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NAS CECIL FIELD, FL
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WORK PLAN ADDENDUM 21 FOR EXCAVATION OF CONTAMINATED SOIL AT OPERABLE
UNIT 5 (OU 5) SITE 15 BLUE 10 ORDNANCE DISPOSAL AREA NAS CECIL FIELD FL
11/1/2005
CH2MHILL CONSTRUCTORS INC

**Work Plan Addendum No. 21
Excavation of Contaminated Soil at Site 15,
Blue 10 Ordnance Disposal Area**

**Former Naval Air Station Cecil Field
Jacksonville, Florida**

Revision No. 00

**Contract No. N62467-98-D-0995
Contract Task Order No. 0057**

Submitted to:



**U.S. Naval Facilities
Engineering Command
Southern Division**

Prepared by:



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

November 2005

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Prepared/Approved By:

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Client Acceptance:

U.S. Navy Responsible Authority

Date

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Acronyms and Abbreviations

AFCEE	Air Force Center for Environmental Excellence
AHA	activity hazard analysis
BaPEq	benzo(a)pyrene equivalents
bgs	below ground surface
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CH2M HILL	CH2M HILL Constructors, Inc.
CO	Contracting Officer
COC	Chemical of Concern
CTO	Contract Task Order
cy	cubic yards
DOT	Department of Transportation
EISOPQAM	Environmental Investigative Standard Operating Procedure and Quality Assurance Manual
FAC	Florida Administrative Code
FDEP	Florida Department of Environmental Protection
FS	Feasibility Study
IRCDQM	Installation Restoration Chemical Data Quality Manual
LDR	Land Disposal Restriction
mg/kg	milligrams per kilogram
NAS	Naval Air Station
NAVFAC	Naval Facilities Engineering Command, Engineering Field Division South
EFDSOUTH	
NGVD	National Geodetic Vertical Datum
NTR	Navy Technical Representative
PAH	polynuclear aromatic hydrocarbons
PPE	personal protective equipment
QA	quality assurance
QC	quality control
QCR	Quality Control Report
RAO	Remedial Action Objective
RCRA	Resource Conservation and Recovery Act
RI	Remedial Investigation
ROICC	Resident Officer in Charge of Construction
SAP	Sampling and Analysis Plan
SCTL	Soil Cleanup Target Levels
SOPs	Standard Operating Procedures
T&D	transportation and disposal
TAT	turnaround time
TNT	trinitrotoluene
TRPH	total recoverable petroleum hydrocarbons
TtNUS	Tetra Tech NUS, Inc.

UCL	Upper Confidence Level
USACE	U.S. Army Corps of Engineers
USEPA	U.S. Environmental Protection Agency
VOA	volatile organic analytic
µg/kg	micrograms per kilogram

1.0 Introduction

CH2M HILL Constructors, Inc. (CH2M HILL) has been contracted by the U.S. Naval Facilities Engineering Command, Engineering Field Division South (NAVFAC EFD SOUTH), to prepare this Work Plan Addendum, under Response Action Contract No. N62467-98-D-0995, Contract Task Order (CTO) No. 0057. The purpose of this Work Plan Addendum is to outline the procedures to be used to perform contaminated soil excavation at Site 15, Blue 10 Ordnance Disposal Area located at former Naval Air Station (NAS) Cecil Field, Jacksonville, Florida.

Contaminated soil excavation will include the following:

- Mobilization and site preparation
- In-situ waste disposal characterization of 20 contaminated soil excavation areas
- Pre-excavation land survey
- Tree felling, brush clearing, and grubbing to facilitate contaminated soil excavation
- Excavation and backfill of 20 contaminated soil excavation areas
- Transportation and disposal (T&D) of approximately 11,600 cubic yards (cy) of contaminated soil
- Post-excavation land survey
- Site restoration
- Preparation and submittal of a Construction Completion Report

This Work Plan Addendum is organized into seven sections of text and three appendixes.

Section 1.0 Introduction includes the site description and project objectives.

Section 2.0 Project Execution Plan details the required scope of work, the project schedule, the communications plan, and the traffic control plan. The NAS Cecil Field Basewide Work Plan (CH2M HILL, 1998) provides a brief description of the reporting requirements under this Contract.

Section 3.0 Sampling and Analysis Plan (SAP) provides project sample locations, sample collection frequency, and the required laboratory analyses for samples collected during project activities. The NAS Cecil Field Basewide Work Plan and Florida Department of Environmental Protection (FDEP) Standard Operating Procedures (SOPs) outline the sample collection methodology including sample handling, labeling, and required collection of quality assurance (QA) and quality control (QC) samples.

Section 4.0 Waste Management Plan discusses the characterization, disposal, onsite management, and transportation of wastes encountered or generated during project activities. Waste management forms are provided in Appendix C.

Section 5.0 Environmental Protection Plan contains site-specific environmental provisions and references the NAS Cecil Field Basewide Work Plan, which contains the Environmental Protection Plan for all work completed at former NAS Cecil Field.

Section 6.0 Quality Control Plan includes the testing requirements for work described in this Work Plan Addendum. The site-specific project organization for this CTO is also included in this section. The QC attachments (submittal register, testing plan and log, etc.) are provided in Appendix C. All other QC information is contained in the NAS Cecil Field Basewide Work Plan (CH2M HILL, 1998), including information on the quality administrators, the project organization for the work to be completed at former NAS Cecil Field, and the definable features of work for each project site.

Section 7.0 References includes references to documents used to prepare this Work Plan Addendum.

The site-specific health and safety plan included in Appendix B addresses the work described in this Work Plan Addendum. Section 5.0 Site Health and Safety Plan of the NAS Cecil Field Basewide Work Plan (CH2M HILL, 1998) addresses project-specific health and safety issues for the remedial activities to be completed at former NAS Cecil Field.

1.1 Site Description

Site 15 is located in the southwest section of Yellow Water Weapons Area and is shown on Figure 1-1. The area is approximately 85 acres with elevations ranging from approximately 79 feet National Geodetic Vertical Datum (NGVD) to 72 feet NGVD. The site is heavily forested, primarily with slash pine and understory vegetation, as shown on Figure 1-2. Several forest fires have occurred in the area designated as “Forest Burn Area” located in the southwestern portion of the site, as shown on Figure 1-3 (Tetra Tech NUS, Inc. [TtNUS], 2005).

From the early 1940s through the mid 1950s, the site was used as a skeet range. The former skeet range was approximately 1,000 feet by 2,400 feet in size. From the mid 1960s through 1977, Site 15 was used for ordnance disposal. This operation consisted of burning ordnance materials in a large metal chamber and static firing of rockets. The ordnance disposal structures were located west of the skeet range. The majority of ordnance disposed of at the site was burned and included small arms munitions up to 20 millimeters in size, parachute and distress flares, Mark IV signal cartridges, rocket igniters, cartridge activated devices, 2.75-inch rockets, and 5-inch rockets. Rocket propellant was reportedly placed on the ground and ignited in the area of the burn chamber. An estimated 350 tons of ordnance was disposed of at the site while in operation (TtNUS, 2005).

The ordnance burn chamber and static rocket firing pad are the only structures currently at the site. The burn chamber is a rounded, steel, tank-like container, approximately 10 feet in length and 4 feet in height. The chamber has a burn stack that rises approximately 3 feet above the body of the chamber. Access to the chamber is through a 2-foot by 2-foot hinged door. When full, the burn chamber can accommodate 1.5 cy of material. The static rocket firing pad is an L-shaped concrete structure approximately 10 feet long by 4 feet wide by 6 feet high. Steel firing rods are seated into the concrete at 45-degree angles. Several concrete

building foundations, remnants of buildings that supported skeet range activities, are located in the area surrounding the burn chamber and firing pad (TtNUS, 2005).

Review of aerial photographs from 1952, prior to the initiation of ordnance disposal on Site 15, show an active trap and skeet range facility located at the site. The area covered by the skeet range appears to be approximately 50 acres in size, and is centered over the area in which the burn chamber and firing pad were constructed (TtNUS, 2005).

An area of stressed vegetation, referred to as the forest burn area, is located in the southwestern portion of the site, approximately 900 feet southwest of the burn chamber and firing pad. Several slash pines are partially burned in this area. Controlled burns were commonly undertaken in this area to control understory growth in the planted pine forests. This is an area where elevated polynuclear aromatic hydrocarbons (PAH) concentrations were detected (TtNUS, 2005).

An extensive investigation of Site 15 was conducted beginning in 1985 and continued through the preparation of the Feasibility Study (FS) conducted by TtNUS in 2005. During this period, 853 soil samples, 13 sediment samples, 7 surface water samples, 40 groundwater samples, and 15 ecological samples were collected and analyzed. Figure 1-4 shows all sample locations. Figure 1-5 shows the PAH sample locations selected during the Remedial Investigation (RI) screening and confirmatory sampling of Site 15 surface soil, subsurface soil, and sediments. Figure 1-6 shows the lead sampling location selected during RI screening and confirmatory sampling of Site 15 surface soil, subsurface soil, and sediments. The trinitrotoluene (TNT) and total recoverable petroleum hydrocarbons (TRPH) sampling locations selected during the RI screening of Site 15 surface soils are shown on Figures 1-7 and 1-8, respectively. Supplemental sample locations for PAH, lead, arsenic, and TRPH with respect to the historical sample locations for the same analyses during the RI field investigations are shown on Figures 1-9, 1-10, 1-11, and 1-12, respectively. Shaded areas representing the isoconcentration contours for PAHs in terms of Benzo(a)pyrene Equivalents (BaPEq) and lead are shown on Figures 1-13 and 1-14, respectively, based on all surface soil samples collected during screening, confirmatory, and supplemental sampling (TtNUS, 2005).

A statistical based approach was used to determine the concentrations above which soil must be removed to achieve upper confidence limits (UCLs) or average concentrations less than or equal to the Soil Cleanup Target Level (SCTL) for a defined exposure unit, the area to which a receptor is assumed to be exposed. Site-specific Remedial Action Objectives (RAOs) specify chemicals of concern (COCs), media of interest, exposure pathways, and cleanup goals or acceptable contaminant concentrations. The RAOs identified for the Site 15 soil are as follows:

- Prevent unacceptable human health risk associated with exposure to surface soil containing PAHs, arsenic, and lead at concentrations greater than the established site-specific SCTLs.
- Reduce ecological risk associated with exposure to surface soil containing PAHs and lead above site-specific ecological target levels.

A third RAO was developed in order to allow continued use of the site as a "green space," as follows:

- The remediation of the site will not adversely impact the anticipated future land use of the site, which is as a Natural and Recreation Corridor (TtNUS, 2005).

In accordance with Chapter 62-780, Florida Administrative Code (FAC), soil with concentrations greater than three times the site-specific SCTLs would be removed based on acute toxicity. Based on the existing conditions and the site-specific SCTLs, remediation or treatment would not be needed to address antimony, 1-methylnaphthalene, or 2-methylnaphthalene. Removal of soil with BaPEq and arsenic concentrations greater than three times their site-specific SCTLs is more than sufficient to result in site-wide UCLs less than the site-specific SCTLs. To be protective of human and ecological receptors, the existing onsite TRPH concentrations indicate that remediation or treatment would not be needed. However, TRPH concentrations exceed the leachability criterion of 340 milligrams per kilogram (mg/kg), the most restrictive FDEP SCTL for TRPH, in some locations. Because the volume of soil associated with the exceedance of the leachability criterion was relatively insignificant, it was agreed that the Pickup Value for TRPH would be based on the leachability criterion rather than conducting additional investigations to further delineate the extent of required cleanup (TtNUS, 2005).

The corresponding Pickup Values that comply with regulatory requirements and would obtain site-wide cleanup goals that allow for recreational use of the site are presented in Table 1-1 (TtNUS, 2005).

TABLE 1-1
Recreational Use Pickup Levels

COCs	Maximum Concentration Detected	Recreational Use Cleanup Goal	Recreational Use Pickup Level
BaPEq	956,000 µg/kg	2,250 µg/kg	6,750 µg/kg ⁽¹⁾
Arsenic	451 mg/kg	36 mg/kg	108 mg/kg ⁽¹⁾
Lead	41,400 mg/kg	3,281 mg/kg	6,500 mg/kg ⁽²⁾
TRPH	2,380 mg/kg	8,900 mg/kg	340 mg/kg ⁽³⁾

Notes:

µg/kg: micrograms per kilogram

mg/kg: milligrams per kilogram

COC: chemical of concern

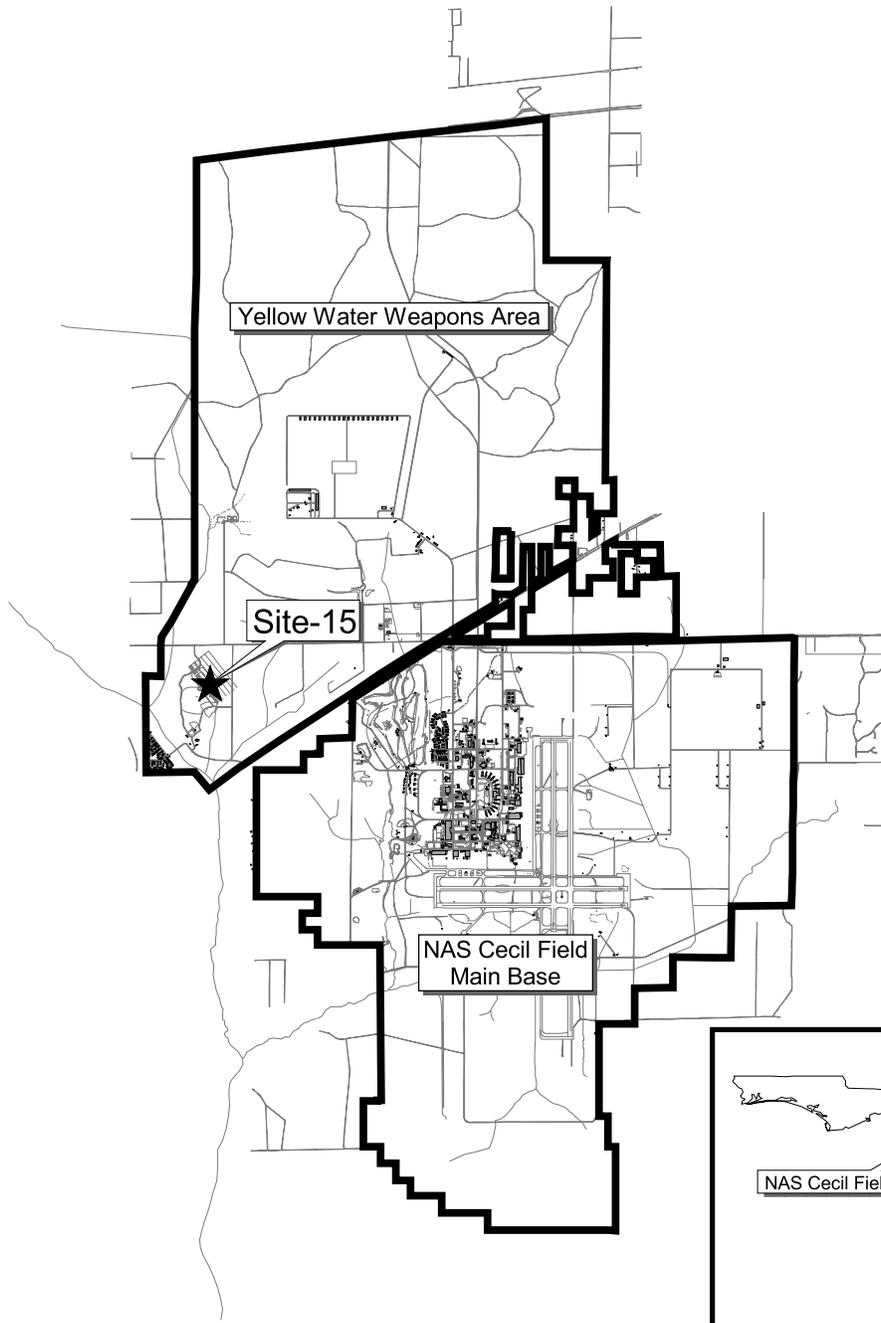
1 Three times the site-specific recreational SCTL as per FAC 62-780 for acute toxicity

2 Site-specific acute toxicity SCTL

3 Chapter 62-777 FAC leachability SCTL

1.2 Project Objectives

Based on the RI/FS for Site 15, Blue 10 Ordnance Disposal Area (TtNUS, 2005), the project objective is to excavate, transport, and dispose of approximately 11,600 cy of soil from 20 areas where COC concentrations are above the recreational use Pickup Levels in order to reduce human health risk and ecological risk and allow for the anticipated future land use as a Natural Resource and Recreation Corridor. The excavated areas will be backfilled with certified “clean” material and revegetated with all disturbed wetlands restored.



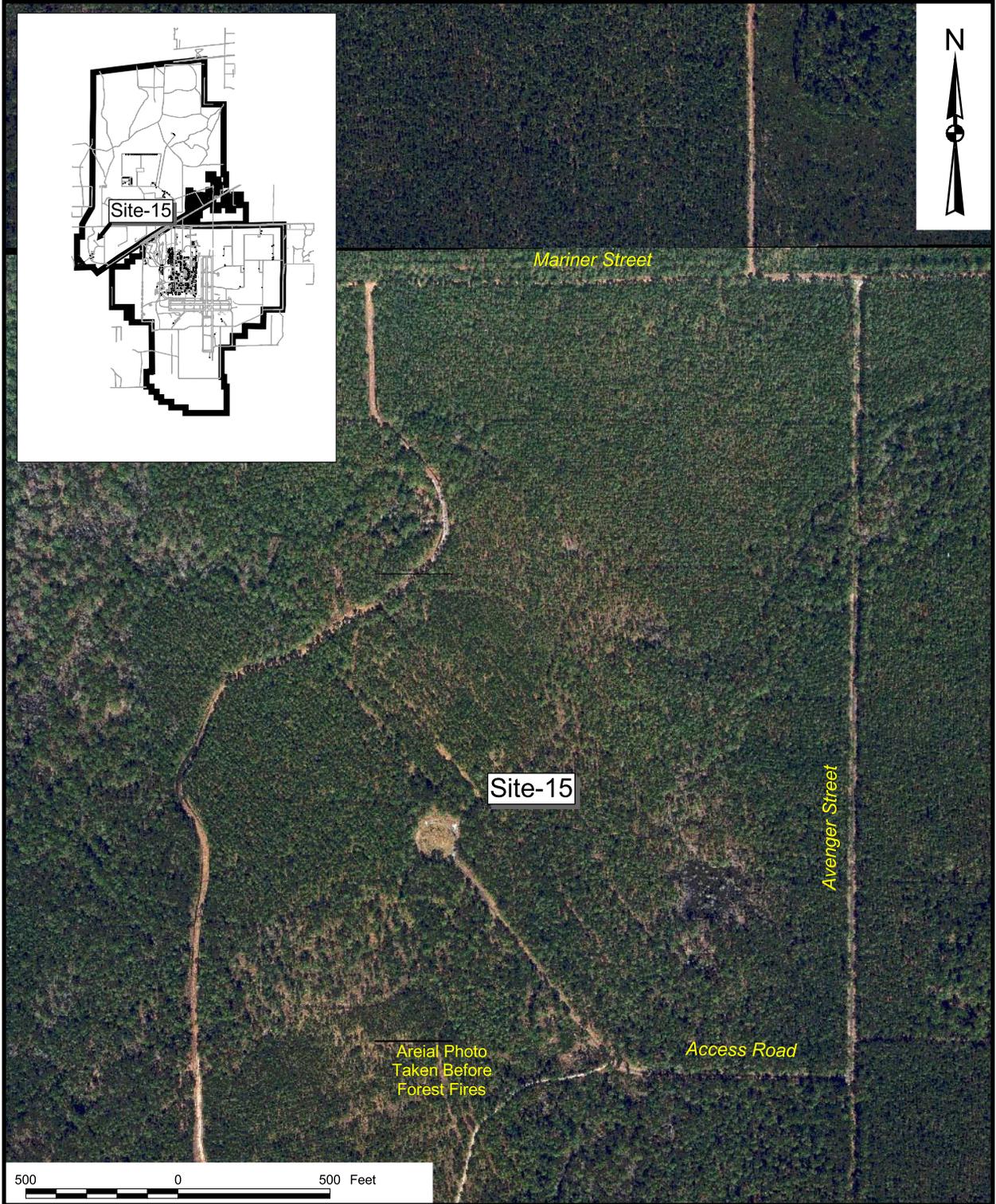
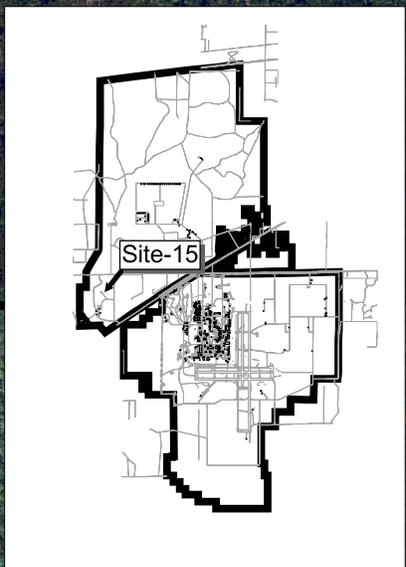
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COST/SCHEDULE-AREA	
SCALE AS NOTED	



GENERAL LOCATION MAP
OU 5, SITE 15
FEASIBILITY STUDY REPORT
NAS CECIL FIELD
JACKSONVILLE, FLORIDA

CONTRACT NUMBER 7653	
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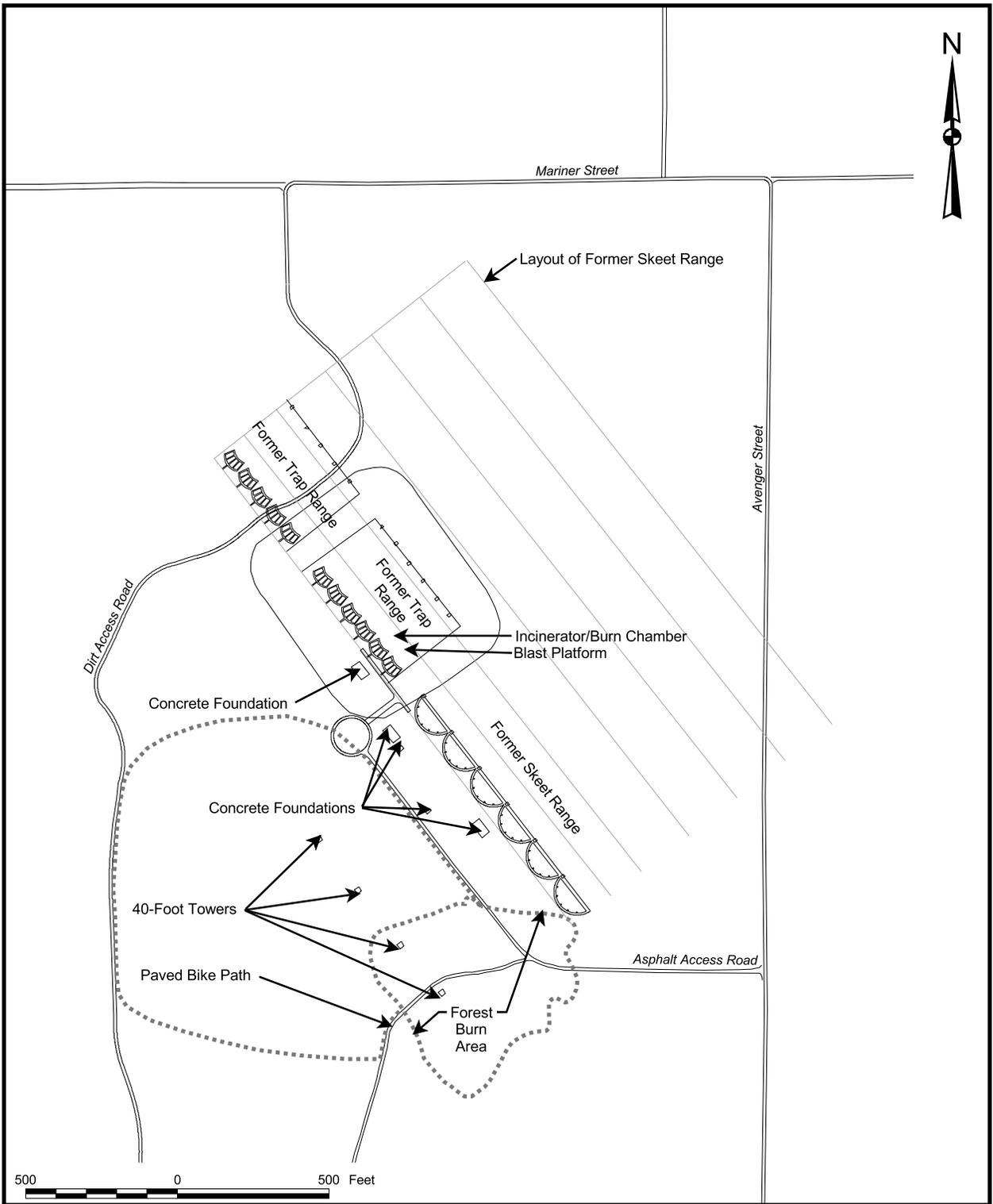


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SCALE AS NOTED	



SITE VICINITY MAP
 OU 5, SITE 15
 FEASIBILITY STUDY REPORT
 NAS CECIL FIELD
 JACKSONVILLE, FLORIDA

CONTRACT NUMBER 7653	
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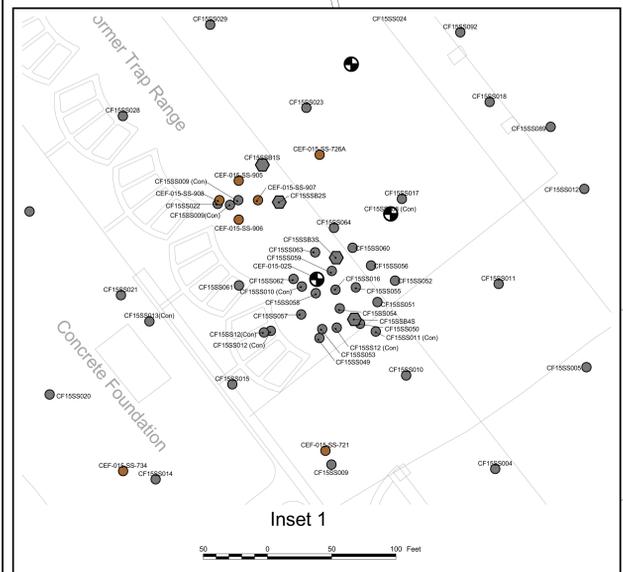
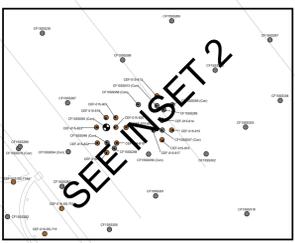
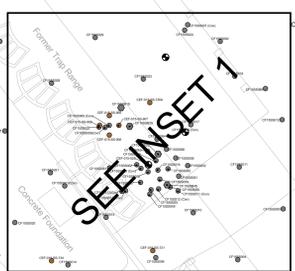
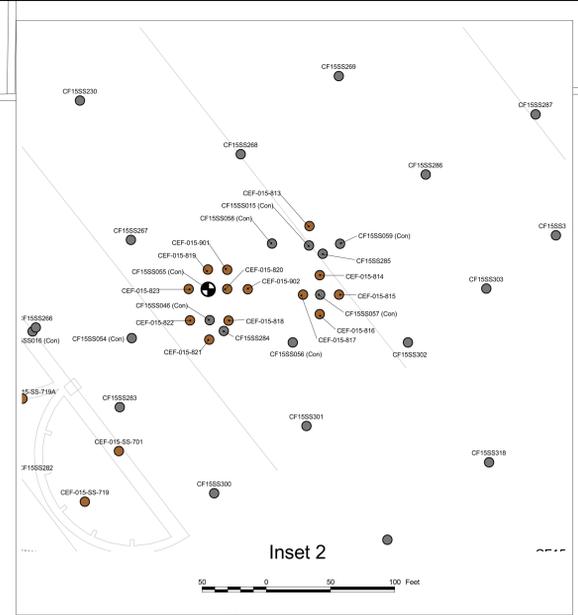
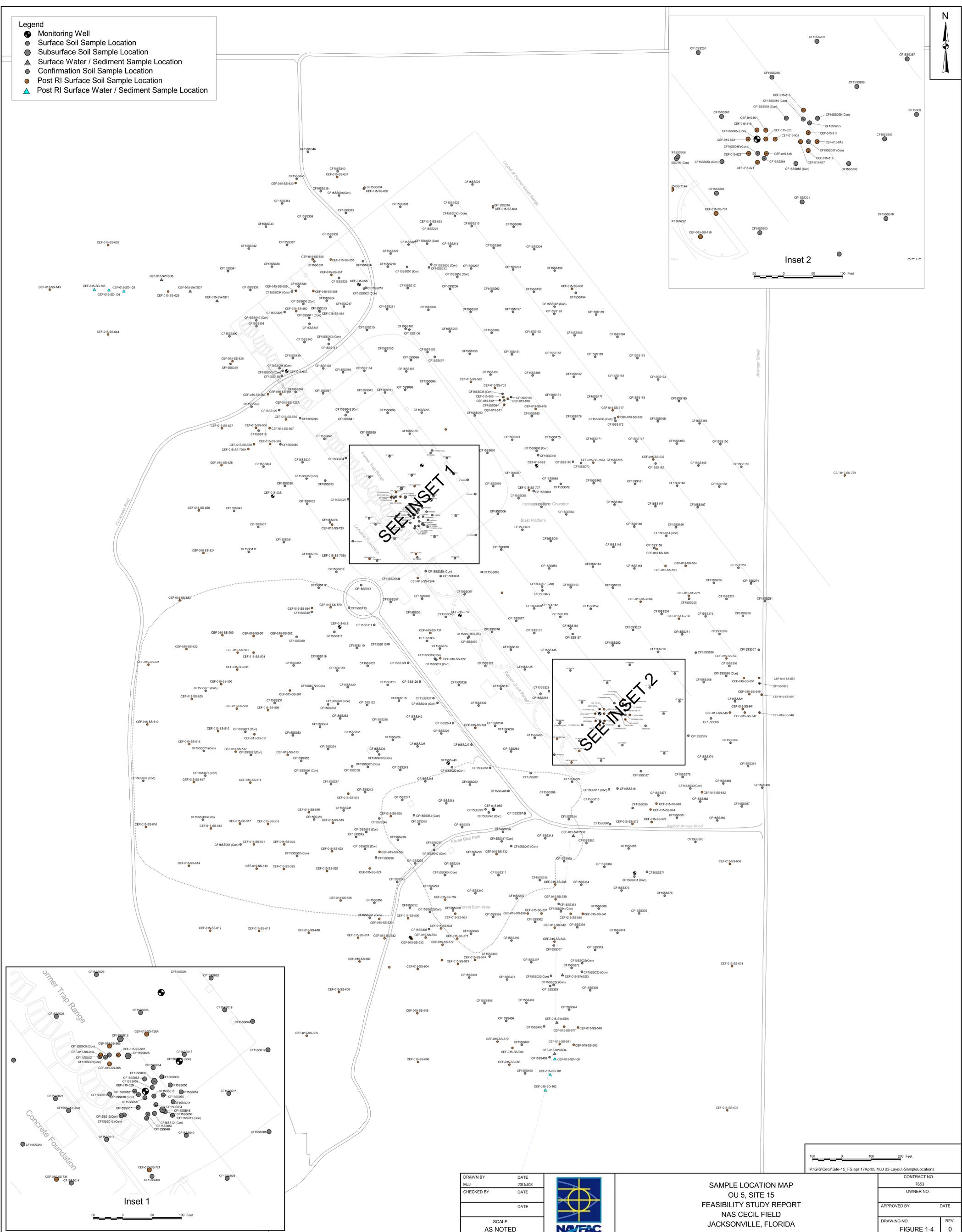
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GENERAL ARRANGEMENT
 OU 5, SITE 15
 FEASIBILITY STUDY REPORT
 NAS CECIL FIELD
 JACKSONVILLE, FLORIDA

CONTRACT NUMBER 7653	
APPROVED BY	DATE
APPROVED BY	DATE
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- Legend**
- Monitoring Well
 - Surface Soil Sample Location
 - Subsurface Soil Sample Location
 - ▲ Surface Water / Sediment Sample Location
 - Confirmation Soil Sample Location
 - Post RI Surface Soil Sample Location
 - ▲ Post RI Surface Water / Sediment Sample Location



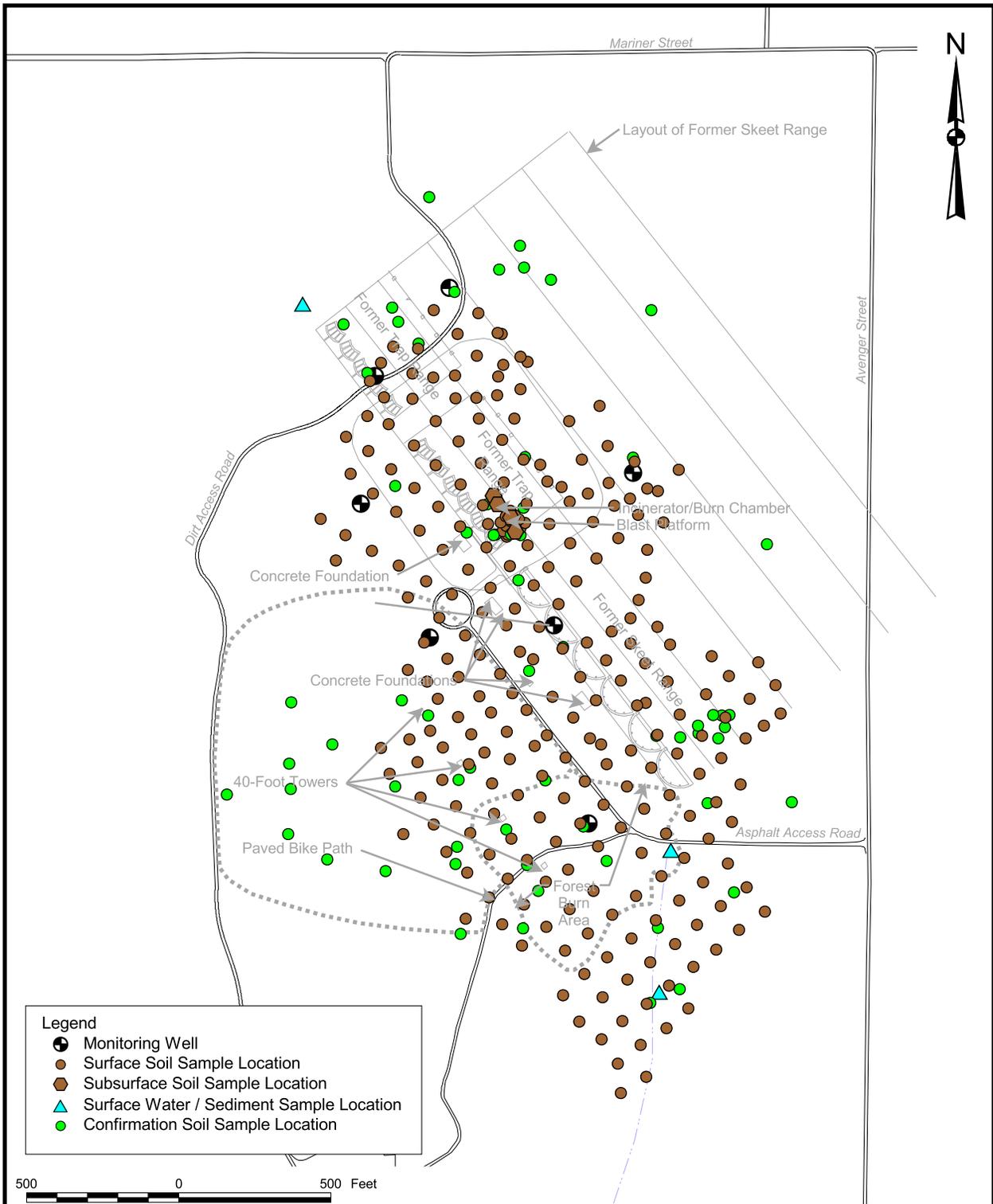
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SAMPLE LOCATION MAP
OU 5, SITE 15
FEASIBILITY STUDY REPORT
NAS CECIL FIELD
JACKSONVILLE, FLORIDA

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OWNER NO.	
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FIGURE 1-4	0



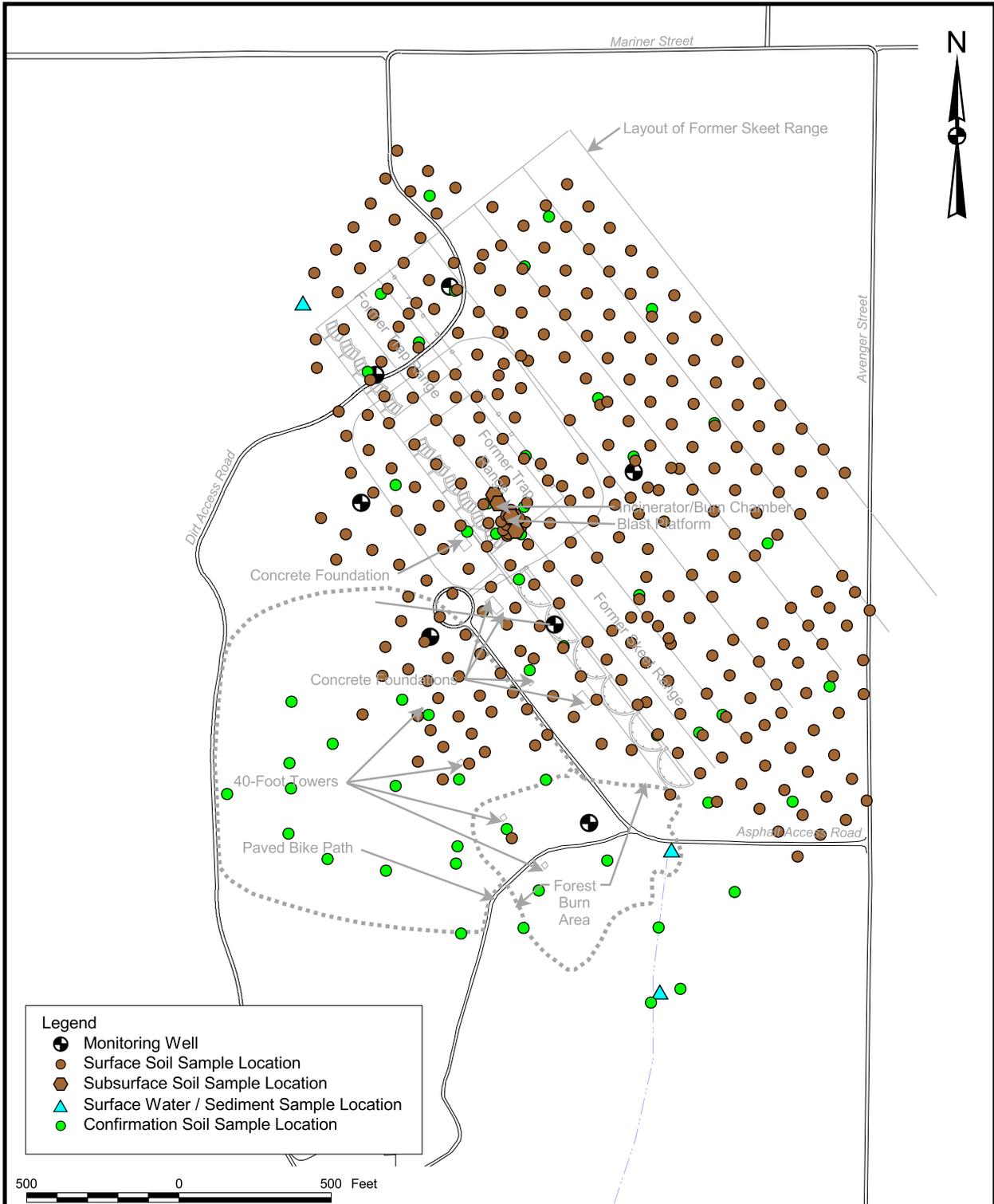
- Legend**
- Monitoring Well
 - Surface Soil Sample Location
 - Subsurface Soil Sample Location
 - ▲ Surface Water / Sediment Sample Location
 - Confirmation Soil Sample Location

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COST/SCHEDULE-AREA	
SCALE AS NOTED	



RI SAMPLING LOCATIONS SELECTED FOR
 PAH SCREENING & CONFIRMATORY SAMPLING
 OU 5, SITE 15
 FEASIBILITY STUDY REPORT
 NAS CECIL FIELD
 JACKSONVILLE, FLORIDA

CONTRACT NUMBER 7653	
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- Legend**
- Monitoring Well
 - Surface Soil Sample Location
 - Subsurface Soil Sample Location
 - Surface Water / Sediment Sample Location
 - Confirmation Soil Sample Location

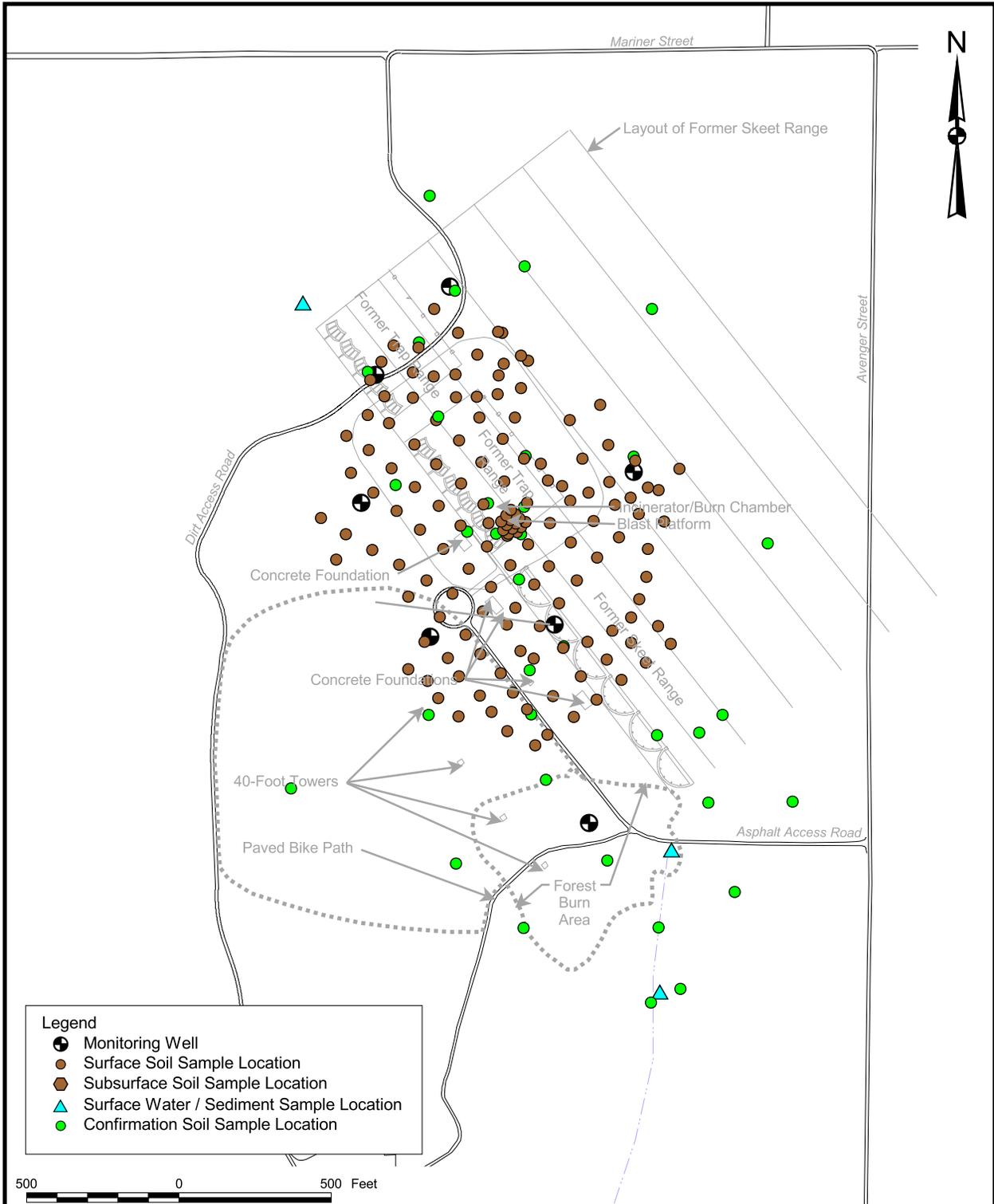


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SCALE AS NOTED	



RI SAMPLING LOCATIONS SELECTED FOR
 LEAD SCREENING & CONFIRMATORY SAMPLING
 OU 5, SITE 15
 FEASIBILITY STUDY REPORT
 NAS CECIL FIELD
 JACKSONVILLE, FLORIDA

CONTRACT NUMBER 7653	
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Legend

- Monitoring Well
- Surface Soil Sample Location
- Subsurface Soil Sample Location
- ▲ Surface Water / Sediment Sample Location
- Confirmation Soil Sample Location

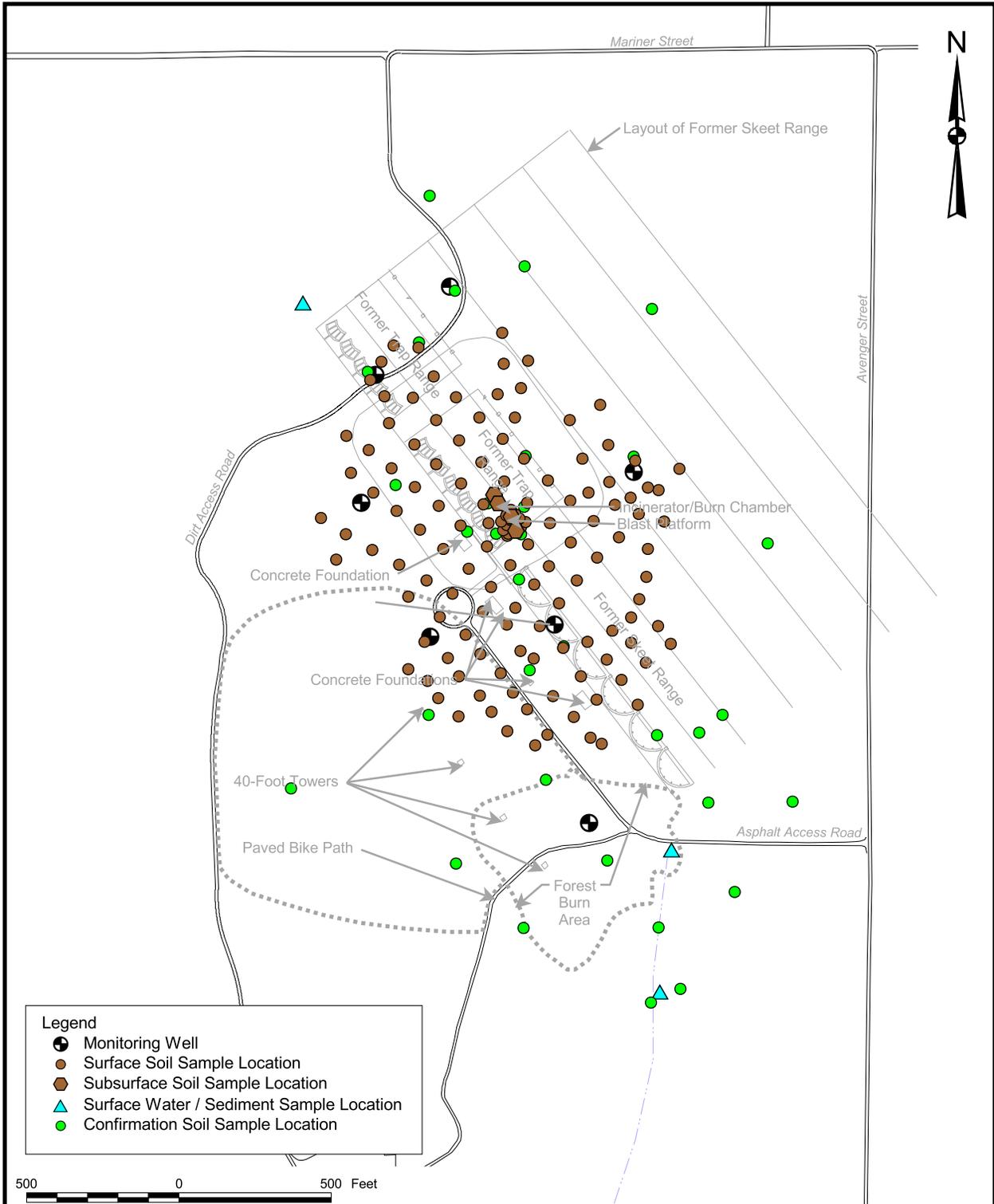


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COST/SCHEDULE-AREA	
SCALE AS NOTED	



RI SAMPLING LOCATIONS SELECTED FOR
TNT SCREENING & CONFIRMATORY SAMPLING
OU 5, SITE 15
FEASIBILITY STUDY REPORT
NAS CECIL FIELD
JACKSONVILLE, FLORIDA

CONTRACT NUMBER 7653	
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- Legend**
- Monitoring Well
 - Surface Soil Sample Location
 - Subsurface Soil Sample Location
 - ▲ Surface Water / Sediment Sample Location
 - Confirmation Soil Sample Location



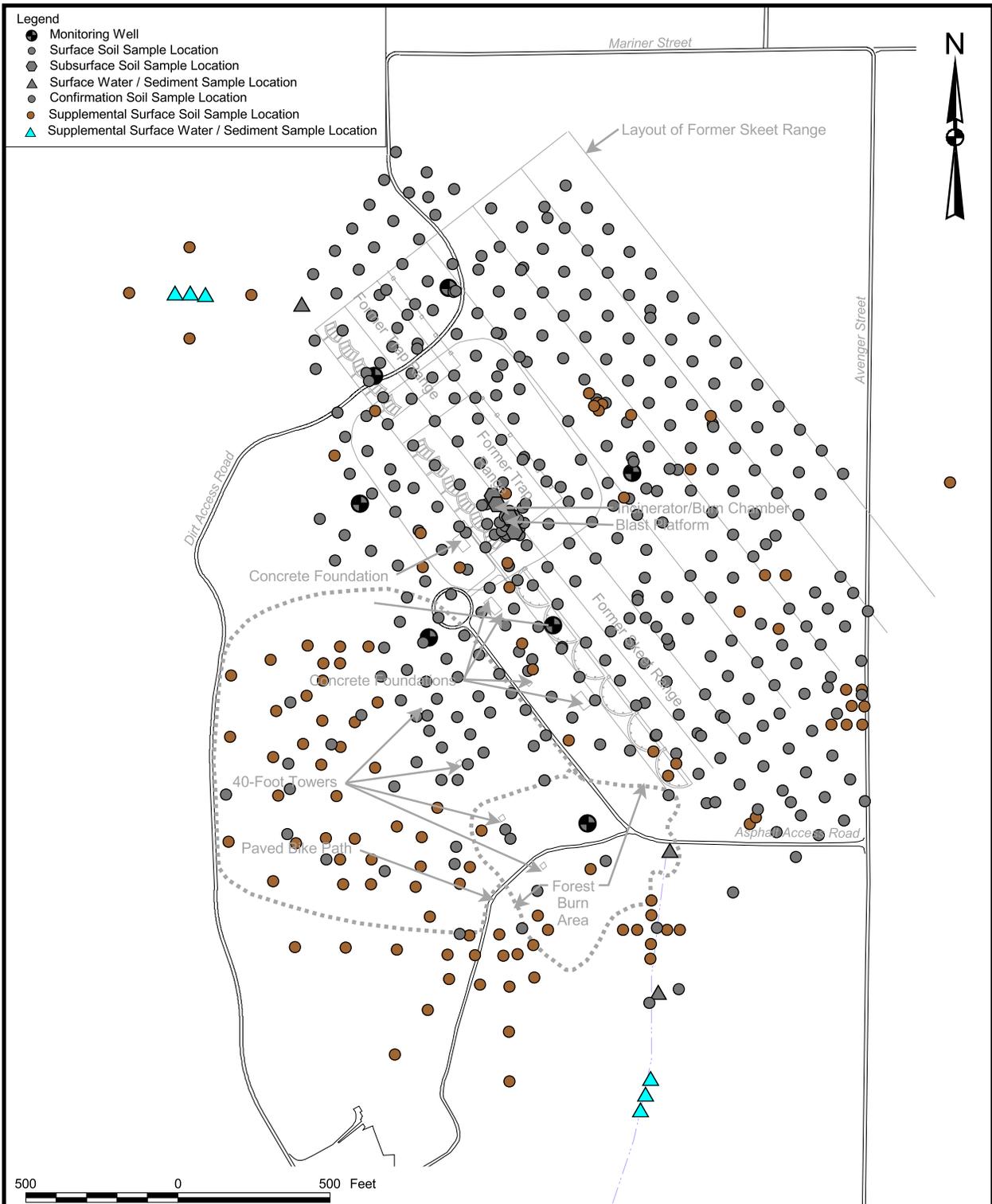
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SCALE AS NOTED	



RI SAMPLING LOCATIONS SELECTED FOR
 TRPH SCREENING & CONFIRMATORY SAMPLING
 OU 5, SITE 15
 FEASIBILITY STUDY REPORT
 NAS CECIL FIELD
 JACKSONVILLE, FLORIDA

CONTRACT NUMBER 7653	
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APPROVED BY	DATE
DRAWING NO. FIGURE 1-8	REV 0

- Legend**
- Monitoring Well
 - Surface Soil Sample Location
 - Subsurface Soil Sample Location
 - ▲ Surface Water / Sediment Sample Location
 - Confirmation Soil Sample Location
 - Supplemental Surface Soil Sample Location
 - ▲ Supplemental Surface Water / Sediment Sample Location

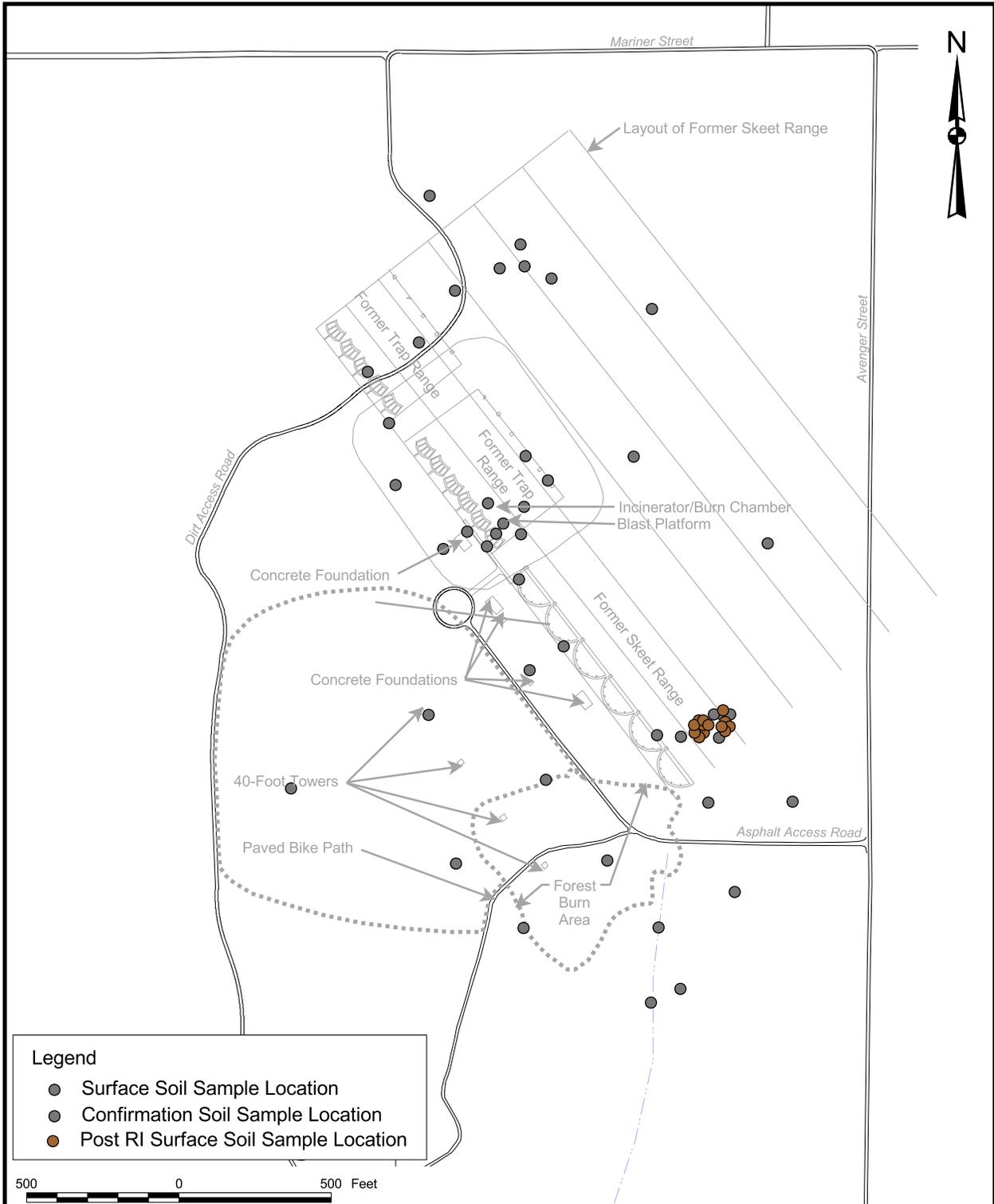


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SCALE AS NOTED	



SUPPLEMENTAL SURFACE SOIL/SEDIMENT
 SAMPLING LOCATIONS SELECTED FOR LEAD ANALYSIS
 OU 5, SITE 15
 FEASIBILITY STUDY REPORT
 NAS CECIL FIELD
 JACKSONVILLE, FLORIDA

CONTRACT NUMBER 7653	
APPROVED BY	DATE
APPROVED BY	DATE
DRAWING NO. FIGURE 1-10	REV 0



- Legend**
- Surface Soil Sample Location
 - Confirmation Soil Sample Location
 - Post RI Surface Soil Sample Location



DRAWN BY MJJ	DATE 21Jan00		SUPPLEMENTAL SURFACE SOIL/SEDIMENT SAMPLING LOCATIONS SELECTED FOR ARSENIC ANALYSIS OU 5, SITE 15 FEASIBILITY STUDY REPORT NAS CECIL FIELD JACKSONVILLE, FLORIDA		CONTRACT NUMBER 7653	
CHECKED BY	DATE		APPROVED BY	DATE	APPROVED BY	DATE
COST/SCHEDULE-AREA			DRAWING NO. FIGURE 1-11	REV 0		
SCALE AS NOTED						



Legend

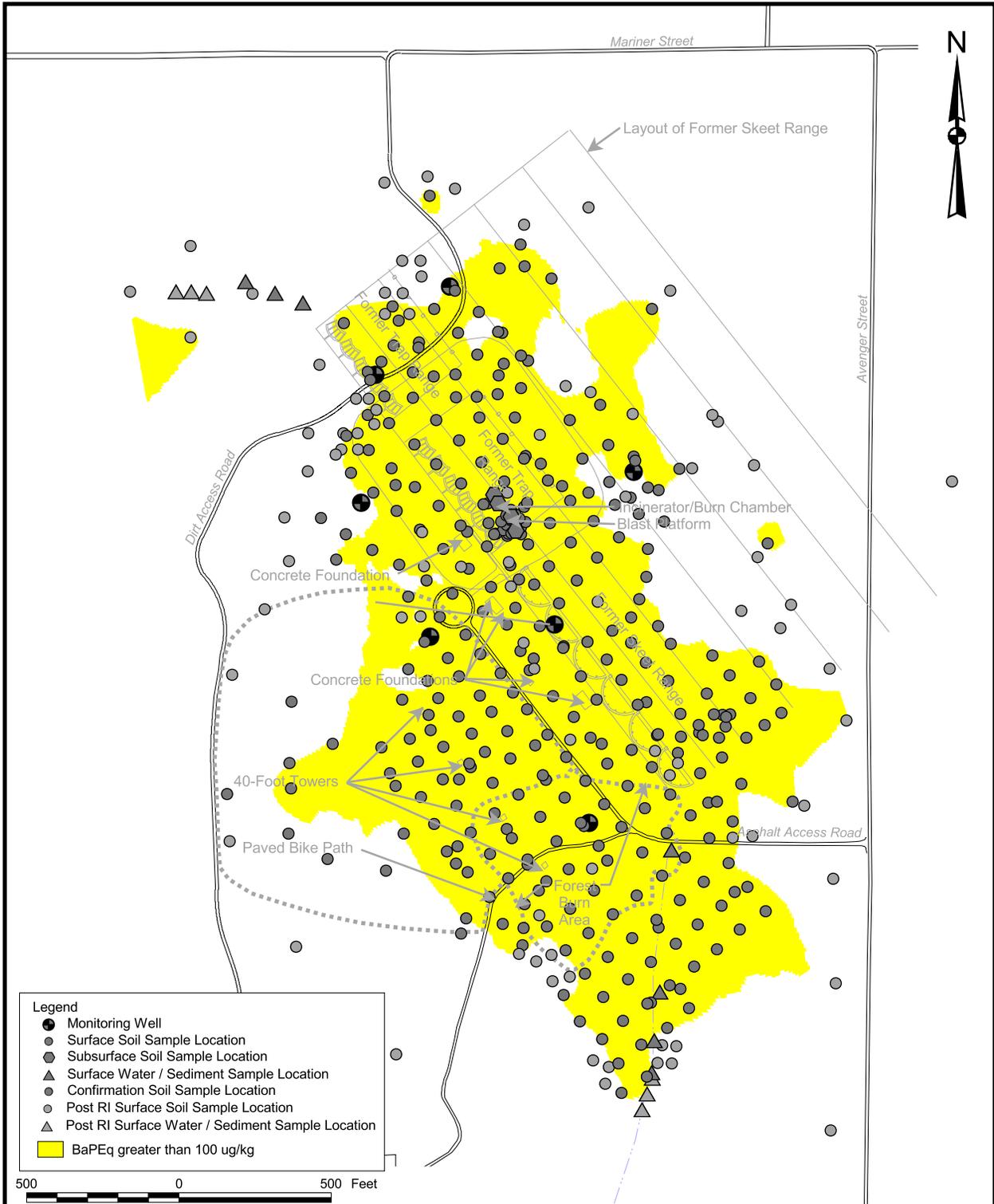
- Surface Soil Sample Location
- Confirmation Soil Sample Location
- Post RI Surface Soil Sample Location

DRAWN BY MJJ	DATE 21Jan00
CHECKED BY	DATE
COST/SCHEDULE-AREA	
SCALE AS NOTED	



SUPPLEMENTAL SURFACE SOIL/SEDIMENT
 SAMPLING LOCATIONS SELECTED FOR TRPH ANALYSIS
 OU 5, SITE 15
 FEASIBILITY STUDY REPORT
 NAS CECIL FIELD
 JACKSONVILLE, FLORIDA

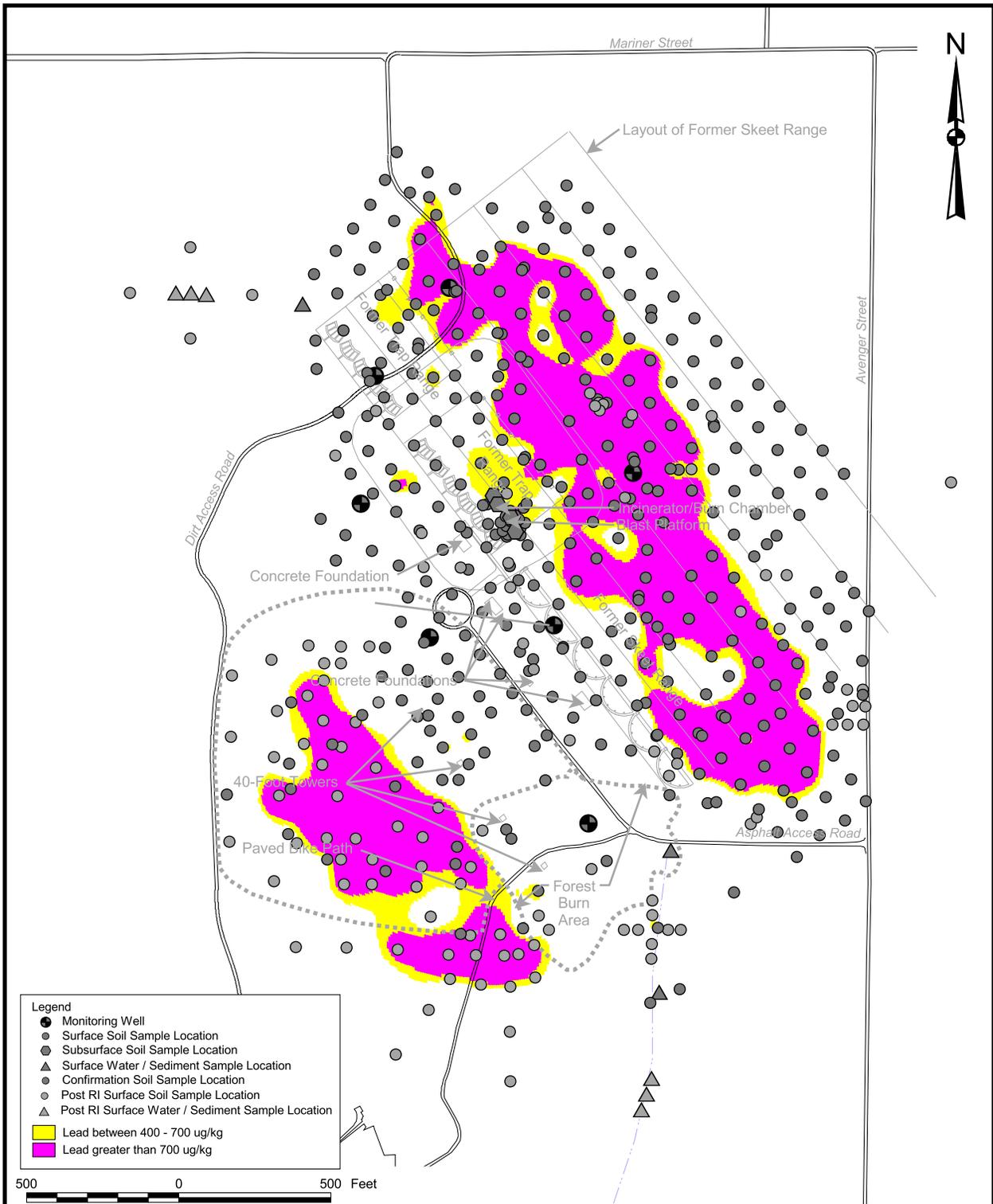
CONTRACT NUMBER 7653	
APPROVED BY	DATE
APPROVED BY	DATE
DRAWING NO. FIGURE 1-12	REV 0



- Legend**
- Monitoring Well
 - Surface Soil Sample Location
 - Subsurface Soil Sample Location
 - ▲ Surface Water / Sediment Sample Location
 - Confirmation Soil Sample Location
 - Post RI Surface Soil Sample Location
 - ▲ Post RI Surface Water / Sediment Sample Location
 - BaPEq greater than 100 ug/kg



DRAWN BY MJJ	DATE 21Jan00		PAH CONCENTRATIONS IN SURFACE SOIL SAMPLES EXCEEDING FDEP SCTLs OU 5, SITE 15 FEASIBILITY STUDY REPORT NAS CECIL FIELD JACKSONVILLE, FLORIDA		CONTRACT NUMBER 7653	
CHECKED BY	DATE		APPROVED BY	DATE	APPROVED BY	DATE
COST/SCHEDULE-AREA			DRAWING NO. FIGURE 1-13	REV 0		
SCALE AS NOTED						



- Legend**
- Monitoring Well
 - Surface Soil Sample Location
 - Subsurface Soil Sample Location
 - ▲ Surface Water / Sediment Sample Location
 - Confirmation Soil Sample Location
 - Post RI Surface Soil Sample Location
 - ▲ Post RI Surface Water / Sediment Sample Location
 - Lead between 400 - 700 ug/kg
 - Lead greater than 700 ug/kg



DRAWN BY MJJ	DATE 21Jan00
CHECKED BY	DATE
COST/SCHEDULE-AREA	
SCALE AS NOTED	



LEAD CONCENTRATIONS IN SURFACE SOIL SAMPLES
 EXCEEDING FDEP SCTLs
 OU 5, SITE 15
 FEASIBILITY STUDY REPORT
 NAS CECIL FIELD
 JACKSONVILLE, FLORIDA

CONTRACT NUMBER 7653	
APPROVED BY	DATE
APPROVED BY	DATE
DRAWING NO. FIGURE 1-14	REV 0

2.0 Project Execution Plan

The scope of work, project schedule, communications plan and traffic control plan are described in this section.

2.1 Scope of Work

The activities associated with the scope of work at Site 15 are as follows:

- Mobilization and site preparation
- Pre-excavation land survey
- Tree felling, brush clearing, and grubbing
- In-situ waste disposal characterization of 20 contaminated soil excavation areas
- Excavation and backfill of 20 contaminated soil excavation areas
- T&D of approximately 11,600 cy of contaminated soil
- Site restoration
- Decontamination and Demobilization
- Post excavation land survey
- Preparation and submittal of a Construction Completion Report

2.1.1 Mobilization and Site Preparation

This task will consist of the mobilization of personnel and equipment to the work area. Project management and scheduling activities, including contractor coordination, will be conducted from the CH2M HILL office located at the former NAS Cecil Field.

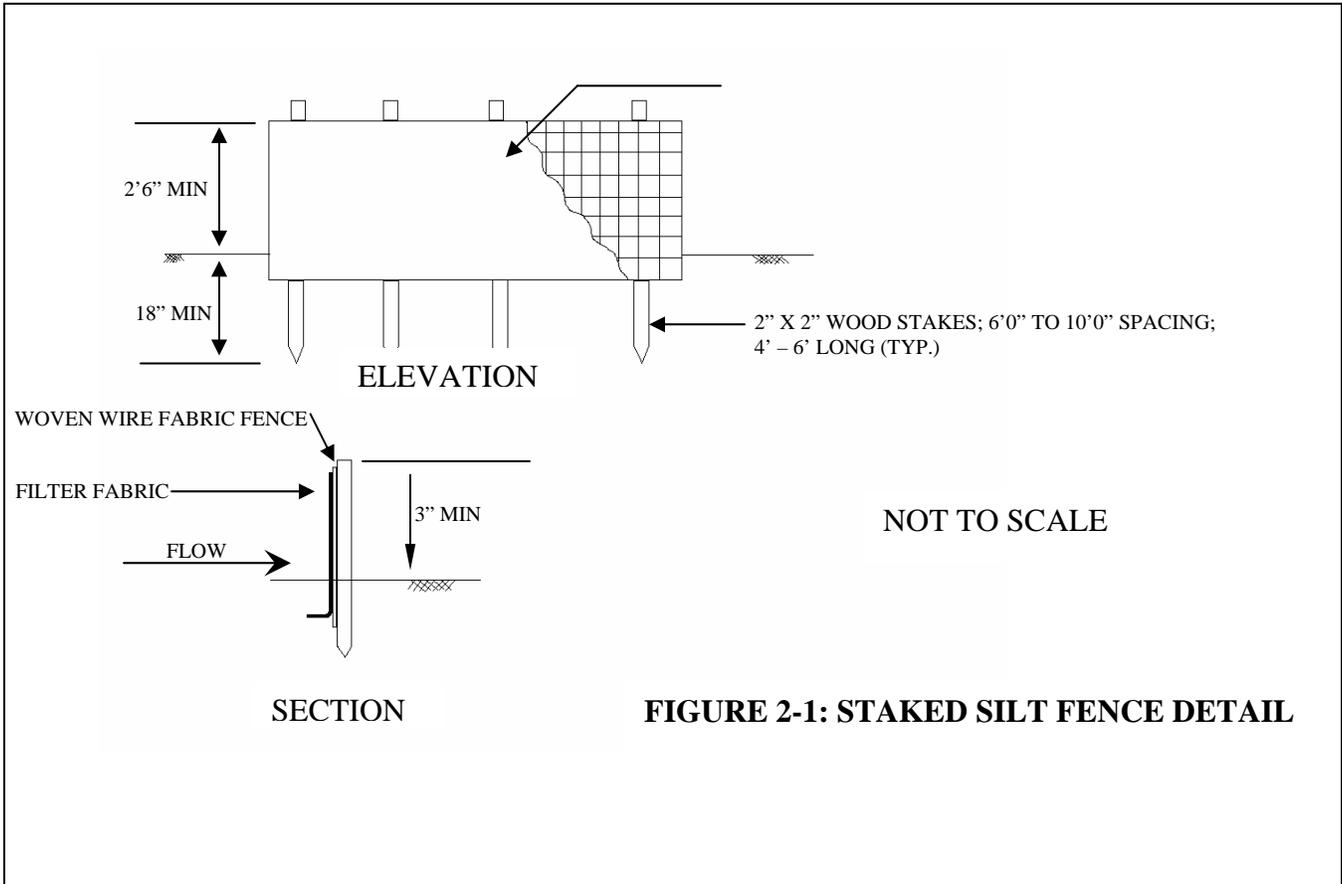
Prior to the commencement of work at the site, TtNUS will locate and mark the horizontal excavation limits using survey stakes and marking tape. CH2M HILL will coordinate with Sunshine State One Call of Florida and VT Griffin Global Services to complete a site utility survey, acquire utility layout plans of the area, and complete the excavation permit. Utilities in the work areas will be marked with paint and stakes, as appropriate. All marked utility lines in construction areas will be uncovered with hand tools. In addition, the progress of subsurface work will be continuously monitored for evidence of obstructions.

Any damage to underground utilities or subsurface structures will be immediately reported to VT Griffin Global Services and the Resident Officer in Charge of Construction (ROICC), and subsequently repaired by CH2M HILL using methods approved by VT Griffin Global Services and the ROICC.

A gopher tortoise survey will be conducted prior to any excavation activities to determine if any burrows of this species are within the areas to be disturbed by excavation activities. The Florida Fish and Wildlife Conservation Commission has established guidelines for the protection of the gopher tortoise under FAC Rules 68A-25.002 and 68A-27.002.

Erosion control measures will be implemented if soil is stockpiled or an excavation remains open overnight. Plastic sheeting, silt fencing, and hay bales will be available onsite should

weather conditions warrant covering and berming stockpiled material to control runoff or dust emissions. Figure 2-1 provides a detail of the staked silt fence that will be installed around the perimeter of any open excavation and drainage feature. Figure 2-2 shows a detail of the temporary barricade fencing to be placed around any excavations that remain open overnight. Figure 2-3 presents a detail of the temporary containment of excavated soil in the event soil is staged at the site overnight. This temporary containment will consist of straw bales around the perimeter of the staging area and a polyethylene liner and cover.



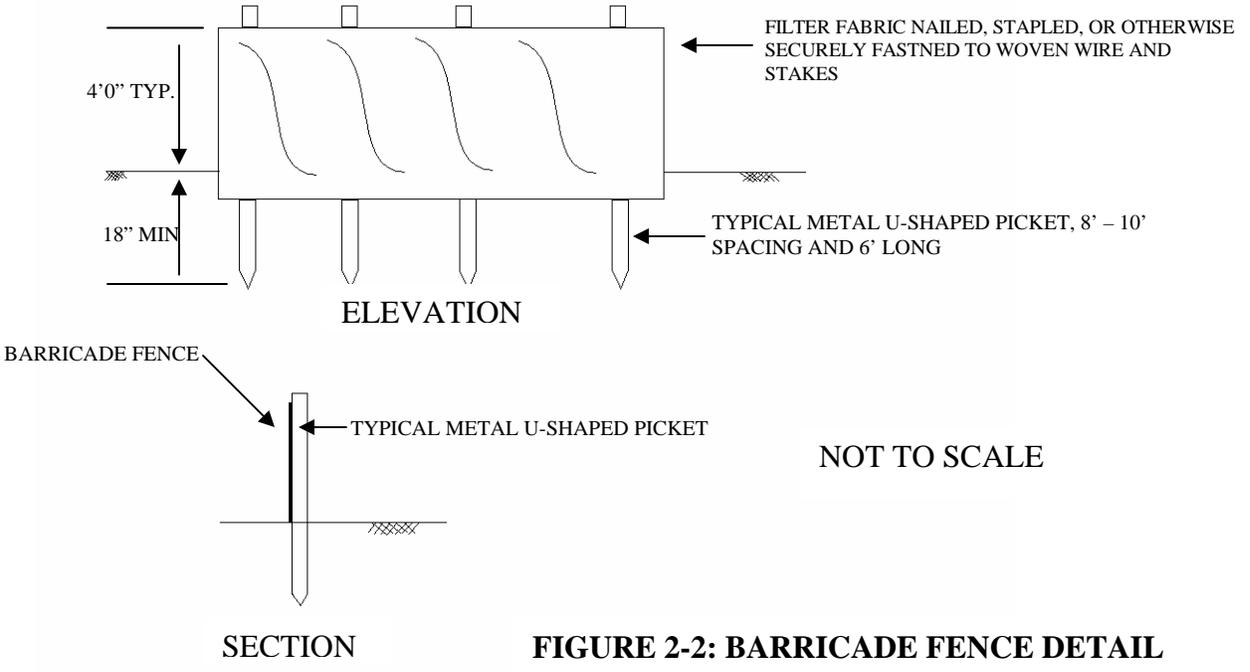


FIGURE 2-2: BARRICADE FENCE DETAIL

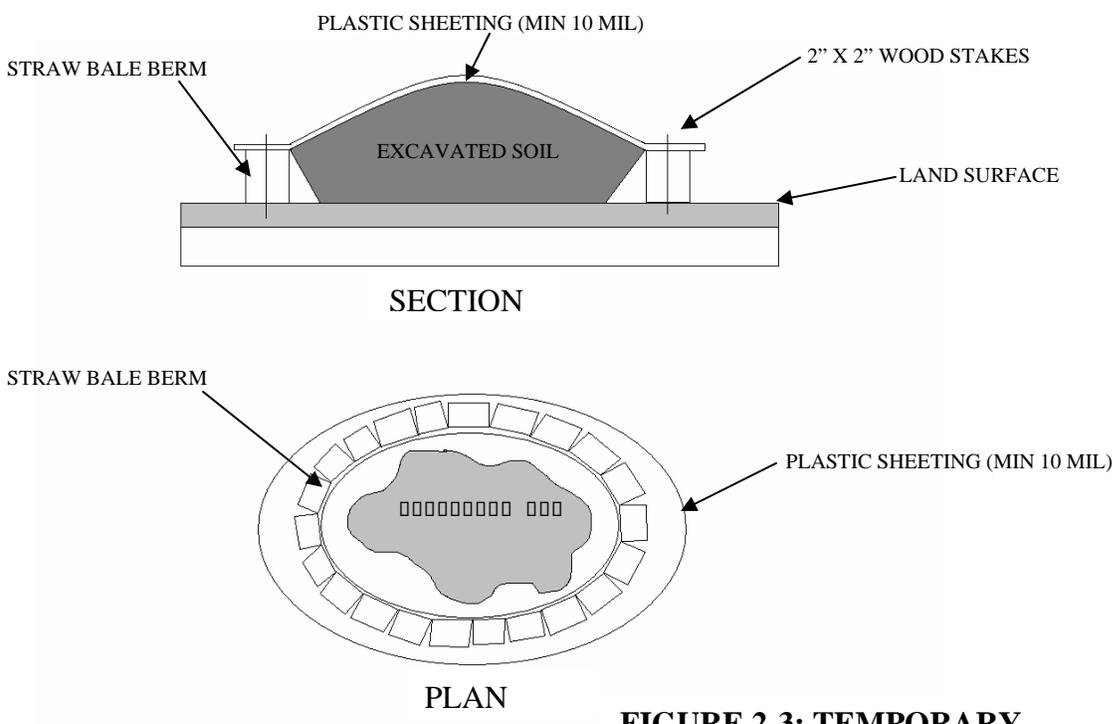


FIGURE 2-3: TEMPORARY CONTAINMENT OF EXCAVATED SOIL

2.1.2 Pre-excavation Survey

Site 15 will be surveyed by a Florida-registered professional land surveyor and pre-excavation drawings will be prepared for the site. The pre-excavation drawing will document surface/subsurface structure locations, locations of buried utilities, soil sample locations, and access road locations.

All survey data will conform to the Tri-Service Spatial Data Standards. Horizontal controls for graphic and non-graphic information are Mercator Projection, GRS 80, State Plan Coordinate System, North American Datum 1983, Lambert Zones 1 through 6 (or appropriate zone for region to be mapped). Vertical controls are Mean Sea Level, North American Vertical Datum, 1988.

2.1.3 Tree Felling, Brush Clearing, and Grubbing

Areas scheduled for tree felling and subsequent clearing and grubbing are shown on Figure 2-4. Tree clearing will be performed within the limits of each excavation and other areas necessary to complete excavation activities. Tree clearing will be kept to the minimum necessary to complete the project.

The majority of the trees to be cleared are slash pines. The trees will be cut to within 1 foot of ground surface using mechanical means. The cut trees will be transported to staging area(s) adjacent to the work area. At the staging area, the trees will be trimmed and cut, and loaded for transport. Pine tree limbs and smaller trees will be chipped using a tub grinder and spread within the newly cleared areas (or otherwise disposed by approved methods). All tree stumps in the excavation boundaries will be excavated, loaded, transported, and disposed of with the contaminated soil.

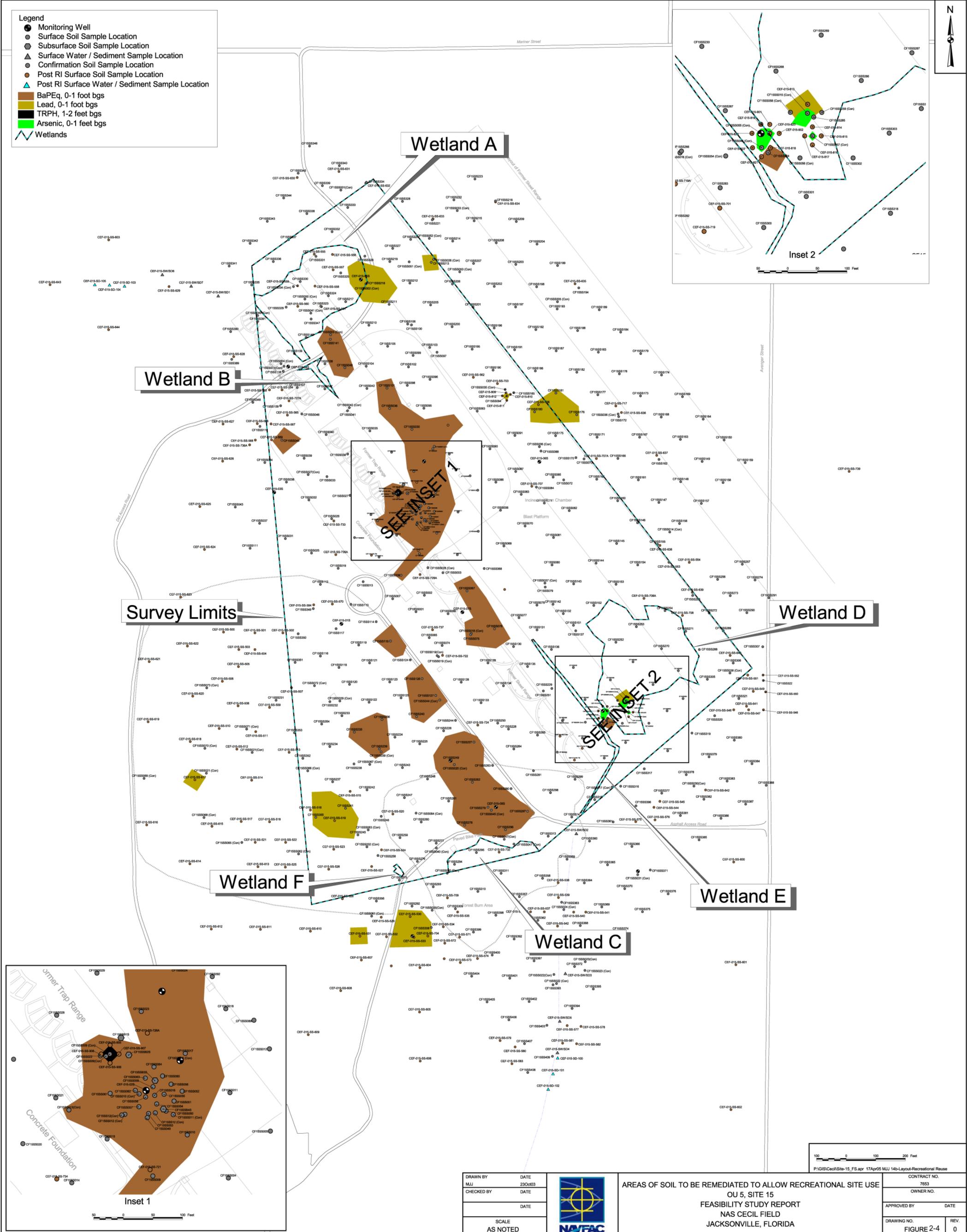
Clearing of brush and small trees remaining after tree clearing will be performed to provide access to the excavation and designated work areas. As needed, brush will be cut and mulched by mechanical means and will include removal of small trees, shrubs, grass, and weeds.

It is not anticipated that temporary access roads will be required, however, if needed, grubbing will be performed only within road right-of-ways. Grubbing limits will extend at least 2 feet on either side of the temporary access roads. These areas (access roads) will be grubbed to remove all stumps, large roots, buried logs, and other vegetative material. Protruding rocks and other debris will be removed from the road areas before installing geotextile sheeting to prevent punctures and tears. Grubbing debris will be chipped using a tub grinder and spread onsite within the newly cleared areas (or otherwise disposed by approved methods).

2.1.4 Pre-excavation Waste Characterization of Soil

Pre-excavation soil characterization sampling and analysis will be performed in accordance with Section 3.0 Sampling and Analysis Plan of this Work Plan Addendum prior to excavation to determine the necessary handling and T&D requirements for the contaminated soil. From within each of the 20 excavation areas, at least one composite sample from five representative locations per 300 tons of soil will be collected for

- Legend**
- Monitoring Well
 - Surface Soil Sample Location
 - Subsurface Soil Sample Location
 - ▲ Surface Water / Sediment Sample Location
 - Confirmation Soil Sample Location
 - Post RI Surface Soil Sample Location
 - ▲ Post RI Surface Water / Sediment Sample Location
 - BaPEq, 0-1 foot bgs
 - Lead, 0-1 foot bgs
 - TRPH, 1-2 feet bgs
 - Arsenic, 0-1 feet bgs
 - ▭ Wetlands



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SCALE	
AS NOTED	



AREAS OF SOIL TO BE REMEDIATED TO ALLOW RECREATIONAL SITE USE
 OU 5, SITE 15
 FEASIBILITY STUDY REPORT
 NAS CECIL FIELD
 JACKSONVILLE, FLORIDA

CONTRACT NO. 7853	
OWNER NO.	
APPROVED BY	DATE
DRAWING NO.	REV.
FIGURE 2-4	0

P:\GIS\CecilSite-15_FS_apr_17Apr05 MJJ 14b-Layout-Recreational Reuse

characterization. If an excavation area is larger than 300 tons, it will be divided into equal sections no larger than 300 tons and one composite sample will be collected from each section.

2.1.5 Excavation of Contaminated Soil, T&D, and Backfilling

Contaminated soil from 20 distinct areas with a combined surface area of 7.2 acres containing concentrations of the COCs greater than the recreational use Pickup Levels will be excavated. These areas are outlined below:

- PAH-contaminated soil with BaPEq concentrations greater than 6,750 µg/kg in nine areas totaling 235,900 square feet, from 0 to 1-foot below ground surface (bgs)
- Lead-contaminated soil with concentrations greater than 6,500 mg/kg in eight areas totaling 75,300 square feet, from 0 to 1-foot bgs
- Arsenic-contaminated soil with concentrations greater than 36 mg/kg in two areas totaling 1,600 square feet, from 0 to 1-foot bgs
- TRPH contaminated soil with concentrations greater than 340 mg/kg in one area totaling 500 square feet, from 1 to 2 feet bgs (This area is located within the excavation limits of one of the areas of PAH-contaminated soil.)

The proposed horizontal extents of contaminated soil excavation determined by TtNUS are shown on Figure 2-4. Approximately 11,600 cy of contaminated soil will be excavated from the site. Excavated contaminated soil will be managed, transported, and disposed of in accordance with Section 4.0 of this Work Plan Addendum.

Excavated contaminated material will be direct loaded in tandem trailer trucks for transportation and disposal; or contaminated material may be stockpiled on 20-mil polyethylene sheeting, covered with 10 or 6-mil polyethylene sheeting, and bermed as shown on Figure 2-3 and in accordance with Section 4.0 of this Work Plan Addendum to avoid the potential for contaminating the surrounding soil or surface water.

The excavated areas not located within previously delineated wetlands, as shown on Figure 2-4, will be backfilled to original grade in an even distribution with certified “clean” granular fill material from an offsite source. Fill material will be placed in maximum of 1-foot lifts and machine compacted. Topsoil is not required; however, the offsite material used for backfill will be capable of supporting vegetation.

Approximately 6,575 square feet of excavation area will impact previously delineated wetlands, as shown on Figure 2-4. Prior to backfilling, the soil surface in each excavation area will be gently disked to alleviate surface soil compaction caused by excavation equipment. The excavation areas will be backfilled to original grade in an even distribution with certified “clean,” naturally friable topsoil with a United States Department of Agriculture soil texture classification of loamy sand, sandy loam, or loam. Finer textural classification should not be used because surface runoff could pond within the excavation area for extended periods. The topsoil should be obtained from a source free of infestation by phragmites (*Phragmites australis*), reed canary grass (*Phalaris arundinacea*), or other plant species recognized as invasive in wetland settings. Fill material will be placed with no mechanical compaction.

Analytical results from an approved laboratory for a representative sample of each fill material are required to certify clean fill furnished from an offsite source(s). One sample from each fill source is required and the required analyses are specified in Section 3.0 Sampling and Analysis Plan of this Work Plan Addendum. Fill material must meet FDEP SCTLs for Direct Exposure – Residential or Leachability based on Groundwater Criteria, whichever is lower, as specified in Chapter 62-777 FAC to be certified as “clean.”

2.1.6 Site Restoration

Any disturbed areas caused by excavation operations not located within previously delineated wetlands will be restored to match pre-excavation conditions. This will include grading to provide drainage and hydro-seeding to match the existing grass type.

In disturbed areas caused by excavation operations located within previously delineated wetlands, the soil will be disked to incorporate 400 pounds per acre of 10-20-20 fertilizer and 2 tons per acre of agricultural lime into the topsoil. The seed mixture, consisting of the species of vegetation listed in Table 2-1, will be broadcast over the excavation footprint.

TABLE 2-1
Seed Mix

Scientific Name	Common Name	Seeding Rate (lb. PLS/A)	Quantity Required (lb. PLS)
Panicum virgatum	Switchgrass	25	47.5
Dichanthelium clandestim	Deertongue grass	12	22.8
--	Winter Rye	20	38

Note: lb. PLS/A = Pounds Pure Live Seed per Acre

2.1.7 Post Excavation Survey

On completion of the project, Site 15 will be surveyed by a Florida-registered professional land surveyor and post-excavation as-built construction drawings prepared. The post-excavation drawings will document surface/subsurface structure locations, limits of excavation, locations of buried utilities, access road locations, locations of land clearing, locations of disturbed and restored wetlands, and any deviations encountered.

All survey data will conform to the Tri-Service Spatial Data Standards. Horizontal controls for graphic and non-graphic information are Mercator Projection, GRS 80, State Plan Coordinate System, North American Datum 1983, Lambert Zones 1 through 6 (or appropriate zone for region to be mapped). Vertical controls are Mean Sea Level, North American Vertical Datum, 1988.

2.1.8 Decontamination and Demobilization

Personnel and equipment will be properly decontaminated to remove all contamination that may be adhering to personnel or equipment as a result of remedial activities. Any water accumulated during the decontamination process will be containerized in 55-gallon drums or portable tanks, sampled in accordance with Section 3.0 Sampling and Analysis Plan, and managed, transported, and disposed in accordance with Section 4.0 Waste Management

Plan of this Work Plan Addendum. Decontamination of personnel and equipment will be performed in accordance with the site-specific Health and Safety Plan provided in Appendix B and the applicable provisions of 29 Code of Federal Regulations (CFR) 1910.120.

During demobilization, temporary facilities, utilities, and equipment will be removed from the site. In addition, any debris or solid waste material remaining from construction activities will be removed and properly disposed of offsite in accordance with Section 4.0 Waste Management Plan of this Work Plan Addendum.

2.1.9 Construction Completion Report

A Construction Completion Report will be prepared to document the activities performed to complete the scope of work and will include:

- Introduction
- Summary of action
- Survey construction drawings showing pre-excavation and post-excavation site conditions
- Site photographs
- Complete set of all field test and laboratory analytical results, including waste characterization and backfill certification laboratory analytical results
- Documentation of offsite transportation and treatment of materials, including approved waste disposal profiles, copies of the final manifests and weight tickets, and the certificate of destruction/recycle

2.2 Project Schedule

The major project activities and estimated duration for each are outlined below. Field work will begin following Work Plan Addendum approval. A detailed Project Schedule is included in Appendix A of this Work Plan Addendum.

- | | |
|--|----------|
| • Pre-construction meeting/Submittal Preparation/Reviews | 2 weeks |
| • Pre-excavation Soil Characterization | 2 weeks |
| • Backfill Material Certification | 2 weeks |
| • Site Preparation | 3 weeks |
| • Excavation, Backfill, and T&D of Contaminated Soil | 15 weeks |
| • Site Restoration | 1 week |
| • Construction Completion Report | 12 weeks |

CH2M HILL anticipates the total project duration will be approximately 35 weeks. This proposed schedule may vary depending on the actual conditions encountered in the field.

2.3 Communications Plan

A communication matrix outlining the lines of communications for NAVFAC EFD SOUTH and CH2M HILL is presented in Table 2-2. Table 2-3 provides a project personnel directory.

TABLE 2-2
Communications Matrix

CH2M HILL Position	Navy Direct Report
Ray Tyler, Executive Sponsor	Eva Clement, CO
Scott Smith, Program Manager	Dorothy Okamoto, COTR Richard Stanley, ACO
Michael Halil, CTO Project Manager	Dorothy Okamoto, COTR Richard Stanley, ACO Mark Davidson, RPM Larry Blackburn, NTR/ROICC

CO – Contracting Officer
ACO – Administrative Contracting Officer
NTR – Navy Technical Representative
RPM – Remedial Project Manager
COTR – Contracting Officer’s Technical Representative

TABLE 2-3
Project Personnel Directory

Contact	Company
Scott Smith, Program Manager Joe Giandonato, Contracts Administration Manager Richard Rathnow, Health and Safety Manager Theresa Rojas, QA/QC Manager	CH2M HILL Constructors, Inc 115 Perimeter Center Place, N.E. Suite 700 Atlanta, GA 30346-1278 770/604-9095
Michael Halil, Project Manager	CH2M HILL Constructors, Inc 6219 Authority Avenue Jacksonville, FL 32221 904/777-4812 x. 233
Eva Clement, CO	NAVFAC EFD SOUTH P.O. Box 190010 North Charleston, SC 29419-9010 843/820-5518
Richard Stanley, ACO	As above 843/820-5939
Dorothy Okamoto, COTR	As above 843/820-5940
Mark Davidson, RPM	As above 843/820-5526
Larry Blackburn, NTR/ROICC	Engineering Field Activity Southeast Environmental Programs Coordinator/Resident Officer in Charge of Construction P. O. Box 139, Building 13 NAS Jacksonville, FL 32212-0139 904/ 542-8745 ext.1116

2.4 Traffic Control Plan

Traffic control will be the responsibility of the CH2M HILL Project Superintendent. CH2M HILL will minimize disturbance to Cecil Commerce Center traffic patterns during project activities. CH2M HILL will consult with onsite personnel to evaluate site access, placement of equipment, and traffic flow to minimize the impact of this work to Cecil Commerce Center operations.

3.0 Sampling and Analysis Plan

This SAP describes the tasks and responsibilities of CH2M HILL with respect to the sampling and analysis associated with the work effort described in this Work Plan Addendum. CH2M HILL intends this document to be a site-specific guide for use by the field team while performing the project-required 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 Project Manager and Project Chemist.

Samples will be collected in accordance with the United States Environmental Protection Agency (USEPA) Region IV Environmental Investigative Standard Operating Procedures and Quality Assurance Manual (EISOPQAM), November 2001 and FDEP 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.

A Navy, U.S. Army Corps of Engineers (USACE)-, or Air Force Center for Environmental Excellence (AFCEE)- and FDEP-approved laboratory will be used for all sample analyses.

3.1 Data Quality Levels for Measurement Data

The data quality levels for each sampling task are listed in Table 3-1. The sampling events, sampling and analytical requirements, and the required level of quality and data packages are listed in Table 3-2. 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.

TABLE 3-1
Data Quality Levels

Sampling Activity	Data Quality Level Category
Clean Fill Certification (offsite laboratory analyses)	Definitive
Liquid Waste Characterization (offsite laboratory analyses)	Definitive
Solid Waste Characterization (offsite laboratory analyses)	Definitive

**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 Preservtn	Containers
Soil/Solids Characterization Sampling													
Soil/Solids Characterization Sampling	Within Each of 20 Excavation Areas	Soil/ Solids	One per 300 tons	65	Composite 5 random grabs into 1 sample	SS spoon, SS bowl	7 day	CCI Level B	TCLP Volatiles	1311/8260B	14 day TCLP extr; 14 day analysis	Cool to 4°C	(1) 4 oz amber glass
									TCLP Semi-Volatiles	1311/8270C	14 day TCLP extr; 7 day extr; 40 day analysis		(4) 8 oz amber glass
									TCLP Metals	1311/6010A/7470	6 month TCLP extr; 6 month analysis Hg: 28 day TCLP extr; 28 day analysis		
									TCLP Pesticides	1311/8081A	14 day TCLP extr; 7 day extr; 40 day analysis		
									TCLP Herbicides	1311/8151A	14 day TCLP extr; 7 day extr; 40 day analysis		
									PCBs	8082	14 day extr; 40 day analysis		
									Corrosivity	9045a	ASAP		
Ignitability	1010/1020	ASAP											
Liquid Characterization Sampling													
Liquid Characterization Sampling (to include drummed liquid / plastic and decon water)	Drums	Water	Once	1	Grab	Drum thief or dip jar	7 days	CCI Level B	TCL Volatiles	8260B	14 days	HCl pH< 2; Cool to 4°C	(2) 40 ml vial
									TCL Semi-volatiles	8270C	7 days ext; 40 days analysis	Cool to 4°C	(3) 1L amber glass
									TCL Pesticides	8081A	7 days ext; 40 days analysis		
									TCL Herbicides	8151A	7 day extr; 40 day analysis		
									PCBs	8082	7 day extr; 40 day analysis	(1) L amber glass	
									TAL Metals	6010B/7470A	180 days; Hg=28 days	HNO3 pH< 2; Cool to 4°C	(1) 500ml HDPE
									Ignitability	1010	ASAP	Cool to 4°C	(1) 250 mL amber glass
Corrosivity	9040B	ASAP	(1) 250 mL amber glass										

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 Preservtn	Containers
Backfill Characterization Sampling													
Characterization of Backfill Material	Once per Off-Site Source	Soil	As necessary	2	Composite 5 random grabs into 1 sample (Do not composite VOCs)	SS spoon, SS bowl, TerraCore samplers, (3) Prepared 40 ml vials (4 or 8 oz jar for stone)	7 days	CCI Level C	TCL Volatiles	5035/8260B	14 day	Methanol; Sodium Bisulfite; H2O; Cool to 4°C	TerraCore samplers, (3) Prepared 40 ml vials and 4 oz jar for stone
									TCL Semi-Volatiles	8270C	14 day extr; 40 day analysis		
									PAHs (including 1- and 2- Methyl-naphthalene)	8270C (low-level)	14 day extr; 40 day analysis		
									TCL Pesticides	8081A	14 day extr; 40 day analysis		
									TCL Herbicides	8151A	14 day extr; 40 day analysis		
									PCBs	8082	14 day extr; 40 day analysis		
									TRPH	FL-PRO	14 day extr; 40 day analysis		
									TAL Metals	6010B/7471	6 month; Hg 28 days		
	pH	9045B	ASAP										
	Trip Blank	Water	1 Per cooler containing volatile samples	2	Prepared by Lab	(2) 40 mL vials	7 days	CCI Level C	TCL Volatiles	8260B	14 day	HCl pH< 2; Cool to 4°C	(2) 40 mL vials

Notes:
1. Calendar days

3.2 Sampling Objectives

The sampling objectives for this project will be as follows:

- Collect samples for verification of backfill materials.
- Collect in-situ samples of soil within excavation areas for waste characterization.
- Collect samples for water used in equipment decontamination, as necessary.

3.3 Backfill Certification

In order to certify backfill source materials as uncontaminated or equal to site conditions, one sample for backfill certification will be collected from each site and source used to provide backfill materials. Backfill material must meet FDEP SCTLs for Direct Exposure – Residential or Leachability based on Groundwater Criteria, whichever is lower, as specified in Chapter 62-777 FAC.

The samples will be collected in the following manner and analyzed in accordance with Table 3-2.

Procedure for Collecting Volatile Fractions

1. Using an auger, split spoon, or other device, retrieve a core from the stockpile or borrow source area to be tested.
2. Remove the core from the auger, split spoon, or other device.
3. Using a TerraCore sampler, take an approximate 5-gram sample from the core.
4. Place the 5-gram sample into a pre-preserved volatile organic analytic (VOA) vial and seal the cap tightly. Repeat for all vials provided by the laboratory (Note: Ideally, the entire operation – filling the TerraCore sampler, pushing it into the vial, and capping the vial – should not take more than 1 minute).
5. After filling the required VOA vials, fill a 4-ounce jar completely full with the remaining core sample. This will be used by the laboratory to determine percent moisture.
6. Label the vials.
7. Place in cooler for shipment to the laboratory.

Procedure for Collecting Non-Volatile Samples

1. From five randomly selected sample locations, collect several spoonfuls of the soil into a stainless steel bowl.
2. Homogenize the five grab samples by the quartering techniques using the stainless steel spoon.
3. Fill the appropriate sample jars full with the homogenized sample.
4. Close the jar, label, and package the sample for shipment to the laboratory.

A CH2M HILL Level C data package will be required along with appropriate QC samples for required analyses. All analytical data will be submitted by both hard copy and electronic files.

3.4 Soil Disposal Characterization

Solid waste from the site will be in the form of excavated contaminated soil. Pre-excavation soil characterization sampling and analysis will be performed prior to excavation to determine the necessary handling and T&D requirements for the contaminated soil. From within each of the 20 excavation areas, at least one composite sample from five representative locations per 300 tons of soil will be collected for characterization. If an excavation area is larger than 300 tons, it will be divided into equal sections no larger than 300 tons and one composite sample will be collected from each section. An estimated 65 samples will be collected from Site 15 for soil disposal characterization. Additional samples may be necessary pending the types of waste streams generated. The samples will be collected in the following manner and analyzed in accordance with Table 3-2.

Procedure for Collecting Volatile Fractions

1. At the selected sample location, using an auger, split spoon, or other similar device retrieve a core.
2. Fill the appropriate (4 oz jars) sample jars completely full with the sample from the core.
3. Close the jar, label, and package the sample for shipment to the laboratory.

Procedure for Collecting Non-Volatile Samples

1. From five additional randomly selected sample locations, collect several spoonfuls of the soil into a stainless steel bowl.
2. Homogenize the five samples by the quartering techniques using the stainless steel spoon.
3. Fill the appropriate sample jars completely full with the homogenized sample.
4. Close the jar, label, and package the sample for shipment to the laboratory.

A CH2M HILL Level B data package will be required along with appropriate QC samples for required analyses. All analytical data will be submitted by both hard copy and electronic files.

3.5 Decontamination Water Disposal Characterization

Liquid waste from the site will be in the form of decontamination water. Decontamination water will be containerized in 55-gallon drums or portable tanks. It is estimated that one sample will be needed to perform characterization of the decontamination water. Additional samples may be necessary pending the types of waste streams generated. The sample will be collected in the following manner and analyzed in accordance with Table 3-2.

1. Using a bailer or dip jar, collect a water sample from its containment.

2. The sample containers for volatile analyses will be filled first. The 40-ml vials will be filled so that there is no headspace in each vial.
3. The sample containers for the remaining analyses will then be filled.
4. Label and package the samples for shipment to the laboratory.

A CH2M HILL Level B data package will be required along with appropriate QC samples for required analyses. All analytical data will be submitted by both hard copy and electronic files.

3.6 Sample Documentation

Sampling documentation will include the following:

- Numbered Chain-of-Custody Reports
- Sample Log Book which includes the following information:
 - Name of laboratories 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
 - Measurements, volume of flow, 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 EFD SOUTH, 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
 - Diagrams of processes
 - Maps/sketches of sampling locations
 - Weather conditions that may affect the sample (e.g., rain, extreme heat or cold, wind, etc.)
- Sample Labels
 - Custody Seals (minimum of two on each shipping container)

3.7 Field Quality Control

For backfill material certification, one trip blank sample will be provided at a frequency of one per sample cooler containing volatile samples.

Field QC samples are not required for disposal characterization samples.

3.8 Analytical Methods

Samples will be collected for analytical methods summarized in Table 3-2.

Preliminary analytical results will be faxed to Bethany Garvey at the following fax number per the TAT listed in Table 3-2 from day of sample receipt. 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

Kama White
CH2M HILL
115 Perimeter Center Place, Suite 700
Atlanta, GA 30346
(770) 604-9182 ext 564
Efax: (678) 604-9282
Kama.white@ch2m.com

4.0 Waste Management Plan

The Waste Management Plan addresses the management and disposal requirements for wastes generated during project activities. It is anticipated that the following wastes will be generated:

- PAH-, lead-, arsenic-, and TRPH-contaminated soil and materials generated from excavation activities.
- Debris, including discarded materials generally considered not water-soluble. Debris includes, but is not limited to, materials used in decontamination (for example, plastic sheeting, sampling materials, and personal protective clothing).
- Sampling-related waste including, but not limited to decontamination water, sampling equipment, gloves, and protective clothing.

4.1 Waste Characterization

Wastes will be characterized according to the SAP in Section 3.0 of this Work Plan Addendum. Waste characterization information for wastes will be documented on a waste profile form provided by the offsite treatment or disposal facility as part of the waste acceptance process. CH2M HILL will provide analytical data from waste characterization sampling to the designated off-site facilities for review. The profile will be completed by CH2M HILL, and will be submitted to the CH2M HILL Waste Coordinator for approval prior to submission to the Navy for generator signature. Where generator certification and/or signature are required, Navy personnel will provide. The signed profile will then be submitted to the disposal facility for review and approval.

The profile typically requires the following information, including but not limited to:

- Generator (Navy) information including name, address, contact, and phone number
- Site name including street/ mailing address
- Process generating waste (soil removal)
- Source of contamination
- Historical use for area
- Waste composition (95percent soil, 5 percent debris)
- Physical state of waste (solid, liquid, etc.)
- Applicable hazardous waste codes

A facility approved copy of the waste profile will be received prior to scheduling of offsite transportation of the waste.

4.2 Waste Management

4.2.1 Waste Storage Time Limit

Hazardous wastes will be removed from the site within 90 days from the date of generation. Additionally, as required under Chapter 62-770 FAC, petroleum-contaminated soil (including excessively contaminated soil) will not be stored onsite for more than 60 days. However, petroleum-contaminated soil (including excessively contaminated soil) may be containerized in watertight drums and stored onsite for 90 days, after which time proper treatment or proper disposal of the contaminated soil will occur. Other wastes will be removed from the site as soon as possible.

Contaminated soil from Site 15 will be pre-characterized and direct loaded into trucks or staged in lined and bermed stockpiles before being loaded onto trucks and delivered to the disposal facility.

The debris (personal protective equipment [PPE], visqueen, sampling equipment, etc.) will be characterized as the waste the debris comes in contact with and will be removed from the site as soon as possible but before 90 days has expired.

4.2.2 Labels

The labeling of waste containers will be in accordance with 49 CFR 172, 173, and 178. Labels will include the type of waste, the location from which the waste was generated, and accumulation start date. Containers and tanks used to store/accumulate waste (including soil and groundwater) will include one of the following labels:

- “Analysis Pending” or “Waste Material” - Temporary or handwritten label affixed to drum or container until analytical results are received and reviewed. This label will include the accumulation start date.
- “Hazardous Waste” - Pre-printed hazardous waste labels with the following information:
 - Accumulation start date
 - Generator Name
 - USEPA ID number
 - Waste codes
 - Prior to transport the Manifest number must be added (for containers of less than 110-gallon capacity)
- “Non-Hazardous Waste” - Pre-printed labels with the following information:
 - Accumulation start date
 - Generator name
 - USEPA ID number
 - Waste-specific information (e.g., contaminated soil)

Where applicable, the major hazards (for example, flammable, oxidizer, and carcinogen) will be included on the label.

It is expected that each type of label will be required for this project.

4.2.3 General Waste Management Requirements

Contaminated soil will be contained in 55-gallon drums, roll-off boxes, in stockpiles or direct loaded onto waiting trucks. Liquid wastes will be contained in drums or tanks for offsite disposal at an approved wastewater treatment facility.

Hazardous wastes will be segregated from non-hazardous wastes. Additionally, incompatible wastes (for example, flammable and corrosive wastes) will be segregated. Wastes of the same matrix, contamination, and the same source may be aggregated to facilitate storage and disposal.

Wastes will be accumulated in an area identified or approved by the Navy. If an accumulation area is not designated, CH2M HILL will accumulate hazardous wastes in an area that is not accessible to the general public and that can be secured.

Waste accumulation areas will contain appropriate emergency response equipment. The Health and Safety Plan in Appendix B identifies the specific emergency response procedures and equipment. Hazardous waste accumulation areas will include fire extinguishers (in areas where wastes are known or suspected to be flammable or ignitable), decontamination equipment, and an alarm system (if radio equipment is not available to all staff working in accumulation area). **Spill control equipment (for example, sorbent pads) will be available in the waste accumulation areas, and where liquids are transferred from one vessel to another.**

Drums/Small Containers

The following guidelines relate to drums and small containers:

- Drums and small containers will be transported to the temporary accumulation areas on wood pallets and will be secured together with non-metallic banding.
- Drums will be inspected and inventoried upon arrival onsite for signs of contamination and/or deterioration.
- Adequate aisle space (e.g., 30 inches) will be provided for containers such as 55-gallon drums to allow the unobstructed movement of personnel and equipment. A row of drums should be no more than two drums wide.
- Each drum will be provided with its own label, and labels will be visible.
- Drums will remain covered except when removing or adding waste to the drum. Covers will be properly secured at the end of each workday.
- Drums will be disposed of with the contents. If the contents are removed from the drums for offsite transportation and treatment or disposal, the drums will be decontaminated prior to re-use or before leaving the site.
- Drums containing liquids or hazardous waste will be provided with secondary containment.

Tanks

- Tanks will be inspected upon arrival onsite for signs of deterioration and contamination. Any tank arriving onsite with contents or in poor condition will be rejected.
- Tanks will be provided with covers and secondary containment.
- Only non-stationary tanks (such as a cargo tank or other wheeled tank) will be used to accumulate hazardous waste.
- Each tank will be labeled as discussed above.

Roll-off Boxes

- Roll-off boxes shall be inspected upon arrival on-site. Any roll-off container arriving with contents or in poor condition shall be rejected.
- Roll-off boxes for hazardous or “excessively contaminated” soil shall be provided with covers and disposable liners. Liners shall be disposed of as contaminated debris along with the soil.
- When not in use, securely fastened covers shall be installed on all roll-off boxes.
- Old labels shall be removed and a new, appropriate label applies as discussed above.
- Roll-off containers shall be inspected by the transporter after removal of the liner and decontaminated in the event of evidence of liner failure.

Soil Stockpiles

- Stockpiles of contaminated soil will be located near the excavation areas and within an area of existing contamination.
- Stockpiles will be provided with liner, cover, and perimeter berm to prevent release or infiltration of liquids.
 - Minimum 10- and 6-mil polyethylene sheeting will be used for liners and covers, respectively.
 - The perimeter berm will be constructed of clean materials (e.g., hay bales under the liner) and allow for collection of any free liquids draining from the stockpile.
 - Accumulated free liquids will be pumped-out to a container or tank.
- Covers and perimeter berms will be secured in-place when not in use and at the end of each workday, or as necessary to prevent wind dispersion or run-off from major precipitation events.
- Construction materials for the stockpiles that contact contaminated soil will be disposed of as contaminated debris.
- Accumulation start dates will be recorded on a log or a sign located at the stockpile.

Waste/Debris Stockpiles

Where appropriate, construction debris and waste or scrap equipment may be accumulated in stockpiles. These stockpiles will be managed in such a manner as to maintain good housekeeping, and to prevent the spread of contamination.

- Contaminated debris stockpiles will be provided with containment as indicated for soil stockpiles. Damaged or leaking equipment shall be placed in containers, and may not be stored in storage piles.
- Uncontaminated or decontaminated debris stockpiles, or intact equipment should be placed on a liner. These piles shall be covered as necessary to prevent storm water run-on and run-off.

Inspection of Waste Storage Areas

Waste accumulation areas will be inspected for malfunctions, deterioration, discharges, and leaks that could result in a release. The following inspection schedule will be followed:

- At least weekly inspection of containers, tanks and roll-off containers (for leaks, signs of corrosion, or signs of general deterioration).
- At least weekly inspection of stockpiles (for liner and berm integrity).

If operations will suspended for more than 7-days, contact the regulatory compliance manager and alternate inspection arrangements will be made. Prior to demobilization, all hazardous wastes will be removed from the site.

Inspections will be recorded in the daily Quality Control Report (QCR) and include any deficiencies and how issue was rectified. Copies of the report will be maintained onsite, and available for review.

Any deficiencies observed or noted during inspection will be rectified immediately. Appropriate measures may include transfer of waste from leaking container to new container, replacement of liner or cover, or repair of containment berm.

4.3 Shipping Documentation

Prior to offsite disposal of any waste, CH2M HILL will provide the Navy with a waste approval package for each waste stream. This package will include a waste profile naming the U.S. Navy as the generator of the waste, analytical summary table(s) applicable to the waste, letter of approval from the proposed waste disposal facility to accept the waste, Land Disposal Restriction (LDR) notification for any hazardous wastes, a completed waste manifest, and any other applicable information necessary for the Navy to complete its review of the disposal package and signature as the generator.

The signed profile will then be submitted to the disposal facility for acceptance approval. Once the approval letter is received from the disposal facility, transportation can be scheduled.

Each load of waste material will be manifested prior to leaving the site. At a minimum, the manifest form will include the following information:

- Generator information including name, address, contact, and phone number, USEPA ID number
- Transporter information including name, address, contact and phone number, USEPA ID number (if available/applicable)
- Facility information including name, address, phone number, USEPA ID number
- Site name including street address at a minimum, mailing address if available
- For all Hazardous Materials (including hazardous wastes) as defined at 49 CFR 171.8, the U.S. Department of Transportation (DOT) Proper Shipping Name (e.g., Hazardous Waste Solid, n.o.s., 9, UN 3077, PG III (D008))
- Type and number of container(s)
- Quantity of waste (volumetric estimate)
- CTO or job number
- Profile number
- 24-hour Emergency phone number

Additional documentation required for each shipment of waste includes the following:

- A haul (weight) ticket.
- A LDR Notification/Certification (required for **hazardous wastes**). This form also requires the generator signature and submission to the disposal facility.
- Finally, a copy of the relevant portion of the DOT Emergency Response Guide (ERG) that applies to the hazardous material/waste being shipped should be included, if possible.

The generator (Navy) and the transporter must sign the manifest (and LDR, if applicable) prior to the load of waste leaving the site. A copy of the manifest will be retained on site and included with the daily QCR. The original signed manifest will be returned to the address of the generator. The facility will provide a copy of this signed manifest to CH2M HILL for the final report. The final report will include copies of the facility signed manifest, haul ticket, LDR (if applicable), and the Certificate of Disposal/Destruction/Recycle.

If the signed hazardous waste manifest from the designated offsite facility is not received within 35 days, CH2M HILL will contact the transporter or the designated facility to determine the status of the waste. If the signed hazardous waste manifest has not been received within 45 days, CH2M HILL, in coordination with the Navy, will issue an "Exception Report" to the state of Florida, as required under 40 CFR 262.42.

4.4 Transportation

Each transportation vehicle and load of waste will be inspected before leaving the site and documented. The quantities of waste leaving the site will be recorded, and at a minimum, documented on the T&D Log. A contractor licensed for commercial transportation will transport non-hazardous wastes. In the event that wastes are hazardous, the transporter

must have a USEPA Identification number, and will comply with transportation requirements outlined in 49 CFR 171-179 (Department of Transportation) and 40 CFR 263.11 and 263.31 (Hazardous Waste Transportation). A copy of the documentation indicating that the selected transporter has the appropriate licenses will be received and approved by CH2M HILL prior to transport of any waste.

4.4.1 Transporter Responsibilities

The transporter will be responsible for weighing loads at a certified scale. For each load of material, weight measurements will be obtained for each full and empty container, dump truck, or tanker truck. For shipment of bulk solids, disposal quantities will be based on the difference of weight measurements (tare vs. gross) between the full and empty container, dump truck, or tanker truck. For liquids, disposal quantities will be based on gallons. For containerized (drummed) wastes, quantities may be based on gallons for liquids and/or drum weights. Weights and/or volumes will be recorded on the waste manifest. The transporter will provide copies of weight tickets to CH2M HILL.

The transporter will observe the following practices when hauling and transporting wastes offsite:

- Minimize impacts to general public traffic.
- Repair road damage caused by construction and/or hauling traffic.
- Clean up waste spilled in transit.
- Line and cover trucks/trailers used for hauling contaminated waste to prevent releases and contamination.
- Decontaminate vehicles prior to re-use, other than hauling contaminated waste.
- Seal trucks transporting liquids.

All personnel involved in offsite disposal activities will follow safety and spill response procedures outlined in the Health and Safety Plan.

No materials from other projects will be combined with materials from former NAS Cecil Field.

4.4.2 Transportation and Disposal Log

The T&D Log is used to track waste from generation to final disposition. Wastes will be logged into the T&D Log the day waste is generated and placed into containers.

Transportation of wastes will be inventoried the day of transportation from the site using the T&D Log. Final disposal will be documented on the T&D Log using the Certificate of Disposal. The blank T&D Log is attached in Appendix C.

5.0 Environmental Protection Plan

The Environmental Protection Plan of the NAS Cecil Field Basewide Work Plan (CH2M HILL, 1998) addresses general procedures that will be implemented to prevent pollution and protect the environment. The purpose of this plan is to provide specific requirements/procedures to protect the environment during contaminated soil excavation activities at former NAS Cecil Field.

5.1 Regulatory Drivers

Remedial activities at Site 15 are regulated under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). Wastes generated during the remediation activities at former NAS Cecil Field will be managed consistent with State of Florida hazardous waste generator provisions (Chapter 62-730 FAC).

5.2 Spill Prevention and Control

The provisions for spill prevention and control establish minimum site requirements. All spills will be reported to the CH2M HILL site supervisor and/or project manager. Refer to the Health and Safety Plan for emergency response procedures and further reporting requirements.

5.3 Spill Prevention

All fuel, chemical, and waste storage areas will be properly protected from on- and off-site vehicle traffic. All tanks (including fuel storage and waste storage) must be equipped with secondary containment. These tanks must be inspected daily for signs of leaks. Accumulated water must be inspected for signs of contamination (for example, product sheen, discoloration, and odor) before being discarded. Fire protection provisions outlined in the Health and Safety Plan must be adhered to.

Chemical products must be properly stored, transferred, and used. Should chemical product use occur outside areas equipped with spill control materials, adequate spill control materials must be maintained at the local work area.

5.4 Spill Containment and Control

Spill control materials will be maintained in the support zone, at fuel storage and dispensing locations, and at waste storage areas. Incidental spills will be contained with sorbent and disposed of properly. Spilled materials must be immediately contained and controlled. Spill response procedures include:

- Immediately warn any nearby workers and notify supervisor.

- Assess the spill area to ensure that it is safe to respond.
- Evacuate area if spill presents an emergency.
- Ensure any nearby ignition sources are immediately eliminated.
- Stop source of spill.
- Establish site control for spill area.
- Contain and control spilled material through use of sorbent booms, pads, or other material.
- Use proper PPE in responding to spills.

5.5 Spill Cleanup and Removal

All spilled material, contaminated sorbent and contaminated media will be cleaned up and removed as soon as possible. Contaminated spill material will be drummed, labeled, and properly stored until material is disposed of. Contaminated spill material will be managed as waste (see Waste Management Plan) and disposed of according to applicable, federal, state, and local requirements.

5.6 Erosion Control

During those excavation activities that have the potential to disturb the land, CH2M HILL will adhere to the following practices:

- The smallest practical area will be disturbed.
- Trees outside the excavation area will be protected from any construction activity. No ropes, cables, or guy lines will be fastened or attached to any existing trees.
- Temporary erosion and sediment controls will be used to prevent sediment from discharging to any ponds or wetland areas. Structural controls may include the use of straw bales, silt fences, earth dikes, drainage swales, sediment traps, and sediment basins.
- Material staging areas will be properly barricaded for containment and to control runoff.

6.0 Quality Control Plan

This Quality Control Plan details the quality administrators and the project organization for the work to be completed at the former NAS Cecil Field. Additionally, this plan discusses the construction inspections associated with contaminated soil excavation at Site 15.

The Submittal Register, included in Appendix C, documents submittals in accordance with CH2M HILL's Contract Management Plan (dated July 1998). CH2M HILL, the Navy, or others will approve submittals as identified in the Submittal Register. All approved submittals will be distributed by CH2M HILL to the appropriate Navy personnel (CO, ROICC (in duplicate), etc.), the project site, and to the project file.

The project organization chart (Figure 6-1) depicts the chain-of-command for this CTO and the individuals responsible for executing the work as indicated. Individual roles and responsibilities of CTO personnel are summarized in Table 6-1.

6.1 Project QC Manager

The Project QC Manager for this project is Jeffery Marks and the Alternate Project QC Manager is Greg Ramey. The appointment letters for Mr. Marks and Mr. Ramey will be submitted under separate cover.

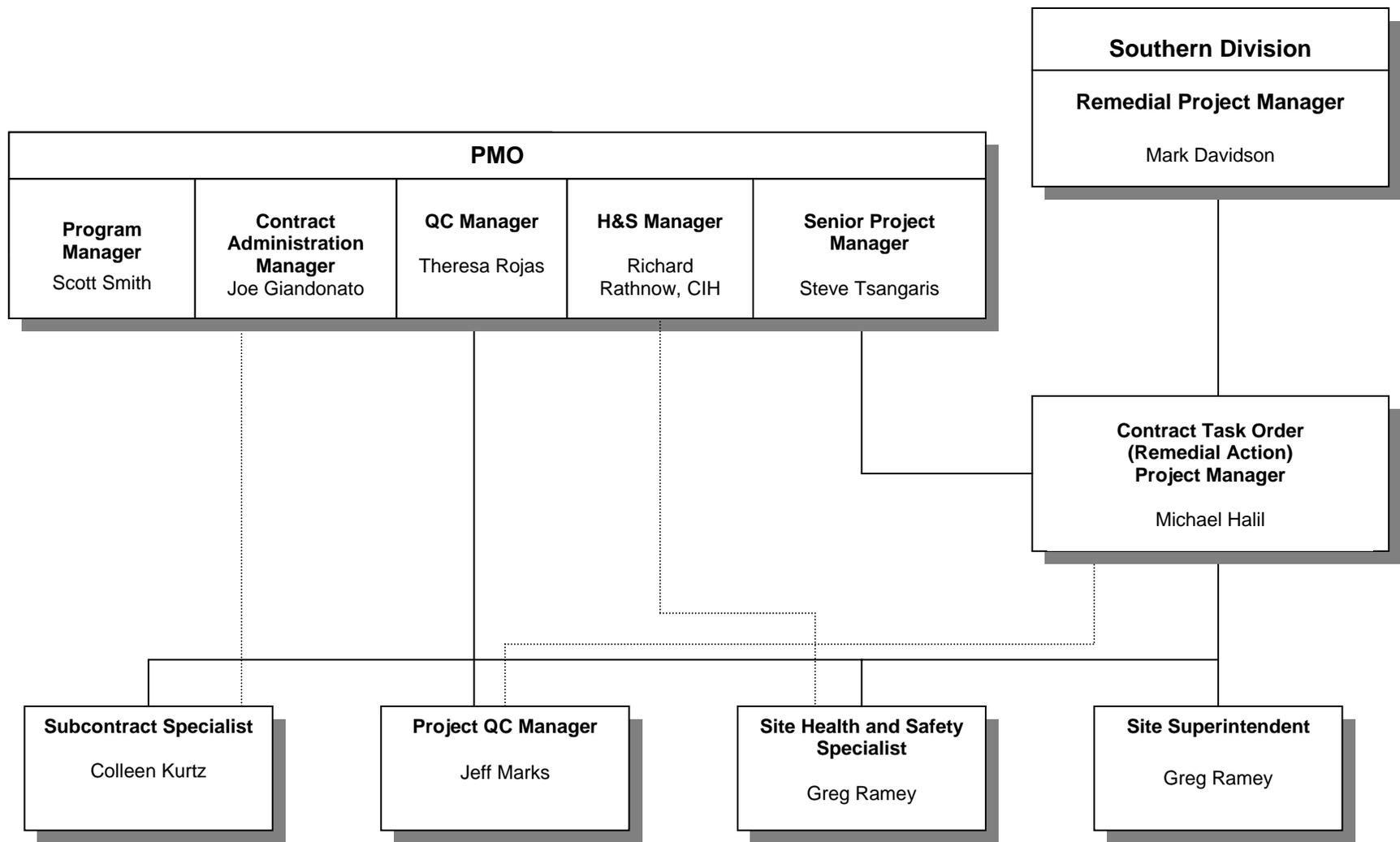
6.2 Construction Inspections

The Project QC Manager will perform final inspections of the materials and overall work activities. The inspections are performed to ensure safe, efficient, high quality work is performed, while meeting the objectives and requirements of the plans and specifications.

The project tasks for this CTO project are grouped into definable features of work, which are work activities that are significant enough to warrant distinct plans and specifications. The definable features of work for this project are:

- Mobilization and Site Preparation
- Surveying
- Tree Felling, Brush Clearing, and Grubbing
- Field Sampling
- Excavation, Backfilling, and Site Restoration
- Waste Management
- Decontamination and Demobilization

The definable features of work will be inspected in accordance with the three phases of control. The three phases include Preparatory, Initial, and Follow-up. An overview of the inspection provisions is outlined in the subsections that follow.



- Subcontractors
- T&D Coordinator (as needed)
- Project Assistant (as needed)

TABLE 6-1
Roles, Responsibilities, and Authorities of Key Project Personnel

Role	Responsibility	Authority
Project Manager	<ul style="list-style-type: none"> • Management and Technical Direction of work • Communication with Southern Division RPM and NTR • Overview subcontractor performance • Select CTO staff • Develop CTO Work Plan and supporting plans • Meet CTO Performance Objectives • Prepare status reports 	<ul style="list-style-type: none"> • Approve subcontractor selection • Approve invoices to Southern Division • Approve CTO baseline schedule • Stop work at the site for any reason • Approve payment to vendors and suppliers • Approve payment to subcontractors
Site Superintendent	<ul style="list-style-type: none"> • Responsible for all site activities • Provide direction to subcontractors • Act for Project Manager • Provide daily status reports • Prepare CTO Work Plan • Conduct daily safety meetings • Review subcontractor qualifications • Stop work for unsafe conditions or practices 	<ul style="list-style-type: none"> • Stop work for subcontractors • Approve corrective action for site work-arounds • Approve materials and labor costs for site operations • Resolve subcontractor interface issues • Approve daily and weekly status reports
Engineering Manager	<ul style="list-style-type: none"> • Monitor and oversee subcontractor compliance with scope of work • Review requests for changes in scope of work • Review technical qualifications of subcontractors • Prepare Field Change Requests • Respond to Design Change Notices • Recommend improvements in work techniques or metrics • Recommend work-around to Site Superintendent 	<ul style="list-style-type: none"> • Approve Field Change Requests below ceiling amount • Complete daily compliance report
Field Accountant	<ul style="list-style-type: none"> • Provide project scheduling coordination • Responsible for site cost tracking and reporting • Maintain record of site purchases • Maintain government property records 	<ul style="list-style-type: none"> • Approve payables for disposable items
Transportation and Disposal Coordinator	<ul style="list-style-type: none"> • Develop site specific procedures for transport and disposal practices • Plan and coordinate the transport and disposal of waste • Review subcontractor qualifications • Audit T&D subcontractors compliance with contract requirements 	<ul style="list-style-type: none"> • Approve subcontractors daily report of waste material removed from the site • Approve corrective action plans from T&D subcontractor

TABLE 6-1
Roles, Responsibilities, and Authorities of Key Project Personnel

Role	Responsibility	Authority
Project Assistant	<ul style="list-style-type: none"> • Maintain CTO files and correspondence • Coordinate CTO schedule and monitor deliverables • Maintain change management records • Maintain Action Tracking System log 	<ul style="list-style-type: none"> • Submit Action Tracking System log • Assign correspondence log numbers
Project QC Manager/ QC Inspector(s)	<ul style="list-style-type: none"> • Monitor and report on subcontractor quality and quantities • Audit subcontractors offsite fabrication • Maintain Submittal Register • Participate in Continuous Improvement Team • Stop work for non-compliant operations • Maintain Lessons Learned Log 	<ul style="list-style-type: none"> • Stop work for non-compliant operations • File daily quantities report • File Lessons Learned Log Sheet • Approve resumption of work for resolved quality issues
Site Health and Safety Specialist	<ul style="list-style-type: none"> • Monitor and report on subcontractor safety and health performance • Record and report safety statistics • Conduct needed site safety and health orientation • Maintain Environmental Log • Stop work for unsafe practices or conditions 	<ul style="list-style-type: none"> • Stop work for unsafe practices or conditions • Approve subcontractor site specific health and safety plan • Set weekly safety objectives • Approve resumption of work for resolved safety issues
Subcontract Specialist	<ul style="list-style-type: none"> • Prepare bid packages • Purchase disposable materials • Maintain subcontract log 	

6.3 Mobilization and Site Preparation

As part of the mobilization activity, a pre-construction meeting will be held to review the preparedness to begin the project, the overall project scope and schedule, communications and reporting. The preparedness check will verify that site preparation provisions such as permitting/approvals, utility clearances, demarcating the work zones, and staging of equipment and material, as necessary, are in place to begin the intrusive work activities. Additionally, equipment and materials will be verified functional and in good working condition prior to starting the project.

6.3.1 Preparatory Phase

The preparatory phase will include a review of the relevant activity hazard analyses (AHAs), the project Work Plan Addendum, communications matrix, project schedule, submittal status, and confirmation of appropriate materials and equipment.

6.3.2 Initial Phase

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

6.3.3 Follow-up Phase

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

6.4 Surveying

6.4.1 Preparatory Phase

The preparatory phase will include the following: a review of the relevant AHAs, a review of the requirements provided in the Work Plan Addendum and the site specific Health and Safety Plan, and verify acceptance and approval of surveyor qualifications/license (Florida-registered professional land surveyor). The competent person will be identified and the logistical approach for conducting the activity will be discussed, ensure boundaries are marked by TtNUS in accordance with Figure 2-4, and ensure that the general layout conforms with excavation plan.

6.4.2 Initial Phase

As the activities proceed, the Project QC Manager will conduct initial inspections, verify existing monuments and structures, verify instrument calibration and accuracy, and monitor the work completed to verify conformity with this Work Plan Addendum. Deficiencies will be documented and corrected as necessary.

6.4.3 Follow-up Phase

The Project QC Manager will be responsible for the ongoing inspection of the site activities, verification of instrument calibration and accuracy, and surveillance will verify that the work is being completed according to the Work Plan Addendum provisions.

6.5 Tree Felling, Brush Clearing, and Grubbing

6.5.1 Preparatory Phase

The preparatory phase will include the following: a review of the relevant AHAs, a review of the requirements provided in the Work Plan Addendum and the site specific Health and Safety Plan, verifying acceptance and approval of the utility clearance, and confirming that craftsmen are available to complete the work. The competent person will be identified and the logistical approach for conducting the activity will be discussed. Containers and waste staging areas will be prepared and managed in accordance with the protocols of the Waste Management Plan.

6.5.2 Initial Phase

As the activities proceed, the Project QC Manager will conduct initial inspections and monitor the work completed to verify conformity with this Work Plan Addendum. Deficiencies will be documented and corrected as necessary.

6.5.3 Follow-up Phase

The Project QC Manager will be responsible for the ongoing inspection of the site activities. Surveillance will verify that the work is being completed according to the Work Plan Addendum provisions, ensure that only trees necessary to access the excavation areas will be felled, and monitor safe operation of clearing and grubbing equipment and proper safety gear is worn.

6.6 Field Sampling

6.6.1 Sample Collection and Testing

Representative samples of borrow soil and in-situ soil within proposed excavation areas will be collected. Environmental samples will be collected in accordance with USEPA and FDEP SOPs. Other controls will include, but are not limited to, maintaining a chain of custody; proper handling, packing, and shipping; sampling performed by qualified persons; and the use of certified laboratories.

6.6.2 Preparatory Phase

The preparatory phase for sample collection activities includes a review of the relevant AHAs, a review of sampling procedures provided in the SAP, verifying acceptance of the selected laboratory, and confirming that the appropriate equipment and materials are available to perform the sampling activities.

6.6.3 Initial Phase

Backfill certification and waste characterization samples will be collected and subsequently analyzed at an approved laboratory in accordance with requirements outlined in the SAP (Section 3.0). Sample collection activities, including proper chain-of-custody documentation, will follow the protocols outlined in the project-specific SAP. Samples will be collected of fill materials, soil to be excavated, and aqueous wastes (decontamination water).

6.6.4 Follow-up Phase

The Project QC Manager will observe sample collection activities and the associated documentation records throughout each sampling event. Analytical reports from the approved laboratory will be reviewed for accuracy and quality. If required, data validation information from the laboratory will be reviewed to resolve discrepancies in the analytical data. CH2M HILL QA personnel will validate laboratory data and field sampling results.

6.7 Excavation, Backfilling, and Site Restoration

6.7.1 Preparatory Phase

The preparatory phase will include the following: a review of the relevant AHAs, a review of the requirements provided in the Work Plan Addendum and the site-specific Health and Safety Plan; verifying acceptance and approval of the utility clearance; determining status of borrow source for use as backfill; and confirming that craftsmen are available to complete the work. The excavation competent person will be identified and the logistical approach for conducting the excavations and site restorations will be discussed. Containers and waste staging areas will be prepared and managed in accordance with the protocols of the Waste Management Plan.

6.7.2 Initial Phase

As the excavation activities proceed, the Project QC Manager will conduct initial inspections and monitor the work completed to verify conformity with this Work Plan Addendum. Deficiencies will be documented and corrected as necessary.

6.7.3 Follow-up Phase

The Project QC Manager will be responsible for the ongoing inspection of excavation and site restoration activities. Surveillance will verify that the work is being completed according to the Work Plan Addendum provisions. The following quality checks will be completed:

- Measure and record horizontal and vertical boundaries to verify excavation depth and width.
- Inspect placement of erosion control measures.
- Maintain chronological journal of visual observations while work activities progress.
- Verify approval to backfill completed excavations and determine adequate soil compactive effort during backfill.
- Monitor segregation and management of wastes.
- Observe reseeding for even seed distribution and proper casting rates and seed types.
- Verify wetland restoration performed in accordance with this Work Plan Addendum.

6.8 Waste Management

6.8.1 Preparatory Phase

The preparatory phase for transportation and disposal of waste streams includes a review of the waste management plan included in this Work Plan Addendum; disposal, recycling or treatment facility qualifications; transportation schedule for hauling material offsite; and confirming that the appropriate equipment and materials, such as waste manifests, are available to commence the work activity. Review and acceptance of the waste disposal

package by the CH2M HILL waste coordinator is required prior to submitting the package to the Navy for approval. Prior to any work, the relevant AHAs will be reviewed and discussed. All temporary storage containers will be inspected prior to acceptance onto the project and labeled.

6.8.2 Initial Phase

This phase includes inspecting the waste transport vehicles (roll-off containers, end-dumps, transports, etc.) prior to accepting on the job. Containers used for soil transport will be lined prior to loading. Containers used for transporting liquids will be free of liquids or other foreign materials prior to filling. Information provided on the waste manifest must be verified as complete and accurate including, but not limited to, generator name, address and signature, date, type of material being hauled, designated recycling or treatment facility, and volume and/or weight of material. Any discrepancies on waste manifest documents will be corrected.

6.8.3 Follow-up Phase

This phase includes verifying that the designated recycling or treatment facility has accepted and treated the waste material at the facility and has sent the required completed manifest to the generator or the generator's technical representative. Receipt of the certificate of recycling or disposal from the designated facility must be verified, as well as that the invoice is complete and accurate. A field logbook and an electronic log of all transportation and disposal shipments will be maintained. Containers, tanks, and roll-off containers will be routinely inspected for integrity and inventoried. Waste storage areas (including areas with stockpiles, containers, tanks, roll-off containers) will be visually inspected on a daily basis for releases or signs of corrosion, deterioration, or other conditions that could result in a release. These results of all inspections will be recorded.

6.9 Decontamination and Demobilization

Equipment utilized to perform intrusive work 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 Work Plan Addendum. The Project QC Manager will verify that the objectives of associated remedial 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.

6.9.1 Preparatory Phase

The preparatory phase will include a review of decontamination procedures, the site-specific health and safety plan, the waste management plan, and relevant AHAs.

6.9.2 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.

6.9.3 Follow-up Phase

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

6.10 CTO Support Organizations

The supporting organizations for this project are yet to be determined.

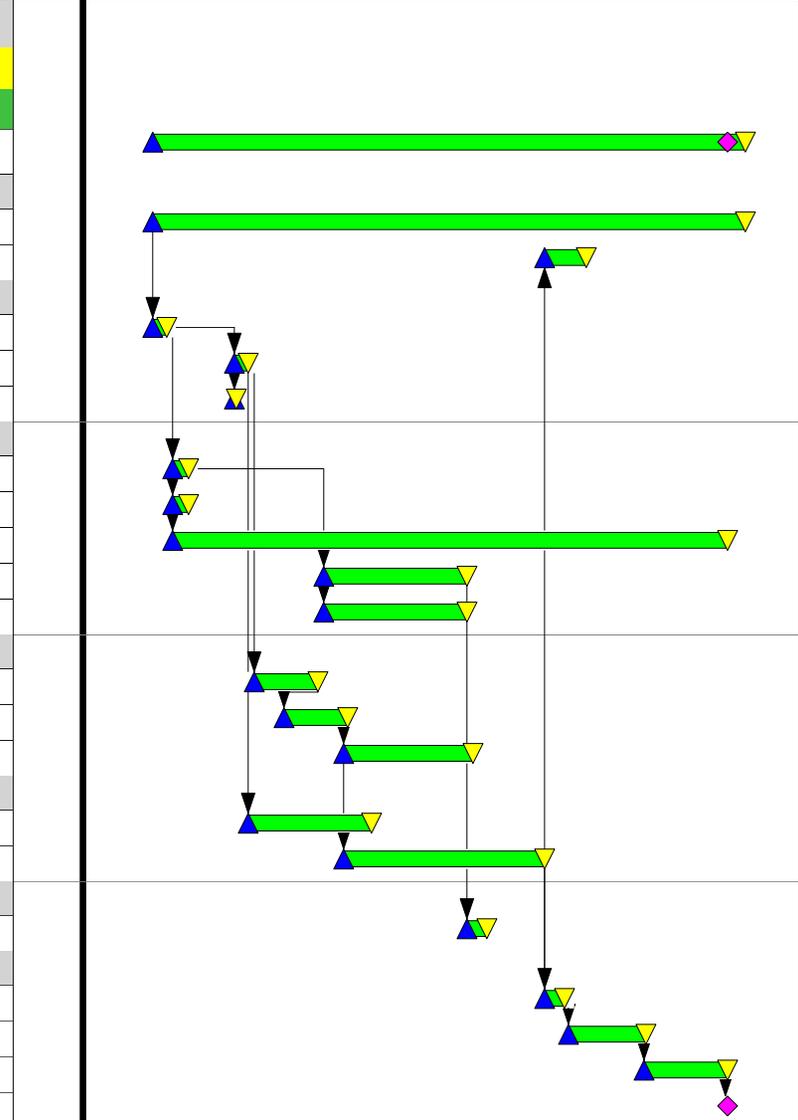
7.0 References

CH2M HILL Constructors, Inc. 1998. *Basewide Work Plan, Revision No. 01, Naval Air Station Cecil Field, Jacksonville, Florida*. November.

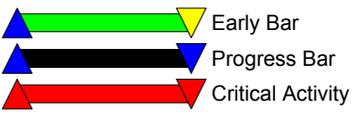
Tetra Tech NUS, Inc. 2005. *Draft Feasibility Study Report for Site 15 Blue 10 Ordnance Disposal Area, Naval Air Station Cecil Field, Jacksonville, Florida*. May.

Appendix A
Project Schedule

Activity ID	WBS CHARGE #	% Comp	Activity Description	Orig Dur	Rem Dur	Early Start	Early Finish	2005			2006						
								OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	
CTO #0057 - NAS CECIL FIELD																	
PHASE 3																	
SITE 15 - YWWA EXCAVATION OF HAZ/NON-HAZ SOILS																	
Subtotal		0		143	143	21NOV05	12JUN06										
PROJECT MANAGEMENT																	
BU32992201	99.22.01.01	0	Project Management	143	143	21NOV05*	12JUN06										
BU99220426	99.22.04.26	0	Project QA/QC Audit	10	10	05APR06	18APR06										
MOBILIZATION & PREPARATORY WORK																	
BU32010394	32.01.03.94	0	Subcontractor's Pre-Con Submittals	5	5	21NOV05	25NOV05										
BU32010290	32.01.02.90	0	Subcontractor Mobilization	5	5	19DEC05	23DEC05										
BU32221209	32.22.12.09	0	Subcontractor Bonds	1	1	19DEC05	19DEC05										
MONITORING, SAMPLING, TEST & ANALYSIS																	
BU32020906	32.02.09.06	0	Disposal Characterization Analysis	5	5	28NOV05	02DEC05										
BU32020990	32.02.09.90	0	Backfill Certification Analysis	5	5	28NOV05	02DEC05										
BU33021491	32.02.14.91	0	Data Validation & Management	136	136	28NOV05	06JUN06										
BU32020907	32.02.09.07	0	Confirmatory Sampling Analysis	35	35	19JAN06	08MAR06										
BU32021490	32.02.14.90	0	Independent Data Validation	35	35	19JAN06	08MAR06										
SITE WORK																	
BU32030290	32.03.02.90	0	Clearing & Grubbing(Tree Removal)	16	16	26DEC05	16JAN06										
BU32030302	32.03.03.02	0	Earthwork(Hazardous Soil Excavation/Backfill)	19	19	05JAN06	26JAN06										
BU32030303	32.03.03.03	0	Earthwork(NonHazardous Soil	32	32	26JAN06	10MAR06										
TRANSPORTATION AND DISPOSAL																	
BU32190301	32.19.03.01	0	T&D - Hazardous Soil	42	42	24DEC05	03FEB06										
BU32190302	32.19.03.02	0	T&D - Non-Hazardous Soil	49	49	26JAN06	04APR06										
SITE RESTORATION																	
BU32200401	32.20.04.01	0	Seeding, Mulch, Fertilizer	5	5	09MAR06	15MAR06										
POST CONSTRUCTION																	
BU32210590	32.21.05.90	0	Subcontractor Demobilization	5	5	05APR06	11APR06										
BU32210694	32.21.06.94	0	Subcontractor's Post-Con Submittals	19	19	13APR06	09MAY06										
BU32210605	32.21.06.05	0	CCR/Source Removal Reports	20	20	09MAY06	06JUN06										
BU32210606		0	Submit CCR/SSR	0	0		06JUN06										



Start Date 26JAN01
 Finish Date 12JUN06
 Data Date 28OCT05
 Run Date 08NOV05 16:20



NFAC - CO57
 CTO #0057 - NAS CECIL FIELD
 CTO COMPLETION SCHEDULE
 NAVY RAC SOUTHERN DIVISION

Sheet 1 of 1



Appendix B

Site Specific Health and Safety Plan

**Health and Safety Plan
Excavation of Contaminated Soil at Site 15,
Blue 10 Ordnance Disposal Area**

**Former Naval Air Station Cecil Field
Jacksonville, Florida**

**Contract No. N62467-98-D-0995
Contract Task Order No. 0057**

Revision 00

Submitted to:



**U.S. Naval Facilities
Engineering Command
Southern Division**

Prepared by:



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

November 2005

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- 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
CPR	cardiopulmonary resuscitation
CTO	Contract Task Order
dBA	decibel A-rated
DOT	Department of Transportation
FA	first aid
FID	flame ionization detector
GFCI	ground fault circuit interrupter
HAZCOM	hazard communication
HR	heart rate
HSM	Health and Safety Manager
HSP	Health and Safety Plan
IDLH	immediately dangerous to life and health
IDW	investigation-derived waste
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
NAS	Naval Air Station
NAVFAC EFD SOUTH	U.S. Navy Facilities Engineering Command, Southern Division
NDG	nuclear density gauge
NGVD	National Geodetic Vertical Datum
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
PDF	personal flotation device
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
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: 0057

CLIENT: Southern Division, U.S. Navy Facilities Engineering Command (NAVFAC EFD SOUTH)

PROJECT/SITE NAME: Excavation of Contaminated Soil at Site 15/Blue 10 Ordnance Disposal Area

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

CH2M HILL PROJECT MANAGER: Michael Halil

CH2M HILL OFFICE: Jacksonville, Florida

DATE HEALTH AND SAFETY PLAN PREPARED: November 2005

DATE(S) OF SITE WORK: November 2005 – October 2006

SITE BACKGROUND AND SETTING:

Site 15 is located in the southwest section of Yellow Water Weapons Area. The area is approximately 85 acres with elevations ranging from approximately 79 feet National Geodetic Vertical Datum (NGVD) to 72 feet NGVD. The site is heavily forested, primarily with slash pine and understory vegetation. Several forest fires have occurred in the area designated as ‘Forest Burn Area’ located in the southwestern portion of the site.

From the early 1940s through the mid 1950s, the site was used as a skeet range. The former skeet range was approximately 1,000 feet by 2,400 feet in size. From the mid 1960s through 1977, Site 15 was used for ordnance disposal. This operation consisted of burning ordnance materials in a large metal chamber and static firing of rockets. The ordnance disposal structures were located west of the skeet range. The majority of ordnance disposed of at the site was burned and included small arms munitions up to 20 millimeters in size, parachute and distress flares, Mark IV signal cartridges, rocket igniters, cartridge activated devices, 2.75-inch rockets, and 5-inch rockets. Rocket propellant was reportedly placed on the ground and ignited in the area of the burn chamber. An estimated 350 tons of ordnance was disposed of at the site while in operation .

The ordnance burn chamber and static rocket firing pad are the only structures currently at the site. The burn chamber is a rounded, steel, tank-like container, approximately 10 feet in length and 4 feet in height. The chamber has a burn stack that rises approximately 3 feet above the body of the chamber. Access to the chamber is through a 2-foot by 2-foot hinged door. When full, the burn chamber can accommodate 1.5 cy of material. The static rocket firing pad is an L-shaped concrete structure approximately 10 feet long by 4 feet wide by 6 feet high. Steel firing rods are seated into the concrete at 45-degree angles. Several concrete building foundations, remnants of buildings that supported skeet range activities, are located in the area surrounding the burn chamber and firing pad.

Review of aerial photographs from 1952, prior to the initiation of ordnance disposal on Site 15, show an active trap and skeet range facility located at the site. The area covered by the skeet range appears to be approximately 50 acres in size, and is centered over the area in which the burn chamber and firing pad were constructed.

An area of stressed vegetation, referred to as the forest burn area, is present in the southwestern portion of the site, approximately 900 feet southwest of the burn chamber and firing pad. Several slash pines are partially burned in this area. Controlled burns were commonly undertaken in this area to control undergrowth in the planted pine forests. This is an area where elevated polynuclear aromatic hydrocarbons (PAH) concentrations were detected.

The project objective is to excavate, transport, and dispose of approximately 11,600 cy of contaminated soil from 20 areas in order to reduce human health risk and ecological risk and allow for the anticipated future land use as a Natural Resource and Recreation Corridor. The excavated areas will be backfilled with certified "clean" material and revegetated with all disturbed wetlands restored.

DESCRIPTION OF SPECIFIC TASKS TO BE PERFORMED: The activities associated with the scope of work at Site 15 are as follows:

- Mobilization and site preparation
- Backfill material certification
- Pre-excavation land survey
- Tree felling, brush clearing, and grubbing
- In-situ waste disposal characterization of 20 contaminated soil excavation areas
- Excavation and backfill of 20 contaminated soil excavation areas
- Transportation and Disposal of approximately 11,600 cy of contaminated soil
- Post excavation land survey
- Site restoration
- Preparation and submittal of a Construction Completion Report

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
- Pre-excavation Confirmation Soil Screening, Sampling, and Analyses
- Backfill Material Certification
- Pre-excavation Land Survey
- Tree felling, Brush Clearing, and Grubbing
- Excavation of Contaminated Soil and Backfilling
- Waste Characterization
- Site Restoration
- Transportation & Disposal of Contaminated Soil/Materials Decontamination
- Post-excavation Survey
- Demobilization

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 Construction Completion Report	<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, Site setup, Pre-excavation Land Survey, Soil Sampling	Tree removal, Clearing and Grubbing	Excavation of Contaminated Soil and Backfilling	T&D of Contaminated/Uncontaminated Materials	Site Restoration	Decontamination	Excavation Waste Characterization	Demobilization	
Manual Lifting (HSE-112)	X	X	X	X	X	X	X	X	X
Fire Prevention (HSE-208)	X	X	X	X		X			X
Electrical Safety (HSE-206)	X					X			X
Lockout /Tagout (HES-310)									
Ladders & Stairs(HSE-214)									
Compressed Gas Cylinders (HS-63)									
Buried Utilities	X	X	X						
Excavations (HSE-307)			X	X	X				
Fall Protection (HSE-308)									
Heavy Equipment (HSE-306)		X	X	X	X				X
Confined Space Entry (HSE-203)									
Concrete & Masonry Work (HSE-302)									
Cranes and Hoisting (HSE-303)									
Demolition (HS-45)									
Scaffolding(HS-73)									
Steel erection (HS-62)									
Welding and cutting (HS-22)									
Aerial Lifts (HS-41)									
Hand & Power Tools (HSE-210)	X	X	X			X	X	X	X
Forklifts (HS-48)									
Drilling (HS_35)									
Noise (HS-39)	X	X	X	X	X	X	X		X
Pressurized Lines/Equipment									
Pressure Washing/Equip Decon			X	X		X			
Vacuum Truck/Pumping Operations									
Suspended Loads									
Vehicle Traffic	X	X	X	X	X	X	X		X
Haul Truck Operations		X	X	X					
Visible Lighting	X	X	X	X	X	X	X	X	X
Mechanical Guarding Hazards		X				X			
Arsenic Hazard (HSE-501)	X	X	X	X		X		X	
Lead Hazard (HSE-508)	X	X	X	X		X		X	
Chemical Hazard-Dermal/Inhalation	X	X	X	X		X		X	
Dust Hazard (Silica/Metals)									
Fire/Explosion Hazards	X	X	X						

3.0 Hazard Controls

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

The health and safety hazards posed by field activities have been identified for each project activity and is 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 will 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 Clearing and Grubbing

The following sections provide procedures associated with the clearing and grubbing activity.

The following rules apply to those using a chainsaw:

- Ensure an Activity Hazard Analysis is written for this task.
- Verify that the owner's manual is available to personnel using equipment.
- Verify operator has inspected equipment:
 - No leaks, wear or damage.
 - Throttle trigger, safety, throttle lock, and stop switches operate correctly.
 - Chain brake works properly.
 - Carburetor idle is adjusted properly.
- Verify that the person operating the saw has received training if task is new or unfamiliar to them.
- Prohibit smoking while fueling or operating the saw.
- Refuel the saw only after it has cooled, and require funnel use.
- Make sure the fuel cap is secured and any fuel spillage is cleaned up.
- Move at least 35 feet away from refueling area before restarting saw.
- Keep a fire extinguisher nearby.
- Transport and store fuel only in approved containers.
- Do not distract or disturb someone who is operating a chainsaw.
- Ensure persons who are using a chainsaw take breaks and drink plenty of water. If they become tired or overheated, ensure they are examined for heat stress – refer to Section 3.2.7 for heat stress information.

- Instruct equipment operators to clean chainsaw after work completion.
- Working from heights (ladder, aerial lift, back of trucks) requires additional planning and must be approved by the Health and Safety Manager.
- Review both the Tick and Poison Oak Fact Sheets contained in this document— refer to Sections 3.3.3 and 3.3.2.
- Utilize DEET to prevent against mosquito and tick bites.
- Personnel operating chain saws must wear a minimum of the following Personal Protective Equipment:
 - Long trousers, chainsaw chaps, and appropriate footwear.
 - Safety goggles or ANSI Z87 approved eyewear with a face shield.
 - A hardhat with the visor facing forward.
 - Leather work gloves.
 - Long-sleeved shirt.
 - Ear muffs.
- To prevent injury from kickback, the chainsaw operator will:
 - Ensure the machine has a chain brake and that it is clean and functions properly.
 - Hold chainsaw firmly making sure that the left hand encircles top handle with the thumb underneath.
 - Avoid bringing the upper quadrant of the guide bar into contact with any foreign object.
 - Don't cut above shoulder height.
 - Never hold chainsaw with one hand or by the handle only.
 - Always begin the cut at peak saw RPMs.

The following rules apply to those using a wood chipper:

- Mechanical chippers must be maintained in accordance with the manufacturer's specifications:
 - The motor ignition will be locked out and the key removed from the ignition before any maintenance or service is performed, or when the chipper is left unattended.
 - The chipper drum will be blocked, and only authorized persons allowed to perform any service or maintenance.
 - On the drum or blades, retightening of chipper blade bolts will be done according to manufacturer's specifications.
- The chipper will be equipped with a workable "kill" switch of approved design, located at the in feed location.
- The chipper will have a curtain in place at all times (workable in all weather conditions) in order to prevent fly-back of material.

- Before the wood chipper is started, the apron and feed platform should be checked and cleared of any foreign objects.
- The front of the feed apron table will be a minimum of 1500 mm (60 inches) from the chipper blades.
- The following safety equipment is mandatory for personnel working with wood chippers:
 - Personal hearing protection.
 - Approved safety head gear.
 - Full face shield, in addition to safety eye wear.
 - Loose-fitting leather gloves will be worn by the person feeding the chipper.
 - One-piece coveralls will be worn (blaze color in areas where traffic may be present).
 - Non-slip approved safety footwear.
- Hands or feet will not be placed beyond the curtain guard while the blade is in operation.
- A push stick or brush will be used to force short or thorny brush into the chipper.
- Care will be exercised when chipping dead or frozen wood in order to avoid kickback.
- Maximum diameter of material to be fed into the chipper will be 150 mm (6 inches), unless manufacturer's specifications allow larger material size.
- Material from 75 mm to 150 mm (3 to 6 inches) diameter will not exceed 2.5 meters (8 feet) in length, unless manufacturer's specifications allow longer material length.
- The person feeding the chipper will stand to the side of the apron at the rear of material being fed into the machine.
- No person will be allowed to stand or sit on any part of the discharge chute while the brush chipper is in operation.
- No person will stand or sit on any part of the brush chipper while it is in operation or while it is being transported from one job site to another.
- The chipper apron is to be secured in the "up" position when being transported from one job site to another.

3.1.3 Survey Lasers

- Laser beams used in surveying may be hazardous to the eyes.
- The severity of the hazard depends on the type of laser and its power.
- Avoid direct eye contact with the beam.
- This is most important when wearing corrective eyeglasses, which can intensify the beam's focus on the retina.
- Lasers used in surveying are usually low power.

- Lasers must be posted with safety warning signs.

3.1.4 Excavation Activities

(Reference CH2M HILL, SOP HSE-307, *Excavations*)

- 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.

3.1.5 Operating Heavy Equipment

(Reference CH2M HILL, SOP HSE-306, *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 will 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 will 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 3.1.6 “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 will 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, lnelines, etc.) are required to be used on scaffolding.
- Personnel working from suspended scaffolding are required to wear a full body harness with lanyard attached to an independent lifeline.

3.1.6 Procedures for Locating Buried Utilities

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

- When the client or other onsite party is responsible for determining the presence and locations of buried utilities, the SHSS should confirm that arrangement.

3.1.7 Exposure to Vehicular Traffic

(Reference CH2MHILL, SOP HSE-216, Traffic Control)

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

- Exercise caution when exiting traveled way or parking along street – avoid sudden stops, use flashers, etc.
- Park in a manner that will allow for safe exit from vehicle, and where practicable, park vehicle so that it can serve as a barrier.
- All staff working adjacent to traveled way or within work area must wear reflective/high-visibility safety vests.
- Eye protection should be worn to protect from flying debris.
- Remain aware of factors that influence traffic related hazards and required controls – sun glare, rain, wind, flash flooding, limited sight-distance, hills, curves, guardrails, width of shoulder (i.e., breakdown lane), etc.
- Always remain aware of an escape route – behind an established barrier, parked vehicle, guardrail, etc.
- Always pay attention to moving traffic – never assume drivers are looking out for you
- Work as far from traveled way as possible to avoid creating confusion for drivers.
- When workers must face away from traffic, a “buddy system” should be used, where one worker is looking towards traffic.
- When working on highway projects, obtain a copy of the contractor’s traffic control plan.
- Work area should be protected by a physical barrier – such as a K-rail or Jersey barrier.
- Review traffic control devices to ensure that they are adequate to protect your work area. Traffic control devices should: 1) convey a clear meaning, 2) command respect of road users, and 3) give adequate time for proper traffic response. The adequacy of these devices are dependent on limited sight distance, proximity to ramps or intersections, restrictive width, duration of job, and traffic volume, speed, and proximity.
- Either a barrier or shadow vehicle should be positioned a considerable distance ahead of the work area. The vehicle should be equipped with a flashing arrow sign and truck-mounted crash cushion (TMCC). All vehicles within 40 feet of traffic should have an orange flashing hazard light atop the vehicle.
- Except on highways, flaggers should be used when 1) two-way traffic is reduced to using one common lane, 2) driver visibility is impaired or limited, 3) project vehicles

enter or exit traffic in an unexpected manner, or 4) the use of a flagger enhances established traffic warning systems.

- Lookouts should be used when physical barriers are not available or practical. The lookout continually watches approaching traffic for signs of erratic driver behavior and warns workers. Vehicles should be parked at least 40 feet away from the work zone and traffic. Minimize the amount of time that you will have your back to oncoming traffic.

3.1.8 Hand and Power Tools

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

- Tools will be inspected prior to use, and damaged tools will be tagged and removed from service.
- Hand tools will be used for their intended use and operated in accordance with manufacturer instructions and design limitations.
- Maintain all hand and power tools in a safe condition.
- Use PPE (such as gloves, safety glasses, earplugs, and face shields) when exposed to a hazard from a tool.
- Do not carry or lower a power tool by its cord or hose.
- Portable power tools will be plugged into GFCI-protected outlets; and
- Portable power tools will be UL listed and have a three-wire grounded plug or be double insulated.
- Disconnect tools from energy sources when they are not in use, before servicing and cleaning them, and when changing accessories (such as blades, bits, and cutters).
- Safety guards on tools must remain installed while the tool is in use and must be promptly replaced after repair or maintenance has been performed.
- Store tools properly in a place where they will not be damaged or come in contact with hazardous materials.
- If a cordless tool is connected to its recharge unit, both pieces of equipment must conform strictly with electrical standards and manufacturer's specifications.
- Tools used in an explosive environment must be rated for work in that environment (that is, intrinsically safe, spark-proof, etc.).
- When using a knife or blade tool, stroke or cut away from the body with a smooth motion. Be careful not to use excessive force that could damage the tool, the material being cut, or unprotected hands.
- Working with manual and pistol-grip hand tools may involve highly repetitive movement, extended elevation, constrained postures, and/or awkward positioning of body members (for example, hand, wrist, arm, shoulder, neck, etc.). Consider alternative tool designs, improved posture, the selection of appropriate materials, changing work

organization, and sequencing to prevent muscular, skeletal, repetitive motion, and cumulative trauma stressors.

- Tools will be tested each day before use to see that safety devices are in proper working condition. The method of testing will be in accordance with the manufacturer's recommended procedure.
- Belts, gears, shafts, pulleys, sprockets, spindles, drums, fly wheels, chains, or other reciprocating, rotating or moving parts of equipment will be guarded if such parts are exposed to contact by employees or otherwise create a hazard.
- All liquid fuel-powered tools will be stopped while being refueled, serviced, or maintained.

3.1.9 Arsenic

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

- Do not enter regulated work areas unless training, medical monitoring, and PPE requirements established by the competent person have been met.
- Do not eat, drink, smoke, chew tobacco or gum, or apply cosmetics in regulated areas.
- Avoid skin and eye contact with liquid and particulate arsenic or arsenic trichloride.
- Arsenic is considered a "confirmed human carcinogen."
- Arsenic particulates (inorganic metal dust) are odorless. Vapor and gaseous odor varies depending upon specific organic arsenic compound.
- Respiratory protection and other exposure controls selection will be based on the most recent exposure monitoring results obtained from the competent person.

3.1.10 Lead

(Reference CH2M HILL SOP HSE-508, *Lead*)

- Do not enter regulated work areas unless training, medical monitoring, and PPE requirements established by the competent person have been met.
- Do not eat, drink, smoke, chew tobacco or gum, or apply cosmetics in regulated areas.
- Avoid skin and eye contact with soil contaminated with lead.
- Lead particulates (inorganic metal dust) are odorless. Vapor and gaseous odor varies depending upon specific organic lead compound.
- Respiratory protection and other exposure controls selection will be based on the most recent exposure monitoring results obtained from the competent person.

3.2 General Hazards

3.2.1 General Practices and Housekeeping

(Reference CH2M HILL- SOP HSE-209, *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 will 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 will be removed at regular intervals.
- All spills will be quickly cleaned up. Oil and grease will be cleaned from walking and working surfaces.

3.2.2 Hazard Communication

(Reference CH2M HILL-SOP HSE-107, *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 HSE-112, *Lifting/Manual*)

- 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 HSE-208, *Fire Prevention*)

- Fire extinguishers will 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 HSE-206, *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 will not be suspended by their electric cord unless designed for suspension. Lights will be protected from accidental contact or breakage.
- Protect all electrical equipment, tools, switches, and outlets from environmental elements.

3.2.7 Heat Stress

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

- Drink 16 ounces of water before beginning work. Disposable cups and water maintained at 50°F to 60°F should be available. Under severe conditions, drink 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.
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!

3.2.7.1 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.

3.2.8 Cold Stress

(Reference CH2M HILL- SOP HSE-211, *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.

3.3 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	Exposure Limit ^b	IDLH ^c	Symptoms and Effects of Exposure	PIP ^d (eV)
Arsenic	SS: 36 mg/m ³	0.01 mg/m ³	5 Ca	Ulceration of nasal septum, respiratory irritation, dermatitis, gastrointestinal disturbances, peripheral neuropathy, hyperpigmentation.	NA
Lead	SS: 6500 mg/m ³	0.05 mg/m ³	100	Weakness lassitude, farcical pallor, weight loss, malnutrition, abdominal pain, constipation, anemia, gingival lead line, tremors, paralysis of wrist and ankles, encephalopathy, kidney disease, irritated eyes, hypertension	NA
TRPH	SS: 340 mg/m ³	100 ppm	1000	Eye, skin, and nose irritation; headache; dizziness; vomiting; dermatitis, burning sensation, in chest, weakness, chemical pneumonia	UK
Footnotes: ^a Specify sample-designation and media: SS (Surface Soil). ^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
Michael Halil	JAX	Project Manager	
Jeffrey Marks	JAX	Project Manager	SC-C, SC-HW; CPR-FA
Rich Rathnow	ORO	HSM	SC-C, SC-HW; CPR-FA

4.2 Field Team Chain of Command and Communication Procedures

4.2.1 Client

Contact Name: Larry Blackburn, NTR/ROICC
Phone: 904/542-8745 ext. 1116

4.2.2 CH2M HILL

Program Manager: Scott Smith/ATL 770/604-9095
Project Manager: Michael Halil, JAX 904/777-4812 ext. 233
Health and Safety Manager: Richard Rathnow/ATL 770/604-9095
Field Team Leader: Greg Ramey

Site Health and Safety Specialist: Greg Ramey

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 2.2.2
- Act as the project “Emergency Response Coordinator” and perform the responsibilities outlined in Section 4
- Post OSHA job-site poster; the poster is required at sites where project field offices, trailers, or equipment-storage boxes are established; posters can be obtained by calling 800/548-4776 or 800/999-9111
- Verify that safety meetings are conducted and documented in the project file initially and as needed throughout the course of the project (e.g., as tasks or hazards change)
- Verify that project H&S forms and permits, found in Attachment 5, are being used as outlined in Section 2
- Perform oversight and/or assessments of subcontractor HS&E practices per the site-specific safety plan and verify that project activity self-assessment checklists, found in Attachment 5, are being used as outlined in Section 2
- Verify that project files available to site personnel include copies of executed subcontracts and subcontractor certificates of insurance (including CH2M HILL as named additional insured), bond, contractors license, training and medical monitoring records, and site-specific safety procedures prior to start of subcontractor’s field operations
- Manage the site and interfacing with 3rd parties in a manner consistent with our contract/subcontract agreements and the applicable standard of reasonable care
- Coordinate with the HS&E manager regarding CH2M HILL and subcontractor operational performance, and 3rd party interfaces
- Ensure that the overall, job-specific, HS&E goals are fully and continuously implemented
- The training required for the SHSS is as follows:
 - SHSS 10 hour course
 - OSHA 10 hour course for Construction
 - First Aid and CPR

- Relevant Competent Person Courses (excavation, confined space, scaffold, fall protection, etc.)

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

4.2.3 Subcontractors

(Reference CH2M HILL- SOP HSE-215, *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 will 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 Oversight of remediation and construction Surveying Clearing and Grubbing	D	Work clothes; steel-toe, leather work boots; work glove.	Hardhat ^c Safety glasses Hearing protection ^d	None required
Pre-excavation Confirmation Soil Screening, Sampling, and Analyses Backfill Material Certification Pre-excavation Survey Waste Characterization T&D of contaminated/uncontaminated materials Site Restoration Post-excavation Survey Demobilization Sampling and Analyses	Modified D	Work clothes or cotton coveralls Boots: Steel-toe, chemical-resistant boots OR steel-toe, leather work boots with outer rubber boot covers Gloves: Inner surgical-style nitrile & outer chemical-resistant nitrile gloves.	Hardhat ^c Safety glasses Hearing protection ^d	None required
Excavation of Contaminated Soil and Backfilling Decontamination	Modified D	Coveralls: Uncoated Tyvek® Boots: Steel-toe, chemical-resistant boots OR steel-toe, leather work boots with outer rubber boot covers Gloves: Inner surgical-style nitrile & outer chemical-resistant nitrile gloves.	Hardhat ^c Splash shield ^c Safety glasses Hearing 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 nitrile gloves.	Hardhat ^c Splash shield ^c Hearing 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 nitrile gloves.	Hardhat ^c Splash shield ^c Ear protection ^d Spectacle inserts	Positive-pressure demand self-contained breathing apparatus (SCBA); MSA Ultralite, or equivalent.

TABLE 5-1
PPE Specifications^a

Task	Level	Body	Head	Respirator ^b
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 Hearing protection should be worn when conversations cannot be held at distances of 3 feet or less without shouting (>85 dB(A)).

^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
PID: OVM with 10.6eV lamp or equivalent	All intrusive operations	< 100ppm	Level D	Initially and periodically during task	Daily
		≥ 100 ppm, <1000 ppm	Level C; notify HSM		
		>1000 ppm	Level B: Contact HSM		
Dust Monitor Visual Assessment	Excavation T&D of Soil Other dust generation activities	No Visible Dust	Level D	Initially and periodically during tasks	Zero Daily
		Visible Dust: <0.01 mg/m3	Use dust suppression methods		
		≥ 0.01 mg/m3	Level C		
Nose-Level Monitor ^e :	As needed	<85 dB(A)	No action required	Initially and periodically during task	Daily
		85-120 dB(A)	Hearing protection required		
		120 dB(A)	Stop; re-evaluate		

^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

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.

7.0 Decontamination

(Reference CH2M HILL- SOP HSE-506, *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.

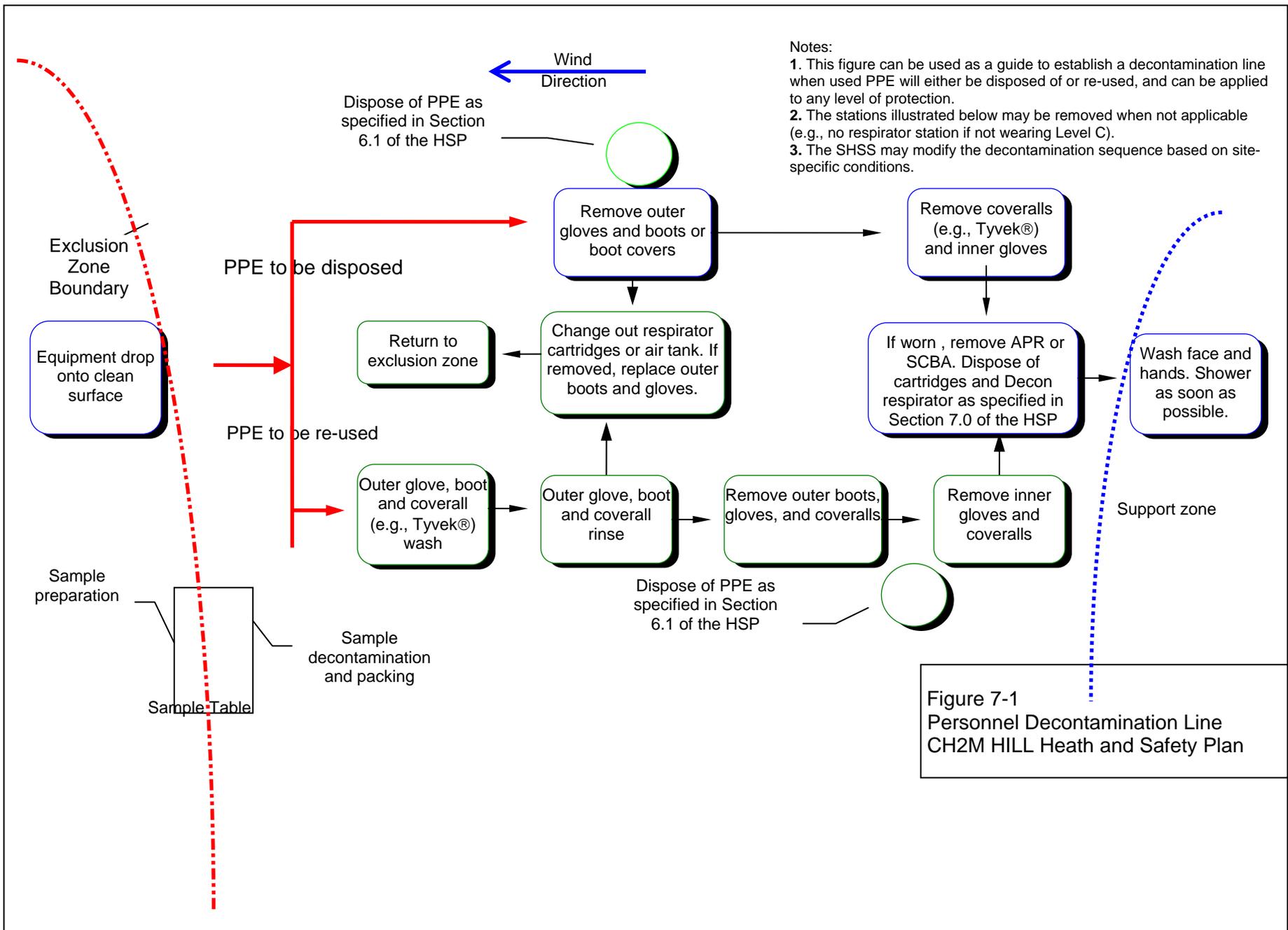
7.1 Decontamination Specifications

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.



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

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 HSE-510, *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 HSE-106, *Emergency Planning*)

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) will 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 will 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 will 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 will 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 will 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 will 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) will 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 will perform at least one LPO each week for a tasks/operations addressed in the project-specific HSP or AHA. The Site Supervisor/SHSS will complete the LPO form in Attachment 6 for the task/operation being observed.

11.4 Loss/Near Loss Investigations

Loss/Near Loss Investigations will 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 will 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 will 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 will 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 will be submitted to the Project Manager and HSM within 24 hours of incident occurs. The final Incident Investigation and Root Cause Analysis will 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.

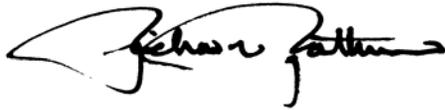
12.1 Original Plan

Written By: Rich Rathnow

Date: 10-27-2005

Approved By: Rich Rathnow

Date: 10-28-2005



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: Site 15, Cecil Field SHSS:	Project #: 284587 Trainer:
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TRAINING PARTICIPANTS:

NAME	SIGNATURE	NAME	SIGNATURE

REGULATED PRODUCTS/TASKS COVERED BY THIS TRAINING:

The HCC will 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 will 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 will 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 #: 911
Local Ambulance #: 911

CH2M HILL- Medical Consultant

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

Fire/Spill Emergency -- 911

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

Local Occupational Physician

Security & Police – 911

Facility Security #: 911
Local Police #: 911

Navy RAC Program Manager

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

Utilities Emergency

Water:
Gas:
Electric: 911

Navy RAC Health and Safety Manager (HSM)

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

Site Health and Safety Specialist (SHSS)

Name: Greg Ramey
Phone: 904-777-4812

CH2M HILL Human Resources Department

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

Project Manager

Name: Mike Halil
Phone: 904-777-4812

Corporate Human Resources Department

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

Federal Express Dangerous Goods Shipping

Phone: 800/238-5355

Emergency Number for Shipping Dangerous Goods

Phone: 800/255-3924

CH2M HILL Worker's Compensation and Auto Claims

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

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

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

Facility Alarms:

Evacuation Assembly Area(s):

Facility/Site Evacuation Route(s):

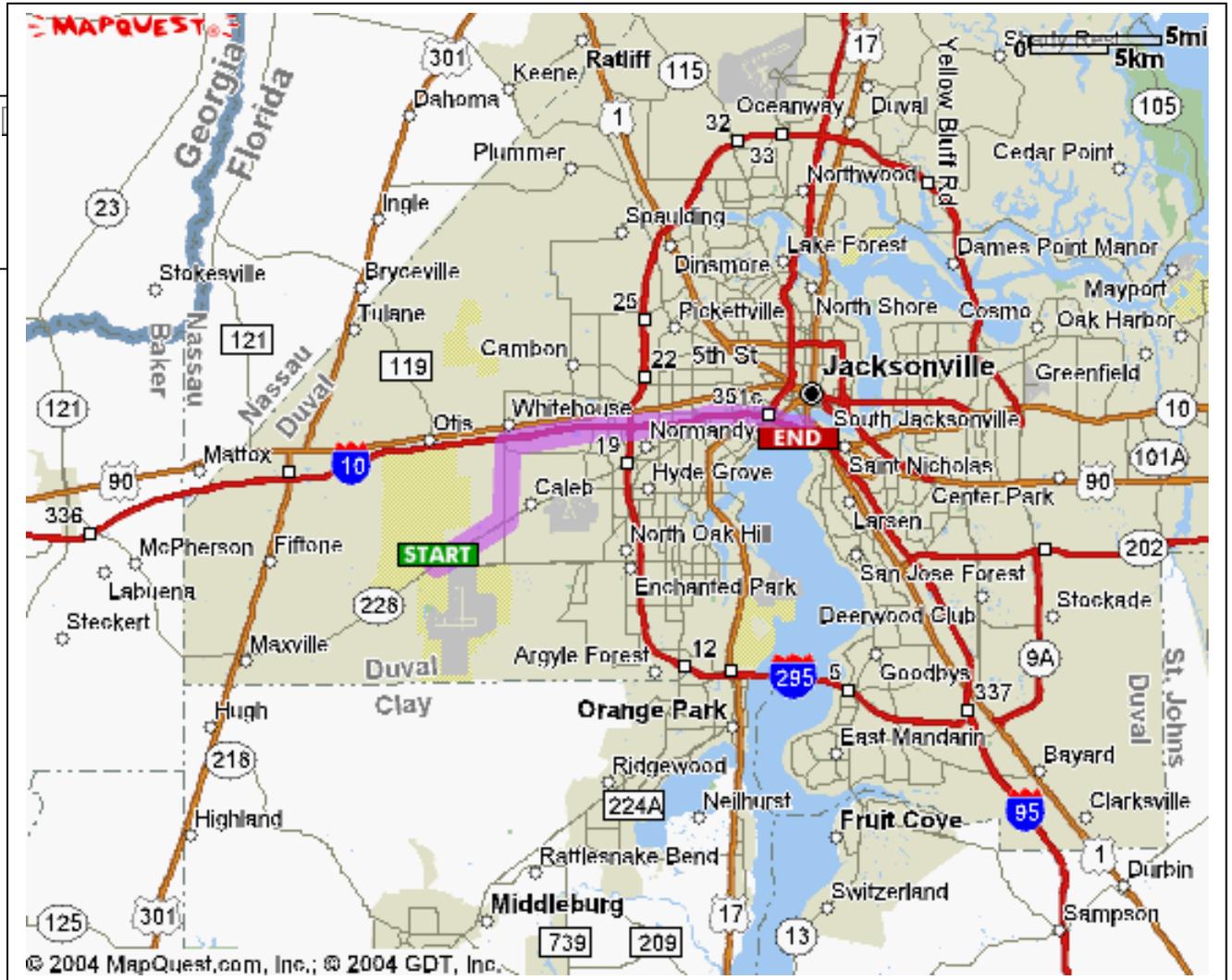
Hospital Name/Address:
Baptist Medical Center

Hospital Phone #: Hospital Phone #:
904-202-2000

Directions to Hospital

See map

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



Attachment 5

Project Activity Self-Assessment Checklists/Permits

Arsenic

Chainsaws

Earthmoving Equipment

Excavations

Hand and Power Tools

Lead

Traffic Control

Waste Characterization, Sampling, and Analysis

Hazardous Waste Management

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

This checklist is to be used at the following locations: 1) where CH2M HILL employees are exposed to arsenic, or 2) CH2M HILL provides oversight of subcontractor personnel who are exposed to arsenic.

The SSC or DSC may consult with subcontractors when completing this checklist, but will not direct the means and methods of arsenic operations nor direct the details of corrective actions. Subcontractors will 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) will be corrected immediately, or all exposed personnel will be removed from the hazard until corrected.

Completed checklists will 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 arsenic hazards
 Evaluate a CH2M HILL subcontractor's compliance with the arsenic standard and its requirements
 Subcontractors Name: _____

- Check "Yes" if an assessment item is complete/correct.
- Check "No" if an item is incomplete/deficient. Deficiencies will 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-65.

SECTION 1

PERSONNEL SAFE WORK PRACTICES (3.1)

	<u>Yes</u>	<u>No</u>	<u>N/A</u>	<u>N/O</u>
1. Areas that exceed the PEL have been designated as regulated areas	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Personnel meet medical and training requirements	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. No eating, drink, and/or smoking are allowed in the regulated areas.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Warning signs have been posted at all entrances to the regulated areas	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Selection of PPE is based on most relevant exposure monitoring data	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Personnel working near arsenic-contaminated soil or material will use wet methods and work practices to control dust; wear disposable coveralls and exercise personal hygiene practices	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Contact lenses are not worn when working with arsenic	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

<u>SECTION 2</u>	<u>Yes</u>	<u>No</u>	<u>N/A</u>	<u>N/O</u>
EXPOSURE ASSESSMENTS (3.2.2)				
8. Initial air monitoring conducted over full shift for each job classification.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. Air sampling conducted every six months when exposure limit (EL) ≥ AL but < PEL	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. Air sampling of employees conducted quarterly when EL ≥ PEL.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11. Additional air monitoring has been collected when there are any changes in operation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
COMMUNICATION OF HAZARDS (3.2.3)				
12. Training on the Hazard Communication Standard has been met.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13. CH2M HILL personnel have completed the Arsenic Training Module	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13. Training on the Fact Sheet, HSP/FSI and OSHA standard has been met.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14. Employees have been informed of air monitoring results within 5 days after receipt of results.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14. Where PEL is exceeded, affected employees have been notified of results and control measures to be utilized to reduce exposure below the PEL.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15. Storage or shipping containers have been properly labeled	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
16. Written compliance program is available to all affected employees	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
CONTROL METHODS (3.2.4)				
17. Engineering controls and work practices have been utilized to reduce exposures below the PEL.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
18. When controls are unable to reduce exposures below the PEL, respiratory protection is utilized.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
19. Regulated areas have been established and demarcated where exposures exceed the PEL	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
20. Only authorized personnel with respiratory protection may enter regulated areas.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
21. Where EL ≥ PEL, a written compliance program is implemented prior to commencing work	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
22. The compliance program is based on the most recent air monitoring/sampling results.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
23. The compliance program is updated for new exposure monitoring data or every six months	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
24. All surfaces are free of accumulation of arsenic	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
25. Cleaning methods minimize airborne arsenic activity	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
26. Where vacuuming is used, vacuums are used and emptied as to minimize airborne arsenic	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
27. A written housekeeping and maintenance plan is in place and maintained	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
28. Compressed air not used to remove arsenic from surfaces	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
29. Employees do not eat, drink, smoke, chew tobacco/gum, or apply cosmetics in regulated areas	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
30. Change areas provided where EL ≥ PEL or where employees are subject to eye or skin irritation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
31. Employee not allowed to leave workplace wearing clothing worn during work shift	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
32. Shower facilities installed and used with cleaning agents and towels, where feasible	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
33. Hand washing facilities provided for use by employees prior to eating, drinking, smoking, etc.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
34. Eating facilities free of arsenic provided for employees working in regulated areas	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
PERSONAL PROTECTIVE EQUIPMENT (3.2.5)				
23. Respirators are used in areas where EL ≥ PEL.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
24. Respirator cartridges are replaced at the end of shift or service life indicator, where available	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
25. The selection of the appropriate respirator is based on the airborne arsenic concentration	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
26. PAPRs are provided to employees who request such a respirator	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
27. PPE is supplied at no cost to employees	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
28. Employee exposed to arsenic tri-chloride wear impervious clothing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
29. Clean and dry protective clothing is provided weekly. Daily if EL ≥ 100 µg/m³	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
30. Protective clothing is repair or replaced if found to be ineffective	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
31. Contaminated protective clothing is removed from change areas at the end of the shift	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
32. All clothing requiring laundering is packaged in sealed, labeled containers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
33. Personnel or vendors who launder contaminated clothing are formally informed of the hazards	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

This checklist will be used by CH2M HILL personnel **only** and will 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 operating chainsaws, and/or 2) CH2M HILL is providing oversight of a subcontractor operating a chainsaw.

Safety Coordinators may consult with chainsaw subcontractors when completing this checklist, but will not direct the means and methods of chainsaw operations nor direct the details of corrective actions. Chainsaw subcontractors will 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) will be corrected immediately or all exposed personnel will be removed from the hazard until corrected.

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

This specific checklist has been completed to:

Evaluate CH2M HILL employee exposures to chainsaw hazards
 Evaluate a CH2M HILL subcontractor’s compliance with chainsaw HS&E requirements
 Subcontractor Name: _____

- Check “Yes” if an assessment item is complete/correct.
 - Check “No” if an item is incomplete/deficient. Deficiencies will be brought to the immediate attention of the excavation subcontractor. Section 2 must be completed for all items checked “No.”
 - Check “N/A” if an item is not applicable.
 - Check “N/O” if an item is applicable but was not observed during the assessment.
- Numbers in parentheses indicate where a description of this assessment item can be found in Standard of Practice HS-49.

<u>SECTION 1</u>		<u>Yes</u>	<u>No</u>	<u>N/A</u>	<u>N/O</u>
SAFETY EQUIPMENT (2.3)					
1. Chainsaw equipped with spark arrestor and fully functioning chain brake		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Chainsaw operator’s manual readily available		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Fully stocked first aid kit and multipurpose fire extinguisher available		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Appropriate personal protective equipment available and worn		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Clothing free of loose edges that could become entangled in the saw		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
PLANNING ACTIVITIES (2.5)					
6. Operators have read the chainsaw operator’s manual		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. If aerial lifts to be used, aerial lift training completed		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Daily safety briefing/meeting conducted with project personnel to discuss planned work		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. Immediate area surrounding operation cleared of obstructions		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. Companion maintained within calling distance of the chainsaw operator		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

SECTION 1 (Continued)

Yes No N/A N/O

INSPECTION (3.1.1)

- 11. Chain tension, sharpness, condition, and guide gap checked Yes No N/A N/O
- 12. Chainsaw components checked for physical damage Yes No N/A N/O
- 13. Chain does not rotate at idle with chain brake off Yes No N/A N/O
- 14. Chain brake and stop switch operating correctly Yes No N/A N/O
- 15. Throttle trigger can not be engaged until throttle trigger lock out pressed Yes No N/A N/O

STARTING THE ENGINE (3.1.2)

- 16. Chainsaw operator's manual consulted for proper starting procedures Yes No N/A N/O
- 17. Saw placed on level ground with guide bar and chain off the ground Yes No N/A N/O
- 18. Saw is not drop-started Yes No N/A N/O

SAFE OPERATION (3.1.3)

- 19. Chainsaw handles kept dry, clean, and free of oil or fuel mixture Yes No N/A N/O
- 20. Chainsaws held firmly with both hands and used right-handed Yes No N/A N/O
- 21. Operator standing to the left of the saw out of the plane of the chain Yes No N/A N/O
- 22. Saw used between the waist and mid-chest level Yes No N/A N/O
- 23. Full throttle maintained while cutting Yes No N/A N/O
- 24. Operator aware of position of guide bar tip, does not contact tip with anything being cut Yes No N/A N/O
- 25. Bumper spikes maintained as close to the object as possible Yes No N/A N/O
- 26. Operator aware of what is in the saw's downward path after the cut Yes No N/A N/O
- 27. No attempt to made to cut material that is larger than the guide bar of the saw Yes No N/A N/O
- 28. Cuts avoided that will cause chain to jam Yes No N/A N/O
- 29. Non-metallic wedges used to prevent compression cuts from jamming the blade Yes No N/A N/O
- 30. Bystanders and helpers kept at a safe distance from operation Yes No N/A N/O
- 31. Chainsaw not operated when fatigued Yes No N/A N/O
- 32. Fire extinguisher present when operating the chainsaw in forest or brushy areas Yes No N/A N/O

ELECTRICAL CHAINSAW PRECAUTIONS (3.1.3)

- 33. Extension cords approved for outdoor use Yes No N/A N/O
- 34. Electrical cords equipped with third-wire grounding Yes No N/A N/O
- 35. Ground fault circuit interrupter (GFCI) used Yes No N/A N/O
- 36. Electrical cord positioned carefully to avoiding cutting with saw or trip hazard Yes No N/A N/O
- 37. Saw switched to the off position before completing electrical connections Yes No N/A N/O
- 38. Saw unplugged before making adjustments and when not in use Yes No N/A N/O

REFUELING THE ENGINE (3.1.4)

- 39. Fuel mixed in accordance with the manufacturer's recommendations Yes No N/A N/O
- 40. Fuel stored and transported in an approved safety container Yes No N/A N/O
- 41. Engine shut off and allowed to cool before refueling Yes No N/A N/O
- 42. Fire extinguisher present during fueling and refueling Yes No N/A N/O
- 43. Area around refueling site free from combustible materials Yes No N/A N/O
- 44. Smoking around fueling or refueling operations prohibited Yes No N/A N/O
- 45. Funnel/flexible nozzle used to avoid spilling fuel on the engine Yes No N/A N/O

TRANSPORT AND STORAGE (3.1.5)

- 46. Chainsaws carried with engine off and guide bar pointing to rear Yes No N/A N/O
- 47. Chain guard attached or placed in carrying case prior to transporting Yes No N/A N/O
- 48. Fuel tank drained and spark plug disconnected for long-term storage Yes No N/A N/O
- 49. Chainsaw placed in scabbard or secured to platform prior to transporting in aerial lift Yes No N/A N/O

SECTION 1 (Continued)

Yes No N/A N/O

TOPPING UTILITY POLES (3.2.1)

- | | | | | |
|--|--------------------------|--------------------------|--------------------------|--------------------------|
| 50. CH2M HILL only topping utility poles from an aerial lift platform | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 51. Aerial lifts operated safely (use aerial lift checklist in HS-41) | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 52. Maximum length of pole section cut at one time does not exceed 2' | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 53. Pole tested for stray voltage with foreign voltage detector prior to cutting | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 54. Wiring, staples, nails, and other hardware removed within 4" of cut path | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 55. Saw handled between chest and waist level | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 56. Personnel below pole safe distance from the fall area | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 57. Cutting stopped leaving approximately one half inch of pole uncut | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 58. Pole section removed manually by pulling cut section towards body | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 59. Cut pole sections lowered by rope or placed in aerial lift platform | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 60. Rough edges hammered over after last cut | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

TREE FELLING (3.2.2)

- | | | | | |
|--|--------------------------|--------------------------|--------------------------|--------------------------|
| 61. CH2M HILL not felling trees beyond scope of SOP HS-49 | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 62. Power company contacted prior to felling trees within two tree lengths of power lines | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 63. Underground services checked that could be damaged when tree strikes the ground | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 64. Danger zone created two tree lengths from public areas, public removed from danger zone | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 65. Personnel maintain a distance equal to two tree lengths of the tree being felled | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 66. Intended direction of fall determined | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 67. Suitable escape path determined and maintained clear | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 68. Equipment needed to prevent tree from sitting back on the saw determined and readily available | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 69. Undercut notch cut on side of the tree in the direction of the fall line | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 70. Back cut started 1-2" inches above the undercut | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 71. As tree starts to fall, saw shut off and operator steps into the escape path | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

LIMBING STANDING TREES (3.2.3)

- | | | | | |
|---|--------------------------|--------------------------|--------------------------|--------------------------|
| 72. CH2M HILL not operating chainsaws where overhead electrical power lines may be contacted | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 73. Only subcontractors with special training permitted to work around electrical power lines | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 74. Branches/limbs not cut above shoulder height | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 75. If limbing from a ladder, ladder secured in position and operator independently secured | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 76. Chainsaws not used from rope and harness unless operator has received specific training | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

LIMBING FALLEN TREES (3.2.4)

- | | | | | |
|--|--------------------------|--------------------------|--------------------------|--------------------------|
| 77. No dead branches/other debris hanging above work that may fall | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 78. Personnel do not attempt to manually pull over elevated trees, mechanical equipment used | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 79. Springpoles cut safely, avoiding springback | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 80. Small-size brush and saplings cut with hand saws or other cutting tools | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 81. Operator standing uphill of tree unless secured to prevent rolling/sliding downhill | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 82. Cuts made with operator standing on the opposite side of the tree | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 83. Operator keeping sight of saw tip, avoiding kickback | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 84. Debris removed periodically to maintain clear vision and movement around tree | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

BUCKING TREES (3.2.5)

- | | | | | |
|---|--------------------------|--------------------------|--------------------------|--------------------------|
| 85. Operator standing uphill of tree unless secured to prevent rolling/sliding downhill | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 86. Working from small end to larger to improve stability | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 87. If tree on level ground, cutting from upper side and avoiding running chain into ground | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 88. If tree supported at one end, cutting from lower side one-third, then upper side | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 89. If tree supported at both ends, cutting from upper side one-third, then lower side | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

HS&E Self-Assessment Checklist - EARTHMOVING EQUIPMENT

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

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

The CH2M HILL Safety Coordinator may consult with subcontractors operating earthmoving equipment when completing this checklist, but will not direct the means and methods of equipment operations nor direct the details of corrective actions. Earthmoving equipment subcontractors will 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) will be corrected immediately or all exposed personnel will be removed from the hazard until corrected.

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

This specific checklist has been completed to:

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

- Check “Yes” if an assessment item is complete/correct.
 - Check “No” if an item is incomplete/deficient. Deficiencies will be brought to the immediate attention of the earthmoving equipment subcontractor. Section 3 must be completed for all items checked “No.”
 - Check “N/A” if an item is not applicable.
 - Check “N/O” if an item is applicable but was not observed during the assessment.
- Numbers in parentheses indicate where a description of this assessment item can be found in Standard of Practice HSE-27.

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

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

HS&E Self-Assessment Checklist – EXCAVATIONS

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

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

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

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

This specific checklist has been completed to:

Evaluate CH2M HILL employee exposures to excavation hazards
 Evaluate a CH2M HILL subcontractor’s compliance with excavation HS&E requirements
 Subcontractor Name: _____

- Check “Yes” if an assessment item is complete/correct.
 - Check “No” if an item is incomplete/deficient. Deficiencies will be brought to the immediate attention of the excavation subcontractor. Section 3 must be completed for all items checked “No.”
 - Check “N/A” if an item is not applicable.
 - Check “N/O” if an item is applicable but was not observed during the assessment.
- Numbers in parentheses indicate where a description of this assessment item can be found in Standard of Practice HSE-32.

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

<u>SECTION 2</u>	<u>Yes</u>	<u>No</u>	<u>N/A</u>	<u>N/O</u>
GENERAL (4.2.1)				
9. Daily safety briefing/meeting conducted with personnel	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. Excavation and protective systems adequately inspected by competent person	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11. Defective protective systems or other unsafe conditions corrected before entry	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12. Guardrails provided on walkways over excavation 6' (1.8m) or deeper	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13. Barriers provided at excavations 6' or deeper when excavation not readily visible	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14. Barriers or covers provided for wells, pits, shafts, or similar excavation 6' (1.8 m) or deeper	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15. Earthmoving equipment operated safely (use earthmoving equipment checklist in HS-27)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
PRIOR TO EXCAVATING (4.2.2)				
16. Dig permit obtained where required by client/facility	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
17. Location of underground utilities and installations identified	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
18. Excavation area evaluated for OE/UXO hazards	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
19. Soils characterized prior to excavation where contamination may be present	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
20. USDA (or local equivalent) soil permit obtained for soil transport, where required	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
21. Excavation area checked for wetlands, endangered species, cultural/historic resources	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
22. ACOE/CWA 404 (or local equivalent) permit obtained for wetlands, where required	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
23. Stockpile management plan prepared	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
24. Waste discharge/NPDES (or local equivalent) permit obtained for excavation dewatering	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
25. Stormwater pollution prevention or erosion & sediment control plan prepared, where required)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
EXCAVATING ACTIVITIES (4.2.3)				
26. Rocks, trees, and other unstable surface objects removed or supported	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
27. Exposed underground utility lines supported	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
28. Undermined surface structures supported or determined to be in safe condition	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
29. Warning system used to remind equipment operators of excavation edge	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
30. Stockpile, excavation covers, liners, silt fences in place, where required	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
31. Fugitive dust suppressed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
EXCAVATION ENTRY (4.2.4)				
32. Trenches > 4' (1.2 m) deep provided with safe means of egress within 25' (7.6 m)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
33. Structure ramps designed and approved by competent person	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
34. Potential hazardous atmospheres tested prior to entry	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
35. Rescue equipment provided where potential for hazardous atmospheres exists	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
36. Ventilation used to control hazardous atmospheres and air tested frequently	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
37. Appropriate respiratory protection used when ventilation does not control hazards	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
38. Precautions taken to prevent cave-in from water accumulation in excavation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
39. Precautions taken to prevent surface water from entering excavation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
40. Protection provided from falling/rolling material from excavation face	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
41. Spoil piles, equipment, materials restrained or kept at least 2' (61 cm) from excavation edge	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
EXCAVATION PROTECTIVE SYSTEMS (4.2.5)				
42. Protective systems used for excavations 5' (1.5 m) or deeper, unless stable rock	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
43. Protective systems for excavation deeper than 20' (6.1 m) designed by registered PE	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
44. If soil unclassified, maximum allowable slope is 34 degrees	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
45. Protective systems free from damage	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
46. Protective system used according to manufacturer's recommendations and not subjected to loads exceeding design limits	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
47. Protective system components securely connected to prevent movement or failure	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
48. Cave-in protection provided while entering/exiting shielding systems	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
49. Personnel removed from shielding systems when installed, removed, or vertical movement	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

<u>SECTION 2 (Continued)</u>	<u>Yes</u>	<u>No</u>	<u>N/A</u>	<u>N/O</u>
PROTECTIVE SYSTEM REMOVAL AND BACKFILLING (4.2.6)				
50. Protective system removal starts and progresses from excavation bottom	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
51. Protective systems removed slowly and cautiously	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
52. Temporary structure supports used if failure of remaining components observed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
53. Backfilling taking place immediately after protective system removal	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
54. Backfill certified clean when required by client or local regulation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
EXCAVATING AT HAZARDOUS WASTE SITES (4.2.7)				
55. Waste disposed of according to HSP and RCRA regulations	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
56. Appropriate decontamination procedures being followed, per HSP	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
EXCAVATING AT POTENTIAL ORDNANCE EXPLOSIVES SITES (4.2.8)				
57. OE plan prepared and approved	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
58. OE/UXO avoidance provided, routes and boundaries cleared and marked	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
59. Personnel remain inside the marked boundary	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
60. Earthmoving equipment does not excavate closer than 1' (30.5 cm) to anomalies	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

CH2MHILL

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

This checklist will be used by CH2M HILL personnel **only** and will 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 will not direct the means and methods of hand and power tool use nor direct the details of corrective actions. Subcontractors will 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) will be corrected immediately or all exposed personnel will be removed from the hazard until corrected.

Completed checklists will 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 will 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"/> |
| Safety devices are installed on automatic fastener feed tools as required. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 37. 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"/> |
| 38. 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"/> |
| 39. Hoses are not used for hoisting or lowering tools. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 40. 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"/> |
| 41. Airless spray guns have required safety devices installed. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 42. 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"/> |
| 43. Supports are provided for mounting nozzles when not in use. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 44. Air receiver drains, handholes, and manholes are easily accessible. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 45. 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"/> |
| 46. Air receivers are completely drained at required intervals. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 47. Air receivers are equipped with indicating pressure gauges. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 48. Safety, indicating, and controlling devices are installed as required. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 49. 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"/> |

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"/> |

This checklist will be used by CH2M HILL personnel **only** and will 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 lead operations and/or 2) CH2M HILL provides oversight of subcontractor personnel who are exposed to lead operations.

SSC or DSC may consult with subcontractors when completing this checklist, but will not direct the means and methods of lead operations nor direct the details of corrective actions. Subcontractors will 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) will be corrected immediately or all exposed personnel will be removed from the hazard until corrected.

Completed checklists will 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 lead hazards
 Evaluate a CH2M HILL subcontractor’s compliance with the lead standard and its requirements
 Subcontractors Name: _____

- Check “Yes” if an assessment item is complete/correct.
 - Check “No” if an item is incomplete/deficient. Deficiencies will 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-57.

<u>SECTION 1</u>				
	<u>Yes</u>	<u>No</u>	<u>N/A</u>	<u>N/O</u>
PERSONNEL SAFE WORK PRACTICES (3.1)				
1. Work activities identified where there is a potential for lead exposure.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Surfaces tested where lead may be present.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Regulated areas have been identified and marked.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Personnel entering into regulated areas have been trained and medically qualified.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. No eating, drinking, smoking, chewing, or applying cosmetics in regulated areas.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Respiratory protection and other controls selected as per direction of competent person.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Work progresses from areas of less contamination to more	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Water is added to soil prior to and during ground intrusive work to minimize dust generation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. Personnel in vicinity of ground intrusive activities are wearing disposable coveralls or equal	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. Personnel exercising enhanced personal hygiene near contaminated soil operations	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

SECTION 2

Yes No N/A N/O

EXPOSURE ASSESSMENTS (3.2.2)

- 11. The exposure assessment has been completed. Yes No N/A N/O
- 12. Air monitoring data supporting the exposure data is available. Yes No N/A N/O
- 13. PPE is appropriate for the type of activity and concentration. Yes No N/A N/O
- 14. Personnel have been provided PPE, hygiene facilities, biological monitoring, and training during initial exposure determination. Yes No N/A N/O
- 15. An assessment has been conducted for each process, personnel, or control. Yes No N/A N/O
- 16. New assessment conducted when a change occurs in process, personnel, or controls. Yes No N/A N/O
- 17. Air monitoring results above the AL but below the PEL have been sampled in the last 6 months. Yes No N/A N/O
- 18. Air monitoring results above the PEL have been sampled in the last 3 months. Yes No N/A N/O
- 19. The exposure assessment based on theoretical calculations, historical data, or other information has been verified. Yes No N/A N/O

COMMUNICATION OF HAZARDS (3.2.3)

- 20. Training on the Hazard Communication Standard has been met. Yes No N/A N/O
- 21. The Written Compliance Program is available. Yes No N/A N/O
- 22. Warning Signs have been posted in areas above the PEL Yes No N/A N/O
- 23. Notification of owners, tenants, and contractors has been made. Yes No N/A N/O

CONTROL METHODS (3.2.4)

- 24. Engineering and work practices are implemented in areas at or above the PEL. Yes No N/A N/O
- 25. The mechanical ventilation has been assessed to control lead exposures. Yes No N/A N/O
- 26. Where administrative controls are used, a job rotation schedule has been implemented. Yes No N/A N/O
- 27. A written compliance program is established and implemented. Yes No N/A N/O
- 28. All surfaces are clean of lead dust accumulation. Yes No N/A N/O
- 29. Vacuums are equipped with HEPA filters. Yes No N/A N/O
- 30. Compressed air is not used to remove lead or control lead dust. Yes No N/A N/O
- 31. Employees not allowed to eat, drink, or smoke in regulated areas. Yes No N/A N/O
- 32. Change areas are available when regulated areas are in use. Yes No N/A N/O
- 33. PPE used in lead operations not worn by employees off the worksite. Yes No N/A N/O
- 34. Personal hygiene facilities (showers and wash facilities) are available in areas above the PEL. Yes No N/A N/O
- 35. Employees required to wash hands and face at end of shift and prior to eating, smoking, etc. Yes No N/A N/O
- 36. Eating facilities, free of lead contamination, provided and readily accessible. Yes No N/A N/O

PERSONAL PROTECTIVE EQUIPMENT (3.2.5)

- 37. Respirators are used in areas at or above the PEL. Yes No N/A N/O
- 38. The selection of the appropriate respirator is based on the airborne lead concentration. Yes No N/A N/O
- 39. All other required PPE (coveralls, gloves, goggles, etc) and equipment provided to employees. Yes No N/A N/O
- 40. PAPRs have been made available to employees who request them. Yes No N/A N/O
- 41. Clean & dry protective clothing provided weekly; daily to employees exposed over 200 µg/m³ Yes No N/A N/O
- 42. Clothing to be laundered is labeled with "Caution" signs. Yes No N/A N/O
- 43. Businesses and personnel laundering contaminated clothing have been informed of lead hazard. Yes No N/A N/O

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

SSC or DSC may consult with subcontractors when completing this checklist, but will not direct the means and methods of traffic control operations nor direct the details of corrective actions. Subcontractors will 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) will be corrected immediately or all exposed personnel will be removed from the hazard until corrected.

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

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

This specific checklist has been completed to:

Evaluate CH2M HILL employee exposure to traffic hazards.
 Evaluate a CH2M HILL subcontractor's compliance with traffic control requirements.
 Subcontractors Name: _____

- Check "Yes" if an assessment item is complete/correct.
 - Check "No" if an item is incomplete/deficient. Deficiencies will 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-24.

<u>SECTION 1</u>		<u>Yes</u>	<u>No</u>	<u>N/A</u>	<u>N/O</u>
SAFE WORK PRACTICES (3.1)					
1.	Personnel working on/adjacent to active roadways or in control zones are wearing safety vests.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.	Traffic control plan (TCP) is consistent with roadway, traffic, and working conditions.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.	TCP has been approved by regulatory or contractual authority prior to work.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.	TCP considers all factors that may influence traffic related hazards and controls.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5.	Work areas are protected by rigid barriers.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6.	Lookouts are used when applicable.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7.	Vehicles are parked 40 feet away from work zone or are equipped with hazard beacon/strobe.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8.	TMCC or TMA vehicle is used where appropriate.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9.	All CH2M HILL traffic control devices conform to MUTCD standards.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10.	Traffic control devices are inspected continuously.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11.	Flagging is only used when other means of traffic control are inadequate.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12.	Additional traffic control zone controls have been implemented.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13.	Cranes do not swing loads/booms over nor do workers enter/cross live roadways (as defined).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

SECTION 2

Yes No N/A N/O

GENERAL (3.2.1)

- 14. Lane closings are performed when required by this SOP.
- 15. Traffic control configurations are based on an engineering study of the location.
- 16. If no study, traffic control is performed with approval of the authority having jurisdiction.
- 17. TCP has been prepared and understood by all responsible parties prior to work.
- 18. Special preparation/coordination with external parties has been conducted where applicable.
- 19. All contractor traffic control devices conform to MUTCD standards.
- 20. Traffic movement and flow are inhibited or disrupted as little as possible.
- 21. Supplemental equipment and activities do not interfere with traffic.
- 22. Drivers and pedestrians are considered when entering and traversing traffic control zone.

TRAFFIC CONTROL ZONES (3.2.2)

- 23. Traffic control zones are divided into the necessary five areas.
- 24. Advances warning area is designed based on conditions of speed, roadways, and driver needs.
- 25. Advanced warning signage is spaced according to roadway type and conditions.
- 26. Transition areas are used to channelize traffic around the work area.
- 27. Buffer areas are used to provide a margin of safety for traffic and workers.
- 28. The buffer area is free of equipment, workers, materials, and worker vehicles.
- 29. The length of the buffer area is two times the posted speed limit in feet.
- 30. All work is contained in the work area and is closed to all traffic.
- 31. A termination area is used to provide traffic to return to normal lanes.
- 32. A downstream taper is installed in the termination area.

DEVICE INSTALLATION AND REMOVAL (3.2.3)

- 33. All vehicles involved with device installation/removal have hazard beacons/strobes.
- 34. Devices are installed according to the order established by this SOP.
- 35. Devices are removed in the opposite order of installation.
- 36. Tapers are used to move traffic out of its normal path.
- 37. Tapers are created using channelizing devices.
- 38. The length of taper is determined by posted speed and width of lane to be closed (see formula).
- 39. Local police or highway patrol assist during taper installation and removal.
- 40. TMCC/ TMA vehicles are used to protect personnel during installation and removal of devices.
- 41. Cone trucks are equipped with platforms and railings.
- 42. Cones are the appropriate height for the specific roadway and are reflectorized.
- 43. Temporary sign supports are secured using sandbags to prevent movement.
- 44. Arrow panels are used on lane closures where required.
- 45. Concrete barriers are used where required.
- 46. Barrels, crash cushions, or energy absorbing terminals are used to protect traffic as required.
- 47. Changeable message signs (CMS) are used as required.
- 48. CMS are not used to replace required signage.
- 49. No more than two message panels are used in any message cycle on CMS.

FLAGGING (3.2.4)

- 50. Flagging is used only when other traffic control methods are inadequate.
- 51. Only approved personnel with current certification are allowed to be used as flaggers.
- 52. Flaggers are located off the traveled portion of the roadway.
- 53. A communication system is established when more than one flagger is used.
- 54. Hand signaling by flaggers is by means of red flags, sign paddles, or red lights.
- 55. Flaggers are alert, positioned close enough to warn work crews, and easily identified from crew.
- 56. An escape plan is established by crew and flaggers prior to traffic control set up.
- 57. Signs indicating a flagger is present are used and removed as required.

SECTION 2**Yes No N/A N/O****INSPECTION AND MAINTENANCE (3.2.5)**

- | | | | | |
|--|--------------------------|--------------------------|--------------------------|--------------------------|
| 58. Traffic control zones are monitored to determine their effectiveness under varying conditions. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 59. Traffic control devices are inspected at the beginning and continuously during work shift. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 60. Traffic control devices are restored to their proper position immediately and continuously. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 61. Damaged, old, or ineffective devices are removed and replaced immediately and continuously. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 62. Devices using reflected light for illumination are cleaned and monitored continuously. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

This checklist will be used by CH2M HILL personnel **only** and will 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 will not direct the means and methods of waste characterization, sampling and analysis operations nor direct the details of corrective actions. Subcontractors will 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) will be corrected immediately or all exposed personnel will be removed from the hazard until corrected.

Completed checklists will 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 will 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"/>	<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"/>	<input type="checkbox"/>
3. Waste characterized before it is generated.	<input type="checkbox"/>	<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"/>	<input type="checkbox"/>
5. Waste volumes estimated.	<input type="checkbox"/>	<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"/>	<input type="checkbox"/>
7. Disposal facility evaluated (see HSE-78).	<input type="checkbox"/>	<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"/>	<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"/>	<input type="checkbox"/>
10. Analyses required for transport, treatment, and disposal determined.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11. Detection limits identified.	<input type="checkbox"/>	<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"/>	<input type="checkbox"/>
13. Analytical test methods identified.	<input type="checkbox"/>	<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,
- 18. The label on the container is covered with clear tape to prevent loss.

collected sampler's name, sample preserves, analysis to be performed.

CHAIN OF CUSTODY (COC)

- 19. Sample shipping containers sealed with two custody seals.
- 20. Custody seals placed over the left and rights sides of the container's cover (cooler).
- 21. Each seal signed and dated (with time).
- 22. Seals are covered with clear tape to prevent loss.
- 23. Custody seals placed on sample container immediately after collection.
- 24. Custody seals must be placed in a manner that they must be broken to open sample container.
- 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).

CHAIN OF CUSTODY FORM INSTRUCTIONS (7.2.5)

- 26. Chain of Custody form completed per instructions

RECORDS (7.2.6)

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

Attachment 6

Behavior Based Loss Prevention System Forms

Activity Hazard Analysis
Pre-Task Safety Plans
Loss Prevention Observation
Incident Report and Investigation

PRINT

SIGNATURE

Supervisor Name:

Date/Time: _____

Safety Officer Name:

Date/Time: _____

Employee Name(s):

Date/Time: _____

CH2MHILL**PRE-TASK SAFETY PLAN**

Project: _____ Location: _____ Date: _____

Supervisor: _____ Emergency Number(s): _____

Brief Job Descriptions:

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

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

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

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

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

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

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

Other Potential Hazards (Describe):

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

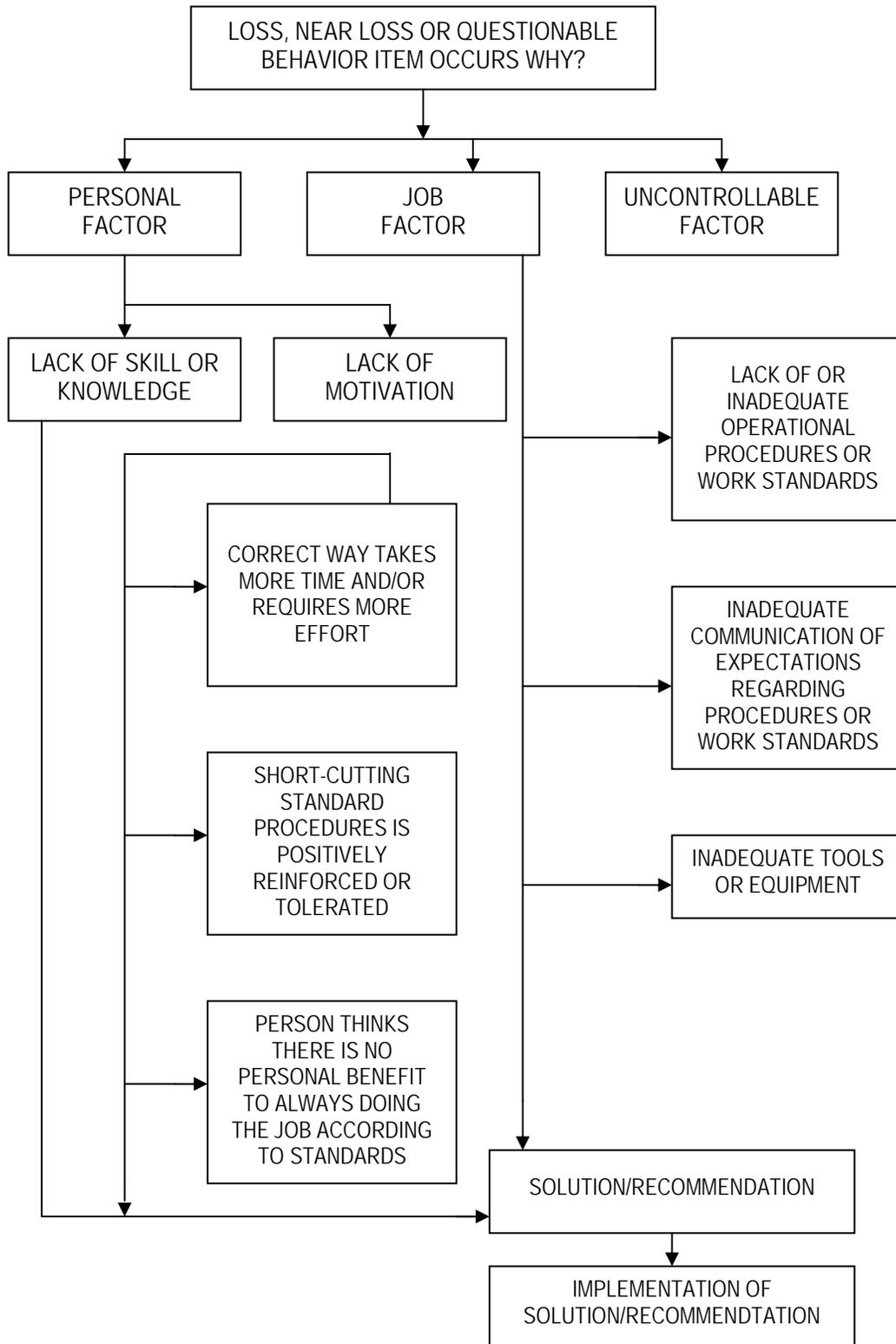
Name	Job Title	Date

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

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"/> Burn/Scald (Heat) | <input type="checkbox"/> Dermatitis |
| <input type="checkbox"/> Amputation | <input type="checkbox"/> Cancer | <input type="checkbox"/> Dislocation |
| <input type="checkbox"/> Asphyxia | <input type="checkbox"/> Carpal Tunnel | <input type="checkbox"/> Electric Shock |
| <input type="checkbox"/> Bruise/Contusion/Abrasion | <input type="checkbox"/> Concussion | <input type="checkbox"/> Foreign Body in eye |
| <input type="checkbox"/> Burn (Chemical) | <input type="checkbox"/> Cut/Laceration | <input type="checkbox"/> Fracture |

- Freezing/Frost Bite
- Headache
- Hearing Loss
- Heat Exhaustion
- Hernia
- Infection
- Irritation to eye

- Ligament Damage
- Multiple (Specify) _____
- Muscle Spasms
- Other (Specify) _____

- Poisoning (Systemic)
- Puncture
- Radiation Effects
- Strain/Sprain
- Tendonitis
- Wrist Pain

Part of Body Injured

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

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

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

Nature of Injury

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

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

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

Initial Diagnosis/Treatment Date: _____

Type of Treatment

- Admission to hospital/medical facility
- Application of bandages
- Cold/Heat Compression/Multiple Treatment
- Cold/Heat Compression/One Treatment
- First Degree Burn Treatment
- Heat Therapy/Multiple treatment
- Multiple (Specify) _____

- Heat Therapy/One Treatment
- Non-Prescriptive medicine
- None
- Observation
- Other (Specify) _____

- Prescription- Multiple dose

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

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

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

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

Describe how you may have prevented this injury: _____

Physician Information

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

Hospital Information

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

Property Damage (Complete for Property Damage incidents only)

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

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

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

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

Describe Environmental or Permit Issue: _____
Permit Type: _____
Permitted Level or Criteria (e.g., discharge limit): _____
Permit Name and Number (e.g., NPDES No. ST1234): _____
Substance and Estimated Quantity: _____
Duration of Permit Exceedence: _____

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

CH2M HILL Personnel Notified: _____
Client Notified: _____

Witnesses (Complete for all incident types)

Witness Information (First Witness)

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

Witness Information (Second Witness)

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

Additional Comments:

NEAR LOSS INVESTIGATION FORM

Employer Information

Company Name: _____

Project Name: _____ Project Number: _____

Project Location: _____

CHIL Project? Yes No

Task Location: _____

Job Assignment: _____ Business Group: _____

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

Near Loss Incident Specific Information

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

Location of incident:

Company premises Field In Transit Other: _____

Address where the incident occurred: _____

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

Describe any property damage: _____

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

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

Describe the specific incident and how it occurred:

Describe how this incident may have been prevented:

Contributing Factors (Describe in detail why incident occurred):

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

NEAR LOSS INVESTIGATION FORM

Witness Information (First Witness)

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

Witness Information (Second Witness)

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

Additional information or
comments: _____

Attachment 7

Applicable Material Safety Data Sheets
(available onsite)

Attachment 8

Subcontractor H&S Plans/Procedures

Attachment 9

Lead and Arsenic Awareness Fact Sheets

Lead Exposure Training Instructions

This module was designed for employees who work in areas with percent levels of inorganic lead or areas where there is a potential lead exposure above the action level of 30 $\mu\text{g}/\text{m}^3$.

Lead Exposure Training Program

The OSHA lead standard (29 CFR 1910.1025), requires employers to provide lead training for those employees who may be exposed to inorganic lead above the action level of 30 $\mu\text{g}/\text{m}^3$. This training program satisfies this OSHA requirement and is provided to assist employees in recognizing lead exposure hazards and understanding the procedures to be followed to minimize exposure.

Objectives

- Inform employees of the possible adverse health effects of lead exposure
- Inform employees of the regulatory requirements when working with or around lead
- Identify how lead exposures could occur on CH2M HILL projects

How to complete this training

Employees are required to read the training materials that follow and complete a short quiz. The training materials must be read thoroughly and understood before completing the quiz; you will have only one chance at answering each question.

Quiz scores will automatically be sent to the Health and Safety Training Administrator. A minimum score of 70% must be obtained to receive credit for this training. If a passing score is obtained, the H&S Training Administrator will issue you a certificate of completion. If a passing score is not obtained, you are required to contact your regional health and safety program manager to discuss the training material directly.

Lead Exposure Training

1. Uses And Occurrences

Lead is a well-known naturally-occurring metal found in the earth's crust, often associated with silver and zinc. It has had a variety of uses since antiquity, but its greatest use today is in car batteries. It was formerly used in gasoline, water pipes, pottery glazes, paint, solder, and as metal alloy. It currently has a variety of other uses such as radiation shielding, as vibration dampening material, in explosives, bullets, magnets, and in electronic equipment. It is also a common contaminant at hazardous waste sites.

2. Physical Characteristics

Lead exist as the familiar soft, dull gray metal, as a white or red solid as lead oxide, a gray or black solid as lead sulfide (galena), a white solid as lead sulfate, all which are insoluble in water. There are numerous other forms of inorganic lead. The organic forms, tetraethyl lead and tetramethyl lead, used in the past in fuels, are flammable colorless liquids also insoluble in water.

3. Toxicity And Hazards

Lead is a highly toxic substance that has a variety of adverse health effects from both chronic and acute exposure. An acute exposure to high levels of lead can cause a brain condition known as encephalopathy which can lead to death in a few days. The more common chronic exposure can also cause brain damage, blood disorders (anemia), kidney damage, damage to the reproductive system of both men and women and toxic effects to fetuses. Lead is stored in the bones and eliminated from the body very slowly. Consequently, exposures to low levels over many years can cause these adverse health effects. Lead is toxic by inhalation and ingestion, but is not absorbed through the skin. Some common symptoms of chronic overexposure include loss of appetite, metallic taste in mouth, anxiety, insomnia and muscle and joint pain or soreness.

4. Regulations

Inorganic lead has been specifically regulated in general industry by OSHA since 1981(29 CFR 1910.1025) and in construction (29 CFR 1926.62)since 1994. The 8-hour permissible exposure limit is 50 µg/M³. There is no short term exposure limit. OSHA also specifies an action level of 30µg/M³. These limits apply to both general industry and construction. Initial air monitoring must be done whenever there are indications of lead exposure above the action level. If the action level is not exceeded, air monitoring can cease. If the action level is exceeded, initial blood lead level monitoring must be made available. If exposed above the action level for more than 30 days in a year, medical surveillance must be provided which includes further blood lead level monitoring and a medical examination. If specified blood levels are exceeded, the employee must be removed from the job or task where lead exposure occurs. Training must also be provided. If the PEL is exceeded, engineering controls must be implemented to reduce exposure. If engineering controls are not feasible or ineffective, respirators must be provided and worn. Air-purifying respirators with high-efficiency (HEPA) filters can be worn when airborne levels are as high as 500 µg/M³. If levels exceed this amount, supplied air respirators must be worn. In addition, if

the PEL is exceeded, OSHA requires the establishment of regulated areas, showers, change rooms, separate clean lunchrooms and warning signs. Regulated areas are demarcated from the rest of the workplace to limit access to authorized personnel who have received lead training. To enter a regulated area you must also wear protective clothing. Tetraethyl and tetramethyl lead each have separate PELs of 100 µg/M³ and 150 µg/M³ respectively, and are not covered under the inorganic lead regulation.

5. How Exposures Can Occur At Ch2m Hill Projects

Exposure to lead can occur at hazardous waste sites where lead is found in soil or groundwater and at old mining sites or former smelter sites. Exposure to lead-containing dust could occur during drilling, heavy equipment movement or other soil-disturbing activities. Dust formation can be minimized by wetting soils. Exposure could also occur during lead paint removal activities, during welding on metal surfaces with lead-containing paint, or in project work in smelters, battery recycling or manufacturing plants or at some mines.

6. Additional Information

Persons working at hazardous waste sites with known high amounts in soils (3% or 30,000 ppm) should have blood lead draws taken before and after site work. Air sampling should be done during soil disturbing activities at the site. Person working at non-hazardous waste site who have information or suspect they have been exposed to lead above the action level should contact a health and safety manager to determine if medical monitoring is needed or other regulatory requirements apply.

Arsenic

Standard of Practice HSE-501

Arsenic Fact Sheet

Uses and Occurrences

The manufacture and transportation of arsenic compounds; use in the manufacture of herbicide, pesticide, fungicides, and defoliants; use in the manufacture and handling of calcium arsenate; use in the manufacture of electrical semiconductors, diodes, and solar batteries; as an additive for food and drinking water for animals; use as a preharvest desiccant, sugarcane ripener, soil sterilant, or for timber thinning; use as a bronzing or decolorizing addition in glass manufacturing; use in the production of opal glass and enamels; use as an addition to alloys to increase hardening and heat resistance; during smelting of ores; during the cleanup of soil contaminated with arsenic; military applications; and general handling, storage, and use of arsenic.

Physical Characteristics

Appearance: Gray metal or white powder

Odor: Garlic-like when heated

Flammable: None

Flash Point: None

Flammable Range: None

Specific gravity: 5.73 for arsenic metal, 2.16 for arsenic trioxide

Stability: Stable

Incompatibilities: Heat, hydrogen gas, and oxidizing agents

Melting Point: Sublimes at 613°C; -8.5°C for arsenic trioxide

Boiling Point: Sublimes at 613°C; 130°C for arsenic trioxide

Signs and Symptoms of Exposure

Short term (Acute): Nausea, vomiting, diarrhea, weakness, loss of appetite, cough, chest pain, giddiness, headache, and breathing difficulty.

Long term (Chronic): Numbness and weakness in the legs and feet, skin and eye irritation, hyperpigmentation, thickening of palms and soles

(hyperkeratosis), contact dermatitis, skin sensitization, warts, ulceration and perforation of the nasal septum

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HSE-501 A3, VERSION 1.2

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Modes of Exposure

Inhalation: Dusts and Vapors

Absorption: Liquid

Ingestion: Dusts and Liquid

Exposure Limits

Action level 5 µg/m³

PEL 10 µg/m³

STEL None

TLV 10 µg/m³

Exposure Level vs. Regulatory Requirements

EXPOSURE LEVEL (EL) REGULATORY REQUIREMENTS

EL < AL Maintain exposure as low as reasonably achievable

AL > EL, EL < PEL Implement portions of the OSHA Arsenic standard and

Training

EL > PEL Implement all portions of the OSHA Arsenic Standard including training, medical surveillance, engineering controls, establishment of work areas, etc.

PPE

Eye: Safety Glasses; contact lenses should **not** be worn

Skin: Chemical protective gloves and body protection

Respiratory: Air purifying respirators and supplied air respirators, depending on the exposure

First Aid

Inhalation: Move to fresh air; seek medical attention promptly

Skin: Quick drenching with water; wash skin with soap and water; seek medical attention promptly

Eyes Flush with water for 15 minutes, lifting the lower and upper lids occasionally; seek medical attention promptly

Ingestion: Seek medical attention promptly

We will only maintain controlled copies online. Printed versions of this document are uncontrolled copies. To ensure you have the current version, use the copy found at: http://www.int.ch2m.com/safety_counts/SOPs/Alpha.htm.

Appendix C

Transportation and Disposal/Quality Control Attachments

- Transportation and Disposal Log
- Submittal Register
- Testing Plan and Log
- Summary of Field Tests Log
- Contractor Daily Production Report
- Contractor Daily Quality Control Report
- Preparatory Phase Report

Submittal Register

Contract Number: N62467-98-D-0995			CTO No.: 0057		CTO Title: Excavation of Contaminated Soil at Site 15					Location: NAS Cecil Field, Jacksonville, FL			Contractor: CH2M HILL Constructors, Inc.				
A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
Item Number	Spec Section	Item Description	Para. Number	Approving Authority	Other Reviewers	Submittal Number	Scheduled Submission Date	CCI Review Date	CCI Disposition	CCI Transmit Date	QC Admin Received Date	QC Disposition	QC Admin Transmit Date	Contracting Officer Received	Contracting Officer Disposition	Contracting Officer Return	Remarks
	DIV 1	General Paragraphs															
		SD-09, Reports	--	--													
1		A Work Plan		CO													
2		B Health & Safety Plan		CO													
		SD-18, Records		--													
3		A As Built Records		CO													
4		B Environmental Conditions Report		NTR													
5		C Test Results Summary Report		NTR													
6		D Daily Production Reports		NTR													
7		E QC Report		NTR													
8		F Rework Items List		NTR													
9		G Permits		JAA													
10		H Construction Documentation Report		CO													
	DIV 2	General Excavation, Filling, and Backfilling															
		SD-02, Manufacturer's Catalog Data	--	--													
11		A Fill Materials		CCI													
12		B Grass Seed		CCI													
		SD-12, Field Test Reports	--	--													
13		A Backfill Compaction Tests		CCI													
	DIV 2	T&D of Contaminated Material															
		SD-08, Statements	--	--													
14		A Treatment Facility Permit		CCI													
		SD-18, Records	--	--													
15		A Shipment Manifests		CCI													
16		B Delivery Certificates		CCI													
17		C Disposal Site Decontamination Certificate		CCI													
18		D Work Site Decontamination Certificate		CCI													
19		E Treatment and Disposal Certificate		CCI													

CH2M HILL SOUTH DIV RAC N62467-98-D-0995	CONTRACTOR PRODUCTION REPORT (ATTACH ADDITIONAL SHEETS IF NECESSARY)	DATE OF REPORT: REVISION NO: REVISION DATE:			
CTO NO:	PROJECT NAME/LOCATION:	REPORT NO:			
PROJECT NO:	SUPERINTENDENT:	SITE H&S SPECIALIST:			
AM WEATHER:	PM WEATHER:	MAX TEMP: F MIN TEMP: F			
SUMMARY OF WORK PERFORMED TODAY					
	Was A Job Safety Meeting Held This Date? <input type="checkbox"/> Yes <input type="checkbox"/> No	TOTAL WORK HOURS ON JOB SITE THIS DATE (Including Continuation Sheets)			
	Were there any lost-time accidents this date? (If Yes, attach copy of completed OSHA report) <input type="checkbox"/> Yes <input type="checkbox"/> No	CH2MHILL On-Site Hours			
	Was a Confined Space Entry Permit Administered This Date? (If Yes, attach copy of each permit) <input type="checkbox"/> Yes <input type="checkbox"/> No	JA JONES On-Site Hours			
	Was Crane/Manlift/Trenching/Scaffold/HV Elec/High Work/Hazmat Work Done?? (If Yes, attach statement or checklist showing inspection performed) <input type="checkbox"/> Yes <input type="checkbox"/> No	Subcontractor On-Site Hours			
	Was Hazardous Material/Waste Released into the Environment? (If Yes, attach description of incident and proposed action) <input type="checkbox"/> Yes <input type="checkbox"/> No	Total On-Site Hours This Date			
		Cumulative Total of Work Hours From Previous Report			
	Total Work Hours From Start of Construction				
SAFETY ACTIONS TAKEN TODAY/SAFETY INSPECTIONS CONDUCTED (Include Safety Violations, Corrective Instructions Given, Corrective Actions Taken, and Results of Safety Inspections Conducted):					
EQUIPMENT/MATERIAL RECEIVED TODAY TO BE INCORPORATED IN JOB					
DESCRIPTION OF EQUIPMENT/MATERIAL RECEIVED	MAKE/ MODEL/ MANUFACTURER	EQUIPMENT/ LOT NUMBER			
EQUIPMENT USED ON JOB SITE TODAY.					
EQUIPMENT DESCRIPTION	EQUIPMENT MAKE/MODEL	SAFETY CHECK PERFORMED BY	NUMBER OF HOURS		
			USED	IDLE	REPAIR
CHANGED CONDITIONS/DELAY/CONFLICTS ENCOUNTERED (List any conflicts with the delivery order [i.e., scope of work and/or drawings], delays to the project attributable to site and weather conditions, etc.):					
VISITORS TO THE SITE:					
LIST OF ATTACHMENTS (OSHA report, confined space entry permit, incident reports, etc.):					
SAFETY REQUIREMENTS HAVE BEEN MET <input type="checkbox"/>					
_____ SUPERINTENDENT'S SIGNATURE				_____ DATE	

CH2M HILL SOUTH DIV RAC N62467-98-D-0995	CONTRACTOR QUALITY CONTROL REPORT (ATTACH ADDITIONAL SHEETS IF NECESSARY)	REPORT DATE: REVISION NO: REVISION DATE:		
CTO NO:	PROJECT NAME/LOCATION:	REPORT NO:		
PROJECT NO:	PROJECT QC MANAGER:	SITE H&S SPECIALIST:		
SAFETY MEETINGS AND INSPECTIONS				
WAS A SAFETY MEETING HELD THIS DAY?	<input type="checkbox"/> YES <input type="checkbox"/> NO	IF YES, ATTACH SAFETY MEETING MINUTES		
WAS CRANE USED ON THE SITE THIS DAY?	<input type="checkbox"/> YES <input type="checkbox"/> NO	IF YES, ATTACH DAILY CRANE REPORT OF INSPECTION AND CONTRACTOR CRANE OPERATION CHECKLIST		
DEFINABLE FEATURES OF WORK STATUS				
DFOW No.	Definable Feature Of Work	Preparatory	Initial	Follow-Up
1		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
PREPARATORY	WAS PREPARATORY PHASE WORK PERFORMED TODAY? <input type="checkbox"/> YES <input type="checkbox"/> NO IF YES, FILL OUT AND ATTACH SUPPLEMENTAL PREPARATORY PHASE CHECKLIST.			
	DFOW No.(from list above).	TASK/ACTIVITY	PREPARATORY PHASE REPORT NO.	
INITIAL AND FOLLOW-UP FEATURE OF WORK COMMENTS				
DFOW No.(from list above)	Phase	Comment/Finding/Action		
	Initial <input type="checkbox"/>			
	Follow up <input type="checkbox"/>			
	Initial <input type="checkbox"/>			
	Follow up <input type="checkbox"/>			
	Initial <input type="checkbox"/>			
	Follow up <input type="checkbox"/>			
	Initial <input type="checkbox"/>			
	Follow up <input type="checkbox"/>			
	Initial <input type="checkbox"/>			
	Follow up <input type="checkbox"/>			
	Initial <input type="checkbox"/>			
	Follow up <input type="checkbox"/>			
	Initial <input type="checkbox"/>			
	Follow up <input type="checkbox"/>			
	Initial <input type="checkbox"/>			
	Follow up <input type="checkbox"/>			
REWORK ITEMS IDENTIFIED TODAY (NOT CORRECTED BY CLOSE OF BUSINESS)		REWORK ITEMS CORRECTED TODAY (FROM REWORK ITEMS LIST)		
TASK/ACTIVITY	DATE ISSUED	DESCRIPTION	TASK/ACTIVITY	CORRECTIVE ACTION(S) TAKEN

CH2M HILL SOUTH DIV RAC N62467-98-D-0995	CONTRACTOR QUALITY CONTROL REPORT (ATTACH ADDITIONAL SHEETS IF NECESSARY)	REPORT DATE: REVISION NO: REVISION DATE:					
CTO NO:	PROJECT NAME/LOCATION:	REPORT NO:					
PROJECT NO:	PROJECT QC MANAGER:	SITE H&S SPECIALIST:					
SAMPLING/TESTING PERFORMED							
SAMPLING/TESTING PERFORMED	SAMPLING/TESTING COMPANY	SAMPLING/TESTING PERSONNEL					
MATERIALS/EQUIPMENT INSPECTION (Materials received and inspected against specifications)							
MATERIAL/EQUIPMENT DESCRIPTION	SPECIFICATION	MATERIAL ACCEPTED?	COMMENT/REASON/ACTION				
		YES <input type="checkbox"/> NO <input type="checkbox"/>					
		YES <input type="checkbox"/> NO <input type="checkbox"/>					
		YES <input type="checkbox"/> NO <input type="checkbox"/>					
		YES <input type="checkbox"/> NO <input type="checkbox"/>					
		YES <input type="checkbox"/> NO <input type="checkbox"/>					
		YES <input type="checkbox"/> NO <input type="checkbox"/>					
SUBMITTALS INSPECTION / REVIEW							
SUBMITTAL NO	SUBMITTAL DESCRIPTION	SPEC/PLAN REFERENCE	SUBMITTAL APPROVED?	COMMENT/REASON/ACTION			
			YES <input type="checkbox"/> NO <input type="checkbox"/>				
			YES <input type="checkbox"/> NO <input type="checkbox"/>				
			YES <input type="checkbox"/> NO <input type="checkbox"/>				
			YES <input type="checkbox"/> NO <input type="checkbox"/>				
OFF-SITE SURVEILLANCE ACTIVITIES, INCLUDING ACTIONS TAKEN:							
ACCUMULATION/STOCKPILE AREA INSPECTION							
INSPECTION PERFORMED BY:		SIGNATURE OF INSPECTOR:					
ACCUMULATION/ STOCKPILE AREA LOCATION							
NO OF CONTAINERS:		NO OF TANKS:		NO OF ROLL-OFF BOXES:		NO OF DRUMS:	
INSPECTION RESULTS:							
TRANSPORTATION AND DISPOSAL ACTIVITIES/SUMMARY/QUANTITIES:							
GENERAL COMMENTS (rework, directives, etc.):							
LIST OF ATTACHMENTS (examples, as applicable: preparatory phase checklist, QC meeting minutes, safety meeting minutes, crane inspections, crane operation checklist, COCs, weight tickets, manifests, profiles, rework item list, testing plan and log, etc.):							
<i>On behalf of the contractor, I certify that this report is complete and correct and equipment and material used and work performed during this reporting period is in compliance with the contract drawings and specifications to the best of my knowledge except as noted in this report.</i>							
_____						DATE	
PROJECT QC MANAGER'S SIGNATURE							
<i>On behalf of the contractor, I attest that the work for which payment is requested, including stored material, is in compliance with contract requirements.</i>							
_____						DATE	
PROJECT QC MANAGER'S SIGNATURE							

CH2M HILL SOUTH DIV RAC N62467-98-D-0995	PREPARATORY PHASE REPORT	REPORT NO:	REPORT DATE: REVISION NO: REVISION DATE:	CTO NO:
PROJECT NO:	DEFINABLE FEATURE OF WORK:	SITE/ACTIVITY:		
PERSONNEL PRESENT	GOVERNMENT REP NOTIFIED _____ HOURS IN ADVANCE: YES <input type="checkbox"/> NO <input type="checkbox"/>			
	NAME	POSITION	COMPANY/GOVERNMENT	
SUBMITTALS	REVIEW SUBMITTALS AND/OR SUBMITTAL REGISTER.	HAVE ALL SUBMITTALS BEEN APPROVED? YES <input type="checkbox"/> NO <input type="checkbox"/>		
	IF NO, WHAT ITEMS HAVE NOT BEEN SUBMITTED?			
	ARE ALL MATERIALS ON HAND? YES <input type="checkbox"/> NO <input type="checkbox"/>			
	IF NO, WHAT ITEMS ARE MISSING?			
CHECK APPROVED SUBMITTALS AGAINST DELIVERED MATERIAL. (THIS SHOULD BE DONE AS MATERIAL ARRIVES). COMMENTS:				
MATERIAL STORAGE	ARE MATERIALS STORED PROPERLY? YES <input type="checkbox"/> NO <input type="checkbox"/>			
	IF NO, WHAT ACTION IS TAKEN?			
SPECIFICATIONS	REVIEW EACH PARAGRAPH OF SPECIFICATIONS.			
PRELIMINARY WORK & PERMITS	ENSURE PRELIMINARY WORK IS CORRECT AND PERMITS ARE ON FILE.			
	IF NO, WHAT ACTION IS TAKEN?			

CH2M HILL SOUTH DIV RAC N62467-98-D-0995	PREPARATORY PHASE REPORT	REPORT NO:	REPORT DATE: REVISION NO: REVISION DATE:	CTO NO:
PROJECT NO:	DEFINABLE FEATURE OF WORK:	SITE/ACTIVITY:		
TESTING	IDENTIFY TEST TO BE PERFORMED, FREQUENCY, AND BY WHOM.			
	TEST	FREQUENCY	PERFORMER	
	WHEN REQUIRED?			
	WHERE REQUIRED?			
	REVIEW TESTING PLAN.			
	HAVE TEST FACILITIES BEEN APPROVED?			
	TEST FACILITY	APPROVED?		
	YES <input type="checkbox"/> NO <input type="checkbox"/>			
	YES <input type="checkbox"/> NO <input type="checkbox"/>			
SAFETY	ACTIVITY HAZARD ANALYSIS APPROVED? YES <input type="checkbox"/> NO <input type="checkbox"/>			
	REVIEW APPLICABLE PORTION OF EM 385-1-1.			
MEETING COMMENTS	NAVY/ROICC COMMENTS DURING MEETING.			
OTHER ITEMS OR REMARKS	OTHER ITEMS OR REMARKS:			
PROJECT QC MANAGER NAME		PROJECT QC MANAGER'S SIGNATURE		DATE