd</sup> party and MISS DIG.</li> <li>Ensure that all overhead utility lines are at least 10 feet away.</li> <li>If an obstruction is encountered, suspend work and determine what it is. If it cannot be determined, contact the RHSM/client.</li> </ul>
	Strains from manually moving materials, equipment, and drums.	<ul style="list-style-type: none"> <li>Personnel shall be directed to use proper lifting techniques such as keeping back straight, lifting with legs, limiting twisting, and getting help in moving bulky/heavy materials and equipment.</li> <li>Mechanical equipment shall be used as much as possible to minimize manual lifting.</li> <li>Follow controls in the HSP and SOP, Lifting</li> </ul>
	Exposure to site contaminants	<ul style="list-style-type: none"> <li>Contractor to set up work zones, perform air monitoring, wear PPE, and perform equipment/personal decontamination in accordance with contractor's HSP.</li> <li>PPE includes minimum PPE (hard hat, safety-toed boots, safety glasses with sideshields)</li> <li>Perform air monitoring as specified in the HSP. Follow protocol in HSP.</li> <li>Properly remove PPE and wash hands and face, no smoking, drinking, eating in the EZ or CRZ.</li> <li>Buddy system will be used when entering the EZ.</li> </ul>
	Traffic hazards	<ul style="list-style-type: none"> <li>Wear high visibility traffic vests near heavy equipment or traffic.</li> <li>Contractor to utilize traffic control equipment (cones, delineators, etc.) to route traffic around work area, as needed.</li> </ul>

**ACTIVITY HAZARD ANALYSIS**

<p align="center"><b>Equipment to be used</b> (List equipment to be used in the work activity)</p>	<p align="center"><b>Inspection Requirements</b> (List inspection requirements for the work activity)</p>	<p align="center"><b>Training Requirements</b> (List training requirements including hazard communication)</p>
<ul style="list-style-type: none"> <li>· Heavy Equipment and support trucks</li> <li>· Traffic control equipment</li> <li>· Fuel storage/equipment</li> <li>· Hand and power tools</li> <li>· Fire Extinguisher (present in area)</li> <li>· Eye Wash (present in area)</li> <li>· First Aid Kit (present in area)</li> <li>· PPE</li> </ul>	<ul style="list-style-type: none"> <li>· Inspect all vehicles, equipment, tools, and PPE prior to each use (remove from service any defective equipment)</li> <li>· Calibrate air monitoring equipment daily</li> <li>· Visual inspections of work area daily</li> <li>· Use applicable Self-Assessment Checklists in HSP.</li> </ul>	<ul style="list-style-type: none"> <li>· OSHA 40-hour HAZWOPER initial training, current refresher, 3-day OJT, and medical clearance.</li> <li>· Training on CH2M HILL HSP and applicable AHAs.</li> <li>· Qualified CH2M HILL Safety Coordinator-HW.</li> <li>· Hazard Communication training (see hazard communication section of HSP) for any chemicals brought onsite.</li> <li>· Qualified subcontractor operators (for equipment such as drill rigs, forklifts, aerial lifts)</li> <li>· Documented training on MSDSs for any chemicals used.</li> <li>· Qualified SHSO (with SC-HW training)</li> </ul>

**ACTIVITY HAZARD ANALYSIS**

PRINT NAME

SIGNATURE

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

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

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

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

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

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### Activity Hazard Analysis (AHA)

<b>Task: Mobilization/Demobilization and Site Walkover</b>	<b>Date: May through October 2014</b>
	<b>Project: Velsicol Phase 2 ANP RA - 462655</b>
<b>Description of the work:</b>  <b>1. Mobilization</b> <b>2. Equipment Unloading &amp; Staging</b> <b>3. Site Set Up</b>	<b>Site Supervisor: James Eluskie</b>
	<b>Site Safety Officer: Steve Chumney</b>
	<b>Review for latest use:</b> Each time before the job is performed.

Task Breakdown	Identify & Analyze the Hazards	Identify Hazard Controls
Vehicle Check (prior to driving)	§ Hand injuries, cuts, bruises, pinch points § Slips, trips, & Falls	§ Wear protective gloves; Use hand tools in a safe manner and keep hand tools in good working condition. § Use extreme caution when walking in work areas, working on or around truck beds and around equipment during unloading and staging activities. Watch for ice, uneven pavement or obstructions. Keep lookout for other vehicles.
Driving	§ Traffic accident § Driver fatigue § Poor driving skills § Load shift	§ Keep alert of your surroundings. Do not try to complete other tasks while driving that can distract your attention § Do not drive when tired. Pull off at a safe location and walk around your vehicle and take a break if getting tired. § Use your mirrors while driving. Do not use evasive driving actions. Obey traffic laws. § Secure loads before starting your trip. Make frequent stops to check your load to make sure nothing has become loose. Retighten any loose straps. § Reduce speed as needed depending on road conditions. § Do not talk or text on a mobile device or program GPS when driving § Use Defensive Driving Techniques
Vehicle Backing	§ Traffic accident § Property damage	§ Check your surroundings when before backing. When possible use a spotter. If no spotter available. GOAL – Get Out and Look before backing. § Check for obstructions before backing. Walk around vehicle to make sure area is clear.
Unloading/placing equipment.	<ul style="list-style-type: none"> <li>· Back strain</li> <li>· Hand Injuries; cuts, bruises, pinch points</li> <li>· Slips, Trips, &amp; Falls</li> <li>· Contact with Heavy Equipment while in use (Struck by</li> </ul>	<ul style="list-style-type: none"> <li>· Use proper lifting techniques at all times. Request assistance from other personal when weight limits exceeds 40 lbs. Mechanical means shall be used for gate relocation whenever possible rather than manual means to avoid the risk of stains and sprains.</li> </ul>

### Activity Hazard Analysis (AHA)

Task Breakdown	Identify & Analyze the Hazards	Identify Hazard Controls
	object/line of fire).	<ul style="list-style-type: none"> <li>· Wear protective gloves; Use hand tools in a safe manner and keep hand tools in good working condition.</li> <li>· Use extreme caution when walking in work areas, working on or around truck beds and around equipment during unloading and staging activities.</li> <li>· Only trained and experienced personnel will be allowed to stage and unload heavy equipment.</li> <li>· Only certified operators will be authorized to operate equipment. Certifications must be on site at all times.</li> <li>· High visibility vests will be worn at all times while working in or around heavy equipment, trucks or other mechanized equipment.</li> <li>· All ground personal etc. must maintain eye contact with operators at all times. Do not proceed toward, or into blind spots of equipment without authorization to do so by operator.</li> <li>· All ground personal will stay outside the swing radius of equipment while in operation.</li> </ul>
General Construction Hazards	§ Accidents due to lack of training	§ Worker will be trained prior to performing new activities. Copies of records will be kept by the SSO. This includes signature sheets for AHAs. HASP and any other training documents. § A daily tailgate safety meeting will be held prior to starting each shift. All personnel must attend, review, and sign the Safety Tailgate log before beginning work. CH2M HILL Staff should be present. § All site workers must understand all Emergency procedures, AHA and HASP procedures and signoff that they have reviewed such documents. § A copy of each Tailgate meeting must be supplied to the CH2M HILL onsite rep each day.
I	§ Head Injury  § Eye Injury	§ ANSI-approved hard hats will be worn at all times, in the manner they are designed (brim forward, no modifications, no ball caps, etc.)  § Workers will wear protective eyewear with side shields that meet ANSI Z-87 at all times.
	§ Hearing Damage  § Foot Injury  § Hand Injury	§ Workers will wear hearing protection whenever voices must be raised above normal conversational speech or when noise levels exceed 85 decibels due to a loud noise source; such as working around heavy equipment. § Hearing protection will be worn by equipment operators when working in open cab equipment, or when doors/windows are open.  § Workers will wear safety-toed leather work boots at all times.  § Leather gloves shall be worn when handling sharp, rough, or

### Activity Hazard Analysis (AHA)

Task Breakdown	Identify & Analyze the Hazards	Identify Hazard Controls
General Construction Hazards (CONTINUED)	<p>§ Injuries resulting from manually lifting</p> <p>§ Injuries from being “caught” on equipment</p>	<p>slippery surfaces. Gloves should be on hand / person at all times for such task.</p> <p>§ Workers will be instructed in safe lifting techniques (i.e., back straight, bend at knees, load close to body, lift smoothly, and do not twist).</p> <p>§ Workers will utilize material handling devices such as forklifts, come-alongs, etc. as applicable.</p> <p>§ Two workers will be required for manual lifts of over 40 pounds. Workers are encouraged to get help with any lift that appears excessive or awkward.</p> <p>§ Split heavy loads into smaller loads whenever possible.</p> <p>§ Make sure the path of travel is clear prior to the lift.</p> <p>§ Workers will avoid wearing loose-fitting clothing.</p> <p>§ Workers will keep hands away from moving parts.</p> <p>§ All equipment should have all guards in place to protect employees from this hazard.</p>
	§ Injuries from slips, trips, and falls	<p>§ Walking/working surfaces will be kept free of clutter, debris, and congestion to the greatest extent possible.</p> <p>§ Personnel will be briefed on the hazards of wet, muddy soil hazards and traversing uneven grades.</p> <p>§ Walk or climb only on equipment and/or surfaces that are designed for personnel access.</p> <p>§ Be aware of potential for poor footing while working on un-compacted backfill materials.</p> <p>§ Use three-point contact when climbing onto equipment.</p>
Heavy Equipment Operations	§ Injuries and accidents due to equipment failures	<p>§ Only trained and qualified operators will inspect machinery before use and complete the Daily Inspection checklist. This is required each morning and the checklist must be turned in to the CH2M HILL Site rep.</p> <p>§ Use three-point contact when climbing onto equipment.</p> <p>§ All heavy equipment will be equipped with a functional backup alarm.</p> <p>§ Operators will be instructed to maintain visual contact with personnel working in the immediate equipment area. Hand signals will be used to communicate with operators when necessary and applicable.</p> <p>§ Passengers will be prohibited from riding in or on equipment.</p> <p>§ Seat belts shall be used in accordance with manufacturer’s specifications.</p> <p>§ Fire extinguishers will be mounted on all equipment and kept in site vehicles.</p> <p>§ Hearing protection will be worn by equipment operators when working in open cab equipment, or when doors/windows are open.</p> <p>§ High visibility safety vests will be required at all times.</p>



### Activity Hazard Analysis (AHA)

Task Breakdown	Identify & Analyze the Hazards	Identify Hazard Controls
	§ Injuries due to contact with equipment	§ Workers on the ground will maintain visual contact with the equipment operator when heavy equipment is used. High visibility vests will be worn at all times in an active work zone. § Workers on the ground will not enter an equipment swing radius. § Equipment requiring an operator will not be permitted to run unattended. § All heavy equipment will be equipped with a functional backup alarm. § Workers on the ground will wear high visibility safety vests. § When working in areas that pedestrian or vehicle traffic may be present signs, cones and a spotter may be necessary at times.
	§ Injury due to inclement weather	§ Outdoor work will cease during extreme weather conditions, such as electrical storms, high wind, heavy rain, thunderstorms, and extreme temperatures. § Shut all equipment down when lightning is visible and wait for "all-clear" from the SSO. 30 minute stand down after last thunder clap or visible lightning strike. § Workers will take cover indoors or in vehicle; if necessary follow the emergency procedures for extreme weather conditions. § Supervisors will monitor local forecasts for warnings about specific weather hazards. § Workers will comply with all evacuation orders regarding rough weather directives.
	§ Heat Stress	§ Workers will be trained in the recognition of heat stress and appropriate actions to take. § Workers are encouraged to increase fluid intake while working. § Workers should minimize or avoid alcohol intake the night before working in heat stress situations. § Workers will increase the frequency and duration of rest breaks while working in heat stress situations. § Workers will watch each other for signs and symptoms of heat exhaustion and fatigue.
Site Prep and any manual labor	§ Contusions, abrasions, cuts, and amputations from working with hand and power tools	Tools shall be inspected prior to use. All power tools originally equipped with a safety guard of any type shall be used only with the guard in place and functioning properly. Defective tools shall be tagged and removed from service. Tools shall be used only for their intended purpose and according to manufactures specifications.

### Activity Hazard Analysis (AHA)

Task Breakdown	Identify & Analyze the Hazards	Identify Hazard Controls
General Construction Hazards (CONTINUED)	§ Refueling of equipment	§ Shut down equipment during refueling. § Allow equipment to cool down before refueling. § Refuel from OSHA-compliant portable fuel container. Container will be metal with spark arrestor. Container must be properly labeled. § Personnel performing the refueling operation will exercise caution to avoid spillage. § Absorbent pads and spill kit will be kept near the refueling operations. § Prior to fueling, personnel shall bond the heavy equipment to fueling equipment. § A fire extinguisher will be located in the immediate area during refueling operations. § Secured fuel tanks will be allowed in company pick-up trucks. Fire extinguishers and proper labels are required if transporting fuel
	§ Controlling work areas	§ Fencing, tape, cones or other SSO-approved boundaries will be erected to warn approaching personnel of the hazardous area. § Appropriate signs will be posted at the boundary to instruct personnel in entry requirements. § Traffic control measures will be utilized in the active work area to minimize traffic.
	§ Emergencies	§ Ensure at least one person on each shift has first aid, cardiopulmonary resuscitation (CPR) and bloodborne pathogens training. Two persons are required on Hazwoper sites. § Ensure radio or phone communications capabilities are available to contact the CM or SSO to summon emergency response or report spills/ releases. § Ensure all personnel are familiar with emergency procedures and egress routes. § Personnel who have medical conditions that may be exacerbated by working conditions should notify the CM and SSO of these conditions. § Know the rally points during an emergency. Shut down equipment stay off phones and head to the closest rally point.
	§ Chemical Exposure	§ MSDSs are required for all chemicals brought to the site. § The MSDS book will be kept at the Work area or in the Contractor Lead truck and will be available to all employees.
	§ Spills	§ Spill clean up materials will be staged on the site or on transport vehicle, as necessary. § SSO is to be notified immediately of the spill, regardless of the size or material spilled.

### Activity Hazard Analysis (AHA)

Task Breakdown	Identify & Analyze the Hazards	Identify Hazard Controls
	§ Injuries associated with insects, snakes, spiders and poisonous plants	§ Workers will tuck pants into socks and wear long sleeves and sturdy leather boots when walking in tall grass. § Workers will use insect repellent when needed. § Workers will use buddy system to check for signs of insect and spider bites, such as redness, swelling, and flu-like symptoms if bitten. § If workers have known or suspected allergies, they will carry an Epi-Pen at all times and will notify CH2M HILL and Subcontractor of allergies. § If bitten by any insect notify the CH2M HILL (CCI) oversight rep immediately. This includes any type of injury that would require any type of First Aid.
General Construction Hazards (CONTINUED)	§ Injuries associated with hand tools	§ Tools shall be carried in a safe and proper manner. § Tools shall not be carried up a ladder by hand; tools should be raised or lowered in a tool bag. § Defective tools shall be tagged immediately and removed from service. § Tools shall be used correctly and only for their intended purpose. § Hand tools will be inspected for mushroomed heads, broken or cracked handles, or loose heads prior to use.
	§ Injuries associated with power tools	§ Worker will inspect tools and electrical cords before use. § Defective tools will be tagged and removed from service. § A GFCI will be used to protect all electrical tools. § Portable generators of 5kW or larger will be grounded. § Electrical tools shall be unplugged when changing attachments or performing maintenance. § Electric tools with missing ground prongs, cut or frayed cords shall be removed from service. § Electric tools used in highly conductive locations, such as where employees may contact water, shall be approved for use in these locations. § Pneumatic tools shall be disconnected and air pressure released before repairs are made. § Extension cords shall be inspected prior to and after use. Damaged cords will be tagged and taken out of service.
	§ Unauthorized vehicles	§ No unauthorized vehicles will be allowed on FPS. Vehicles used to travel to and from FPS will be parked in designated parking area outside of FPS, and only authorized site vehicles will be used onsite. § All vehicles must be inspected for safe operation onsite. § Vehicles must be placarded with contractor's name. Unless it is for Transport only to and from the site. § Vehicle operators will be instructed in safe operations while on the site. § Seat belts will be worn by all vehicle occupants. § Cell phones will not be used when operating a vehicle or

### Activity Hazard Analysis (AHA)

Task Breakdown	Identify & Analyze the Hazards	Identify Hazard Controls
		equipment. . § Maintain a fire extinguisher, first aid kit, evacuation map, and route to hospital map/directions, and contact list in all vehicles.
One time deliveries or service calls such as repairs to equipment.	Unescorted visitors breaching policies or misunderstanding evacuation alarms in an Emergency.	· All service calls, delivery personnel must sign in and be escorted at all times.

EQUIPMENT TO BE USED	INSPECTION REQUIREMENTS	TRAINING REQUIREMENTS
Hand tools  Mower, weed eater, pumps, sampling equipment	Visually Inspect hand tools  Visually inspect heavy equipment daily for proper controls, operators manual, fire extinguishers; Inspect hydraulic hoses for leaks prior to staging equipment on site. (All equipment inspections will be turned in to CH2MHill)	None  1.) Only trained and experienced personnel will be allowed to stage and unload heavy equipment. a. Only certified operators will be authorized to operate equipment. Certifications must be on site at all times. b. High visibility vests will be worn at all times while working in or around heavy equipment, trucks or other mechanized equipment. c. All ground personal etc. must maintain eye contact with operators at all times. Do not proceed toward, or into blind spots of equipment without authorization to do so by operator. d. All ground personal will stay outside the swing radius of equipment while in operation.

**Activity Hazard Analysis (AHA)**

**PRINT**

**SIGNATURE**

**Supervisor Name:**

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**Date/Time:**

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**Safety Officer Name:**

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**Employee Name(s):**

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ACTIVITY HAZARD ANALYSIS

<b>Date:</b> April 2014		Task Risk Assessment Code (RAC): E = Extremely High Risk H = High Risk M = Moderate Risk L = Low	<b>Low</b>																																	
<b>Job/Activity:</b> Pre-Construction P2 ANP Residential Owner Meetings																																				
<b>Project:</b> Velsicol Phase 2 ANP Remedial Action		<b>Probability</b>  <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th></th> <th>Frequent</th> <th>Likely</th> <th>Occasional</th> <th>Seldom</th> <th>Unlikely</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;"><b>Catastrophic</b></td> <td style="text-align: center;">E</td> <td style="text-align: center;">E</td> <td style="text-align: center;">H</td> <td style="text-align: center;">H</td> <td style="text-align: center;">M</td> </tr> <tr> <td style="text-align: center;"><b>Critical</b></td> <td style="text-align: center;">E</td> <td style="text-align: center;">H</td> <td style="text-align: center;">H</td> <td style="text-align: center; background-color: #cccccc;">M</td> <td style="text-align: center;">L</td> </tr> <tr> <td style="text-align: center;"><b>Marginal</b></td> <td style="text-align: center;">H</td> <td style="text-align: center;">M</td> <td style="text-align: center;">M</td> <td style="text-align: center;">L</td> <td style="text-align: center;">L</td> </tr> <tr> <td style="text-align: center;"><b>Negligible</b></td> <td style="text-align: center;">M</td> <td style="text-align: center;">L</td> <td style="text-align: center;">L</td> <td style="text-align: center;">L</td> <td style="text-align: center;">L</td> </tr> </tbody> </table>						Frequent	Likely	Occasional	Seldom	Unlikely	<b>Catastrophic</b>	E	E	H	H	M	<b>Critical</b>	E	H	H	M	L	<b>Marginal</b>	H	M	M	L	L	<b>Negligible</b>	M	L	L	L	L
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<b>Marginal</b>	H	M	M	L	L																															
<b>Negligible</b>	M	L	L	L	L																															
<b>Prepared by:</b> James Eluskie/DET																																				
<b>Reviewed by (PM/Site Supervisor/H&amp;S):</b> Carl Woods/CIN																																				
Description of the work: Site visits by project personnel and visitors.																																				
<b>Severity</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)																																		
General preparation	Forgotten safety equipment, no cell phone coverage, lack of emergency preparedness, untimely reporting of an injury or other incident	<ul style="list-style-type: none"> <li>• Complete HSP, AHA review</li> <li>• Complete PTSP, daily safety meeting, and quality briefing.</li> <li>• Check for cell phone coverage.</li> <li>• Designate rally point and evacuation point (daily if working in new locations each day).</li> <li>• Check daily weather report and plan activities around severe weather.</li> <li>• Review, inspect and locate safety equipment including fire extinguisher, first aid kit, insect repellant, PPE, water, food, spill kits, etc.</li> <li>• Be sure to review the requirements for incident notification, reporting and investigation section of the HSP. Report all injuries, no matter how minor. If you are unsure whether an event should be reported, contact your RHSM. Be sure to report near misses.</li> </ul>																																		
Hazards and controls applicable to all steps of field work.	Temperature Extremes ( <b>heat</b> )	<ul style="list-style-type: none"> <li>• Acclimatize to work in hot weather by working in heat and taking more frequent breaks, systematically building up</li> </ul>																																		

		<p>tolerance to heat</p> <ul style="list-style-type: none"> <li>• Conduct meetings in the early morning if possible to avoid heat or inclement weather.</li> <li>• Follow the requirements for physiological monitoring as stated in the HSP.</li> <li>• Be conscious of your individual tolerance to work in hot weather and monitor yourself and co-workers for signs and symptoms of heat stress.</li> <li>• Take breaks as necessary in shady or cool areas and drink plenty of liquids.</li> <li>• Take regular breaks in an air-conditioned truck or trailer during warm weather. Use a wide-brim hat or an umbrella or have a place where shade has been set up (tent or other temporary structure) when working under direct sun for extended periods.</li> <li>• Persons who experience signs of heat or cold stress should contact the SC, PM and RHSM. Call the occupational nurse first if symptoms are severe at 1-866-893-2514.</li> </ul>
	<p>Temperature Extremes <b>(cold)</b></p>	<ul style="list-style-type: none"> <li>• Read and follow cold stress precautions specified in the HSP.</li> <li>• Wear layers and ensure you're dressed adequately for site conditions.</li> <li>• Takes breaks in a warm location as necessary and stay hydrated with warm fluids (avoid caffeine).</li> <li>• Monitor your co-workers for signs of cold stress.</li> <li>• Persons who experience signs of heat or cold stress should contact the SC, PM and RHSM. Call the occupational nurse first if symptoms are severe at 1-866-893-2514.</li> </ul>
	<p>Dogs</p>	<ul style="list-style-type: none"> <li>• Be aware of loose dogs in the neighborhood</li> <li>• If an aggressive dog approaches, do not run, but if possible move slowly toward vehicle and take shelter in vehicle until the dog is at a safe distance away or an owner places a leash on it.</li> <li>• Avoid approaching a chained dog in a yard, regardless of breed</li> </ul>

ACTIVITY HAZARD ANALYSIS

	Small Animal Hazards	<ul style="list-style-type: none"><li>• If scratched or bitten, immediately seek medical attention.</li></ul>
	Wasps/Bees	<ul style="list-style-type: none"><li>• Keep exposed skin to a minimum.</li><li>• Carry a kit if you have had allergic reactions in the past, and inform your supervisor and/or a buddy. When working at a remote location, ensure that first-aid kits contain over-the-counter allergy and itch medication (e.g., Benadryl, Claritin, etc) as well as other over-the-counter medications that may not be available to aid in symptom treatment.</li><li>• If bees or other stinging insects are known to be present, determine whether additional protective clothing should be donned before entering/working in brushy areas.</li><li>• Consider if heavy-weight clothing or tyvek, or head netting would provide additional protection in areas where wasps/bees are known or suspected. Be aware of heat stress conditions additional clothing may cause.</li><li>• Use insect repellent on clothing. Wear light-colored clothing and remove bright reflective safety-colored clothing if not working near a roadway as these may attract the wasps.</li><li>• Wear fragrance-free or lightly-scented sunscreen, and body lotions. Bees are attracted to sweet scents. Avoid using floral scented soaps, shampoos, or conditioners.</li><li>• If you encounter a wasp, back away slowly and calmly, do not run or swat at the insect. Wait for it to leave, or gently move or brush it off gently with a piece of paper or other light object. Do not use your hand.</li><li>• If you are stung, contact the occupational nurse at 1-866-893-2514, no matter how minor it may seem. If a stinger is present, remove it as soon as possible using something with a thin, hard edge (e.g., credit card) to scrape the stinger out. Be sure to sanitize the object first with hand sanitizer, alcohol or soap and water. Wash and disinfect the wound, cover it, and apply ice. Watch for an allergic reaction if you have never been stung before. Call 911 if the reaction is severe.</li><li>• Use wasp/bee spray if necessary in accordance with manufacturer's labeling and direction for use.</li></ul>
	Brown Recluse and other spiders	<ul style="list-style-type: none"><li>• Wear long sleeves shirts and long pants, no matter the</li></ul>



ACTIVITY HAZARD ANALYSIS

		<p>weather.</p> <ul style="list-style-type: none"><li>• Always wear gloves when opening wells, or reaching into areas where spiders or other insects may be.</li><li>• Inspect or shake out any clothing, shoes, or equipment before use. Inspect tools, backpacks, etc. after working in field prior to stowing.</li><li>• Minimize the empty spaces between stacked materials.</li><li>• Remove and reduce debris and rubble from around the outdoor work areas.</li><li>• Trim or eliminate tall grasses from around outdoor work areas.</li><li>• Store apparel and outdoor equipment in tightly closed plastic bags.</li><li>• Keep your tetanus boosters up-to-date (every 10 years). Spider bites can become infected with tetanus spores.</li><li>• If you think you have been bit by a poisonous spider, immediately call the occupational nurse at 1-866-893-2514 and notify the PM and RHSM.</li></ul>
	Other biological hazards	<ul style="list-style-type: none"><li>• Refer to the HSP for controls on other biological hazards possibly present dependent on season/location, including snakes, spiders, and poisonous plants.</li></ul>
	Inclement weather	<ul style="list-style-type: none"><li>• Sudden inclement weather can rapidly encroach upon field personnel. Preparedness and caution are the best defenses. Carry clothing appropriate for inclement weather.</li><li>• Take heed of the weather forecast for the day and pay attention for signs of changing weather that indicate an impending storm. Signs include towering thunderheads, darkening skies, or a sudden increase in wind. If stormy weather ensues, field personnel should discontinue work and seek shelter until the storm has passed.</li><li>• Avoid working during thunderstorms.</li><li>• If caught in one, seek shelter.</li><li>• Avoid lone trees as shelter and open, bare areas.</li><li>• If caught in open area, place feet close together and crouch down as small as possible, without lying on the ground.</li></ul>

ACTIVITY HAZARD ANALYSIS

		<ul style="list-style-type: none"><li>• Ground strikes are known to be initiated by “leaders”, or charges, from the earth making a connection to the charge in the clouds. This may cause your hair to stand up, and since you do not want to be part of a leader that makes the connection to form a cloud-to-ground strike, immediately crouch as described above.</li><li>• Avoid low lying areas such as washes after rain as they can flood.</li><li>• Take time to review where the closest structure that can be used when severe weather occurs and what route will be used to get there. Listen to weather reports and plan for severe weather. Designate an emergency evacuation assembly area and evacuation routes for non-weather related emergencies (fire, etc.). Keep a copy of the Emergency Contact page from the HSP accessible.</li></ul>
Operating Work Vehicle to site	Traffic accidents	<ul style="list-style-type: none"><li>• Inspect the vehicle prior to departure.</li><li>• If driving a rental car, become familiar with the safe operation of vehicles of the type and size to be operated. Large vehicles such as full size vans and pick-ups have different vision challenges and handling characteristics than smaller vehicles.</li><li>• Drivers shall not use cellular phones, or other two-way communication devices while driving (including hands-free devices). Pull over and park the car to make or take phone calls, text, or e-mail.</li><li>• Be sure to take adequate rest breaks when driving, especially on long distance trips.</li><li>• Obey speed limits; be aware of blind spots or other hazards associated with low visibility. Practice defensive driving techniques, such as leaving plenty of room between your vehicle and the one ahead of you.</li><li>• If vehicle is malfunctioning, don't pull over off the road suddenly. Give the traffic behind you notice that you are pulling off.</li><li>• Always wear seatbelt in vehicle, regardless of length of drive.</li><li>• Apply Get Out and Look (GOAL) when returning to the</li></ul>

ACTIVITY HAZARD ANALYSIS

		vehicle to prevent property damage and injury by looking for obstructions, personnel or other items. Back slowly and use a spotter when view is obstructed.
Vehicle Parking	Pedestrian accidents and vehicle fires	<ul style="list-style-type: none"> <li>• Vehicles should be parked off road in areas where access to from vehicles is safe and avoids active roadways.</li> <li>• Do not park vehicle over grassed areas due to the potential fire hazard from the catalytic converter. Park on gravel or paved areas whenever possible.</li> <li>• Do not block any property access roads.</li> <li>• Wear reflective orange vests when near traffic.</li> <li>• Know the location and operation of the fire extinguisher carried in the field vehicle or near treatment system.</li> </ul>
Walking to Meetings	Slips, trips, and falls	<ul style="list-style-type: none"> <li>• Inspect area for slip, trip, and fall hazards.</li> <li>• Wear proper footwear, with good tread.</li> <li>• Be alert to potential deterioration of walking and working surfaces, such as heaving sidewalks and potholes in road.</li> <li>• Pay attention and constantly observe the work area for hazards, changing weather conditions, biological hazards.</li> </ul>

**ACTIVITY HAZARD ANALYSIS**

<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)
<ul style="list-style-type: none"><li>• Portable eye wash, fire extinguisher</li><li>• First Aid/Bloodborne pathogen kit</li><li>• Biological hazard precautions (insect spray, wasp spray if needed).</li><li>• Sunscreen</li></ul>	<ul style="list-style-type: none"><li>• Inspect all vehicles</li><li>• Ensure cell phone has coverage and have fully charged.</li><li>• Determine daily rally point/evacuation route.</li><li>• Use applicable Self-Assessment Checklists as required per the HSP.</li></ul>	<ul style="list-style-type: none"><li>• Training on CH2M HILL HSP</li><li>• Hazard Communication training (see HSP for how to document)</li><li>• VO Modules as required by the Velsicol Sitewide Health and safety plan.</li></ul>

PRINT NAME

SIGNATURE

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

\_\_\_\_\_

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

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

\_\_\_\_\_

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

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

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LONE WORKER

CALL - IN CONTACT FORM

Date of site work: \_\_\_\_\_ Expected start time: \_\_\_\_\_

Name of CH2M HILL employee in the field: \_\_\_\_\_

Name of CH2M HILL employee responsible to receive contact:

Client Emergency Contact (if any):

CH2M HILL employee's contact numbers:

Radio # \_\_\_\_\_

Cell Phone # \_\_\_\_\_

Address and Location of work: \_\_\_\_\_

Field Vehicle Information:

Make: \_\_\_\_\_

Model: \_\_\_\_\_

License Plate #: \_\_\_\_\_

Directions/Map:

Planned Activity: \_\_\_\_\_

Specified Frequency and time for call in: \_\_\_\_\_

Time	Verified	Location

<b>Activity: Vessel based sediment and fish sample collection activities at Pine River, St. Louis, MI</b>	<b>Date: September 2013</b>
	<b>Project: Velsicol OU3, St. Louis, MI</b>
<b>Description of the work: Vessel based sediment and tissue sampling including collections using sediment corers, seine nets, and electrofishing.</b>	<b>Site Supervisor: Grant Koster/DET or Tom Hutchinson/DET</b>
	<b>Site Safety Officer: Grant Koster/DET or Steve Chumney/DET</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)
General vessel operations/vessel launching.	1. Vessel malfunctions	1. Pre-launch vessel inspection, including filling in checklist and determining that motor(s) function properly.
General offshore activities using boat, including visual surveys and field reconnaissance.	1. Personnel falling overboard.	1. Approved USCG personal flotation devices will be worn by all onboard personnel when working on the watercraft.
	2. Electrical or ignitable sources (fuel) creating the potential for fire.	2. Approved fire extinguishers will be onboard and readily accessible. Personnel will be trained in the proper use of fire extinguishers.
	3. Severe weather encountered on Water Body.	3. Marine radio will monitor weather broadcasts. Crew will be equipped with cellular phones.
	4. Thermal stress due to cold and/or inclement weather	4a. Personnel will wear appropriate cool weather, water resistant clothing. Work/rest cycles will be implemented if needed. Personnel will monitor each other for signs of cold stress. Water and Gatorade will be available for personnel to remain hydrated.

<p align="center"><b>Work Activity Sequence</b> (Identify the principal steps involved and the sequence of work activities)</p>	<p align="center"><b>Potential Health and Safety Hazards</b> (Analyze each principal step for potential hazards)</p>	<p align="center"><b>Hazard Controls</b> (Develop specific controls for each potential hazard)</p>
		<p>4b. Float coats or Mustang work suits (or equivalent) will be worn if conditions warrant. See chart at bottom for additional information regarding cold weather work on the water.</p>
	<p>5. Slips and falls during boarding vessel</p>	<p>5a. Dock utilized should be in good repair and there should not be an excessive distance between dock surface and vessel deck.</p> <p>5b. Maintain three point contact when boarding and exiting the vessel.</p> <p>5c. To extent possible, equipment and supplies should be handed to staff members on/off the vessel, rather than trying to carry on/off the boat.</p>
<p>Sediment sampling activities.</p>	<p>1. Boat tipping during sampling.</p>	<p>1. Approved USCG personal flotation devices will be worn by all onboard personnel when working on the watercraft. During sampling the boat will be anchored and stabilized.</p>
	<p>2. Underground utilities; electrocution, explosion.</p>	<p>2a. Utility clearance will be performed before all intrusive work.</p> <p>2b. Shoreline will be observed at each location to determine if utility clearance marked lines crossing river in or around the sampling location.</p>
	<p>3. Sampling equipment or tools falling on or striking workers.</p>	<p>3.a. Hard hats and safety shoes or boots must be worn by all workers and visitors if equipment is suspended above head height.</p> <p>3.b. Only trained personnel shall work sampling equipment. All others will stand as directed by the boat captain out of the range of the equipment.</p>
	<p>4. Objects/splashes in eyes during equipment retrieval.</p>	<p>4. Wear safety glasses.</p>



<p align="center"><b>Work Activity Sequence</b> (Identify the principal steps involved and the sequence of work activities)</p>	<p align="center"><b>Potential Health and Safety Hazards</b> (Analyze each principal step for potential hazards)</p>	<p align="center"><b>Hazard Controls</b> (Develop specific controls for each potential hazard)</p>
	<p>5. Slips, trips and falls.</p>	<p>5.a. Keep safety boots free of mud and grease.            5.b. Keep sharp objects off ground in work area.            5.c. Inspect work zones and remove trip hazards.            5.d. Vessel deck will be kept clean of mud, grease and ice.</p>
	<p>6. Hand injuries.</p>	<p>6.a. Keep hands away from hoists, wire, and rope.            6.b. When opening sample casing joints, position hands so that fingers will not be injured should the casing slip.            6.c. Keep tools clean and dry.            6.d. Scoops will be used to handle sediment; sediment will not be manipulated with hands unless cut resistant gloves are worn.            6e. Hand tools will be inspected prior to use to assure they are in good repair.            6f. Staff will review proper use of equipment prior to use to determine pinch points and other possible hazards.</p>
	<p>7. Exposure to potentially contaminated sediment or water</p>	<p>7a. Wearing proper PPE (i.e. nitrile gloves and rain gear or coated tyvek) during any phase of work that requires contact with potentially contaminated material.            7b. Good hygiene practices (hand washing) will be maintained.</p>
	<p>8. Strain/Back Injuries during core recovery.</p>	<p>8.a Rope and hoists (or cathead) will be used in core recovery to minimize physical strain of sediment grab recovery.            8.b. Two-person sampling teams will rotate duties to minimize repetitive physical stress.            8.c. Team lifting will be utilized to move heavy sample coolers or equipment when required.            8.d. Proper lifting technique (lift with the legs) will</p>

<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)
		be used.
	9. Entanglement in lines as equipment is deployed	9a. Lines will neatly coiled on deck or placed in line-totes; care will be taken to make sure staff are not positioned in the path of the line. 9b. All non-essential personnel will exit the work area prior to deployment.

<b>Marine Vessel Checklist</b>		
	<b>Yes</b>	<b>N/A</b>
Personal Flotation Devices (PFDs)		
Visual Distress Signals (e.g., spotlight, flag)		
Anchor and Anchor Line		
Sound-Producing Devices (e.g., whistle, airhorn)		
Navigation Lights		
Fire Extinguishers		
Alternative Propulsion (e.g., paddles)		
Overall Vessel Condition Satisfactory		
State/Coast Guard Requirements met		
Spill Kit		
Marine Sanitation Device		
Ropes and Bumpers		
First Aid Kit and Bloodborne Pathogen Kit		
Nonslip Deck		
Emergency Access Ladder		

<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)
Vessel  Vibracoring and sediment sampling equipment, water sampling equipment	Self-Assessment Checklist—Open Water Work Per vendor/manufacturer specification and subcontractor H&S plan prior to each survey.	OSHA 40-hr Hazwoper, Able to swim, Review of HSE-404  OSHA 40-hr Hazwoper, User qualified.

Water Temperature (F)	Expected Time Before Exhaustion or Unconsciousness	Expected Time of Survival
32.5°	< 15 minutes	45 minutes
32.5° - 40°	15 - 30 minutes	30 - 90 minutes
40° - 50°	30 - 60 minutes	1 - 3 hours
50° - 60°	1 - 2 hours	1 - 6 hours
60° - 70°	2 - 7 hours	2 - 40 hours
70° - 80°	3 - 12 hours	3 hours - Indefinite
> 80°	Indefinite	Indefinite

**PRINT NAME**

**SIGNATURE**

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

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

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

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<b>Date:</b> March 2014		Task Risk Assessment Code (RAC):  L = Low	<b>Medium</b>																																						
<b>Job/Activity:</b> Observation of drilling																																									
<b>Project:</b> Velsicol RDI		E = Extremely High Risk H = High Risk M = Moderate Risk  <table border="1"> <tr> <td colspan="2"></td> <th colspan="5">Probability</th> </tr> <tr> <td colspan="2"></td> <th>Frequent</th> <th>Likely</th> <th>Occasional</th> <th>Seldom</th> <th>Unlikely</th> </tr> <tr> <th rowspan="4" style="writing-mode: vertical-rl; transform: rotate(180deg);">Severity</th> <th>Catastrophic</th> <td>E</td> <td>E</td> <td>H</td> <td>H</td> <td>M</td> </tr> <tr> <th>Critical</th> <td>E</td> <td>H</td> <td>H</td> <td>M</td> <td>L</td> </tr> <tr> <th>Marginal</th> <td>H</td> <td>M</td> <td style="background-color: #cccccc;">M</td> <td>L</td> <td>L</td> </tr> <tr> <th>Negligible</th> <td>M</td> <td>L</td> <td>L</td> <td>L</td> <td>L</td> </tr> </table>			Probability							Frequent	Likely	Occasional	Seldom	Unlikely	Severity	Catastrophic	E	E	H	H	M	Critical	E	H	H	M	L	Marginal	H	M	M	L	L	Negligible	M	L	L	L	L
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<b>Prepared by:</b> Steve Chumney																																									
<b>Reviewed by (PM/Site Supervisor/H&amp;S):</b> Scott Pratt																																									
<b>Description of the work:</b> Observe drilling activities																																									
Work Activity Sequence <small>(Identify the principal steps involved and the sequence of work activities)</small>	Potential Health and Safety Hazards <small>(Analyze each principal step for potential hazards)</small>	Hazard Controls <small>(Develop specific controls for each potential hazard)</small>																																							
Preparing for activities outdoors	Warm/Hot weather/sun exposure, dehydration  Biological Hazards (Insects/Ticks-Lime Disease, Bees and Wasps, gnats, poisonous plants)  Severe Weather/Evacuation	<ul style="list-style-type: none"> <li>• Keep exposed skin covered or use sun block, drink plenty of water, avoid caffeinated beverages.</li> <li>• Follow temperature extremes section of HSP. Acclimatize to hot weather work.</li> <li>• Be conscious of your individual tolerance to work in hot weather and monitor yourself and co-workers for signs and symptoms of heat stress.</li> <li>• Stay hydrated; take breaks as needed in air-conditioned area (vehicle or trailer) to cool down.</li> <li>• Inspect work area for potential biological hazards including poisonous plants, bee hives or nests, ticks, gnats, etc.</li> <li>• Follow the biological hazard precautions, guidelines, and fact sheets in the safety plan for, ticks, snakes, hazardous plants, etc. If a biological hazard is identified that is not in the safety plan, contact the RHSM.</li> <li>• For ticks: wear light-colored long sleeved shirt and pants;</li> </ul>																																							

		<p>tuck pant legs into socks; spray only outside of clothing with permethrin or permanone; spray skin with only DEET; and check yourself frequently for ticks. If these control measures don't seem to be deterring ticks from getting on you, consider wearing PPE (e.g., Tyvek) or Bug-out suits.</p> <ul style="list-style-type: none"> <li>Take time to review where the closest structure that can be used when severe weather occurs and what route will be used to get there. Listen to weather reports and plan for severe weather. Designate an emergency evacuation assembly area and evacuation routes for non-weather related emergencies (fire, etc.). Keep a copy of the Emergency Contact page from the HSP accessible.</li> </ul>
<p>Mobilizing to location</p>	<p>Vehicle Break-down                      High foot and vehicle traffic on site                      Restricted access areas/unauthorized personnel                      Slips/trips/falls at work location                      Strains/sprains from lifting</p>	<ul style="list-style-type: none"> <li>Perform a visual of inspection of vehicle prior to use, including looking underneath the vehicle.</li> <li>Follow all posted speed limits and follow traffic patterns/haul routes.</li> <li>Always wear your seatbelt.</li> <li>Drive defensively.</li> <li>Use a spotter to maneuver in tight areas.</li> <li>Be aware of all restricted areas and obey rules regarding access to those areas. In general, avoid restricted areas whenever possible.</li> <li>Perform a visual inspection of the site, identify and remove potential trip hazards, verify walkways are clear and necessary equipment and safety supplies are readily available</li> <li>Use a buddy when necessary to haul equipment and supplies</li> <li>Follow the controls of the lifting section of the safety plan. In general, use your legs and not your back to lift, don't twist with a load, and plan your route before you unload to avoid slip/trip hazards. If over 40 pounds or is awkward use a buddy to help. Use material handling devices such as a dolly or the like whenever possible to reduce manual lifting.</li> <li>Ensure a spill kit, eye-wash unit, first aid and bloodborne pathogen kit, and fire extinguisher are at the location.</li> </ul>

<p>Observation of drilling</p>	<p>Slips, trips, and falls</p>	<ul style="list-style-type: none"> <li>• Inspect area for tripping hazards—mark or remove obstructions.</li> <li>• Wear safety-toed boots, with good tread.</li> <li>• Use good housekeeping practices, keeping the work area clear of potential tripping hazards.</li> </ul>
	<p>Fire/explosion/Spills</p>	<ul style="list-style-type: none"> <li>• Contractor to have spill materials and fire extinguisher in the area.</li> <li>• Keep ignition sources away from the work area.</li> <li>• No smoking in the area.</li> </ul>
	<p>Noise, flying debris, and entanglement with equipment.</p>	<ul style="list-style-type: none"> <li>• Personnel conducting oversight duties shall wear hearing protection if it is not possible to communicate with another person standing next to you using your normal voice.</li> <li>• Personnel shall maintain a safe distance from the drilling equipment.</li> <li>• Personnel shall wear eye protection and hard hats at all times when at the worksite.</li> <li>• Personnel shall not wear loose fitting clothing to avoid the potential for entanglement.</li> <li>• Operator should be verifying equipment condition daily before work start using equipment specific checklist, demonstrate emergency stop switch operability.</li> <li>• Be aware and stand clear of heavy objects that are hoisted overhead.</li> </ul>
	<p>Underground/overhead utilities</p>	<ul style="list-style-type: none"> <li>• CH2M HILL protocol for underground utilities include: a background/records assessment or known utilities or other subsurface obstructions; contacting the designated local utility locating service (e.g., MISS DIG); conducting an independent field survey to locate, identify and mark utilities/obstructions; and a visual survey of the area to validate the chosen location (see safety plan for details).</li> <li>• If drilling will be conducted within 5 feet of an underground utility (or when there is uncertainty about location), locations must be physically verified with non-aggressive means such as with air or water knifing, hand digging/augering.</li> <li>• Aggressive methods are never allowed within 2 feet of an</li> </ul>

		<p>identified high risk utility (utility that can't be de-energized or would cause significant impacts if damaged).</p> <ul style="list-style-type: none"> <li>• Deviation from these requirements must be approved by RHSM.</li> <li>• Ensure that all overhead utility lines are at least 10 feet away.</li> <li>• If an obstruction is encountered, suspend work and determine what it is. If it cannot be determined, contact the RHSM/client.</li> </ul>
	<p>Strains from manually moving materials, equipment, and drums.</p>	<ul style="list-style-type: none"> <li>• Personnel shall be directed to use proper lifting techniques such as keeping back straight, lifting with legs, limiting twisting, and getting help in moving bulky/heavy materials and equipment.</li> <li>• Mechanical equipment shall be used as much as possible to minimize manual lifting.</li> <li>• Follow controls in the HSP and SOP HSE-121, Lifting</li> </ul>



	<p>Exposure to site contaminants</p>	<ul style="list-style-type: none"> <li>• Contractor to set up work zones, wear PPE, and perform equipment/personal decontamination in accordance with HSP.</li> <li>• PPE includes minimum PPE (hard hat, safety-toed boots, safety glasses with sideshields, tyvek/coveralls to keep personal clothing clean, booties/nitrile gloves). Drilling in NAPL/DBCP areas will be initiated in Level B. Drilling in all other areas of the site can be initiated in Level D and modified as required.</li> <li>• Ventilation fans will be used as an engineering control for vapor exposure for all drilling activities.</li> <li>• Site contaminants are listed in section 12 of the HASP— primary exposure route is inhalation, ingestion, dermal absorption. Emphasize good PPE doffing procedures including properly removing PPE and washing hands and face after leaving the EZ, no smoking, drinking, eating in the EZ or CRZ.</li> <li>• Dust control will be implemented to “no visible dust”. If dust cannot be controlled to this level, contact the RHSM.</li> <li>• Buddy system will be used when entering the EZ.</li> </ul>
	<p>Traffic hazards</p>	<ul style="list-style-type: none"> <li>• Wear high visibility traffic vests near heavy equipment or traffic.</li> <li>• Contractor to utilize traffic control equipment (cones, delineators, etc.) to route traffic around work area, as needed.</li> </ul>

<p align="center"><b>Equipment to be used</b> (List equipment to be used in the work activity)</p>	<p align="center"><b>Inspection Requirements</b> (List inspection requirements for the work activity)</p>	<p align="center"><b>Training Requirements</b> (List training requirements including hazard communication)</p>
<ul style="list-style-type: none"> <li>· Hand and power tools, if needed</li> <li>· Fire Extinguisher (present in area)</li> <li>· Eye Wash (present in area)</li> <li>· First Aid Kit (present in area)</li> <li>· PPE</li> </ul>	<ul style="list-style-type: none"> <li>· Inspect all vehicles, equipment, tools, and PPE prior to each use (remove from service any defective equipment)</li> <li>· Use applicable Self-Assessment Checklists in HSP.</li> </ul>	<ul style="list-style-type: none"> <li>· OSHA 40-hour HAZWOPER initial training, 3-day OJT, current refresher and medical clearance.</li> <li>· Training on CH2M HILL HSP and applicable AHAs.</li> <li>· Qualified CH2M HILL Safety Coordinator-HW.</li> <li>· Hazard Communication training (see hazard communication section of HSP) for any chemicals brought onsite.</li> </ul>

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

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

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**Activity Hazard Analysis: Drilling Oversight**

<b>Task Breakdown</b>	<b>Potential Hazards</b>	<b>Critical Safety Practices</b>	<b>Personal Protective Clothing and Equipment</b>	<b>Monitoring Devices</b>
Equipment/Facility Set-up	Slips, Trips, Falls	<ul style="list-style-type: none"> <li>Clear walkways work areas of equipment, tools, vegetation, excavated material and debris</li> <li>Mark, identify, or barricade other obstructions</li> </ul>		
	Struck By/Against Heavy Equipment	<ul style="list-style-type: none"> <li>Wear reflective warning vests when exposed to vehicular traffic</li> <li>Isolate equipment swing areas</li> <li>Make eye contact with operators before approaching equipment</li> <li>Understand and review hand signals</li> </ul>	Warning vests, Hard hat, Safety glasses, Steel toe work boots	
	Handling Heavy Objects	<ul style="list-style-type: none"> <li>Observe proper lifting techniques</li> <li>Obey sensible lifting limits (60 lb. Maximum per person manual lifting)</li> <li>Use mechanical lifting equipment (hand carts, trucks) to move large, awkward loads</li> </ul>		
	Sharp Objects	<ul style="list-style-type: none"> <li>Wear cut resistant work gloves when the possibility of lacerations or other injury may be caused by sharp edges or objects</li> <li>Maintain all hand and power tools in a safe condition</li> <li>Keep guards in place during use</li> </ul>	Leather gloves	
	High Noise Levels	<ul style="list-style-type: none"> <li>Use hearing protection when exposed to excessive noise levels (greater than 85 dBA over an 8-hour work period)</li> <li>Assess noise level with sound level meter if possibility exists to exceed 85 dBA TWA</li> </ul>	Ear plugs	
	High/Low Ambient Temperature	<ul style="list-style-type: none"> <li>Monitor for Heat/Cold stress</li> <li>Provide fluids to prevent worker dehydration</li> </ul>	Insulated Clothing (subject to ambient temperature)	
	Biological Hazards	<ul style="list-style-type: none"> <li>Spray clothing with repellents containing permethrin or N,N-diethyl-meta-toluamide (DEET) since mosquitoes may bite through thin</li> </ul>		

**Activity Hazard Analysis: Drilling Oversight**

Task Breakdown	Potential Hazards	Critical Safety Practices	Personal Protective Clothing and Equipment	Monitoring Devices
		<p>clothing.</p> <ul style="list-style-type: none"> <li>• Apply insect repellent sparingly to exposed skin. An effective repellent will contain 35% DEET. Repellents may irritate the eyes and mouth, so avoid applying repellent to the hands</li> <li>• Whenever using insecticide or insect repellent, be sure to read and follow the manufacturer’s directions for use, as printed on the product.</li> <li>• All tools used in the poison ivy, sumac, or oak areas must be decontaminated before they are placed back into the site vehicle or equipment storage area. If onsite decontamination is not possible, use plastic to wrap any tools or equipment until they can be decontaminated.</li> <li>• PPE must be worn. PPE must be placed into plastic bags and sealed if they are not disposed immediately into a trash receptacle.</li> <li>• As soon as possible following the work, shower to remove any potential contamination. Any body part with suspected or actual exposure should be washed with Zanfel, Tecnu, or other product designed for removing urushiol. IF you do not have Zanfel or Tecnu was with cold water. Do not take a bath, as the oils can form and invisible film on top of the water and contaminate your entire body upon exiting the bath.</li> <li>• Use IvyBlock or similar products to prevent poison oak, ivy and sumac contamination. Check with the closest CH2M HILL warehouse to see if these products are available. Follow all directions for application.</li> </ul>		
	General	<ul style="list-style-type: none"> <li>• Only qualified operators shall operate equipment</li> <li>• Daily, or before first operation of the day the equipment shall be inspected for proper operation.</li> <li>• No passengers will be carried except in an approved safety platform.</li> <li>• Loads will not be suspended or travel over personnel</li> <li>• A spotter shall be used if operators view is obstructed.</li> <li>• Operator shall be aware of all equipment and worker(s) near his/her operating area.</li> </ul>	<p>Minimum PPE shall include; Hardhat, safety glasses with side shields, hearing protection, shirt with a minimum of 4” sleeves, long pants and safety toed work boots.</p> <p>High visibility vest</p>	

## Activity Hazard Analysis: Drilling Oversight

Task Breakdown	Potential Hazards	Critical Safety Practices	Personal Protective Clothing and Equipment	Monitoring Devices
		<ul style="list-style-type: none"> <li>Operator shall ensure load is proper equipment rigging and positioning.</li> <li>Operator shall not exceed safe operating conditions.</li> <li>Operator shall not exceed safe operating conditions.</li> <li>Operator shall not operate equipment other than in accordance with the manufacturers operating manual.</li> <li>Hands and loose clothing/material shall be kept clear of all moving parts.</li> </ul>		
Drilling	Rig Movement/Set Up	<ul style="list-style-type: none"> <li>Rig should be positioned so that it is on as firm a footing as possible.</li> <li>Leveling devices/feet should be firmly on the ground surface.</li> <li>Use of bricks, rocks or other type of material under the feet is not authorized for leveling rigs.</li> <li>All cables and anchoring devices must be inspected by a qualified operator and found in proper condition.</li> <li>Defective equipment must be tagged out and taken out of service immediately.</li> </ul>	<p>Minimum PPE shall include; Hardhat, safety glasses with side shields, hearing protection, shirt with a minimum of 4" sleeves, long pants and safety toed work boots.</p> <p>High visibility vest</p>	
	Noise	<ul style="list-style-type: none"> <li>If shouting is needed to hear a conversation 3-feet away, hearing protection shall be required.</li> <li>Use standard hand signals if voice communication is not possible.</li> </ul>	<p>Hearing protection; Muffs or ear plugs</p>	
	Operating equipment	<ul style="list-style-type: none"> <li>Only a qualified operator shall operate the equipment.</li> <li>Equipment shall be inspected by a qualified operator prior to each use.</li> <li>Minimum PPE shall include; Hardhat, safety glasses with side shields, hearing protection, shirt with a minimum of 4" sleeves, long pants and safety toed work boots.</li> <li>All safety precautions and manufacturers recommendations dealing with proper equipment operation must be understood and followed prior to the commencement of any work.</li> <li>Only one person should operate the machinery at any time.</li> <li>An alternate person should know the proper procedures for emergency shut-off.</li> <li>Ensure everyone is clear of machinery prior to engaging controls.</li> </ul>	<p>Minimum PPE shall include; Hardhat, safety glasses with side shields, hearing protection, shirt with a minimum of 4" sleeves, long pants and safety toed work boots.</p> <p>High visibility vest</p>	

## Activity Hazard Analysis: Drilling Oversight

Task Breakdown	Potential Hazards	Critical Safety Practices	Personal Protective Clothing and Equipment	Monitoring Devices
		<ul style="list-style-type: none"> <li>• Never place hands on top of probe rod while rod is under probing machine.</li> <li>• Avoid hydraulic fluid leaks.</li> <li>• Do Not check for leaks with hands while equipment is under pressure.</li> <li>• Do Not move drill rig with the mast up.</li> <li>• Never exert downward pressure on the probe rod so as to lift the probe foot over six inches off the ground</li> <li>• Never exert down pressure on the probe rod so as to lift the rear tires of the carrier vehicle off the ground.</li> <li>• The vehicle catalytic converter is hot and may present a fire hazard when operating over dry grass or combustibles.</li> <li>• Shut down hydraulic system and stop the vehicle before attempting to clear or service equipment.</li> <li>• In event of a problem, operator shall release the spring-loaded levers and/or return them to the neutral position.</li> </ul>		
	Struck By	<ul style="list-style-type: none"> <li>• Barriers, cones, or caution tape shall be used to clearly define drilling-operating area.</li> <li>• All unauthorized personnel shall stay outside of the equipment operating areas.</li> <li>• Only enter operating area after operator grants authorization and temporarily stops operations.</li> <li>• Never walk between equipment and stationary object while equipment is in operation.</li> <li>• All traffic shall remain clear of operating area.</li> <li>• Be aware of all audible alarms, horns, backup alarms. Stop and verify where they are coming from.</li> <li>• Work and operating area shall be properly illuminated. You must be able to read a newspaper without any difficulty.</li> <li>• A spotter wearing a highly reflective vest shall be used whenever view is obstructed.</li> <li>• Spotter and operator shall clearly understand standard hand signals. Work will be stopped if there is any question as to signals meaning.</li> </ul>	<p>Minimum PPE shall include; Hardhat, safety glasses with side shields, hearing protection, shirt with a minimum of 4" sleeves, long pants and safety toed work boots.</p>	
			High visibility vest	
			<p>Minimum PPE shall include; Hardhat, safety glasses with side shields, hearing protection, shirt with a minimum of 4" sleeves, long pants and safety toed work boots.</p>	

**Activity Hazard Analysis: Drilling Oversight**

<b>Task Breakdown</b>	<b>Potential Hazards</b>	<b>Critical Safety Practices</b>	<b>Personal Protective Clothing and Equipment</b>	<b>Monitoring Devices</b>
			High visibility vest	
	Slips, Trips, Falls	<ul style="list-style-type: none"> <li>Clear walkways, work areas of equipment, vegetation, tools and debris</li> <li>Mark, identify, or barricade other obstructions</li> </ul>	Safety toe boots	
Well Installation/ Isolation casing Installation	Suspended loads	<ul style="list-style-type: none"> <li>Stay as clear as possible of all hoisting operations</li> <li>Loads shall not be hoisted overhead of personnel</li> </ul>		
	Flying debris/objects	<ul style="list-style-type: none"> <li>Minimum PPE will include: hardhat, steel-toe safety toe boots, and safety glasses with side shields.</li> </ul>	Minimum PPE: hardhat, steel-toe safety toe boots, safety glasses with side shields, and tyvek.	
	Slips, Trips, Falls	<ul style="list-style-type: none"> <li>Clear walkways, work areas of equipment, vegetation, tools and debris</li> <li>Mark, identify, or barricade other obstructions</li> </ul>	Safety toe boots	
	Lifting	<ul style="list-style-type: none"> <li>Avoid manual lifting of loads beyond your physical capacity. Seek assistance if required, and use team lifts when able.</li> <li>Ensure field personnel have completed manual lifting training.</li> <li>Use proper lifting techniques including: feet should be shoulder width apart, bend at knees not the back, position object close to the body, secure a firm grip, lift with legs, and avoid twisting at the waist.</li> </ul>		
	Chemical Hazard	<ul style="list-style-type: none"> <li>In work areas where actual or potential hazards are present and any time, PPE must be worn by employees working or walking through the area.</li> <li>PPE must be maintained in clean and reliable condition. PPE will be inspected prior to use and after any occurrence to identify any deterioration or damage. Damaged PPE will not be used and must either be repaired or discarded.</li> </ul>	Minimum PPE: hardhat, steel-toe safety toe boots, safety glasses with side shields, and tyvek.	
Equipment Decontamination	Struck by/Against Heavy	<ul style="list-style-type: none"> <li>Wear reflective warning vests when exposed to vehicular traffic</li> <li>Isolate equipment swing areas</li> </ul>	Warning vests, hard hat safety glasses, goggles	



**Activity Hazard Analysis: Drilling Oversight**

<b>Task Breakdown</b>	<b>Potential Hazards</b>	<b>Critical Safety Practices</b>	<b>Personal Protective Clothing and Equipment</b>	<b>Monitoring Devices</b>
	Equipment, Protruding Objects	<ul style="list-style-type: none"> <li>• Make eye contact with operators before approaching equipment</li> <li>• Understand and review hand signals</li> </ul>	and face shield, steel toe work boots	
	Inhalation and Contact with Hazardous Substances & Splashes	<ul style="list-style-type: none"> <li>• Provide workers proper skin, eye and respiratory protection based on the exposure hazards present</li> <li>• Review hazardous properties of site contaminants with workers before operations begin</li> <li>• Wear hard hats, safety glasses with side shields, or goggles with splash shields and steel-toe safety boots</li> </ul>	PVC rain suit or Tyvek coveralls, nitrile or latex gloves, neoprene or latex boots (See Section 5.0 HASP)	
	Burns	<ul style="list-style-type: none"> <li>• Wear proper gloves, face shield/safety goggles, shin and toe guards, and splash suits to protect workers from skin burns and injury when operating laser (high pressure washers)</li> </ul>	Goggles and face shield, shin and toe guards	
	Handling Heavy Objects	<ul style="list-style-type: none"> <li>• Observe proper lifting techniques</li> <li>• Obey sensible lifting limits (60 lb. maximum per person manual lifting)</li> <li>• Use mechanical lifting equipment (hand carts, trucks) to move large, awkward loads</li> </ul>		
Equipment Decontamination (Continued)	Sharp Objects	<ul style="list-style-type: none"> <li>• Wear cut resistant work gloves when the possibility of lacerations or other injury may be caused by sharp edges or objects</li> <li>• Maintain all hand and power tools in a safe condition</li> <li>• Keep guards in place during use</li> </ul>	Leather gloves	
	High Noise Levels	<ul style="list-style-type: none"> <li>• Use hearing protection when exposed to excessive noise levels (greater than 85 dBA over an 8-hour work period)</li> <li>• Assess noise level with sound level meter if possibility exists that level may exceed 85 dBA TWA</li> </ul>	Ear plugs	
	High/Low Ambient Temperature	<ul style="list-style-type: none"> <li>• Monitor for Heat/Cold stress in accordance with JVI policies</li> <li>• Provide fluids to prevent worker dehydration</li> </ul>	Insulated Clothing (subject to ambient temperature)	

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<b>Activity:</b> Electrofishing on the Pine River (Pine River (Velsicol OU3), St. Louis, MI)	<b>Date:</b> September – October 2013
	<b>Project:</b> Velsicol OU3 – Remedial Investigation / Feasibility Study
<b>Description of the work:</b> Capturing fish using electrofishing unit that stuns fish to characterize the fish community areas of interest in the Pine River.	<b>Site Supervisor:</b> Tom Hutchinson/DET
	<b>Site Safety Officer:</b> Jeffrey Johnson/DAY or Jeremy Scott/NVR
	<b>Review for latest use:</b> Before the job is performed.

<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)
1. Inspect vessel for structural integrity, and integrity of equipment including weather radio, navigation equipment, USCG-approved floatation devices, cellular/satellite phone, and fire response equipment.	1a. Severe weather encountered on Water Body. 1b. Personnel or equipment falling overboard. 1c. Electrical or ignitable sources (fuel) creating the potential for fire.	1a. Marine radio will be used to monitor weather broadcasts/conditions. Crew will be equipped with cellular phones 1b. USCG-approved personal flotation devices will be worn by all onboard personnel when working outside the exclusion zone. 1c. Approved fire extinguishers will be onboard and readily accessible. Personnel will be trained in the proper use of said fire extinguishers.
2. Inspect vessel motor and/or vessel maintenance log. Ensure sufficient battery charge for work to be performed. Sufficient fuel in tank, and spare tank if necessary.	2. Motor/vessel malfunctions.	2. Turn motor off before engaging battery. Use caution when performing battery transfer and/or charging operations to avoid hazardous material release or fire.
3. Ensure sufficient equipment is available to complete daily activities. Load equipment/supplies and material onto vessel. Secure	3a. Lifting hazard/musculoskeletal injury. 3b. Slip/trip/fall hazards.	3a. Size up the load before lifting and use proper lifting technique. 3b. Ensure footing and limit moisture/water that creates wet conditions for potential slip hazard. Inspect work area

<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)
equipment.		for icing conditions and apply deicer and/or sand as necessary.
4. Navigating to sample location (getting into and out of boat)	4a. Falling into water/drowning	4a. All workers will be wearing PFDs. Use three points of contact when stepping into and out of boat. Do not stand when boat is moving. <u>If a worker falls into water implement man-over board sequence:</u> <ol style="list-style-type: none"> <li>a. Pull worker into boat / throw safety line if needed</li> <li>b. If necessary, navigate boat to nearest vehicle to acquire dry clothes;</li> <li>c. If no injury or stress occurred (i.e. worker only had wet clothes) worker may return to work and near miss should be documented.</li> </ol>
5. Electroshocking and collecting fish samples	5a. Electrocution 5b. Slips/trips/fall hazards 5c. Back strain when seining for fish	5a. All workers will wear insulated rubber gloves, rubber chest waders. The electroshocker operator will give audible signal "i.e. preparing to shock" and field team will respond "Shock on". Field team will avoid putting gloved hands in water during shocking. If public arrives during electrofishing activities, immediately turn-off device and ensure public remains 30 meters away from the water.  5b. Use 3-pts of contact when in boat or stepping in and out of boat.  5c. Use proper lifting techniques (bend at knees); stretch frequently (before, between, and after sampling).

Marine Vessel Checklist		
	<b>Yes</b>	<b>N/A</b>
Personal Flotation Devices (PFDs)		
Visual Distress Signals (e.g., spotlight, flag)		
Anchor and Anchor Line		
Sound-Producing Devices (e.g., whistle, airhorn)		
Navigation Lights		
Fire Extinguishers		
Alternative Propulsion (e.g., paddles)		
Overall Vessel Condition Satisfactory		
State/Coast Guard Requirements met		
Spill Kit		
Marine Sanitation Device		
Ropes and Bumpers		
First Aid Kit and Bloodborne Pathogen Kit		
Nonslip Deck		
Emergency Access Ladder		

<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)
Watercraft/vessel	Self-Assessment Checklist—Open Water Work	OSHA 40-hr Hazwopr, Able to swim, Review of HSE-404
Hand tools (cutting device, drill, GFCI)	Self-Assessment Checklist – Hand tools	OSHA 40-hr Hazwopr ,HSE-210
Electroshocker	Self-Assessment Checklist—Electroshocker	OSHA 40-hr Hazwopr, previous work with 1.5KVA electroshocker

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<p><b>Define the Scope of Work (Title): Visual survey of excavated test pit areas to determine the presence or subsurface debris</b></p>	<p><b>Originating Organization: CH2M HILL</b></p>
	<p><b>Person preparing the AHA: Scott Pratt/DET</b></p>
<p><b>Description of the work: CH2M HILL employees will oversee the excavation of test pits by a subcontractor and conduct a visual survey of the excavated areas to determine the presence or absence of subsurface debris in place. Additionally, the soil of the test pits will be examined and logged.</b></p>	<p><b>Date the AHA was originally performed: March 2014</b></p>
	<p><b>Review for latest use:</b> Each time before the job is performed.</p>

<b>Job Safety Analysis for Site Preparation</b>				
<b>Task Breakdown</b>	<b>Potential Hazards</b>	<b>Critical Safety Practices</b>	<b>Hazard Control</b>	<b>Monitoring Devices</b>
Equipment/Facility Set-up	Slips, Trips, Falls	<ul style="list-style-type: none"> <li>• Clear walkways work areas of equipment, tools, vegetation, excavated material and debris</li> <li>• Mark, identify, or barricade other obstructions</li> <li>• Evaluate fall hazards above 4 ft; use fall protection equipment (harness/lanyard), standard guardrails or other fall protection systems when working on elevated platforms above 6 ft.</li> <li>• Use “heavy duty industrial” (type 1A) ladders</li> <li>• Tie-off all straight/extension ladders or manually hold by co-worker at base</li> <li>• Halt roof, exterior scaffold work in high winds, severe weather</li> </ul>		
Equipment/Facility Set-up	Electrical Shock	<ul style="list-style-type: none"> <li>• De-energize or shut off utility lines at their source before work begins</li> <li>• Use double insulated or properly grounded electric power-operated</li> </ul>	Lockout/Tagout Devices	Voltage Meter or ATic@Tracer

(Continued)		<p>tools</p> <ul style="list-style-type: none"> <li>• Maintain tools in a safe condition</li> <li>• Provide an equipment-grounding conductor program or employ ground-fault circuit interrupters</li> <li>• Use qualified electricians to hook up electrical circuits</li> <li>• Inspect all extension cords daily for structural integrity, ground continuity, and damaged insulation</li> <li>• Cover or elevate electric wire or flexible cord passing through work areas to protect from damage</li> <li>• Keep all plugs and receptacles out of water</li> <li>• Use approved water-proof, weather-proof type if exposure to moisture is likely</li> <li>• Inspect all electrical power circuits prior to commencing work</li> </ul>		
Equipment/Facility Set-up (Continued)	Struck By/Against Heavy Equipment	<ul style="list-style-type: none"> <li>• Wear reflective warning vests when exposed to vehicular traffic</li> <li>• Isolate equipment swing areas</li> <li>• Make eye contact with operators before approaching equipment</li> </ul>	Warning vests, Hard hat, Safety glasses, Steel toe work boots	
Equipment/Facility Set-up (Continued)	Handling Heavy Objects	<ul style="list-style-type: none"> <li>• Observe proper lifting techniques</li> <li>• Obey sensible lifting limits (60 lb. Maximum per person manual lifting)</li> <li>• Use mechanical lifting equipment (hand carts, trucks) to move large, awkward loads</li> </ul>		
Equipment/Facility Set-up (Continued)	Sharp Objects	<ul style="list-style-type: none"> <li>• Wear cut resistant work gloves when the possibility of lacerations or other injury may be caused by sharp edges or objects</li> <li>• Maintain all hand and power tools in a safe condition</li> <li>• Keep guards in place during use</li> </ul>	Leather and nitrile gloves	
Equipment/Facility Set-up (Continued)	High Noise Levels	<ul style="list-style-type: none"> <li>• Use hearing protection when exposed to excessive noise levels (greater than 85 dBA over an 8-hour work period)</li> <li>• Assess noise level with sound level meter if possibility exists to exceed 85 dBA TWA</li> </ul>	Ear plugs	Hearing protection to be worn at all times



Equipment/Facility Set-up (Continued)	High/Low Ambient Temperature	<ul style="list-style-type: none"> <li>• Monitor for Heat/Cold stress</li> <li>• Provide fluids to prevent worker dehydration</li> </ul>		Meteorological Equipment
Excavation	General	<ul style="list-style-type: none"> <li>§ Only qualified operators shall operate equipment</li> <li>§ Daily, or before first operation of the day the equipment shall be inspected for proper operation.</li> <li>§ No passengers will be carried except in an approved safety platform.</li> <li>§ Loads will not be suspended or travel over personnel</li> <li>§ A spotter shall be used if operators view is obstructed.</li> <li>§ Operator shall be aware of all equipment and worker(s) near his/her operating area.</li> <li>§ Operator shall ensure load is proper equipment rigging and positioning.</li> <li>§ Operator shall not exceed safe operating conditions.</li> <li>§ Operator shall not exceed safe operating conditions.</li> <li>§ Operator shall not operate equipment other than in accordance with the manufacturers operating manual.</li> <li>§ Hands and loose clothing/material shall be kept clear of all moving parts.</li> </ul>	<p>Minimum PPE shall include; Hardhat, safety glasses with side shields, hearing protection, shirt with a minimum of 4" sleeves, long pants and safety toed work boots.</p> <p>High visibility vest</p>	
Excavation (continued)	Rig Movement/Set Up	<ul style="list-style-type: none"> <li>§ Excavator should be positioned so that it is on as firm a footing as possible.</li> <li>§ Leveling devices/feet should be firmly on the ground surface.</li> <li>§ Use of bricks, rocks or other type of material under the feet is not authorized for leveling excavator.</li> <li>§ All cables and anchoring devices must be inspected by a qualified operator and found in proper condition.</li> <li>§ Defective equipment must be tagged out and taken out of service immediately.</li> </ul>	<p>Minimum PPE shall include; Hardhat, safety glasses with side shields, hearing protection, shirt with a minimum of 4" sleeves, long pants and safety toed work boots.</p> <p>High visibility vest</p>	
Excavation (continued)	Noise	<ul style="list-style-type: none"> <li>§ If shouting is needed to hear a conversation 3-feet away, hearing protection shall be required.</li> <li>§ Use standard hand signals if voice communication is not possible.</li> </ul>	<p>Hearing protection; Muffs or ear plugs</p>	
Excavation (continued)	Operating equipment	<ul style="list-style-type: none"> <li>• Only a qualified operator shall operate the equipment.</li> <li>• Equipment shall be inspected by a qualified operator prior to each use.</li> <li>• Minimum PPE shall include; Hardhat, safety glasses with side shields, hearing protection, shirt with a minimum of 4" sleeves, long pants and safety toed work boots.</li> <li>• All safety precautions and manufacturers recommendations dealing</li> </ul>	<p>Minimum PPE shall include; Hardhat, safety glasses with side shields, hearing protection, shirt with a minimum of 4" sleeves, long pants and safety toed work boots.</p>	

		<p>with proper equipment operation must be understood and followed prior to the commencement of any work.</p> <ul style="list-style-type: none"> <li>• Only one person should operate the machinery at any time.</li> <li>• An alternate person should know the proper procedures for emergency shut-off.</li> <li>• Ensure everyone is clear of machinery prior to engaging controls.</li> <li>• Avoid hydraulic fluid leaks.</li> <li>• Do Not check for leaks with hands while equipment is under pressure.</li> <li>• The vehicle catalytic converter is hot and may present a fire hazard when operating over dry grass or combustibles.</li> <li>• Shut down hydraulic system and stop the vehicle before attempting to clear or service equipment.</li> <li>• In event of a problem, operator shall release the spring-loaded levers and/or return them to the neutral position.</li> </ul>	High visibility vest	
Excavation (continued)	Struck By	<p>§ Barriers, cones, or caution tape shall be used to clearly define drilling-operating area.</p> <p>§ All unauthorized personnel shall stay outside of the equipment operating areas.</p> <p>§ Only enter operating area after operator grants authorization and temporarily stops operations.</p> <p>§ Never walk between equipment and stationary object while equipment is in operation.</p> <p>§ All traffic shall remain clear of operating area.</p> <p>§ Be aware of all audible alarms, horns, backup alarms. Stop and verify where they are coming from.</p>	<p>Minimum PPE shall include; Hardhat, safety glasses with side shields, hearing protection, shirt with a minimum of 4" sleeves, long pants and safety toed work boots.</p> <p>High visibility vest</p>	
Excavation (continued)	Poor Visibility	<p>§ Work and operating area shall be properly illuminated. You must be able to read a newspaper without any difficulty.</p> <p>§ A spotter wearing a highly reflective vest shall be used whenever view is obstructed.</p> <p>§ Spotter and operator shall clearly understand standard hand signals. Work will be stopped if there is any question as to signals meaning.</p>	<p>Minimum PPE shall include; Hardhat, safety glasses with side shields, hearing protection, shirt with a minimum of 4" sleeves, long pants and safety toed work boots, coated tyveck as needed.</p> <p>High visibility vest</p>	

Excavation (continued)	Site Contaminants	<ul style="list-style-type: none"> <li>• Contractor to set up work zones, wear PPE, and perform equipment/personal decontamination in accordance with HSP.</li> <li>• PPE includes minimum PPE (hard hat, safety-toed boots, safety glasses with sideshields, tyvek/coveralls to keep personal clothing clean, booties/nitrile gloves). Test pits completed in NAPL/DBCP areas will be initiated in Level B.</li> <li>• Test pits in all other areas of the site can be initiated in Level D and modified as required.</li> <li>• Ventilation fans will be used as an engineering control for vapor exposure for all drilling activities.</li> <li>• Site contaminants are listed in section 12 of the HASP—primary exposure route is inhalation, ingestion, dermal absorption. Emphasize good PPE doffing procedures including properly removing PPE and washing hands and face after leaving the EZ, no smoking, drinking, eating in the EZ or CRZ.</li> <li>• Dust control will be implemented to “no visible dust”. If dust cannot be controlled to this level, contact the RHSM.</li> <li>• Buddy system will be used when entering the EZ.</li> </ul>	Implementation of PPE as required by HASP.	
Site Restoration and Seeding	Struck by/Against Heavy Equipment, Protruding Objects	<ul style="list-style-type: none"> <li>• Wear reflective warning vests when exposed to vehicular traffic</li> <li>• Isolate equipment swing areas</li> <li>• Make eye contact with operators before approaching equipment</li> <li>• Wear hard hats, safety glasses with side shields, or splash/face shields and goggles, and steel-toe safety boots at all times</li> <li>• Understand and review hand signals</li> </ul>	Warning vests, Hard hat, Safety glasses, Steel toe work boots	
Site Restoration and Seeding (Continued)	Slips, Trips, Falls	<ul style="list-style-type: none"> <li>• Clear walkways of equipment, tools, debris, other materials</li> <li>• Mark, identify, or barricade other obstruction</li> </ul>		
Site Restoration and Seeding (Continued)	High Noise Levels	<ul style="list-style-type: none"> <li>• Use hearing protection when exposed to excessive noise levels (greater than 85 dBA over an 8-hour work period)</li> <li>• Assess noise level with sound level meter if possibility exists that level may exceed 85 dBA TWA</li> </ul>	Ear plugs	Sound Level Meter

Site Restoration and Seeding (Continued)	Handling Heavy Objects	<ul style="list-style-type: none"> <li>• Observe proper lifting techniques</li> <li>• Obey sensible lifting limits (60 lb. per person for manual lifting)</li> <li>• Use mechanical lifting equipment (hand carts, trucks) to move large, awkward loads</li> </ul>		
	High/Low Ambient Temperature	<ul style="list-style-type: none"> <li>• Monitor for Heat/Cold stress</li> <li>• Provide fluids to prevent worker dehydration</li> </ul>	Insulated Clothing (subject to ambient temperature)	Meteorological Equipment

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<b>Subcontractor Authorization: (If On Site)</b>	_____	_____	<b>Date/Time:</b> _____
<b>Site Environmental, Safety and Health Representative (SESHR)</b>	_____	_____	<b>Date/Time:</b> _____

ACTIVITY HAZARD ANALYSIS

<b>Date:</b> April 2014 <b>Job/Activity:</b> Groundwater sampling, water level gauging, and NAPL/DNAPL gauging		Task Risk Assessment Code (RAC): E = Extremely High Risk H = High Risk M = Moderate Risk L = Low	<h2>Moderate</h2>					
<b>Project:</b> Velsicol Main Plant Site RD <b>Prepared by:</b> Elizabeth Markham/DET <b>Reviewed by (PM/Site Supervisor/H&amp;S):</b> Carl Woods/CIN		<h3>Probability</h3>						
Description of the work: Groundwater sampling. Sample preparation, collection, packaging, shipment of groundwater samples. Water level gauging and NAPL/DNAPL gauging.		<b>Severity</b>	<b>Frequent</b>	<b>Likely</b>	<b>Occasional</b>	<b>Seldom</b>	<b>Unlikely</b>	
			<b>Catastrophic</b>	E	E	H	H	M
			<b>Critical</b>	E	H	H	M	L
			<b>Marginal</b>	H	M	M	L	L
			<b>Negligible</b>	M	L	L	L	L
Work Activity Sequence <small>(Identify the principal steps involved and the sequence of work activities)</small>	Potential Health and Safety Hazards <small>(Analyze each principal step for potential hazards)</small>	Hazard Controls <small>(Develop specific controls for each potential hazard)</small>						
General preparation	Forgotten safety equipment, no cell phone coverage, lack of emergency preparedness, untimely reporting of an injury or other incident	<ul style="list-style-type: none"> <li>• Complete HSP, AHA review</li> <li>• Complete PTSP, daily safety meeting, and quality briefing.</li> <li>• Check for cell phone coverage.</li> <li>• Designate rally point and evacuation point (daily if working in new locations each day).</li> <li>• Check daily weather report and plan activities around severe weather.</li> <li>• Review, inspect and locate safety equipment including fire extinguisher, first aid kit, insect repellent, PPE, water, food, spill kits, etc.</li> <li>• Be sure to review the requirements for incident notification, reporting and investigation section of the HSP. Report all injuries, no matter how minor. If you are unsure whether an event should be reported, contact your RHSM. Be sure to report near misses.</li> </ul>						
Hazards and controls applicable to all steps of field work.	Temperature Extremes ( <b>heat</b> )	<ul style="list-style-type: none"> <li>• Acclimatize to work in hot weather by working in heat and taking more frequent breaks, systematically building up</li> </ul>						

		<p>tolerance to heat</p> <ul style="list-style-type: none"> <li>· Conduct field activities in the early morning if possible to avoid heat or inclement weather.</li> <li>· California has a specific heat illness prevention regulation that must be implemented. This includes,             <ul style="list-style-type: none"> <li>· Having enough water onsite so that each worker can consume at a minimum, one quart per hour per shift.</li> <li>· Frequent reminders and/or water breaks shall be taken so that each person can consume enough water.</li> <li>· Access to shade (i.e., blockage from direct sunlight) shall be provided at all times and shall be reasonably close to the work area. Keep in mind that a vehicle or other enclosed are with no air conditioning is NOT considered shade. Must be a well ventilated area or have air conditioning.</li> <li>· Workers suffering from heat illness-related symptoms OR if needed for preventative recovery shall be provided access to shade for at least 5 minutes, or longer, for recovery. (if heat related symptoms are occurring, contact the RHSM).</li> <li>· Training on risk factors, signs and symptoms of heat illness, importance of hydration and acclimatization, and importance of reporting symptoms and what to do in case of heat illness emergency, and contacting emergency medical services (see HSP, Temperature Extremes section).</li> <li>· Read and follow heat stress precautions specified in the HSP.</li> </ul> </li> <li>· Follow the requirements for physiological monitoring as stated in the HSP. (e.g., During work in Tyvek in temperatures above 70 degrees , perform physiological monitoring—see safety plan if not wearing Tyvek for when to start monitoring) and document on the heat stress physiological monitoring form.</li> <li>· Be conscious of your individual tolerance to work in hot weather and monitor yourself and co-workers for signs and symptoms of heat stress.</li> </ul>
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ACTIVITY HAZARD ANALYSIS

		<ul style="list-style-type: none"> <li>• Take breaks as necessary in shady or cool areas and drink plenty of liquids.</li> <li>• Take regular breaks in an air-conditioned truck or trailer during warm weather. Use a wide-brim hat or an umbrella or have a place where shade has been set up (tent or other temporary structure) when working under direct sun for extended periods.</li> <li>• Persons who experience signs of heat or cold stress should contact the SC, PM and RHSM. Call the occupational nurse first if symptoms are severe at 1-866-893-2514.</li> </ul>
	<p>Temperature Extremes (<b>cold</b>)</p>	<ul style="list-style-type: none"> <li>• Read and follow cold stress precautions specified in the HSP.</li> <li>• Wear layers and ensure you're dressed adequately for site conditions.</li> <li>• Takes breaks in a warm location as necessary and stay hydrated with warm fluids (avoid caffeine).</li> <li>• Monitor your co-workers for signs of cold stress.</li> <li>• Persons who experience signs of heat or cold stress should contact the SC, PM and RHSM. Call the occupational nurse first if symptoms are severe at 1-866-893-2514.</li> </ul>
	<p>Ticks</p>	<ul style="list-style-type: none"> <li>• Wear light colored long sleeve shirts and pants. Use repellent on exposed skin (with at least 35% DEET) if ticks/other biting insects are suspected in the area. Whenever you use an insecticide or insect repellent, be sure to read and follow the manufacturer's DIRECTIONS FOR USE, as printed on the product. Tape bottoms of pant legs or tuck pants into socks.</li> <li>• Wear protective clothing such as Tyvek or Bug-out suits if ticks are abundant in addition to controls above.</li> <li>• Have tick removal kits accessible. Use the buddy system and perform tick inspections prior to entering the field vehicle. If ticks were not planned to be encountered and are observed, do not continue field work until these controls can be implemented.</li> <li>• See Tick Fact Sheet attached to the HSP for further precautions and controls to implement when ticks are</li> </ul>



		<p>present. If bitten by a tick, follow the removal procedures found in the tick fact sheet, call the occupational nurse at 1-866-893-2514.</p>
	<p>Wasps</p>	<ul style="list-style-type: none"> <li>• Keep exposed skin to a minimum.</li> <li>• Carry a kit if you have had allergic reactions in the past, and inform your supervisor and/or a buddy. When working at a remote location, ensure that first-aid kits contain over-the-counter allergy and itch medication (e.g., Benadryl, Claritin, etc) as well as other over-the-counter medications that may not be available to aid in symptom treatment.</li> <li>• If bees or other stinging insects are known to be present, determine whether additional protective clothing should be donned before entering/working in brushy areas.</li> <li>• Consider if heavy-weight clothing or tyvek, or head netting would provide additional protection in areas where wasps/bees are known or suspected. Be aware of heat stress conditions additional clothing may cause.</li> <li>• Use insect repellent on clothing. Wear light-colored clothing and remove bright reflective safety-colored clothing if not working near a roadway as these may attract the wasps.</li> <li>• Wear fragrance-free or lightly-scented sunscreen, and body lotions. Bees are attracted to sweet scents. Avoid using floral scented soaps, shampoos, or conditioners.</li> <li>• If you encounter a wasp, back away slowly and calmly, do not run or swat at the insect. Wait for it to leave, or gently move or brush it off gently with a piece of paper or other light object. Do not use your hand.</li> <li>• If you are stung, contact the occupational nurse at 1-866-893-2514, no matter how minor it may seem. If a stinger is present, remove it as soon as possible using something with a thin, hard edge (e.g., credit card) to scrape the stinger out. Be sure to sanitize the object first with hand sanitizer, alcohol or soap and water. Wash and disinfect the wound, cover it, and apply ice. Watch for an allergic reaction if you have never been stung before. Call 911 if the reaction is severe.</li> <li>• Use wasp/bee spray if necessary in accordance with</li> </ul>

ACTIVITY HAZARD ANALYSIS

		<p>manufacturer's labeling and direction for use.</p>
	Black widow and other spiders	<ul style="list-style-type: none"> <li>• Wear long sleeves shirts and long pants, no matter the weather.</li> <li>• Always wear gloves when opening wells, or reaching into areas where spiders or other insects may be.</li> <li>• Inspect or shake out any clothing, shoes, or equipment before use. Inspect tools, backpacks, etc. after working in field prior to stowing.</li> <li>• Minimize the empty spaces between stacked materials.</li> <li>• Remove and reduce debris and rubble from around the outdoor work areas.</li> <li>• Trim or eliminate tall grasses from around outdoor work areas.</li> <li>• Store apparel and outdoor equipment in tightly closed plastic bags.</li> <li>• Keep your tetanus boosters up-to-date (every 10 years). Spider bites can become infected with tetanus spores.</li> <li>• If you think you have been bit by a poisonous spider, immediately call the occupational nurse at 1-866-893-2514 and notify the PM and RHSM.</li> </ul>
	Other biological hazards	<ul style="list-style-type: none"> <li>• Refer to the HSP for controls on other biological hazards possibly present dependent on season/location, including Valley Black Gnats, snakes, spiders, and poisonous plants.</li> </ul>
	Inclement weather	<ul style="list-style-type: none"> <li>• Sudden inclement weather can rapidly encroach upon field personnel. Preparedness and caution are the best defenses. Carry clothing appropriate for inclement weather.</li> <li>• Take heed of the weather forecast for the day and pay attention for signs of changing weather that indicate an impending storm. Signs include towering thunderheads, darkening skies, or a sudden increase in wind. If stormy weather ensues, field personnel should discontinue work and seek shelter until the storm has passed.</li> <li>• Avoid working during thunderstorms.</li> <li>• If caught in one, seek shelter.</li> <li>• Avoid lone trees as shelter and open, bare areas.</li> </ul>

		<ul style="list-style-type: none"> <li>• If caught in open area, place feet close together and crouch down as small as possible, without lying on the ground.</li> <li>• Ground strikes are known to be initiated by “leaders”, or charges, from the earth making a connection to the charge in the clouds. This may cause your hair to stand up, and since you do not want to be part of a leader that makes the connection to form a cloud-to-ground strike, immediately crouch as described above.</li> <li>• Avoid low lying areas such as washes after rain as they can flood.</li> <li>• Take time to review where the closest structure that can be used when severe weather occurs and what route will be used to get there. Listen to weather reports and plan for severe weather. Designate an emergency evacuation assembly area and evacuation routes for non-weather related emergencies (fire, etc.). Keep a copy of the Emergency Contact page from the HSP accessible.</li> </ul>
	Damage to vernal pools	<ul style="list-style-type: none"> <li>• Refer to vernal pool maps and avoid driving through vernal pools. If uncertain, exit the vehicle and find a path to the well that avoids vernal pools.</li> </ul>
Operating Work Vehicle to site	Traffic accidents	<ul style="list-style-type: none"> <li>• Inspect the vehicle prior to departure.</li> <li>• If driving a rental car, become familiar with the safe operation of vehicles of the type and size to be operated. Large vehicles such as full size vans and pick-ups have different vision challenges and handling characteristics than smaller vehicles.</li> <li>• Drivers shall not use cellular phones, or other two-way communication devices while driving (including hands-free devices). Pull over and park the car to make or take phone calls, text, or e-mail.</li> <li>• Be sure to take adequate rest breaks when driving, especially on long distance trips.</li> <li>• Obey speed limits; be aware of blind spots or other hazards associated with low visibility. Practice defensive driving techniques, such as leaving plenty of room between your vehicle and the one ahead of you.</li> <li>• If vehicle is malfunctioning, don't pull over off the road</li> </ul>

ACTIVITY HAZARD ANALYSIS

		<p>suddenly. Give the traffic behind you notice that you are pulling off.</p> <ul style="list-style-type: none"> <li>Always wear seatbelt in vehicle, regardless of length of drive.</li> <li>Apply Get Out and Look (GOAL) when returning to the vehicle to prevent property damage and injury by looking for obstructions, personnel or other items. Back slowly and use a spotter when view is obstructed.</li> </ul>
Loading/Unloading Vehicle	Strains/sprains, pinch points, unsecured equipment	<ul style="list-style-type: none"> <li>Use partner to assist in lift of heavy equipment, be aware of pinch points when using truck lift gates, lift with legs not your back.</li> <li>Tie down all loads securely (rope, bungee cords, load bars)</li> <li>Wear leather gloves, as necessary, when loading equipment</li> </ul>
Vehicle Parking	Pedestrian accidents and vehicle fires	<ul style="list-style-type: none"> <li>Vehicles should be parked off road in areas where access to from vehicles is safe and avoids active roadways.</li> <li>Do not park vehicle over grassed areas due to the potential fire hazard from the catalytic converter. Park on gravel or paved areas whenever possible.</li> <li>Do not block any property access roads.</li> <li>Wear reflective orange vests when near traffic.</li> <li>Know the location and operation of the fire extinguisher carried in the field vehicle or near treatment system.</li> </ul>
Site walk, inspection of area	Slips, trips, and falls	<ul style="list-style-type: none"> <li>Inspect area for slip, trip, and fall hazards. Remove hazard, if possible, or mark it. Designate foot traffic around trip hazards.</li> <li>Wear proper footwear, with good tread.</li> <li>Be alert to potential deterioration of walking and working surfaces.</li> <li>Pay attention and constantly observe the work area for hazards, changing weather conditions, biological hazards.</li> <li>Step slowly and tentatively in tall grass where the ground can't be seen to avoid depressions or other obstacles that could cause ankle/knees sprains.</li> <li>Be on the lookout for biological hazards, including poisonous plants...do not begin field work unless you have the means</li> </ul>

ACTIVITY HAZARD ANALYSIS

		to implement the controls in the safety plan for biological hazards.
Accessing and opening well	Over tightened bolts, rusty locks/slipping causing cuts/abrasions to hands. PID readings > action levels specified in HSP Contact with potentially contaminated water. Watch for presence of wasps before opening well	<ul style="list-style-type: none"> <li>Know the limitations of all hand tools. Use socket wrench and, if necessary, bolt cutters to remove old, rusty locks</li> <li>Stand up-wind of well when opening lid. Perform air monitoring as described in the HSP. When readings are above action levels at the well head, immediately take readings in the breathing zone. If readings in the breathing zone exceed the action level in the HSP, follow the protocol in the HSP (this may include collecting detector tubes and/or contacting the HSM).</li> <li>Wear leather gloves if necessary to avoid sharp edges or pinch points; Wear nitrile gloves when there is a potential for contact with water</li> <li>Keep exposed skin to a minimum.</li> <li>See wasp hazard controls above.</li> </ul>
Setting up Site	extension cords/slips, trips and falls Electrical hazards/shock from generator Generator/noise hazard	<ul style="list-style-type: none"> <li>Use GFCI and grounding rods</li> <li>Place generator at extension cord length distance down wind of site</li> </ul>
Water level measurement	Probe recoiling too quickly striking personnel, hunching over well (back fatigue) Contact with potentially contaminated groundwater	<ul style="list-style-type: none"> <li>Recoil meter slowly as the probe reaches meter</li> <li>Maintain good posture while standing at well, and take breaks as necessary to stretch out back muscles.</li> <li>Wear PPE, including nitrile gloves and safety glasses to prevent dermal contact</li> <li>Decon equipment after every use.</li> </ul>
NAPL/DNAPL level measurement	Oil-Water Probe recoiling too quickly striking personnel Hunching over well (back fatigue) Contact with potentially contaminated groundwater Contact with potential NAPL/DNAPL Potential cross-contamination with other wells	<ul style="list-style-type: none"> <li>Recoil meter slowly as the probe reaches meter</li> <li>Maintain good posture while standing at well, and take breaks as necessary to stretch out back muscles</li> <li>Wear PPE, including nitrile gloves and safety glasses to prevent dermal contact</li> <li>Decon equipment after every use following procedures in field operating procedures and work plans</li> </ul>
Sample Collection	Placing or removing pump from well/pinch points, muscle strain	<ul style="list-style-type: none"> <li>Be aware of hands as pump is lowered and recoiled, don't allow pumphead to fly out of well.</li> </ul>

ACTIVITY HAZARD ANALYSIS

	<p>Sample preservatives/vapors released once water is added or splashing of preservative/groundwater on skin Tape gun – sharp edge</p>	<ul style="list-style-type: none"> <li>• Stand upwind when adding sample preservatives (if outside); do not hold sample containers on your lap when adding preservative.</li> <li>• Hold sample containers away from face when filling and wear proper PPE including Nitrile gloves and safety glasses Do not over tighten lids</li> <li>• To extent possible, prepare tape strips separately and apply to sample bottles by hand; break tape by pushing tape gun away from you; ensure hands and legs are not in the path of the tape gun</li> </ul>
<p>Sample Preparation &amp; Packaging</p>		
<p>Preparation of sample containers</p>	<p>Handling of chemicals/spilling of chemicals on skin, clothes or eyes.</p>	<ul style="list-style-type: none"> <li>• Never leave open chemicals unattended.</li> <li>• Know location of nearest eyewash kit.</li> <li>• Wear proper PPE. (nitrile gloves, safety glasses)</li> <li>• Keep prep and pack area well ventilated (open window)</li> <li>• Know location of MSDS, and absorbent spill cloth</li> <li>• Make sure all caps are secure</li> <li>• Know location of MSDS forms</li> <li>• Do not hold sample containers on your lap when adding preservative.</li> <li>• If using glass sample containers, use caution not to drop, and use caution if you have to clean up broken glass (wear leather gloves under nitrile, if necessary)</li> </ul>
<p>Receiving pre-preserved bottles</p>	<p>Glass containers/broken glass, cuts to hands Packaging material / acid leak</p>	<ul style="list-style-type: none"> <li>• Use caution when opening package</li> <li>• Wear proper PPE (nitrile gloves, safety glasses; if cleaning up broken glass, wear leather gloves under nitriles, if necessary)</li> </ul>
<p>Receiving coolers from the field</p>	<p>Heavy coolers/back injury Ticks, insects/Lyme Disease, spider bites and stings</p>	<ul style="list-style-type: none"> <li>• Bend at knees, ask for assistance</li> <li>• Use handtruck when available</li> <li>• Use caution when taking contents out of cooler. Inspect coolers for ticks/spiders</li> </ul>
<p>Preparing coolers for delivery</p>	<p>Strapping machine/ tripping over unrolled tape.</p>	<ul style="list-style-type: none"> <li>• Make sure strapping machine is properly rolled.</li> <li>• Use caution, be aware of cutting edge; To extent possible,</li> </ul>

**ACTIVITY HAZARD ANALYSIS**

	<p>Tape gun/cuts to hands Heavy coolers/back injury Slipping on ice/pools of water from melted ice</p>	<p>break tape by pushing tape gun away from you; ensure hands and legs are not in the path of the tape gun</p> <ul style="list-style-type: none"> <li>• Bend at knees, ask for assistance</li> <li>• Use handtruck as necessary</li> <li>• Avoid spilling ice, pick up any spilled ice. Wipe up wet areas with a towel to avoid slips.</li> </ul>
	<p>Back injury due to improper lifting</p>	<ul style="list-style-type: none"> <li>• Stretch before work begins, take regular breaks</li> <li>• Observe proper lifting techniques</li> <li>• Obey sensible lifting limits (50 lb. maximum per person manual lifting)</li> <li>• Use mechanical lifting equipment (hand carts, trucks) to move large, awkward loads such as IDW drums.</li> <li>• Employees should be instructed in safe lifting techniques. Back straight, bend at knees, load close to body, lift smoothly, and do not twist</li> </ul>
	<p>Spills, other environmental considerations</p>	<ul style="list-style-type: none"> <li>• Have spill materials and fire extinguisher in the area.</li> <li>• Have environmental plan or waste management plan nearby to refer to for any procedures for spill clean-up, containment, storage, etc.</li> <li>• Have MSDS for EVO and perform hazard communication training in accordance with the HSP.</li> <li>• Ensure totes are labeled.</li> </ul>
<p>Lone Worker and lone worker protocols</p>		
<p>Prepare for Field Activity</p>	<p>Activity not permitted to be performed alone</p> <p>People unaware of field activities being performed by lone worker</p> <p>Lone worker getting injured</p> <p>Inability to contact help</p> <p>Inclement weather</p>	<ul style="list-style-type: none"> <li>• Be sure the activity is approved by the project manager to perform alone and ensure the activities listed under the working alone section of the HSP is not going performed. If working alone, designate an office employee (preferably one familiar with the project) and arrange to have them monitor your time in the field. Provide them with a copy of "The Lone Worker Call-In Contact Form".</li> <li>• Prepare and fill out applicable sections of "The Lone Worker Call-In Contact Form", a copy of which is attached to this AHA. Ensure that the office worker has the emergency numbers, address of site, PM and RHSM names and contact numbers (a copy of the HSP's "Emergency Contacts</li> </ul>

ACTIVITY HAZARD ANALYSIS

		<p>Page” and the hospital route would be best).</p> <ul style="list-style-type: none"> <li>• Check weather conditions and wear / bring appropriate clothing. If inclement weather such as severe thunderstorms develops, cease work until the storm passes or reschedule work.</li> <li>• Go over plan for the day with the office employee, and fill out PTSP, review AHAs applicable to the type of work being performed and be sure all emergency, PPE, and other materials needed for the day is in the field vehicle.</li> </ul>
<p>Working Alone</p>	<p>No assistance immediately available in case of injury.</p> <p>Difficult to hear ringing cell-phone during windy conditions</p> <p>Miscommunication</p>	<ul style="list-style-type: none"> <li>• During field work, a copy of “The Lone Worker Call-In Contact Form” should be maintained by both the office-worker and the field-worker.</li> <li>• “Lone Worker” and “Office Contact” must both have cell phones and each others’ phone number.</li> <li>• Field-worker should call the office worker when he has arrived on-site, before exiting his vehicle. On this phone call a time should be arranged for a “check-in” call to be made by the field worker (2 hours maximum, or more frequent if task or conditions are more hazardous). On each “check-in” call a time should be arranged for the next “check-in” call. Document this time on the form.</li> <li>• Worker should carry cell phone throughout the field event and put the ringer on its loudest setting as wind is strong and can muffle the sound. If, for any reason the phone becomes inoperable, the field-worker should immediately stop work, leave the site, and use the nearest phone to contact the office-worker to verify their safety and to inform them of the issue.</li> <li>• Work should not proceed in the field until the field-worker has a working device that provides communication with the office-worker.             <ul style="list-style-type: none"> <li>○ <i>If office worker does not receive “check-in” call at scheduled time he should attempt to contact field-worker. If no contact is made then office worker should phone for emergency services inform them that there is a possible emergency and instruct them to go to the field location and assist worker. Provide the lone worker’s name,</i></li> </ul> </li> </ul>



		<p><i>their last known location, vehicle description and your contact information.</i></p> <ul style="list-style-type: none"> <li>○ <i>After Emergency Services have been contacted, immediately call the other emergency contacts, including Project Manager, and Health and Safety Manager.</i></li> <li>· Upon completion of work activities, field-worker should pack up all materials and prepare to leave site. Then, before starting the engine of the vehicle to leave site, the field-worker should contact the office-worker and inform him or her that work is complete and that he or she is leaving the site. Make contact again when field worker arrives at his/her final destination.</li> </ul>
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**ACTIVITY HAZARD ANALYSIS**

<p align="center"><b>Equipment to be used</b> (List equipment to be used in the work activity)</p>	<p align="center"><b>Inspection Requirements</b> (List inspection requirements for the work activity)</p>	<p align="center"><b>Training Requirements</b> (List training requirements including hazard communication)</p>
<ul style="list-style-type: none"> <li>· Portable eye wash, fire extinguisher</li> <li>· First Aid/Bloodborne pathogen kit</li> <li>· PPE as noted above, including safety glasses, safety-toed boots, work gloves, as needed, high visibility vests,</li> <li>· Biological hazard precautions (insect spray, tick removal kit, duct tape, Tyvek or bug-out suit, wasp spray if needed, Ivy Block, Benadryl)</li> <li>· Sunscreen</li> <li>· Timer, ear thermometer (for heat stress monitoring)</li> <li>· Spill kit/materials</li> <li>· MSDS for any chemicals used onsite</li> <li>· Hand tools (bolt cutters, socket wrenches, tubing cutters)</li> <li>· Water level indicator</li> <li>· Oil-Water level indicator</li> <li>· Sample bottleware</li> <li>· Groundwater sampling pump (peristaltic, bladder pump, etc.), tubing, micron filters</li> </ul>	<ul style="list-style-type: none"> <li>· Inspect all vehicles, equipment, tools, and PPE prior to each use (remove from service any defective equipment)</li> <li>· Ensure cell phone has coverage and have fully charged.</li> <li>· Determine daily rally point/evacuation route.</li> <li>· Use applicable Self-Assessment Checklists as required per the HSP.</li> </ul>	<ul style="list-style-type: none"> <li>· OSHA 40-hour HAZWOPER initial training, 3-day OJT, current refresher and medical clearance.</li> <li>· Training on CH2M HILL HSP</li> <li>· Hazard Communication training (see HSP for how to document)</li> <li>· VO Modules as required by the Beale Sitewide Health and safety plan.</li> <li>· Aviation Safety VO Module if working on flight line</li> </ul>

ACTIVITY HAZARD ANALYSIS

PRINT NAME

SIGNATURE

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

\_\_\_\_\_

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

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

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

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

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LONE WORKER

CALL - IN CONTACT FORM

Date of site work: \_\_\_\_\_ Expected start time: \_\_\_\_\_

Name of CH2M HILL employee in the field: \_\_\_\_\_

Name of CH2M HILL employee responsible to receive contact:

Client Emergency Contact (if any):

CH2M HILL employee's contact numbers:

Radio # \_\_\_\_\_

Cell Phone # \_\_\_\_\_

Address and Location of work: \_\_\_\_\_

Field Vehicle Information:

Make: \_\_\_\_\_

Model: \_\_\_\_\_

License Plate #: \_\_\_\_\_

Directions/Map:

Planned Activity: \_\_\_\_\_

Specified Frequency and time for call in: \_\_\_\_\_

Time	Verified	Location

**Activity Hazard Analysis: IDW Management**

<b>Task Breakdown</b>	<b>Potential Hazards</b>	<b>Critical Safety Practices</b>	<b>Personal Protective Clothing and Equipment</b>	<b>Monitoring Devices</b>
IDW Handling	Sharp Objects	<ul style="list-style-type: none"> <li>Wear cut resistant work gloves when the possibility of lacerations or other injury may be caused by sharp edges or objects</li> <li>Maintain all hand and power tools in a safe condition</li> <li>Keep guards in place during use</li> </ul>	Leather gloves	
	Handling Heavy Objects	<ul style="list-style-type: none"> <li>Observe proper lifting techniques</li> <li>Obey sensible lifting limits (60 lb. Maximum per person manual lifting)</li> <li>Use mechanical lifting equipment (hand carts, trucks) to move large, awkward loads</li> </ul>		
	Slips, Trips, Falls	<ul style="list-style-type: none"> <li>Clear walkways, work areas of equipment, tools, vegetation, excavated material, and debris</li> <li>Mark, identify, or barricade other obstructions</li> </ul>		
	Inhalation and Skin Contact with Hazardous Substances	<ul style="list-style-type: none"> <li>Provide workers proper skin, eye and respiratory protection based on the exposure hazards present</li> <li>Review hazardous properties of site contaminants with workers before operations begin</li> <li>Monitor breathing zone air to determine levels of contaminants</li> <li>Follow proper procedures for handling/preserving/packaging/labeling analytical samples; chemicals/preserving agents</li> <li>Follow proper decontamination procedures to prevent ingestion of contaminants</li> </ul>	Tyvek coveralls, latex or neoprene boots, nitrile gloves (see Section 11.0 HASP)	PID, Mini-RAM
	High/Low Ambient Temperature	<ul style="list-style-type: none"> <li>Monitor for Heat/Cold stress</li> <li>Provide fluids to prevent worker dehydration</li> </ul>	Insulated Clothing (subject to ambient temperature)	
	General	<ul style="list-style-type: none"> <li>Only qualified operators shall operate equipment</li> <li>Daily, or before first operation of the day the equipment shall be inspected for proper operation.</li> <li>No passengers will be carried except in an approved safety platform.</li> <li>Loads will not be suspended or travel over personnel</li> </ul>	Minimum PPE shall include; Hardhat, safety glasses with side shields, hearing protection, shirt with a minimum of 4" sleeves, long pants and safety	

**Activity Hazard Analysis: IDW Management**

Task Breakdown	Potential Hazards	Critical Safety Practices	Personal Protective Clothing and Equipment	Monitoring Devices
		<ul style="list-style-type: none"> <li>• A spotter shall be used if operators view is obstructed.</li> <li>• Operator shall be aware of all equipment and worker(s) near his/her operating area.</li> <li>• Operator shall ensure load is proper equipment rigging and positioning.</li> <li>• Operator shall not exceed safe operating conditions.</li> <li>• Operator shall not exceed safe operating conditions.</li> <li>• Operator shall not operate equipment other than in accordance with the manufacturers operating manual.</li> <li>• Hands and loose clothing/material shall be kept clear of all moving parts.</li> </ul>	<p>toed work boots. High visibility vest</p>	
IDW Sampling	<p>Inhalation and Skin Contact with Hazardous Substances</p> <p>Sample Handling</p>	<ul style="list-style-type: none"> <li>• Provide workers proper skin, eye and respiratory protection based on the exposure hazards present</li> <li>• Review hazardous properties of site contaminants with workers before operations begin</li> <li>• Monitor breathing zone air to determine levels of contaminants</li> <li>• Follow proper procedures for handling/preserving/packaging/labeling analytical samples; chemicals/preserving agents</li> <li>• Use the proper tool for sampling the waste media</li> <li>• Wear proper PPE for sample collection: protective nitrile gloves, splash protection when necessary, safety glasses and/or goggles</li> <li>• Following sample collection, sample container lids should be tightened securely to prevent any leaks, and other containers should be rinsed with clean water to ensure that they are free of chemical constituents before labeling and placing them in the cooler for shipment to the laboratory</li> <li>• Minimize transportation of drums or other containers with waste materials</li> <li>• Follow proper decontamination procedures for sample equipment</li> <li>• Properly containerize, label, store, and dispose of any decontamination wastes</li> </ul>	<p>nitrile gloves, splash protection, safety glasses, goggles (see HASP)</p>	<p>PID, Mini-RAM</p>

**Activity Hazard Analysis: IDW Management**

<b>Task Breakdown</b>	<b>Potential Hazards</b>	<b>Critical Safety Practices</b>	<b>Personal Protective Clothing and Equipment</b>	<b>Monitoring Devices</b>
		<ul style="list-style-type: none"> <li>Ensure sample containers are labeled properly and that it is easy to determine which sample corresponds to which waste media/drum</li> </ul>		
Equipment Decontamination	Struck by/Against Heavy Equipment, Protruding Objects	<ul style="list-style-type: none"> <li>Wear reflective warning vests when exposed to vehicular traffic</li> <li>Isolate equipment swing areas</li> <li>Make eye contact with operators before approaching equipment</li> <li>Understand and review hand signals</li> </ul>	Warning vests, hard hat safety glasses, goggles and face shield, steel toe work boots	
	Inhalation and Contact with Hazardous Substances & Splashes	<ul style="list-style-type: none"> <li>Provide workers proper skin, eye and respiratory protection based on the exposure hazards present</li> <li>Review hazardous properties of site contaminants with workers before operations begin</li> <li>Wear hard hats, safety glasses with side shields, or goggles with splash shields and steel-toe safety boots</li> </ul>	PVC rain suit or Tyvek coveralls, nitrile or latex gloves, neoprene or latex boots (See Section 5.0 HASP)	
	Burns	<ul style="list-style-type: none"> <li>Wear proper gloves, face shield/safety goggles, shin and toe guards, and splash suits to protect workers from skin burns and injury when operating laser (high pressure washers)</li> </ul>	Goggles and face shield, shin and toe guards	
	Handling Heavy Objects	<ul style="list-style-type: none"> <li>Observe proper lifting techniques</li> <li>Obey sensible lifting limits (60 lb. maximum per person manual lifting)</li> <li>Use mechanical lifting equipment (hand carts, trucks) to move large, awkward loads</li> </ul>		
Equipment Decontamination (Continued)	Sharp Objects	<ul style="list-style-type: none"> <li>Wear cut resistant work gloves when the possibility of lacerations or other injury may be caused by sharp edges or objects</li> <li>Maintain all hand and power tools in a safe condition</li> <li>Keep guards in place during use</li> </ul>	Leather gloves	
	High Noise Levels	<ul style="list-style-type: none"> <li>Use hearing protection when exposed to excessive noise levels (greater than 85 dBA over an 8-hour work period)</li> <li>Assess noise level with sound level meter if possibility exists that level may exceed 85 dBA TWA</li> </ul>	Ear plugs	
	High/Low Ambient	<ul style="list-style-type: none"> <li>Monitor for Heat/Cold stress in accordance with JVI policies</li> </ul>	Insulated Clothing (subject to ambient)	

**Activity Hazard Analysis: IDW Management**

Task Breakdown	Potential Hazards	Critical Safety Practices	Personal Protective Clothing and Equipment	Monitoring Devices
	Temperature	. Provide fluids to prevent worker dehydration	temperature)	



## ACTIVITY HAZARD ANALYSIS

<b>Activity:</b> Use of Knives for collection of fish tissue samples	<b>Date:</b> 19 August 2013
	<b>Project:</b> Velsicol Operational Unit 3 – Pine River RI/FS
<b>Description of the work:</b> Filleting fish for tissue samples	<b>Site Supervisor:</b> Tom Hutchinson/DET
	<b>Site Safety Officer:</b> Grant Koster/DET
	<b>Review for latest use:</b> Before the job is performed.

<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)
Filleting fish for tissue samples	Cutting hand on open blade	Proper training in knife use (review of this AHA)
	Cutting body with open blade	Kevlar or cut proof gloves with rubber palm/finger grip to prevent getting cut and minimize knife slippage.
		Cut only when fish is secured to fillet board by securing clip
		Only cut away from the body
		Ensure that knife is sharp. Use knife with a blade only as long as it needs to be to perform the task. When not in use, ensure the knife is stored properly within accompanying sheath.
<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)
Fillet knife	Daily for sharpness, protectiveness of sheath	Onsite training in proper fillet technique.
Fillet board with grabber clamp		
Kevlar gloves/cut proof gloves		
Processing table (with holes drilled to secure fillet board)		

Approved: 21-August-2013 – Carl Woods (Responsible H&S Manager)

**Activity Hazard Analysis: Membrane Interface Probing (MIP) Oversight**

<b>Task Breakdown</b>	<b>Potential Hazards</b>	<b>Critical Safety Practices</b>	<b>Personal Protective Clothing and Equipment</b>	<b>Monitoring Devices</b>
Equipment/Facility Set-up	Slips, Trips, Falls	<ul style="list-style-type: none"> <li>Clear walkways work areas of equipment, tools, vegetation, excavated material and debris</li> <li>Mark, identify, or barricade other obstructions</li> </ul>	Warning vests, Hard hat, Safety glasses, Steel toe work boots	
	Struck By/Against Heavy Equipment	<ul style="list-style-type: none"> <li>Wear reflective warning vests when exposed to vehicular traffic</li> <li>Isolate equipment swing areas</li> <li>Make eye contact with operators before approaching equipment</li> <li>Understand and review hand signals</li> </ul>		
	Handling Heavy Objects	<ul style="list-style-type: none"> <li>Observe proper lifting techniques</li> <li>Obey sensible lifting limits (40 lb. Maximum per person manual lifting)</li> <li>Use mechanical lifting equipment (hand carts, trucks) to move large, awkward loads</li> </ul>		
	Sharp Objects	<ul style="list-style-type: none"> <li>Wear cut resistant work gloves when the possibility of lacerations or other injury may be caused by sharp edges or objects</li> <li>Maintain all hand and power tools in a safe condition</li> <li>Keep guards in place during use</li> </ul>	Leather gloves	
	High Noise Levels	<ul style="list-style-type: none"> <li>Use hearing protection when exposed to excessive noise levels (greater than 85 dBA over an 8-hour work period)</li> <li>Assess noise level with sound level meter if possibility exists to exceed 85 dBA TWA</li> </ul>	Ear plugs	
	High/Low Ambient Temperature	<ul style="list-style-type: none"> <li>Monitor for Heat/Cold stress per HSP</li> <li>Provide fluids to prevent worker dehydration</li> <li>Designate rest area to warm up/cool down during work day</li> <li>Implement a work/rest regimen according to HSP</li> <li>Keep exposed skin covered to prevent exposure to high/low temperatures and sun.</li> </ul>	Insulated Clothing (subject to ambient temperature)	
	Biological Hazards	<ul style="list-style-type: none"> <li>Spray clothing with repellents containing permethrin or N,N-diethyl-meta-toluamide (DEET) since mosquitoes may bite through thin</li> </ul>		

**Activity Hazard Analysis: Membrane Interface Probing (MIP) Oversight**

Task Breakdown	Potential Hazards	Critical Safety Practices	Personal Protective Clothing and Equipment	Monitoring Devices
		<p>clothing.</p> <ul style="list-style-type: none"> <li>• Apply insect repellent sparingly to exposed skin. An effective repellent will contain 35% DEET. Repellents may irritate the eyes and mouth, so avoid applying repellent to the hands</li> <li>• Whenever using insecticide or insect repellent, be sure to read and follow the manufacturer’s directions for use, as printed on the product.</li> <li>• All tools used in the poison ivy, sumac, or oak areas must be decontaminated before they are placed back into the site vehicle or equipment storage area. If onsite decontamination is not possible, use plastic to wrap any tools or equipment until they can be decontaminated.</li> <li>• PPE must be worn. PPE must be placed into plastic bags and sealed if they are not disposed immediately into a trash receptacle.</li> <li>• As soon as possible following the work, shower to remove any potential contamination. Any body part with suspected or actual exposure should be washed with Zanfel, Tecnu, or other product designed for removing urushiol. IF you do not have Zanfel or Tecnu was with cold water. Do not take a bath, as the oils can form and invisible film on top of the water and contaminate your entire body upon exiting the bath.</li> <li>• Use IvyBlock or similar products to prevent poison oak, ivy and sumac contamination. Check with the closest CH2M HILL warehouse to see if these products are available. Follow all directions for application.</li> </ul>		
	General	<ul style="list-style-type: none"> <li>• Only qualified operators shall operate equipment</li> <li>• Daily, or before first operation of the day the equipment shall be inspected for proper operation.</li> <li>• No passengers will be carried except in an approved safety platform.</li> <li>• Loads will not be suspended or travel over personnel</li> <li>• A spotter shall be used if operators view is obstructed.</li> <li>• Operator shall be aware of all equipment and worker(s) near his/her operating area.</li> </ul>	<p>Minimum PPE shall include; Hardhat, safety glasses with side shields, hearing protection, shirt with a minimum of 4” sleeves, long pants and safety toed work boots.</p> <p>High visibility vest</p>	

**Activity Hazard Analysis: Membrane Interface Probing (MIP) Oversight**

Task Breakdown	Potential Hazards	Critical Safety Practices	Personal Protective Clothing and Equipment	Monitoring Devices
		<ul style="list-style-type: none"> <li>• Operator shall ensure load is proper equipment rigging and positioning.</li> <li>• Operator shall not exceed safe operating conditions.</li> <li>• Operator shall not exceed safe operating conditions.</li> <li>• Operator shall not operate equipment other than in accordance with the manufacturers operating manual.</li> <li>• Hands and loose clothing/material shall be kept clear of all moving parts.</li> </ul>		
MIP System Setup and Operation	Rig Movement/Set Up	<ul style="list-style-type: none"> <li>• Rig should be positioned so that it is on as firm a footing as possible.</li> <li>• Leveling devices/feet should be firmly on the ground surface.</li> <li>• Use of bricks, rocks or other type of material under the feet is not authorized for leveling rigs.</li> <li>• All cables and anchoring devices must be inspected by a qualified operator and found in proper condition.</li> <li>• Defective equipment must be tagged out and taken out of service immediately.</li> </ul>	Minimum PPE shall include; Hardhat, safety glasses with side shields, hearing protection, shirt with a minimum of 4" sleeves, long pants and safety toed work boots. High visibility vest	
	Noise	<ul style="list-style-type: none"> <li>• If shouting is needed to hear a conversation 3-feet away, hearing protection shall be required.</li> <li>• Use standard hand signals if voice communication is not possible.</li> </ul>	Hearing protection; Muffs or ear plugs	
	Operating equipment	<ul style="list-style-type: none"> <li>• Only a qualified operator shall operate the drilling equipment.</li> <li>• Only a qualified operator shall operate the MIP sensors and equipment. This includes preparation of performance tests, reagents, etc.</li> <li>• Equipment shall be inspected by a qualified operator prior to each use.</li> <li>• Minimum PPE shall include; Hardhat, safety glasses with side shields, hearing protection, shirt with a minimum of 4" sleeves, long pants and safety toed work boots.</li> <li>• All safety precautions and manufacturers recommendations dealing with proper equipment operation must be understood and followed prior to the commencement of any work.</li> <li>• Only one person should operate the machinery at any time.</li> </ul>	Minimum PPE shall include; Hardhat, safety glasses with side shields, hearing protection, shirt with a minimum of 4" sleeves, long pants and safety toed work boots. High visibility vest	

**Activity Hazard Analysis: Membrane Interface Probing (MIP) Oversight**

Task Breakdown	Potential Hazards	Critical Safety Practices	Personal Protective Clothing and Equipment	Monitoring Devices
		<ul style="list-style-type: none"> <li>• An alternate person should know the proper procedures for emergency shut-off.</li> <li>• Ensure everyone is clear of machinery prior to engaging controls.</li> <li>• Never place hands on top of probe rod while rod is under probing machine.</li> <li>• Avoid hydraulic fluid leaks.</li> <li>• Do Not check for leaks with hands while equipment is under pressure.</li> <li>• Do Not move drill rig with the mast up.</li> <li>• Never exert downward pressure on the probe rod so as to lift the probe foot over six inches off the ground</li> <li>• Never exert down pressure on the probe rod so as to lift the rear tires of the carrier vehicle off the ground.</li> <li>• The vehicle catalytic converter is hot and may present a fire hazard when operating over dry grass or combustibles.</li> <li>• Shut down hydraulic system and stop the vehicle before attempting to clear or service equipment.</li> <li>• In event of a problem, operator shall release the spring-loaded levers and/or return them to the neutral position.</li> </ul>		
	Struck By	<ul style="list-style-type: none"> <li>• Barriers, cones, or caution tape shall be used to clearly define drilling-operating area.</li> <li>• All unauthorized personnel shall stay outside of the equipment operating areas.</li> <li>• Only enter operating area after operator grants authorization and temporarily stops operations.</li> <li>• Never walk between equipment and stationary object while equipment is in operation.</li> <li>• All traffic shall remain clear of operating area.</li> <li>• Be aware of all audible alarms, horns, backup alarms. Stop and verify where they are coming from.</li> <li>• Work and operating area shall be properly illuminated. You must be able to read a newspaper without any difficulty.</li> <li>• A spotter wearing a highly reflective vest shall be used whenever view is obstructed.</li> </ul>	<p>Minimum PPE shall include; Hardhat, safety glasses with side shields, hearing protection, shirt with a minimum of 4" sleeves, long pants and safety toed work boots.</p>	
			High visibility vest	
			<p>Minimum PPE shall include; Hardhat, safety glasses with side shields, hearing protection, shirt with a</p>	

**Activity Hazard Analysis: Membrane Interface Probing (MIP) Oversight**

<b>Task Breakdown</b>	<b>Potential Hazards</b>	<b>Critical Safety Practices</b>	<b>Personal Protective Clothing and Equipment</b>	<b>Monitoring Devices</b>
		<ul style="list-style-type: none"> <li>Spotter and operator shall clearly understand standard hand signals. Work will be stopped if there is any question as to signals meaning.</li> </ul>	minimum of 4" sleeves, long pants and safety toed work boots.  High visibility vest	
	Slips, Trips, Falls	<ul style="list-style-type: none"> <li>Clear walkways, work areas of equipment, vegetation, tools and debris</li> <li>Mark, identify, or barricade other obstructions</li> </ul>	Safety toe boots	
	Electrocution/Contact with energized electrical lines	<ul style="list-style-type: none"> <li>Inspect instrument power cords each day, replace or repair if worn</li> <li>During rain events, protect energized equipment by closing access doors, or provide moisture barrier</li> <li>All circuits must include a GFI safety device</li> </ul>		
	Flying debris/objects	<ul style="list-style-type: none"> <li>Minimum PPE will include: hardhat, steel-toe safety toe boots, and safety glasses with side shields.</li> </ul>	Minimum PPE: hardhat, steel-toe safety toe boots, safety glasses with side shields, and tyvek.	
	Lifting	<ul style="list-style-type: none"> <li>Avoid manual lifting of loads beyond your physical capacity. Seek assistance if required, and use team lifts when able.</li> <li>Ensure field personnel have completed manual lifting training.</li> <li>Use proper lifting techniques including: feet should be shoulder width apart, bend at knees not the back, position object close to the body, secure a firm grip, lift with legs, and avoid twisting at the waist.</li> </ul>		
	Caught between moving parts when handling heavy objects	<ul style="list-style-type: none"> <li>Provide and wear proper work gloves when the possibility of crush, pinch, or other injury may be caused by moving/stationary edges or objects.</li> </ul>	Minimum PPE: hardhat, steel-toe safety toe boots, safety glasses with side shields, and tyvek.	
	Fire/Explosion	<ul style="list-style-type: none"> <li>Obtain hot work permit, if required, for generator or FID use</li> <li>Prohibit smoking in the MIP unit</li> <li>Provide ABC (or equivalent) fire extinguisher</li> </ul>	Fire extinguisher Chemical resistant gloves	

**Activity Hazard Analysis: Membrane Interface Probing (MIP) Oversight**

<b>Task Breakdown</b>	<b>Potential Hazards</b>	<b>Critical Safety Practices</b>	<b>Personal Protective Clothing and Equipment</b>	<b>Monitoring Devices</b>
		<ul style="list-style-type: none"> <li>• Store flammable liquids in well ventilated areas</li> <li>• Prohibit storage and transfer of flammable liquids in plastic containers</li> <li>• Store combustible materials away from flammables</li> </ul>		
	Compressed gas cylinders	<ul style="list-style-type: none"> <li>• Transport compressed gas cylinders properly secured and labeled</li> <li>• During mobilization, secure compressed gas cylinders with safety caps</li> <li>• Ensure only properly trained subcontractors are using compressed gas cylinders</li> </ul>		
	Contact with Performance Test Reagents	<ul style="list-style-type: none"> <li>• Wear nitrile gloves when preparing performance test stock solutions, or when preparing test aqueous solutions. Also when immersing the MIP probe in performance test solutions</li> <li>• Properly containerize and dispose of performance test solutions</li> <li>• Perform air monitoring during performance tests</li> <li>• Make eye contact with operators before approaching equipment</li> <li>• Understand and review hand signals</li> </ul>	Safety glasses, goggles and face shield, steel toe work boots, hearing protection, nitrile gloves  Eyewash kit, SDSs, first aid kit, bloodborne pathogens kit	PID or equivalent
	Inhalation and Skin Contact with Hazardous Substances	<ul style="list-style-type: none"> <li>• Provide workers proper skin, eye and respiratory protection based on the exposure hazards present. Follow procedures outline in HSP, and upgrade PPE as necessary</li> <li>• Review hazardous properties of site contaminants with workers before operations begin</li> <li>• Monitor breathing zone air to determine levels of contaminants</li> <li>• Follow proper procedures for handling/preserving/packaging/labeling analytical samples; chemicals/preserving agents</li> <li>• Follow proper decontamination procedures to prevent ingestion of contaminants</li> <li>• Implement engineering controls (i.e., vent fans) to direct vapors away from samplers and drillers</li> </ul>	Tyvek coveralls, latex or neoprene boots, nitrile gloves (see Section 11.0 HASP)	PID, Mini-RAM HAPSITE field-portable, gas chromatograph/mass spectrometer  Vent fans
	Potential max out of sensors – time	<ul style="list-style-type: none"> <li>• Plan and operate MIP starting in least contaminated areas and</li> </ul>		

**Activity Hazard Analysis: Membrane Interface Probing (MIP) Oversight**

<b>Task Breakdown</b>	<b>Potential Hazards</b>	<b>Critical Safety Practices</b>	<b>Personal Protective Clothing and Equipment</b>	<b>Monitoring Devices</b>
	delay in work	move into more contaminated areas <ul style="list-style-type: none"><li>• Allow sensors enough time to zero-out after each bore hole.</li><li>• Ensure subcontractor is aware of schedule, and that subcontractor has plan to increase sensor zeroing after each boring.</li></ul>		



**Activity Hazard Analysis: Mobilization & Demobilization**

<b>Task Breakdown</b>	<b>Potential Hazards</b>	<b>Critical Safety Practices</b>	<b>Personal Protective Clothing and Equipment</b>	<b>Monitoring Devices</b>
Site Setup and Support Functions – includes trailer swap-out (removal of current onsite trailer and set up of new trailer)	Communication	<ul style="list-style-type: none"> <li>Reliable communication (radios, cell phones, or telephones) shall be established.</li> <li>Reliable internet connection will be set up.</li> <li>Warning/alert signals such as air horn should be considered.</li> <li>An employee working alone in a remote location or away from other workers shall be provided a means of emergency communications.</li> </ul>	Steel-toe boots	
	Forgetting equipment/supplies in the old trailer	<ul style="list-style-type: none"> <li>Ensure removal of all project related items (i.e., project documents, tools, shelving and organizational supplies, sampling supplies, etc.) from trailer.</li> <li>Set up covered staging area for equipment and supplies during trailer swap-out.</li> </ul>	Work gloves	
	Electrical (electrical shock/electrocution)	<ul style="list-style-type: none"> <li>A certified electrician will perform set up of electrical to trailer.</li> <li>All personal working with or around electrical equipment have completed electrical safety training.</li> <li>Assume all electrical equipment and wires are energized until tested.</li> <li>Prior to performing maintenance work on electrical equipment, follow lockout/tagout procedures for all energy sources.</li> <li>When working with or around electrical equipment or lines use non-conductive tools and ladders.</li> </ul>	Lockout/tagout tags	
	Rest Area	<ul style="list-style-type: none"> <li>The onsite trailer will function as an indoor, air-conditioned rest area. In the event that work is performed at a distance away from the onsite trailer, another shaded rest area (i.e., field vehicle).</li> <li>Trash receptacles and/or plastic bags shall be available and maintained in a sanitary condition. Trash/recycling pickup will be coordinated through the site operations manager and/or project manager for weekly pickup at the site.</li> <li>Vermin control – all employees shall be instructed not to feed any animals or leave open food unattended.</li> </ul>		
	Visibility	<ul style="list-style-type: none"> <li>Work and operating areas shall be properly illuminated.</li> </ul>		

**Activity Hazard Analysis: Mobilization & Demobilization**

<b>Task Breakdown</b>	<b>Potential Hazards</b>	<b>Critical Safety Practices</b>	<b>Personal Protective Clothing and Equipment</b>	<b>Monitoring Devices</b>		
Loading/Unloading Equipment	Slip, Trips, Fall	<ul style="list-style-type: none"> <li>Be aware of surroundings; observe area for objects that may impede travel or present a hazard</li> <li>Clear walkways and work areas of equipment, tools, vegetation, excavated material, and debris</li> <li>Mark, identify, or barricade other obstructions</li> <li>Ensure stable ground and adequate footing during loading operations</li> <li>Wear proper footwear based on conditions of ground surface</li> </ul>	Steel-toe boots; rubber boots Work gloves as necessary Safety glasses			
		Handling Heavy Objects (Sprains, strains, hernias, crush, fracture)	<ul style="list-style-type: none"> <li>Observe proper lifting techniques – do not use your back to lift loads; do not twist/turn while lifting a load</li> <li>Walk slowly and surely with the load</li> <li>Obey sensible lifting limits (60 lb. Maximum per person manual lifting)</li> <li>Use mechanical lifting equipment (hand carts, trucks) to move large, awkward loads</li> <li>Use appropriate personal protective equipment (PPE) where required</li> </ul>	Work gloves Steel-toe boots Safety glasses		
			Unsecured Loads	<ul style="list-style-type: none"> <li>Ensure load is properly strapped to vehicle; anchor points are free from damage; straps do not have frays, tears, rips, and/or knots; straps are of adequate tensile strength to secure load</li> <li>Ensure straps are properly connected to attachment mechanism</li> <li>Ensure straps are properly positioned to reduce horizontal or vertical movement of the load</li> <li>Use appropriate PPE when required</li> </ul>	Safety glasses Steel-toe boots Tie-down straps; rope; bungee cords	
				Load Capacity Exceeded	<ul style="list-style-type: none"> <li>Ensure load capacity does not exceed manufacturer's specifications for the type of vehicle used</li> </ul>	Vehicle/Trailer
	High/Low Ambient Temperature	<ul style="list-style-type: none"> <li>Monitor for Heat/Cold stress</li> <li>Provide fluids to prevent worker dehydration</li> </ul>	Insulated Clothing (subject to ambient temperature)			

**Activity Hazard Analysis: Mobilization & Demobilization**

Task Breakdown	Potential Hazards	Critical Safety Practices	Personal Protective Clothing and Equipment	Monitoring Devices
Driving	Vehicular Accidents	<ul style="list-style-type: none"> <li>• Vehicle operators will inspect vehicles prior to operation to ensure safe operating conditions and minimize the potential for vehicle break-downs during travel</li> <li>• Vehicle operators should drive defensively to minimize the potential for accidents</li> <li>• Vehicle operators may not operate cellular phones or other electronic devices while in transit to, from, or while driving on the work site</li> <li>• Vehicle operators will have in their possession insurance, registration, and any required document if transporting any potential hazards</li> <li>• All vehicles will have an operable and inspected fire extinguisher while on site</li> <li>• All vehicles should carry road flares or other acceptable markers in the event of a breakdown to minimize collision hazards</li> <li>• All vehicles will be equipped with a first aid kit and should contain blankets in the event of a breakdown or other traffic problem (i.e., road closure due to snowy/icy conditions)</li> <li>• If involved in an accident, vehicle operator or any other non-injured passenger will immediate report the accident to the authorities and to the CH2M HILL field team leader (FTL), site safety coordinator (SSC), and/or other designated CH2M HILL contact person</li> </ul>	<p>First aid kit Road flares; traffic cones; flashlight</p>	
	Violation of traffic laws	<ul style="list-style-type: none"> <li>• Vehicle operators will abide by all posted traffic laws</li> <li>• An infractions that result in an issued citation will be reported to the CH2M HILL FTL, SSC, and/or other designated CH2M HILL contact person</li> </ul>		
	Obstacles	<ul style="list-style-type: none"> <li>• Vehicle operators should be aware of surroundings at all times</li> <li>• Vehicle operators and passengers should be alert to road conditions, obstacles, potential obstacles, animal hazards, and construction activities</li> <li>• Vehicle operators should respond accordingly to respective</li> </ul>		

**Activity Hazard Analysis: Mobilization & Demobilization**

Task Breakdown	Potential Hazards	Critical Safety Practices	Personal Protective Clothing and Equipment	Monitoring Devices
	Backing Vehicle	<p>hazards by minimizing speed, using proper signaling to change lanes and/or using hazard lights when anticipated reduction in speed will be maintained to avoid rear end collisions</p> <ul style="list-style-type: none"> <li>• Vehicle operators will avoid sudden reactions to road obstacles, if possible</li> <li>• Use alarm or spotter when reversing a vehicle or vehicle with trailer</li> <li>• Spotter will wear a high visibility safety vest and, if needed, have flashlights for vehicle backing operations during night operations</li> <li>• Ensure all personnel are clear of operation to a suitable safe distance</li> </ul>	High visibility vest Flashlight	
	Driving Under the Influence/Driving While Intoxicated	<ul style="list-style-type: none"> <li>• Driving Under the Influence (DUI) or Driving While Intoxicated (DWI) will not be tolerated</li> <li>• If a vehicle operator is cited for a DUI or DWI, a capable passenger will immediately notify the CH2M HILL FTL, SSC, and/or other designated CH2M HILL contact person</li> <li>• The vehicle operator will be immediately removed from the project</li> <li>• Additional consequences will be determined pending further investigation by CH2M HILL</li> <li>• The subcontractor will be obligated to fulfill the terms and conditions of the contract by supplying personnel to fill the vacant position</li> </ul>		

**Activity Hazard Analysis: Mobilization & Demobilization**

<b>Task Breakdown</b>	<b>Potential Hazards</b>	<b>Critical Safety Practices</b>	<b>Personal Protective Clothing and Equipment</b>	<b>Monitoring Devices</b>
Trailer Roof Completion	Working from Height	<p>Three point contact for ladders, stairs or equipment.</p> <p>Ladders shall extend 3 rungs above top edge, have proper footing and be secured.</p> <p>All ladders should be tied off.</p> <p>If someone is securing the bottom of the ladder, they must wear a hard hat, and safety glasses.</p>	<p>Work gloves</p> <p>Steel-toe boots</p> <p>High visibility vest</p> <p>Safety glasses</p>	
Leveling Trailer and tie down installation	Struck by/line of fire	<p>All personnel shall remain clear and never place themselves in a position to be under trailer during set up, leveling, and tie down installation.</p> <p>If hydraulic jacks are used manufacturer load rating is not to be exceeded.</p> <p>Follow provisions of hand tool AHA.</p>	<p>Work gloves</p> <p>Steel-toe boots</p> <p>High visibility vest</p> <p>Safety glasses</p>	

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

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**Activity Hazard Analysis: Moving Equipment Between Sample Locations**

Task Breakdown	Potential Hazards	Critical Safety Practices	Personal Protective Clothing and Equipment	Monitoring Devices
Loading/Unloading Equipment	Slip, Trips, Fall	<ul style="list-style-type: none"> <li>Be aware of surroundings; observe area for objects that may impede travel or present a hazard</li> <li>Clear walkways and work areas of equipment, tools, vegetation, excavated material, and debris</li> <li>Mark, identify, or barricade other obstructions</li> <li>Ensure stable ground and adequate footing during loading operations</li> <li>Wear proper footwear based on conditions of ground surface</li> </ul>	Steel-toe boots; rubber boots	
	Handling Heavy Objects (Sprains, strains, hernias, crush, fracture)	<ul style="list-style-type: none"> <li>Observe proper lifting techniques – do not use your back to lift loads; do not twist/turn while lifting a load</li> <li>Walk slowly and surely with the load</li> <li>Obey sensible lifting limits (60 lb. Maximum per person manual lifting)</li> <li>Use mechanical lifting equipment (hand carts, trucks) to move large, awkward loads</li> <li>Use appropriate personal protective equipment (PPE) where required</li> </ul>	Work gloves Steel-toe boots	
	Unsecured Loads	<ul style="list-style-type: none"> <li>Ensure load is properly strapped to vehicle; anchor points are free from damage; straps do not have frays, tears, rips, and/or knots; straps are of adequate tensile strength to secure load</li> <li>Ensure straps are properly connected to attachment mechanism</li> <li>Ensure straps are properly positioned to reduce horizontal or vertical movement of the load</li> <li>Use appropriate PPE when required</li> </ul>	Safety glasses Steel-toe boots Tie-down straps; rope; bungee cords	
	Load Capacity Exceeded	<ul style="list-style-type: none"> <li>Ensure load capacity does not exceed manufacturer’s specifications for the type of vehicle used</li> </ul>	Vehicle/Trailer	
	High/Low Ambient Temperature	<ul style="list-style-type: none"> <li>Monitor for Heat/Cold stress</li> <li>Provide fluids to prevent worker dehydration</li> </ul>	Insulated Clothing (subject to ambient temperature)	

**Activity Hazard Analysis: Moving Equipment Between Sample Locations**

Task Breakdown	Potential Hazards	Critical Safety Practices	Personal Protective Clothing and Equipment	Monitoring Devices
Driving	Vehicular Accidents	<ul style="list-style-type: none"> <li>• Vehicle operators will inspect vehicles prior to operation to ensure safe operating conditions and minimize the potential for vehicle break-downs during travel</li> <li>• Vehicle operators should drive defensively to minimize the potential for accidents</li> <li>• Vehicle operators may not operate cellular phones or other electronic devices while in transit to, from, or while driving on the work site</li> <li>• Vehicle operators will have in their possession insurance, registration, and any required document if transporting any potential hazards</li> <li>• All vehicles will have an operable and inspected fire extinguisher while on site</li> <li>• All vehicles should carry road flares or other acceptable markers in the event of a breakdown to minimize collision hazards</li> <li>• All vehicles will be equipped with a first aid kit and should contain blankets in the event of a breakdown or other traffic problem (i.e., road closure due to snowy/icy conditions)</li> <li>• If involved in an accident, vehicle operator or any other non-injured passenger will immediate report the accident to the authorities and to the CH2M HILL field team leader (FTL), site safety coordinator (SSC), and/or other designated CH2M HILL contact person</li> </ul>	First aid kit Road flares; traffic cones; flashlight	
	Violation of traffic laws	<ul style="list-style-type: none"> <li>• Vehicle operators will abide by all posted traffic laws</li> <li>• An infractions that result in an issued citation will be reported to the CH2M HILL FTL, SSC, and/or other designated CH2M HILL contact person</li> </ul>		
	Obstacles	<ul style="list-style-type: none"> <li>• Vehicle operators should be aware of surroundings at all times</li> <li>• Vehicle operators and passengers should be alert to road conditions, obstacles, potential obstacles, animal hazards, and construction activities</li> <li>• Vehicle operators should respond accordingly to respective hazards by minimizing speed, using proper signaling to change lanes and/or</li> </ul>		



**Activity Hazard Analysis: Moving Equipment Between Sample Locations**

Task Breakdown	Potential Hazards	Critical Safety Practices	Personal Protective Clothing and Equipment	Monitoring Devices
Backing Vehicle		<p>using hazard lights when anticipated reduction in speed will be maintained to avoid rear end collisions</p> <ul style="list-style-type: none"> <li>• Vehicle operators will avoid sudden reactions to road obstacles, if possible</li> <li>• Use alarm or spotter when reversing a vehicle or vehicle with trailer</li> <li>• Spotter will wear a high visibility safety vest and, if needed, have flashlights for vehicle backing operations during night operations</li> <li>• Ensure all personnel are clear of operation to a suitable safe distance</li> </ul>	<p>High visibility vest Flashlight</p>	
Driving Under the Influence/Driving While Intoxicated		<ul style="list-style-type: none"> <li>• Driving Under the Influence (DUI) or Driving While Intoxicated (DWI) will not be tolerated</li> <li>• If a vehicle operator is cited for a DUI or DWI, a capable passenger will immediately notify the CH2M HILL FTL, SSC, and/or other designated CH2M HILL contact person</li> <li>• The vehicle operator will be immediately removed from the project</li> <li>• Additional consequences will be determined pending further investigation by CH2M HILL</li> <li>• The subcontractor will be obligated to fulfill the terms and conditions of the contract by supplying personnel to fill the vacant position</li> </ul>		

**Activity Hazard Analysis: Oversight of Utility Locate**

Task Breakdown	Potential Hazards	Critical Safety Practices	Personal Protective Clothing and Equipment	Monitoring Devices
Oversight	Slip, Trips, Fall	<ul style="list-style-type: none"> <li>• Be aware of surroundings; observe area for objects that may impede travel or present a hazard</li> <li>• Clear walkways and work areas of equipment, tools, vegetation, excavated material, and debris</li> <li>• Mark, identify, or barricade other obstructions</li> <li>• Ensure stable ground and adequate footing during loading operations</li> <li>• Wear proper footwear based on conditions of ground surface</li> </ul>	Steel-toe boots/rubber boots with good tread	
	Changing Weather Conditions	<ul style="list-style-type: none"> <li>• Monitor the weather forecast prior to beginning field work and continue monitoring as it progresses</li> <li>• Review evacuation routes, rally/meeting points, and route to hospital</li> <li>• Take time to review where the closest structure that can be used when severe weather occurs</li> </ul>	Weather radio or other device to check weather forecasts	
	High/Low Ambient Temperature	<ul style="list-style-type: none"> <li>• Monitor for Heat/Cold stress</li> <li>• Follow a proper work/rest regime – provide a rest area for workers to warm up/cool down</li> <li>• Provide fluids to prevent worker dehydration</li> <li>• Be conscious of your individual tolerance to work in hot weather and monitor yourself and co-workers for signs and symptoms of heat/cold stress</li> <li>• Keep exposed skin covered</li> </ul>	Insulated Clothing (subject to ambient temperature)  Sunscreen other protective clothing	
	Biological Hazards	<ul style="list-style-type: none"> <li>• Be aware of surroundings and follow the biological hazard precautions, guidelines, and fact sheets in the HSP for ticks, snakes, spiders, hazardous plants, etc.</li> <li>• Wear light colored long-sleeved shirt and pants; tuck pant legs into socks; check for ticks at least daily; use insect repellent containing DEET</li> </ul>		
	Traffic Hazards	<ul style="list-style-type: none"> <li>• Wear high visibility traffic vests near heavy equipment or traffic</li> <li>• The subcontractor will utilize traffic control equipment (cones, delineators, etc.) to route traffic around work areas, as needed</li> </ul>	High visibility vest  Traffic cones, signs, barricades	

**Activity Hazard Analysis: Oversight of Utility Locate**

<b>Task Breakdown</b>	<b>Potential Hazards</b>	<b>Critical Safety Practices</b>	<b>Personal Protective Clothing and Equipment</b>	<b>Monitoring Devices</b>
	Unauthorized Persons Entering Work Zone	<ul style="list-style-type: none"> <li>• Obtain access agreements from residential homeowners prior to beginning work</li> <li>• Notify residential homeowners when work will begin and review health and safety risks of activities to be performed</li> <li>• Set up an exclusion zone with cones, barricades, and/or delineators, and signs. Take care to provide adequate walkways and keep driveways clear for residents to access their property as safely as possible</li> <li>• Be aware of surroundings and direct people around work areas</li> </ul>	Traffic cones, signs, barricade	

# Open-bladed Knife Safety Guidelines

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*Environmental Services Business Group*

## Open-bladed Knife Policy

Open-bladed knives (e.g., box cutters, utility knives, pocket knives, machetes, and multi-purpose tools with fixed blades such as a Leatherman®) are prohibited at worksites except where the following three conditions are met:

- The open-bladed knife is determined to be the best tool for the job
- An approved Activity Hazard Analysis (AHA) or written procedure is in place that covers the necessary safety precautions (work practices, PPE, and training)
- Knife users have been trained and follow the AHA

An AHA or written procedure should contain the following information as appropriate.

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<b>Responsibilities</b>	<ul style="list-style-type: none"><li>• Supervisors are responsible for funding and ensuring the correct tool is being used, employees wear the proper PPE when using knives, and they have documented the user training or review this policy. Consult with HSE staff as necessary.</li><li>• Employees are responsible for using cutting tools in the way they are intended, maintaining them in good working order and reporting faulty or unusable items. PPE as specified in the procedure or AHA is to be used.</li><li>• Those engaging and supervising subcontractors are to ensure that the requirements of this policy are communicated in writing as part of their contractual requirements and confirmed in the pre-job meetings.</li></ul>
<b>Glove Requirements</b>	<ul style="list-style-type: none"><li>• The most appropriate gloves shall be identified within the AHA/ written procedure. These can be obtained from the regional warehouses and most stores selling safety supplies. Sufficient supplies shall be available on site to ensure size and damage/wear meet the requirements of the job and staff</li><li>• In general, cut resistant gloves (e.g. Kevlar) are to be worn when using a knife in an occupational setting.</li><li>• Other types of gloves may be required and will be identified within the AHA / written procedure. Example - Leather gloves may be worn when using the acetate sleeve cutter.</li></ul>

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**Training (Ref. VO  
for additional hand  
safety topics)**

- All employees that will use a cutting tool must be trained in the proper use.
- Position the item to be cut on a stable surface. Secure it to prevent slippage, wherever possible. Select a work location which does not put your body in the line of fire of a knife slippage or failure.
- When using a knife do not cut towards yourself.
- When cutting, make the force of the cut carry the blade away from any part of your body. If you have a peculiar situation where this is not possible, protect yourself with a leather apron, or other material placed between you and the blade. Consider putting the material to be cut in a vise, or other holding device.
- Many tasks using a utility knife require a knife edge but not a sharp point. For these tasks you can add protection against puncture wounds by using a rounded-tip blade.
- If you use a folding knife, it must be a locking blade type.
- Never use a knife that will fold under pressure.
- If you use a fixed blade knife, make sure there is a handle guard
- to keep your hand from slipping forward. Also, make sure the handle is dry and non- greasy/slippery to assure a better grip.
- If you carry a fixed blade knife, use a sheath or holder.
- Store utility knives safely, retract the blade or sheath an open blade before storing. Never, leave a knife with the blade exposed on the floor, on a pallet, on a work surface, or in a drawer or cabinet.
- Keep your knife sharp. A dull blade requires you to use more force to cut, and consequently increases the risk of slip or mistake.
- Knives used on the job, but not carried with you , must be properly stored when not in use
- Never use a defective knife.
- Utility knife blades are brittle and can snap easily. Don't bend them or apply side loads to them by using them to open cans or pry loose objects.
- Use the knife only to cut. It was not designed to work as a pry bar, screwdriver, or hole punch.
- If you do get cut, seek medical attention to treat the injury by notifying your supervisor and contacting WorkCare at 1-866-893-2514.

## Examples of preferred tools and Kevlar cut resistant gloves



A safety spring provides for automatic blade "shoot-back" into the handle when contact w/cutting surface is lost

**Stay focused on the cutting job.** It only takes a second of inattention with a sharp blade to produce a serious cut.

- Letting the mind wander or talking with others while using a knife greatly increases the risk of an accident and injury.
- If you are interrupted while working with a knife, stop cutting, retract the blade, and place the knife down on a secure surface before dealing with the interruption. You should never continue cutting while distracted!

As always, utilize the hierarchy of controls and first attempt to engineer out the hazard and frequently ask ourselves do we have the right tool for the job.

**Activity Hazard Analysis: Soil Sample Handling and Processing**

<b>Task Breakdown</b>	<b>Potential Hazards</b>	<b>Critical Safety Practices</b>	<b>Personal Protective Clothing and Equipment</b>	<b>Monitoring Devices</b>
Receiving Sample Containers	Broken containers – cuts to hands	<ul style="list-style-type: none"> <li>Use caution when opening packages/coolers and removing containers</li> <li>Wear protective gloves when opening packages to avoid contacting broken glass with skin</li> </ul>	Protective gloves	
	Preservative leaks	<ul style="list-style-type: none"> <li>Use caution when handling containers with preservative.</li> <li>Wear protective gloves, splash protection as needed, and safety glasses or goggles</li> <li>Know the location of the nearest eyewash station and emergency shower</li> </ul>	Protective gloves, safety glasses or goggles, splash protection	
Preparing Sample Containers	Handling/Spilling Chemicals	<ul style="list-style-type: none"> <li>Never leave open chemicals unattended</li> <li>Know the location of the chemical MSDSs, first aid kit, nearest eyewash station, emergency shower, and the spill kit</li> <li>Wear proper PPE: safety glasses with side shields or goggles, nitrile gloves, splash protection, as necessary</li> <li>Keep container preparation area well ventilated</li> <li>Be familiar with the MSDS for the preservation material</li> <li>Do not hold sample containers on your lap when adding preservative</li> <li>Make sure all caps are secure</li> </ul>	First aid kit Eyewash station Emergency shower Proper PPE: safety glasses, goggles, splash protection, nitrile gloves	
Collecting Soil Samples	Exposure/Contact with Contaminated Soil	<ul style="list-style-type: none"> <li>Monitor air space using a photoionization detector (PID) as specified in the HSP</li> <li>Wear proper PPE: tyvek, coveralls, safety glasses with side shields or goggles, chemical resistant gloves, etc.</li> <li>Use dedicated writing implements for logging information into field book and/or field forms to prevent potential contact with contaminants following soil sampling activities</li> <li>Utilize appropriate non-reactive tools (plastic spoons, stainless steel trowels, etc.) to collect media</li> </ul>	Proper PPE: Tyvek, coveralls, safety glasses, goggles, face shield, chemical resistant gloves Non-reactive tools	MiniRAE or MultiRAE PID
	Cross-contamination	<ul style="list-style-type: none"> <li>Follow sampling procedures detailed in the site specific sampling and analysis plan</li> </ul>		

**Activity Hazard Analysis: Soil Sample Handling and Processing**

Task Breakdown	Potential Hazards	Critical Safety Practices	Personal Protective Clothing and Equipment	Monitoring Devices
	<p>between sample locations</p> <p>Sample Container/Location Mix-up</p>	<ul style="list-style-type: none"> <li>• Maintain a clean work area to prevent possible cross-contamination</li> <li>• Use dedicated sampling equipment for each sample, or perform decontamination procedures on sampling equipment</li> <li>• Handle sample jars safely. If a jar is broken, make sure work gloves are used to clean it up</li> <li>• Label sample containers with sample location, sample ID, date, time of collection, and sampler's name; ensure label is legible and written with permanent ink</li> <li>• When possible, create a sample list with the information listed above either in the field logbook, or separate sheet of paper</li> <li>• Perform a quality check on sample jar labels, sample list, printed label, and chain-of-custody to ensure all information is correct</li> <li>• Use spray paint, flags, flagging tape, and/or stakes to mark sample locations for easy identification; use a portable GPS to obtain GPS coordinates of sample locations in case field markings are removed</li> </ul>		
<p>Handling/ Loading Sample Coolers</p>	<p>Lifting Hazards</p> <p>Contact with broken glass in coolers; Exposure to potential contaminants</p>	<ul style="list-style-type: none"> <li>• Utilize proper lifting procedures when moving and loading coolers.</li> <li>• Use mechanical means or a buddy when available or necessary</li> <li>• Bend at the knees and lift with your legs rather than bending and lifting with your back; do not lift and twist</li> <li>• When possible, pack coolers so that they are not too heavy to move</li> <li>• Wear work gloves to improve grip when handling coolers</li> <li>• Use caution when taking contents out of coolers</li> <li>• Wear protective gloves if you encounter broken glass</li> <li>• Be sure to use packaging material to cushion sample jars and prevent breakage as much as possible</li> <li>• Wear appropriate PPE (protective gloves) when handling sample containers</li> <li>• The vehicle operator will be immediately removed from the project</li> <li>• Additional consequences will be determined pending further investigation by CH2M HILL</li> </ul>		



**Activity Hazard Analysis: Soil Sample Handling and Processing**

Task Breakdown	Potential Hazards	Critical Safety Practices	Personal Protective Clothing and Equipment	Monitoring Devices
	Tape Gun – Sharp Edge	<ul style="list-style-type: none"> <li>• The subcontractor will be obligated to fulfill the terms and conditions of the contract by supplying personnel to fill the vacant position</li> <li>• To extent possible, prepare tape strips separately and apply to sample bottles by hand</li> <li>• Break tape by pushing the tape gun away from you</li> <li>• Ensure hands and legs are not in the path of the tape gun</li> <li>• Wear protective gloves to ensure bare hands will not come into contact with the tape gun</li> </ul>		

<b>Activity:</b> Operation of DNAPL/GW Collection System	<b>Date:</b> May 2010 Revision
	<b>Project:</b> Velsicol Chemical/Pine River Site OU2 O&M - WA No. 058-RARA-0532
<b>Description of the work:</b> Mobilization/Driving DNAPL/GW depth gauging System component inspection Shoreline inspection DNAPL/GW collection system operation Oversight of waste transportation activities	<b>Site Supervisor:</b> Theo von Wallmenich
	<b>Site Safety Officer:</b> Scott Pratt
	<b>Review for latest use:</b> Before the job is performed.

<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)
Mobilization/Driving	Vehicular accidents.	<ul style="list-style-type: none"> <li>• Vehicle operators will inspect vehicles prior to operation to ensure safe operating conditions and minimize the potential for vehicle break-downs during travel.</li> <li>• Vehicle operators should drive defensively to minimize the potential for accidents.</li> <li>• Vehicle operators should avoid the use of cellular phones, reading, writing, or listening to headphones while operating a vehicle in transit to or from the work site.</li> <li>• <b>Cellular phones may not be used by the vehicle operator while driving on the site.</b></li> <li>• Vehicle operators will have in their possession insurance, registration and any other required document such as a MSDS if transporting fuel, chemicals or other potential hazards in small quantities.</li> <li>• <b>If involved in an accident, vehicle operator or any other non-injured passenger will immediately report the accident to the authorities and to the CH2M HILL SC or other designated CH2M HILL contact person.</b></li> </ul>

<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)
Mobilization/Driving (cont.)	Violation of traffic laws.	<ul style="list-style-type: none"> <li>• Vehicle operators will abide by all posted traffic laws.</li> <li>• Any infractions that result in an issued citation will be reported to the CH2M HILL SC or other designated CH2M HILL contact person.</li> </ul>
	Obstacles.	<ul style="list-style-type: none"> <li>• Vehicle operators should be aware of surroundings at all times.</li> <li>• Vehicle operators and passengers should be alert to road conditions, obstacles, potential obstacles, animal hazards, and construction activities.</li> <li>• Vehicle operators should respond accordingly to respective hazards by minimizing speed, using proper signaling to change lanes and/or using hazard lights when anticipated reduction in speed will be maintained to avoid rear end collisions.</li> <li>• Vehicle operators will avoid sudden reactions to road obstacles, if possible.</li> </ul>
	Backing vehicle/trailer.	<ul style="list-style-type: none"> <li>• Use alarm or spotter when reversing a vehicle or vehicle with trailer.</li> <li>• Spotter will wear a high visibility safety vest and, if needed have flashlights for vehicle backing operations during night operations.</li> <li>• Spotters should be familiar with standard hand and arm signals for directing vehicle movement in both forward and reverse directions.</li> <li>• Ensure all personnel are clear of operation to a suitable safe distance.</li> </ul>

<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)
System, component, and shoreline inspections and all activities that require walking the Site.	Slip/trip/fall	<ul style="list-style-type: none"> <li>• Clear walkways and work areas of objects</li> <li>• Mark, identify, or barricade other obstructions</li> <li>• Identify uneven surfaces or ground protrusions</li> <li>• Institute and maintain good housekeeping practices.</li> <li>• Observe and avoid tools and debris in a work area.</li> <li>• Walk or climb only on surfaces designed for personnel access.</li> <li>• Be aware of poor footing and potential slipping and tripping hazards in the work area.</li> <li>• Observe and avoid areas of unprotected holes, ramps, roof areas and ground penetrations or protrusions (stumps, roots, holes curbs, utility structures etc). Employees walking in ditches, swales and other drainage structures adjacent to roads, across undeveloped land or in controlled industrial work/process areas must use caution to prevent slips and falls, which can result in twisted or sprained ankles, knees, and backs.</li> <li>• Whenever possible observe the conditions from a flat surface and do not enter a steep ditch or side of a steep road bed.</li> <li>• Sturdy safety shoes or boots that provide ankle support should be used. The need for ladders or ropes to provide stability should be evaluated prior to exercising this option</li> </ul>
DNAPL/GW depth gauging	Fumes/nuisance odors from manholes	<ul style="list-style-type: none"> <li>• Operator should stand upwind from open manholes</li> <li>• Site specific data indicate that there is no open air exposure risk. Given the small amount of time that this task requires, if nuisance odors are present operator should don respirator in accordance with the HASP as a prophylactic measure, complete task and close manhole.</li> </ul>

<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)
DNAPL/GW collection system operation	Chemical exposure from gauging tape	<ul style="list-style-type: none"> <li>• Operators should wear chemical resistant gloves while measuring GW/DNAPL levels.</li> <li>• Operators should obtain soap and water before completing task and wash hands after completing task.</li> <li>• Equipment should be thoroughly cleaned after each use.</li> </ul>
	Equipment damage/failure	<ul style="list-style-type: none"> <li>• Operators completed site and equipment specific training.</li> <li>• Operation of system equipment and components should be completed in accordance with the manufacturer's specifications and the standard operating procedures included in the Site Management Plan.</li> <li>• Emergency procedures are included in the Site Management Plan</li> </ul>
	Manual lifting during discharge hose re-alignment	<ul style="list-style-type: none"> <li>• Proper lifting techniques (lift with the legs and not the back) must be followed.</li> <li>• Know where the load is going before it is moved and ensure area is clear.</li> <li>• Do not twist the body when moving load.</li> </ul>
	Fumes/nuisance odors from tanks during discharge hose re-alignment	<ul style="list-style-type: none"> <li>• Operator should stand upwind from tank openings if possible.</li> <li>• Site specific data indicate that there is no open air exposure risk. Given the small amount of time that this task requires, if nuisance odors are present operator should don respirator in accordance with the HASP as a prophylactic measure and complete task.</li> <li>• During site operations that require that the tank access is open, place provided tarps over tank opening and limit access to area.</li> </ul>
	Climbing	<ul style="list-style-type: none"> <li>• Three point contact for tank ladders and stairs.</li> </ul>

<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)
DNAPL/GW collection system operation (cont.)	Spills	<ul style="list-style-type: none"> <li>• Spill prevention procedures are incorporated into all system standard operating procedures included in the Site Management Plan.</li> <li>• All spills will be cleaned up at the time of occurrence. PPE will be determined by the nature of the spill and as required by the HASP.</li> <li>• Containment areas will be utilized when transferring liquids into the storage tank.</li> <li>• Material generated from a spill will be placed in an appropriate container until final transportation and disposition is completed.</li> <li>• Waste will be labeled, handled and disposed of according to state and federal regulations.</li> </ul>

<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)
	<p style="text-align: center;">Biological Hazards</p>	<ul style="list-style-type: none"> <li>• Biological hazards are everywhere and change with the region and season. If you encounter a biological hazard that has not been identified in this plan, contact the RHSM so that a revision to this plan can be made. Whether it is contact with a poisonous plant, a poisonous snake, or a bug bite, do not take bites or stings lightly. If there is a chance of an allergic reaction or infection, or to seek medical advice on how to properly care for the injury, contact the occupational nurse at 1-866-893-2514. The following common biological concerns may be encountered: bees and other stinging insects; mosquitoes; poison ivy, poison oak, and poison sumac and other poisonous plants; snakes; spiders; ticks. Review the approved HASP for hazards definitions and controls prior to the commencement of work.</li> </ul>
	<p style="text-align: center;">Thermal stress due to heat, cold and/or inclement weather</p>	<ul style="list-style-type: none"> <li>• Review heat and cold stress provisions of the approved HASP. Personnel will wear appropriate cool weather, water resistant clothing and personnel will monitor each other for signs of cold stress. Work/rest cycles will be implemented if needed and water/gatorade will be available for personnel to remain hydrated.</li> </ul>
<p style="text-align: center;">Oversight of waste transportation activities (water)</p>	<p style="text-align: center;">Vacuum hoses and equipment</p>	<ul style="list-style-type: none"> <li>• All hoses and equipment must be in proper working order.</li> <li>• No holes or patches in hoses allowed.</li> <li>• Tank and vacuum truck attachments are clean and debris free prior to use.</li> <li>• Vacuum truck openings are shut tight and secured with appropriate locking mechanisms.</li> <li>• Proper housekeeping to prevent slip, trip, and fall related accidents.</li> </ul>

<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)
Oversight of waste transportation activities (water)	Spills	<ul style="list-style-type: none"> <li>• Spill prevention procedures are incorporated into all system standard operating procedures included in the Site Management Plan.</li> <li>• All spills will be cleaned up at the time of occurrence. PPE will be determined by the nature of the spill and as required by the HASP.</li> <li>• Containment areas will be utilized when transferring liquids from storage tank to vacuum truck.</li> <li>• Material generated from a spill will be placed in an appropriate container until final transportation and disposition is completed.</li> <li>• Waste will be labeled according to state and federal regulations</li> <li>• Manifests will be utilized to ship the waste from the point of generation to the final disposal site.</li> </ul>
	Traffic control	<ul style="list-style-type: none"> <li>• No unauthorized vehicular traffic in work areas.</li> <li>• Spotters/signalperson used as needed.</li> <li>• Wear DOT safety vests (reflective).</li> <li>• Place orange safety cones around work area.</li> <li>• Park in designated areas only.</li> </ul>
	Fire Protection	<ul style="list-style-type: none"> <li>• Vacuum truck will be equipped with a fire extinguisher. The extinguisher will be fully charged and in good condition. It will be visually inspected each month, and undergo a maintenance check each year.</li> </ul>
	Physical Toxins	<ul style="list-style-type: none"> <li>• Proper PPE must be worn when contact with free product is possible (SEE SITE SPECIFIC HASP).</li> </ul>
Oversight of waste transportation activities (NAPL)	See above precautions for oversight of waste transportation activities water handling	The TTM must be on-site functioning as the SSC in order to complete this task. HSP procedures must be consulted and a



<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)
<p>Oversight of waste transportation activities (NAPL)</p>	<p>See above precautions for oversight of waste transportation activities water handling</p>	<p>task specific briefing completed prior to completion of this task.</p> <p>It is anticipated that the work will be completed in Level D PPE.</p> <p>Additional safety procedures required for Area 3 manhole are described below.</p> <ul style="list-style-type: none"> <li>• Only those people directly involved with the NAPL collection operation are allowed in the vicinity when the Area 3 manhole is open.</li> <li>• All work will be performed upwind of the open manhole or other potential source of Area 3 NAPL. This is particularly important for equipment wipe down where Area 3 NAPL may remain on equipment even after flushing.</li> <li>• A ventilation fan will be used to create an inward flow of clean air into the manhole. The ventilation suction will be placed as low as practical inside the manhole and at least 5 feet below manhole level. An air flow rate of three air changes per hour or greater is required. No work in or on the manhole will begin until at least one air change has occurred.</li> <li>• A smoke test or other visual means to confirm airflow into the manhole will be performed prior to working in or on the manhole.</li> <li>• After pumping operations have ended and equipment has been flushed, one or both of the ventilation fans will be used to provide ventilation for equipment removal and wipe down.</li> </ul>

<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)
Oversight of waste transportation activities (NAPL)	See above precautions for oversight of waste transportation activities water handling	<ul style="list-style-type: none"> <li>• Direct reading air monitoring for oxygen, combustible gas, and ionizable vapor (PID) will be conducted by CH2M HILL before work begins in the vicinity of the manholes. Air sampling as described in the site specific HASP will also be performed by CH2M HILL personnel.</li> <li>• Entry into the manholes is prohibited.</li> </ul>

<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)
Misc. hand tools	Visual Inspection	<ul style="list-style-type: none"> <li>• Review AHA with all task personnel</li> <li>• Review Site Specific Health and Safety Plan.</li> <li>• Review operations/safety manuals for all equipment utilized</li> <li>• Training per 29 CFR 1910.120 or other training as required</li> </ul>
Steel tape and paste	Visual Inspection	
Safety equipment <ul style="list-style-type: none"> <li>• First aid kit</li> <li>• Fire extinguisher</li> <li>• Eye wash</li> <li>• PPE as required by task (safety vest, gloves, hearing protection, safety glasses, tyveck, respirator)</li> </ul>	Visual inspection as required	
Vacuum/tanker truck	Visual Inspection Qualified Operator Roadway inspection	

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**Date/Time:**

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**Safety Officer Name:**

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ACTIVITY HAZARD ANALYSIS

<b>Date:</b> April 2014 <b>Job/Activity:</b> Site Walks/Visits		Task Risk Assessment Code (RAC): E = Extremely High Risk H = High Risk M = Moderate Risk L = Low	<h2>Moderate</h2>				
<b>Project:</b> Velsicol Main Plant Site RD <b>Prepared by:</b> Elizabeth Markham/DET <b>Reviewed by (PM/Site Supervisor/H&amp;S):</b> Carl Woods/CIN		<h3>Probability</h3>					
Description of the work: Site visits by project personnel and visitors.		<b>Severity</b>	<b>Frequent</b>	<b>Likely</b>	<b>Occasional</b>	<b>Seldom</b>	<b>Unlikely</b>
		<b>Catastrophic</b>	E	E	H	H	M
		<b>Critical</b>	E	H	H	M	L
		<b>Marginal</b>	H	M	M	L	L
		<b>Negligible</b>	M	L	L	L	L
<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)					
General preparation	Forgotten safety equipment, no cell phone coverage, lack of emergency preparedness, untimely reporting of an injury or other incident	<ul style="list-style-type: none"> <li>• Complete HSP, AHA review</li> <li>• Complete PTSP, daily safety meeting, and quality briefing.</li> <li>• Check for cell phone coverage.</li> <li>• Designate rally point and evacuation point (daily if working in new locations each day).</li> <li>• Check daily weather report and plan activities around severe weather.</li> <li>• Review, inspect and locate safety equipment including fire extinguisher, first aid kit, insect repellant, PPE, water, food, spill kits, etc.</li> <li>• Be sure to review the requirements for incident notification, reporting and investigation section of the HSP. Report all injuries, no matter how minor. If you are unsure whether an event should be reported, contact your RHSM. Be sure to report near misses.</li> </ul>					
Hazards and controls applicable to all steps of field work.	Temperature Extremes ( <b>heat</b> )	<ul style="list-style-type: none"> <li>• Acclimatize to work in hot weather by working in heat and taking more frequent breaks, systematically building up</li> </ul>					

		<p>tolerance to heat</p> <ul style="list-style-type: none"> <li>· Conduct field activities in the early morning if possible to avoid heat or inclement weather.</li> <li>· California has a specific heat illness prevention regulation that must be implemented. This includes,             <ul style="list-style-type: none"> <li>· Having enough water onsite so that each worker can consume at a minimum, one quart per hour per shift.</li> <li>· Frequent reminders and/or water breaks shall be taken so that each person can consume enough water.</li> <li>· Access to shade (i.e., blockage from direct sunlight) shall be provided at all times and shall be reasonably close to the work area. Keep in mind that a vehicle or other enclosed are with no air conditioning is NOT considered shade. Must be a well ventilated area or have air conditioning.</li> <li>· Workers suffering from heat illness-related symptoms OR if needed for preventative recovery shall be provided access to shade for at least 5 minutes, or longer, for recovery. (if heat related symptoms are occurring, contact the RHSM).</li> <li>· Training on risk factors, signs and symptoms of heat illness, importance of hydration and acclimatization, and importance of reporting symptoms and what to do in case of heat illness emergency, and contacting emergency medical services (see HSP, Temperature Extremes section).</li> <li>· Read and follow heat stress precautions specified in the HSP.</li> </ul> </li> <li>· Follow the requirements for physiological monitoring as stated in the HSP. (e.g., During work in Tyvek in temperatures above 70 degrees , perform physiological monitoring—see safety plan if not wearing Tyvek for when to start monitoring) and document on the heat stress physiological monitoring form.</li> <li>· Be conscious of your individual tolerance to work in hot weather and monitor yourself and co-workers for signs and symptoms of heat stress.</li> </ul>
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ACTIVITY HAZARD ANALYSIS

		<ul style="list-style-type: none"> <li>• Take breaks as necessary in shady or cool areas and drink plenty of liquids.</li> <li>• Take regular breaks in an air-conditioned truck or trailer during warm weather. Use a wide-brim hat or an umbrella or have a place where shade has been set up (tent or other temporary structure) when working under direct sun for extended periods.</li> <li>• Persons who experience signs of heat or cold stress should contact the SC, PM and RHSM. Call the occupational nurse first if symptoms are severe at 1-866-893-2514.</li> </ul>
	<p>Temperature Extremes (<b>cold</b>)</p>	<ul style="list-style-type: none"> <li>• Read and follow cold stress precautions specified in the HSP.</li> <li>• Wear layers and ensure you're dressed adequately for site conditions.</li> <li>• Takes breaks in a warm location as necessary and stay hydrated with warm fluids (avoid caffeine).</li> <li>• Monitor your co-workers for signs of cold stress.</li> <li>• Persons who experience signs of heat or cold stress should contact the SC, PM and RHSM. Call the occupational nurse first if symptoms are severe at 1-866-893-2514.</li> </ul>
	<p>Ticks</p>	<ul style="list-style-type: none"> <li>• Wear light colored long sleeve shirts and pants. Use repellent on exposed skin (with at least 35% DEET) if ticks/other biting insects are suspected in the area. Whenever you use an insecticide or insect repellent, be sure to read and follow the manufacturer's DIRECTIONS FOR USE, as printed on the product. Tape bottoms of pant legs or tuck pants into socks.</li> <li>• Wear protective clothing such as Tyvek or Bug-out suits if ticks are abundant in addition to controls above.</li> <li>• Have tick removal kits accessible. Use the buddy system and perform tick inspections prior to entering the field vehicle. If ticks were not planned to be encountered and are observed, do not continue field work until these controls can be implemented.</li> <li>• See Tick Fact Sheet attached to the HSP for further precautions and controls to implement when ticks are</li> </ul>

		<p>present. If bitten by a tick, follow the removal procedures found in the tick fact sheet, call the occupational nurse at 1-866-893-2514.</p>
	<p>Wasps</p>	<ul style="list-style-type: none"> <li>• Keep exposed skin to a minimum.</li> <li>• Carry a kit if you have had allergic reactions in the past, and inform your supervisor and/or a buddy. When working at a remote location, ensure that first-aid kits contain over-the-counter allergy and itch medication (e.g., Benadryl, Claritin, etc) as well as other over-the-counter medications that may not be available to aid in symptom treatment.</li> <li>• If bees or other stinging insects are known to be present, determine whether additional protective clothing should be donned before entering/working in brushy areas.</li> <li>• Consider if heavy-weight clothing or tyvek, or head netting would provide additional protection in areas where wasps/bees are known or suspected. Be aware of heat stress conditions additional clothing may cause.</li> <li>• Use insect repellent on clothing. Wear light-colored clothing and remove bright reflective safety-colored clothing if not working near a roadway as these may attract the wasps.</li> <li>• Wear fragrance-free or lightly-scented sunscreen, and body lotions. Bees are attracted to sweet scents. Avoid using floral scented soaps, shampoos, or conditioners.</li> <li>• If you encounter a wasp, back away slowly and calmly, do not run or swat at the insect. Wait for it to leave, or gently move or brush it off gently with a piece of paper or other light object. Do not use your hand.</li> <li>• If you are stung, contact the occupational nurse at 1-866-893-2514, no matter how minor it may seem. If a stinger is present, remove it as soon as possible using something with a thin, hard edge (e.g., credit card) to scrape the stinger out. Be sure to sanitize the object first with hand sanitizer, alcohol or soap and water. Wash and disinfect the wound, cover it, and apply ice. Watch for an allergic reaction if you have never been stung before. Call 911 if the reaction is severe.</li> <li>• Use wasp/bee spray if necessary in accordance with</li> </ul>



ACTIVITY HAZARD ANALYSIS

		<p>manufacturer's labeling and direction for use.</p>
	<p>Black widow and other spiders</p>	<ul style="list-style-type: none"> <li>• Wear long sleeves shirts and long pants, no matter the weather.</li> <li>• Always wear gloves when opening wells, or reaching into areas where spiders or other insects may be.</li> <li>• Inspect or shake out any clothing, shoes, or equipment before use. Inspect tools, backpacks, etc. after working in field prior to stowing.</li> <li>• Minimize the empty spaces between stacked materials.</li> <li>• Remove and reduce debris and rubble from around the outdoor work areas.</li> <li>• Trim or eliminate tall grasses from around outdoor work areas.</li> <li>• Store apparel and outdoor equipment in tightly closed plastic bags.</li> <li>• Keep your tetanus boosters up-to-date (every 10 years). Spider bites can become infected with tetanus spores.</li> <li>• If you think you have been bit by a poisonous spider, immediately call the occupational nurse at 1-866-893-2514 and notify the PM and RHSM.</li> </ul>
	<p>Other biological hazards</p>	<ul style="list-style-type: none"> <li>• Refer to the HSP for controls on other biological hazards possibly present dependent on season/location, including Valley Black Gnats, snakes, spiders, and poisonous plants.</li> </ul>
	<p>Inclement weather</p>	<ul style="list-style-type: none"> <li>• Sudden inclement weather can rapidly encroach upon field personnel. Preparedness and caution are the best defenses. Carry clothing appropriate for inclement weather.</li> <li>• Take heed of the weather forecast for the day and pay attention for signs of changing weather that indicate an impending storm. Signs include towering thunderheads, darkening skies, or a sudden increase in wind. If stormy weather ensues, field personnel should discontinue work and seek shelter until the storm has passed.</li> <li>• Avoid working during thunderstorms.</li> <li>• If caught in one, seek shelter.</li> <li>• Avoid lone trees as shelter and open, bare areas.</li> </ul>

		<ul style="list-style-type: none"> <li>• If caught in open area, place feet close together and crouch down as small as possible, without lying on the ground.</li> <li>• Ground strikes are known to be initiated by “leaders”, or charges, from the earth making a connection to the charge in the clouds. This may cause your hair to stand up, and since you do not want to be part of a leader that makes the connection to form a cloud-to-ground strike, immediately crouch as described above.</li> <li>• Avoid low lying areas such as washes after rain as they can flood.</li> <li>• Take time to review where the closest structure that can be used when severe weather occurs and what route will be used to get there. Listen to weather reports and plan for severe weather. Designate an emergency evacuation assembly area and evacuation routes for non-weather related emergencies (fire, etc.). Keep a copy of the Emergency Contact page from the HSP accessible.</li> </ul>
<p>Operating Work Vehicle to site</p>	<p>Traffic accidents</p>	<ul style="list-style-type: none"> <li>• Inspect the vehicle prior to departure.</li> <li>• If driving a rental car, become familiar with the safe operation of vehicles of the type and size to be operated. Large vehicles such as full size vans and pick-ups have different vision challenges and handling characteristics than smaller vehicles.</li> <li>• Drivers shall not use cellular phones, or other two-way communication devices while driving (including hands-free devices). Pull over and park the car to make or take phone calls, text, or e-mail.</li> <li>• Be sure to take adequate rest breaks when driving, especially on long distance trips.</li> <li>• Obey speed limits; be aware of blind spots or other hazards associated with low visibility. Practice defensive driving techniques, such as leaving plenty of room between your vehicle and the one ahead of you.</li> <li>• If vehicle is malfunctioning, don't pull over off the road suddenly. Give the traffic behind you notice that you are pulling off.</li> <li>• Always wear seatbelt in vehicle, regardless of length of</li> </ul>

ACTIVITY HAZARD ANALYSIS

		<p>drive.</p> <ul style="list-style-type: none"> <li>Apply Get Out and Look (GOAL) when returning to the vehicle to prevent property damage and injury by looking for obstructions, personnel or other items. Back slowly and use a spotter when view is obstructed.</li> </ul>
Vehicle Parking	Pedestrian accidents and vehicle fires	<ul style="list-style-type: none"> <li>Vehicles should be parked off road in areas where access to from vehicles is safe and avoids active roadways.</li> <li>Do not park vehicle over grassed areas due to the potential fire hazard from the catalytic converter. Park on gravel or paved areas whenever possible.</li> <li>Do not block any property access roads.</li> <li>Wear reflective orange vests when near traffic.</li> <li>Know the location and operation of the fire extinguisher carried in the field vehicle or near treatment system.</li> </ul>
Site walk	<p>Slips, trips, and falls            Entrance into exclusion zone without proper PPE            Potential skin contact and/or inhalation hazardous substances/contaminated material/vapors            Possible wandering visitors away from group</p>	<ul style="list-style-type: none"> <li>Inspect area for slip, trip, and fall hazards. Remove hazard, if possible, or mark it. Designate foot traffic around trip hazards.</li> <li>Wear proper footwear, with good tread.</li> <li>Be alert to potential deterioration of walking and working surfaces.</li> <li>Pay attention and constantly observe the work area for hazards, changing weather conditions, biological hazards.</li> <li>Step slowly and tentatively in tall grass where the ground can't be seen to avoid depressions or other obstacles that could cause ankle/knees sprains.</li> <li>Be on the lookout for biological hazards, including poisonous plants...do not begin field work unless you have the means to implement the controls in the safety plan for biological hazards.</li> <li>Review hazardous properties of site contaminants with site visitors before walking the site.</li> <li>Be sure field personnel visibly mark out exclusion zones to ensure unauthorized personnel/site visitors without proper PPE do not enter exclusion zone. If visitors enter exclusion zone, follow proper decontamination procedures to prevent</li> </ul>

ACTIVITY HAZARD ANALYSIS

		<p>ingestion of and prolonged contact with contaminants</p> <ul style="list-style-type: none"><li>• Ensure visitors wear proper PPE when walking the site. Do not allow visitors to enter site areas without proper PPE. Provide visitors with proper skin, eye, and respiratory protection based on the exposure hazards present.</li><li>• Stand upwind from potentially contaminated areas/exclusions zones as able.</li><li>• Implement engineering controls (i.e., vent fans) to direct vapors away from samplers, drillers, and visitors.</li><li>• Instruct visitors to stay in group and not to wander around site alone. Site representative should keep remain cognizant of the number of visitors in group, and periodically check that all visitors are accounted for during the site walk.</li></ul>
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**ACTIVITY HAZARD ANALYSIS**

<p align="center"><b>Equipment to be used</b> (List equipment to be used in the work activity)</p>	<p align="center"><b>Inspection Requirements</b> (List inspection requirements for the work activity)</p>	<p align="center"><b>Training Requirements</b> (List training requirements including hazard communication)</p>
<ul style="list-style-type: none"> <li>· Portable eye wash, fire extinguisher</li> <li>· First Aid/Bloodborne pathogen kit</li> <li>· PPE as noted above, including safety glasses, safety-toed boots, work gloves, as needed, high visibility vests,</li> <li>· Biological hazard precautions (insect spray, tick removal kit, duct tape, Tyvek or bug-out suit, wasp spray if needed, Ivy Block, Benadryl)</li> <li>· Sunscreen</li> <li>· Timer, ear thermometer (for heat stress monitoring)</li> <li>· Spill kit/materials</li> <li>· MSDS for any chemicals used onsite</li> <li>· Hand tools (bolt cutters, socket wrenches, tubing cutters)</li> <li>· Water level indicator</li> <li>· Oil-Water level indicator</li> <li>· Sample bottleware</li> <li>· Groundwater sampling pump (peristaltic, bladder pump, etc.), tubing, micron filters</li> </ul>	<ul style="list-style-type: none"> <li>· Inspect all vehicles, equipment, tools, and PPE prior to each use (remove from service any defective equipment)</li> <li>· Ensure cell phone has coverage and have fully charged.</li> <li>· Determine daily rally point/evacuation route.</li> <li>· Use applicable Self-Assessment Checklists as required per the HSP.</li> </ul>	<ul style="list-style-type: none"> <li>· OSHA 40-hour HAZWOPER initial training, 3-day OJT, current refresher and medical clearance.</li> <li>· Training on CH2M HILL HSP</li> <li>· Hazard Communication training (see HSP for how to document)</li> <li>· VO Modules as required by the Beale Sitewide Health and safety plan.</li> <li>· Aviation Safety VO Module if working on flight line</li> </ul>

ACTIVITY HAZARD ANALYSIS

CH2MHILL

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SIGNATURE

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

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

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

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LONE WORKER

CALL - IN CONTACT FORM

Date of site work: \_\_\_\_\_ Expected start time: \_\_\_\_\_

Name of CH2M HILL employee in the field: \_\_\_\_\_

Name of CH2M HILL employee responsible to receive contact:

Client Emergency Contact (if any):

CH2M HILL employee's contact numbers:

Radio # \_\_\_\_\_

Cell Phone # \_\_\_\_\_

Address and Location of work: \_\_\_\_\_

Field Vehicle Information:

Make: \_\_\_\_\_

Model: \_\_\_\_\_

License Plate #: \_\_\_\_\_

Directions/Map:

Planned Activity: \_\_\_\_\_

Specified Frequency and time for call in: \_\_\_\_\_

Time	Verified	Location

**Activity Hazard Analysis: Soil Excavation Oversight – less than 3 feet deep**

Task Breakdown	Potential Hazards	Critical Safety Practices	Personal Protective Clothing and Equipment	Monitoring Devices				
Oversight	Slip, Trips, Fall	<ul style="list-style-type: none"> <li>• Be aware of surroundings; observe area for objects that may impede travel or present a hazard</li> <li>• Clear walkways and work areas of equipment, tools, vegetation, excavated material, and debris</li> <li>• Identify uneven surfaces or ground protrusions and notify field personnel of their location, and/or mark these locations</li> <li>• Mark, identify, or barricade other obstructions</li> <li>• Exist equipment slowly and maintain three-point contact</li> <li>• Wear proper footwear based on conditions of ground surface</li> </ul>	Steel-toe boots/rubber boots with good tread	Visual Inspection				
	Cave-ins/falls	<ul style="list-style-type: none"> <li>• Open excavations will be secured with fencing and do not enter signs when not attended</li> <li>• Fence or barricade all excavations when not in the work zone</li> <li>• A detailed inspection will be performed if changes in soil conditions or weather exists</li> <li>• Equipment will be positioned no greater than 2 feet towards the excavation</li> <li>• Entry into excavations will be prohibited until inspection and “Competent Person” provides authorization</li> <li>• Surface water will be diverted from all open excavations</li> <li>• All standing water will be removed prior to employee entrance</li> </ul>			Fencing, signs, cones, and/or barricades	Visual Inspection by Competent Person		
	Struck By/Against Heavy Equipment	<ul style="list-style-type: none"> <li>• Wear reflective warning vests or high visibility clothing</li> <li>• Isolate equipment swing areas</li> <li>• Make/maintain eye contact with operators before approaching equipment; do no approach equipment from rear or from blink spot of operator</li> <li>• Understand and review hand signals</li> <li>• Ensure equipment has operable back-up alarms</li> <li>• Follow hand signals of ground workers for equipment manipulation when placing/loading equipment into bucket</li> </ul>						



**Activity Hazard Analysis: Soil Excavation Oversight – less than 3 feet deep**

Task Breakdown	Potential Hazards	Critical Safety Practices	Personal Protective Clothing and Equipment	Monitoring Devices
	Heavy Equipment Operations	<ul style="list-style-type: none"> <li>• Step away from equipment when bucket adjustments are made</li> <li>• Ensure heavy equipment operator has spotter for obstructed views and backing up</li> <li>• Avoid positioning between fixed objects and operating equipment</li> <li>• Ground personnel may not enter equipment work zones until the operator's attention has been gained, the operator idles the equipment, grounds all buckets or other extensions, and gives ground personnel permission to enter the area</li> <li>• Only qualified operators shall operate equipment</li> <li>• The qualified operator will perform inspections on the equipment at least daily and/or prior to each use</li> <li>• Inspect area for wildlife</li> <li>• Seat belts, hardhats, and safety glasses with side shields shall be worn while equipment is being operated</li> <li>• No passengers will be carried</li> <li>• Loads will not be suspended or travel over personnel</li> <li>• A spotter shall be used if operators view is obstructed</li> <li>• Prior to excavation, all underground utilities shall be located and clearly marked</li> <li>• Ensure minimum clearance of 10' is maintained from all overhead utilities</li> <li>• Operators shall be aware of all equipment and workers near his/her operating area</li> <li>• Operator shall not exceed safe operating conditions</li> <li>• Operator shall not operate equipment other than in accordance with manufactures operating manual</li> <li>• Site monitoring will be performed by CH2M HILL; all action levels and actions will be followed</li> <li>• Equipment shall not be positioned closer than 2 feet from edge of excavation</li> </ul>	Proper PPE: Hard hat, safety glasses, hearing protection	Inspections by qualified operator

**Activity Hazard Analysis: Soil Excavation Oversight – less than 3 feet deep**

Task Breakdown	Potential Hazards	Critical Safety Practices	Personal Protective Clothing and Equipment	Monitoring Devices
		<ul style="list-style-type: none"> <li>• During sampling from bucket, the bucket will be set on the ground</li> <li>• Dust control will be implemented when necessary</li> <li>• Soil will be kept as low as possible to ground and lowered on top of bottom of excavation to not create dust</li> <li>• Excavations will be backfilled and compacted as soon as feasible</li> </ul>		
	Pinch Points	<ul style="list-style-type: none"> <li>• Review equipment adjustment procedures, identify pinch points</li> <li>• Isolate/block pinch points to limit motion when inserting pins, fasteners, closing tackles</li> </ul>	Leather gloves	
	Sharp Objects	<ul style="list-style-type: none"> <li>• Wear cut resistant work gloves when the possibility of lacerations or other injury may be caused by sharp edges or objects</li> <li>• Avoid razor knives</li> <li>• Cut away from the body and never towards another worker</li> <li>• Maintain all hand and power tools in a safe condition</li> </ul>	Leather gloves	
	High Noise Levels	<ul style="list-style-type: none"> <li>• Use hearing protection when exposed to excessive noise levels (greater than 85 dBA over an 8-hour work period)</li> </ul>	Hearing protection	Noise Dosimeter
	High/Low Ambient Temperature	<ul style="list-style-type: none"> <li>• Monitor for Heat/Cold stress</li> <li>• Follow a proper work/rest regime – provide a rest area for workers to warm up/cool down</li> <li>• Provide fluids to prevent worker dehydration</li> <li>• Be conscious of your individual tolerance to work in hot weather and monitor yourself and co-workers for signs and symptoms of heat/cold stress</li> </ul>	Insulated Clothing (subject to ambient temperature) Sunscreen other protective clothing	Meteorological Equipment
	Horseplay	<ul style="list-style-type: none"> <li>• Keep exposed skin covered</li> <li>• Prohibit horseplay on all project sites</li> <li>• Review rules about horseplay with subcontract supervisors and workers</li> <li>• Remind workers not to respond/participate in horseplay started by others</li> </ul>		

**Activity Hazard Analysis: Soil Excavation Oversight – less than 3 feet deep**

<b>Task Breakdown</b>	<b>Potential Hazards</b>	<b>Critical Safety Practices</b>	<b>Personal Protective Clothing and Equipment</b>	<b>Monitoring Devices</b>
	Unauthorized Persons Entering Work Zone	<ul style="list-style-type: none"> <li>Obtain access agreements from residential homeowners prior to beginning work</li> <li>Notify residential homeowners when work will begin and review health and safety risks of activities to be performed</li> <li>Set up an exclusion zone with cones, barricades, and/or delineators, and signs. Take care to provide adequate walkways and keep driveways clear for residents to access their property as safely as possible</li> <li>Be aware of surroundings and direct people around work areas</li> </ul>	Traffic cones, signs, barricade	
	Traffic Hazards	<ul style="list-style-type: none"> <li>Wear high visibility traffic vests near heavy equipment or traffic</li> <li>The subcontractor will utilize traffic control equipment (cones, delineators, etc.) to route traffic around work areas, as needed</li> </ul>	High visibility vest Traffic cones, signs, barricades	
Equipment Decontamination	Exposure to contaminants	<ul style="list-style-type: none"> <li>Wear gloves and PPE as recommended in the CH2M HILL HSP, including Polycoated Tyvek or equivalent, 16-inch-high steel-toed rubber boots, safety glasses, hard hat with face shield, and inner and outer nitrile gloves will be worn, at a minimum</li> <li>Dry decon bucket as needed, scraping with either a shovel or hand trowel</li> </ul>		
	Injury – Dust in Eyes, Struck by, Hand Injury	<ul style="list-style-type: none"> <li>Perform work slowly as not to create dust or breathing hazard, lower dirt to ground with shovel</li> <li>Be sure equipment is off and bucket is on the ground during decontamination procedures</li> <li>Non-operators must remain a safe distance from the operator</li> </ul>		
	Pressure washer hazards (if used)	<ul style="list-style-type: none"> <li>Inspect pressure washer before use and confirm deadman trigger is fully operational</li> <li>Follow manufacturer’s safety and operating instructions</li> <li>The wand must always be pointed at the work area</li> </ul>		

**Activity Hazard Analysis: Soil Excavation Verification Sample Collection**

<b>Task Breakdown</b>	<b>Potential Hazards</b>	<b>Critical Safety Practices</b>	<b>Personal Protective Clothing and Equipment</b>	<b>Monitoring Devices</b>
General	Slip, Trips, Fall	• Be aware of surroundings; observe area for objects that may impede travel or present a hazard	Steel-toe boots/rubber boots with good tread	
		• Clear walkways and work areas of equipment, tools, vegetation, excavated material, and debris		
		• Mark, identify, or barricade other obstructions		
		• Ensure stable ground and adequate footing during loading operations		
	Changing Weather Conditions	• Wear proper footwear based on conditions of ground surface	Weather radio or other device to check weather forecasts	
• Monitor the weather forecast prior to beginning field work and continue monitoring as it progresses				
High/Low Ambient Temperature	• Review evacuation routes, rally/meeting points, and route to hospital	Insulated Clothing (subject to ambient temperature)  Sunscreen other protective clothing		
	• Take time to review where the closest structure that can be used when severe weather occurs			
	• Monitor for Heat/Cold stress			
	• Follow a proper work/rest regime – provide a rest area for workers to warm up/cool down			
Biological Hazards	• Provide fluids to prevent worker dehydration			
	• Be conscious of your individual tolerance to work in hot weather and monitor yourself and co-workers for signs and symptoms of heat/cold stress			
	• Keep exposed skin covered			
Traffic Hazards	• Be aware of surroundings and follow the biological hazard precautions, guidelines, and fact sheets in the HSP for ticks, snakes, spiders, hazardous plants, etc.	High visibility vest  Traffic cones, signs, barricades		
	• Wear light colored long-sleeved shirt and pants; tuck pant legs into socks; check for ticks at least daily; use insect repellent containing DEET			
		• Wear high visibility traffic vests near heavy equipment or traffic		
		• The subcontractor will utilize traffic control equipment (cones, delineators, etc.) to route traffic around work areas, as needed		

**Activity Hazard Analysis: Soil Excavation Verification Sample Collection**

<b>Task Breakdown</b>	<b>Potential Hazards</b>	<b>Critical Safety Practices</b>	<b>Personal Protective Clothing and Equipment</b>	<b>Monitoring Devices</b>
	Unauthorized Persons Entering Work Zone	<ul style="list-style-type: none"> <li>Obtain access agreements from residential homeowners prior to beginning work</li> <li>Notify residential homeowners when work will begin and review health and safety risks of activities to be performed</li> <li>Set up an exclusion zone with cones, barricades, and/or delineators, and signs. Take care to provide adequate walkways and keep driveways clear for residents to access their property as safely as possible</li> <li>Be aware of surroundings and direct people around work areas</li> </ul>	Traffic cones, signs, barricade	
Soil Excavation Verification Sampling	Contact/Exposure to Potential Contaminants	<ul style="list-style-type: none"> <li>Monitor air space using a photoionization detector (PID) as specified in the HSP</li> <li>Wear proper PPE: tyvek, coveralls, safety glasses with side shields or goggles, chemical resistant gloves, etc.</li> <li>Use dedicated writing implements for logging information into field book and/or field forms to prevent potential contact with contaminants following soil sampling activities</li> <li>Utilize appropriate non-reactive tools (plastic spoons, stainless steel trowels, etc.) to collect media</li> </ul>	Proper PPE: Tyvek, coveralls, safety glasses, goggles, face shield, chemical resistant gloves  Non-reactive tools	MiniRAE or MultiRAE PID
	Personnel Injury	<ul style="list-style-type: none"> <li>Personnel working near equipment are not to enter working radius of moving parts of equipment without first making direct eye contact with operator prior to entering space</li> <li>Only trained personnel will be allowed to operate heavy equipment</li> <li>No personnel are allowed to walk under elevated buckets on excavation equipment</li> <li>The bucket will be placed on the ground and equipment turned off prior to sampling from the bucket</li> </ul>		
	Exertion/Strains from Tool Use	<ul style="list-style-type: none"> <li>Use proper material handling techniques such as keeping back straight, lifting with legs, limiting twisting, and getting help when moving bulky/heavy materials and equipment</li> <li>Inspect tools prior to use</li> </ul>		

**Activity Hazard Analysis: Soil Excavation Verification Sample Collection**

Task Breakdown	Potential Hazards	Critical Safety Practices	Personal Protective Clothing and Equipment	Monitoring Devices
	<p>Cross-contamination between sample locations</p> <p>Mishandling of Samples</p>	<ul style="list-style-type: none"> <li>• Use appropriate tools for the task</li> <li>• Take breaks/turns to avoid fatigue</li> <li>• Use a balanced stance with feet shoulder width apart to avoid back, neck, and wrist strain</li> <li>• Drink plenty of water</li> <li>• Follow sampling procedures detailed in the site specific sampling and analysis plan</li> <li>• Maintain a clean work area to prevent possible cross-contamination</li> <li>• Use dedicated sampling equipment for each sample, or perform decontamination procedures on sampling equipment</li> <li>• Handle sample jars safely. If a jar is broken, make sure work gloves are used to clean it up</li> <li>• Ensure each sample is appropriately labeled upon collection; label sample containers with sample location, sample ID, date, time of collection, and sampler's name; ensure label is legible and written with permanent ink</li> <li>• Ensure proper storage of samples; do not put samples in refrigerators or coolers for food storage</li> <li>• Ensure proper chain of custody procedures are followed</li> <li>• When possible, create a sample list with the information listed above either in the field logbook, or separate sheet of paper</li> <li>• Perform a quality check on sample jar labels, sample list, printed label, and chain-of-custody to ensure all information is correct</li> <li>• Refer to the sample handling and processing AHA for additional safety practices during sampling</li> </ul>		

**Activity Hazard Analysis: Soil Sampling**

<b>Task Breakdown</b>	<b>Potential Hazards</b>	<b>Critical Safety Practices</b>	<b>Personal Protective Clothing and Equipment</b>	<b>Monitoring Devices</b>
Soil Sampling	Sharp Objects	<ul style="list-style-type: none"> <li>Wear cut resistant work gloves when the possibility of lacerations or other injury may be caused by sharp edges or objects</li> <li>Maintain all hand and power tools in a safe condition</li> <li>Keep guards in place during use</li> </ul>	Leather gloves	
	Handling Heavy Objects	<ul style="list-style-type: none"> <li>Observe proper lifting techniques</li> <li>Obey sensible lifting limits (60 lb. Maximum per person manual lifting)</li> <li>Use mechanical lifting equipment (hand carts, trucks) to move large, awkward loads</li> </ul>		
	Slips, Trips, Falls	<ul style="list-style-type: none"> <li>Clear walkways, work areas of equipment, tools, vegetation, excavated material, and debris</li> <li>Mark, identify, or barricade other obstructions</li> </ul>		
	Inhalation and Skin Contact with Hazardous Substances	<ul style="list-style-type: none"> <li>Provide workers proper skin, eye and respiratory protection based on the exposure hazards present</li> <li>Review hazardous properties of site contaminants with workers before operations begin</li> <li>Monitor breathing zone air to determine levels of contaminants</li> <li>Follow proper procedures for handling/preserving/packaging/labeling analytical samples; chemicals/preserving agents</li> <li>Follow proper decontamination procedures to prevent ingestion of contaminants</li> <li>Implement engineering controls (i.e., vent fans) to direct vapors away from samplers and drillers</li> </ul>	Tyvek coveralls, latex or neoprene boots, nitrile gloves (see Section 11.0 HASP)  Level B in NAPL/DBCP Areas 1 and 2	PID, Mini-RAM  HAPSITE field-portable, gas chromatograph/mass spectrometer  Vent fans
	High/Low Ambient Temperature	<ul style="list-style-type: none"> <li>Monitor for Heat/Cold stress</li> <li>Provide fluids to prevent worker dehydration</li> </ul>	Insulated Clothing (subject to ambient temperature)	
	General	<ul style="list-style-type: none"> <li>Only qualified operators shall operate equipment</li> <li>Daily, or before first operation of the day the equipment shall be inspected for proper operation.</li> <li>No passengers will be carried except in an approved safety</li> </ul>	Minimum PPE shall include; Hardhat, safety glasses with side shields, hearing	

**Activity Hazard Analysis: Soil Sampling**

Task Breakdown	Potential Hazards	Critical Safety Practices	Personal Protective Clothing and Equipment	Monitoring Devices
		platform. <ul style="list-style-type: none"> <li>• Loads will not be suspended or travel over personnel</li> <li>• A spotter shall be used if operators view is obstructed.</li> <li>• Operator shall be aware of all equipment and worker(s) near his/her operating area.</li> <li>• Operator shall ensure load is proper equipment rigging and positioning.</li> <li>• Operator shall not exceed safe operating conditions.</li> <li>• Operator shall not exceed safe operating conditions.</li> <li>• Operator shall not operate equipment other than in accordance with the manufacturers operating manual.</li> <li>• Hands and loose clothing/material shall be kept clear of all moving parts.</li> </ul>	protection, shirt with a minimum of 4" sleeves, long pants, safety toed work boots, and tyvek. Level B in NAPL/DBCP Areas 1 and 2 High visibility vest	



PRINT NAME

SIGNATURE

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

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**Activity Hazard Analysis: Residential Yard Sampling – Hand Auger Method**

<b>Task Breakdown</b>	<b>Potential Hazards</b>	<b>Critical Safety Practices</b>	<b>Personal Protective Clothing and Equipment</b>	<b>Monitoring Devices</b>
General Hazards	Slip, Trips, Fall	<ul style="list-style-type: none"> <li>Be aware of surroundings; observe area for objects that may impede travel or present a hazard</li> <li>Clear walkways and work areas of equipment, tools, vegetation, excavated material, and debris</li> <li>Mark, identify, or barricade other obstructions</li> <li>Ensure stable ground and adequate footing during loading operations</li> <li>Wear proper footwear based on conditions of ground surface</li> </ul>	Steel-toe boots/rubber boots with good tread	
	Changing Weather Conditions	<ul style="list-style-type: none"> <li>Monitor the weather forecast prior to beginning field work and continue monitoring as it progresses</li> <li>Review evacuation routes, rally/meeting points, and route to hospital</li> <li>Take time to review where the closest structure that can be used when severe weather occurs</li> </ul>	Weather radio or other device to check weather forecasts	
	High/Low Ambient Temperature	<ul style="list-style-type: none"> <li>Monitor for Heat/Cold stress</li> <li>Follow a proper work/rest regime – provide a rest area for workers to warm up/cool down</li> <li>Provide fluids to prevent worker dehydration</li> <li>Be conscious of your individual tolerance to work in hot weather and monitor yourself and co-workers for signs and symptoms of heat/cold stress</li> <li>Keep exposed skin covered</li> </ul>	Insulated Clothing (subject to ambient temperature)  Sunscreen other protective clothing	
	Biological Hazards	<ul style="list-style-type: none"> <li>Be aware of surroundings and follow the biological hazard precautions, guidelines, and fact sheets in the HSP for ticks, snakes, spiders, hazardous plants, etc.</li> <li>Wear light colored long-sleeved shirt and pants; tuck pant legs into socks; check for ticks at least daily; use insect repellent containing DEET</li> </ul>		
Hand Augering	Mechanical Hazards – Crushing, Pinch	<ul style="list-style-type: none"> <li>Wear proper PPE at all times: hard hats, safety-toed leather or rubber work boots with good tread, work gloves, and safety glasses with side shields</li> </ul>	Hand augers and rod extensions  Proper PPE: hard hat,	

**Activity Hazard Analysis: Residential Yard Sampling – Hand Auger Method**

<b>Task Breakdown</b>	<b>Potential Hazards</b>	<b>Critical Safety Practices</b>	<b>Personal Protective Clothing and Equipment</b>	<b>Monitoring Devices</b>
	Points, Cuts, Struck by Objects, Flying Debris	<ul style="list-style-type: none"> <li>Use caution when lifting auger to remove soil; persons shall keep proper distance from operating auger to avoid potential struck by incidents</li> </ul>	highly reflective vest (when necessary), safety-toe work boots with good tread, safety glasses, work gloves, etc.	
	Exertion Hazards	<ul style="list-style-type: none"> <li>Hand auger slowly, do not force through soil</li> <li>If an obstruction is encountered, suspend work and determine what it is. If it cannot be determined, contact client or project representative – location may have to be moved</li> <li>Use a balanced stance with feet shoulder width apart to avoid back, neck, and wrist strain</li> <li>Use proper lifting techniques when pulling auger from ground</li> <li>Take turns to avoid fatigue</li> <li>Keep hydrated</li> </ul>		
	Contact/Exposure to Contaminated Soil	<ul style="list-style-type: none"> <li>Monitor air space using a photoionization detector (PID) as specified in the HSP</li> <li>Wear proper PPE: tyvek, coveralls, safety glasses with side shields or goggles, chemical resistant gloves, etc.</li> <li>Use dedicated writing implements for logging information into field book and/or field forms to prevent potential contact with contaminants following soil sampling activities</li> <li>Utilize appropriate non-reactive tools (plastic spoons, stainless steel trowels, etc.) to collect media</li> <li>Use plastic sheeting to stage soil and reduce possibility of tracking potentially contaminated soil across work areas</li> </ul>	Proper PPE: Tyvek, coveralls, safety glasses, goggles, face shield, chemical resistant gloves Non-reactive tools	MiniRAE or MultiRAE PID
	Striking or coming into contact with buried utilities	<ul style="list-style-type: none"> <li>Check sample locations for underground utilities – contact MISSDIG and conduct a third party utility locate</li> <li>All cleared locations will be marked with spray paint</li> </ul>	Work gloves Steel-toe boots	
	Unauthorized persons entering	<ul style="list-style-type: none"> <li>Obtain access agreements from residential homeowners prior to</li> </ul>	Traffic cones, signs,	

**Activity Hazard Analysis: Residential Yard Sampling – Hand Auger Method**

Task Breakdown	Potential Hazards	Critical Safety Practices	Personal Protective Clothing and Equipment	Monitoring Devices
	work zone	beginning work <ul style="list-style-type: none"> <li>• Notify residential homeowners when work will begin and review health and safety risks of activities to be performed</li> <li>• Set up an exclusion zone with cones, barricades, and/or delineators, and signs. Take care to provide adequate walkways and keep driveways clear for residents to access their property as safely as possible</li> <li>• Be aware of surroundings and direct people around work areas</li> </ul>	barricade	
	Equipment Decontamination	<ul style="list-style-type: none"> <li>• Become familiar with the detergent (i.e., Alconox or Liquinox) MSDS before beginning decontamination</li> <li>• Be aware of potential slip and trip hazards such as wet surfaces and hoses</li> <li>• Contain all decontamination water and dispose of properly according to site specific plans</li> <li>• Properly dispose of decontamination water and PPE in designated areas according to site specific plans</li> <li>• Wear proper PPE: safety glasses with side shields or goggles, splash protection, as necessary, protective gloves, etc.</li> </ul>	Proper PPE	

**CH2M HILL HEALTH AND SAFETY PLAN**  
**Attachment 11**

**Material Safety Data Sheets**