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NAS CECIL FIELD, FL
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WORK PLAN REVISION 3 WORK PLAN ADDENDUM 18 INSTALLATION OF AIR SPARGING
SYSTEMS AT JET ENGINE TEST CELL AND BUILDING 271 NAS CECIL FIELD FL
1/28/2008
CH2MHILL CONSTRUCTORS INC

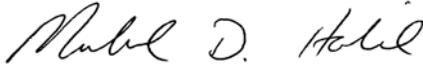


PROJECT NAME:	Former Naval Air Station (NAS) Cecil Field, Jacksonville, Florida	CTO NO:	RAC III 0086
SITE/TASK:	Troubleshooting and Repair of Air Sparging System at Building 271	WORK PLAN DATE:	August 2003
WORK PLAN NAME:	Work Plan Addendum No. 18 – Installation of Air Sparging Systems at the Jet Engine Test Cell (JETC) and Building 271	DATE OF REVISION:	January 28, 2008
REVISION PREPARED BY: Monte Stokes			

Modifications/Revisions:

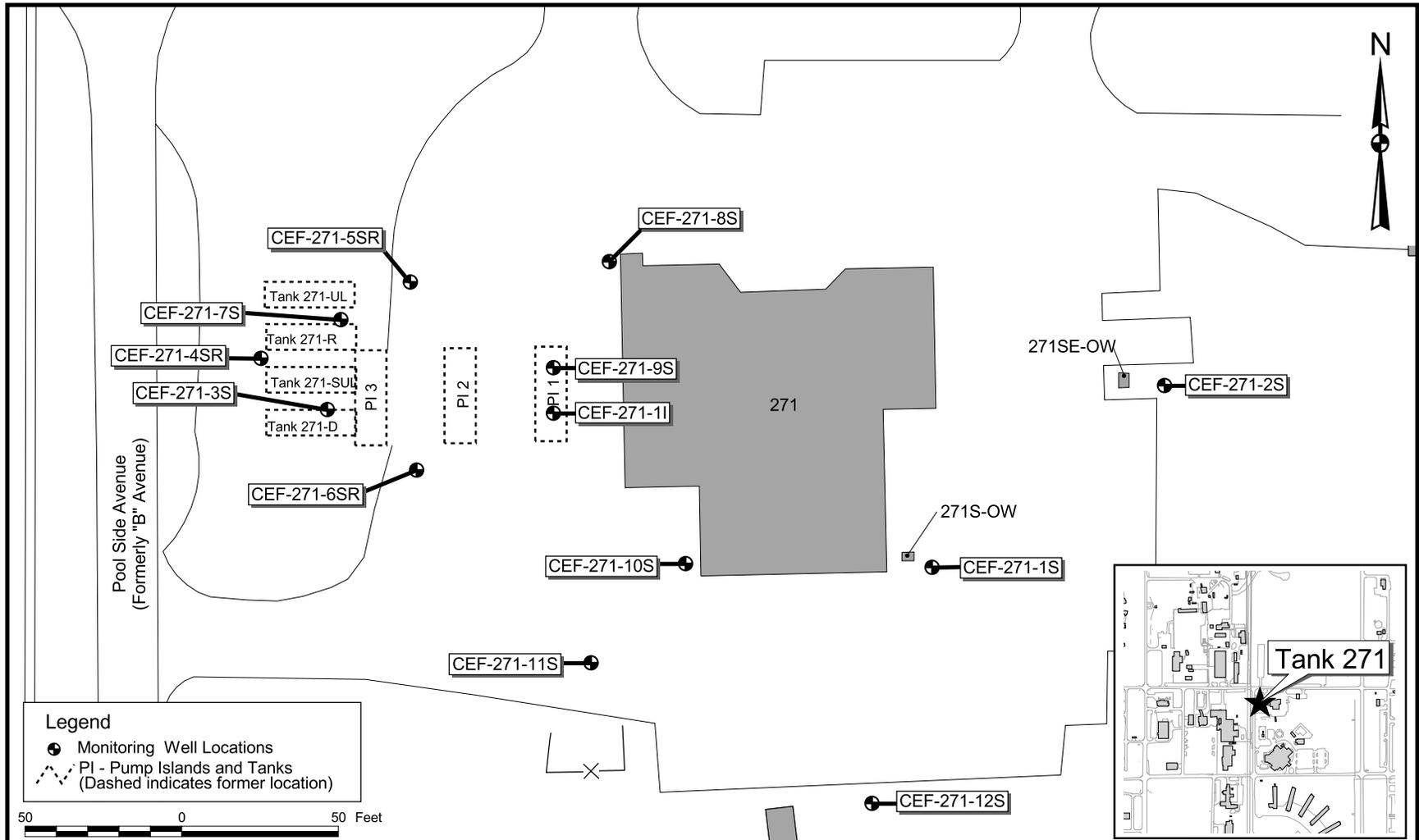
Item No.	Description of Modifications/Revisions
Purpose	<p>The purpose of this Work Plan Revision is to supplement the RAC III CTO No. 0086 Work Plan Addendum No. 18 with detailed information for troubleshooting the air sparging system at the Building 271 site at the former NAS Cecil Field, Jacksonville, Florida. Troubleshooting will consist of steps outlined in System Start-up (Section 2.1.5.6) of the Work Plan Addendum.</p> <p>The air sparging system will be monitored and checked for proper operational status. If the system operation is found to be in conformance with the design requirements, pressure indicators, pressure regulators, and flowmeters located within each air sparging well vault will be checked to see if adequate pressure and flow as per design requirements are being maintained at each well location.</p> <p>The physical condition of various system components such as the blower and associated motor, filters, air intake, compressed air piping, and various fittings will be thoroughly inspected for physical integrity while the system is de-energized.</p> <p>All observations will be recorded in detail in the field logbook.</p> <p><u>No intrusive activities are expected to be conducted during this troubleshooting operation. Adequate lock-out and tag-out procedures will be followed during inspection in accordance with the approved Site Health and Safety Plan (HSP) and the Activity Hazard Analysis included in the HSP.</u></p> <p>This revision provides the supplemental details necessary to the troubleshoot the air sparging system, updated role assignments for the primary and alternate Project Quality Control (QC) Managers, the updated HSP and the updated Activity Hazard Analysis forms included therein.</p> <p>Following are the specific modifications/revisions:</p>
001	Site map, well vault locations and Process and Instrumentation Diagrams - Figures 1-1, 2-9 and 2-12.
002	<p>Section 6.1; Project Quality Control Manager</p> <p>The primary Project QC Manager will be Mr. Craig Haas. Mr. Haas will also serve as the Site Superintendent and Site Health and Safety Specialist. The Alternate Project QC Manager will be Mr. Randy Dumaop. The Project QC Manager appointment letters for Mr. Haas and Mr. Dumaop are attached.</p>
003	<p>Updated HSP and Activity Hazard Analysis</p> <p>The HSP has been updated to reflect current project and site conditions.</p> <p>The Activity Hazard Analysis forms for the tasks associated with troubleshooting the air sparging system at Building 271 have been updated to current standards and are attached.</p>

Reasons for the Modifications/Revisions:

Item No.	Reasons for the Modifications/Revisions		
All	This revision is being prepared to facilitate air sparging troubleshooting to facilitate proper operation of the existing air sparging system at the Building 271 site, NAS Cecil Field, Jacksonville, FL. These troubleshooting activities will aid in determining the steps required to restore this air sparging system to proper operational conditions per the design for this system as specified in Work Plan Addendum No.18. A brief technical memorandum will be prepared to document the findings of the troubleshooting activities and provide recommendations for further actions to ensure continued proper operation of the air sparging system at Building 271.		
Sam Naik CTO Project Manager		01/28/2008	
	Signature	Date	
Mike Halil, P.E. Deputy Program Manager		01/28/2008	
	Signature	Date	
U.S. Navy Responsible Authority	Signature	Date	

Document Control Distribution

David Grabka, FDEP	Barbara Nwokike, NAVFAC SE	Art Mosley, NAVFAC SE
Mark Speranza, TTNUS	CH2M HILL Project File No. 271591	



Legend

- Monitoring Well Locations
- PI - Pump Islands and Tanks (Dashed indicates former location)

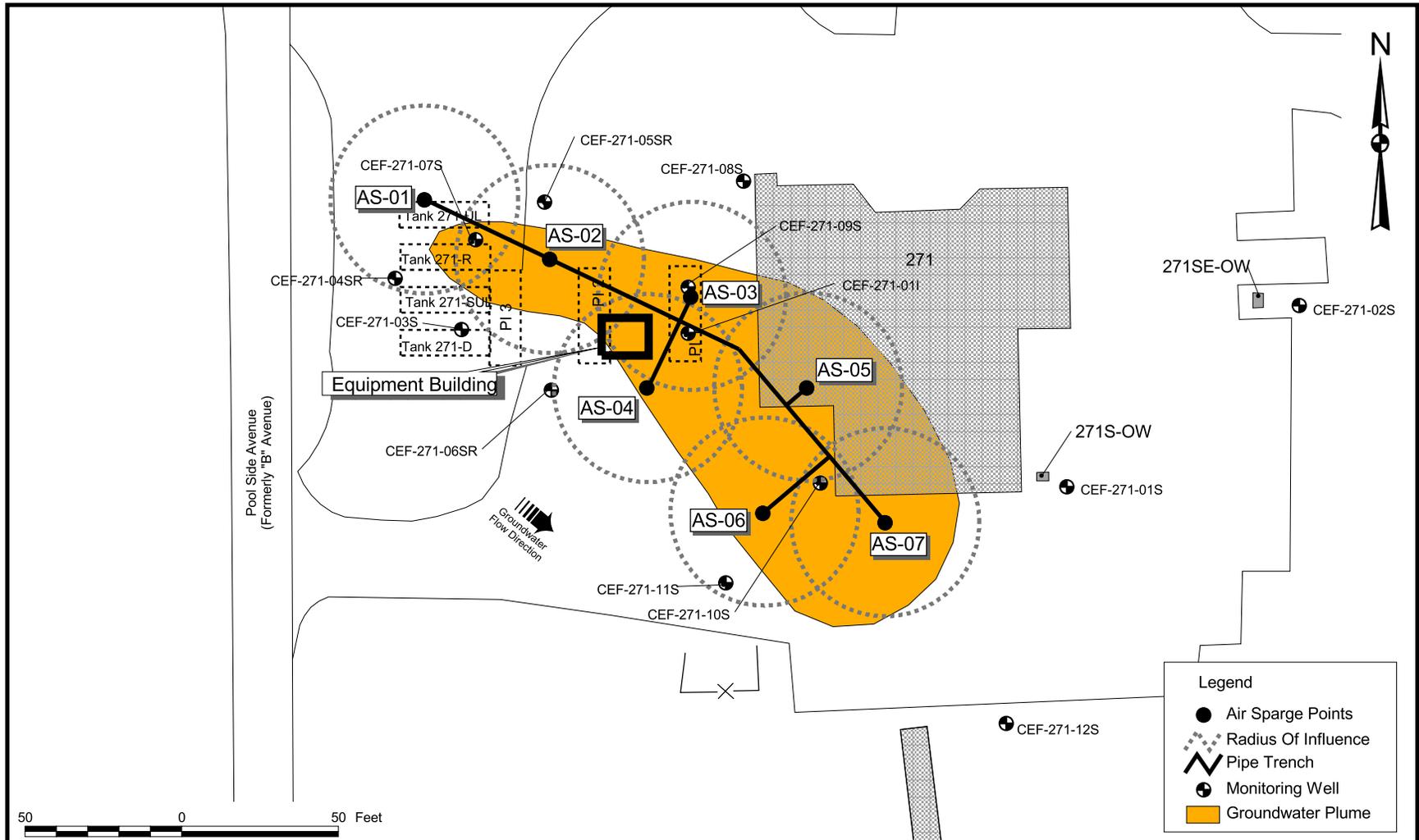


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COST/SCHEDULE-AREA	
SCALE AS NOTED	



SITE LAYOUT MAP
 BUILDING 271, TANKS 271 UL/R/SUL/D
 NAVAL AIR STATION CECIL FIELD
 JACKSONVILLE, FLORIDA

CONTRACT NUMBER N4248	
APPROVED BY	DATE
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<i>Figure 1-1</i>	
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SCALE AS NOTED	



PROPOSED REMEDIAL SYSTEM LAYOUT
 BUILDING 271, TANKS 271 UL/R/SUL/D
 NAVAL AIR STATION CECIL FIELD
 JACKSONVILLE, FLORIDA

CONTRACT NUMBER N4248	
APPROVED BY	DATE
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Figure 2-9	
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January 22, 2008

Mr. Craig Haas
CH2M HILL Constructors, Inc.
225 East Robinson Street Suite 505
Orlando, Florida 32801-4321

RE: Contract No. N62467-98-D-0995
Contract Task Order No. 0086
Naval Air Station (NAS) Cecil Field - Jacksonville, Florida
Project Quality Control Manager Letter of Appointment

Dear Mr. Haas:

Herein describes the responsibilities and authority delegated to you in your capacity as the Project QC Manager on the NAS Cecil Field site, Contract Task Order (CTO) 0086 under RAC III Contract No. N62467-98-D-0995.

In this position, you assist and represent the Program QC Manager in continued implementation and enforcement of the Project QC Plans. Your primary role is to ensure all requirements of the contract are met. Consistent with this responsibility, you will: (i) implement the QC program as described in the Navy RAC contract; (ii) manage the site-specific QC requirements in accordance with the Project QC Plans; (iii) attend the coordination and mutual understanding meeting; (iv) conduct QC meetings; (v) oversee implementation of the three phases of control; (vi) perform submittal review and approval; (vii) ensure testing is performed; (viii) prepare QC certifications and documentation required in the Navy RAC Contract; and, (ix) furnish a Completion Certificate to the Contracting Officer or designated representative, upon completion of work under a contract task order, attesting that "the work has been completed, inspected, and tested, and is in compliance with the contract."

Your responsibilities further include identifying and reporting quality problems, rejecting nonconforming materials, initiating corrective actions, and recommending solutions for nonconforming activities.

You have the authority to control or stop further processing, delivery, or installation activities until satisfactory disposition and implementation of corrective actions are achieved. You have the authority to direct the correction of non-conforming work. All work requiring corrective action will be documented on daily reports, and, in the event non-conforming work is not immediately corrected you are required to submit a non-conformance report to the PM and copy the Program QC Manager. A status log will be kept of all non-conforming work. You shall immediately notify the Program QC Manager in the event of any stop work order.

It is imperative that you comply with all terms of the basic contract. In particular, Section C, Paragraph 6.5.2, which states:

"No work or testing may be performed unless the QC Program Manager or Project QC Manager is on the work site."

In the event that you are not able to be at the work site when work or testing is to be performed, it is your responsibility to inform the Program QC Manager and Project Manager, in advance, so that other arrangements can be made.

Further, if you are requested to perform the duties of the Site Supervisor, it is your responsibility to inform the Program QC Manager so that approval can be obtained in advance from the Contracting Officer or designated representative, in accordance with Section C Paragraph.6.2.1of the contract.

You are a key member of the Project Manager's team. You ensure that work meets the specific requirements and intent of the work plan, the Navy's scope of work and the basic contract. Should you have any questions regarding this role, you should immediately contact the Program QC Manager, Theresa Rojas. Your day-to-day activities on the site should be coordinated with all site personnel and the Project Manager. In event of any deficient items, the Superintendent and Project Manager should be advised immediately so they have opportunity to remedy the situation.

Sincerely,

CH2M HILL Constructors, Inc.



Michael Halil
Deputy Program Manager

cc: Eric Burrell/ATL
Sam Naik/ATL
Project File No. 271591



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January 22, 2008

Mr. Randy Dumaop
AGVIQ Environmental Services
6219 Authority Avenue
Jacksonville, Florida 32221

RE: Contract No. N62467-98-D-0995
Contract Task Order No. 0086
Naval Air Station (NAS) Cecil Field - Jacksonville, Florida
Alternate Project Quality Control Manager Letter of Appointment

Dear Mr. Dumaop:

Herein describes the responsibilities and authority delegated to you in your capacity as the alternate Project QC Manager on the NAS Cecil Field, Contract Task Order (CTO) 0086 under RAC Contract No. N62467-98-D-0995.

In this position, you assist and represent the Project QC Manager in the event that he is not on the project site and the Program QC Manager in continued implementation and enforcement of the Project QC Plans. Your primary role is to ensure all requirements of the contract are met. Consistent with this responsibility, you will: (i) implement the QC program as described in the Navy RAC contract; (ii) manage the site-specific QC requirements in accordance with the Project QC Plans; (iii) attend the coordination and mutual understanding meeting; (iv) conduct QC meetings; (v) oversee implementation of the three phases of control; (vi) perform submittal review and approval; (vii) ensure testing is performed; , (viii) prepare QC certifications and documentation required in the Navy RAC Contract; and, (ix) furnish a Completion Certificate to the Contracting Officer or designated representative, upon completion of work under a contract task order , attesting that "the work has been completed, inspected, and tested, and is in compliance with the contract."

Your responsibilities further include identifying and reporting quality problems, rejecting nonconforming materials, initiating corrective actions, and recommending solutions for nonconforming activities.

You have the authority to control or stop further processing, delivery, or installation activities until satisfactory disposition and implementation of corrective actions are achieved. You have the authority to direct the correction of non-conforming work. All work requiring corrective action will be documented on daily reports, and, in the event non-conforming work is not immediately corrected you are required to submit a non-conformance report to the PM and copy the Program QC Manager. A status log will be kept of all non-conforming work. You shall immediately notify the Program QC Manager in the event of any stop work order.

It is imperative that you comply with all terms of the basic contract. In particular, Section C, Paragraph 6.5.2, which states:

"No work or testing may be performed unless the QC Program Manager or Project QC Manager is on the work site."

In the event that you are not able to be at the work site when work or testing is to be performed, it is your responsibility to inform the Program QC Manager and Project Manager, in advance, so that other arrangements can be made.

Further, if you are requested to perform the duties of the Site Supervisor, it is your responsibility to inform the Program QC Manager so that approval can be obtained in advance from the Contracting Officer or designated representative, in accordance with Section C Paragraph.6.2.1of the contract.

You are a key member of the Project Manager's team and ensure that work meets the specific requirements and intent of the work plan, the Navy's scope of work and the basic contract. Should you have any questions regarding this role, you should immediately contact the Program QC Manager, Theresa Rojas. Your day-to-day activities on the site should be coordinated with all site personnel and the Project Manager. In event of any deficient items, the Superintendent and Project Manager should be advised immediately so they have opportunity to remedy the situation.

You may be assigned other responsibilities concurrent with this assignment. Regardless of other responsibilities assigned, you shall take your QC and safety responsibilities as primary. Any other assigned responsibilities shall be secondary to your QC and safety responsibilities.

Sincerely,

CH2M HILL Constructors, Inc.



Michael Halil
Deputy Program Manager

cc: Eric Burrell/ATL
Sam Naik/ATL
Project File No. 271591

Health and Safety Plan Installation of Air Sparging Systems at the Jet Engine Test Cell and Building 271

Former Naval Air Station Cecil Field
Jacksonville, Florida

Contract No. N62467-98-D-0995
Contract Task Order No. 0086

Revision 01

Submitted to:



U.S. Naval Facilities
Engineering Command
Southeast

Prepared by:



1000 Abernathy Road
Suite 1600
Atlanta, GA 30328

January 2008

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Attachments

- 1 Employee Signoff Form – Field Safety Instructions
- 2 Project-Specific Chemical Product Hazard Communication Form
- 3 Chemical-Specific Training Form
- 4 Emergency Contacts
- 5 Project Activity Self-Assessment Checklists/Permits/Forms
- 6 Behavior Based Loss Prevention System Forms
- 7 Applicable Material Safety Data Sheets
- 8 Subcontractor H&S Plans/Procedures

Acronyms

°F	degrees Fahrenheit
ALARA	as low as reasonably achievable
APR	air-purifying respirator
ATL	Atlanta
CH2M HILL	CH2M HILL Constructors, Inc.
CNS	central nervous system
CPR	cardiopulmonary resuscitation
CTO	Contract Task Order
dBA	decibel A-rated
DOT	Department of Transportation
FA	first aid
FID	flame ionization detector
GFCI	ground fault circuit interrupter
HAZCOM	hazard communication
HR	heart rate
HSM	Health and Safety Manager
HSP	Health and Safety Plan
IDLH	immediately dangerous to life and health
IDW	investigation-derived waste
lb	pound
LEL	lower explosive limit
mg/m ³	milligrams per cubic meter
MSDS	Material Safety Data Sheet
mW/cm ²	milliwatt per square centimeter
NAS	Naval Air Station
NDG	nuclear density gauge
NSC	National Safety Council
OSHA	Occupational Safety and Health Administration
PAPR	powered air-purifying respirator
PDF	personal flotation device
PID	photoionization detector
PPE	personal protective equipment
ppm	parts per million
RMSF	Rocky Mountain Spotted Fever
SAR	supplied-air respirator
SCBA	self-contained breathing apparatus
SHSS	Site Health and Safety Specialist
SOP	standard of practice
STEL	short-term exposure limit
SZ	support zone
TBD	to be determined
TMCC	truck-mounted crash cushion
TSDF	treatment, storage, and disposal facility

This Health and Safety Plan (HSP) will be kept on the site during field activities and will be reviewed as necessary. The plan will be amended or revised as project activities or conditions change or when supplemental information becomes available. The plan adopts, by reference, the Standards of Practice (SOPs) in the CH2M HILL *Corporate Health and Safety Program, Program and Training Manual*, as appropriate. In addition, this plan adopts procedures in the project Work Plan. The Site Safety Coordinator (SSC) is to be familiar with these SOPs and the contents of this plan. CH2M HILL Constructors Inc.'s (CH2M HILL) personnel and subcontractors must sign Attachment 1.

1.0 Project Information and Description

CONTRACT TASK ORDER (CTO) No.:0086

CLIENT: Southern Division, U.S. Navy Facilities Engineering Command (NAVFAC-SE)

PROJECT/SITE NAME: Installation of Air Sparging Systems at the Jet Engine Test Cell and Building 271. Additional activity of troubleshooting the air sparging system operation at Building 271.

SITE ADDRESS: Former Naval Air Station Cecil Field Jacksonville, Florida

CH2M HILL PROJECT MANAGER: Sam Naik/CH2MHILL

CH2M HILL OFFICE: ATL

DATE HEALTH AND SAFETY PLAN PREPARED: August 20, 2003; Revision1 dated January 2008.

DATE(S) OF SITE WORK: August 2003- August 2004; Troubleshooting work December 2007 - January 2008.

1.1 Site Background and Setting: Building 271

Building 271 was a former retail gasoline facility that maintained four underground storage tanks (USTs) and two oil-water separators (OWSs). The USTs were grouped in a tank pit located on the west side of Building 271, while the OWSs were located on the east side of the building. Three of the USTs (UL, R, and SUL) each had an approximate capacity of 10,000 gallons. The fourth UST (D) had an approximate capacity of 6,000 gallons.

According to UST closure records, Tank 271-D was removed on March 5, 1996. The closure report indicates that no soil or groundwater contamination was detected relative to Tank 271-D. The report also indicates that the tank and associated piping were removed from the site.

In July 1999, Harding and Lawson Associates (HLA) compiled the confirmatory Sampling Report (CSR) for the tank and the two OWSs. The CSR indicated that petroleum-impacted soil was encountered at two locations relative to the tank site. The CSR also reported that no Kerosene Analytical Group (KAG), as defined by the Florida Administrative Code (FAC), Chapter 62-770, constituents were detected in the groundwater sample from the monitoring well CEF-271-3S installed for the tank investigation. HLA reported no soil or groundwater contamination relative to the OWSs. Based on their finding of soil contamination, a Site Assessment (SA) was recommended for the UST site. A Site Assessment Plan for the assessment of soil and groundwater at the UST site was prepared by Tetra Tech NUS, Inc. (TtNUS).

Following completion of the planned investigation in the Site Assessment Plan, CH2M HILL removed the remaining three USTs and associated piping and distribution systems. The work on the site addressed the soil contamination issues and indicated the existence of

groundwater contamination. TtNUS proceeded to plan and execute a second investigation in a Site Assessment Plan Addendum (2001) to address the remaining site contamination in the groundwater.

CH2M HILL also removed both OWSs, and submitted separate Limited Closure Assessment Reports (LCAR) for each OWS site in April 2001 to the FDEP. Both LCARs for the OWSs indicated that no petroleum contamination of the soil or groundwater existed relative to the OWSs. On May 23, 2001, the FDEP issued separate letters agreeing with CH2M HILL's findings.

The Site Assessment Report prepared by TtNUS concluded that petroleum constituents have impacted groundwater and that all of the contaminated soil was removed from the vicinity of the former USTs at the site. Benzene [89 micrograms per liter ($\mu\text{g/L}$)], ethylbenzene (520 $\mu\text{g/L}$), toluene (2,900 $\mu\text{g/L}$), xylenes (3,300 $\mu\text{g/L}$), naphthalene (230 $\mu\text{g/L}$), 1-methylnaphthalene (35 $\mu\text{g/L}$), 2-methylnaphthalene (55 $\mu\text{g/L}$), and MTBE (11 $\mu\text{g/L}$) were detected above target levels in the groundwater. A site plan showing the Building 271 site is shown in Figure 1-1. The groundwater contaminant plume with respect to benzene is shown in Figure 1-2.

1.1.1 JETC

The JETC site, located near the intersection of Flightline Road and Cecil Pines Street, includes Buildings 339, 334, 328, and 811. The JETC facility was previously used by the Navy, and is currently used by the private sector, to test jet engines. Jet engines were mounted and operated in Buildings 334, 339, and 811. Building 811 was demolished and only the foundation remains. Each Building has a smaller control building associated with it. During the tests, a jet engine is mounted in a test building, connected to a fuel system, and activated.

Two 20,000-gallon JP-5 USTs, Tanks 339-TC-1 and 339-TC2, were located in a fuel tank yard between Buildings 811 and 339. The eastern portion of this tank yard also contained a 5,000-gallon JP-5 aboveground storage tank (AST), Tank 339-TC3, surrounded by a 3-foot high concrete block containment wall. One 940-gallon AST, Tank 334P, contained 10W engine oil and was located within a rubber containment structure on a concrete pad on the north side of Building 334. Other petroleum storage/handling facilities associated with the JETC site include two OWSs at Building 334, Tank 325-OW and Tank 334-OW and one OWS at Building 339, Tank 339-OW.

Environmental investigations began at the JETC site in 1989 when leaks were discovered during tightness testing at Tanks 339-TC1 and 339-TC2, the 20,000-gallon JP-5 tanks northwest of Building 339. In addition to leakage, spills from overfilling during site operations were also reported for Tanks 339-TC1 and 339-TC2. ABB Environmental Services, Inc. (ABB-ES) began a preliminary Contamination Assessment (CA) in 1990, during which excessively contaminated soil, defined as having a flame ionization detector (FID) reading of greater than 50 parts per million (ppm), was identified and a CA was recommended. CA field activities were performed by the United States Army Corps of Engineers and ABB-ES from 1991 to 1994. Free product, soil, and groundwater contamination associated with Tanks 339-TC1 and 339-TC2 were identified and delineated during the CA and CA Report (CAR) Addendum field efforts.

Soil contamination was also identified at Buildings 334, Tank 334-OW during Confirmatory Sampling Report (CSR) field activities by ABB-ES. The extent of the contamination was not adequately delineated during this investigation, and additional soil delineation work was performed. Soil contamination at Tank 334-OW was delineated during field activities for associated with the September 1999 Sampling and Analysis Report (SAR). Groundwater contamination was not detected during the CSR or SAR Field efforts for Tank 334-OW.

Soil excavation activities were conducted at the Tank 334-OW site in 1999; however, all of the contaminated soil as defined in the September 1999 SAR was not removed.

In addition to investigations at Tanks 339-TC1, 339-TC2, and 334-OW, environmental investigations at other petroleum storage/handling units at the JETC site include the following:

- A November 1997 SAR for Tank 339P that found no soil contamination.
- A February 1999 CAR for Tank 339-OW that found no soil or groundwater contamination in excess of regulatory levels.
- A September 1999 CSR for Building 334 and Tank 325-OW that found no soil or groundwater contamination in excess of regulatory levels.

In May 1999, a groundwater Monitoring Only Plan for natural attenuation was approved by the FDEP for the JETC site, including wells associated with Tanks 339-TC1, TC-2, and 334-OW. Quarterly groundwater sampling was conducted under this plan from July 1999 to October 2000. Based on quarterly sampling results it was decided that additional delineation of the groundwater contamination at the site was required. TtNUS conducted a Site Assessment Report Addendum (SARA) field investigation in 2001.

The SARA delineated the extent of the groundwater and concluded that not all of the contaminated soil identified in previous investigations was removed from the vicinity of the OWS at the site.

Groundwater contamination appears to be limited to northern and southern plumes in the area of Building 334 and 339. Benzene (14.3 µg/L), ethylbenzene (76.3 µg/L), toluene (86.4 µg/L), xylenes (296 µg/L), naphthalene (378 µg/L), 1-methylnaphthalene (172 µg/L), and 2-methylnaphthalene (181 µg/L) were detected above target levels in monitoring wells within the two plumes.

In the SARA, TtNUS recommended that the two plumes be handled as one site due to their proximity and that the remaining petroleum-contaminated soil to the east of the Tank 334-OW excavation be excavated and disposed offsite. A site plan showing the JETC site and the remaining area of contaminated soil is shown in Figure 1-3. The groundwater contaminant plume is shown in Figure 1-4.

DESCRIPTION OF SPECIFIC TASKS TO BE PERFORMED: The project objective at the Building 271 site is to install and operate an air sparging system to remediate contaminated groundwater at the site to FDEP groundwater cleanup target levels (GCTLs).

The project objectives at the JETC site are to excavate, transport, and dispose of one area of contaminated soil exceeding FDEP Direct Exposure-Residential and Leachability Soil

Cleanup Target Levels (SCTLs) and install and operate an air sparging system to remediate contaminated groundwater at the site to FDEP GCTLs.

2.0 Tasks to be Performed Under this Plan

2.1 Description of Tasks

(Reference Field Project Start-up Form)

Refer to project documents (i.e., Work Plan) for detailed task information. A health and safety risk analysis (Table 2-1) 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).

2.1.1 Hawwoper-Regulated Tasks

- Mobilization and Site Preparation
- Pre-construction Site Survey
- Utility Locates
- Backfill Material Certification including associated analytical data
- Pre-excavation Confirmation Soil, Screening, Sampling, and Analysis
- Soil Excavation and Backfilling
- Waste Characterization
- Installation of Air Sparge Wells and the associated Well Piping, Fittings, Valves, Meters, Controls, Instrumentation, etc.
- Construction of Treatment System Compound
- Installation of Treatment System Equipment, associated Piping and Instrumentation, Utilities, and Ancillary Hardware
- T&D of Contaminated/Non-contaminated Materials
- Start-up and Optimization of Treatment System Operation (LO/TO and testing)
- Site Restoration
- Decontamination

2.1.2 Non-Hawwoper-Regulated Tasks

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

Tasks

- Post-construction Site Survey
- Demobilization
- Preparation and Submittal of an Operation and Maintenance Manual
- Preparation and Submittal of a Construction Completion Report
- Operation and Maintenance for One Year Following System Installation

Controls

- Brief on hazards, limits of access, and emergency procedures
- Post contaminant areas as appropriate
- Sample and monitor as appropriate

TABLE 2-1
Hazard Analysis
(Refer to Section 3 for hazard controls)

POTENTIAL HAZARDS	Project Activities													
	Mobilization	Pre-construction Site Survey	Utility Locate	Backfill Material Certification including associated analytical data	Pre-excavation Confirmation Soil, Screening, Sampling, and Analysis	Soil Excavation and Backfill	Waste Characterization	Installation of Air Sparge Wells,	Construction of Treatment System Compound	Installation of Treatment System Equipment	T&D of Contaminated /Non-contaminated Materials	Start-up and Optimization of Treatment System Operation	Site Restoration	Decon
Manual Lifting	X		X	X		X		X	X	X	X		X	X
Fire Prevention	X					X		X	X	X	X	X		
Electrical Safety	X				X	X		X	X	X				X
Lockout /Tagout	X							X	X	X	X			
Ladders & Stairs	X							X	X	X	X			X
Compressed Gas Cylinders	X					X		X	X	X	X			X
Buried Utilities			X		X	X		X	X	X			X	
Excavations			X		X	X		X	X	X			X	
Fall Protection								X	X					
Heavy Equipment	X					X		X	X	X	X			X
Confined Space Entry						X								
Concrete & Masonry Work									X					
Cranes and Hoisting								X	X	X				
Demolition														
Scaffolding								X	X	X				
Steel erection														
Welding and cutting								X	X	X				
Aerial Lifts								X	X	X				
Hand & Power Tools	X		X		X	X		X	X	X		X	X	X
Forklifts	X							X	X	X				
Drilling								X						
Noise	X		X		X	X	X	X	X	X	X	X	X	X
Pressurized Lines/Equipment	X					X		X	X	X	X			X
Pressure Washing/Equip Decon						X		X	X	X	X		X	X
Vacuum Truck/Pumping Operations														
Suspended Loads	X				X			X	X	X				
Vehicle Traffic	X					X					X		X	
Haul Truck Operations						X					X		X	X
Visible Lighting	X		X		X	X	X	X	X	X	X	X	X	X
Mechanical Guarding Hazards	X				X	X		X	X	X	X			
Asbestos Hazard														
Lead Hazard														
Chemical Hazard-Dermal/Inhalation	X	X	X	X	X	X	X	X	X	X	X		X	X
Dust Hazard (Silica/Metals)														
Fire/Explosion Hazards	X				X	X	X	X	X	X	X			

3.0 Hazard Controls

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

The health and safety hazards posed by field activities have been identified for each project activity and are provided in the Hazard Analysis Table (Table 2-1). Hazard control measures for project-specific and general H&S hazards are provided in this section.

Activity Hazard Analysis will be prepared before beginning each project activity posing H&S hazards to project personnel using the AHA form provided in the HSP Attachments as a guide. The AHA shall identify the work tasks required to perform each activity, along with potential H&S hazards and recommended control measures for each work task. In addition, a listing of the equipment to be used to perform the activity, inspection requirements and training requirements for the safe operation of the equipment listed must be identified. **AHAs shall be submitted to the Navy Technical Representative (NTR) for review at least 15 days prior to the start of each project activity phase.**

In addition to the controls specified in this section, Project-Activity Self-Assessment Checklists are contained in Attachment 5. These checklists are to be used to assess the adequacy of CH2M HILL and subcontractor site-specific safety requirements. The objective of the self-assessment process is to identify gaps in project safety performance, and prompt for corrective actions in addressing these gaps. Self-assessment checklists should be completed early in the project, when tasks or conditions change, or when otherwise specified by the HSM. The self-assessment checklists, including documented corrective actions, should be made part of the permanent project records.

Project-activity self-assessments checklist shall be completed weekly by the SHSS during the course of the project, completing the applicable checklist depending on the work performed at the time on the project.

3.1 Project-Specific Hazards

3.1.1 Drilling Safety

- 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 15 feet 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

3.1.2 Welding/cutting with compressed Gas Cylinders

(Reference CH2M HILL, SOP, *Welding and Cutting*)

- Complete hot work permit.
- Wear appropriate personal protective equipment.
- Remove or combustible materials in the immediate hot work area.
- Station fire watch with fire extinguisher.
- Valve caps must be in place when cylinders are transported, moved, or stored.
- Cylinder valves must be closed when cylinders are not being used and when cylinders are being moved.
- Cylinders must be secured in an upright position at all times.
- Cylinders must be positioned to avoid being struck or knock over; coming in contact with electrical circuits or extreme heat sources; and shielded from welding and cutting operations.
- Cylinders must be secured on a cradle, basket or pallet when hoisted; they may not be hoisted by choker slings.

3.1.3 Working around Material Handling Equipment

- 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.
- Because heavy equipment may not be equipped with properly functioning reverse signal alarms, 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; 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.

3.1.4 Cranes and Rigging

(Reference CH2M HILL, SOP *Cranes*)

- The Navy Contracting Officer and the Navy Technical Representative shall be notified at least 15 days prior to bringing crane equipment on-site.
- A Certificate of Compliance for each crane shall be provided and posted on each crane.
- Crane inspection reports are required to be in accordance with EM 385-1-1 with Daily Reports of Inspections.
- Cranes shall be operated by a trained, qualified, and certified crane operator who has been trained not to bypass safety devices (e.g., anti-two block devices) during lifting operations.
- A critical lift plan shall be submitted according to EM 385-1-1 section 16 when crane loads meet or exceed 75 percent of the crane load capacity in any configuration.
- The crane's operations manual and load chart specifically designed for the crane shall be on the crane at all times.
- The crane must have a current annual inspection to include load test certification (within the last 12 months) that meet 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.
- 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 pre-lift meeting will be conducted to include all parties involved in that days crane operation.
- Only one person shall signal the crane operator. This person shall be thoroughly familiar with all of the cranes operation and be able to communicate with the crane operator with the appropriate hand signals.
- 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.
- No part of the crane will come within 10 feet of overhead electrical powerlines rated 50 kV or less. For lines over 50 kV, increase clearance distance by 4 inches for every 10 kV over 50kV.
- A Weight Handling Equipment Incident Report shall be provided to the Contracting Officer within 30 days of any accident.

3.1.5 Excavation Activities

(Reference CH2M HILL, SOP *Excavation and Trenching*)

- CH2M HILL personnel must notify and be granted authorization from the excavation competent person prior to entering any excavation. CH2M HILL personnel must follow all excavation requirements established by the competent person.
- The competent person must inspect the trench and/or excavation everyday and after everyday hazard increasing event. Documentation of this inspection must be maintained onsite at all times.
- Excavations must be protected from cave-ins by adequate protective systems unless the excavation is less than 5 feet in depth and a competent person determines there is no indication of cave-in or the excavation is made entirely in stable rock that is not fractured.
- Prior to excavating at a location, buried utilities in the area must be identified; refer to Section 2.2.8 "Procedures for locating buried utilities".
- CH2M HILL personnel must not enter any excavation where protective systems are deficient at any time, for any reason. The competent person must be notified of such conditions.
- Refer to CH2M HILL SOP HS-32 "Excavations and Trenching" for more specific details on excavation requirements.

3.1.6 Operating Heavy Equipment

(Reference CH2M HILL, SOP *Earthmoving Equipment*)

- CH2M HILL authorizes only those employees qualified by training or previous experience to operate material handling equipment.
- Equipment must be checked at the beginning of each shift to ensure the equipment is in safe operating condition and free of apparent damage. The check should include: service brakes, parking brakes, emergency brakes, tires, horn, back-up alarm, steering mechanism, coupling devices, seat belts and operating controls. All defects shall be corrected before the equipment is placed in service. Documentation of this inspection must be maintained onsite at all times.
- Equipment must be on a stable foundation such as solid ground or cribbing; outriggers are to be fully extended.
- Equipment must not be used to lift personnel; loads must not be lifted over the heads of personnel.
- Equipment, or parts thereof, which are suspended must be substantially blocked or cribbed to prevent shifting before personnel are permitted to work under or between them. All controls shall be in a neutral position, with the motors stopped and brakes set.

- Equipment which is operating in reverse must have a reverse signal alarm distinguishable from the surrounding noise or a signal person when the operators view is obstructed.
- When equipment is used near energized powerlines, the closest part of the equipment must be at least 10' from the powerlines < 50 kV. Provide an additional 4' for every 10 kV over 50 kV. A person must be designated to observe clearances and give timely warning for all operations where it is difficult for the operator to maintain the desired clearance by visual means. All overhead powerlines must be considered to be an energized until the electrical utility authorities indicate that it is not an energized line and it has been visibly grounded.
- Underground utility lines must be located before excavation begins; refer to Section 2.2.8 "Procedures for locating buried utilities".
- Operators loading/unloading from vehicles are responsible for seeing that vehicle drivers are in the vehicle cab or in a safe area.
- The parking brake shall be set whenever equipment is parked, wheels must be chocked when parked on inclines.
- When not in operation, the blade/bucket must be blocked or grounded; the master clutch must be disengaged when the operator leaves the cab. When equipment is unattended, power must be shut off, brakes set, blades/buckets landed and shift lever in neutral.

3.1.7 Fall Protection Activities

(Reference CH2M HILL, SOP, *Fall Protection*)

- CH2M HILL personnel exposed to fall hazards must complete the Fall Protection training course in the Basic Program and receive project-specific fall protection training. Personnel may not use fall protection systems on which they have not been trained.
- The CH2M HILL Site Health and Safety Specialist (SHSS) must complete the Project Fall Protection Evaluation Form and provide project-specific fall protection training to all CH2M HILL personnel exposed to fall hazards. The Project Fall Protection Evaluation Form is provided in Attachment 5.
- Fall protection systems must be used to eliminate fall hazards of 6 feet or greater.
- All components of the personal fall arrest system must be inspected for proper working condition prior to each use.
- Personal fall arrest system anchorages must be capable of supporting 5000 pounds per individual.
- Refer to CH2M HILL SOP HS-31 "Fall Protection" for more specific details on fall protection requirements.

3.1.8 Scaffolding Activities

(Reference CH2M HILL, SOP, *Scaffolds*)

- CH2M HILL personnel must notify and be granted authorization from the scaffolding competent person prior to climbing any scaffold.
- Personnel must follow all requirements established by the competent person or as identified on the "safe-to-climb" scaffold tag.

- The competent person must perform a detailed daily inspection of the scaffold and all components. Documentation of this inspection must be maintained onsite at all times.
- Personnel must not use boxes, ladders or any other device on the scaffold platform to increase the working level height.
- Personnel must remain within the scaffold guardrails; do not cross or lean over the guardrails.
- Ladders, stairways or integral prefabricated scaffold ladders must be used to access the platform; scaffold crossbracing may not be used as a means of access.
- CH2M HILL personnel must have completed CH2M HILL's fall protection training when personal fall arrest systems (harness, lanyard, lnelines, etc.) are required to be used on scaffolding.
- Personnel working from suspended scaffolding are required to wear a full body harness with lanyard attached to an independent lifeline.

3.1.9 Lockout/Tagout Activities

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

- Only CH2M HILL employees meeting the definition of "authorized employee" may perform lockout/tagout. Training for authorized employees includes the online Lockout/Tagout module located on the Virtual Office. The CH2M HILL authorized employee also needs to have either completed the OSHA 10-hour Construction Safety course or the online General Electrical Safety training module. Only qualified personnel may work on energized equipment that has not been deenergized by lockout/tagout procedures.
- When CH2M HILL personnel are affected by the unexpected operation of equipment they must complete the lockout/tagout training course in the Basic Program. Project training may also be required on site specific lockout procedures.
- A daily safety briefing/meeting shall be conducted with all affected and authorized employees to discuss the lockout/tagout activities planned for the day and the HS&E requirements to be followed.
- Authorized and affected employees shall be made aware of any equipment specific lockout/tagout procedures being used at the facility.
- Authorized employees shall be provided with lockout devices, locks, tags, and other hardware for isolating, securing, or blocking equipment from energy sources.
- When new equipment is installed or when existing equipment is replaced, renovated, modified, or undergoing major repair, the equipment shall be designed or modified to accept a lockout device
- CH2M HILL authorized employees shall complete the Equipment-Specific Lockout/Tagout Procedure Development Form provided in Attachment 5 to create an equipment-specific lockout/tagout procedure when such procedures are not available or when existing procedures are determined to be insufficient.
- 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.
- The “HS&E Self-Assessment Checklist – Lockout/Tagout” in Attachment 5 is provided as a method for verifying compliance with this SOP and shall be completed weekly as long as LO/TO activities are being performed.
- CH2M HILL SOP HSE-310 “Lockout/Tagout” serves as the written lockout/tagout program and shall be reviewed by authorized and affected personnel. Refer to HSE-310 for more specific details on lockout/tagout requirements.

3.1.10 Use of Aerial Lifts

(Reference CH2M HILL, SOP, *Aerial Lifts*)

- Only authorized personnel are permitted to operate aerial lifts.
- Personnel shall wear a full body harness and attach their lanyard to the boom or basket; never attach to an adjacent structure. Personnel working in or operating a scissor lift are not required to wear fall protection as long as they are working totally within the confines of the lift, with both feet on the floor of the lift.
- Personnel shall remain in the basket at all times and shall not climb on the lift to gain access to elevated work location.
- Personnel shall always stand on the floor of the basket and not on the guardrails, planks, ladders or other devices to extend reach.
- Aerial lifts shall be positioned on level surfaces when possible and the brakes shall be set. If outriggers are provided, they shall be positioned on solid surfaces or cribbing. Wheel chocks shall be installed before using lifts on inclines.
- Lifts shall be provided with upper and lower controls and these controls shall be tested for proper function before each days use. The lower controls shall not be operated unless permission has be obtained from personnel in the lift, except in the case of emergency.
- Boom and basket load limits, as specified by the manufacturer, shall be known and shall not be exceeded.
- Aerial lifts shall be prohibited from moving with workers in the basket, unless specifically designed for this type of operation.
- Personnel shall not work on elevated platforms when winds exceed twenty (20) miles per hour.
- Lifts shall be lowered before moving horizontally.
- An aerial lift shall not be used as a material hoist.

3.1.11 Confined Space Entry Activities

(Reference CH2M HILL, SOP, *Confined Space Entry*)

Project personnel are not anticipated to enter permit-required confined spaces during field activities. CH2MHILL personnel will enter confined spaces using the Alternative Procedure Permit attached to this plan for each entry.

- CH2M HILL personnel entering a confined space must have completed the 8-hour confined space entry training in the Recovery Center.
- Prior to entry, a confined space permit must be completed identifying entry requirements. Entrants must review the permit prior to each entry to verify the requirements have been satisfied.
- The atmosphere in the space must be tested with air monitoring equipment. CH2M HILL personnel must confirm the test results are consistent with acceptable entry conditions.
- Mechanical ventilation (portable blower) shall be applied to the space when these atmospheric conditions are not met during entries. Re-entry may only occur when the above atmospheric conditions are met and mechanical ventilation is continuously applied to maintain these conditions.
- CH2M HILL personnel entering confined spaces requiring respiratory protection must have completed respiratory protection training in the Basic program, received a respirator fit test and completed respirator wearer medical surveillance.
- Refer to CH2M HILL SOP HS-17 “Confined Space Entry” for more specific details on confined space entry requirements.

3.1.12 Concrete and Masonry Construction Activities

- Protruding reinforcing steel (rebar), onto which personnel could fall, must be guarded to eliminate the hazard of impalement
- During post-tensioning, only those personnel essential to the operation are permitted behind the tensioning jacks.
- Personnel shall not ride concrete buckets nor position themselves in areas where buckets are lifted overhead.
- Personnel shall maintain a safe distance from formwork and shoring being removed from concrete structures.
- Personnel shall maintain a safe distance from precast and lift-slab concrete being lifted into position until physically secured.
- Personnel shall not enter limited access zones during masonry wall construction.

3.1.13 Forklift Operations

Forklifts may be required for materials movement during project activities. Forklifts present the potential for damage to equipment, materials and personnel by impaling or striking personnel or materials with the forklift tines. Additionally, forklifts may tip if they are incorrectly loaded, driven at excessive speeds or operated with the forks too high.

The following rules apply whenever a forklift is used on the project:

- 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 trained and authorized drivers will 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).

3.1.14 Exposure to Public Vehicular Traffic

The following precautions must be taken when working around traffic, and in or near an area where traffic controls have been established by a contractor.

- 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 -- 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 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 away from the work zone and traffic. Minimize the amount of time that you will have your back to oncoming traffic.

3.1.15 Rigging

- Stay as clear as possible of all hoisting operations. Loads shall not be hoisted overhead of personnel.
- Hoists shall not be used to lift or lower personnel.
- Do not exceed hoist load limits.
- Ensure load is level and stable before hoisting
- Inspect all rigging equipment prior to use. Do not use defective rigging for any reason.
- Only use rigging equipment for the purpose it was designed and intended.
- A Weight Handling Equipment Incident Report shall be provided to the Contracting Officer within 30 days of any accident.

3.2 General Hazards

3.2.1 General Practices and Housekeeping

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

3.2.2 Hazard Communication

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

The SHSS is to perform the following:

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

3.2.3 Shipping and Transportation of Chemical Products

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

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

3.2.4 Lifting

(Reference CH2M HILL-SOP, *Lifting*)

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

3.2.5 Fire Prevention

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

3.2.6 Electrical

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

- Only qualified personnel are permitted to work on unprotected energized electrical systems.
- Only authorized personnel are permitted to enter high-voltage areas.
- Do not tamper with electrical wiring and equipment unless qualified to do so. All electrical wiring and equipment must be considered energized until lockout/tagout procedures are implemented.
- Inspect electrical equipment, power tools, and extension cords for damage prior to use. Do not use defective electrical equipment, remove from service.

- All temporary wiring, including extension cords and electrical power tools, must have ground fault circuit interrupters (GFCIs) installed.
- Extension cords must be:
 - equipped with third-wire grounding.
 - covered, elevated, or protected from damage when passing through work areas.
 - protected from pinching if routed through doorways.
 - not fastened with staples, hung from nails, or suspended with wire.
- Electrical power tools and equipment must be effectively grounded or double-insulated UL approved.
- Operate and maintain electric power tools and equipment according to manufacturers' instructions.
- Maintain safe clearance distances between overhead power lines and any electrical conducting material unless the power lines have been de-energized and grounded, or where insulating barriers have been installed to prevent physical contact. Maintain at least 10 feet from overhead power lines for voltages of 50 kV or less, and 10 feet plus ½ inch for every 1 kV over 50 kV.
- Temporary lights shall not be suspended by their electric cord unless designed for suspension. Lights shall be protected from accidental contact or breakage.
- Protect all electrical equipment, tools, switches, and outlets from environmental elements.

3.2.7 Stairways and Ladders

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

- Stairway or ladder is generally required when a break in elevation of 19 inches 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 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 > 24 feet 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 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.

3.2.8 Heat Stress

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

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.

Symptoms and Treatment of Heat Stress					
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!

Monitoring Heat Stress

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

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

3.2.9 Cold Stress

- Be aware of the symptoms of cold-related disorders, and wear proper, layered clothing for the anticipated fieldwork. Appropriate rain gear is a must in cool weather.
- Consider monitoring the work conditions and adjusting the work schedule using guidelines developed by the U.S. Army (wind-chill index) and the National Safety Council (NSC).
- Wind-Chill Index is used to estimate the combined effect of wind and low air temperatures on exposed skin. The wind-chill index does not take into account the body part that is exposed, the level of activity, or the amount or type of clothing worn. For those reasons, it should only be used as a guideline to warn workers when they are in a situation that can cause cold-related illnesses.
- NSC Guidelines for Work and Warm-Up Schedules can be used with the wind-chill index to estimate work and warm-up schedules for fieldwork. The guidelines are not absolute; workers should be monitored for symptoms of cold-related illnesses. If symptoms are not observed, the work duration can be increased.
- Persons who experience initial signs of immersion foot, frostbite, hypothermia should consult the SHSS 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 not hot—water. Have victim drink warm fluids, but not coffee or alcohol. Do not break blisters. Elevate the injured area, and get medical attention.	Remove victim to a warm place. Have victim drink warm fluids, but not coffee or alcohol. Get medical attention.

3.2.10 Compressed Gas Cylinders

- Valve caps must be in place when cylinders are transported, moved, or stored.
- Cylinder valves must be closed when cylinders are not being used and when cylinders are being moved.
- Cylinders must be secured in an upright position at all times.
- Cylinders must be 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 must be secured on a cradle, basket, or pallet when hoisted; they may not be hoisted by choker slings.

3.2.11 Procedures for Locating Buried Utilities

- Where available, obtain utility diagrams for the facility.
- Review locations of sanitary and storm sewers, electrical conduits, water supply lines, natural gas lines, and fuel tanks and lines.
- Review proposed locations of intrusive work with facility personnel knowledgeable of locations of utilities. Check locations against information from utility mark-out service.
- Where necessary (e.g., uncertainty about utility locations), excavation or drilling of the upper depth interval should be performed manually
- Monitor for signs of utilities during advancement of intrusive work (e.g., sudden change in advancement of auger or split spoon).
- When the client or other onsite party is responsible for determining the presence and locations of buried utilities, the SHSS should confirm that arrangement.

3.3 Biological Hazards and Controls

3.3.1 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 a person is bitten by a snake, wash and immobilize the injured area, keeping it lower than the heart if possible. Seek medical attention immediately. **DO NOT** apply ice, cut the wound, or apply a tourniquet. Try to identify the type of snake: note color, size, patterns, and markings.

3.3.2 Poison Ivy 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. Become familiar with the identity of these plants. Wear protective clothing that covers exposed skin and clothes. Avoid contact with plants and the outside of protective clothing. If skin contacts a plant, wash the area with soap and water immediately. If the reaction is severe or worsens, seek medical attention.

3.3.3 Ticks

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

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

3.3.4 Bees and Other Stinging Insects

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

3.3.5 Bloodborne Pathogens

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

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

3.3.6 Mosquito Bites

Due to the recent detection of the West Nile Virus in the Southeastern United States it is recommended that preventative measures be taken to reduce the probability of being bitten by mosquitos whenever possible. Mosquitos 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 mosquitos 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 DEET since mosquitoes may bite through thin clothing.

- Apply insect repellent sparingly to exposed skin. An effective repellent will contain 35% DEET (N,N-diethyl-meta-toluamide). DEET in high concentrations (greater than 35%) provides no additional protection.
- Repellents may irritate the eyes and mouth, so avoid applying repellent to the hands.
- 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.

Note: 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 3-15 days.

If you have any questions or to report any suspicious symptoms, contact the project Health and Safety Manager.

3.4 Radiological Hazards and Controls

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

Hazards	Controls
None Known	None Required

3.5 Contaminants of Concern

Contaminants of concern are listed in Table 3-1.

3.6 Potential Routes of Exposure

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

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

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

TABLE 3-1

Contaminants of Concern

(Refer to Project Files for more detailed contaminant information)

Contaminant	Location and Maximum ^a Concentration (ppm)	Exposure Limit ^b	IDLH ^c	Symptoms and Effects of Exposure	PIP ^d (eV)
Benzene	GW: 0.089 SB: SS:	1 ppm	500 Ca	Eye, nose, skin, and respiratory irritation; headache; nausea; dermatitis; fatigue; giddiness; staggered gait; bone marrow depression	9.24
Ethyl Benzene	GW: .0520 SB: SS:	100 ppm	800	Eye, skin, and mucous membrane irritation; headache; dermatitis; narcotic; coma	8.76
1- Methylnaphthalene	GW: 0.172	10 ppm	250	Eye irritation, headache, confusion, excitement, nausea, vomiting, abdominal pain, bladder irritation, profuse sweating, dermatitis, corneal damage, optical neuritis	
2- Methylnaphthalene	GW: 0.181	10 ppm	250	Eye irritation, headache, confusion, excitement, nausea, vomiting, abdominal pain, bladder irritation, profuse sweating, dermatitis, corneal damage, optical neuritis	
Naphthalene	GW: 0.378 SB: SS:	10 ppm	250	Eye irritation, headache, confusion, excitement, nausea, vomiting, abdominal pain, bladder irritation, profuse sweating, dermatitis, corneal damage, optical neuritis	8.12
TRPH	GW: 17.5 SB: SS:	100 ppm	1000 Ca	Irritation to eyes; skin; nose; light headedness, drowsiness, dermatitis	UK
Toluene	GW: 2.9 SB: SS:	50 ppm	500	Eye and nose irritation, fatigue, weakness, confusion, dizziness, headache, dilated pupils, excessive tearing, nervousness, muscle fatigue, paresthesia, dermatitis, liver and kidney damage	8.82
Xylenes	GW: 3.3 SB: SS:	100 ppm	900	Irritated eyes, skin, nose, and throat; dizziness; excitement; drowsiness; incoherence; staggering gait; corneal vacuolization; anorexia; nausea; vomiting; abdominal pain; dermatitis	8.56
<p>Notes:</p> <p>^a Specify sample-designation and media: SB (Soil Boring), A (Air), D (Drums), GW (Groundwater), L (Lagoon), TK (Tank), S (Surface Soil), SL (Sludge), SW (Surface Water).</p> <p>^b Appropriate value of PEL, REL, or TLV listed.</p> <p>^c IDLH = immediately dangerous to life and health (units are the same as specified "Exposure Limit" units for that contaminant); NL = No limit found in reference materials; CA = Potential occupational carcinogen.</p> <p>^d PIP = photoionization potential; NA = Not applicable; UK = Unknown.</p>					

4.0 Project Organization and Personnel

4.1 CH2M HILL Employee Medical Surveillance and Training

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

The employees listed 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 “SHSS” have completed a 12-hour site safety coordinator course, and have documented requisite field experience. An SHSS 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. At least two FA-CPR trained employees must be available at each job site/operation. 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 HS-04, *Reproduction Protection*, including obtaining a physician’s statement of the employee’s ability to perform hazardous activities before being assigned fieldwork.

Employee Name	Office	Responsibility	SHSS/FA-CPR
Sam Naik	CH2MHILL	Project Manager	SC-HW; FA-CPR
Craig Haas	CH2MHILL	Health and Safety Manager	SC-HW; SC-C, FA-CPR

4.2 Field Team Chain of Command and Communication Procedures

4.2.1 Client: U.S. Navy Facilities Engineering Command Southeast

Contact Name: COTR - Dorothy Okamoto

Phone: 843/820-5544

Facility Contact Name: Larry Blackburn

4.2.2 CH2M HILL

Program Manager: Sidney Allison/ATL

Project Manager: Sam Naik/ATL

Health and Safety Manager: Rich Rathnow/ORO

Field Team Leader: Craig Haas/ORL

Site Health and Safety Specialist: Craig Haas/ORL

The CH2M HILL project manager (PM) is responsible for providing adequate resources (budget and staff) for project-specific implementation of the HS&E 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 SOP:

- Include standard terms and conditions, and contract-specific HS&E roles and responsibilities in contract and subcontract agreements (including flow-down requirements to lower-tier subcontractors)
- Select safe and competent subcontractors by:
 - obtaining, reviewing and accepting or rejecting subcontractor pre-qualification questionnaires
 - ensuring that acceptable certificates of insurance, including CH2M HILL as named additional insured, are secured as a condition of subcontract award
 - including HS&E submittals checklist in subcontract agreements, and ensuring that appropriate site-specific safety procedures, training and medical monitoring records are reviewed and accepted prior to the start of subcontractor’s field operations
- Maintain copies of subcontracts and subcontractor certificates of insurance (including CH2M HILL as named additional insured), bond, contractors license, training and medical monitoring records, and site-specific safety procedures in the project file accessible to site personnel
- Provide oversight of subcontractor HS&E practices per the site-specific safety plan
- Manage the site and interfacing with 3rd parties in a manner consistent with our contract and subcontract agreements and the applicable standard of reasonable care
- Ensure that the overall, job-specific, HS&E goals are fully and continuously implemented

The CH2M HILL H&S Manager is responsible for:

- Review and accept or reject subcontractor pre-qualification questionnaires that fall outside the performance range delegated to the Contracts Administrator (KA)
- Review and accept or reject subcontractor training records and site-specific safety procedures prior to start of subcontractor’s field operations
- Support the SHSS's oversight of subcontractor (and lower-tier subcontractors) HS&E practices and interfaces with on-site 3rd parties per the site-specific safety plan

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

- Verify this HSP remains current and amended when project activities or conditions change
- Verify CH2M HILL site personnel and subcontractor personnel read this HSP and sign Attachment 1 “Employee Signoff Form” prior to commencing field activities
- Verify CH2M HILL site personnel and subcontractor personnel have completed any required specialty training (e.g., fall protection, confined space entry) and medical surveillance as identified in Section 2
- Verify compliance with the requirements of this HSP and applicable subcontractor health and safety plan(s)
- Act as the project “Hazard Communication Coordinator” and perform the responsibilities outlined in Section 2.2.2

- Act as the project “Emergency Response Coordinator” and perform the responsibilities outlined in Section 4
- Post OSHA job-site poster; the poster is required at sites where project field offices, trailers, or equipment-storage boxes are established; posters can be obtained by calling 800/548-4776 or 800/999-9111
- Verify that safety meetings are conducted and documented in the project file initially and as needed throughout the course of the project (e.g., as tasks or hazards change)
- Verify that project H&S forms and permits, found in Attachment 5, are being used as outlined in Section 2
- Perform oversight and/or assessments of subcontractor HS&E practices per the site-specific safety plan and verify that project activity self-assessment checklists, found in Attachment 5, are being used as outlined in Section 2
- 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, contractors license, training and medical monitoring records, and site-specific safety procedures prior to start of subcontractor’s field operations
- Manage the site and interfacing with 3rd parties in a manner consistent with our contract/subcontract agreements and the applicable standard of reasonable care
- Coordinate with the HS&E manager regarding CH2M HILL and subcontractor operational performance, and 3rd party interfaces
- Ensure that the overall, job-specific, HS&E goals are fully and continuously implemented

The training required for the SHSS is as follows:

- SHSS 10 hour course
- OSHA 10 hour course for Construction
- First Aid and CPR
- Relevant Competent Person Courses (excavation, confined space, scaffold, fall protection, etc.)

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

4.2.3 CH2M HILL Subcontractors

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

Subcontractor: Aerostar Environmental Services

Subcontractor Contact Name: James O. Smith Jr, Richard D McCann

Certain subcontractors (drilling, remedial and construction contractors) are required to be pre-qualified for safety by completing the Subcontractor Safety Performance Questionnaire. The subcontractors listed above are covered by this HSP. However, this plan does not address hazards associated with the tasks and equipment that the subcontractor has expertise in (e.g., drilling, excavation work, electrical). Subcontractors are responsible for the health and safety procedures specific to their work, and are required to submit these procedures to CH2M HILL for review before the start of field work by following the Subcontractor Safety Procedure Criteria specific to their work.

Subcontractors are also required to prepare Activity Hazard Analysis before beginning each activity posing H&S hazards to their personnel using the AHA form provided in Attachment 6 as a guide. The AHA shall identify the principle steps of the activity, potential H&S 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.

Subcontractors must comply with the established health and safety plan(s). The CH2M HILL SHSS should verify that subcontractor employee training, medical clearance, and fit test records are current and must monitor and enforce compliance with the established plan(s). CH2M HILL oversight does not relieve subcontractors of their responsibility for effective implementation and compliance with the established plan(s).

CH2M HILL should continuously endeavor to observe subcontractors' safety performance. This endeavor should be reasonable, and include observing for hazards or unsafe practices that are both readily observable and occur in common work areas. CH2M HILL is not responsible for exhaustive observation for hazards and unsafe practices. In addition to this level of observation, the SHSS is responsible for confirming CH2M HILL subcontractor performance against both the subcontractor's safety plan and applicable self-assessment checklists. **Self-assessment checklists** contained in **Attachment 5** are to be used by the SHSS to review subcontractor performance.

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

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

5.0 Personal Protective Equipment

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

PPE Specifications ^a

Task	Level	Body	Head	Respirator ^b
-General site entry, -Mobilization and Site Preparation, -Pre-construction Site Survey, -Utility Locates, -Backfill Material Certification including associated analytical data, -Pre-excavation Confirmation Soil, Screening, Sampling, and Analysis,, -Waste Characterization, -T&D of Contaminated/Non-contaminated Materials -Start-up and Optimization of - Treatment System Operation -Site Restoration	D	Work clothes; steel-toe, leather work boots; work glove.	Hardhat ^c Safety glasses Ear protection ^d	None required
-Soil Excavation and Backfilling -Installation of Air Sparge Wells and the associated Well Piping, Fittings, Valves, Meters, Controls, Instrumentation, etc. -Construction of Treatment System Compound -Installation of Treatment System Equipment, associated Piping and Instrumentation, Utilities, and Ancillary Hardware	Modified D	Work clothes or cotton coveralls Boots: Steel-toe, chemical-resistant boots OR steel-toe, leather work boots with outer rubber boot covers Gloves: Inner surgical-style nitrile & outer chemical-resistant nitrile gloves.	Hardhat ^c Safety glasses Ear protection ^d	None required
-Decontamination	Modified D	Coveralls: Uncoated Tyvek® Boots: Steel-toe, chemical-resistant boots OR steel-toe, leather work boots with outer rubber boot covers Gloves: Inner surgical-style nitrile & outer chemical-resistant nitrile gloves.	Hardhat ^c Splash shield ^c Safety glasses Ear protection ^d	None required.
Tasks Requiring upgrade per Table 6.0	C	Coveralls: Polycoated Tyvek® Boots: Steel-toe, chemical-resistant boots OR steel-toe, leather work boots with outer rubber boot covers Gloves: Inner surgical-style nitrile & outer chemical-resistant nitrile gloves.	Hardhat ^c Splash shield ^c Ear protection ^d Spectacle inserts	APR, full face, MSA Ultratwin or equivalent; with GME-H cartridges or equivalent ^e .
Tasks requiring upgrade per Table 6.0	B	Coveralls: Polycoated Tyvek® Boots: Steel-toe, chemical-resistant boots OR steel-toe, leather work boots with outer rubber boot covers Gloves: Inner surgical-style nitrile & outer chemical-resistant nitrile gloves.	Hardhat ^c Splash shield ^c Ear protection ^d Spectacle inserts	Positive-pressure demand self-contained breathing apparatus (SCBA); MSA Ultralite, or equivalent.

Reasons for Upgrading or Downgrading Level of Protection

Upgrade ^f	Downgrade
<ul style="list-style-type: none"> Request from individual performing tasks. Change in work tasks that will increase contact or potential contact with hazardous materials. 	<ul style="list-style-type: none"> New information indicating that situation is less hazardous than originally thought. Change in site conditions that decreases the

- Occurrence or likely occurrence of gas or vapor emission.
 - Known or suspected presence of dermal hazards.
 - Instrument action levels (Section 5) exceeded.
 - hazard.
 - Change in work task that will reduce contact with hazardous materials.
-

^a Modifications are as indicated. CH2M HILL will provide PPE only to CH2M HILL employees.

^b No facial hair that would interfere with respirator fit is permitted.

^c Hardhat and splash-shield areas are to be determined by the SHSS.

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

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

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

6.0 Air Monitoring/Sampling

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

6.1 Air Monitoring Specifications

Instrument	Tasks	Action Levels ^a		Frequency ^b	Calibration
PID: OVM with 10.6eV lamp or equivalent	Intrusive Operations and tasks associated with contaminated groundwater	<1 ppm 1-5 ppm >5 ppm	Level D Level C Take benzene tube reading or ventilate and wait until level dissipates to <1ppm Contact HSM for direction	Initially and periodically during task	Daily
CGI: MSA model 260 or 261 or equivalent	For confined space or trench entry work; work with vapor accumulation in enclosed areas	0-10% : 10-25% LEL: >25% LEL:	No explosion hazard Potential explosion hazard Explosion hazard; evacuate or vent	Continuous during advancement of boring or trench	Daily
O₂Meter: MSA model 260 or 261 or equivalent	For confined space or trench entry work; work with vapor accumulation in enclosed areas	>25% ^c O ₂ : 20.9% ^c O ₂ : <19.5% ^c O ₂ :	Explosion hazard; evacuate or vent Normal O ₂ O ₂ deficient; vent or use SCBA	Continuous during advancement of boring or trench	Daily
Dust Monitor: Visual Assessment	All	No visible dust Visible dust	Level D Use dust suppression measures	Initially and periodically during tasks	Zero Daily
Detector Tube: Drager benzene specific 0.5/c (0.5 to 10 ppm range) with pre-tube, or equivalent	PID Readings over 1 ppm	<0.5 ppm 0.5-1 ppm >1 ppm	Level D Level C Level B	Initially and periodically when PID/FIB >1 ppm	Not applicable

^a Action levels apply to sustained breathing-zone measurements above background.

^b The exact frequency of monitoring depends on field conditions and is to be determined by the SHSS; 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.).

^c If the measured percent of O₂ is less than 10, an accurate LEL reading will not be obtained. Percent LEL and percent O₂ action levels apply only to ambient working atmospheres, and not to confined-space entry. More-stringent percent LEL and O₂ action levels are required for confined-space entry (refer to Section 2).

^d Refer to SOP HS-10 for instructions and documentation on radiation monitoring and screening.

^e Noise monitoring and audiometric testing also required.

6.2 Calibration Specifications

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

Instrument	Gas	Span	Reading	Method
PID: OVM, 10.6 or 11.8 eV bulb	100 ppm isobutylene	RF = 1.0	100 ppm	1.5 lpm reg T-tubing
PID: MiniRAE, 10.6 eV bulb	100 ppm isobutylene	CF = 100	100 ppm	1.5 lpm reg T-tubing
PID: TVA 1000	100 ppm isobutylene	CF = 1.0	100 ppm	1.5 lpm reg T-tubing
FID: OVA	100 ppm methane	3.0 ± 1.5	100 ppm	1.5 lpm reg T-tubing
FID: TVA 1000	100 ppm methane	NA	100 ppm	2.5 lpm reg T-tubing
Dust Monitor: Miniram-PDM3	Dust-free air	Not applicable	0.00 mg/m ³ in "Measure" mode	Dust-free area OR Z-bag with HEPA filter
CGI: MSA 260, 261, 360, or 361	0.75% pentane	N/A	50% LEL ± 5% LEL	1.5 lpm reg direct tubing

6.3 Air Sampling

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

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

7.0 Decontamination

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

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

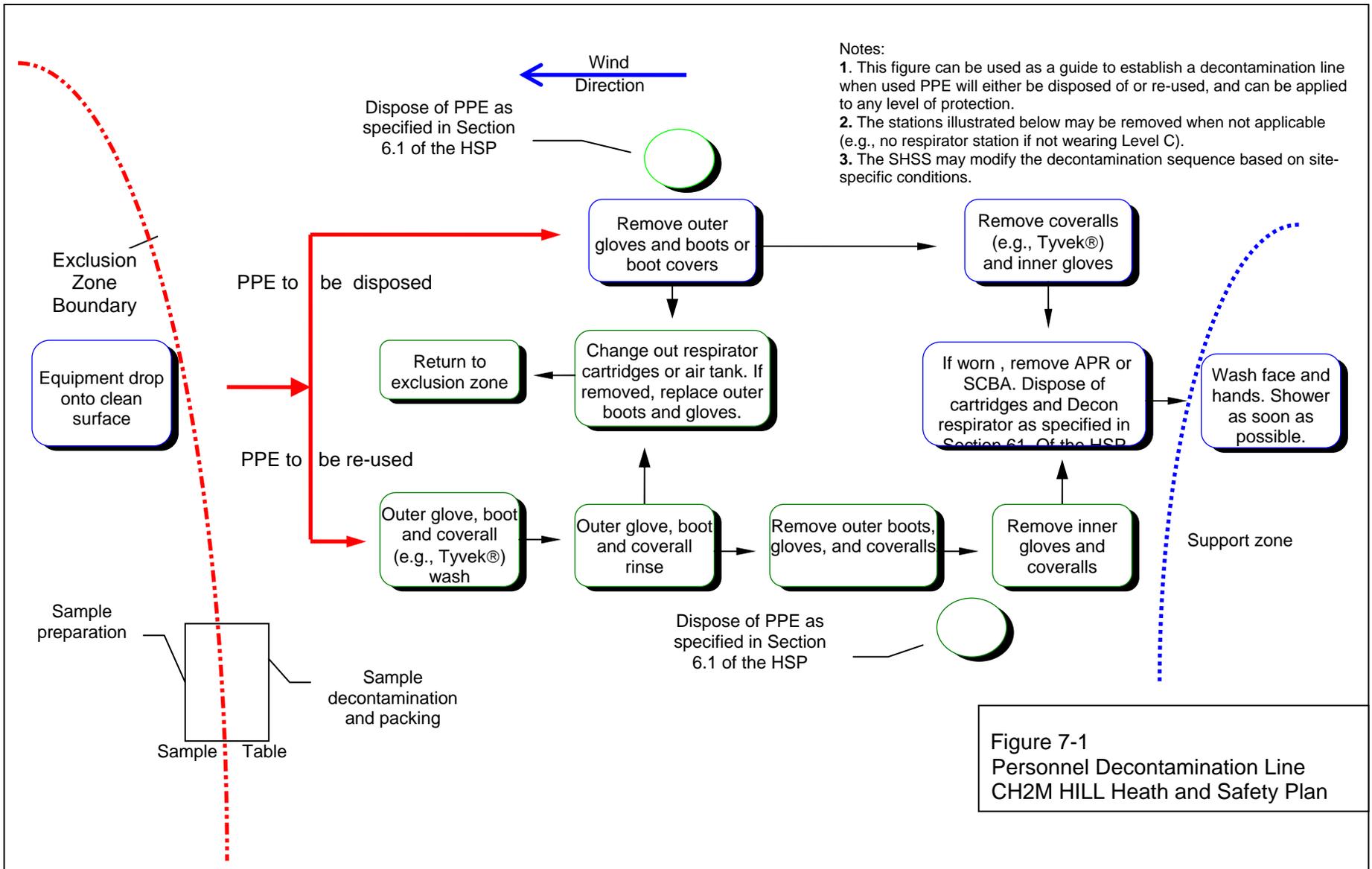
7.1 Decontamination Specifications

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

7.2 Diagram of Personnel-Decontamination Line

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

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



8.0 Spill Containment Procedures

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

9.0 Site Control Plan

9.1 Site Control Procedures

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

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

9.2 Hazwoper Compliance Plan

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

Certain parts of the site work are covered by state or federal Hazwoper standards and therefore require training and medical monitoring. Anticipated Hazwoper tasks (Section 1.1.1) might occur consecutively or concurrently with respect to non-Hazwoper tasks. This section outlines procedures to be followed when approved activities specified in Section 1.1.2 do not require 24- or 40-hour training. Non-Hazwoper-trained personnel also must be trained in accordance with all other state and federal OSHA requirements.

- In many cases, air sampling, in addition to real-time monitoring, must confirm that there is no exposure to gases or vapors before non-Hazwoper-trained personnel are allowed on the site, or

while non-Hazwoper-trained staff are working in proximity to Hazwoper activities. Other data (e.g., soil) also must document that there is no potential for exposure. The HSM must approve the interpretation of these data. Refer to subsections 2.5 and 5.3 for contaminant data and air sampling requirements, respectively.

- When non-Hazwoper-trained personnel are at risk of exposure, the SHSS must post the exclusion zone and inform non-Hazwoper-trained personnel of the:
 - nature of the existing contamination and its locations
 - limitations of their access
 - emergency action plan for the site
- Periodic air monitoring with direct-reading instruments conducted during regulated tasks also should be used to ensure that non-Hazwoper-trained personnel (e.g., in an adjacent area) are not exposed to airborne contaminants.
- When exposure is possible, non-Hazwoper-trained personnel must be removed from the site until it can be demonstrated that there is no longer a potential for exposure to health and safety hazards.
- Remediation treatment system start-ups: Once a treatment system begins to pump and treat contaminated media, the site is, for the purposes of applying the Hazwoper standard, considered a treatment, storage, and disposal facility (TSDF). Therefore, once the system begins operation, only Hazwoper-trained personnel (minimum of 24 hour of training) will be permitted to enter the site. All non-Hazwoper-trained personnel must not enter the TSDF area of the site.

10.0 Emergency Response Plan

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

10.1 Pre-Emergency Planning

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

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

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

10.2 Emergency Equipment and Supplies

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

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

10.3 Incident Reporting, Investigation and Response

For any accident meeting the definition of Recordable Occupational Injuries or Illnesses or Significant Accidents, NAVFAC SE Contracting Officer and Navy Technical Representative (NTR) shall be notified by the HSM or Program Manager soon as practical, but not later than four hours after occurrence. All other incidents must be reported to NAVFAC SE within 24 hours of incident occurrence.

Therefore in order for the incident to be assessed for reportability purposes it is imperative that according to CH2M HILL requirements, all personal injuries, near-misses, or property damage incidents involving CH2M HILL or subcontractor project personnel be reported IMMEDIATELY to the HSM Rich Rathnow/ORO at the numbers identified in the emergency contact attachment contained in this plan.

The Site Manager or designee must report the following incident information to the HSM immediately after incident occurrence:

- Date and time of mishap
- Project name and project number
- Name and worker classification
- Extent of known injuries
- Level of medical attention
- Injury cause

A written incident investigation shall be performed and submitted to the HSM within 24 hours of incident occurrence by the completing the Incident Report, Near Loss Investigation and Root Cause Analysis provided in the HSP Attachments.

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

- Shut down CH2M HILL operations and evacuate the immediate work area.
- Notify appropriate response personnel.
- Account for personnel at the designated assembly area(s).
- Assess the need for site evacuation, and evacuate the site as warranted.

Instead of implementing a work-area evacuation, note that small fires or spills posing minimal safety or health hazards may be controlled.

10.4 Emergency Medical Treatment

The procedures listed below may also be applied to non-emergency incidents. CH2M HILL employee injuries and illnesses must be reported to the Human Resource contact in Attachment 4.

If there is doubt about whether medical treatment is necessary, or if the injured person is reluctant to accept medical treatment, contact the CH2M HILL medical consultant, depending on whose employee is injured. During non-emergencies, follow these procedures as appropriate.

- Notify appropriate emergency response authorities listed in Section 9.8 (e.g., 911).
- The SHSS will assume charge during a medical emergency until the ambulance arrives or until the injured person is admitted to the emergency room.
- Prevent further injury.
- Initiate first aid and CPR where feasible.
- Get medical attention immediately.
- Perform decontamination where feasible; lifesaving and first aid or medical treatment take priority.
- Make certain that the injured person is accompanied to the emergency room.
- When contacting the medical consultant, give your name and telephone number, the name of the injured person, the extent of the injury or exposure, and the name and location of the medical facility where the injured person was taken.
- Report incident as outlined in Section 9.7.

10.5 Evacuation

- Evacuation routes and assembly areas (and alternative routes and assembly areas) are specified on the site map.
- Evacuation route(s) and assembly area(s) will be designated by the SHSS before work begins.
- Personnel will assemble at the assembly area(s) upon hearing the emergency signal for evacuation.
- The SHSS 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 SHSS will account for all personnel in the onsite assembly area.
- A designated person will account for personnel at alternate assembly area(s).
- The SHSS will write up the incident as soon as possible after it occurs and submit a report to the Corporate Director of Health and Safety.

10.6 Evacuation Signals

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

10.7 Incident Notification and Reporting

- Upon any project incident (fire, spill, injury, near miss, death, etc.), immediately notify the PM and HSM. Call emergency beeper number if HSM is unavailable.
- For CH2M HILL work-related injuries or illnesses, contact the respective Human Resources contact listed in Attachment 4. For CH2M HILL incidents the HR administrator completes an Incident Report Form (IRF). IRF must be completed within 24 hours of incident.
- For CH2M HILL subcontractor incidents, complete the Subcontractor Accident/Illness Report Form (Attachment 5) and submit to the HSM.
- Notify and submit reports to client as required in contract.

11.0 Behavior Based Loss Prevention System

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

The four basic Loss Prevention tools that will be used on CH2M HILL projects to implement the BBLPS include:

- Activity Hazard Analysis (AHA)
- Pre-Task Safety Plans (PTSP)
- Loss Prevention Observations (LPO)
- Loss and Near Loss Investigations (NLI)

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

11.1 Activity Hazard Analysis

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

Activity Hazard Analysis will be prepared before beginning each project activity posing H&S hazards to project personnel using the AHA form provided in Attachment 6. The AHA shall identify the work tasks required to perform each activity, along with potential H&S hazards and recommended control measures for each work task. In addition, a listing of the equipment to be used to perform the activity, inspection requirements and training requirements for the safe operation of the equipment listed must be identified.

An AHA shall be prepared for all field activities performed by CH2M HILL and subcontractor during the course of the project by the Site Supervisor/SHSS. The Project-Specific and General Hazards (Sections 2.1 and 2.2, respectively) of the HSP, the Hazard Analysis Table (Table 2-1), and applicable CH2Mhill Standards of Practice (SOPs) should be used as a basis for preparing CH2M HILL's AHAs.

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 work plan/scope of work, along with their project-specific HSP. Additions or changes in CH2M HILL or subcontractor field activities, equipment, tools or material to perform work or additional/different hazard encountered that require additional/different hazard control measures requires either a new AHA to be prepared or an existing AHA to be revised.

11.2 Pre-Task Safety Plans

Daily safety meetings are held with all project personnel in attendance to review the hazards posed and required H&S procedures/JSAs, that apply for each day's project activities. The PTSPs serve the same purpose as these general assembly safety meetings, but the PTSPs are held between the crew supervisor and their work crews to focus on those hazards posed to individual work crews. At the start of each day's activities, the crew supervisor completes the PTSP, provided in Attachment 6, with input from the work crew, during their daily safety meeting. The day's tasks, personnel, tools and equipment that will be used to perform these tasks are listed, along with the hazards posed and required H&S procedures, as identified in the JSA. The use of PTSPs, better promotes worker participation in the hazard recognition and control process, while reinforcing the task-specific hazard and required H&S procedures with the crew each day. The use of PTSPs is a common safety practice in the construction industry.

11.3 Loss Prevention Observations

Loss Prevention Observations (LPOs) shall be conducted by Site Supervisor/SHSS for specific work tasks or operations comparing the actual work process against established safe work procedures identified in the project-specific HSP and AHAs. LPOs are a tool to be used by supervisors to provide positive reinforcement for work practices performed correctly, while also identifying and eliminating deviations from safe work procedures that could result in a loss. Site Supervisor/SHSS shall perform at least one LPO each week for a tasks/operations addressed in the project-specific HSP or AHA. The Site Supervisor/SHSS shall complete the LPO form in **Attachment 6** for the task/operation being observed.

11.4 Loss/Near Loss Investigations

Loss/Near Loss Investigations shall be performed for the all CH2M HILL and subcontractor incidents involving:

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

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

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

Site Supervisors/SHSS shall perform an incident investigation, as soon as practical after incident occurrence during the day of the incident, for all Loss and Near Loss Incidents that occur on the project. Loss and Near Loss incident investigations shall be performed using the following incident investigation forms provided in Attachment 6:

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

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

12.0 Approval

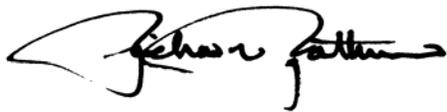
This site-specific Health and Safety Plan has been written for use by CH2M HILL only. CH2M HILL claims no responsibility for its use by others unless that use has been specified and defined in project or contract documents. The plan is written for the specific site conditions, purposes, dates, and personnel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

Written By: Rich Rathnow

Date: 10-27-2005

Approved By: Rich Rathnow

Date: 10-28-2005



Revisions Made By: Terry McElveen

Date: 5/19/06

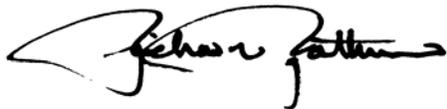
Sandy Wise

Date: 1/11/08

Revisions to Plan: Added self-perform LO/TO requirements (1/11/08)

Revisions Approved By: Rich Rathnow

Date: 1/11/08



CH2MHILL**CHEMICAL-SPECIFIC TRAINING FORM-ATTACHMENT 3**

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.

Emergency Contacts

24-hour CH2M HILL Emergency Beeper – 720-286-4911

If injured on the job, notify your supervisor and then call 1-800-756-1130 to contact CH2M HILL'S Occupational Nurse

Medical Emergency – 911

Facility Medical Response #: 911
Local Ambulance #: 911

CH2M HILL- Medical Consultant

Dr. Jerry H. Berke, M.D., M.P.H.
Health Resources
600 West Cummings Park, Suite 3400
Woburn, MA 01801-6350
781/938-4653
800/350-4511
(After hours calls will be returned within 20 minutes)

Fire/Spill Emergency -- 911

Facility Fire Response #: 911
Local Fire Dept #: 911

Local Occupational Physician

Security & Police – 911

Facility Security #: 911
Local Police #: 911

Navy RAC Program Manager

Name: Sid Allison/ATL
Phone: 770/604/9182

Utilities Emergency

Water:
Gas:
Electric: 911

Navy RAC Health and Safety Manager (HSM)

Name: Rich Rathnow/ORO
Phone: 865/483-9005 (Office); 865/607-6734 (Cell)
865/531-2933 (Home)

Site Health and Safety Specialist (SHSS)

Name: Craig Haas
Phone: (863) 286-8320

CH2M HILL Human Resources Department

Name: Nancy Orr/COR
Phone: 303/771-0952

Project Manager

Name: Sam Naik
Phone: (770) 604-9182 ext: 54248

Corporate Human Resources Department

Name: John Monark/COR
Phone: 303/771-0900

Federal Express Dangerous Goods Shipping

Phone: 800/238-5355

Emergency Number for Shipping Dangerous Goods

Phone: 800/255-3924

CH2M HILL Worker's Compensation and Auto Claims

Sterling Administration Services
Phone: 800/420-8926 After hours: 800/497-4566

Report fatalities AND report vehicular accidents involving pedestrians, motorcycles, or more than two cars.

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

Facility Alarms:

Evacuation Assembly Area(s):

Facility/Site Evacuation Route(s):

Hospital Name/Address:

Baptist Medical Center

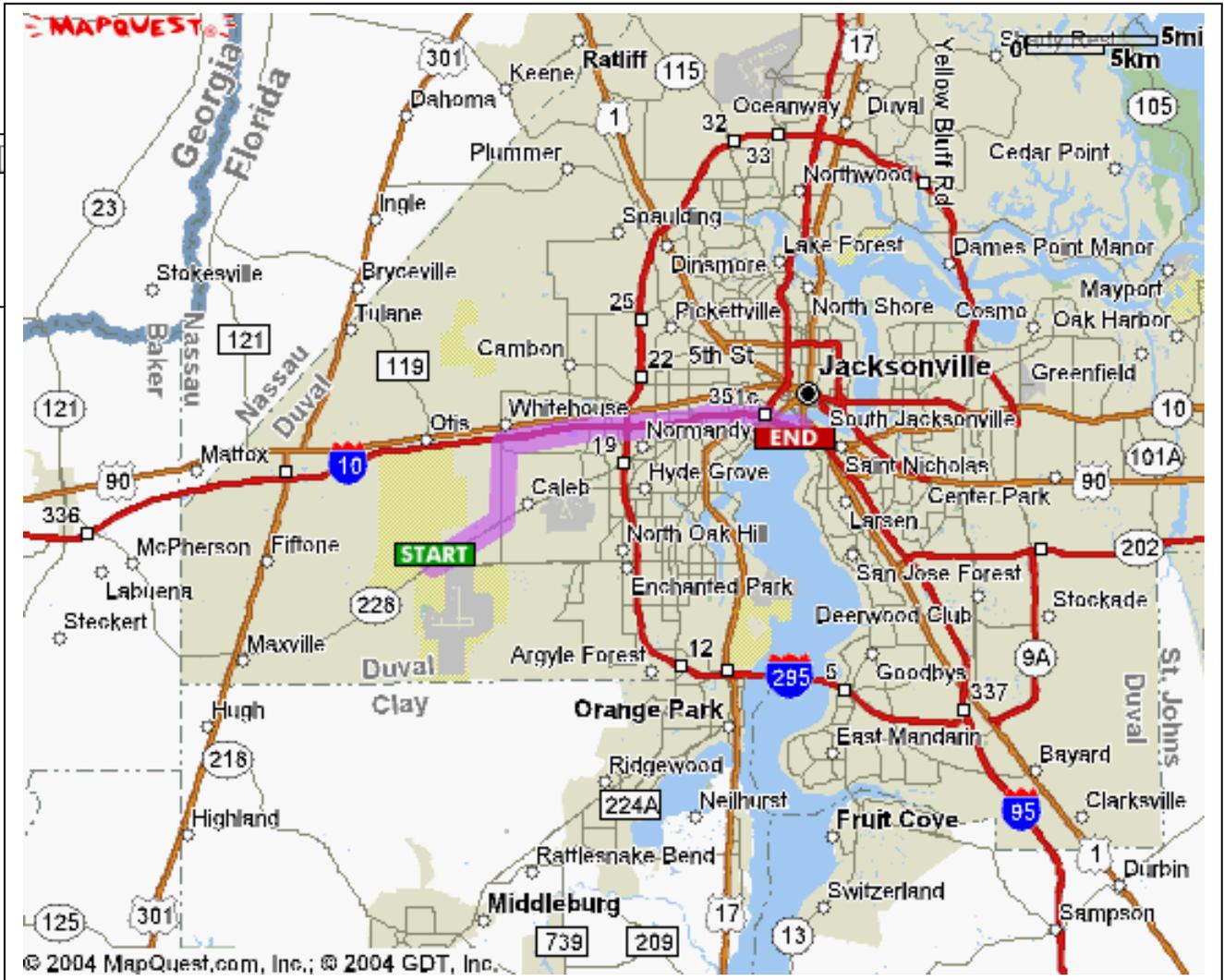
Hospital Phone #: Hospital Phone #:

904-202-2000

Directions to Hospital

See map

- 1: Start out going Northeast on NORMANDY BLVD/FL-228 E toward FL-134 W/103RD ST. 2.9 mi.
- 2: Turn LEFT onto CHAFFEE RD S/CR-115C. 2.7 miles
- 3: Merge onto I-10 E. 10.0 miles
- 4: Merge onto I-95 S toward JAX BEACHES/DAYTONA BEACH. 0.9 miles
- 5: Take the PALM AVE exit- exit number 350B- toward SAN MARCO BLVD. 0.4 miles
- 6: Turn LEFT onto PALM AVE. 0.1 miles
- 7: Turn LEFT onto PRUDENTIAL DR. 0.1 miles
- 8: End at 800 Prudential Dr Jacksonville FL



CH2M HILL HEALTH AND SAFETY PLAN

Attachment 5

Project Activity Self-Assessment Checklists/Permits

- **Concrete and Masonry**
- **Earthmoving Equipment**
- **Excavations**
- **Hand and Power Tools**
- **Lockout/Tagout**

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 concrete and masonry hazards and/or 2) CH2M HILL provides oversight of subcontractor personnel who are exposed to concrete and masonry hazards.

SSC or DSC may consult with subcontractors when completing this checklist, but shall not direct the means and methods of concrete and masonry 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 concrete and masonry hazards.
 Evaluate a CH2M HILL subcontractor’s compliance with concrete and masonry requirements.
 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-43.

<u>SECTION 1</u>		<u>Yes</u>	<u>No</u>	<u>N/A</u>	<u>N/O</u>
SAFE WORK PRACTICES (3.1)					
1.	Personnel in areas where concrete is being poured are wearing PPE as required.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.	Protruding rebar is adequately guarded to control impalement hazards.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.	Personnel do not ride concrete buckets or position themselves in lifting areas.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.	Personnel maintain safe distance from formwork, shoring, precast, and lift-slab operations.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5.	Personnel do not enter limited access zones during masonry wall construction.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6.	Personnel are not permitted under loads being lifted or walls being jacked.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7.	Personnel access is limited in areas where post-tension operations are performed.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8.	Scaffolding conforms to the requirements of SOP HS-73 prior to use.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9.	Excavations conform to the requirements of SOP HS-32 prior to entry.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10.	Lifting and rigging devices conform to the requirements of SOP HS-44.	<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>
GENERAL (3.2.1)					
11.	All concrete structures where loads are to be placed have been inspected, as required.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12.	All protruding rebar, onto which employees could fall, are guarded.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13.	No employee is permitted to be behind the jack during tensioning operations except those employees essential to the post-tensioning operations.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14.	Signs and barriers are erected to limit employee access to the post-tensioning area during tensioning operations.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
TOOLS, MATERIALS, AND EQUIPMENT (3.2.2)					
15.	Requirements for confined space entry and lockout/tagout are met, where required.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
16.	Concrete mixers have clearing devices and guardrails installed, as required.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
17.	Powered/rotating concrete troweling machines have appropriate shutoff devices installed.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
18.	Concrete buggy handles do not extend beyond the wheels on either side of the buggy.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
19.	Concrete pumping systems using discharge pipes are provided with supports, as required.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
20.	Concrete buckets w/hydraulic or pneumatic gates have positive safety devices, as required.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
21.	Employees are not permitted to work under concrete buckets during lifting and lowering.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
22.	Elevated concrete buckets are routed so that no employees are exposed to overhead loads.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
23.	Employees are not permitted to ride concrete buckets.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
24.	Sections of tremies and similar concrete conveyances are secured with wire rope.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
25.	Bull float handles used where they might contact conductors are nonconductive or insulated.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
26.	Masonry saws are guarded with a semicircular enclosure over the blade.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
27.	Employees are not permitted to apply a cement, sand, and water mixture through a pneumatic hose unless the employee is wearing protective head and face equipment.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
FORMWORK AND SHORING (3.2.3)					
28.	Formwork is capable of supporting loads that may be reasonably anticipated to be applied.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
29.	Drawings and plans required to be at the jobsite are available.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
30.	All shoring equipment is inspected prior to erection.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
31.	Damaged shoring equipment is not used.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
32.	Erected shoring is inspected prior to, during, and immediately after concrete placement.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
33.	The sills for shoring are sound, rigid, and capable of carrying the maximum intended load.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
34.	All base plates, shore heads, extension devices, and adjustment screws are installed correctly.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
35.	Eccentric loads on shore heads and similar are prohibited unless designed for such loading.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
36.	Whenever single-post shores are tiered, shoring is designed and inspected, as required.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
37.	Tiered single-post shores are vertically aligned and adequately braced, as required.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
38.	Adjustment of single-post shores to raise formwork is not made after placement of concrete.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
39.	Re-shoring is erected when concrete is required to support loads in excess of its capacity.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
40.	Forms/shores are only removed when concrete has gained sufficient strength as needed.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
41.	Re-shoring is not removed until the concrete being supported has attained adequate strength to support its weight and all loads placed upon it.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
42.	Precast concrete wall units, structural framing and tilt-up wall panels are adequately supported to prevent overturning and to prevent collapse until permanent connections are completed.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
43.	All masonry walls over 8 feet in height are adequately braced.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
LIFTING AND JACKING (3.2.4)					
44.	Embedded lifting inserts attached to precast concrete members have required strength.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
45.	Lifting hardware is capable of supporting at least five times the maximum intended load.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
46.	Employees are not permitted under precast concrete members being lifted or tilted.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
47.	Lift-slab operations are designed and planned by a registered professional engineer.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

<u>SECTION 2 (Continued)</u>		<u>Yes</u>	<u>No</u>	<u>N/A</u>	<u>N/O</u>
LIFTING AND JACKING (3.2.4) (continued)					
48.	Jacks/lifting units are marked to indicate the manufacturer’s rated capacity.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
49.	Jacks/lifting units are not loaded beyond the manufacturer’s rated capacity.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
50.	Jacking equipment is capable of supporting at least two and one-half times the load.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
51.	Jacks/lifting units are designed not to lift or continue to lift beyond their rated capacity.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
52.	Jacks/lifting units have a safety device, which will provide load support upon malfunction.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
53.	Jacking operations are synchronized to maintain slab within 1/2 inch of level position.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
54.	If using automatic leveling, a device is installed that will stop the operation as required.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
55.	A competent person is attending a centrally located manual leveling control.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
56.	The maximum number of manually controlled jacks/lifting units on one slab is limited as required.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
57.	No non-essential employees are permitted in buildings/structures while jacking is occurring.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
58.	No non-essential employees are permitted beneath a slab while it is being lifted.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
59.	When making temporary connections to support slabs, wedges are appropriately secured.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
60.	All welding on temporary and permanent connections is performed by a certified welder.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
61.	Load transfers from jacks/lifting units to building columns are not done until welds on the column shear plates (weld blocks) are cooled to air temperature.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
62.	Jacks/lifting units are positively secured to columns as to not become dislodged or dislocated.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
63.	Equipment is designed/installed so that the lifting rods cannot slip out of position.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
64.	Jacks/vertical supports are positioned so as loads do not exceed rated capacity of jacks.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
65.	The jacks/ lifting devices are designed to support slip forms in the event of failure.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
66.	The form structure is maintained within all design tolerances specified for plumbness during the jacking operation.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
67.	The predetermined safe rate of lift is not exceeded.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
LIMITED ACCESS ZONES (3.2.5)					
68.	A limited access zone is established whenever a masonry wall is being constructed.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
69.	The limited access zone is established prior to the start of construction of the wall.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
70.	The limited access zone is equal to the height of the wall to be reconstructed plus 4 feet and runs the entire length of the wall.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
71.	The limited access zone is established on the side of the wall, which will be unscaffolded.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
72.	The limited access zone restricts entry to employees not engaged in constructing the wall.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
73.	The limited access zone remains in place until the wall is adequately braced, as 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 hazards associated with earthmoving equipment operations (complete Sections 1 and 3), and/or 2) CH2M HILL oversight of a earthmoving equipment subcontractor is required (complete entire checklist).

SSC/DSC may consult with earthmoving equipment subcontractors 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.

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

Project Name: _____ Project No.: _____
 Location: _____ PM: _____
 Auditor: _____ Title: _____ Date: _____

This specific checklist has been completed to:

Evaluate CH2M HILL employee exposures to earthmoving equipment hazards
 Evaluate a CH2M HILL subcontractor’s compliance with earthmoving equipment H&S requirements
 Subcontractors Name: _____

- Check “Yes” if an assessment item is complete/correct.
 - Check “No” if an item is incomplete/deficient. Deficiencies shall be brought to the immediate attention of the 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 HS-27.

<u>SECTION 1</u>	<u>Yes</u>	<u>No</u>	<u>N/A</u>	<u>N/O</u>
PERSONNEL SAFE WORK PRACTICES (3.1)				
1. Only authorized personnel operating earthmoving equipment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Personnel maintaining safe distance from operating equipment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Personnel and equipment operator in close communication when personnel must be in proximity of 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 wearing high-visibility and/or reflective vests when close to operating equipment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Personnel riding only in seats of equipment cab and using seat belts	<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 instructed 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"/>

<u>SECTION 2</u>	<u>Yes</u>	<u>No</u>	<u>N/A</u>	<u>N/O</u>
GENERAL (3.2.1)				
11. Daily safety briefing/meeting conducted with crew	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12. Daily inspection of equipment and equipment accessories conducted before use	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13. At least one fire extinguisher available at the equipment operating area	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
EARTHMOVING EQUIPMENT COMPONENTS (3.2.2)				
14. Backup alarm or spotter used when backing equipment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15. Operational horn provided on bi-directional equipment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
16. Seat belts are provided and used	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
17. Rollover protective structures (ROPS) provided	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
18. Braking system capable of stopping full payload	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
19. Headlights and taillights operable when additional light required	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
20. Brake lights in operable condition	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
21. Cab glass provides no visible distortion to the operator	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
22. Hauling equipment (dump trucks) provided with cab shield or canopy	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
23. 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"/>
24. Dump truck operating levers provided with latch to prevent accidental dumping	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
EARTHMOVING EQUIPMENT PLACEMENT (3.2.3)				
25. Location of underground utilities identified	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
26. Safe clearance distance maintained while working under overhead powerlines	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
27. Safe distance is maintained while traveling under powerlines	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
28. Unattended equipment visibly marked at night	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
29. Parking brake set when equipment parked and equipment chocked when parked on incline	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
EARTHMOVING EQUIPMENT OPERATION (3.2.4)				
30. Equipment operated on safe roadways and grades	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
31. Equipment operated at safe speed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
32. Equipment not operated during inclement weather, lightning storms	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
33. Using equipment to lift loads, other than earth, done according to equipment manufacturer specifications	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
34. Lifting and hauling capacities are not exceeded	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
35. Equipment components lowered when not in use	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
36. All machine guards are in place	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
37. Air monitoring conducted per HSP/FSI for hazardous atmospheres	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
EARTHMOVING EQUIPMENT MAINTENANCE (3.2.5)				
38. Defective components repaired immediately	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
39. Suspended equipment or equipment parts are supported prior to work under or between	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
40. Lockout/tagout procedures used prior to maintenance	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
41. Tires on split rims removed using safety tire rack or cage	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
42. Good housekeeping maintained on and around equipment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
EXCAVATING AT HAZARDOUS WASTE SITES (3.2.6)				
43. Waste disposed of according to HSP	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
44. Appropriate decontamination procedures being followed, per HSP	<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 enter excavations (complete Sections 1 and 3), and/or 2) CH2M HILL oversight of an excavation subcontractor is required (complete entire checklist).

SC 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 carefully rely on their expertise. Items considered to be imminently dangerous (possibility of serious injury or death) shall be corrected immediately or all exposed personnel shall be removed from the hazard until corrected.

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

Project Name: _____ Project No.: _____
 Location: _____ PM: _____
 Auditor: _____ Title: _____ Date: _____

This specific checklist has been completed to:

Evaluate CH2M HILL employee exposures to 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.
- Numbers in parentheses indicate where a description of this assessment item can be found in Standard of Practice HS-32.

<u>SECTION 1</u>	<u>Yes</u>	<u>No</u>	<u>N/A</u>	<u>N/O</u>
PERSONNEL SAFE WORK PRACTICES (4.1)				
1. Competent person has completed daily inspection and has authorized entry	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Personnel 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"/>
4. Surface objects/structures secured from falling into excavation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. 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"/>
6. 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"/>
7. Personnel wearing appropriate PPE, per HSP/FSI	<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>
GENERAL (4.2.1)				
8. Daily safety briefing/meeting conducted with personnel	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. Excavation and protective systems adequately inspected by competent person	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. Defective protective systems or other unsafe conditions corrected before entry	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11. Guardrails provided on walkways over excavation 6' or deeper	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12. Barriers provided at excavations 6' or deeper when not readily visible	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13. Barriers or covers provided for wells, pits, shafts, or similar excavation 6' or deeper	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14. Excavating equipment operated safely (use earthmoving equipment checklist in HS-27)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
PRIOR TO EXCAVATING (4.2.2)				
15. Location of underground utilities and installations identified	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
16. Soils characterized prior to excavation where contamination may be present	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
17. Excavation area checked for wetlands, endangered species, cultural/historic resources	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
18. Stockpile construction and management plan	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
19. ECC consulted and plan established for wastewater disposal from excavation dewatering	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
20. SWPPP prepared for construction site 1-5 acres (depending on project location)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
EXCAVATING ACTIVITIES (4.2.3)				
21. Rocks, trees, and other unstable surface objects removed or supported	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
22. Exposed underground utility lines supported	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
23. Undermined surface structures supported or determined to be in safe condition	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
24. Warning system used to remind equipment operators of excavation edge	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
25. Stockpile, excavation covers, liners, silt fences in place, where required	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
26. Fugitive dust suppressed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
EXCAVATION ENTRY (4.2.4)				
27. Trenches > 4' deep provided with safe means of egress within 25'	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
28. Structure ramps designed and approved by competent person	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
29. Potential hazardous atmospheres tested prior to entry	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
30. Rescue equipment provided where potential for hazardous atmospheres exists	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
31. Ventilation used to control hazardous atmospheres and air tested frequently	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
32. Appropriate respiratory protection used when ventilation does not control hazards	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
33. Precautions taken to prevent cave-in from water accumulation in the excavation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
34. Precautions taken to prevent surface water from entering excavation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
35. Protection provided from falling/rolling material from excavation face	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
36. Spoil piles, equipment, materials restrained or kept at least 2' from excavation edge	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
EXCAVATION PROTECTIVE SYSTEMS (4.2.5)				
37. Protective systems used for excavations 5' or deeper	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
38. Protective systems for excavation deeper than 20' designed by registered PE	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
39. If soil unclassified, maximum allowable slope is 34 degrees	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
40. Protective systems free from damage	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
41. Protective system used according to manufacturer recommendations and not subjected to loads exceeding design limits	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
42. Protective system components securely connected to prevent movement or failure	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
43. Cave-in protection provided while entering/exiting shielding systems	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
44. Personnel removed from shielding systems when installed, removed, or vertical movement	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
PROTECTIVE SYSTEM REMOVAL (4.2.6)				
45. Protective system removal starts and progresses from excavation bottom	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
46. Protective systems removed slowly and cautiously	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
47. Temporary structure supports used if failure of remaining components observed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
48. Backfilling taking place immediately after protective system removal	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

EXCAVATING AT HAZARDOUS WASTE SITES (4.2.7)

49. Waste disposed of according to HSP and RCRA regulations

50. Appropriate decontamination procedures being followed, per HSP

BACKFILL (4.2.8)

51. Backfill certified clean when required by client or local regulation

FORMS/PERMITS (4.3)

52. Waste discharge/NPDES permit obtained for excavation de-watering, where required

53. Dig permit obtained, where required by client/facility

54. USDA soil permit obtained (for south/southeast and coastal states)

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

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

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

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

Project Name: _____ Project No.: _____

Location: _____ PM: _____

Auditor: _____ Title: _____ Date: _____

This specific checklist has been completed to:

Evaluate CH2M HILL employee exposure to hand and power tool hazards.

Evaluate a CH2M HILL subcontractor’s compliance with hand and power tool requirements.

Subcontractors Name: _____

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

SECTION 1

Yes No N/A N/O

SAFE WORK PRACTICES (3.1)

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 (3.2.1)

- 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 (3.2.2)

- 22. Electric tools are approved double insulated or grounded and used according to SOP HS-23.
- 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 (3.2.3)

- 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 (3.2.4)

- 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.
- Safety devices are installed on automatic fastener feed tools as required. 37.
- 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 (3.2.5)**

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

POWDER-ACTUATED TOOLS (3.2.6)

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

JACKING TOOLS (3.2.7)

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

HAND TOOLS (3.2.8)

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

EQUIPMENT-SPECIFIC LOCKOUT/TAGOUT PROCEDURE DEVELOPMENT FORM

Project name: _____ Project No.: _____

Equipment identity (name, number, etc.): _____

Equipment location: _____

Authorized employee that developed this procedure: _____ Date: _____

Purpose

This procedure shall be used by CH2M HILL to establish the minimum requirements for the lockout/tagout of energy isolating devices whenever servicing and maintenance activities are performed on the above equipment. It shall be used to ensure that the equipment is stopped, isolated from all potentially hazardous energy sources and locked out and tagged before employees perform any servicing and maintenance where the unexpected energization, start-up of the equipment, or release of stored energy could cause injury.

Compliance With This Procedure

All employees are required to comply with the restrictions and limitations imposed upon them during the use of lockout/tagout. The authorized employees are required to perform the lockout/tagout in accordance with this procedure. All employees, upon observing equipment that is locked/tagged out shall not attempt to start, energize, or use the equipment.

Authorized Employee

Specific servicing and maintenance activity to be performed

_____	_____
_____	_____
_____	_____

Sequence of Initiating Lockout/Tagout Control

- 1) Notify all affected employees that servicing and maintenance is required and that the equipment must be shut down and this lockout/tagout procedure implemented.

Affected Employee(s) Notified

_____	_____	_____
_____	_____	_____

- 2) Authorized employee(s) shall identify the type and magnitude of the energy that the equipment uses, and shall understand the hazards and the methods to control the energy.

Energy Sources

Magnitude

Hazards

Control methods

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

- 3) If the equipment is operating, shut it down by the normal stopping procedures listed below.

Equipment shutdown steps:

- 4) Locate and operate energy isolating device(s) to isolate the equipment from the energy source(s).

Energy Isolating Device

Location

Isolated

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

EQUIPMENT-SPECIFIC LOCKOUT/TAGOUT PROCEDURE DEVELOPMENT FORM

- 5) Authorized employee(s) shall apply their personal lockout device and tag to each energy isolating device. Lockout devices and tags shall meet the requirements provided in Section 5.5.4 of the Lockout/Tagout SOP 310. When servicing and maintenance activities are to be performed by more than one authorized employee, a primary authorized employee shall be identified and a group lockout/tagout process shall be used that meets the requirements provided in Section 5.5.6 of the Lockout/Tagout SOP 310.

Primary Authorized Employee: _____ **Phone No.:** _____

- 6) Stored or residual energy shall be dissipated or restrained

Type(s) of stored energy

Methods to dissipate or restrain

- 7) Authorized employee(s) shall verify that isolation of the equipment has been completed by trying to operate the equipment using normal operating control(s) or by testing to verify that the equipment will not operate. Control(s) shall be returned to the neutral or "off" position after isolations are verified.

Method(s) used to verify equipment isolation:

Sequence of Releasing Lockout/Tagout Control

- 1) Verify that all personnel in the work area are in a safe position.
- 2) Ensure all nonessential items have been removed and equipment components are operationally intact, including the proper reattachment of all equipment safe guards.
- 3) Verify that the controls are in neutral or "off" position.
- 4) Each lockout device and tag shall be removed from each energy isolating device by the authorized employee who applied the devices. If an authorized employee is unavailable to remove their device, the requirements provided in Section 5.5.5 of the Lockout/Tagout SOP 310, shall be followed.
- 5) All affected employees shall be notified that the lockout devices and tags have been removed before starting the equipment.

Special Conditions

Shift or personnel changes made during servicing and maintenance activities shall be coordinated to ensure lockout/tagout protection is always provided, including the orderly transfer of lockout devices and tags between off-going and oncoming authorized employees.

Method(s) of lockout/tagout control transfer:

When lockout devices and tags must be temporarily removed from the energy isolating device and the equipment energized to test or reposition the equipment, the following sequence shall be followed:

- 1) Clear equipment of tools and materials and remove all employees from the equipment area.
- 2) Remove only the lockout devices and tags needed to energize the equipment for testing or repositioning.
- 3) Energize and proceed with testing or repositioning.
- 4) Deenergize the equipment and reapply the lockout devices and tags to continue the servicing and maintenance activities.

Other Requirements:

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 the following locations: 1) Where CH2M HILL employees are exposed to equipment requiring lockout/tagout or 2) Where CH2M HILL provides oversight of subcontractor personnel who are exposed to equipment requiring lockout/tagout.

The SSC or DSC 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.

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 equipment requiring lockout/tagout

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 HS-33.

SECTION 1

SAFE WORK PRACTICES (3.1)

Yes No N/A N/O

- | | | | | |
|---|--------------------------|--------------------------|--------------------------|--------------------------|
| 1. Only authorized personnel are performing lockout/tagout | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2. Only qualified personnel working on energized equipment via energized electrical work permit | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3. Contractor lockout/tagout programs have been verified prior to start of work | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 4. All affected employees notified of lockout/tagout | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 5. Equipment has been shutdown using normal operating controls | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 6. All energy sources have been isolated | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 7. Individual locks and tags have been applied to energy isolating device | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

H&S Self-Assessment Checklist-Lockout/Tagout

- 8. Stored or residual energy has been relieve or restrained
- 9. Locked/tagged equipment has been tested to verify zero energy state
- 10. All safe guards have been replaced when lockout/tagout is complete
- 11. Controls are positioned in the safe mode prior to lockout/tagout removal
- 12. Only individuals who apply locks/tags may remove them
- 13. Lockout is selected over tagout as preferred method of hazardous energy control
- 14. Master or duplicate keys are prohibited and lock removal is controlled by written procedure
- 15. Multiple work group lockout/tagout activities are coordinated on large projects

SECTION 2

Yes No N/A N/O

GENERAL (3.2.1)

- 16. An energy control program is in place with appropriate procedures
- 17. Lockout or tagout is performed by trained, authorized employees only
- 18. Authorized employees are familiar with facility procedures specific to individual energy types
- 19. Employee do not attempt to start, energize or use equipment that is locked or tagged out
- 20. Affected employees are notified before and after lockout/tagout controls are applied
- 21. Locking is the preferred method of energy control
- 22. Tags are used only where locks cannot be applied
- 23. Additional safety measures are implemented in conjunction with the tagout system

LOCKOUT/TAGOUT DEVICES (3.2.2)

- 24. New or modified equipment is designed to accept a lockout device
- 25. Locks, tags, and other equipment are supplied to employees
- 26. L/T devices are singularly identified and not used for other purposes
- 27. L/T devices are capable of withstanding anticipated environmental conditions of use
- 28. L/T devices are standardized on the project by color, shape, size, print, and format
- 29. Lockout devices are substantial to prevent removal without the use of excessive force
- 30. Tagout devices and their means of attachment, are substantial to prevent inadvertent removal
- 31. L/T devices indicate the identity of the employee applying the device(s)
- 32. Tagout devices warn against hazardous conditions if equipment is energized
- 33. Tags are only removed by authorized user and never bypassed, ignored, or defeated
- 34. Tagout devices are attached at the same location as lockout devices
- 35. Tags shall be legible and understandable by all employees

INITIATING CONTROL (3.2.3)

- 36. Orderly shutdown of equipment is conducted that does not increase hazards
- 37. All devices needed to isolate equipment from energy sources are installed and/or operated
- 38. Lockout/Tagout devices are affixed to equipment by authorized employees
- 39. Lockout/Tagout devices are affixed to secure equipment in the “off” position
- 40. Tags are located as close to or at the energy isolating device
- 41. All hazardous stored or residual energy is relieved, disconnected or restrained.
- 42. Isolation of energy sources has been verified (tested) prior to start of work on equipment

RELEASING CONTROL (3.2.4)

- 43. Work area is inspected prior to removing lockout/tagout devices and re-energization
- 44. Only authorized employees who installed lockout/tagout devices are removing devices
- 45. Written procedure is followed for the removal of lockout/tagout devices when authorized employees are not available
- 46. All affected employees are notified prior to starting equipment previously locked or tagged out

CH2M HILL HEALTH AND SAFETY PLAN

Attachment 6

Behavior Based Loss Prevention System Forms

Activity Hazard Analysis

Pre-Task Safety Plans

Loss Prevention Observation

Incident Report and Investigation

PRINT

SIGNATURE

Supervisor Name:

Date/Time: _____

Safety Officer Name:

Date/Time: _____

Employee Name(s):

Date/Time: _____

CH2MHILL**PRE-TASK SAFETY PLAN**

Project: _____ Location: _____ Date: _____

Supervisor: _____ Emergency Number(s): _____

Brief Job Descriptions:

1. _____ 2. _____
 _____ 3. _____

 4. _____
 5. _____

List Specific Tasks for the Jobs (Match number from above).

1. _____ 2. _____
 _____ 3. _____
 _____ 4. _____
 _____ 5. _____

Tools/Equipment required for Tasks, (ladders, scaffolds, fall protection, cranes/rigging, heavy equipment, power tools)match number from above:

1. _____ 2. _____
 _____ 3. _____
 _____ 4. _____

 5. _____

Potential H&S Hazards, including chemical, physical, safety, biological and environmental **(Check all that apply and review exposures as they will be encountered in the tasks above):**

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

Other Potential Hazards (Describe):

CH2MHILL

PRE-TASK SAFETY PLAN

Hazard Control Measures (Check all that apply):

PPE <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	Protective Systems <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	Fire Protection <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	Electrical <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
Fall Protection <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	Air Monitoring <input type="checkbox"/> PID/FID <input type="checkbox"/> Detector tubes <input type="checkbox"/> Radiation <input type="checkbox"/> Personnel sampling <input type="checkbox"/> LEL/O2 <input type="checkbox"/> Other	Proper Equipment <input type="checkbox"/> Aerial lift/ladders/scaffolds <input type="checkbox"/> Forklift/ Heavy equipment <input type="checkbox"/> Backup alarms <input type="checkbox"/> Hand/power tools <input type="checkbox"/> Crane w/current inspection <input type="checkbox"/> Proper rigging <input type="checkbox"/> Operator qualified	Welding & Cutting <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
Confined Space Entry <input type="checkbox"/> Isolation <input type="checkbox"/> Air monitoring <input type="checkbox"/> Trained personnel <input type="checkbox"/> Permit completed <input type="checkbox"/> Rescue	Medical/ER <input type="checkbox"/> First-aid kit <input type="checkbox"/> Eye wash <input type="checkbox"/> FA-CPR trained personnel <input type="checkbox"/> Route to hospital	Heat/Cold Stress <input type="checkbox"/> Work/rest regime <input type="checkbox"/> Rest area <input type="checkbox"/> Liquids available <input type="checkbox"/> Monitoring <input type="checkbox"/> Training	Vehicle/Traffic <input type="checkbox"/> Traffic control <input type="checkbox"/> Barricades <input type="checkbox"/> Flags <input type="checkbox"/> Signs
Permits <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	Demolition <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	Inspections: <input type="checkbox"/> Ladders/aerial lifts <input type="checkbox"/> Lanyards/harness <input type="checkbox"/> Scaffolds <input type="checkbox"/> Heavy equipment <input type="checkbox"/> Cranes and rigging	Training: <input type="checkbox"/> Hazwaste <input type="checkbox"/> Construction <input type="checkbox"/> Competent person <input type="checkbox"/> Task-specific (THA) <input type="checkbox"/> Hazcom
FieldNotes: _____ _____			

Supervisor signature: _____

Date: _____

Project: _____	Supervisor: _____	Date: _____
Task/Operation Observed: _____ _____ _____		Job Title of Worker Observed: _____ _____
Background Information/comments: _____ _____ _____		Task Hazard Analysis completed for task (Y/N): _____
Positive Observations/Safe Work Procedures 1. _____ 2. _____ 3. _____ 4. _____		
Questionable Activity/Unsafe Condition Observed 1. _____ 2. _____ 3. _____		
Observed Worker's Comment(s) 1. _____ 2. _____ 3. _____ 4. _____		
Supervisor's Corrective Actions Taken: 1. _____ 2. _____ 3. _____ 4. _____		

CH2MHILL

Loss Investigation Report Form

Employer Information

Company Name: _____

Project Name: _____ Project Number: _____

Project Location: _____

CHIL Project? Yes No

Task Location: _____

Job Assignment: _____ Business Group: _____

Preparer's Name: _____ Preparer's Employee Number: _____

Near Loss Incident Specific Information

Date of Incident: _____ Time of Incident: _____ a.m./p.m.

Location of incident:

Company premises

Field

In Transit

Other: _____

Address where the incident occurred: _____

Equipment Malfunction : Yes No

Activity was a Routine Task: Yes No

Describe any property damage: _____

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

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

Describe the specific incident and how it occurred:

Describe how this incident may have been prevented:

Contributing Factors (Describe in detail why incident occurred):

Date employer notified of incident: _____ To whom reported: _____

Witness Information (First Witness)

Name: _____

Employee Number (for CH2M HILL employees):

Address: _____

City: _____

Zip Code : _____

Phone: _____

Witness Information (Second Witness)

Name: _____

Employee Number (for CH2M HILL employees): _____

Address: _____

City: _____

Zip Code: _____

Phone : _____

Additional information or comments: _____

COMPLETE ROOT CAUSE ANALYSIS FORM

Root Cause Analysis Form

Root Cause Analysis (RCA)

Lack of skill or knowledge Lack of or inadequate operational procedures or work standards Inadequate communication of expectations regarding procedures or work standards Inadequate tools or equipment	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 Uncontrollable
--	---

RCA #	Solution(s): How to Prevent Loss From Occurring	RC ¹	CF ²	Corrective Action Lead	Due Date	Completion Date	Date Verified

¹ RC = Root Cause; ² CF = Contributing Factors (check which applies)

Investigation Team Members

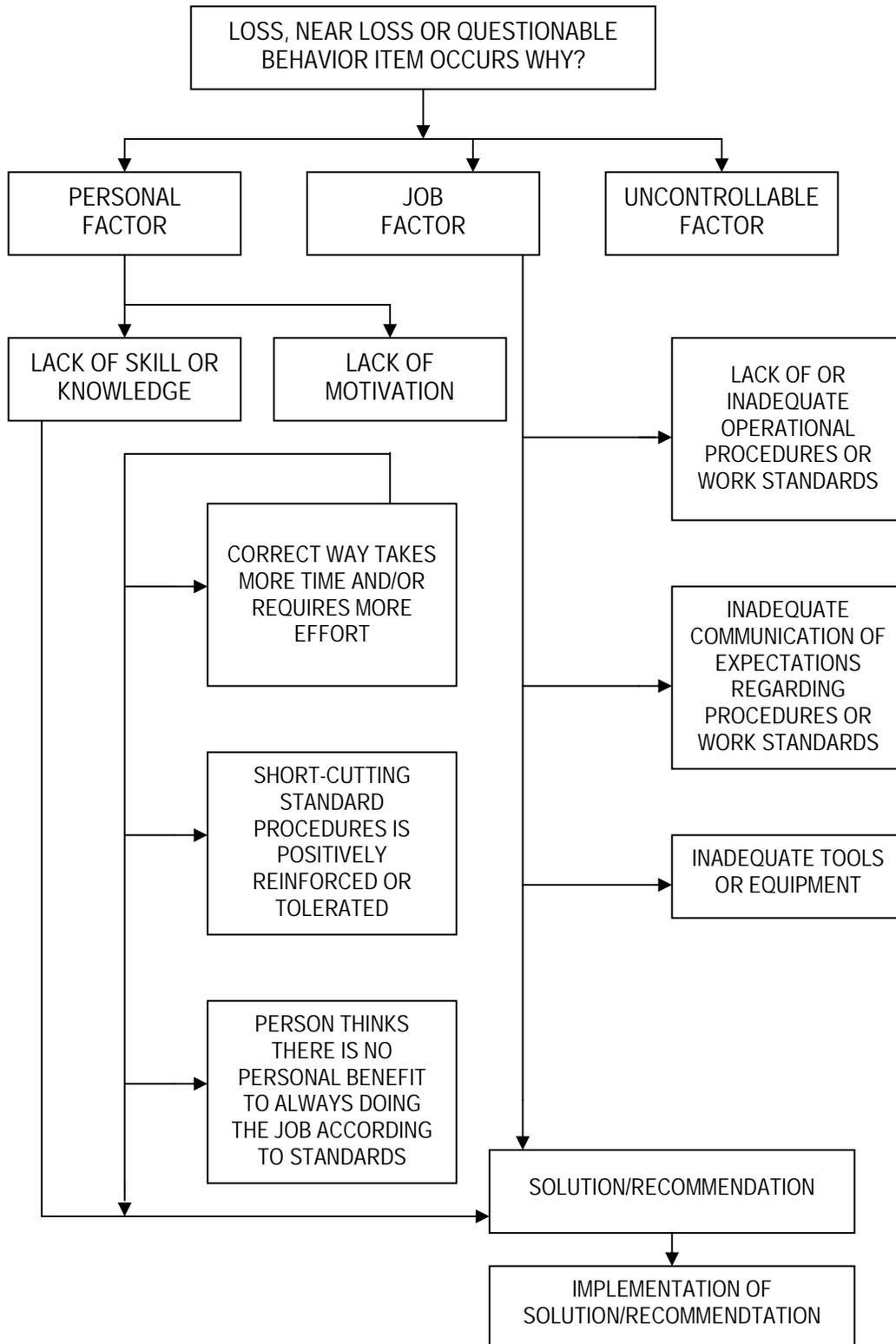
Name	Job Title	Date

Results of Solution Verification and Validation

Reviewed By

Name	Job Title	Date

Root Cause Analysis Flow Chart



Determination of Root Cause(s)

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

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

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

Personal Factors

Lack of skill or knowledge

Correct way takes more time and/or requires more effort

Short-cutting standard procedures is positively reinforced or tolerated

Person thinks that there is no personal benefit to always doing the job according to standards

Job Factors

Lack of or inadequate operational procedures or work standards.

Inadequate communication of expectations regarding procedures or standards

Inadequate tools or equipment

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

Incident Report Form

Type of Incident (Select at least one)

- | | | |
|---|--|--|
| <input type="checkbox"/> Injury/Illness | <input type="checkbox"/> Property Damage | <input type="checkbox"/> Spill/Release |
| <input type="checkbox"/> Environmental/Permit Issue | <input type="checkbox"/> Near Miss | <input type="checkbox"/> Other |

General Information (Complete for all incident types)

Preparer's Name: _____ Preparer's Employee Number: _____
Date of Report: _____ Date of Incident: _____ Time of Incident: _____ am/pm

Type of Activity (Provide activity being performed that resulted in the incident)

- | | | |
|--|--|--|
| <input type="checkbox"/> Asbestos Work | <input type="checkbox"/> Excavation Trench-Haz Waste | <input type="checkbox"/> Other (Specify) _____ |
| <input type="checkbox"/> Confined Space Entry | <input type="checkbox"/> Excavation Trench-Non Haz | |
| <input type="checkbox"/> Construction Mgmt- Haz Waste | <input type="checkbox"/> Facility Walk Through | <input type="checkbox"/> Process Safety Management |
| <input type="checkbox"/> Construction Mgmt - Non-Haz Waste | <input type="checkbox"/> General Office Work | <input type="checkbox"/> Tunneling |
| <input type="checkbox"/> Demolition | <input type="checkbox"/> Keyboard Work | <input type="checkbox"/> Welding |
| <input type="checkbox"/> Drilling-Haz Waste | <input type="checkbox"/> Laboratory | <input type="checkbox"/> Wetlands Survey |
| <input type="checkbox"/> Drilling-Non Haz Waste | <input type="checkbox"/> Lead Abatement | <input type="checkbox"/> Working from Heights |
| <input type="checkbox"/> Drum Handling | <input type="checkbox"/> Motor Vehicle Operation | <input type="checkbox"/> Working in Roadways |
| <input type="checkbox"/> Electrical Work | <input type="checkbox"/> Moving Heavy Object | <input type="checkbox"/> WWTP Operation |

Location of Incident (Select one)

- Company Premises (CH2M HILL Office: _____)
- Field (Project #: _____ Project/Site Name: _____ Client: _____)
- In Transit (Traveling from: _____ Traveling to: _____)
- At Home

Geographic Location of Incident (Select region where the incident occurred)

- | | | |
|------------------------------------|------------------------------------|---|
| <input type="checkbox"/> Northeast | <input type="checkbox"/> Southwest | <input type="checkbox"/> Asia Pacific |
| <input type="checkbox"/> Southeast | <input type="checkbox"/> Corporate | <input type="checkbox"/> Europe Middle East |
| <input type="checkbox"/> Northwest | <input type="checkbox"/> Canadian | <input type="checkbox"/> Latin America |

If a CH2M HILL subcontractor was involved in the incident, provide their company name and phone number: _____

Describe the Incident (Provide a brief description of the incident): _____

Injured Employee Data (Complete for Injury/Illness incidents only)

12.1.1.1.1.1.1 If CH2M HILL employee injured

Employee Name: _____ Employee Number: _____

12.1.1.1.1.1.2 If CH2M HILL Subcontractor employee injured

Employee Name: _____ Company: _____

Injury Type

- | | | |
|--|---|--|
| <input type="checkbox"/> Allergic Reaction | <input type="checkbox"/> Cancer | <input type="checkbox"/> Electric Shock |
| <input type="checkbox"/> Amputation | <input type="checkbox"/> Carpal Tunnel | <input type="checkbox"/> Foreign Body in eye |
| <input type="checkbox"/> Asphyxia | <input type="checkbox"/> Concussion | <input type="checkbox"/> Fracture |
| <input type="checkbox"/> Bruise/Contusion/Abrasion | <input type="checkbox"/> Cut/Laceration | <input type="checkbox"/> Freezing/Frost Bite |
| <input type="checkbox"/> Burn (Chemical) | <input type="checkbox"/> Dermatitis | <input type="checkbox"/> Headache |
| <input type="checkbox"/> Burn/Scald (Heat) | <input type="checkbox"/> Dislocation | <input type="checkbox"/> Hearing Loss |

- Heat Exhaustion
- Hernia
- Infection
- Irritation to eye
- Ligament Damage

- Multiple (Specify) _____
- Muscle Spasms
- Other (Specify) _____
- Poisoning (Systemic)

- Puncture
- Radiation Effects
- Strain/Sprain
- Tendonitis
- Wrist Pain

Part of Body Injured

- Abdomen
- Ankle(s)
- Arms (Multiple)
- Back
- Blood
- Body System
- Buttocks
- Chest/Ribs
- Ear(s)
- Elbow(s)
- Eye(s)
- Face
- Finger(s)
- Foot/Feet

- Hand(s)
- Head
- Hip(s)
- Kidney
- Knee(s)
- Leg(s)
- Liver
- Lower (arms)
- Lower (legs)
- Lung
- Mind
- Multiple (Specify) _____

- Neck
- Nervous System
- Nose
- Other (Specify) _____
- Reproductive System
- Shoulder(s)
- Throat
- Toe(s)
- Upper Arm(s)
- Upper Leg(s)
- Wrist(s)

12.1.1.1.1.1.2.1 Nature of Injury

- Absorption
- Bite/Sting/Scratch
- Cardio-Vascular/Respiratory System Failure
- Caught In or Between
- Fall (From Elevation)
- Fall (Same Level)
- Ingestion

- Inhalation
- Lifting
- Mental Stress
- Motor Vehicle Accident
- Multiple (Specify) _____
- Other (Specify) _____

- Overexertion
- Repeated Motion/Pressure
- Rubbed/Abraded
- Shock
- Struck Against
- Struck By
- Work Place Violence

Initial Diagnosis/Treatment Date: _____

Type of Treatment

- Admission to hospital/medical facility
- Application of bandages
- Cold/Heat Compression/Multiple Treatment
- Cold/Heat Compression/One Treatment
- First Degree Burn Treatment
- Heat Therapy/Multiple treatment
- Multiple (Specify) _____
- Heat Therapy/One Treatment
- Non-Prescriptive medicine
- None
- Observation
- Other (Specify) _____
- Prescription- Multiple dose

- Prescription- Single dose
- Removal of foreign bodies
- Skin Removal
- Soaking therapy- Multiple Treatment
- Soaking Therapy- One Treatment
- Stitches/Sutures
- Tetanus
- Treatment for infection
- Treatment of 2nd /3rd degree burns
- Use of Antiseptics - multiple treatment
- Use of Antiseptics - single treatment
- Whirlpool bath therapy/multiple treatment
- Whirlpool therapy/single treatment
- X-rays negative
- X-rays positive/treatment of fracture

Number of days doctor required employee to be off work: _____

Number of days doctor restricted employee's work activity: _____

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

Describe how you may have prevented this injury: _____

Physician Information

Name: _____
Address: _____
City: _____
Zip Code: _____
Phone: _____

Hospital Information

Name: _____
Address: _____
City: _____
Zip Code: _____
Phone: _____

Property Damage (Complete for Property Damage incidents only)

Property Damaged: _____ Property Owner: _____
Damage Description: _____
Estimated Amount: \$ _____

Spill or Release (Complete for Spill/Release incidents only)

Substance (attach MSDS): _____ Estimated Quantity: _____
Facility Name, Address, Phone No.: _____
Did the spill/release move off the property where work was performed?: _____
Spill/Release From: _____ Spill/Release To: _____

Environmental/Permit Issue (Complete for Environmental/Permit Issue incidents only)

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: _____

Verbal Notification (Complete for all incident types)(Provide names, dates and times)

CH2M HILL Personnel Notified: _____
Client Notified: _____

Witnesses (Complete for all incident types)

Witness Information (First Witness)

Name: _____
Employee Number (CH2M HILL): _____
Address: _____
City: _____
Zip Code: _____
Phone: _____

Witness Information (Second Witness)

Name: _____
Employee Number (CH2M HILL): _____
Address: _____
City: _____
Zip Code: _____
Phone : _____

Additional Comments:

NEAR LOSS INVESTIGATION FORM

Employer Information

Company Name: _____

Project Name: _____ Project Number: _____

Project Location: _____

CHIL Project? Yes No

Task Location: _____

Job Assignment: _____ Business Group: _____

Preparer's Name: _____ Preparer's Employee Number: _____

Near Loss Incident Specific Information

Date of Incident: _____ Time of Incident: _____ a.m./p.m.

Location of incident:

Company premises Field In Transit Other: _____

Address where the incident occurred: _____

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

Describe any property damage: _____

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

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

Describe the specific incident and how it occurred:

Describe how this incident may have been prevented:

Contributing Factors (Describe in detail why incident occurred):

Date employer notified of incident: _____ To whom reported: _____

NEAR LOSS INVESTIGATION FORM

Witness Information (First Witness)

Name: _____

Employee Number (for CH2M HILL employees): _____

Address: _____

City: _____

Zip Code : _____

Phone: _____

Witness Information (Second Witness)

Name: _____

Employee Number (for CH2M HILL employees): _____

Address: _____

City: _____

Zip Code: _____

Phone : _____

Additional information or
comments: _____

CH2M HILL HEALTH AND SAFETY PLAN

Attachment 7

**Applicable Material Safety Data Sheets
(provided onsite)**

CH2M HILL HEALTH AND SAFETY PLAN

Attachment 8

**Subcontractor H&S Plans/Procedures
(provided onsite)**