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SAMPLING AND ANALYSIS PLAN FOR DELINEATION OF POLYCHLORINATED BIPHENYL
AND LEAD CONTAMINATED SOIL AT DEFENSE REUTILIZATION AND MARKETING
OFFICE TRUMAN ANNEX NAS KEY WEST FL

7/1/2006
CH2M HILL

Sampling and Analysis Plan

Defense Reutilization and Marketing Office
Truman Annex

Naval Air Station Key West
Key West, Florida

Revision No. 00

Contract No. N62467-01-D-0331
Contract Task Order No. 0045

Submitted to:



Department of the Navy
Naval Facilities Engineering Command Southeast

Prepared by:



115 Perimeter Center Place, N.E.
Suite 700
Atlanta, GA 30346

July 2006

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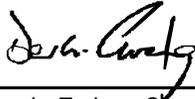
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07/31/2006

Date

Client Acceptance:

U.S. Navy Responsible Authority

Date

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Acronyms and Abbreviations

AHA	Activity Hazard Analysis
CH2M HILL	CH2M HILL Constructors, Inc.
COC	Contaminant of Concern
CTO	Contract Task Order
DPT	direct push technology
DRMO	Defense Reutilization and Marketing Office
EISOPQAM	Environmental Investigative Standard Operating Procedure and Quality Assurance Manual
EPC	exposure point concentration
FAC	Florida Administrative Code
FDEP	Florida Department of Environmental Protection
IRCDQM	Installation Restoration Chemical Data Quality Manual
Mg/kg	milligrams per kilogram
MS	matrix spike
MSD	matrix spike duplicate
NAS	Naval Air Station
NAVFAC SE	Naval Facilities Engineering Command Southeast
NTR	Navy Technical Representative
PCB	polychlorinated biphenyl
ppm	parts per million
PWC	Public Works Center
QA	quality assurance
QC	quality control
SAP	Sampling and Analysis Plan
SCTL	Soil Cleanup Target Levels
SOP	Standard operating procedure
SPLP	Synthetic Precipitation Leaching Procedure
TAT	turnaround time
TM	technical memorandum
UCL	upper confidence limit
USEPA	U.S. Environmental Protection Agency

Sampling and Analysis Plan

1.0 Introduction

CH2M HILL Constructors, Inc. (CH2M HILL) was contracted by the Department of the Navy, Naval Facilities Engineering Command Southeast (NAVFAC SE), to prepare this Sampling and Analysis Plan (SAP), under Response Action Contract No. N62467-01-D-0331, Contract Task Order (CTO) No. 0045. The purpose of this SAP is to outline the procedures to be used to perform the delineation of polychlorinated biphenyl (PCB) and lead contaminated soil at the Defense Reutilization and Marketing Office (DRMO), Truman Annex, located at the Naval Air Station (NAS) Key West in Key West, Florida.

Contaminated soil delineation (for PCBs and lead) will include the following activities:

- Mobilization and site preparation
- Sampling and analysis to establish an exposure point concentration (EPC) estimation using U.S. Environmental Protection Agency (USEPA) and Florida Department of Environmental Protection (FDEP) tools to achieve a risk-based remediation solution
- Decontamination and demobilization
- Soil delineation results reporting and determination of extent of soils requiring removal

This SAP outlines the tasks and responsibilities of CH2M HILL with respect to sampling and analysis to be performed at the site prior to the soil removal action. CH2M HILL intends this document to be a site-specific guide for use by the field team while performing the sampling and analysis. Any changes to the activities described in this SAP must be documented as a revision to this SAP and approved by the CH2M HILL Project Manager and Project Chemist. Following acceptance of the soil delineation results and the proposed extent of contaminated soil removal by the NAS Key West Partnering Team, CH2M HILL will prepare a complete Work Plan Addendum describing the approach to remove PCB/lead-contaminated soils at the site.

2.0 Site Background

The DRMO is located on Truman Annex in Key West, Florida (see Figure 1). The site addressed in this sampling effort is approximately 6.25 acres in area and was formerly used as a storage facility for new and used military equipment. Over time, contaminants were released to the site soils. An elevated water tank was formerly located at the site and removed within the past 2 years. This elevated tank was previously painted with lead-based paints. When the tank was demolished, lead from chipped paint was released to the surrounding soils. During a recent lead soil assessment and remediation project, lead soil disposal characterization identified PCBs as an additional contaminant of concern (COC) for

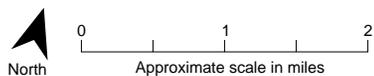
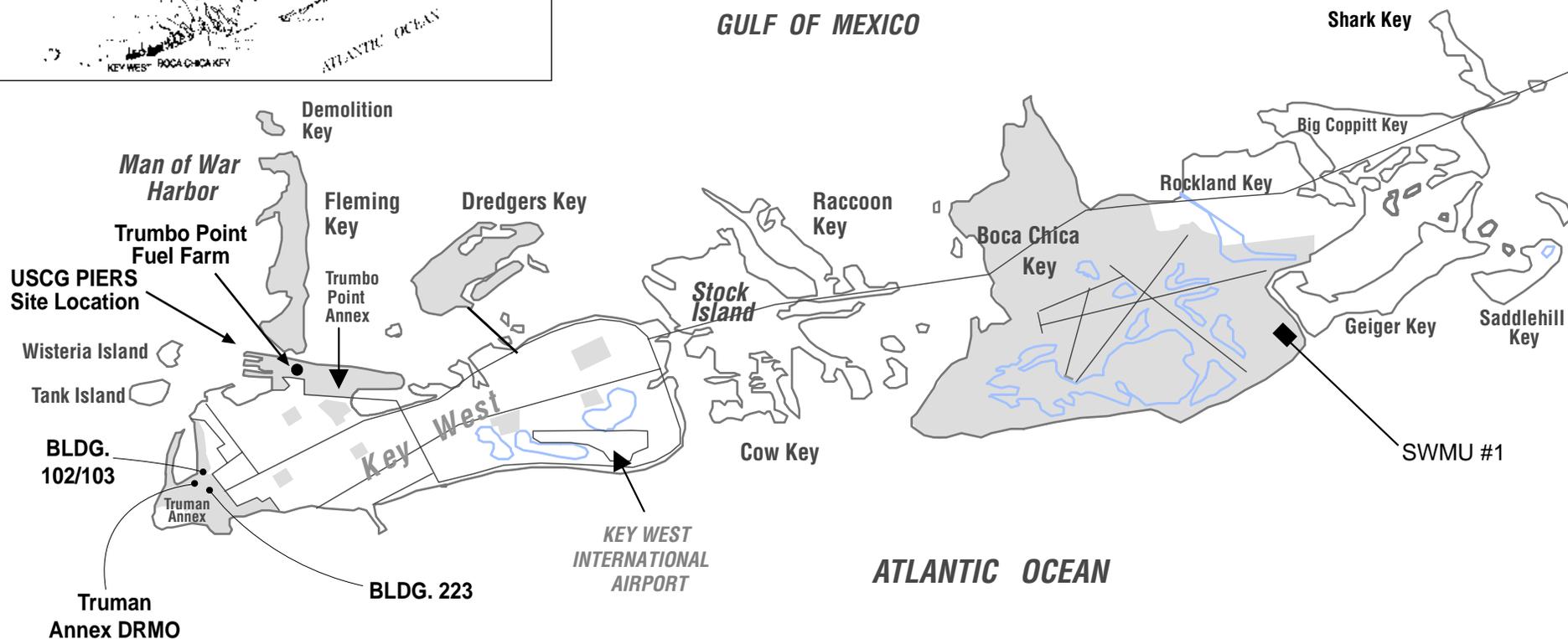
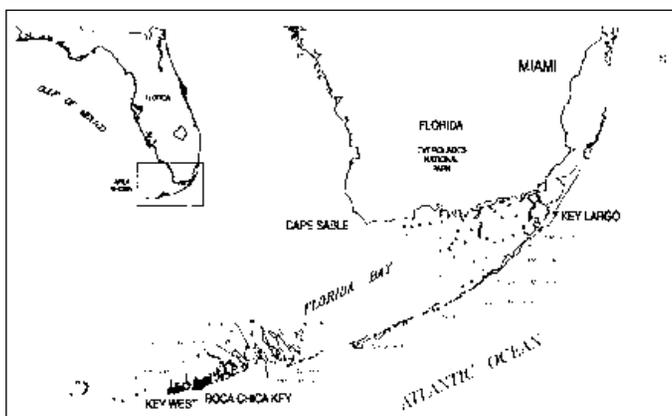


FIGURE 1
 Site Location Map
 DRMO, Truman Annex
 NAS Key West
 Key West, Florida

remediation at the site. Further delineation of the extent of PCB and lead-contaminated soils at the site is needed to define the limits of soil removal and ensure that the end use for the site can be achieved based on existing regulatory drivers.

These contaminated soils require removal because the City of Key West plans to develop the site as a *mixed use* site. The sampling effort described in this SAP focuses on defining the extent of contamination currently in site soils for the two COCs (PCBs and lead).

3.0 Site-Specific Objectives

This sampling event and subsequent removal action will accomplish the following site-specific objectives at the DRMO:

- Prevent unacceptable human-health risks associated with potential future exposures to surface soil containing PCBs and lead above health-based protective target levels. The target levels are selected from the Florida Soil Cleanup Target Levels (SCTLs), Residential Exposure, per Chapter 62-777, Florida Administrative Code (FAC), Table 2 (see Table 3 below).
- Eliminate potential ecological risks associated with potential exposure to surface soil contaminants. Because the site is located within a developed area, no quantitative target levels have been developed for the ecological end-points for PCBs and lead.
- Prevent the potential for residual soil contamination leaching to groundwater under current and potential future land use conditions. The target levels for leachability protection are also selected from Florida SCTLs per Chapter 62-777, FAC, Table 2 (see Table 3 below).
- Allow for maximum flexibility in future land use for the site, which may include its use as a Natural and Recreation Corridor.

The subsequent removal action will meet residential land use-based criteria and will also protect other lesser exposure-based receptors, such as recreational visitors to the site.

4.0 Data Quality Levels for Measurement Data

The data quality levels for each sampling task to be performed during this work are listed in Table 1. The sampling events, sampling and analytical requirements, and the required level of quality and data packages are listed in Table 2. The quantitation, project action, accuracy, precision, and completeness limits by which the data will be evaluated will be provided by the selected laboratory and approved by CH2M HILL’s Project Chemist prior to any samples being analyzed.

TABLE 1
Data Quality Levels

Sampling Activity	Data Quality Level Category
Statistical Based Sampling Approach (offsite laboratory analyses)	Definitive

**TABLE 3-2
SAMPLING AND ANALYTICAL SUMMARY**

TABLE 2
Sampling and Analysis Summary

Sample Task	Sample Point	Matrix	Sampling Frequency	Approx Sample No	Sampling Method	Sampling Equipment	TAT	Data Package Reqmnt	Required Analysis	Analytical Method	Holding Time	Sample Preservation	Containers
<i>Florida Upper Confidence Level (UCL) Sampling</i>													
Soil Sampling (up to 24')	10 locations within each 1/4 acre grid; one 0-6" sample and one 6-24" sample per location	Soil	Once	500 + 50 FD + 25 MS/MSD= 600	Grab	SS spoon, SS bowl, DPT rig	2 day	CH2M HILL Level C	PCBs	8082	14 day extr; 40 day analysis	Cool to 4°C	(1) 8 oz amber glass
									Lead	6010B	6 Months		(1) 8 oz amber glass
	Pre-Equipment Rinsate Blank	Water	1 per set of pre-cleaned equipment (5%)	25	Prepared in Field	Analyte-free water, SS funnel	2 day	CH2M HILL Level C	PCBs	8082	7 day extr; 40 day analysis	Cool to 4°C	(1) 1L amber glass
									Lead	6010B	6 Months		HNO ₃ to pH <2
	Post-Equipment Rinsate Blank	Water	1 per set of field-cleaned equipment (5%) (if equipment is decon in the field)	25	Prepared in Field	Analyte-free water, SS funnel	2 day	CH2M HILL Level C	PCBs	8082	7 day extr; 40 day analysis	Cool to 4°C	(1) 1L amber glass
									Lead	6010B	6 Months		HNO ₃ to pH <2
SPLP Analysis (if required)	Locations up to 24" within each 1/4 acre grid yielding the highest concentration of PCB & Lead	Soil	Once	unknown	Grab	SS spoon, SS bowl, DPT rig	3 day	CH2M HILL Level C	SPLP PCBs	1312/8082	14 day TCLP extr; 7 day extr; 40 day analysis	Cool to 4°C	analysis will be performed using samples previously collected for total lead and PCB
									SPLP Lead	1312/6010B	6 month TCLP extr; 6 month analysis		
Soil Sampling greater than 24" depth (if required)	Locations up to 24" within each 1/4 acre grid exceeding the SPLP PCB & SPLP Lead leachability based SCTLs	Soil	Once	unknown	Grab	SS spoon, SS bowl, DPT rig	2 day	CH2M HILL Level C	PCBs	8082	14 day extr; 40 day analysis	Cool to 4°C	(1) 8 oz amber glass
									Lead	6010B	6 Months		(1) 8 oz amber glass
	Pre-Equipment Rinsate Blank	Water	1 per set of pre-cleaned equipment (5%)	unknown	Prepared in Field	Analyte-free water, SS funnel	2 day	CH2M HILL Level C	PCBs	8082	7 day extr; 40 day analysis	Cool to 4°C	(1) 1L amber glass
									Lead	6010B	6 Months		HNO ₃ to pH <2

Notes:
1. Calendar days

**TABLE 3-2
SAMPLING AND ANALYTICAL SUMMARY**

Sample Task	Sample Point	Matrix	Sampling Frequency	Approx Sample No	Sampling Method	Sampling Equipment	TAT	Data Package Reqmnt	Required Analysis	Analytical Method	Holding Time	Sample Preservation	Containers
	Post-Equipment Rinsate Blank	Water	1 per set of field-cleaned equipment (5%) (if equipment is decon in the field)	unknown	Prepared in Field	Analyte-free water, SS funnel	2 day	CH2M HILL Level C	PCBs	8082	7 day extr; 40 day analysis	Cool to 4°C	(1) 1L amber glass
									Lead	6010B	6 Months	HNO ₃ to pH <2	(1) 500ml HDPE
SPLP Analysis (if required)	Locations greater than 24" depth exceeding the Residential SCTLs for PCB & Lead	Soil	Once	unknown	Grab	SS spoon, SS bowl, DPT rig	3 day	CH2M HILL Level C	SPLP PCBs	1312/8082	14 day TCLP extr; 7 day extr; 40 day analysis	Cool to 4°C	analysis will be performed using samples previously collected for total lead and PCB
									SPLP Lead	1312/6010B	6 month TCLP extr; 6 month analysis		

5.0 Investigation Approach

This effort will focus on sampling and analysis of site soils to delineate the extent of PCB and lead contamination at concentrations above SCTLs and identify the horizontal and vertical extent of soils that will require removal based on the anticipated land use. The SCTLs are listed in Table 3.

TABLE 3
Soil Cleanup Target Levels (per Chapter 62-777, FAC)

Chemical	Residential SCTL (mg/kg)	Industrial SCTL (mg/kg)	Soil-to groundwater Leachability SCTL (mg/kg)
PCBs	0.5	2.6	17
Lead	400	1400	NA

NA - A value not available

mg/kg – milligrams per kilogram

Those soils analyzed to be three times above the Residential SCTL for lead and/or PCBs will be removed up to 24 inches below land surface (bls) to prevent direct exposure and related health risks. After removal, the remaining soils will meet the FL SCTLs, by ensuring that the area-wide 95 percent UCL concentrations will be below the established criteria.

The Residential SCTLs will be met on an area-wide basis across an exposure unit, and not at every sample location, following the standard risk-based approach. Per FDEP guidance, an exposure unit is a 0.25-acre residential lot for this site. A statistically-based approach will be used to determine the concentrations above which soil will be removed to achieve the 0.25-acre exposure unit-wide upper 95 percent or greater confidence limits (UCLs) on the average concentrations to be within the target levels. The FDEP guidance indicates that, in order to estimate the UCL levels, a minimum of 10 samples should be collected per exposure unit area. The lead concentrations will be compared against SCTLs using average concentrations across exposure unit in determining exceedance, following USEPA guidance for lead target level development.

The deeper soil samples (>2 ft depths) will be remediated based on the exceedance of leachability criteria in each grid. Table 3 includes FDEP's soil-to-ground water leachability SCTL. Exceedances of the established criteria for the deeper soils will determine the need for removal activities based on 2-foot interval sampling to the groundwater table.

6.0 Soil Sampling and Analysis

Twenty soil samples will be collected from ten grid-intersection locations at two depths within each 0.25-acre grid and will be analyzed for total PCBs by USEPA Method 8082 and total lead by USEPA Method 6010B (see Figure 2 for the proposed sampling grid). The procedures for sampling and analysis will follow those outlined in the Basewide Work Plan (CH2M HILL, May 2000) and any site-specific details are included in the following section. The data will be validated by an independent contractor on a minimum of 10 percent of the analytical results.

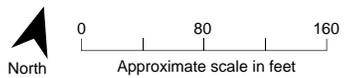


FIGURE 2
 Proposed Sampling Locations/Grid Spacing
 DRMO, Truman Annex (CTO 45)
 NAS Key West
 Key West, Florida

Samples will be collected from two depths at each of the ten sample location using direct push technology (DPT). Samples will be collected from 0 to 6 inches and from 6 to 24 inches bls. Therefore, a total of 20 soil samples from each 0.25-acre grid, will be shipped overnight to PEL Analytical Laboratories, a Navy-approved laboratory, for analysis. Additionally, quality assurance/quality control (QA/QC) samples will also be included in the samples shipped for analysis. Of the 20 samples shipped, only 10 samples and associated QA/QC samples will be requested for analysis. This results in an estimated total of over 250 samples from across the DRMO site.

Every alternate sample, one from 0 to 6 inches bls, and one from 6 to 24 inches bls, will be analyzed for PCBs and lead. Therefore, a total of 10 samples will be analyzed for PCBs and lead, along with the associated QA/QC samples. The statistical upper-bound 95 percent (UCL95 percent) level for the combined 10 samples will be estimated using the Florida UCL calculation tool. If estimated UCL95 percent is below for residential SCTL, then the grid will be considered "clean." No soil removal action will be proposed in grids where results from surface soil from shallow and deeper surface soil (up to 24 inches in depth) are below the criteria.

Additionally five sample location at two depths, from those sample results yielding the highest concentration of lead and PCBs, regardless of the location of the grid within the DRMO site, will be analyzed using the synthetic precipitation leaching procedure (SPLP) method for leachable fraction analysis. All laboratory SPLP results will be converted to soil concentration (milligrams per kilogram for criteria evaluation). If any of the results from the initial 10 samples exceed the leachability-based SCTLs for PCBs (>17 milligrams per kilogram [mg/kg]) or lead (>400 mg/kg), further sampling will continue to a vertical depth (at 2-foot intervals starting at 4 feet bls) adjacent to the initial sampling location until the soils analysis no longer exceed the leachability criteria or until groundwater is encountered (currently assumed to be at 6 feet bls). The deeper soil samples (below 2 feet bls) will initially be analyzed for total lead and total PCB and if the deeper samples exceed 400 parts per million (ppm) for lead and 0.5 ppm for PCB, then the samples will be analyzed additionally for leachability using an SPLP test (USEPA Test Method 1312/6010B [lead] and Method 1312/8082 [PCBs]) and will be evaluated for contamination above criteria. Table 4 presents the anticipated number of samples proposed for the 6.25-acre DRMO site, including QA/QC samples, for analysis (assuming 25 grids).

Samples will be collected in accordance with the USEPA Region IV Environmental Investigative Standard Operating Procedures and Quality Assurance Manual (EISOPQAM), November 2001 and FDEP Standard Operating Procedures (SOPs) for Field Activities, DEP-SOP-001/01, February 1, 2004. Where the two documents conflict, the more stringent will apply. The sampling team will be qualified under the Navy Installation Restoration Chemical Data Quality Manual (IRCDQM), 1999, sampling requirements.

Sampling equipment will be decontaminated between each sample location/elevation. Decontamination fluids will be placed into 55-gallon drums and appropriately labeled. These drums will remain onsite until the soil removal action. At that time, the drum contents will be added to the soils being disposed offsite.

TABLE 4
 Samples Proposed for Collection and Analysis

Medium	Number of Samples (per 0.25-acre grid)	Minimum number of samples analyzed	Maximum number of samples analyzed	QA/QC Samples (Dups at 10%; EQBs at 10%; MS/MSD at 5%)	
				Min	Max
Surface Soil (0-6")	10	125	250	40	75
Surface Soil(>6 to 24")	10	125	250	40	75
Subsurface Soil (>24")	?	?	?	?	?
Subsurface Soil – SPLP Analysis	*	*	*	*	*
Total Number of Samples	20	250	500	80	150

? – Number of samples to be collected is dependent on SPLP PCBs and SPLP lead exceedance at shallower depth.

* -- Number of samples to be collected is dependent on lead and PCB exceedances (if any) at the deeper depths.

The 0.25-acre grid system and each sample location will be surveyed using a Trimble Pro XRS GPS receiver with an antenna data collection device (provides real time sub-meter accuracy for the generation of GIS data maps).

7.0 Sampling Procedures

Soil samples will be shipped via overnight delivery to PEL, the offsite laboratory. Samples will be collected in the following manner and analyzed in accordance with Table 2.

1. Using the DPT rig, obtain a core from the appropriate depth to be sampled.
2. Remove the core from the DPT sampling device.
3. Open one sample container.
4. Using a stainless steel spoon, place soil from the appropriate depth of core and place in the sample container.
5. Immediately cap the sample container.
6. Repeat the process for the other sample containers.
7. Label the sample containers.
8. Place in cooler for shipment to the laboratory.
9. The sample label, chain-of-custody, and logbook will contain the sample identification, sample date, sample preservative, required analyses, name/initials of the sampler, and NAS Key West reference.
10. Place the samples in a cooler packed on ice with the chain-of-custody. Seal the cooler with custody seals and ship by overnight delivery to the offsite laboratory.

Excess soil will be returned to the DPT boring. Decontamination water will be placed directly into 55-gallon drums and labeled as outlined above.

8.0 Sample Documentation

Sample documentation will include the following:

- Numbered Chain-of-Custody Reports
- Sample Log Book which includes the following information:
 - Name of laboratory (PEL) and contacts to which the samples were sent, turnaround time (TAT) requested, and data results, when possible
 - Termination of a sample point or parameter and reasons
 - Unusual appearance or odor of a sample
 - Temperature and weather conditions
 - Additional samples and reasons for obtaining them
 - Levels of protection used (with justification)
 - Meetings and telephone conversations held with the NAVFAC ES, NTR, regulatory agencies, project manager, or supervisor
 - Details of QC samples obtained
 - Sample collection equipment and containers, including their serial or lot numbers
 - Field analytical equipment, and equipment utilized to make physical measurements will be identified
 - Calculations, results, and calibration data for field sampling, field analytical, and field physical measurement equipment
 - Property numbers of any sampling equipment used, if available
 - Sampling station identification
 - Date and time of sample collection
 - Description of the sample location
 - Description of the sample
 - Sampler(s)' name(s) and company
 - How the sample was collected
 - Maps/sketches of sampling locations
- Sample Labels
- Custody Seals (minimum of two on each shipping container)

9.0 Field Quality Control

9.1.1 Project QC Manager

The project QC Manager will be Mr. Jeffery Marks. The letter appointing Mr. Marks to this position is attached in Appendix B.

9.1.2 Identification and Certification of Testing Laboratories

PEL Analytical Laboratories has been identified to perform the analytical services for this sampling event, as a subcontractor to CH2M HILL. This laboratory is an approved Navy and FDEP laboratory.

9.1.3 Sampling Inspections

The Project QC Manager will perform inspections of the overall work activities. The inspections are performed to ensure safe, efficient, high quality work is performed, while meeting the objectives and requirements of this SAP. The inspections for the delineation activities will be performed in accordance with the three phases of control. The definable features of work are mobilization, field sampling, and demobilization. The inspections associated with these work items are described in the subsections that follow.

Mobilization

As part of the mobilization activity, a pre-construction meeting will be held to review the preparedness to begin the work, the overall project scope and schedule, communications and reporting. The work zone will be demarcated, utility clearances obtained, equipment staging area selected, and site access routes discussed.

Preparatory Phase

The preparatory phase will include a review of the relevant activity hazard analyses (AHAs), the Health and Safety Plan, communications matrix, project schedule, submittal status, and confirmation of appropriate sampling materials and equipment. The preparedness check will verify that coordination with the DPT subcontractor, PEL Laboratories, support personnel such as the Project Chemist, and sampling supplies, as necessary, are in place.

Initial Phase

Inspections will be made as necessary to ensure limits of work areas are defined, utilities marked, and material staged in the designated areas.

Follow-up Phase

The Project QC Manager will provide oversight of activities to verify that the work is completed in accordance with the requirements provided in this SAP. Deficiencies will be noted and corrected.

The quality controls that will be implemented during mobilization activities include:

- Pre-construction Meeting
 - Verification of excavation permit and utility clearance from Environmental Division Public Works Center (PWC), NAS Key West
 - Verification of designated locations of equipment layout, material and waste staging, and decontamination
- Site Walk
 - Verification of site layout plan
- Preconstruction Submittals
 - Subcontractor AHAs
 - Subcontractor personnel qualification and certifications

Field Sampling

Environmental samples will be collected in accordance with EPA methods and procedures. Other controls will include, but are not limited to, maintaining a chain of custody; proper handling, packing, and shipping; and the use of qualified laboratories. The perimeters of the work zones will be staked (temporary monuments) and the sample locations marked with labeled pin flags.

Field duplicate samples and equipment blank samples will be collected at a minimum frequency of 10 percent. Matrix spike/matrix spike duplicates (MS/MSD) will be required at a frequency of one per sample event or a minimum of 5 percent of the total number of samples collected for an analysis. No trip blank samples will be required as no volatile organic samples are being collected. The quantity and frequency of QA/QC samples are detailed in Table 2.

Preparatory Phase

The preparatory phase for sample collection activities includes a review of the sampling procedures provided in the SAP, verifying acceptance of the selected laboratory (PEL) for offsite sample testing, and confirming that the appropriate equipment and materials are available to complete the sampling activities.

Initial Phase

Delineation samples will be collected and shipped to PEL Laboratories for analysis. The results of which will determine the areas requiring excavation. Sample collection activities, including proper chain-of-custody documentation, will follow the protocols outlined in this SAP.

Follow-up Phase

Sample collection locations and activities will be properly documented throughout the sampling event. Analytical reports from PEL Laboratories will be reviewed for accuracy and completeness. If required, data quality and quality assurance information from PEL Laboratories will be reviewed to verify discrepancies in the analytical data. CH2M HILL

quality assurance personnel will review and tabulate laboratory data and field sampling results.

The quality controls that will be implemented during field sampling activities include:

- Verify laboratory (PEL Laboratories) and credentials.
- Verify appropriate sampling equipment.
- Verify equipment decontamination.
- Verify appropriate facilities and testing equipment are available and comply with testing standards.
- Verify the field instruments are calibrated in accordance with manufacturers' recommendations.
- Verify recording forms, including all of the test documentation requirements, have been prepared and are accurate and complete.
- Communicate with the Project Chemist and Construction Manager throughout the sampling events to evaluate sample results and determine path forward (decision matrix for subsequent sampling within each 0.25 acre grid).
- Maintain sample log.

Demobilization

Personnel and equipment will be decontaminated in accordance with the provisions of the site-specific Health and Safety Plan. Pre-final inspection of cleanliness will be performed by the Site Superintendent and the Site Health and Safety Specialist. Final equipment inspections will be performed and documented by the Project QC Manager, or his/her designee.

Equipment and personnel will demobilize from the site following the completion of the work activities identified in this SAP. The Project QC Manager will verify that the objectives of the sampling activities have been met. A final inspection will be conducted to verify completion of all project activities. Findings, should any be identified, will be tracked, resolved, and documented during a final site walk-through inspection.

Preparatory Phase

The preparatory phase will include a review of decontamination procedures, the site-specific Health and Safety Plan, and relevant AHAs.

Initial Phase

The Site Superintendent will perform inspections to confirm that the objectives of the decontamination activities have been met and that the rework items, if any, have been completed to the satisfaction of CH2M HILL and the Navy.

Follow-up Phase

The Project QC Manager will provide oversight of the decontamination and demobilization to verify that the work is completed in accordance with the requirements provided in this SAP. Deficiencies will be noted and corrected.

The quality controls that will be implemented during demobilization activities include:

- Pre-final site inspection and develop punch-list items
- Work areas to ensure all temporary facilities, equipment and materials are safely removed from the site
- Work areas to ensure project housekeeping and cleaning
- Decontamination of personnel and equipment
- Completion inspection when work is substantially complete
- Punch lists on outstanding items
- Project housekeeping and final project cleaning
- Final Inspections
- Orderly site demobilization
- Collate site records and documents
- Final reports and deliverables
- Complete Resolution of punch-list items
- Final site inspection
- Orderly site demobilization

10.0 Analytical Methods

Samples will be collected for analytical methods summarized in Table 2.

Preliminary analytical results will be faxed to Bethany Garvey at the following fax number per the turnaround time (TAT) listed in Table 2 (from the day of sample receipt by the laboratory). The final hardcopy data and electronic file will be delivered to Kama White within 14 days of sample receipt.

Bethany Garvey
Laboratory Coordinator
CH2M HILL
115 Perimeter Center Place, Suite 700
Atlanta, GA 30346
770-604-9182 ext 263
EFax: 678-579-8176
Bgarvey@ch2m.com

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(770) 604-9182 ext 564
Efax: (678) 604-9282
Kama.white@ch2m.com

11.0 Technical Memorandum and Recommendations

Subsequent to receipt of the analytical and survey results, CH2M HILL will prepare a technical memorandum (TM) summarizing the analytical results and the extent of proposed soil removal. This TM will be provided to the Key West Partnering Team for review and

acceptance. Following acceptance of the results, a Work Plan Addendum will be prepared to outline the soil removal activities.

The basis for determining the extent of soil removal will be based on the following decision logic. If the site-wide statistical averages as discussed in Section 6 are below SCTLs, grids will be identified as “clean” and no further sampling or remedial action will be recommended for that grid. The grids identified with statistical averages values above SCTLs for residential and/or leachability will be identified and recommended for removal. The average and the UCL will be recalculated for those grids where contamination is removed. Removal actions will be continued until the below the criteria conditions are accomplished across each grid.

Following the EPA guidance for the lead SCTL value of 400 mg/kg, the **average** lead concentration across each 0.25-acre grid (not UCL) will be compared against the SCTL value listed in Table 3. Where as, for PCBs, the 0.25-acre grid-wide UCL concentrations will be compared against PCB target levels. The excavated areas will be filled with uncontaminated offsite borrow material. Therefore, the residual site concentrations in the remediated areas will have the clean fill material concentrations, which is likely to be similar to background levels for lead and below detection limits for PCBs. This planned approach is in accordance with State guidance.

Appendix A

Site-Specific Health and Safety Plan

**Health and Safety Plan
Defense Reutilization and Marketing Office
Truman Annex**

**Naval Air Station Key West
Key West, Florida**

**Contract No. N62467-01-R-0331
Contract Task Order No. 045**

Revision 00

Submitted to:



**Department of the Navy
Naval Facilities Engineering Command Southeast**

Prepared by:



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July 7, 2006

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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
AHA	Activity Hazard Analysis
ALARA	as low as reasonably achievable
APR	air-purifying respirator
ATL	Atlanta
BBLPS	Behavior Based Loss Prevention System
CH2M HILL	CH2M HILL Constructors, Inc.
CNS	central nervous system
COC	contaminant of concern
CPR	cardiopulmonary resuscitation
CTO	Contract Task Order
dBA	decibel A-rated
DOT	Department of Transportation
DRMO	Defense Reutilization and Marketing Office
EPC	exposure point concentration
FA	first aid
FDEP	Florida Department of Environmental Protection
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
IRF	Incident Report Form
lb	pound
LEL	lower explosive limit
LPO	Loss Prevention Observations
mg/m ³	milligrams per cubic meter
MSDS	Material Safety Data Sheet
mW/cm ²	milliwatt per square centimeter
Naval Air Station	Naval Air Station
NAVFAC SE	Naval Facilities Engineering Command Southeast
NDG	nuclear density gauge
NLI	Near Loss Investigation
NS	Naval Station
NSC	National Safety Council
NTR	Navy Technical Representative
OSHA	Occupational Safety and Health Administration
PAHs	polynuclear aromatic hydrocarbons
PAPR	powered air-purifying respirator
PCBs	polychlorinated biphenyls

PDF	personal flotation device
PEL	Permissible Exposure Level
PID	photoionization detector
PPE	personal protective equipment
ppm	parts per million
PTSP	Pre-Task Safety Plan
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
T&D	Transportation and disposal
TBD	to be determined
TMCC	truck-mounted crash cushion
TRPHs	total recoverable petroleum hydrocarbons
TSDF	treatment, storage, and disposal facility
USEPA	U.S. Environmental Protection Agency
UST	underground storage tank
VOCs	volatile organic compounds

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 Health and Safety Specialist (SHSS) 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: 0045

CLIENT: Naval Facilities Engineering Command Southeast (NAVFAC SE)

PROJECT/SITE NAME: Truman Annex, Key West Florida

SITE ADDRESS: Truman Annex, Naval Air Station Key West Florida

CH2M HILL PROJECT MANAGER: Denis Ewing

CH2M HILL OFFICE: Atlanta, Georgia (ATL)

DATE HEALTH AND SAFETY PLAN PREPARED: July 7, 2006

DATE(S) OF SITE WORK: July 2006 to July 2007

SITE BACKGROUND AND SETTING: The Defense Reutilization and Marketing Office (DRMO) is located on Truman Annex in Key West, Florida. The site addressed in this sampling effort is approximately 6.25 acres in area and was formerly used as a storage facility for new and used military equipment. Over time, contaminants were released to the site soils. An elevated water tank was formerly located at the site and removed within the past 2 years. This elevated tank was historically painted with lead-based paints. When the tank was demolished, lead from chipped paint was released to the surrounding soils. During a recent lead soil assessment and remediation project, lead soil disposal characterization identified polychlorinated biphenyls (PCBs) as an additional contaminant of concern (COC) for remediation at the site. Further delineation of the extent of PCB and lead-contaminated soils at the site is needed to define the limits of soil removal and ensure that the end use for the site can be achieved based on existing regulatory drivers.

These contaminated soils now require removal since the City of Key West plans to develop the site as a *mixed use* site. The sampling effort described in this SAP focuses on defining the extent of contamination currently in site soils for the two COCs (PCBs and lead).

DESCRIPTION OF SPECIFIC TASKS TO BE PERFORMED: Contaminated soil delineation (for PCBs and lead) will include the following activities:

- Mobilization and site preparation
- Sampling and analysis to establish an exposure point concentration (EPC) estimation using United States Environmental Protection Agency (USEPA) and Florida Department of Environmental Protection (FDEP) tools to achieve a risk-based remediation solution
- Decontamination and demobilization
- Soil delineation results reporting and determination of extent of soils requiring removal

2.0 Tasks to be Performed Under this Plan

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.

2.1 Hazwoper-Regulated Tasks

- Mobilization and site preparation
- Sampling and analysis to establish an EPC estimation using USEPA and FDEP tools to achieve a risk-based remediation solution
- Decontamination and demobilization
- Soil delineation results reporting and determination of extent of soils requiring removal

2.2 Non-Hazwoper-Regulated Tasks

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

Tasks	Controls
<ul style="list-style-type: none">• Preparation and Submittal of a Technical Memorandum	<ul style="list-style-type: none">• 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 and site preparation	Sampling and analysis	Decontamination and demobilization
Manual Lifting (HS-29)	X	X	X
Fire Prevention (HS-22)			
Electrical Safety (HS-23)			
Lockout /Tagout (HS-33)			
Ladders & Stairs(HS-25)			
Compressed Gas Cylinders (HS-63)			
Buried Utilities	X		X
Excavations (HS-32)			
Fall Protection (HS-31)			
Heavy Equipment (HS-27)			
Confined Space Entry (HS-17)			
Concrete & Masonry Work (HS-43)			
Cranes and Hoisting (HS-44)			
Demolition (HS-45)			
Scaffolding(HS-73)			
Steel erection (HS-62)			
Welding and cutting (HS-22)			
Aerial Lifts (HS-41)			
Hand & Power Tools (HS-50)	X	X	X
Forklifts (HS-48)			
Drilling (HS_35)			
Noise (HS-39)	X	X	X
Pressurized Lines/Equipment			
Pressure Washing/Equip Decon			X
Vacuum Truck/Pumping Operations			
Suspended Loads			
Vehicle Traffic			
Haul Truck Operations			
Visible Lighting	X	X	X
Mechanical Guarding Hazards			
Asbestos Hazard			
Lead Hazard	X	X	X
Chemical Hazard-Dermal/Inhalation	X	X	X
Dust Hazard (Silica/Metals)	X	X	X
Fire/Explosion Hazards			

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) in this section. Hazard control measures for project-specific and general H&S hazards are provided in 3.1 and 3.2 of 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 will 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 will 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 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.

3.1.2 Excavation Activities

(Reference CH2M HILL, SOP HS-32, *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.

3.1.3 Lead

The following requirements pertain to lead abatement activities:

- Work activities involving cutting, grinding, burning, welding, and other abrasive operations performed on any painted and/or coated surfaces should be treated as having an increased potential for lead exposure.
- Surfaces suspected of containing lead shall be treated as lead unless documentation and/or testing results indicate otherwise.

- Do not enter regulated work areas unless training, medical monitoring, and PPE requirements established by the competent person have been met.
- Do not eat, drink, smoke, chew tobacco or gum, or apply cosmetics in regulated areas.
- Do not launder work clothes with ordinary clothes.
- Respiratory protection and other exposure controls selection shall be based on the most recent exposure monitoring results obtained from the competent person.

3.1.4 Pressure Washing Operations

- Only trained, authorized personnel may operate the high-pressure washer.
- Follow manufacturer's safety and operating instructions.
- Inspect pressure washer before use and confirm deadman switch fully operational
- The wand must always be pointed at the work area.
- The trigger should never be tied down
- Never point the wand at yourself or another worker.
- The wand must be at least 42 inches from the trigger to the tip.
- The operator must maintain good footing.
- Non-operators must remain a safe distance from the operator.
- No unauthorized attachment may be made to the unit.
- Do not modify the wand.
- All leaks or malfunctioning equipment must be repaired immediately or the unit taken out-of-service.
- Polycoated Tyvek or equivalent, 16-inch-high steel-toed rubber boots, safety glasses, hard hat with face shield, and inner and outer nitrile gloves will be worn, at a minimum.

3.1.5 Operating Heavy Equipment

(Reference CH2M HILL, SOP HS-27, *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 power lines, the closest part of the equipment must be at least 10 feet from the power lines < 50 kV. Provide an additional 4 feet 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 power lines 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 3.2.11 "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.
- 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, lines, 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.

3.1.6 Sample Handling

Sample handling, packaging, and preservation will be conducted in support of several field activities. Employee procedures and work practices to be followed during these activities include:

- Skin contact with contaminated water, soils, debris, or equipment shall be avoided at all times.
- Caution should be exercised when filling bottles containing acid or base preservatives. Both liquid and vapor phases of acid can cause severe burns.

- Following sample collection, sample container lids should be tightened securely to prevent any leaks, and the containers should be rinsed with clean water to ensure that they are free of chemical constituents. Sample activities, sample collection, and equipment decontamination procedures.
- The personnel handling acids and the other corrosive materials are required to wear long pants, long-sleeved shirts, and closed-toe shoes (preferably leather). In addition, nitrile gloves and chemical goggles must be worn. All transfers should take place in a properly operational fume hood or a well-ventilated area. In the event of a small spill, the spill area should be thoroughly flushed with water.

3.1.7 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.

3.2 General Hazards

3.2.1 General Practices and Housekeeping

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

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

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 HS-29, *Lifting*)

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

3.2.5 Fire Prevention

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

- Fire extinguishers shall be provided so that the travel distance from any work area to the nearest extinguisher is less than 100 feet. When 5 gallons or more of a flammable or

combustible liquid is being used, an extinguisher must be within 50 feet. Extinguishers must:

- be maintained in a fully charged and operable condition,
 - be visually inspected each month, and
 - undergo a maintenance check each year.
- The area in front of extinguishers must be kept clear.
 - Post “Exit” signs over exiting doors, and post “Fire Extinguisher” signs over extinguisher locations.
 - Combustible materials stored outside should be at least 10 feet from any building.
 - Solvent waste and oily rags must be kept in a fire resistant, covered container until removed from the site.
 - Flammable/combustible liquids must be kept in approved containers, and must be stored in an approved storage cabinet.

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 HS-25, *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 6 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

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

- Drink 16 ounces of water before beginning work. Disposable cups and water maintained at 50oF to 60oF 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					
	Heat Syncope	Heat Rash	Heat Cramps	Heat Exhaustion	Heat Stroke
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!

3.2.8.1 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

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

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

Underground Utilities

Do not begin subsurface construction activities (e.g., trenching, excavation, drilling, etc.) until a check for underground utilities and similar obstructions has been conducted. The use of as-built drawings and utility company searches must be supplemented with a geophysical or other survey by a qualified, independent survey contractor to identify additional and undiscovered buried utilities.

Examples of the type of geophysical technologies include:

- **Ground Penetrating Radar (GPR)**, which can detect pipes, including gas pipes, tanks, conduits, cables etc, both metallic and non-metallic at depths up to 30 feet depending on equipment. Sensitivity for both minimum object size and maximum depth detectable depends on equipment selected, soil conditions, etc.
- **Radio Frequency (RF)**, involves inducing an RF signal in the pipe or cable and using a receiver to trace it. Some electric and telephone lines emit RF naturally and can be

detected without an induced signal. This method requires knowing where the conductive utility can be accessed to induce RF field if necessary.

- **Dual RF**, a modified version of RF detection using multiple frequencies to enhance sensitivity but with similar limitations to RF
- **Ferromagnetic Detectors** are metal detectors that will detect ferrous and non-ferrous utilities. Sensitivity is limited, e.g. a 100-mm iron disk to a depth of about one meter or a 25 mm steel paper clip to a depth of about 20 cm.
- **Electronic Markers** are emerging technologies that impart a unique electronic signature to materials such as polyethylene pipe to facilitate location and tracing after installation. Promising for future installations but not of help for most existing utilities already in place.

Procedure

The following procedures will be used to identify and mark underground utilities during subsurface construction activities on the project:

- The survey contractor will determine the most appropriate geophysical technique or combinations of techniques to identify the buried utilities on the project, based on the survey contractor's experience and expertise, types of utilities anticipated to be present and specific site conditions.
- The survey contractor will employ the same geophysical techniques used on the project to identify the buried utilities, to survey the proposed path of subsurface construction work to confirm no buried utilities are present.
- Identify customer specific permit and/or procedural requirements for excavation and drilling activities. For military installations contact the Base Civil Engineer and obtain the appropriate form to begin the clearance process.
- Contact utility companies or the state/regional utility protection service at least 2 working days prior to excavation activities to advise of the proposed work, and ask them to establish the location of the utility underground installations prior to the start of actual excavation.
- Schedule the independent survey.
- Obtain utility clearances for subsurface work on both public and private property.
- Clearances are to be in writing, signed by the party conducting the clearance.
- Underground utility locations must be physically verified by hand digging using wood or fiberglass-handled tools when any adjacent subsurface construction activity (e.g. mechanical drilling, excavating) work is expected to come within 5 feet of the marked underground system. If subsurface construction activity is within 5 feet and parallel to a marked existing utility, the utility location must be exposed and verified by hand digging every 100 feet.

- Protect and preserve the markings of approximate locations of facilities until the markings are no longer required for safe and proper excavations. If the markings of utility locations are destroyed or removed before excavation commences or is completed, the Project Manager must notify the utility company or utility protection service to inform them that the markings have been destroyed.
- Conduct a site briefing for employees regarding the hazards associated with working near the utilities and the means by which the operation will maintain a safe working environment. Detail the method used to isolate the utility and the hazards presented by breaching the isolation..
- Monitor for signs of utilities during advancement of intrusive work (e.g., sudden change in advancement of auger or split spoon during drilling or change in color, texture or density during excavation that could indicate the ground has been previously disturbed).

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 mosquitoes whenever possible. Mosquitoes are believed to be the primary source for exposure to the West Nile Virus as well as several other types of encephalitis. The following guidelines should be followed to reduce the risk of these concerns for working in areas where mosquitoes are prevalent:

- Stay indoors at dawn, dusk, and in the early evening.
- Wear long-sleeved shirts and long pants whenever you are outdoors.
- Spray clothing with repellents containing permethrin or DEET since mosquitoes may bite through thin clothing.
- Apply insect repellent sparingly to exposed skin. An effective repellent will contain 35 percent DEET (N,N-diethyl-meta-toluamide). DEET in high concentrations (greater than 35 percent) 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.

3.3.6.1 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.

3.5 Contaminants of Concern

Contaminants of Concern are listed in Table 3-1.

TABLE 3-1
Contaminants of Concern

Contaminant	Location and Maximum ^a Concentration (ppm)	Exposure Limit ^b	IDLH ^c	Symptoms and Effects of Exposure	PIP ^d (eV)
Lead	GW: SB: SS:	0.05 mg/m ³	100	Weakness lassitude, facial pallor, pal eye, weight loss, malnutrition, abdominal pain, constipation, anemia, gingival lead line, tremors, paralysis of wrist and ankles, encephalopathy, kidney disease, irritated eyes, hypertension	NA
PCBs (Limits as Aroclor 1254)	GW: SB: SS:	0.5 mg/m ³	5 Ca	Eye and skin irritation, acne-form dermatitis, liver damage, reproductive effects	UK
Footnotes: ^a Specify sample-designation and media: SB (Soil Boring). ^b Appropriate value of PEL, REL, or TLV listed. ^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. ^d PIP = photoionization potential; NA = Not applicable; UK = Unknown.					

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).

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
Denis Ewing	ATL	Construction Manager	SC-HW, FA-CPR
Steve Bivone	ATL	CTO Project Manager	SC-HW, FA-CPR
Rich Rathnow	ORO	Health and Safety	SC-C, FA-CPR
Jeff Marks	JAX	H&S/QC	

4.2 Field Team Chain of Command and Communication Procedures

4.2.1 Client

Contact Name: Dudley Patrick - NAVFAC ES

4.2.2 CH2M HILL

Program Manager: Scott Smith

Project Manager: Denis Ewing

Health and Safety Manager: Rich Rathnow

Field Team Leader: TBD

Site Health and Safety Specialist: Jeffery Marks

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 HSM 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.
- 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 Subcontractors

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

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 are listed in Table 5-1.

TABLE 5-1
PPE Specifications^a

Task	Level	Body	Head	Respirator ^b
General site entry Mobilization and Site Preparation	D	Work clothes; steel-toe, leather work boots; work glove.	Hardhat ^c Safety glasses Ear protection ^d	None required
Sampling and Analysis Decontamination and Demobilization	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 neoprene gloves.	Hardhat ^c Safety glasses Ear protection ^d	None required
Tasks requiring upgrade	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 neoprene 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	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 neoprene 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. Occurrence or likely occurrence of gas or vapor emission. Known or suspected presence of dermal hazards. Instrument action levels (Section 5) exceeded. 	<ul style="list-style-type: none"> New information indicating that situation is less hazardous than originally thought. Change in site conditions that decreases the 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

Air Monitoring Specifications are listed in Table 6-1.

TABLE 6-1
Air Monitoring Specifications

Instrument	Tasks	Action Levels ^a		Frequency ^b	Calibration
Dust Monitor: Miniram model PDM-3 or equivalent	Intrusive or dust generating activities.	<2.0 mg/m ³ ≥2.0 mg/m ³	Level D Suspend operations, institute dust control measures until readings are < 2.0 mg/m³ before continuing or upgrade to Level C and implement lead compliance plan, including lead personal air sampling	Initially and periodically during tasks	Zero Daily
Nose-Level Monitor^e:		<85 dB(A) 85-120 dB(A) 120 dB(A)	No action required Hearing protection required Stop; re-evaluate	Initially and periodically during task	Daily

^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)

Air Monitoring equipment calibration specifications are listed in Table 6-2.

TABLE 6-2
Air Monitoring Equipment Calibration Specifications

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.

A dust monitoring action level of 2.0 mg/m³ has been established that requires excavation operations to be suspended and dust control measures to be instituted until readings are < 2.0 mg/m³ before continuing operations. Should dust control measures not be effective at reducing readings to less than the dust monitoring action level, the level of protection will be upgraded to Level C and the lead compliance plan described below for exceeding the lead action level of .03 mg/m³ will be implemented. This lead compliance plan includes provisions for providing lead personal air sampling, biological monitoring and personal hygiene facilities for exposed personnel to comply with the requirements of the OSHA lead standard. Lead personal air sampling will continue, until lead air sampling results confirm the requirements of the OSHA lead standard are met.

6.3.1 Lead Air Sampling Method

Personnel breathing zone air samples will be collected for 8-hour time-weighted average according to OSHA 1926.62. Contact the HSM to develop air monitoring protocols for assessing personnel lead exposures and to coordinate air sampling equipment and laboratory analysis.

6.3.2 Lead Compliance Plan

Should site personnel be exposed to airborne lead concentration in excess of the Action Level (AL) of .03 mg/m³ the following requirements apply to exposed personnel:

- Personnel lead air monitoring must continue until two consecutive readings in exposed personnel are below the AL.
- Biological monitoring must be implemented (Blood lead and ZZP).
- Lead hazard communication training must be performed.
- Hand washing facilities must be made available.

Should site personnel be exposed to airborne lead concentration in excess of the Permissible Exposure Level (PEL) of .05 mg/m³ for an 8-hour TWA the following requirements apply to exposed personnel:

- Personnel lead air monitoring must continue until two consecutive readings in exposed personnel are below the AL.
- Biological monitoring must be implemented (Blood lead and ZZP).
- Lead hazard communication training must be performed.
- Respiratory protection and protective clothing is required, consistent with Level C protection.
- Personnel are required wash hands/face when exiting the exclusion zone and shower daily prior to exiting the site.

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 7-1 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.

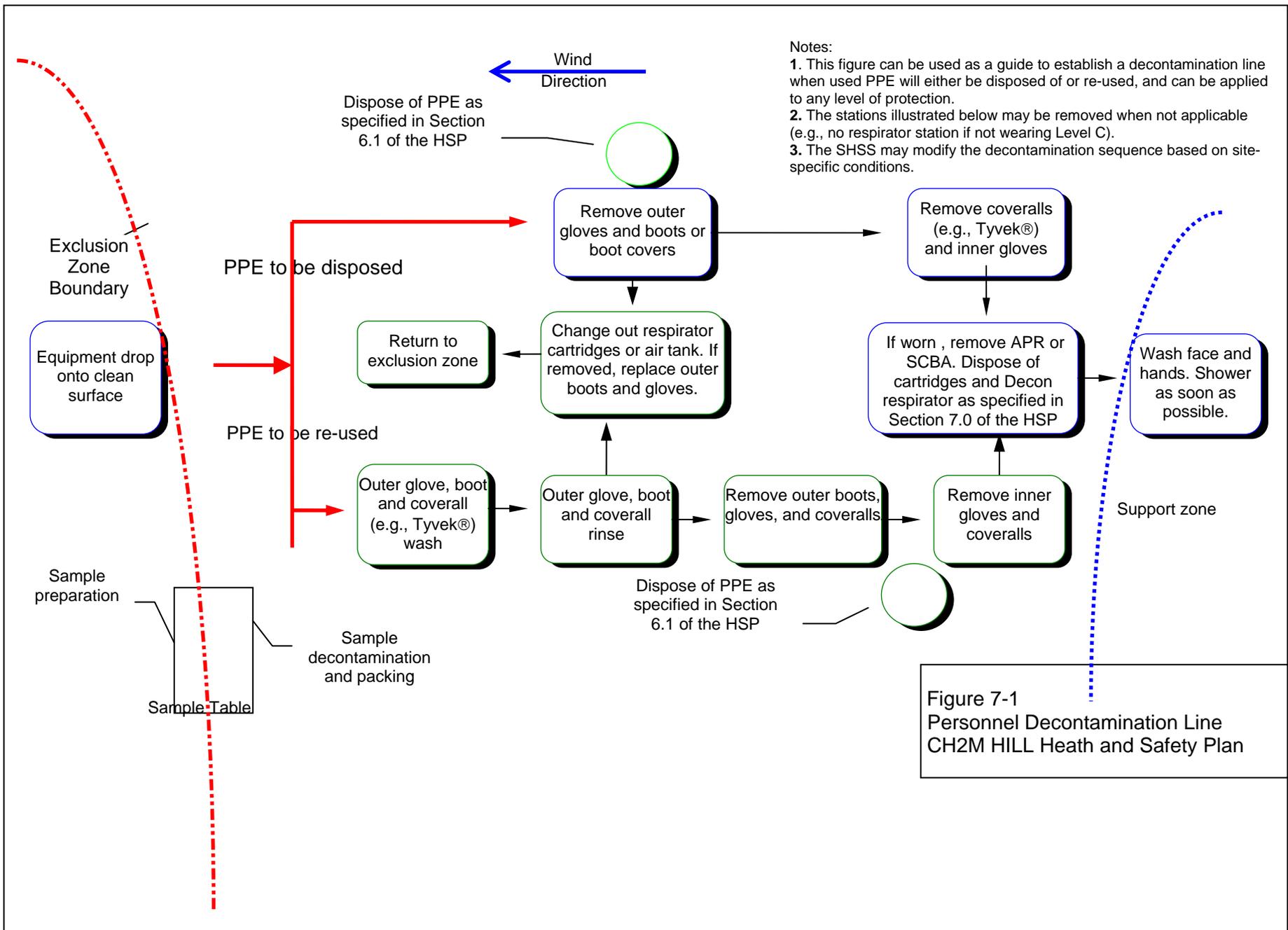


Figure 7-1
Personnel Decontamination Line
CH2M HILL Heath and Safety Plan

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 SHSS 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 might occur consecutively or concurrently with respect to non-Hazwoper tasks. This section outlines procedures to be followed when approved activities 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.
- 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 hours 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

10.3 Incident Reporting, Investigation and Response

For any accident meeting the definition of Recordable Occupational Injuries or Illnesses or Significant Accidents, the Southern Division, NAVFAC 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 Southern Division, NAVFAC 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, Program Manager Scott Newman/ATL, or CH2M HILL Corporate HSM Angelo Liberatore/ATL 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 (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 10.7.

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)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 EE&S 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 of the HSP, the Hazard Analysis Table (Table 2-1), and applicable CH2M HILL Standards of Practice (SOPs) should be used as a basis for preparing CH2M HILL 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/AHAs, 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 AHA. 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.

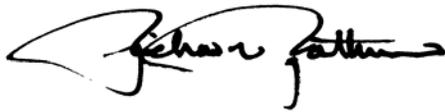
12.1 Original Plan

Written By: Rich Rathnow

Date: 7-7-2006

Approved By: Rich Rathnow

Date: 7-7-2006



12.2 Revisions

Revisions Made By:

Date:

Revisions to Plan:

Revisions Approved By:

Date:

Attachment 1

Employee Signoff Form

Attachment 2

Project-Specific Chemical Product Hazard Communication Form

Attachment 3

Chemical Specific Training Form

CHEMICAL-SPECIFIC TRAINING FORM

Location: NAS Key West DRMO	Project # : 341162
SHSS:	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.

Attachment 4

Emergency Contacts

Emergency Contacts-

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

Medical Emergency – 911

Facility Medical Response #:
Local Ambulance #:

CH2M HILL- Medical Consultant

Dr. Jerry 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 #:
Local Fire Dept #:

Local Occupational Physician

Security & Police – 911

Facility Security #:
Local Police #:

Navy RAC Program Manager

Name: Scott Smith/ATL
Phone: 770/604/9182

Utilities Emergency

Water:
Gas:
Electric:

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:
Phone:

CH2M HILL Human Resources Department

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

Project Manager

Name: Denis Ewing/ATL
Phone: 770/604-9182

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:

Hospital Phone #: Hospital Phone #:

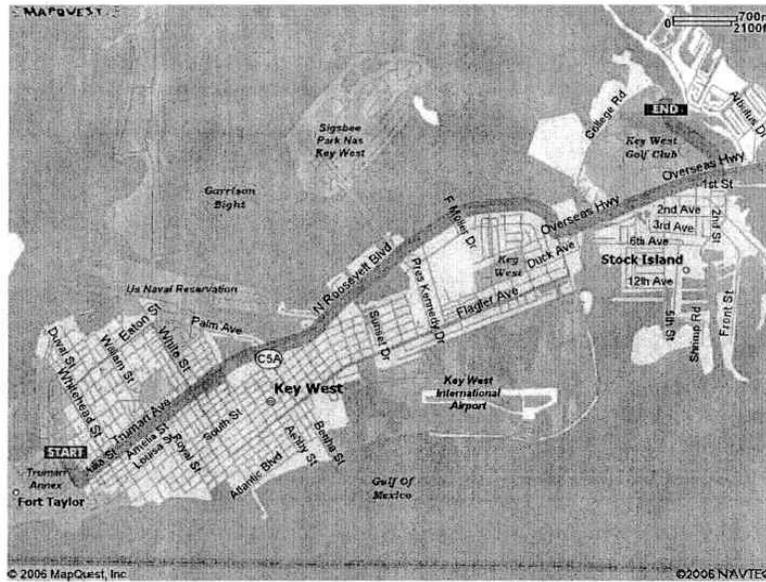
Directions to Hospital

See map

**ROUTE TO
LOWER FLORIDA KEYS HEALTH SYSTEM
5900 COLLEGE RD
KEY WEST, FL**

1. Exit site to US-1 North
2. Proceed on US-1 North (Truman Avenue, then North Roosevelt Blvd.) approximately 4 miles across bridge to Stock Island
4. After crossing into Stock Island, turn left on COLLEGE RD and proceed approximately 0.6 mi
5. Arrive at LOWER FLORIDA KEYS HEALTH SYSTEM

Hospital Route Map



Maneuvers	Distance
 1: Start out going SOUTHEAST on FORT ST toward PETRONIA ST.	0.1 miles
 2: Turn LEFT onto TRUMAN AVE.	1.1 miles
 3: TRUMAN AVE becomes N ROOSEVELT BLVD / US-1.	2.6 miles
 4: Turn LEFT onto US-1 N / FL-5 N.	1.1 miles
 5: Turn LEFT onto COLLEGE RD.	0.5 miles
 6: End at 5900 College Rd Key West, FL 33040-4342, US	

Total Distance = 5.7 miles (approximately 15 minutes)

Attachment 5

Project Activity Self-Assessment Checklists/Permits

Hand and Power Tools
Waste Sampling and Analysis

CH2MHILL

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

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

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

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

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

Project Name: _____ Project No.: _____

Location: _____ PM: _____

Auditor: _____ Title: _____ Date: _____

This specific checklist has been completed to:

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

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

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

SECTION 1

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"/> |

CH2MHILL

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

SECTION 2

Yes No N/A N/O

GENERAL (3.2.1)

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

ELECTRIC-POWERED TOOLS (3.2.2)

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

ABRASIVE WHEEL TOOLS (3.2.3)

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

PNEUMATIC-POWERED TOOLS (3.2.4)

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

CH2MHILL

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

SECTION 2 (continued)

Yes No N/A N/O

LIQUID FUEL-POWERED TOOLS (3.2.5)

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

POWDER-ACTUATED TOOLS (3.2.6)

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

JACKING TOOLS (3.2.7)

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

HAND TOOLS (3.2.8)

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

CH2MHILL

HS&E Self-Assessment Checklist—Waste Characterization, Sampling and Analysis

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 will be managing wastes generated on project sites and/or 2) CH2M HILL provides oversight of subcontractor personnel who are managing wastes generated at project sites.

The Safety Coordinator (SC) may consult with subcontractors when completing this checklist, but shall not direct the means and methods of waste characterization, sampling and analysis 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: _____	
Person filling out checklist: _____ Title: _____ Date: _____	
This specific checklist has been completed to:	
<input type="checkbox"/> Evaluate CH2M HILL compliance with its waste characterization, sampling and analysis standard (SOP-79). <input type="checkbox"/> Evaluate a CH2M HILL subcontractor’s compliance with the waste characterization, sampling and analysis standard and its 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-42.

	<u>Yes</u>	<u>No</u>	<u>N/A</u>
<u>N/O</u>			
GENERAL WASTE CHARACTERIZATION INFORMATION (6.0)			
1. Personnel told not to sign waste documentation (e.g., manifests) unless specifically authorized by the client in writing.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Waste Management Plan developed and available to all project personnel (see HSE-78).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Waste characterized before it is generated.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Waste characterized by Client using generator information.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Waste volumes estimated.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Disposal facility sampling and analytical requirements identified.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Disposal facility evaluated (see HSE-78).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Waste stream characterization documented in project file.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
IDENTIFY ANALYTICAL TEST METHODS (7.1)			
9. Nature and quantity of the waste determined.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. Analyses required for transport, treatment, and disposal determined.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11. Detection limits identified.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12. Provide disposal facility with analytical results.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13. Analytical test methods identified.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

SAMPLING (7.2)

- | | | | | |
|---|--------------------------|--------------------------|--------------------------|--------------------------|
| 14. Developed a sampling plan. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 15. Field activities recorded in a logbook. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 16. Exceptions to sampling plan documented in field logbook. | | | | |
| 17. Each container labeled with the project name, number, sample ID number, date and time, | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 18. The label on the container is covered with clear tape to prevent loss.
collected sampler's name, sample preserves, analysis to be performed. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

CHAIN OF CUSTODY (COC)

- | | | | | |
|---|--------------------------|--------------------------|--------------------------|--------------------------|
| 19. Sample shipping containers sealed with two custody seals. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 20. Custody seals placed over the left and rights sides of the container's cover (cooler). | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 21. Each seal signed and dated (with time). | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 22. Seals are covered with clear tape to prevent loss. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 23. Custody seals placed on sample container immediately after collection. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 24. Custody seals must be placed in a manner that they must be broken to open sample container. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 25. The sample is in custody (in view or physical possession, it has not been tampered with, it is retained in a secured area with restricted access, it is placed in a container and secured with an official seal such that it cannot be reached without breaking the seal). | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

CHAIN OF CUSTODY FORM INSTRUCTIONS (7.2.5)

- | | | | | |
|--|--------------------------|--------------------------|--------------------------|--------------------------|
| 26. Chain of Custody form completed per instructions | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
|--|--------------------------|--------------------------|--------------------------|--------------------------|

RECORDS (7.2.6)

- | | | | | |
|---|--------------------------|--------------------------|--------------------------|--------------------------|
| 27. Original COC submitted to the lab along with final data packages. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 28. Official copy of COC form sent to the project chemist and lab with sample shipment. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 29. Changes to analytical requests on COC form or the PO made in writing to the lab. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 30. A copy of written change sent to PM, lab, and placed in project files. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 31. Reasons for change are included in sample log and project file. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 32. Sample logbooks, sample logs, and COC forms sent to PM at completion of project activities. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

12.3 Appendix A: Waste Characterization, Sampling and Analysis – USA

1.0 Introduction

This appendix provides federal requirements for projects conducted within the U.S. and its territories. Contact the regional ECC for specific state and local requirements.

2.0 Regulatory Review

The Resource Conservation and Recovery Act (RCRA, 40 CFR 258-279) regulates the generation, storage, transportation, treatment and disposal of solid and hazardous waste. States or local agencies may have hazardous waste requirements more restrictive than the Federal standard.

The Toxic Substances Control Act (TSCA, 40 CFR 761) regulates the manufacture, use, storage, treatment, and disposal of toxic substances, including PCBs. States or local agencies may have requirements more restrictive than the Federal standard.

The Clean Air Act (CAA, 40 CFR 61) regulates the emission of hazardous air pollutants, including asbestos and provides management standards to control emissions. States or local agencies may have requirements more restrictive than the Federal standard.

3.0 Responsibilities

3.1 Environmental Compliance Coordinator (ECC)

The ECC is responsible for providing resources to assist Project Managers to interpret environmental requirements and implement the policies and procedures in this appendix.

4.0 CH2M HILL Policy

It is CH2M HILL policy to manage wastes in compliance with applicable regulations. Since waste characterization is the client's legal responsibility, **CH2M HILL will not sign documentation (e.g., manifests) that suggests CH2M HILL is assuming the client's waste characterization responsibility.** If a client requests this service, the approval process described in the Hazardous Waste Policy for U.S. Projects (Attachment A-1) must be followed.

5.0 Definitions

5.1 Acute Hazardous Waste

Acute hazardous waste is designated with an "H" in the *Hazard Code* column in Tables 40 CFR 261.31 (F-list) and 261.33 (P-list).

5.2 Asbestos Containing Material (ACM)

ACM contains greater than 1 percent asbestos determined by polarized light microscopy.

5.3 Container

A container is any portable device in which a material is stored, transported, treated, disposed of, or otherwise handled. Containers include roll-off boxes, drums, and portable tanks.

5.4 Debris

Debris is any solid material exceeding a 60 mm particle size that is intended for disposal and that is a manufactured object, plant or animal matter, or natural geologic material.

5.5 EPA Identification Number

The EPA Identification Number is a unique number assigned by EPA or a state agency to a generator, transporter, and treatment, storage, or disposal facility that manages hazardous waste.

5.6 Environmental Media

Environmental media includes substances occurring in the natural environment, such as groundwater or soil.

5.7 Facility

A facility is all contiguous land, structures, appurtenances, and improvements on the land used for treating, storing, or disposing of hazardous waste. A facility may consist of several treatment, storage, or disposal operational units (e.g., one or more landfills, surface impoundments, or combinations of them).

5.8 Hazardous Waste

Hazardous waste is a solid waste that is not excluded from regulation and: 1) is listed as a hazardous waste, and/or 2) exhibits any of the characteristics of hazardous waste, i.e., ignitability, corrosivity, reactivity, and TCLP toxicity. States may have additional wastes or criteria for state-specific "hazardous" wastes.

5.9 Hazardous Waste Manifest

The hazardous waste manifest (Environmental Protection Agency (EPA) Form 8700-22) is the shipping document for tracking shipments of hazardous waste from the generator's facility to the final disposal facility. The manifest is originated and signed by the generator, and must also be signed by transporters and disposal facilities.

5.10 Munitions and Explosives

Munitions and explosives consist of various types of ordnance such as ammunition, ammunition components, chemical or biological warfare materials that have been abandoned, expelled from demolition pits or burning pads, lost, discarded, buried or fired. "Military munitions" are munitions and explosives that are or have been under the control of various federal agencies such as the DOE and DOD.

5.11 Polychlorinated Biphenyls (PCBs)

PCBs are chemicals in which the biphenyl molecule has been chlorinated and are commonly used in electrical equipment. PCBs may be regulated under TSCA, depending upon concentration.

5.12 Solid Waste

Solid waste is any discarded material regardless of physical state (solid, liquid, or containerized gases). Solid wastes are considered discarded if they are abandoned, recycled, or are inherently waste-like.

5.13 State-Regulated/Special/Industrial Wastes

State-regulated/special/industrial wastes are identified by state agencies for regulation separate from wastes identified by EPA.

5.14 Universal Waste

Universal wastes include batteries, agricultural pesticides, thermostats, and mercury-containing lamps. These wastes are subject to less stringent requirements than RCRA hazardous waste if they are managed in a regulation-specified manner.

5.15 Unexploded Ordnance (UXO)

UXO includes military munitions that have been primed, fuzed, armed, or otherwise prepared for action, and have been fired, dropped, launched, projected or placed in such a manner as to constitute a hazard to operations, installation, personnel, or material and remain unexploded either by malfunction, design, or any other cause.

6.0 Waste Characterization

This section provides fundamental information on how to characterize wastes in accordance with RCRA, the Toxic Substance Control Act (TSCA), and other applicable laws and regulations. Consult your regional Environmental Compliance Coordinator for specific state and local requirements.

CH2M HILL may assist a client with waste characterization if specified in the project scope of work. The following procedures provide general information to assist with our limited scope. However, **CH2M HILL personnel must not sign documentation (such as manifests) that may indicate that CH2M HILL intends to assume the client's waste characterization responsibilities.** If a client requests this service, the approval process described in the Hazardous Waste Policy for U.S. Projects (Attachment A-1) must be followed.

6.1 Hazardous Waste Determination

Generators must determine if waste is hazardous by using process knowledge (e.g., historical data or information in MSDS) or testing the waste using standard EPA methods. With this information, a waste is characterized by asking the following questions:

1. Is it a solid waste?
2. Is it excluded?
3. Is it a listed hazardous waste?
4. Is it "contained in" environmental media or debris?
5. Does it exhibit a hazardous characteristic?

Regulated wastes will carry a specific "waste code" for identification. Hazardous wastes are subject to strict management standards as discussed in HSE-80 (Hazardous Waste Management). The following sections discuss each question to characterize waste.

6.1.1 Is it a Solid Waste?

Almost everything is considered solid under RCRA, including liquids and compressed gases. Solid material becomes solid waste when it is discarded by being abandoned through accumulation, storage, disposal, or treatment or by being recycled.

6.1.2 Is it Excluded?

Some wastes are excluded from regulation as solid and hazardous waste. Solid waste exclusions are found in 40 CFR 261.4. Common solid waste exclusions include domestic sewage and industrial wastewater. Materials that are not solid waste *cannot* be hazardous waste.

Hazardous waste exclusions are found in 40 CFR 261.4. Common hazardous waste exclusions include mining overburden returned to the mine, and wastes from extraction or production of crude oil or natural gas. Evaluate all waste streams for a solid or hazardous waste exclusion and document all exclusions in the project file.

6.1.3 Is it Listed Hazardous Waste?

A solid waste is hazardous if it is included on one of three lists: F-list (40 CFR 261.31), K-list (261.32), and P- and U-lists (261.33). The lists are based on the source of the waste as shown in Table 6-1. Evaluate the source of all project waste streams to determine if a listed waste code applies. Document all waste code determinations in the project file.

Table 6-1 Listed Wastes

WASTE CODE	SOURCE OF WASTE	DESCRIPTION
F-list	Non-Specific Source	Generic wastes produced by any industrial manufacturing processes. Examples include spent solvents from degreasing.
K-list	Specific Source	Wastes from specifically identified industries. Examples include petroleum refining wastes or wood preserving wastes.
P- list (acutely hazardous) U-list (toxic)	Commercial Chemical Products	Pure chemical products or manufacturing intermediates listed in 40 CFR 261.33 or are the sole active ingredient in a mixture. Examples include MEK or TCE.

6.1.4 Is it "Contained-in" Environmental Media or Debris?

Environmental media and debris can become a hazardous waste if it "contains" (i.e., is contaminated) with a listed waste. Evaluate all project waste streams to determine if one of the following "contained-in" rules cause the waste stream to be regulated as a listed hazardous waste.

The "contained-in policy" regulates environmental media that contains listed hazardous waste. Environmental media is regulated as hazardous waste if it is contaminated with an F-, K-, P- or U-listed waste, regardless of the amount of contamination. The waste code can be removed from soil or groundwater by demonstrating that contamination is below health-based standards (e.g., following treatment) and obtaining a "contained-in decision" (also known as a "contained-out" decision) from the state or EPA. Document all determinations and contained-in decisions in the project file.

The "contained-in rule" (also known as the debris rule) applies to debris. It states that debris such as concrete, asphalt, or wood is regulated as hazardous waste if it contains listed hazardous waste. This determination can be removed through treatment to the alternative treatment standards for hazardous debris in 40 CFR 268.45. Treatment technologies include surface extraction such as pressure washing or spalling, depending upon the type of debris. Contact the regional ECC for assistance with "contained-in" rules.

6.1.5 Does it Exhibit a Hazardous Characteristic?

A solid waste is a hazardous waste if it exhibits the following four characteristics:

- Ignitability (D001)
- Corrosivity (D002)
- Reactivity (D003)
- Toxicity (D004-43)

Ignitable wastes (D001) are generally liquids with a flash point of less than 140 degrees F, such as mineral spirits. Other ignitable wastes are non-liquids that can cause fire under standard temperature and pressure, ignitable compressed gases, and ignitable oxidizers (chlorates).

Corrosive wastes (D002) are liquids with a pH < 2 or > 12.5, such as lead acid batteries, hydrochloric acid or sodium hydroxide. Soil cannot be a corrosive waste because it is not aqueous. Note however, that some states regulate corrosive solids.

Reactive wastes (D003) are wastes that are normally unstable and react violently such as a lithium sulfur dioxide battery, heated aerosol cans, or ordnance.

Toxic wastes are liquids or solids that contain a regulated amount of any one of 39 toxic compounds; the waste codes assigned to these compounds are D004 through D043. This determination is usually made by sampling and analysis using the Toxicity Characteristic Leaching Procedure (TCLP). Waste leachate concentrations exceeding the regulatory limits are assigned the corresponding D004 through D043 waste code(s). Table 6-2 lists the constituents applicable to the toxicity characteristic. Evaluate all project waste streams to determine if a D-code will apply.

Table 6-2 Toxicity Characteristic Criteria

Waste Code	Constituent	TCLP Maximum (mg/l)
	Metals	
D004	Arsenic	5.0
D005	Barium	100.0
D006	Cadmium	1.0
D007	Chromium (total)	5.0
D008	Lead	5.0
D009	Mercury	0.2
D010	Selenium	1.0
D011	Silver	5.0
	Insecticides/Herbicides	
D012	Endrin	0.02
D013	Lindane	0.4
D014	Methoxychlor	10.0
D015	Toxaphene	0.5
D016	2,4-D	10.0
D017	2,4,5-TP Silvex	1.0
	Organics	
D018	Benzene	0.5

D019	Carbon tetrachloride	0.5
D020	Chlordane	0.03
D021	Chlorobenzene	100
D022	Chloroform	6.0
	Waste Code	Constituent
D023	o-Cresol*	200.0
D024	m-Cresol*	200.0
D025	p-Cresol*	200.0
D026	Cresols*	200.0
D027	1,4-Dichlorobenzene	7.5
D028	1,2-Dichloroethane	0.5
D029	1,1-Dichloroethylene	0.7
D030	2,4-Dinitrotoluene	0.13
D031	Heptachlor (and epoxide)	0.008
D032	Hexachlorobenzene	0.13
D033	Hexachlorobutadiene	0.5
D034	Hexachloroethane	3.0
D035	Methyl ethyl ketone	200.0
D036	Nitrobenzene	2.0
D037	Pentachlorophenol	100.0
D038	Pyridine	5.0
D039	Tetrachloroethylene	0.7
D040	Trichloroethylene	0.5
D041	2,4,5-Trichlorophenol	400.0
D042	2,4,6-Trichlorophenol	2.0
D043	Vinyl chloride	0.2

6.2 Underlying Hazardous Constituents

Wastes that are determined to be hazardous under Section 6.1 must also be evaluated for the presence of underlying hazardous constituents. These must be evaluated so that the waste can be fully treated to meet the Land Disposal Restrictions (LDRs, 40 CFR 268). The presence of underlying hazardous constituents can be determined through process knowledge, MSDS review, or sampling and analysis. Consult the regional ECC for assistance in determining if your project waste stream contains underlying hazardous constituents.

6.3 State-Specific Wastes

Many states have more stringent requirements than EPA and regulate additional wastes as hazardous or special wastes. Some examples include low-level PCB waste or petroleum-contaminated soil. Contact the regional ECC to evaluate state regulations and guidance to determine if project waste streams are regulated as state-specific wastes.

6.3 TSCA Waste Classification

PCB wastes are regulated under the Toxic Substances Control Act (TSCA, 40 CFR 761). As a general rule, if the concentration of PCBs in the waste is greater than 50 ppm, or if the original PCB source has a concentration greater than 50 ppm, the waste is regulated under TSCA. Refer to the PCB Management SOP (HSE-82) for more information.

6.4 Universal Waste Determination

Universal wastes include batteries, agricultural pesticides, thermostats, and mercury-containing lamps, and are regulated under 40 CFR 273. These wastes are subject to less stringent requirements than RCRA hazardous waste if they are managed in the regulatory specified manner. Refer to the Universal Waste SOP (HSE-83) for these requirements.

6.5 Asbestos

Asbestos is regulated under the Clean Air Act National Emission Standards for Hazardous Air Pollutants (NESHAPs). Waste asbestos or wastes containing asbestos must be removed, packaged, labeled and managed in accordance with 40 CFR 61, Subpart M. Refer to the Asbestos SOP (HSE-42).

6.6 UXO/OEW

Unexploded ordnance/ordnance explosive waste (UXO/OEW) is regulated under RCRA. See the UXO/OEW SOP (HSE-91) for more information.

6.7 Radioactive Waste

If radioactive wastes will potentially be generated at a client site, contact the CH2M HILL Radioactive Waste Expert, Dave McCormack/SEA.

7.0 Waste Sampling and Analysis

This section identifies the requirements for sampling and analysis for wastes generated on U.S. projects. The following should be considered for sampling and analysis activities:

- Avoid resampling by evaluating regulatory and treatment, storage, or disposal facility (TSDF) requirements during project planning
- Ensure that test method detection levels meet regulatory limits
- Supplement laboratory testing with field test kits
- Use total constituent data where possible instead of TCLP to reduce costs
- Develop a sampling and analysis plan for the collection of representative samples

7.1 Identifying Analytical Test Methods

Potential analyses include:

- Totals
- TCLP
- Paint filter test
- Ignitability
- Corrosivity
- Reactivity
- PCBs

7.1.1 Waste Nature and Quantity

Under RCRA Land Disposal Restrictions (LDRs), underlying hazardous constituents must also be identified in a hazardous waste. Underlying hazardous constituents must also be treated to meet LDRs prior to land disposal. Therefore, any inquiries into the nature of the waste should identify underlying constituents that may not cause the waste to be hazardous. Also evaluate the waste to determine if listed hazardous waste is “contained-in” environmental media or debris (See Section 6.1.4). This determination can greatly effect the volume of hazardous waste generated.

7.1.2 Legal Requirements

RCRA requires that samples be representative of the waste stream. Representative sampling is easily accomplished in homogenous waste streams such as no-phase liquids. However, determining representative samples in a heterogeneous waste stream such as contaminated soil is more difficult. The following are EPA resources for determining representative sampling:

- Samplers and Sampling Procedures for Hazardous Waste Streams. 1980. U.S. EPA, Municipal Environmental Research Laboratory, Cincinnati, Ohio 45268, EPA-600/2-80-018. 70 pp. Publication is free. Order by calling EPA, Cincinnati Environmental Research Information Center (513) 569-7562.
- Sampling and Sampling Plans. Test Methods for Evaluating Solid Waste, Volume II: Field Manual, Physical/Chemical Methods, 3rd Edition, SW-846, Part III, Chapter 9, pp. 9-1 to 9-79. November 1986. EPA, Office of Solid Waste and Emergency Response, Washington, D.C. 20460.
- Characterization of Hazardous Waste Sites – A Methods Manual: Volume II. Available Sampling Methods, 2nd Edition. December 1984. EPA, Environmental Monitoring Systems Laboratory, Las Vegas, Nevada 89114, EPA 600/4-84-076.
- Characterizing Heterogeneous Wastes: Methods and Recommendations. February 1992. EPA, Office of Research and Development, Washington, D.C. 20460, EPA/600/R-92/033.

Commercial laboratories should be used for waste analyses. Field test kits may be used to minimize the cost of screening waste streams in the field. However, *these test kits should not be used as a sole source for hazardous waste determination.*

In some cases, total concentration analysis may be used to characterize a waste stream for the toxicity characteristic (D004-43) instead of running TCLP analysis. To use totals analysis, the waste must be entirely solid, or must contain less than 0.5 percent liquid. For *solids* with no liquid fraction, the TCLP leaches 100 grams of sample with 2,000 grams of leaching solution, providing a maximum of 20 times dilution of constituents in the sample. Therefore the conservative “20-Times” rule is to compare total constituent results to the TCLP regulatory limit times 20 to determine if the waste is hazardous. If less than 20x, the waste is below the regulatory limit, if above 20x, you must assume it is a hazardous waste for that constituent, or perform TCLP to make a final determination. For *liquid* wastes which have less than 0.5 percent solids, compare the results directly to the TC regulatory limit, with no multiplier. Note that for both liquids and solids, total constituent data can be more conservative than TCLP, especially for metals.

7.1.3 Detection Limits

Consult with the laboratory to identify the detection limits of the proposed test methods and compare them to the corresponding regulatory level, such as the TCLP limit. Although most detection limits will meet TCLP levels, some test methods cannot meet some regulatory levels, such as PCB concentrations in drinking water.

7.1.4 Disposal Facility Requirements

All facilities require waste characterization whether it be by analyses such as Toxicity Characteristic Leaching Procedure (TCLP) or by generator knowledge. Some facilities will also require additional analyses, such as total organic carbon (TOC) or chemical oxygen demand (COD), while others require testing only to meet certain permit requirements or no testing at all. Contact the proposed treatment/disposal facilities to determine their specific requirements.

12.4 Attachment A-1

HAZARDOUS WASTE POLICY for U.S. PROJECTS

Revision 2.0, January 1996

12.4.1 INTRODUCTION

This document presents the CH2M HILL policy for pursuing and performing projects involving hazardous and toxic wastes, and is effective on the date of issue. It applies to all projects involving the management or remediation of hazardous wastes or toxic substances that are governed by U.S. federal and state laws or regulations. This policy replaces the CH2M HILL, INC. policy issued in May 1993, and presents the prescribed process to follow for screening project opportunities involving hazardous or toxic materials. *This policy is applicable to all project opportunities pursued or performed in all business groups.*

Properly done, hazardous and toxic waste work is challenging, profitable business and represents an investment in our firm's future success. Because this work can involve higher risks and exposures than most of our other work, we must use great care in marketing our services, screening potential projects, negotiating our contracts, and performing our work. We should accept only project work for which we are qualified and for which we have qualified and available people. We should not accept work for which the risks are too great. Most importantly, we must make sure that the health and safety of our employees is not compromised.

This policy represents a significant departure from its earlier versions. It reflects the competitive forces we encounter in the marketplace on a daily basis, and also considers the current legal and practice environment in which we pursue and perform project work involving hazardous and toxic materials. This hazardous waste policy makes the assignment of stewardship and the decision-making process for projects pursuit, except where special approval is required, similar to the decision-making process for pursuing other types of projects.

The policy requires careful screening of all opportunities involving hazardous or toxic materials. The screening process triggers one of several formal bid/no-bid or go/no-go assessments and assigns stewardship depending on the issues identified in the evaluation of the specific project opportunity.

12.4.2 PROJECTS REQUIRING SPECIAL APPROVAL

As a matter of policy, the following types of projects may not be undertaken without special approval as described below:

1. **Hazardous Waste Generator or Transporter.** We will not accept projects or conduct tasks that will cause us to be classified as a generator or transporter of hazardous wastes. For example, we will not sign hazardous waste manifests.
2. **Environmental Impairment Liability (EIL) Insurance Investigations.** We will not accept projects involving EIL investigations or assessments.

3. **Standard Setting.** We will not accept projects that require us to certify, or to express an opinion regarding "safe" levels of contamination; i.e., we will not become "standard setters."
4. **Asbestos Remediation Work.** We will not accept projects involving "stand-alone" asbestos remediation. We can accept assignments involving asbestos remediation that is performed by qualified subcontractors.

Special approval may be obtained from a team comprising the following people:

1. A lawyer from the Legal & Insurance Department.
2. The Regional Manager from the affected region.
3. The Project Delivery Director or Director of Operations from the appropriate business group.
4. If the project opportunity is from a multi-regional client, then the Operations Manager from the appropriate business group will be added to the special approval team.

If you have questions, or you need additional information, contact Dan Smith in the Legal & Insurance Department/COR ext. 2452, David Miller/COR ext. 2411, or Bill Dehn/FGL/COR ext. 2315.

12.5 Appendix B: Waste Characterization, Sampling and Analysis – Canada

(Pending)

12.6 Appendix C: Waste Characterization, Sampling and Analysis – Australia

(Pending)

12.7 Attachment A-1

HAZARDOUS WASTE POLICY for U.S. PROJECTS

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12.8 Appendix B: Waste Characterization, Sampling and Analysis – Canada

(Pending)

12.9 Appendix C: Waste Characterization, Sampling and Analysis – Australia

(Pending)

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: _____

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):

Hazard Control Measures (Check all that apply):

<p>PPE</p> <ul style="list-style-type: none"> <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 	<p>Protective Systems</p> <ul style="list-style-type: none"> <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 	<p>Fire Protection</p> <ul style="list-style-type: none"> <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 	<p>Electrical</p> <ul style="list-style-type: none"> <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
<p>Fall Protection</p> <ul style="list-style-type: none"> <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 	<p>Air Monitoring</p> <ul style="list-style-type: none"> <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 	<p>Proper Equipment</p> <ul style="list-style-type: none"> <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 	<p>Welding & Cutting</p> <ul style="list-style-type: none"> <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
<p>Confined Space Entry</p> <ul style="list-style-type: none"> <input type="checkbox"/> Isolation <input type="checkbox"/> Air monitoring <input type="checkbox"/> Trained personnel <input type="checkbox"/> Permit completed <input type="checkbox"/> Rescue 	<p>Medical/ER</p> <ul style="list-style-type: none"> <input type="checkbox"/> First-aid kit <input type="checkbox"/> Eye wash <input type="checkbox"/> FA-CPR trained personnel <input type="checkbox"/> Route to hospital 	<p>Heat/Cold Stress</p> <ul style="list-style-type: none"> <input type="checkbox"/> Work/rest regime <input type="checkbox"/> Rest area <input type="checkbox"/> Liquids available <input type="checkbox"/> Monitoring <input type="checkbox"/> Training 	<p>Vehicle/Traffic</p> <ul style="list-style-type: none"> <input type="checkbox"/> Traffic control <input type="checkbox"/> Barricades <input type="checkbox"/> Flags <input type="checkbox"/> Signs
<p>Permits</p> <ul style="list-style-type: none"> <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 	<p>Demolition</p> <ul style="list-style-type: none"> <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 	<p>Inspections:</p> <ul style="list-style-type: none"> <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 	<p>Training:</p> <ul style="list-style-type: none"> <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

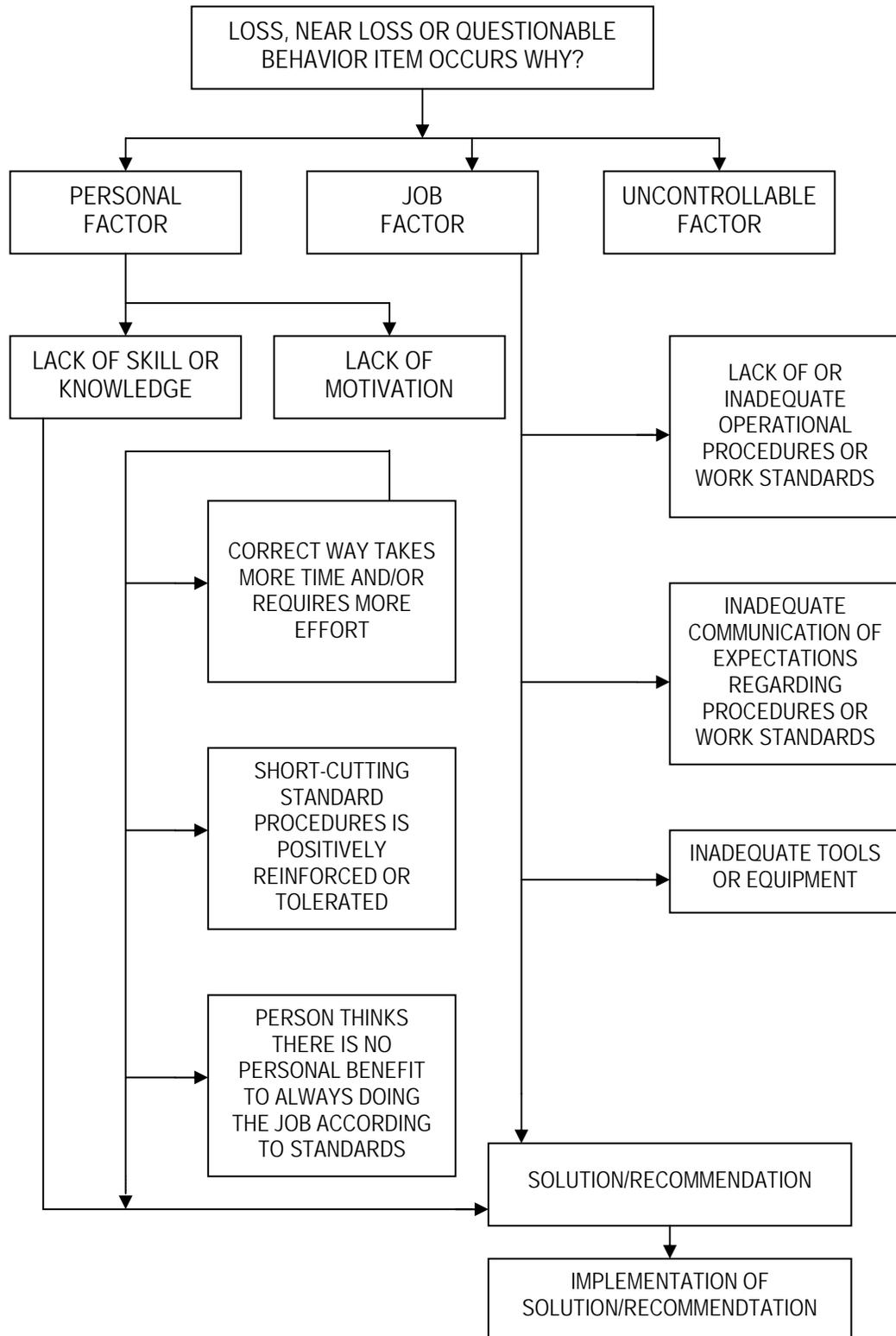
Name	Job Title	Date

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

Fax completed form to:

425.462.5957

CH2M HILL Seattle Office

Attention: Corporate HS&E Department

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)

If CH2M HILL employee injured

Employee Name: _____ Employee Number: _____

If CH2M HILL Subcontractor employee injured

Employee Name: _____ Company: _____

Injury Type

- | | | |
|--|--|---|
| <input type="checkbox"/> Allergic Reaction | <input type="checkbox"/> Electric Shock | <input type="checkbox"/> Multiple (Specify) _____ |
| <input type="checkbox"/> Amputation | <input type="checkbox"/> Foreign Body in eye | <input type="checkbox"/> Muscle Spasms |
| <input type="checkbox"/> Asphyxia | <input type="checkbox"/> Fracture | <input type="checkbox"/> Other (Specify) _____ |
| <input type="checkbox"/> Bruise/Contusion/Abrasion | <input type="checkbox"/> Freezing/Frost Bite | <input type="checkbox"/> Poisoning (Systemic) |
| <input type="checkbox"/> Burn (Chemical) | <input type="checkbox"/> Headache | <input type="checkbox"/> Puncture |
| <input type="checkbox"/> Burn/Scald (Heat) | <input type="checkbox"/> Hearing Loss | <input type="checkbox"/> Radiation Effects |
| <input type="checkbox"/> Cancer | <input type="checkbox"/> Heat Exhaustion | <input type="checkbox"/> Strain/Sprain |
| <input type="checkbox"/> Carpal Tunnel | <input type="checkbox"/> Hernia | <input type="checkbox"/> Tendonitis |
| <input type="checkbox"/> Concussion | <input type="checkbox"/> Infection | <input type="checkbox"/> Wrist Pain |
| <input type="checkbox"/> Cut/Laceration | <input type="checkbox"/> Irritation to eye | |
| <input type="checkbox"/> Dermatitis | <input type="checkbox"/> Ligament Damage | |
| <input type="checkbox"/> Dislocation | | |

Part of Body Injured

- | | | |
|--|---|--|
| <input type="checkbox"/> Abdomen | <input type="checkbox"/> Hand(s) | <input type="checkbox"/> Neck |
| <input type="checkbox"/> Ankle(s) | <input type="checkbox"/> Head | <input type="checkbox"/> Nervous System |
| <input type="checkbox"/> Arms (Multiple) | <input type="checkbox"/> Hip(s) | <input type="checkbox"/> Nose |
| <input type="checkbox"/> Back | <input type="checkbox"/> Kidney | <input type="checkbox"/> Other (Specify) _____ |
| <input type="checkbox"/> Blood | <input type="checkbox"/> Knee(s) | <input type="checkbox"/> Reproductive System |
| <input type="checkbox"/> Body System | <input type="checkbox"/> Leg(s) | <input type="checkbox"/> Shoulder(s) |
| <input type="checkbox"/> Buttocks | <input type="checkbox"/> Liver | <input type="checkbox"/> Throat |
| <input type="checkbox"/> Chest/Ribs | <input type="checkbox"/> Lower (arms) | <input type="checkbox"/> Toe(s) |
| <input type="checkbox"/> Ear(s) | <input type="checkbox"/> Lower (legs) | <input type="checkbox"/> Upper Arm(s) |
| <input type="checkbox"/> Elbow(s) | <input type="checkbox"/> Lung | <input type="checkbox"/> Upper Leg(s) |
| <input type="checkbox"/> Eye(s) | <input type="checkbox"/> Mind | <input type="checkbox"/> Wrist(s) |
| <input type="checkbox"/> Face | | |
| <input type="checkbox"/> Finger(s) | <input type="checkbox"/> Multiple (Specify) _____ | |
| <input type="checkbox"/> Foot/Feet | | |

Nature of Injury

- | | | |
|---|---|---|
| <input type="checkbox"/> Absorption | <input type="checkbox"/> Inhalation | <input type="checkbox"/> Overexertion |
| <input type="checkbox"/> Bite/Sting/Scratch | <input type="checkbox"/> Lifting | <input type="checkbox"/> Repeated Motion/Pressure |
| <input type="checkbox"/> Cardio-Vascular/Respiratory System Failure | <input type="checkbox"/> Mental Stress | <input type="checkbox"/> Rubbed/Abraded |
| <input type="checkbox"/> Caught In or Between | <input type="checkbox"/> Motor Vehicle Accident | <input type="checkbox"/> Shock |
| <input type="checkbox"/> Fall (From Elevation) | <input type="checkbox"/> Multiple (Specify) _____ | <input type="checkbox"/> Struck Against |
| <input type="checkbox"/> Fall (Same Level) | <input type="checkbox"/> Other (Specify) _____ | <input type="checkbox"/> Struck By |
| <input type="checkbox"/> Ingestion | | <input type="checkbox"/> Work Place Violence |

Initial Diagnosis/Treatment Date: _____

Type of Treatment

- | | |
|---|---|
| <input type="checkbox"/> Admission to hospital/medical facility | <input type="checkbox"/> Prescription- Single dose |
| <input type="checkbox"/> Application of bandages | <input type="checkbox"/> Removal of foreign bodies |
| <input type="checkbox"/> Cold/Heat Compression/Multiple Treatment | <input type="checkbox"/> Skin Removal |
| <input type="checkbox"/> Cold/Heat Compression/One Treatment | <input type="checkbox"/> Soaking therapy- Multiple Treatment |
| <input type="checkbox"/> First Degree Burn Treatment | <input type="checkbox"/> Soaking Therapy- One Treatment |
| <input type="checkbox"/> Heat Therapy/Multiple treatment | <input type="checkbox"/> Stitches/Sutures |
| <input type="checkbox"/> Multiple (Specify) _____ | <input type="checkbox"/> Tetanus |
| <input type="checkbox"/> Heat Therapy/One Treatment | <input type="checkbox"/> Treatment for infection |
| <input type="checkbox"/> Non-Prescriptive medicine | <input type="checkbox"/> Treatment of 2 nd /3 rd degree burns |
| <input type="checkbox"/> None | <input type="checkbox"/> Use of Antiseptics - multiple treatment |
| <input type="checkbox"/> Observation | <input type="checkbox"/> Use of Antiseptics - single treatment |
| <input type="checkbox"/> Other (Specify) _____ | <input type="checkbox"/> Whirlpool bath therapy/multiple treatment |
| <input type="checkbox"/> Prescription- Multiple dose | <input type="checkbox"/> Whirlpool therapy/single treatment |
| | <input type="checkbox"/> X-rays negative |
| | <input type="checkbox"/> 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: _____

Attachment 7

Applicable Material Safety Data Sheets
(available onsite)

Attachment 8

Subcontractor H&S Plans/Procedures

Appendix B

Project QC Manager Appointment Letter



CH2M HILL
115 Perimeter Center Place, N.E.
Suite 700
Atlanta, GA
30346-1278
Tel 770.604.9095
Fax 770.604.9282

July 12, 2006

Mr. Jeff Marks
CH2M HILL Constructors, Inc.
6219 Authority Avenue
Jacksonville, Florida 32221

RE: Contract No. N62467-01-D-0331
Contract Task Order No. 0045
Naval Air Station (NAS) Key West - Key West, Florida
Project Quality Control Manager Letter of Appointment

Dear Mr. Marks:

Herein describes the responsibilities and authority delegated to you in your capacity as the Project QC Manager at NAS Key West, Contract Task Order (CTO) 0045 under RAC Contract No. N62467-01-D-0331.

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 6.6.2.1 of 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.



Scott Smith
Program Manager

cc: Denis Ewing/ATL
Steve Bivone/ATL
Theresa Rojas/ATL
Project File No. 341162